The United Kingdom Overseas Development Administration provided the funds for printing this document.

FOREWORD

As the world population increases and our demands on natural resources grow, there is added incentive to establish national and international cooperation in research, information and education. This is particularly urgent and relevant in the management of renewable natural resources including forests. In tropical countries pressures on land lead to the degradation and loss of trees and forests but information does exist on their wise and sustainable management.

The Oxford Forestry Institute (OFI) houses the world's library of deposit for forestry literature and welcomes users from all over the world to consult the literature and the many experienced staff in the institute; in this consultation process information and experience flow in both directions. The institute also conducts collaborative research in many tropical countries and brings the results to the attention of forest management and research agencies worldwide; the OFI has long collaborated with EMBRAPA in joint research and in the education of its staff. As the Resource Centre for the British Government's Overseas Development Administration, the OFI has had considerable input to the programme of technical cooperation between the two countries.

Brazil has been the focus of much of the world's attention in relation to the problems of deforestation and to the successes in plantation development and genetic improvement. Paulo Galvão has played a significant role in the development of forestry research in Brazil and was for five years the regional representative for Latin America on the Executive Board of the International Union of Forestry Research Organizations (IUFRO). In his sabbatical leave period at Oxford he brought new insights to the Institute and reviewed for the benefit of Brazil the current international initiatives in forestry and forest research worldwide.

The collaboration between Brazilian and British Governments, institutions and individuals has proved mutually beneficial and I hope it will long continue.

DR. J. Burley
Director
Oxford Forestry Institute

6 August 1991

PREFÁCIO

A Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA), desde a sua criação em 1973, tem praticado a cooperação internacional como instrumento para seu fortalecimento institucional. Recebe-a diretamente de entidades oficiais de países do Primeiro Mundo, assim como de organismos multilaterais de apoio ao desenvolvimento. Na medida em que se fortaleceu, a EMBRAPA passou, também, a prestar cooperação técnica a países em desenvolvimento, principalmente na forma de consultoria e intercâmbio de material genético melhorado para condições tropicais. Dezenas de países da África, da America Latina e do Caribe têm sido beneficiados pela ação da EMBRAPA em agropecuária e floresta. Dentro desse contexto, a EMBRAPA mantém fecundo intercâmbio com universidades estrangeiras, como é o caso do Oxford Forestry Institute (OFI), da Universidade de Oxford, na forma de treinamento de seus pesquisadores florestais e de pesquisa colaborativa.

A publicação deste trabalho, elaborado durante a permanência do Dr. A. Paulo M. Galvão em Oxford, como pesquisador visitante no OFI, conjuntamente pelas duas instituições, é mais um fruto importante desse esforço. Ele traz consideráveis informações sobre as entidades que atuam em cooperação internacional, analisando os fatores que influenciam a execução e administração de projetos bem sucedidos. Apresenta, também, sugestões e recomendações para aumentar a sua eficiência.

O autor do trabalho possui reconhecida experiência na área florestal. Professor da Universidade de São Paulo/ESALQ, chegou a esta empresa em 1978 para implantar e coordenar o Programa Nacional de Pesquisa Florestal, fruto de convênio estabelecido com o então Instituto Brasileiro de Desenvolvimento Florestal-IBDF, absorvido pelo atual IBAMA. Na EMBRAPA, ocupou diferentes funções, quais sejam: Chefia do Centro Nacional de Pesquisa de Florestas-CNPF, Chefia de Gabinete da Presidência e a Direção Técnica do Centro de Pesquisa Agroflorestal da Amazônia Ocidental-CPAA. Nessas funções, participou de negociações, da elaboração, gerência e execução de projetos nacionais e internacionais, tendo integrado missões oficiais do governo brasileiro ao exterior. Foi, durante cinco anos, membro da Diretoria Executiva da International Union of Forestry Research Organizations (IUFRO) para a America Latina.

A EMBRAPA apoia a publicação deste texto na certeza de que ele contribuirá significativamente para a ampliação e aperfeiçoamento da cooperação internacional em instituições nacionais que atuam na área agrícola e florestal. Igualmente, este livro permite aos parceiros internacionais conhecer melhor as nossas dificuldades, anseios e perspectivas para a pesquisa e desenvolvimento florestal no Brasil.

Murilo Xavier Flores
Presidente da EMBRAPA

Novembro 1991

ACKNOWLEDGEMENTS

This work could not have been accomplished without many different kinds of significant support. These include a scholarship from EMBRAPA which provided me with the financial resources and necessary time. Valuable support was also offered by the Oxford Forestry Institute's staff, particularly by its Director, Jeffery Burley, and - just across the street from home during my stay in Oxford - the unforgettable Green College.

I am grateful to the U.K. Overseas Development Agency which provided financial resources for printing this text.

I would like to express my gratitude to T.J. Synnott for reading the manuscript and offering valuable suggestions, as well as to Sister Monica for the English revision of part of this work. Mary Marshall's revision and the advice of John R. Palmer were significant contributions to this document.

Equally important has been the stimulus from my mother and the encouragement of my relatives and friends. My wife, Bianca, has offered remarkable understanding and ceaseless love; without her I would never have attempted this enterprise.

The example given by my father is precious to me and has helped me in this and all my undertakings. He came to Brazil as an immigrant and started his life in the countryside planting coffee crops, but gave me the necessary education which his parents were not able to provide for him. His 101 years of life was celebrated on the 6th of April 1991 when he realized that his hard work had not been in vain. My daughter, Simone, who will never see her twenty-fourth birthday, has also been for me an admirable example of how to make the most of our ephemeral span of earthly life. In a very peculiar way she contributed significantly to my work.

At least four more persons should be mentioned for their important role in my achievement: Ali Saab, Sergio Ramagem, Raimundo de Araujo and Carlos Alberto Ferreira. Ali gave me the initial idea and support for post-doctoral work abroad; Sergio carried out the institutional arrangements and gave me valuable advice on the necessary procedures; Raimundo supplied the final push which came when I had already desisted from going to Oxford; and Carlos Alberto/Evanilde & Filhos offered me a temporary home during my first days in Oxford as well as a great deal of support through their constant friendship.

I would ask my friends who are not acknowledged here to be as kind as they were when they offered their help and to forgive me for not mentioning all of them here.

Last but not least, the opportunity to live in Oxford has been a precious experience which I will never forget.

CONTENTS

INTRODUCTION

International technical cooperation (ITC) is an efficient means of promoting scientific, technological, economic and social development in the Third World. Furthermore, it disseminates languages and cultures and leads to a better relationship between partners.

The present importance of ITC can be inferred from the total net disbursement from the Development Assistance Committee (DAC), of the Organization for Economic Cooperation and Development (OECD), to developing countries in 1987. This exceeded $9 billion, being 13.4 percent of the total expenditure for Official Development Assistance (ODA) of the DAC countries. In addition to this, positive signs of increasing financial resources are foreseen by OECD/DAC (1988).

In spite of the considerable amount of aid that has been supplied to developing countries, South America and Brazil have been given relatively little aid. They were provided with $1,652 million (3.84 percent) and $288 million (0.67 percent), respectively, out of a total ODA net flow of $43,042 million in 1987 (OECD/DAC, 1988).

Gregersen *et al.* (1989) have reviewed the global research addressing tropical forestry and concluded that investment in education and training for researchers as well as expansion of forestry research are critical needs. They found that estimated expenditures in forestry research, in all developed countries, was about $220 - 250 million in 1989, and that the US Forest Service budget research was $143 million in the same year. On the other hand, in 1981, total expenditures on agricultural experiments was $2,200 million while only $128 million was spent on forestry research.

International donors have provided twenty to 25 percent of the total forestry research expenditure in the developing countries, whereas agricultural experiments have been funded to approximately 40 percent of the total costs (Gregersen *et al.*, 1989).

The Brazilian Cooperation Agency (ABC, 1990) reveals that it coordinated twenty-five environmental projects (including forestry research and development) which involved technical cooperation, totalling $36 million, funded from a number of sources.

As financial resources for research in Brazil have been dramatically squeezed by the debt burden and by other related and unrelated problems, one of the main purposes of this work is to examine the possibilities for the country to enhance technical cooperation (TC) on forestry research and development. Therefore, the focus is more on past and present Brazilian activities in this field as well as on international agencies, institutions and countries which have provided or may provide aid to Brazil and on entities which promote international collaborative research. The report also reviews and describes the types and mechanisms of (ITC) and analyzes the drawbacks, successes and benefits of typical projects, as case studies. It provides an overview of international policies, economics and environmental

case studies. It provides an overview of international policies, economics and environmental issues, as well as of Brazilian technical cooperation policies which make up the framework for TC on forestry research and development in that country. Recommendations are offered to enhance the quality and quantity of technical cooperation to be received.

GENERAL CHARACTERISTICS OF INTERNATIONAL TECHNICAL COOPERATION

International cooperation involves collaboration among countries, making possible the transfer of capital, human resources, knowledge and technology. International collaboration on a country-to-country basis is called bilateral. Cooperation through international agencies, sustained by national governments, is known as multilateral. The United Nations Development Programme (UNDP) of the United Nations (UN) system and the Inter-American Development Bank (IDB) are examples of multilateral agencies.

Aid or assistance should be understood as a transfer of resources to the recipient on better financial terms than loans obtained from the world's capital market. Official development assistance (ODA) is a particular type of aid. OECD/DAC (1972) qualifies aid as ODA if it is made available, by governments or their executive agencies, to developing countries on concessional terms to promote economic development and welfare. This organization also notes that the grant element of ODA must be at least 25 percent based on market terms with interest rates of 10 percent. Technical cooperation is included in ODA. Assistance for other purposes such as military is not considered as ODA.

ODA has been disbursed for many different purposes. OECD/DAC (1988) statistics include the following: a) social and administrative infrastructure which comprises education, health and family planning as well as water supply; b) economic infrastructure, including transport, communication and energy; and c) production, embracing agriculture, mining, construction, trade/banking and tourism. Other purposes such as debt relief, food aid, emergency aid and administrative expenses are also included in ODA.

Technical cooperation covers many forms of activity such as research, institution-building, consultancy, surveys, feasibility studies, short-term training (seminars, study tours, etc.), long-term training (graduate studies), and engineering design. In the view of SUBIN (1978) the most usual forms of technical cooperation are: consultancy; training; granting of equipment and bibliographic support; exchange of personnel and information; joint projects; feasibility studies; institution-building; and design of pilot projects.

It is worth noting that the World Bank has adopted the expression "technical assistance" for technical cooperation. However, other entities have used technical assistance to cover specifically training and consultancy. OECD/DAC have replaced the word *assistance* by *co-operation* in its annual reports since 1972. Thus, when examining ODA references, what is meant by these expressions in the particular document being examined should be noted. Furthermore, when examining technical cooperation from the funding, financial and any statistical point of view, it is advisable to consider that TC is included in many different forms of ODA.

Technical cooperation cannot be properly studied without information provided by OECD and DAC. The OECD was created in 1960 with the main aim of achieving sustainable economic growth and a rise in the standard of living in member countries as well as of contributing to sound economic expansion in member and non-member countries in the process of development. It is a forum where representatives from the member countries discuss and coordinate their economic and social policies. The organization has twenty-four members, consisting of twenty European countries together with the United States, Japan, Australia and New Zealand.

In order to achieve its aims, the OECD has set up a number of specialized bodies, such as committees and working groups, as well as a Development Centre; these cover all aspects of economic and social issues. DAC is one of its specialized committees, set up to secure an expansion of aggregate volume resources made available to developing countries and to improve their effectiveness. It is composed of eighteen OECD members and the Commission for European Communities. They meet periodically to review the amount as well as the nature of their contributions to aid programmes and to consult each other on all relevant aspects of their development assistance policies. DAC is the depository of all official statistics and basic information on aid.

2.1 FLOWS AND TRENDS OF AID RESOURCES

As noted by OECD/DAC (1988), the total world aid was approximately $50 billion and the contribution from DAC members amounted to $41.5 billion, representing over 80 percent of the global assistance provided in 1987. ODA accounted for 54 percent of the total net financial flow to developing countries, playing a crucial role in their economies especially in the present situation of very low private financial resource flows. The Pearson Commission, in 1969, recommended the adoption of a target of 0.7 percent of GNP ODA, which was considered realistic and posing a significant, though achievable, challenge.

The net flow of financial resources from DAC countries to developing countries and multilateral agencies for TC exceeded $9 billion, being 13.4 percent of the total disbursements. TC official bilateral disbursement was $7,490 million in 1986. According to Cassen & Associates (1986), TC is approximately 20 percent of total ODA. Forestry research was provided with $46 million from international donors in 1986, as noted by the International Task Force on Forestry Research (1988).

OECD/DAC (1988) expects total DAC aid to increase over the next few years, continuing to grow in real terms in the following countries: Japan, France, Canada, Finland, Denmark, Belgium, Switzerland, Italy, Netherlands, Norway, Germany and the United Kingdom. Japan had a large ODA increase in 1987, with 13.5 percent over 1986, which represents $2 billion. Japan is likely to be the largest DAC donor in the next few years.

2.2 ELIGIBILITY FOR OFFICIAL DEVELOPMENT ASSISTANCE

Theoretically, all developing countries are eligible for ODA. But priorities have been modified in time according to changing circumstances, the needs of developing countries and the financial constraints of the agencies. OECD/DAC annual reports describe the trends in aid patterns and policies.

Eligibility for bilateral aid depends on the particular foreign policy of the donor country which has its own target recipients. Here, political alignments, previous colonization, together with cultural, linguistic and historical affinities, can be clearly observed. In the present world, economic motives tend to replace political ones. But in all circumstances the candidates for bilateral aid should consult the donor country agency to inform themselves of their possibilities of receiving aid. ODA from multilateral agencies depends on the policies established by their governing organs. To identify the level of a country's economic development, potential recipients are classified in accordance with capita income (OECD) or per capita income, education and proportion of manufacturing in national production (UN system). Thus, based on 1980 per capita income, OECD divides the developing countries into: a) upper middle-income (more than

$1200); b) lower middle-income (between $1200 and $600); c) low-income (less than $600). The United Nations includes a sub-group called "least developed".

United Nations (1969) summarizes common general principles and criteria for technical assistance programs which have been used in its system. All state members of one or more agencies are in principle eligible. However, since the demand exceeds the resources available, criteria such as equitable geographical distribution and other country related factors are applied to provide a basis for distribution of ODA. Country targets are used with the same objective. UNDP country targets for technical assistance are based on the estimated degree of development of a country, the per capita income, the size of the population, the level of assistance available from other sources, the capacity to absorb technical assistance and the recommendations of such organs as the General Assembly and the Economic and Social Council of the United Nations.

Cassen & Associates (1986), in their report, advise that developing countries "should be classified into separate categories" as far as aid is concerned. The "newly industrialized and better-off middle-income countries" would make up the first group with very little need for aid. It would only be necessary for specific purposes, such as technical assistance, debt and trade problems and emergencies; they do not need to be provided with long-term ODA. The second group would be comprised of the lower middle-income and several lower-income countries, which do not require aid to survive; they require ODA as a tool to accelerate development. These countries possess the basis for a good use of their own resources of supplied ODA. They would have access to concessional and official borrowing and trade. The third group could be formed from the poorest countries which cannot survive without ODA, because they do not have the basic tools for development, such as human resources, infrastructure and adequate administration.

When discussing criteria for eligibility, it is important to point out that the situation in the poorest country should not detract attention from other low-income countries. These have been provided with declining aid; nevertheless they have the largest number of people living in poverty. OECD/DAC (1988), reporting the important aid issues for the 1990s, reveals that it is being increasingly noticed by the donor community that most of the poorest people live in the "better" developing country categories, such as India, Pakistan, China, Indonesia, Philippines, Bolivia and Nigeria, which do not meet the UN criteria for "least developed". The report argues that donors should pay more attention to this situation.

INTERNATIONAL POLITICS, ECONOMY, ENVIRONMENT AND COOPERATION

Politics and economy play a crucial role in international affairs and environmental issues have also been a matter of much world concern. Therefore, it would be inadvisable to discuss and examine international cooperation on forestry research and development without an overview of the present situation and international trends in these related matters. However, they will be discussed only in a general and summarized form as needed for the purpose of this work.

The world is increasingly interdependent from the economic, political and environmental point of view. Thus, the domestic policies and activities of one country or block of countries may affect the others. The more economically powerful a nation, is the greater effect its actions can produce. The well-being of people in poor countries people is largely dependent on world economic policies dictated mainly by the developed/ industrialized countries. Within this framework, aid will not solve the existing social and financial problems of the poorer nations. A better understanding of the constraints on Third World development, together with effective measures taken to remove them, is urged. Better trade terms, reduction of protectionism along with access to up-to-date technology and a steady process of its transfer are examples of measures which are as important as the assistance that has been provided by developed countries.

Cooperation, as joint efforts involving the many different aspects of the development process, is one of the most significant means of improving the welfare of people in developing countries, leading to a more equitable global society and a sound environment in which all can live.

3.1 GENERAL TRENDS AND CONSTRAINTS OF WORLD ECONOMY AND POLITICS

The period 1950 to 1973 has been marked by outstanding developments in international relationships and an improvement in world economy. New and powerful international organizations such as the World Bank/IDA and OECD were created, commercial barriers were broken, international trade increased the flow of international private financial resources was restored and large scale official assistance programs were initiated (Emmerij, 1989).

The rate of per capita growth of the Latin American and Asian countries was similar to that of the OECD countries, as is shown in table 1. However, in the 1980s, the situation changed, with average negative rates in Latin America and Africa. The OPEC (Organization of Petroleum Exporting countries) countries were exceptions and the relatively high Asian rates are mainly due to the high performance of the newly industrialized countries of Singapore, Hong Kong, Taiwan, South Korea as well as Malaysia and Thailand.

Table 1 - **Annual average rate of real income growth per capita** (Percent)

	1960-1970	1970-1980	1980-1985
Total OECD	3.9	2.2	1.1
Japan	9.1	3.2	3.0
Total developing countries	3.1	3.1	0.0
Africa	2.2	0.8	-2.5
Asia	3.6	3.8	2.3
Latin America	2.6	2.9	-2.6

Source: Emmerij, L. 1986. Income distribution among countries, the OECD Observer, November, pp. 8-12.

According to the World Bank (1988), in 1987 there was a continuation of moderate growth and relatively low overall inflation in the industrial countries while the growth rate of developing countries was lower than in 1986. The economic situation was largely uneven among developing countries, with declines of GDP in Sub-Saharan countries and in most of the highly indebted, middle income countries. Inflation and other signs of financial instability were worse. On the other hand, the newly industrialized economies of Asia as Malaysia, Taiwan, Hong Kong and Singapore showed good economic performance, mainly through having benefitted from the Japanese import boom. The differences in growth continue to be marked between the countries constrained by debt and those that do not have serious debt problems.

The policy priority of the seven industrialized countries, established in the Toronto meeting of 1988, is to sustain non-inflationary growth and enhance their cooperation to preserve the progress made in the fight against inflation, as reported by the World Bank (1988). The meeting also stressed need for stronger international cooperation to establish common fiscal policies and objectives for the global economy.

Emmerij (1989) points out that, in the decade of the 1990s, global factors will be more important than the isolated ones. For example, two critical elements of economic power, capital availability and technological capacity, are decreasingly under governmental control. Thus the decision making process on a national level, even in the more powerful countries, is increasingly dependent on the private sector which cannot be totally controlled. There is an expanding globalization in the economic and technological markets, with increasing replacement of bilateral by world-scale markets. A multipolarized global economy appears inevitable. There are new regional centres of growing economic power, notably the Asian countries, some Latin American ones, China and India, besides the traditional centres of Europe and North America. A powerful economic machine represented by Japan, Taiwan, Hong Kong, Singapore, and members of ASEAN has been established.

Nevertheless, strong blocks of countries have been or are in the process of being formed; Ricupero (1989) believes that economic globalization will continue. In fact, a strong global trend towards the formation of

economic blocks is demonstrated by the following developments: the full economic integration of twelve European countries in 1992; the signature of a trade agreement between the US and Canada; the joint efforts of USSR and European socialist countries through COMECON; the existence of an area of free trade between Australia and New Zealand; and the possibility of the establishment of a "yen" block among Japan, the four Asian "tigers" (South Korea, Taiwan, Hong Kong and Singapore) and the other Asian developing countries. But in his view the level of protectionism will be tolerable and is not likely to damage the globalization process. Within this tendency, Latin America could also have established a block based on the many similarities of its countries, in spite of trade among ALADI (Latin-American Organization of Integrated Development) countries having decreased from $11.3 billion in 1981 to $7.6 billion in 1986. He points out that marginality of Latin America is mainly technological and caused by the low educational level and the debt crisis. The current abundance of natural resources and cheap labour are no guarantee for Latin American participation in world economic growth.

However, it should also be noted that globalization tends to divide the world into two economic blocks: one prosperous and linked to the world economy and the other increasingly poor and distant from progress. It is also convenient to emphasize that adjustment programs in the developing countries may cause great social turbulence that will overflow their frontiers, affecting developing countries as well (Emmerij, 1989).

Industrialization and increasing economic power do not necessarily assure good income distribution nor the well being of a people. A country can be economically well off and its people badly off. Griffin (1988) stresses that one of the lessons of the recent history is that similar levels of social development can be achieved at very different levels of economic development.

In the opinion of Fishlow (1989), there are many reasons for optimism in the 1990s, such as a new and durable detente between US and USSR, the discussions to reduce military armaments, withdrawal of military troops from Afghanistan, China's approaches to other countries of Asia and recommenced diplomatic and commercial relations with Russia, as well as the decrease of the enormous budget deficit through reduction in military expenditure in the US. There has also been a new type of power division and sharing of economic and military responsibilities which is replacing the existing bipolarization. Thus, Europe is moving towards total economic integration in a European Economic Community in 1992 with strong international political and economic implications, and Japan, based on its economic success, is starting to play a new role as a new world power, already ahead of the US in official economic assistance. Lampreia (1989) reports that the international reserves of Japan and Taiwan amount to approximately 160 billion dollars.

Other reasons for optimism are the political changes in Africa, Asia and Latin America towards more participation of people in governmental decisions and the continuous growth of industrialized countries since 1982, reaching 4 percent in 1988. The increase in world trade since 1987, higher than the average for the 1970s, indicates good perspectives too. It is also encouraging that the growth rate of developing countries has increased as compared to the low levels of 1981 to 83. In 1989, it is estimated at 5.2 percent, mainly due to the developing countries of Asia that have exceeded their previous growth rates (Fishlow, 1989).

Yet, on the other hand, there are also signs leading to pessimistic perspectives, such as the high deficits of the balance of payments of the US and other industrialized countries; the poor economic performance of Latin American and Sub-Saharan countries, which are mostly stagnating with decreasing standards of living worsened by high external debts. There is also a great deal of concern about the ability to arrive at political

agreements in a highly polarized and competitive world, according to Fishlow (1989). The USA economy and the efforts to improve its performance, the establishment of The European Community as well as the aggressive exportation policies of Japan and developing countries may predict future problems. The new American commercial legislation is a warning to Japan and to the very aggressive developing countries. There is a further concern that the unification of Europe, to be finalized in 1992, may lead to more restrictions on world trade resulting in strong commercial blocks that will fight fiercely.

The situation in the US has a strong influence on world politics and economy. This country has one of the highest debts in the world, with a very significant current account deficit (more than $150 billion in 1987) that has been financed by incoming external capital chiefly from Japan and Germany which have very large commercial surpluses, as reported by Fishlow (1989). To adjust its economy the US will have to reduce its balance-of-payment and consequently buy less.

3.2 THE LATIN AMERICA ECONOMIC SITUATION: DEBT

Debt in Latin America has been increasing at a rate of 6 percent per annum since 1982 and was estimated at $420 billion at the end of 1987, corresponding to 350 percent of the annual exports of goods and services. Net transfers of financial resources (or the difference between gross disbursements and total debt service) have been negative to developing countries since 1983, being more than $30 billion in 1987. They were negative for Latin America with a total of $361.8 million and particularly undesirable for Brazil with minus $672.2 million in 1988 (World Bank, 1988). OECD (1988) reveals that the major failure in net financial transfers of the world is centred in Latin America.

The greatest burden from the deterioration of deteriorating economic situation in the 1980s has fallen on Latin America, which has not benefitted from the new trends of international external capital investments. Consequently, expenditures were reduced and the general policy to pay the debt service has been to obtain financial surplus from exports. This strategy has forced a reductions in imports and domestic investments in development as well as in public services in general. A low salary policy has been adopted, helped by high inflation. In practice, there has been no investment in imports of modern industrial equipment to increase productivity. The results of these policies have been mixed and most of the adjustment efforts have not fulfilled the expectations for following reasons: external funding has been insufficient; some debtor countries have not accomplished all the necessary economic reforms; and several have been affected by adverse terms of trade. Between 1980 and 1988, the real price of commodities went down 34 percent and of oil 77 percent. As a result, export earnings decreased even though the volume of exported commodities increased (Fishlow, 1989).

The World Bank (1988) reports that many of the highly indebted, middle income countries have made major progress in implementing reforms. But, in a number of countries rigorous adjustment programs have to be carried out to improve their economies and recover economic growth because the measures so far adopted have not been sufficient. Brazil has kept up its efforts to control inflation, maintaining a viable balance of payments with reduction of public sector deficit and payments of the interest due. However, the results have been disappointing, with a general reduction in economic growth.

Financial flows to developing counties have been inadequate to meet the needs of economic growth, poverty alleviation, structural adjustment and

the resolution of debt difficulties. In 1988, the President of the World Bank urged that political support be directed towards restoring the flow of financial resources to developing countries, allocated to those most in need and most able to make use of them.

In 1987, net disbursements of official development assistance, from most member countries of the Development Assistance Committee (DAC) of the OECD, to the developing countries, represented 0.35 percent of these countries GNP, which is less than half of the United Nations target (0.7 percent) set for the second and third development decade. Only five countries (Denmark, France, Netherlands, Norway and Sweden) disbursed more than the target (OECD/DAC, 1988). This pattern of disbursements from DAC countries is similar to that from the 1983/1984, reported by Cassen and Associates (1986), but the total amount of assistance was approximately $5.6 billion less than the $41.7 billion estimated for 1987.

Official development assistance is greatly needed and highly desirable. However, a resolution of the problems faced by developing countries also depends on the developed countries. Policies and actions have to be taken by both. Besides direct disbursements of financial resources, reduction of protectionist measures and better prices for commodities in order to improve export earnings would also be effective.

All of these factors are closely related to damage to the environment. To face their gigantic debts and deteriorating economies, developing countries must mortgage their natural resources without thinking of preservation. For them, basic needs and personal survival are a higher priority than the environment.

3.3 COOPERATION AND THE ENVIRONMENT

The environment has been severely damaged by ever increasing human activities in developed as well as in developing countries. The media frequently reports on oil slicks, air pollution, destruction of forests by burning and acid rain, accidental discharges from nuclear installations, desertification resulting from inappropriate land-use practices. Climate change has been reported as caused by gas emissions from burning forests, cars and industries. Plant and animal species have disappeared and entire ecosystems are being destroyed or threatened.

It should, therefore, be expected that international cooperation agencies are aware of these facts and take environmental impact appraisal as essential at all relevant stages of programs and projects. The reason is simple: most people, especially those from developed countries, assume that everyone has a right to a healthy environment; this should be interpreted as a right to survive in the future. Precisely, the same as the right to elect governors or the right to own property. To preserve these rights, people put pressure on their politicians, political parties and governments and join or give support to all kinds of environmental or related organizations. On the other hand, elimination of starvation and the satisfaction of basic needs for clothing and shelter are the main concerns of Third World countries. Their people also have the same right to survive. From a practical point of view, however, there is a great difference between the needs of poor and of developed countries. Starvation and epidemic diseases kill in the very near future: today! In fact, most of the developing countries cannot work on current or future environment problems if they have real and tragic problems to be solved in the present. This should also be seriously considered in international cooperation matters.

Cassen & Associates (1986), in their studies on aid, report that there is clear evidence that some aid has had harmful effects on the environment, and assistance agencies are taking steps to require that environmental

protection be considered in projects or programs. Yet, the tying of assistance availability to a country's environmental matters is undesirable from the point of view of sovereignty since it interferes in the national policies of the environment and utilization of natural resources.

Sustained development, defined as "development to meet the needs of the present without compromising the ability of future generations to meet their own needs" is the core of the World Commission on Environment and Development (Brundtland, 1987) and the basis for its recommendations. The Brundtland report, as it is also known, points out the urgent need for common efforts to influence changes in an ecologically and socially threatened world in which economic development as well as the environment are increasingly linked. It recommends fundamental changes in international trade, investments and technology transfer to allow developing countries the economic growth to participate effectively in environmental improvement and protection.

The Brundtland report also emphasizes that a higher proportion of financial resources should be allocated to projects contributing to enhancing the environment and increasing productivity, such as reforestation and watershed protection. The World Bank and IMF rules are regarded as particularly crucial in this area because they set criteria for projects undertaken by other institutions in this field. OECD has also been increasing its attention to environmental issues. Policies promoting the environment and environmental sustainability are two of the essential requirements developed by OECD/DAC for project appraisal and as guiding principles for its members (OECD/DAC, 1988). Carbon dioxide emissions and greenhouse effects are now serious environmental problems. As this subject offers broad opportunities for international cooperation in forestry, it is briefly examined on in this work.

Hall and Rosillo-Calle (1989) have revealed that carbon dioxide levels in the atmosphere have increased by about 27 percent since 1850 due to fossil fuel combustion and changes in land use, which are often preceded by deforestation. According to them, forest plantations offer the possibility of modifying the build-up of atmospheric CO_2 due to the ability of trees to absorb atmospheric carbon. The authors' report on studies by many researchers which have estimated the effects of large reforestation programmes in diminishing the greenhouse effect provoked by CO_2 emission from human activities. For instance, one study estimated that the planting of 170 million hectares of trees would reduce global carbon increase to about a fourth of the current levels. Another study stated that 500 million hectares of new forests would be required to halt global warming over the next two to five decades; and this would be the cheapest way of handling the problem, at an approximate cost of $ 200 - 400 billion.

In 1988, up to 8 billion tons of carbon dioxide had probably been added to the atmosphere, about 5.5 billion tons through fossil fuel combustion and 0.4 - 2.5 billion tons through deforestation (Quesada, 1989). The alternative measures for controlling this increasing concentration are based on three basic mechanisms: regulation of carbon-emitting activities; taxation of carbon emissions; and subsidies to build up carbon sinks. This last option comprises revegetation programmes. The eight means of reducing CO_2, shown by Hall and Rossillo-Calle (1989), also include increasing the rate of replanting in deforested areas as well as improving forest management and halting unnecessary deforestation.

Subsides to establish CO_2 sinks could come from debt relief and taxes on gas emission, as proposed by Quesada (1989). This author also examines the "polluter pays principle", i.e., the one who increases carbon concentration in the atmosphere should pay for its clean-up. Goodland (1989

and personal communication 1990) commented on an American firm that voluntarily has funded reforestation as an offset for releasing carbon dioxide. In his opinion, conscientious companies have no need to wait for international agreements to fund carbon-sink forests.

The tropical regions of the world offer the best possibilities for these reforestation programmes since the growth of planted trees can be considerably faster than in temperate regions. This presents a good opportunity to developing countries, which are mostly located in the tropics. Debt conversion/debt for nature could be used as a funding mechanism for such undertakings.

Three American entities, The US Overseas Cooperative Development Committee, the Volunteers in Overseas Cooperation Assistance, and the Debt-for-Development Coalition, prepared a guide to debt for development, which was published in 1989. The guide aims at helping managers of not-for-profit organizations, such as universities, research institutions and foundations, to identify opportunities and accomplish debt conversion transactions to fund their projects. It was based on a debt conversion programme, known as Brady Programme, which was announced by the Secretary of State of the United States, in 1989, with the goal of an overall reduction in debt interests and/or principal of the developing counties. Basically, the programme allows not-for-profit organizations to obtain financial resources for their projects through the conversion of their countries' external debts from foreign currency into local currency. Conversion decreases the value of loans from its original face value to only a fraction of it. Besides providing other information, the guide identifies the following typical basic steps for a debt conversion transaction:

1) identification of potential investors in the lender nation with an interest in the country where the project is to be and

2) project approval by the debtor's central bank and its appropriate officials.

Recently, a significant tree-planting project has been drawn up by the "Instituto de Estudos Avancados" of the University of Sao Paulo, Brazil. Its basic objective is the establishment of twenty million hectares of new forests through three different types of reforestation in the country:

- corrective reforestation, to be carried out in the rehabilitation areas;

- carbon sink/industrial reforestation, to absorb CO_2 from the atmosphere and to produce raw material for industrial uses;

- combined purposes reforestation, for environmental protection and as an alternative source of income at small property level.

The project has been discussed in Brazil and private/government local support as well as international assistance has been called for.

BRAZILIAN POLICIES ON INTERNATIONAL TECHNICAL COOPERATION

Brazilian international technical cooperation (ITC), including forestry research and development, has become a part of that country's official foreign policy. Its inclusion has been improved since 1969 when a specific secretariat, Secretaria de Cooperação Econômica e Tecnica Internacional (SUBIN), was created to establish and coordinate the execution of a national plan of technical cooperation. In 1987, a special agency was created to replace SUBIN for ITC issues. These subjects, together with an analysis of the objectives and perspectives of ITC derived from information from the Brazilian Cooperation Agency (ABC), are discussed in the following section. The report on Brazilian foreign policy is based mainly on Lampreia (1989).

4.1 BRAZILIAN FOREIGN POLICY

The foreign policy of Brazil is based on national loyalty, on enduring elements in its history, its present and future aims; it also considers the characteristics of other countries and the wishes of the international community. Elementary rules of international cohabitation characterize its execution: self-determination of peoples, non-interference in the internal affairs of other countries, the peaceful solution of controversies and respect for agreements. Brazilian partners are accepted irrespective of their political ideologies and contradictions.

Latin America has the highest priority in Brazilian foreign policy, carried out mainly through bilateral arrangements which always take account of the global aspects of the continental relationships. The Integration Programme Brazil-Argentina is an example of this approach. However, Brazil is also involved in multilateral initiatives such as the Amazonian Cooperation Agreement, established in 1978, to institutionalize and orientate the cooperation process among the Amazon Basin countries. This agreement is considered the appropriate forum to discuss environmental matters related to Amazonia and regional measures for environmental protection and the rational utilization of natural resources.

Western and Central African countries, especially the Portuguese speaking countries of that continent, have received a great deal of attention from Brazilian foreign policy within the framework of South-South cooperation. Brazilian activity in Africa has been characterized by technical and scientific cooperation mainly financed by international agencies in triangular operations, since Brazilian financial resources are scarce. Projects on agriculture, energy, mining, reforestation and housing have been carried out with the participation of governmental as well as private companies.

Brazil has been initiating cooperation with Asian countries especially in the areas of science and technology. In 1987, about seventy Chinese missions came to Brazil to establish bilateral high technology projects. Brazil has already started to receive financial resources for nineteen projects from the Japanese Nakasone Fund. Cooperation with Indonesia is also under way in the transport field.

Relations with Western Europe, though solid and stable, are characterized by controversies over policy within the EEC. Brazil has suffered the effects of new trade arrangements among the EEC countries. The Common Agriculture Policy (CAP) has restricted importation into Europe of Brazilian products and, furthermore, has highly subsidized the competition in markets which has been traditionally Brazilian. As Brazil

increases competitiveness of its products, the EEC also increases protectionism measures, especially for manufactured goods, such as textiles, footwear, iron and steel products. For these reasons, Brazil has been examining and using some of the mechanisms from international organizations to change and adapt its activities in Western Europe to the new reality. Thus, direct investments have been made in Portugal, a technical cooperation agreement to the amount of 60 million Deutschmarks has been signed with Germany, as well as other activities with Belgium, Sweden, and Norway. A global cooperation agreement has been negotiated with Italy, the fifth world economy, with the highest budget for IC in developing countries. It comprises four projects, one of them involving technical and scientific cooperation.

Diplomatic activities in Eastern European countries have been improved since 1987 with increasing bilateral trade.

The United States of America has been the biggest commercial partner and the main source of external financial resources. It is also the most important investor in the Brazilian economy. Relations have always been mature and stable. However, as Brazil develops and improves its industry and agriculture the relationship has become more complex because traditional American partners have been absorbed. Brazil has also competed with Americans in their own domestic markets.

Nonetheless, Brazil considers that any existing controversies are episodic and defends its interests at the appropriate international meetings. In these fora, the country discusses its most important concerns, such as external debt, access to high technology, reorganization of North-South economic relations, protection of the Brazilian high technology industry and, more recently, matters related to the Amazonian environment.

4.2 BRAZILIAN COOPERATION AGENCY (ABC)

Brazil has received international technical cooperation (ITC) since the beginning of the century. However, until 1969, these activities had been scattered and projects negotiated case by case. In that year, the government created a system comprising the Secretariat of Economic and International Technical Cooperation (SUBIN), from the Presidency's Secretariat of Planning (SEPLAN), and the Department of Technical, Scientific and Technological Cooperation (DCOPT), from the Ministry of Foreign Affairs (Itamaraty), in order to provide information on ITC needs as well as to coordinate, supervise and evaluate programmes and projects in this area.

According to ABC (1989), the internal Brazilian crisis at the end of 1970s and beginning of the 1980s had contributed to postponing or abandoning long and medium term planning. There was a lack of clear and well defined policies and priorities; these had been replaced by a list of projects which had not represented the real needs of national development.

In 1986, the Brazilian government created a working group composed of representatives from the Ministry of Foreign Affairs and SEPLAN to consider ITC policies in order to correct the inadequacies of the cooperation process. This group has established objectives, policies and specific priorities for international cooperation activities. ITC was then defined as a "specific tool through which countries and international organizations transfer knowledge and technologies within a planned process of changes associated to the priorities of social economic development linked to the external politics of the nation."

In 1987, the government created the ABC transferring all matters from SEPLAN/SUBIN to the Ministry of Foreign Affairs. The ABC was conceived as an autonomous organization within this Ministry, with

responsibility for the execution of technical cooperation programmes between Brazil and other countries and international agencies, in accord with Brazilian foreign policy. Its activities are carried out in close consultation with other areas of Itamaraty, especially the Department of Technical Cooperation (DCT), ministries, research institutes, universities and private and government enterprises.

ABC is in charge of planning, coordinating, monitoring and evaluating bilateral and multilateral ITC programmes. Thus, it is responsible for cooperation initiatives from developed countries as well as ITC with developing countries. Two departments carry out these activities: one for incoming cooperation and the other for outgoing cooperation with Third World countries.

External assistance received is channelled to productive sector projects in agri-industry, mining, forestry and irrigation as well as to social projects in education, health, sanitation and transport. As noted by Leite Ribeiro (1989), the policies of cooperation with developing countries are aimed at transferring Brazilian know-how acquired from its own technical and scientific development to the partner countries. These transferred technologies are usually more suited to the developing countries than the sophisticated ones available in developed countries. He also points out that Brazil, unlike developed countries, does not intend to be a net donor of financial resources. Areas such as agriculture, cattle raising, reforestation, energy, mining and transport have been covered in this type of cooperation.

The operation of ABC was also envisaged to identify the international cooperation needs of the Brazilian private and public sectors as well as to identify possible donors who may be disposed towards the intended projects. After programme or project approval by Brazilian government and donor, the Agency monitors its implementation and carries out the final evaluation.

Another task of ABC, through the National System of Consultants Record (Sistema Nacional de Cadastro de Consultores), is to assist UN agencies in recruiting officers and experts to fill vacant positions or perform consultancy services. ABC is also responsible for identifying countries or international entities which could provide or receive TC. Furthermore, ABC coordinates the activities of the Technical Consultative Group (Grupo Tecnico Consultivo - GTC) formed from representatives of all sectorial Ministries, public entities and private companies. The main purpose of GTC is to define national policies, guidelines and priorities on TC.

Requests from Brazilian governmental institutions for bilateral TC from external sources, should be submitted to ABC through their related Ministry. Non-governmental institutions and private companies should also send the requests directly to ABC. All proposals are together examined by the Agency and Ministry or Ministries concerned.

In spite of ABC being the official central organization for ITC, Brazilian research organizations, universities and many states have their own initiatives on this area and are in direct contact with foreign institutions or even international agencies for preliminary and informal negotiations.

The ABC has a special fund for ITC, Fundo Especial de Cooperação Tecnica Internacional (FUNEC), with resources from Brazil (government and private sector) and from other national governments and international agencies. According to Oliveira (1989), the resources of FUNEC are to be spent on technical cooperation for the benefit of institutions both in Brazil and in developing countries.

4.3 PURPOSE AND PRIORITIES OF ITC

ITC is inspired by the ideal of collaboration among countries for the progress of mankind; its raw material is knowledge transfer (Flecha de Lima, 1989). It is an instrument of foreign policy as well as an auxiliary means of achieving social and economic development (ABC, 1989). The National Development Plan, as cited by Ribeiro (1989), emphasizes the need for cooperation with Latin American and African countries, taking into account the existing geographical, historical and cultural affinities between these countries and Brazil.

In the view of Ribeiro (1989), Brazil should receive ITC to promote structural changes and to create dynamism in the recipient institutions. He also reports that some of the main priorities of international cooperation are for programmes:

- leading to an increase and diversification of bilateral relationships and offer good perspectives for political, economic and commercial cooperation;
- making possible a real transfer of knowledge to the partners;
- ensuring a relevant Brazilian participation during the whole process of planning, execution, monitoring and evaluation;
- having multiplicative effects and assuring high rentability of the financial resources involved.

Other priorities (ABC, 1989) are for programmes:

- with impact at national level rather than regional and local levels;
- linked to the National Plan of Economic and Social Development;
- with a well defined counterpart from the recipient institutions as being a substantial part of the total budget;
- containing different components of ITC, i.e., consultancy, training of human resources and supply of equipment;
- leading to a real transfer and absorption of priority knowledge to produce innovation.

Flecha de Lima (1989) emphasizes that screening mechanisms should be created to adjust the cooperation received to the national priorities of social/economic development and that it should be replaced by Brazilian expertise when possible.

4.4 FINANCIAL RESOURCES AND COUNTRIES INVOLVED WITH ITC

In the last five years, Brazil has received approximately $560 million for technical cooperation as grant with an internal counterpart of $1,050 million (ABC, 1989). As a measure of comparison, Sudan and Tanzania received an average aid of $740 million and $650 million a year respectively, in 1980 to 1983, and India received $1.7 billion in 1983 (Cassen *et al.*, 1986). Presently, the main sources of external bilateral aid are Canada, France, the United Kingdom, Italy, Japan, Spain, and Germany. Among the international agencies and institutions, PNUD, OEA, EEC, FAO, OIT, UNICEF, Global Food

Program, OMS and UNIDO are important contributors. The total TC received per annum is estimated at $143 million, $123 million from donor countries and $20 million from international institutions (Ribeiro, 1989). Technical cooperation is being negotiated with France, Canada, Italy, Germany, the United Kingdom, Japan and Spain (ABC, 1989).

4.5 PERSPECTIVES OF ITC

According to Ribeiro (1989), analysis of recent developments in Brazilian TC activities has shown the following medium and long term perspectives:

- TC to the developing countries tends to increase geographically and by sector, in bilateral and multilateral terms;

- TC received has been moving to a more qualitative approach, mostly towards projects capable of effective technology transfer.

Due to Brazil's relatively high level of industrial and economic development, the developed countries have not maintained the previous levels of support for TC programmes, thus diminishing the financial resources available for this activity. Therefore, new sources of cooperation are being sought. In view of some of the current common problems which it shares with other countries, Brazil has been negotiating cooperation with China, India and Eastern Europe as alternatives for knowledge transfer. Also, more attention will be given to the non-governmental organizations (NGOs), with the aim of including them in the Brazilian system of ITC (ABC, 1989).

AID DONORS AND RESEARCH PROMOTING INSTITUTIONS

This chapter provides essential information about international donor agencies and countries which had or have been supporting forestry research and development in Brazil and an overview of aid availability and some basic procedures for obtaining it. Possible sources from which Brazil and its institutions may be eligible for aid in this field are also examined, along with institutions which promote collaborative research. The selection of countries and their official agencies has been based mainly on the more recent negotiations or international agreements signed by the Brazilian government and on its foreign policy.

Aid is provided directly by governments of developing countries or its official agents as well as through multilaterally funded agencies. Based on funding, donor agencies are known as **bilateral** or **multilateral**. Aid has also come from **non-governmental organizations (NGOs)**, which have been playing an increasing role in this field. The NGOs are funded by contributions from individuals, private organizations, official government agencies and multilateral organizations. Less commonly, developing countries, or their official agencies, provide aid.

In 1970, the proportion of bilateral and multilateral net flow of financial resources for ODA, from DAC countries, was approximately 81.6% and 18.4%, respectively. Since then, the proportion of ODA supplied by multilateral donors had increased to 33.6% in 1980, 25.5% in 1985 and 28.0% in 1987.

In the descriptions of donors and institutions in this chapter, the following sources of information were used extensively: OECD/DAC (1988), CGIAR (1990); USDA Forest Service (1990), UNDP (1988 and 1990), Eurofi (1988) and Lampreia (1989).

5.1 MULTILATERAL AGENCIES

Multilateral agencies were responsible for approximately 28 percent of the total net flow of financial resources for ODA from DAC countries in 1987, which corresponded to $11.558 billion. They have been created and expanded in response to a need to rationalize and put to more efficient use the flow of resources for aid and to provide more balanced assistance to the developing countries, irrespective of the policies and self-interests of the developed country donors.

Multilateral agencies have many advantages over bilateral ones. They are relatively apolitical, can handle larger projects, offer more favourable procurement conditions and have experienced personnel capable of dealing with diversified projects carried out in many different countries.

Only the organizations concerned with the purpose of this work are described. A general view of the United Nations Organization (UNO) is also reported for a better understanding of the specialized agencies involved in forestry research and development projects in Brazil.

UNO was created in 1945 to maintain international peace and security as well as to develop international cooperation in economic, social and humanitarian areas. It is a very complex organization made up of six principal organs: the General Assembly, the Security Council, the Economic and Social Council (ECOSOC), the Trusteeship Council, the International Court of Justice and the Secretariat.

The General Assembly is the principal debating forum of UNO which, through ECOSOC, has responsibility for the overall coordination of policies and activities of its specialized agencies and bodies. ECOSOC is considered to be the main organ of UNO, with responsibility for the promotion and coordination of world cooperation on economic, social and humanitarian problems. Development assistance, therefore, lies under its responsibility. There are sixteen autonomous, specialized agencies linked to ECOSOC, including the Food and Agriculture Organization (FAO), the United Nations Environment Program (UNEP), International Fund for Agriculture Development (IFAD) and the World Bank Group of agencies - comprising the International Bank of Reconstruction and Development (IBRD), the International Development Association (IDA), the International Finance Corporation (IFC), and the Multilateral Investment Guarantee Agency (MIGA). Twelve autonomous intergovernmental bodies are also linked to ECOSOC such as the United Nations Development Program (UNDP), the UN Environment Program (UNEP) and the Institute for Training and Research (UNITAR).

United Nations Development Programme (UNDP)

UNDP was created in 1956 with a mandate to increase and improve the natural and human resource capabilities of the less developed countries, and presently is the world's largest source of concessional funding for technical cooperation. It is the central funding and coordinating mechanism for technical cooperation by the entire UN development system. UNDP reports to the UN General Assembly through ECOSOC.

The policy-making body of UNDP is the Governing Council, made up of representatives from forty-eight countries: twenty-one from developed countries and twenty-seven from developing ones. Member countries are elected for a three-year period and one third of its membership changes every year. The Council decides on the volume of assistance that will be provided to each country over a five-year period. The fourth cycle covers the 1987 to 1991 period.

UNDP serves 152 countries and territories with 112 field offices, 1,123 international and 4,667 national personnel. A total of 4,667 projects are being carried out and 5,901 were approved in 1988, staffed by 8,613 international and 9,877 national experts. Its headquarters is located in New York (UNDP, 1988).

UNDP covers a wide range of sectors such as agriculture, forestry and fishery, health, education, transport and communications, natural resources, science and technology, as well as other development, humanitarian and social areas. As it is not an executing agency, it operates by supporting specific projects carried out by governments with the assistance of one or more participating agencies, such as FAO. UNDP Assistance is mostly non-monetary, provided as experts' services, consultancies, equipment, training and fellowships.

Basic procedures requesting assistance from UNDP include:

- all requests should be submitted through a ministry or other organization designated by the government as its official channel;

- the project request is prepared by national authorities with the assistance of technical experts together with the Resident Representative of UNDP and representatives of the agency or agencies involved;

- the project request is submitted to the UNDP through the Resident Representative.

UNDP is funded mostly through voluntary contributions from country members, which amounted to $1,069.2 million in 1987. In the same year, the total revenue was $1,236.7 million and project expenditures totalled $810 million. The agriculture, forestry and fishery sectors received the largest share, with 22% of the total project expenditures. In geographic terms, the largest share went to Asia and the Pacific with 36%, 28% to Africa and 14% to Latin America and the Caribbean. Contributions pledged to 1989 amounted to $1.2 billion.

UNDP oversees six associate programmes, funded separately, to provide specific services through its linked agencies. Examples of these are: The United Nations Development Fund for Women (UNIFEM) and the United Nations Sudano-Sahelian Office (UNSO), both with headquarters in New York. UNIFEM provides direct support to projects for women, often executed by NGOs. UNSO assists African countries in their efforts to control drought and desertification.

The distribution of UNDP resources to countries is based on the population, per capita gross national product and additional criteria, to favour countries facing more serious economic and social problems such as unfavourable geographical location, high debt service and deteriorating terms of trade. Resources are distributed on a five-year cycle and the amounts available for each country are shown in the Indicative Planning Figure (IPF). For the 1987 to 1991 period the total financial resources available were $3,665.387 million, from which Latin America and the Caribbean was provided with $272.800 million (7.4% of the total) and Brazil with $17.729 million (6.5% of the total Latin America & Caribbean). The amounts of $156.120 million and $163.331 million were committed to India and China, respectively, in the same period.

Brazil is eligible for UNDP funding and according to the IPF, $17,729 million were available for technical cooperation projects for the 1988 to 1991 cycle.

Food and Agriculture Organization (FAO)

FAO is a specialized UN agency founded in 1945 for the purposes of raising the levels of human nutrition and standards of living, improving the efficiency of production and distribution of all food and agricultural products and amelioration of rural population conditions. Forestry and fisheries are also included in its concerns.

FAO is not, itself, a financial organization. It serves as a coordinating and executing agency of development programmes and projects for developing countries in the areas of nutrition, agriculture, and food production as well as forestry and fisheries. It provides all aspects of technical cooperation in these sectors. It helps the developing countries to identify opportunities for investment and to prepare suitable projects for submission to funding agencies, providing expertise for this purpose.

The principal policy-making bodies are the FAO Conference and the FAO Council. The Conference is the governing organ, composed of one delegate from each member nation. It meets once in every two years in regular session to decide the policy issues, to approve the two year institution and budget programme and to elect the Director General of the Secretariat. The Council is made up of representatives from forty-nine member countries, elected by the Conference for a staggered term of three years. FAO Council governs the organization during the two-year interval until the next FAO Conference.

Standing Committees may be established by the Council on the recommendation of the Director-General who also submits nominations for membership. According to the FAO Rules of Procedures the members of

Standing Committees "shall be appointed in their personal capacity and not as representative of their respective governments and shall be selected for the scientific, administrative or other technical competence in the field of work of the Committee concerned" (FAO, 1951). Important Councils include: Finance and Programme, General Affairs and Information, Economic and Social Policy, Agriculture, Forestry, Fisheries and Development.

FAO activities are carried out through seven departments located in the headquarters in Rome, Italy: Administration and Finance; General Affairs and Information; Economic and Social Policy; Agriculture; Forestry; Fisheries; and Development. Activities are also executed by the regional, country and field offices established in different member countries. The Organization has appointed either a country representative or a senior FAO expert attached to the UNDP representative in a number of countries.

The Department of Forestry is the world's main source of forestry technical assistance to developing countries. It generally has undertaken between 130 and 200 projects at any one time and its staff was operating in more than eighty countries in the Third World in 1982 (FAO, undated). Among the most important activities of the Forestry Department is the Tropical Forestry Action Plan (TFAP), which outlines priority actions to overcome the existing problems of the tropical forestry sector.

FAO provides institutional strengthening, expert services, technical advice for projects, assistance to identify sources of funding for technical development programmes as well as grants for fellowship studies and training programmes. Collection, analysis and dissemination of information in addition to advising countries on legislation and policy on environment and natural resources are other important FAO activities. It also participates directly in technical assistance with the objectives of strengthening local institutions and of assisting training and research. FAO can also contribute through procurement of essential equipment and supplies.

The FAO Technical Cooperation Programme (TCP) is a special kind of assistance activity that can, rapidly and simply, be planned, submitted, approved and carried out. FAO (1985) reports that the TCP is a relatively small programme corresponding to less than 10 percent of FAO's total extrabudgetary activities (it is paid from the Regular Field Programme budget). The TCP budgetary appropriation for 1984 to 1985 was $57.5 million. TCP projects must be small-scale, under $250,000, of a preparatory nature and of less than twelve months' duration.

It should be emphasized that FAO actively participates in the policies and activities of multilateral agencies. For example, a large amount of financial resources of the World Bank is channelled to developing countries through FAO. According to FAO (1985), from 1964 to 1975, the total World Bank lending for agriculture increased from 4 percent to 31 percent of their total lending. During this period one third of the Bank's agricultural projects had received technical contributions from FAO.

Assistance from FAO is provided only at the request of a country through its FAO Country Representative or directly to the headquarters in Rome. Proposal preparation starts with discussions among national authorities, technical assistance experts and representatives from other agencies which may be involved. A formal proposal is then jointly drawn up by the government and FAO for presentation to a funding agency. A counterpart contribution is always required from the soliciting government as well as plans for the project follow up after formal activities have ended.

FAO's activities are financed mainly by contributions from member nations, in accordance with the scale determined by the Conference, by UNDP and by trust funds from member nations. These trust funds are made up of contributions for purposes specified by the donor. As reported by Europa Publications Limited (1989), field programme expenditures amounted

to $315.1 million in 1986, of which UNDP funded 41 percent. The total number of projects in that year was 2,248 and the field staff comprised 3,177 persons. Africa received the largest share of the total funding with $137.8 million, followed by Asia and the Pacific with $71.5 million and the Near East with $51.4 million. Latin America and Caribbean received $23.6 million.

Brazil as a member nation is eligible for FAO assistance.

United Nations Environment Programme (UNEP)

UNEP was founded in 1972 to safeguard and enhance the environment for the benefit of present and future human generations. It was established in response to the recommendations of the Stockholm Conference of 1972 on the Human Environment. On that occasion the deep concern of nations about environmental problems was clearly identified and the need for international cooperation through a programme involving the whole world community was urged.

Its mandate is to raise the level of environmental action and awareness worldwide, and to coordinate the environmental work of all the UN's organizations and agencies. It is not primarily a funding agency; it plays a coordinating and catalytic role, using its resources to initiate programmes which will attract funding from other sources.

UNEP is a body of the UN Organization reporting to the General Assembly through ECOSOC. Its policy is controlled by its Governing Council which comprises representatives from fifty-eight UN member countries elected by the UN General Assembly for three-year terms on a rotating basis. It decides on the basic policies for the direction and coordination of environmental activities within the UN system.

UNEP was the first UN body to be based in a developing country. The Secretariat is located in Nairobi, Kenya, headed by an Executive Director. It also has four regional offices Switzerland, Thailand, Mexico and Bahrain) and a liaison office in New York City. The small staff based at the UNEP Secretariat in Nairobi was approximately 198 professionals in 1988. Together with the Executive Director, they are responsible for implementation of the Council's decisions.

UNEP achieves its fundamental purpose of stimulating environmentally sound development through three functional tasks (environmental assessment, environmental management and supporting measures) which are evenly applied in six subject areas:

- human settlements and human health;
- terrestrial ecosystems;
- environment and development;
- oceans;
- energy;
- natural disasters.

UNEP's work is mainly conducted through the Office of Environmental Programmes, which is divided into three sections Earthwatch, Environmental Management and Support Measures. Their functional tasks may be summarized as follows:

- Earthwatch or environmental assessment, comprising monitoring, research information exchange and evaluation;

- Environmental Management, which attempts to define environmentally sound and sustainable means by which social and economic

development can be pursued. It comprises mainly environmental legislation;

- Supporting Measures, which includes environmental education, environmental training, information and technical assistance.

UNEP continuously examines the six subject areas, defining the problems and working out means of solving them in a three-step process. Every year a report, called State of the Environment, on a specific topic is prepared and submitted at the Council. Based on that first step, objectives and strategies are established and specific actions formulated. Programmes based on these specific actions are presented to governments and to other concerned organizations throughout the world. The third step of the process is to identify activities for UNEP support, through its Environment Fund, as well as to prepare further action by itself and by others.

The projects can be undertaken by UN system agencies, by other supporting organizations or by direct implementation. This last form is carried out by Programme Activity Centres and refers mainly to the development of activities such as the Global Environmental Monitoring System (GEMS) and the International Referral System (INFOTERRA).

UNEP works with governments, NGOs, other organs of the UN system and intergovernmental agencies. It is not an operational agency and the projects are executed by cooperating organizations.

Funding is obtained from resources from the UN regular budget and from contributions to the Environment Fund. The Europa Publications Limited (1989) reports that UNEP was allocated $10.7 million from the UN budget in 1988 to 1989 and voluntary contributions amounted to $28 million in 1986. The total Fund expenditure in 1986 was over $15.5 million with the largest share for Africa with more than $1.43 million. Latin America received over $863 thousand.

Brazil is eligible for UNEP assistance and has received forestry research support.

International Bank for Reconstruction and Development (IBRD). The World Bank

The World Bank group is made up of four agencies: the International Bank for Reconstruction (IBRD), established in 1944; the International Finance Corporation (IFC), founded in 1956; the International Development Association (IDA), established in 1960; and the Multilateral Investment Guarantee Agency (MIGA), established in 1988. IDA and IBRD are known as the World Bank and commonly treated together because they have similar operational methods and common staff. Initially, they were more concerned with the reconstruction of Europe. Now, the basic purpose of these four institutions is to promote economic and social progress in developing countries by channelling financial resources from developed countries to the developing world. IDA provides assistance to the poorest developing countries on a concessional basis. IBRD makes loans to developing countries at more advanced stages of growth on conventional non-concessional terms. However, a programme or project can be provided simultaneously with both types of loan. IFC supplements the activities of the Bank, assisting the private sector companies of less developed countries at commercial interest rates. MIGA insures investors against various types of risks.

The World Bank is the largest multilateral development assistance organization with $19.3 billion committed to aid programmes in 1988 (World Bank, 1988). It also plays a very important role as a bench mark for the

other development agencies. Its policies have served as guide to donor organizations.

The World Bank has a Board of Governors composed of one representative appointed by each of its 151 member nations; this is usually the country's finance minister or central bank governor,. It meets once a year, in regular sessions. The Board of Governors have delegated most of their powers to a Board of Executive Directors, who, together with the President of the Bank, are responsible for the regular operational governing activities. Five of the twenty-two Executive Directors are appointed by the countries which have the largest number of shares of capital stock and seventeen are elected by the Board of Governors. Only members of the International Monetary Fund (IMF) are considered for membership. Matters may be submitted to the Board of Governors at the annual meetings or at any time between them. The President submits project loans and credit proposals for the consideration and final decision of the Executive Directors.

The headquarters is located in Washington, D.C., in the United States. There are also regional offices in Africa, Asia, North, Central and South America and Western Europe. The structure of the World Bank comprises sector departments responsible for activities such as formulation of policies and priorities and departments directly related to the projects or country programmes.

It operates by financing specific programmes or projects in the public or private sectors with country government approval and guarantee. The loans may cover a wide range of sectors such as agriculture, mining, transport and communications, health, industry and technical assistance through the staff of the department concerned. The Bank helps with the project preparation and also serves as an operational executing agency for projects financed by UNDP.

The World Bank does its own research aiming at a better understanding of the social and economic development problems of the world. These studies are a basis for the decision making process of the Organization. It consults regularly with OECD and EEC on development and related issues and has close relationships with other development agencies and concerned organizations, including NGOs, and participates in inter-institutional meetings concerning development assistance programmes.

A proposed forestry lending programme aimed at providing a better balance of Bank activity in the forestry sector was outlined by the World Bank (1978). This is a more people-oriented approach, intended to benefit rural communities and includes a higher priority for:

- environmental forestry projects, comprising forests for protection purposes which is an essential requirement of bank involvement in agricultural settlement projects in tropical forestry regions;

- rural development forestry, involving small-scale wood and timber production for a wide range of purposes;

- institution-building projects, formed from activities concerned with training, education and research, with special emphasis on pilot trials and agroforestry;

- industrial forest projects, to be supported within the framework of country programming and priorities.

However, this still included a significant large-scale, industrial component and support of rural development projects which involved new settlements in tropical forest areas. "About 40 percent of the program will

be channeled into helping finance large-scale industrial plantations by government forest services, infrastructure, logging, and large-scale sawmilling and mechanical wood-using industries" (World Bank, 1978). With regard to both these there has been a de facto change of policy.

According to this programme bank lending would seek to finance broadly based national forestry programmes which include a wider range of components than in the past. Operational guidelines for World Bank activity in the forestry sector included the following:

- emphasis on activities related to environmental and ecological effects of forestry destruction and to rural development strategies that will help low-income groups without, at the same time, leading to ecologically destructive patterns of development;

- continued expansion of lending for agroforestry and fuelwood plantation development;

- the Bank will encourage and provide finance for forestry research, particularly in the areas of agroforestry, fuelwood development and environmental studies;

- the Bank will assist major log-exporting countries to define appropriate policies for the development of their export trade with special emphasis on increasing local processing of manufactured products and maximising value added;

- the Bank will continue to assist governments to formulate appropriate strategies of forestry development with special emphasis on rural and environmental forest issues;

- the Bank will encourage and, where requested, assist, technically and financially those governments wishing to devise comprehensive rural afforestation development plans;

- Bank rural sector missions will identify the key technical, organizational, managerial and manpower constraints that inhibit the development of forestry.

IBRD lends for specific projects either in the public or private sector with country government approval and guarantee. The lending process starts with an informal request submitted to the Bank containing information such as the nature of the project for which the loan is required, its location, its aims and other relevant data. However, the Bank has a particular methodology in assessing projects. It is done through a project cycle consisting of eight basic steps.

The first is a general **economic study** of the country to which a loan is likely to be provided, then a more specific **sector study.** This is followed by the **project identification** step where the Bank and borrowers select a suitable project. To be incorporated in the five year lending programme for a particular recipient, the identified project should suit the objectives and priorities of both the World Bank and the client country. The economic and sector study are normally carried out by the Bank. Preparation, appraisal and Board presentation follow the inclusion of the request in the five year lending programme.

Project preparation is done by the client with Bank guidance and financial assistance, if needed. It may also help the borrower to obtain assistance from other sources. Project feasibility for many different aspects

must be shown and project preparation missions may be sent out to help. Discussions are held with the borrower on the measures needed to ensure success for the project. After an agreement has been reached a project proposal is formally submitted for financial support from IBRD.

Bank's appraisal includes field missions and a comprehensive review of the technical, economic, institutional, managerial and financial aspects of the project. New discussions may be needed and after a final agreement has been reached loans documents are prepared and a final project presented to the Board of Directors for approval.

The borrower is responsible for **project implementation** which is supervised by the Bank through progress reports from the borrower and field visits to evaluate its success in meeting its objectives. **Evaluation** is the final step of the project cycle. Both the client country and IBRD produce their own evaluation reports at the end of the disbursement period. The project cycle, from identification up to approval, takes around two years.

IBRD adopts a standard variable interest rate that reflects the Bank's cost of borrowing in the world capital market. Interest rates of 8.82 percent per annum with a fee of 0.25 percent on loan commitment and a 0.75 percent charge on the available loan not disbursed are recent examples of Bank charges. The average term of repayment is fifteen to twenty years with a grace period of three to five years. The term depends on the nature of the project being financed and circumstances of the country.

There is no interest charge on the loan provided by IDA and the service charge is 0.5% on the annual commitments. The term for full repayment is fifty years beginning after a ten years' grace period.

Although the borrower is responsible for the execution of the project, including the award and administration of contracts, the procurement and bidding have detailed procedures to be followed. These are designed to maximise economy and efficiency and to encourage bidding by local contractors and manufacturers as well as giving opportunity for competive bidding from other developed and developing countries.

Up to 1987, the Bank had made forty-five loans totalling $3,470 million (net of cancellations) for agriculture and development in Brazil. In the fiscal year of 1988, IBRD and IDA approved loans to a total amount of $14,762 million and $4,459 million, respectively. IBRD approved 118 operations for thirty-seven countries and IDA approved ninety-nine operations for thirty-six countries (World Bank, 1988). In that year Brazil received nine loans of $1,359.5 million from a total of $5,152.0 million to Latin America and the Caribbean. Brazil was the fourth largest borrower after India, Mexico and Indonesia. The country did not have any IDA credit approved in that year. From the total registered for 1988, $48.5 million is to be allocated to the Brazilian forestry sector to support a reforestation project in the state of Minas Gerais (World Bank, 1988).

The Bank's operations are funded by subscriptions from its 151 members to its capital stocks in accordance with each member's quota in the International Monetary Fund (IMF) which is designed to reflect the relative economic strength of the country. Borrowing in the international capital markets at low costs also contributes to IBRD assistance activities.

Eligibility criteria for IBRD loans include: 1) being a member of a government or enterprise in their territories and 2) impossibility of obtaining the financial support from other sources on reasonable terms. With the second condition fulfilled, Brazil or its enterprises are eligible for IBRD assistance. IDA lends only to government or government agencies.

Inter-American Development Bank (IDB)

IDB was established in 1959 with the basic aim of providing financial resources for the social and economic development of its member countries in Latin America. It is owned by its forty-four member states, of which twenty-seven are regional members from Latin America, the Caribbean and North America and seventeen are non-regional members from Europe, Asia and the Middle East. In spite of the entry of the non-regional members, beginning in 1976, the IDB's Charter preserves the position of majority stockholder for the regional members as a group. IDB has two affiliated institutions: the Institute for Latin America Integration in Buenos Aires, Argentina, and the Inter-American Investment Corporation (IIC). The Institute serves as a permanent Department of the Bank and its basic task is to promote private sector investment in the region.

The IDB provides assistance on non-concessional as well as on concessional bases together with grants and technical assistance. Its total approved loans in 1988 were $1,681.9 (IDB, 1989).

A Board of Governors is vested with the highest authority. One Governor and one alternate, appointed by each member country, compose the Board of Governors. They are usually ministers of finance or other high ranking government officers. It meets once a year in regular sessions to make the major policy decisions and review IDB activities. It also elects the IDB's President for a five-year term.

The Board of Executive Directors is composed of twelve Executive Directors elected or appointed for three-year terms by the Governors. Each Executive Director appoints an alternate. The Directors carry out all the operational activities such as approval of loans and technical cooperation proposals submitted by the President as well as authorizing borrowings in the capital markets. Presently, as proposed by the US, 65% of votes are needed for any approval. As the US has 34.5% and Canada 4.4% of the total votes, combined they have enough power to veto any decision they do not agree with. This tends to move the multilateral character of IDB towards a bilateral type organization.

IDB has its headquarters in Washington, D.C. and another office in New York, in addition to twenty-three field offices established in its member countries. IDB personnel numbered 1,713 in the beginning of 1988. Of these, 517 were located in the field offices.

The IDB finances specific development projects, to private and public entities, covering a wide range of sectors, including agriculture and fisheries, industry and mining, tourism, energy, transport and communications along with education, science and technology. It also provides technical assistance for the preparation, financing and execution of development plans and projects, including the study of priorities and formulation of specific project proposals. High priority has been given to environment and public health, to energy and to agriculture and fishery which had 26.7%, 24.1% and 20.9% of the total loans, respectively, in 1988.

Although the IDB continuously analyzes the economy and development plans of member countries, it does not propose projects for the borrowers. The requests are submitted directly by the private or public sector of the client country. Guidelines for the preparation of forestry development loan applications can be found in IDB (1984). The project cycle to final approval usually takes one to two years. The borrower is responsible for all the bidding procedures and for the purchase of goods and services. However, as the loan agreements must be followed, the IDB supervises the whole process.

The terms and repayments of loans vary according to the nature of the project, the economic conditions of the country and the source of

capital. Usually, only up to 50 percent of the total cost of the project is financed and loans are completely disbursed within six years. The average term of repayment is ten to thirty years including the grace period and the interest rates are based on the cost of money borrowed by IDB on the international capital market. Projects financed by the Fund For Special Operations, which enables the IDB to make concessional loans, have an interest rate of one to four percent and a full repayment term of twenty to forty years. Loans may also be offered on other conditions.

In the fiscal year of 1988, IDB approved loans to the amount of $1,681.9 million, comprising thirty-two contracts for twenty-eight projects. Technical cooperation amounted to $55.7 million on 217 projects including short-term, intra-regional and small projects in that year. Brazil's participation was $4 million. A total of $39,625 million in loans was distributed in the period 1961 to 1988.

IDB is funded from different sources, but mainly from subscriptions and contributions of member countries. It also borrows money on the capital market. The IDB is owned by Latin America (53.8%), USA (34.5%), Canada (4.4%) and non-regional members (7.3%).

Besides operating the ordinary capital funds, IDB also administers the Fund for Special Operations and other funds on behalf of several countries. This fund enables the Bank to finance projects on concessional terms.

Brazil is eligible for IDB funds and received a cumulative lending of $6,319.5 million in the period 1961 to 1988 which accounted for 15.9% of the total lent by the Bank in the same period. In 1987 and 1988, $369.9 million and $7.1 million in loans were approved, accounting for 15.7% and 0.42%, respectively, of these years' total.

IDB has provided funds for three forestry projects from 1974 to 1987, totalling $2.8 million, out of a total of $90 million which has been provided for the country members in the same period. Besides the projects, IDB has been funding an EMBRAPA agricultural undertaking which has a forestry research component. An approved $133.1 million "Companhia Energetica de Sao Paulo" project, designed to use wood for methanol production, was cancelled without any disbursement.

The relatively small availability of financial resources for Brazil, $250 million per annum, has been a major constraint to more substantial support of forestry activities in the country. This share has been increased to $500 million, according to the seventh replenishment project, and environment and natural resources are the general priorities. Forestry related projects which have had support from IDB are reported in a subsequent chapter.

Commission of the European Communities

The Commission of the European Communities, and the Directorate-General for Science and Development, are the Community bodies concerned with the scope of this section. However, a general overview of the European Community is needed to understand how the Commission and the Directorate operate.

There are three European communities: The European Economic Community (EEC), The European Coal and Steel Community (ECSC) and the European Atomic Energy Community (EURATOM). They were established by treaties signed in 1957 (ECSC) and 1958 (EEC and EURATOM). In 1987, the Single European Act, containing amendments to the original treaties, was established to provide a legal basis for a unified Europe by 1992 (Scott and Reid, 1988).

The European communities govern and carry out their activities through six institutions: the Council of Ministers, the European Parliament,

the Commission, the Social Committee, the Economic Committee and the Court of Auditors.

The **Council of Ministers** is made up of member country representatives . Its composition, as well as the number of ministries, varies according to the subject being discussed. The Ministry of Foreign Affairs meets more frequently than do others. The Council has its own personnel and secretariat based in Brussels. The Council of Prime Ministers is called **the European Council** and meets three times a year. It is the main Community decision-making body.

The **European Parliament** is composed of 518 members elected every five years. The number of representatives of the countries is related to their populations. The four most populous (UK, Germany, France and Italy) have eighty-one representatives each. Luxembourg, with six, has the lowest number. The representatives tend to form political groups rather than national ones. Plenary sessions are held in Strasbourg with representatives of the Commission and the Council being present. The Parliament does not have legislative power but has a strong influence on the budget, participating in major discussions on Community expenditures along with other Community issues.

The **Commission of the European Communities**, or simply the Commission, is composed of seventeen individuals appointed by the Council, on the recommendation of the twelve member countries for a four-year term. France, Italy, Germany, the United Kingdom and Spain each have two Commissioners. Belgium, the Netherlands, Luxembourg, Denmark, Ireland, Greece and Portugal each have one. Commissioners owe their loyalty to the Community only; they are forbidden to act as representatives of their country or of any other institution. Each Commissioner is responsible for one, or more, specific area of Community interest.

The Commission is made up of twenty-two administrative departments, known as **Directorates-General**, each headed by a Director-General. The Directorate-General for Science, Research and Development (DG XII), is of particular relevance here. In general, a national balance is maintained at the senior level and it is usual for the Director-General and his Commissioner to be of different nationalities. The Commission is headquartered in Brussels.

Basically, the Commission operates by proposing policies and drawing up legislation for their implementation for submission to the Council. It is also responsible for ensuring that the country members and their institutions comply with Community related treaties and legislation.

The Council of the European Communities adopted a five-year **Programme of Science and Technology for Development** at the end of 1987. Its basic aim is to support and reinforce activities in science and technology for the benefit of developing countries. Priority is given to projects in regional and integrated programmes. The total estimated cost of the programme is 80 million ECU.

The Commission is responsible for carrying out the programme through its Directorate-General for Science , Research and Development with assistance from the Management and Coordination Advisory Committee for Development.

The main objectives of scientific cooperation between the European Community and developing countries through the Programme of Science and Technology for Development are: to promote contacts between scientists of the two parties; to link the best research centres of the two parties on a cooperative basis to tackle scientific problems of common interest as well as to establish permanent links between scientific communities in Europe and developing countries. The basic tool for achieving these goals is the joint research project.

The joint research project consists of two or more research teams, from the same or different countries, working on a common problem. Only institutions with well-established expertise and with an adequate level of basic equipment are eligible.

The scientific objectives and sectors for cooperation are defined by mutual agreement between the European Community and the national authority of the developing countries involved. The proposals for the joint research projects and applications must be endorsed by the National Research and Development Authorities. The final decision on joint research projects and/or grant holders must be adopted jointly by the two parties. Contracts can be made between the Commission and the research centres and /or grant holders.

The proposals are selected by the Commission with the assistance of the Coordination Advisory Committee, enlarged by external experts invited by the Commission. The basic criteria for selections are:

- scientific merit of the project and of the proposer;
- relevance to the social and economic problems of the developing countries, and the strategies aiming at solving them;
- possibility of collaboration between research bodies in the member countries and in the developing countries;
- the need to complement research and development operations carried out by the community and bilateral/or multilateral research and development operations conducted by the member states;
- the regional impact, scale and urgency of the problems to be solved;
- the aim of the projects, the main objective being to achieve self-sufficiency in food and to increase research in developing countries.

A wide range of fields is covered by the Programme, including medicine, biotechnology, agriculture (embracing forestry), environmental protection and remote sensing. Forestry is included in the sub-programme "Tropical and subtropical agriculture" as "Improvement of forestry production" which is includes:

- surveys, genetic improvement, production techniques for fast growing species (fuelwood), mainly in dry and arid zones;
- surveys, genetic improvement, production techniques for industrial species (timber);
- management of tropical forest ecosystems, development of natural resources and agroforestry;
- technological use of tropical forest products.

Some of the forestry activities, such as remote sensing for the purpose of forestry research, is also included in Sector 2 of the sub-programme under the title " Appraisal of resources".

The approach recommended by the Commission is to increase production in the field without an increase in the use of fertilizers and pesticides. Classical means such as genetics, biotechnology and cultivation technique should be employed. The Commission also recommends research in

agroforestry to concentrate on production by combining agriculture and/or animal husbandry with forestry and gives priority to fuelwood production and protection measures such as desertification control in semi-arid zones.

Joint project proposals should be submitted on appropriate forms supplied by the Commission. These forms should provide information about the principal proposer along with each associated partner in addition to a description of the research work and other relevant data. From the project which shares a common problem, each partner should tackle a specific piece of the work. This procedure emphasises the role of the scientist, as it is the project leader who signs the proposal together with the responsible administrative officer of the principal proposer research institution.

The duration of the proposed research cannot exceed twenty-four months and the work schedule should bear in mind that at least six months may elapse between the closing date for the submission of proposals and the outcome of the negotiations. Community institutions receive grants of up to 50 percent of the total cost of the project and contributions to developing countries are established on a case-by-case basis. The Commission transfers all payments to the principal partner who is responsible for the submission of all technical progress reports and statements of expenditures to the Commission in addition to reimbursement of the project partners. Technical progress reports are due every six months. The Programme is funded by the European Community to the total amount of eighty million ECU.

Brazil is eligible within the framework of a bilateral cooperation agreement which the Community has signed with some Latin American countries. Commission documents note Brazilian participation in forestry sector projects which are referred to in a subsequent chapter.

International Council for Research in Agroforestry (ICRAF)

ICRAF was established in 1978 to improve the nutritional, economic and social well-being of people in developing countries through the promotion of agroforestry systems designed to result in better land-use without detriment to the environment.

ICRAF is governed by a Board of Trustees from eleven developed and developing member countries. ICRAF's operational structure as reported by Lundgren (1987) is made up of four divisions: Finance and Administration, Research and Development, Collaborative Programmes and Information. The activities are headed by a Director assisted by a Management Committee. The professional staff, totalling 120, comprises thirty-two employed on a continuous basis, twenty-eight on a non-permanent basis and sixty supporting employees. Its headquarters is in Nairobi, Kenya.

ICRAF's overall priorities for 1986 to 1990 were: to continue to develop the agroforestry discipline and to maintain its global lead position in this field; to assist in building national institutions' capabilities to design and implement relevant agroforestry research programmes; and to collaborate with national and other institutions in identifying and developing promising agroforestry technologies.

ICRAF operates by encouraging and supporting research and training in agroforestry systems along with facilitating and disseminating relevant information. It also assists in the international coordination of agroforestry development. ICRAF does not execute its own research, nor does it have its own technology generation infrastructure. It participates in research through collaborative efforts with relevant institutions.

Strategies and guidelines for ICRAF's activities (Lundgren, 1987) include: to concentrate work on a few and carefully identified technologies

as a basis for a collaborative research programme; to work with inter-institutional (representing different disciplines) groups in a limited number of countries, encouraging networking among countries; to closely integrate technology generation and institution-building efforts; to support the development of new and the improvement of already developed, generally applicable, research methods, along with using more resources in backstopping collaborative research programmes. An agro-ecological zone approach is adopted and collaboration with other specialized entities such as IUFRO and CGIAR's International Agricultural Research Centres are being pursued. ICRAF was conditionally accepted into the CGIAR in May 1991.

ICRAF has been supported by voluntary financial contributions from governments and donor agencies such as GTZ, IDRC, IBRD as well as the Netherlands and Switzerland. Funding has increased from $0.972 million in 1980 to $4.600 million in 1987.

ICRAF assisted EMBRAPA to plan and prepare projects on agroforestry research for the Northeast and Amazon Region in Brazil in 1979.

International Tropical Timber Organization (ITTO)

ITTO was created in 1985 as a special forum for all governments of countries producing and consuming tropical timbers to discuss issues concerned with tropical forests. Its basic purpose is also to provide and coordinate the means for its rational utilization and conservation.

ITTO is governed by an International Council, composed of one representative from each member state, which usually meets once a year. It establishes general guidelines and policies, approves projects and decides on financing, A Chairman and a Vice-chairman are elected for a period of one year by the Council. Membership comprises forty-two states, of which eighteen are from timber producing countries and twenty-four from timber consuming countries. Voting power is related to the country's contributions, with one thousand votes for each producer and consuming group. Japan (334) and Brazil (189) have the highest number of votes from the consumer and producing groups, respectively. Non-member governments and organizations can request admittance as observers to the Council meetings.

The ITTO Executive Secretariat is located in Yokohama, Japan, with a staff of eight. It is headed by an Executive Director, helped by three Assistant Directors concerned with the different areas covered by the Permanent Committees. Technical operational activities are carried out by three Permanent Committees:

- Committee on Economic Information and Market Intelligence;
- Committee on Reforestation and Forest Management;
- Committee on Forestry Industry.

The Committees' functions include technical appraisal of the project proposals, recommendation of projects for approval and reviews of projects under implementation.

ITTO is not an executing agency. Its main task is coordinating and funding activities related to tropical timber worldwide. Its objectives include: providing an effective framework for cooperation and consultation between tropical timber producing and consuming members; promoting the expansion and diversification of international trade in tropical timber; promoting and supporting research and development in forest management and utilization; improving market intelligence with a view to ensuring

greater transparency in the international tropical timber market; promoting increased production and processing of tropical timber in producing member countries aiming to stimulate industrialization and thereby increase export earnings; encouraging members to support and develop industrial tropical timber reforestation and forest management activities; improving the marketing and distribution of tropical timber exports of producing members; and encouraging the development of national policies aimed at sustainable utilization and conservation of tropical forests and their genetic resources and at maintaining their ecological balance.

Funding is basically obtained from its member states. According to ITTO (1989) the assessed contributions of members for 1989 amounted to $2,459,659. Miller (1991) reported an 1991 administrative budget of $3.2 million.

5.2 BILATERAL DONOR AGENCIES AND COUNTRIES

Bilateral aid is provided by official specialized national agencies or related ministries on a country-to-country basis. In 1987, bilateral ODA was approximately $29.972 billion, comprising 72% of the total net flow of financial resources for ODA from DAC countries. In 1970, bilateral ODA comprised 81.6% of that total volume, decreasing to 66.4% in 1980. Since then the trend has been for a value around 70%. In 1985, 1986 and 1987 it was 74.5%, 71.5% and 72.0%, respectively.

There are many reasons for one country to provide ODA to another and these vary over time. However, every donor country considers its own national objectives before anything else. Silva (1967), in his book *Geopolitica do Brasil*, mentions some wise advice given by the first President of the United States, George Washington, who had emphasized that a country cannot expect to receive disinterested favours from another because everything a nation receives as a favour must be paid for later as a share of its own independence.

National self-security is one of the most important reasons for all types of ODA, including bilateral. But there are many other motives for donor countries providing aid, such as political alignments and cultural, linguistic and historical affinities. Some European countries, especially UK and France, have obvious alignments with their former African colonies. Japan, for well understood reasons, has a great deal of ODA centred on Asia. Other examples can easily be identified.

Domestic politics may also be a good reason for giving aid. For example, the environment attracts votes in nations highly aware of nature conservation. Thus, aid policies and priorities are frequently modified to favour programmes related to this, independent of the personal beliefs of the decision makers. Humanitarian motives should also be mentioned as another reason for aid.

The extent of the influence of any one reason for providing aid varies among donor countries. As their geopolitical concerns vary over time, interested recipient countries and their local institutions should be watchful to notice, identify and take advantage of any possible modification reflecting on priorities, conditions of assistance and eligibility for ODA. However, for the reasons already pointed out, bilateral ODA is not as reliable as multilateral ODA in supporting long-term development policy/programmes in developing countries.

On the other hand, bilateral ODA (especially technical assistance) often suits the particular needs of recipient countries better, due to affinities between the countries in certain areas, e.g. technology. These circumstances are unlikely to occur when dealing with multilateral agencies.

From the donor point of view, bilateral aid has the advantage of receiving steady support from the nations' people because it is in their national self-interest.

The countries and/or their bilateral agencies which have been or may be involved in Brazilian forestry issues are the only ones examined in this section.

Canada/Canadian International Development Agency (CIDA) and International Development Research Center (IDRC)

The net disbursements from Canada to developing countries and multilateral agencies were $1,885 million in 1987, the seventh largest in the DAC nations ranking. Official bilateral disbursements for technical cooperation were $234 million in 1986, the seventh largest among DAC countries.

The Canadian International Development Agency (CIDA) is the main Canadian agency responsible for administering technical assistance and aid to developing countries. Tropical forestry research is supported both by CIDA and by a sister agency, the International Development Research Center (IDRC).

Bilateral aid is almost all administered by CIDA and multilateral aid is divided between the Department of Finance (dealing with the IMF and World Bank Group) and CIDA (handling UN agencies and regional multilateral development banks). Approximately 75 percent of the total government aid budget is administered by CIDA. The remaining 25 percent is administered by four other agencies, including IDRC which helps developing countries to build their own research capabilities.

Direct oversight of CIDA is the task of the Minister for External Relations and International Development, while its President reports to Parliament through the Secretary of State for External Affairs. Its headquarters are located in Hull, Quebec.

The International Development Research Center (IDRC) is a public corporation, created by the Canadian Parliament, in 1970, to stimulate and support scientific and technical research, by and for developing countries. It is guided by an International Board of Governors composed of twenty-one members appointed by the Canadian Government. The Chairman, Vice-Chairman and nine other Governors must be Canadian citizens. In practice, seven of the remaining ten Governors are from developing countries.

IDRC has its headquarters in Ottawa, with a regional office for Latin America and the Caribbean in Montevideo, Uruguay, and five other regional offices in Cairo, New Delhi, Nairobi, Dakar and Singapore. In 1987 the organization staff totalled 617, about half working in the regional offices. It is funded by the Canadian Parliament. The 1987 to 1988 programme budget was C$88.6 million (US $67.6 million). Agriculture, Food and Nutrition Science Division was allocated C$24.5 million (18.7 million) of the total.

IDRC's main objective is to support research relevant to development. This is achieved by: helping to increase the scientific competence of institutions and staff in developing countries; promoting cooperation between researchers in Canada and their counterparts in developing countries; and helping to create and support international research networks.

The basic guidelines of IDRC include:

- grants are made to institutions, not to individuals, except in the case of scholarships. The institutions are required to participate financially in the project, which may take the form of overhead;

- support is primarily given to Third World researchers;

- priority is given to applied research whose results could be expected to benefit the poorest members of the population;

- funds are allocated to a limited number of research areas: agriculture, food and nutrition sciences; health sciences; social sciences; information sciences; earth and engineering sciences; and communications.

IDRC has seven programme divisions; forestry research is included in the agriculture, food, and nutrition sciences division. Forestry funds are made available for tree plantations, social forestry, the participation of NGOs in networking, disseminating research results, and supporting regional training centres in Africa.

The procedures for a formal project proposal include a variable number of elements, usually eight. It starts with a pre-proposal in the form of a short letter from the researcher to an IDRC programme officer outlining the project. Depending on the preliminary IDRC assessment an invitation may follow, with enclosed guidelines, to prepare and submit a formal project proposal. This is prepared with technical assistance from the programme officer and submitted to IDRC. According to Tillman (1988), "pre-packaged" projects have little chance of being accepted. This is due to the characteristics of project preparation undertaken with the close assistance of an IDRC officer who helps to interpret the general policies of the relevant IDRC division. Programme officers play a key role in project development and are responsible for individual projects. Therefore, to avoid problems, close contact with them is advisable.

As the IDRC decision making process is relatively decentralized, regional offices and divisions can consider projects up to certain fixed amounts. Thus, consideration is by the programme officer up to C$10,000 (US $7600). Only funding over C$250,000 (US $190,000) is submitted to the Board of Governors.

A Division Active Project (DAP) may be one of the stages of a proposal or can be used to carry out a small research or information project. DAPs can also pay for expenses such as meetings and consultations before and after a project, workshop, or participation of researchers in meetings. They can be approved very quickly since the decision is made by a division or regional officer.

Brazil is eligible for Canadian TC and EMBRAPA's projects dealing with *Prosopis* have received IDRC support.

Finland/Finnish International Development Agency (FINNIDA)

Finnish development assistance has increased rapidly over the past several years, following a Government decision in 1980 to increase its commitment to 0.7% of GNP by 1990. In real terms, there has been an average yearly increase of 17 percent from 1977 to 1988 (from 0.15% to 0.59% of GNP). From 1987 to 1988, there was a ten percent increase in the ratio of aid flows to GNP (0.49% to 0.59%) and an ODA net disbursements increase of twenty-six percent in real terms to $610 million. Given the high level of public and Parliamentary support for development aid, especially to the very poor countries, this rapid and sustained growth is predicted to continue over the next few years according to the DAC Aid Review of 1989/90 (July 1989). One-third of Finnish bilateral assistance in the future is to be channelled to agriculture and forestry, with especially high priority

given to forestry and forest industries. In 1988, disbursements in forestry projects amounted to approximately $22 million.

The Finnish government supports economic and social development of Third World countries through multilateral agencies and bilateral cooperation programmes and projects. The programmes are administered by the Finnish International Development Agency (FINNIDA), a unit within the Ministry of Foreign Affairs, which is responsible for preparing all policy decisions and managing the development aid programme. Aid implementation is, in general, contracted to other agencies.

In order to strengthen its capacity to manage the rapidly expanding aid programme, FINNIDA's organizational structure was rearranged in 1986, and divided into three major divisions: Bilateral Aid (programmes and projects); International Aid (UN agencies and international financial institutions); and Humanitarian Aid, Technical Assistance and Non-Governmental Organizations.

Aid is concentrated in selected countries and priority has been given to agriculture and rural development as well as energy. The major area of expenditure has been technical cooperation and capital investments. Grant is the main component, most of it provided as goods and services.

Based on a bilateral agreement signed between Brazil and Finland, a joint technical cooperation programme on forestry research has been carried out by the Federal University of Parana and the Finnish Forestry Research Institute since 1985.

France

France is one of Brazil's sources of technical cooperation and negotiations have been carried out to increase its assistance (ABC, 1989). In 1987, France had a net disbursement as ODA to developing countries and multilateral agencies of $6.52 billion, (0.74% of GNP). In 1988, this rose by three percent in real terms to the equivalent of $6.96 billion (0.73% of GNP). Bilateral technical cooperation expenditure was the largest among DAC countries with $2.37 billion in 1987. A large percentage of multilateral aid is channelled through the EEC (82 percent in 1985). France spends approximately $50 million annually on agricultural research for developing countries and has maintained its colonial institutions (e.g. ORSTOM and CIRAD) largely for this purpose.

France's multilateral development aid is officially administered by the Ministry of Foreign Affairs, with responsibility for technical assistance to developing countries outside of Francophone Africa. The Ministry of Development and Cooperation is responsible for technical and capital assistance to the French speaking countries of Africa. There is, however, a slight overlap of responsibility, following the major organizational changes made in the French ministries in 1986. A link between them is provided by Commission on International Agricultural Research (CRAI), within the Ministry of Research and Technology. CRAI advises the Ministries of Foreign Affairs and Development and Cooperation on agricultural research priorities. It is composed of representatives from the Ministries of Foreign Affairs, Development and Cooperation, Research and Technology, Agriculture and from INRA, CIRAD and ORSTOM (see below). CRAI plays a central role in harmonizing the various agency activities and positions with respect to international agricultural research.

The main components of the French agricultural research system are: Institut National de Rechèrche Agronomique (INRA); Centre de Coopération Intérnational en Rechèrche Agronomique pour le Dévèlopment (CIRAD); Institut Français de Rechèrche Scientifique pour le Dévèlopment en Coopération (ORSTOM); and Centre Technique Forestier Tropical (CTFT).

CIRAD and ORSTOM are the joint responsibility of the Ministries of Research and Technology and Development and Cooperation.

CTFT is a public research and development organization, funded by the Ministry for Research and Development. Its staff of 200 (in 1988) provide assistance in tropical forestry and wood technology and are actively involved in development projects of other international institutions. CTFT is permanently involved in more than a dozen countries and on a temporary contract basis in over thirty.

The Development Directorate within the Ministry of Development and Cooperation is responsible for the following services: education, culture and research, multilateral affairs, cooperation with NGOs and project administration.

French development aid is provided through the following entities: Fonds d'Aide à la Coopération (FAC) which is used to finance supply contracts (donor procurement); Caisse Centrale de Co-opération Économique (CCCE) which is the principal source of loans on a concessional basis; and the Treasury which supplies mixed aid funding. The sectors to which aid has been supplied include rural development and agriculture, industrial and mining development, infrastructure, health, education and training.

For the scope of this work, the most important French bilateral entity is CCCE, which provides technical assistance to developing countries and finances investment projects and state investment funds in Asia and Africa. CCCE activities are guided by a Supervisory Board composed of officers from relevant government entities together with experts on finance and the economic problems of developing countries. Three specialized Committees maintained by the Board help to supervise its activities. One of them, a Technical Committee, monitors overseas technical cooperation.

Rural development assistance has had the highest priority for aid. CCCE works closely with other development agencies and approximately half of its projects are co-financed. Most of CCCE's financial resources derive from borrowing and bond issues on the world capital market with the guarantee of the French government.

Although all developing countries are eligible for French bilateral aid most of it is provided to the former French colonies.

The French government, through its cooperation organizations, has been supporting projects in Brazil; this is examined in a subsequent chapter.

Germany

Germany ranked fourth among DAC countries concerning net ODA to developing countries in 1987. It disbursed $4.39 billion which accounted for 0.39% of its GNP. The expenditures for technical cooperation were $1,535 million, the third largest after France and the US. Only 10 percent of bilateral aid is devoted to the agricultural sector, a figure below the DAC average.

The responsibility for German ODA lies with the Federal Ministry of Economic Cooperation (BMZ), in close collaboration with the Ministries of Foreign Affairs, of Economic Affairs, and of Finance. The implementation of ODA programmes and projects is contracted by BMZ to various specialized agencies. Among these are: the Deutsche Gesselschaft für Technische Zuzammenarbeit (German Agency for Technical Cooperation - GTZ), which deals with technical cooperation; the Kreditanstalt für Wiederaufbau (KfW), which handles financial cooperation; and the Deutsche Finanzierungsgesellschaft für Beteiligungen in Entwicklungslandern GmbH (German Finance Company for Investment in Developing Countries - DEG), concerned with private investment in developing countries.

Bilateral ODA is made available as technical cooperation or financial cooperation. This last form involves financing investments and fixed assets for projects considered worthy of promotion in the fields of agriculture and industry along with support for improving economic and social infrastructure.

GTZ is an autonomous agency, which serves BMZ in two functions: project assessment and project execution/funding disbursement (for special projects). It provides TC for various sectors (including agriculture and forestry) which consists mainly of granted consultancy.

KFW is the official Development Bank of Germany with the main purpose of improving the economic and social infrastructure of developing countries. It assists the Federal Government by: providing information on developing countries; indicating the kinds of assistance and projects of high impact; appraising, monitoring and evaluating projects; and administering loans and grants. It also gives financial assistance to development banks in Third World countries to enable the financing of medium and small agricultural and industrial projects.

DEG functions include administering commercial investments in the private sector of developing countries as well as co-financing joint ventures between German companies and Third World companies (as shareholders).

Agricultural research, at the Federal level, is under the Ministry of Food, Agriculture and Forestry (BML). In 1976, BML and BMZ established the German Council for Tropical and Subtropical Agricultural Research (ATSAF), which functions primarily as an advisor (along with GTZ) to BMZ on agricultural research projects and as a forum for coordinating research efforts. The German Foundation for International Development (DSE) is also an integral part of this system, providing scholarships, training, seminars and grants, often involving TC.

Geographically, German ODA shows a wide distribution, with a high concentration in Sub-Saharan Africa (35%) and Asia (35%), and 12% to Latin America. German forestry related projects in Brazil are reported in a subsequent section.

Italy

Italy has steadily increased its development assistance since it enacted its first aid legislation in 1979. During the next five years, its aid budget grew at an average annual rate of 18 percent in real terms. Total ODA in 1988 was $3.01 billion (0.37% of GNP). With a commitment to maintaining their ODA/GNP ratio above 0.4% ODA growth is expected to continue in future. Bilateral aid is growing rapidly, reflecting the Italian policy to bring its bilateral in total ODA to about 70 percent. Bilateral technical cooperation expenditures amounted to $404 million in 1987.

The Directorate-General for Development Cooperation (DGCS) within the Ministry of Foreign Affairs is responsible for coordinating and administering most of Italy's foreign assistance. Implementation is entrusted to a number of public bodies, such as the Mediocredito Centrale (handling concessional loans), parastatal organizations, and technical ministries. The formulation of development cooperation policy is the responsibility of the Inter-Ministerial Committee for Development Cooperation (CICS). The ODA programme budget is approved annually by Parliament. The Inter-Ministerial Committee on Foreign Economic Policy (CIPES) is responsible for decisions for the entire multilateral budget account.

Three levels of committee policy advice are relevant to the budgetary process. At the highest level is the CICS, established within the CIPES, with responsibility for macro-level aid decisions; it is chaired by the Minister of Foreign Affairs. At the next level is the Steering Committee of

the DGCS, also chaired by the Minister of Foreign Affairs. It coordinates the cooperation sector and determines its objectives and basic programmes. And finally there is the National Research Council, a scientific group which advises the DGCS.

Criteria for provision of aid include the existence of historical or cultural ties with Italy and the possibility of achieving significant integration between the Italian and the recipient economy for the mutual benefit of both countries.

Italian bilateral aid is provided as grants or concessional loans. Grants were reported by Eurofi (1988) as being 95 percent of the total ODA in 1985. However, supply of goods and services are restricted to Italian companies.

Italy and Brazil have been negotiating an agreement involving four types of cooperation activity: formation of joint ventures among small and medium sized private companies of the two countries with subsidized Italian credits; scientific and technological cooperation; development cooperation comprising aid for urbanization, health and high technology; and Italian participation in large Brazilian public projects through credits to equipment suppliers.

Japan/Japan International Cooperating Agency (JICA)

Japan's foreign aid disbursements, in 1987, were $7.45 billion and, in 1988, $9.13 billion, representing 0.31% of its GNP in both years. This makes it the second largest donor of economic assistance to developing countries in the world (exceeded only by the US). Bilateral technical cooperation expenditures in 1987 were $1,067 million, with JICA (see below) accounting for $669.7 million (62.8%). JICA (1988) noted the government intention of providing over $50 billion for ODA in the 1988 to 1992 period. This should raise Japan to the first position in the world ODA rank (and enable Japan to reach the DAC average ODA/GNP ratio by 1992).

The majority of Japanese development aid is made available through three government agencies: Japan International Cooperation Agency (JICA), Overseas Economic Cooperation Funds (OECF) and the Export-Import Bank of Japan. As government technical cooperation is under JICA, only this Japanese agency is dealt with in this section.

The Japan International Cooperating Agency (JICA) was established in 1974 as an agency for the administration of government-based technical cooperation to developing countries as well as administration of emigration services. JICA is under the jurisdiction of the Ministry of Foreign Affairs which bears ultimate responsibility for economic cooperation. JICA works closely with the Ministries of Agriculture, Forestry and Fisheries and International Trade. Its headquarters is in Tokyo, Japan.

Functions of JICA include administering government-based technical cooperation and grant aid programmes, dispatch of Japanese overseas cooperation volunteers, development cooperation programmes (investment in and financing of development projects), emigration services and the recruiting and training of qualified Japanese experts for technical cooperation.

The government-based technical cooperation is conducted through six programmes: Training Programme for Overseas Trainees; Youth Invitation; Expert Dispatch; Equipment Supply; Project-Type Technical Cooperation; and Development Survey. The programmes of Training, Dispatch of Experts and Supply of Equipments and Materials may be provided separately or in combination. The Project-Type Technical Cooperation programme integrates technical cooperation from planning to implementation and combines those three forms of cooperation (supply of equipment, training and dispatch of

experts) in a development project to be carried out by the country concerned. It includes the following programmes (which could also be called sub-programmes): Technical Cooperation Centre Programme; Health and Medical Cooperation Programme; Population and Family Planning Cooperation Programme; Agriculture, Forestry and Fisheries Cooperation Programme; and International Development Cooperation Programme.

The Agriculture and Forestry Development Programme accounts for 9.3% of the total JICA expenditure on technical cooperation. It aims to provide assistance in agriculture, forestry and fisheries development to developing countries in order to increase food production, raise farmers income and living standards through an increase in productivity. These forms of cooperation include assistance for enhancing the research and development capacity in developing countries.

It should be noted that Japanese technical cooperation is usually tied to the purchase of Japanese goods and services. Sixty-seven percent was in this form in 1986.

Bilateral aid is focused geographically on Asia (71% in 1985), with Africa receiving 11.4% and Latin America 9.2%).

Presently, Japan is supporting two forestry projects in Brazil.

The Netherlands/Tropenbos Foundation

The net ODA from the Netherlands to developing countries and multilateral agencies was $2.09 billion in 1987 and $2.23 billion in 1988, accounting for 0.98% of its GNP in both years, and representing a 2% increase in ODA volume over the year. Over the past ten years, Dutch ODA/GNP has remained at just under 1.0%, making it one of the highest among DAC countries - nearly three times the DAC average and exceeding the DAC ODA/GNP target of 0.7%. Approximately 30 percent is delivered through multilateral channels. A large share of bilateral aid (23 percent) is consistently devoted to agriculture, ranking it second among DAC countries. Bilateral technical cooperation expenditure was $543 million from the total in 1987, ranking it fifth largest among DAC countries.

Dutch foreign aid is principally the responsibility of the Directorate General for International Cooperation (DGIS), within the Ministry of Foreign Affairs. This agency is charged with planning, programming, and executing all multilateral and bilateral development programmes of the Netherlands (with the exception of those affecting the Netherlands Antilles). Other ministries involved in the development process, particularly with regard to policy making, are the Ministries of Finance, Foreign Affairs, Economic Affairs, and Agriculture and Fisheries.

The planning periods for bilateral aid run for four years. The administration of TC rests with the DGIS. Aid efforts are concentrated on national and regional planning, infrastructure projects, agriculture and industrial development, health care, management organization and knowledge transfer.

As technical cooperation between Brazil and the Netherlands has not been very significant, only the Tropenbos Foundation, which specifically deals with forestry, will be examined in this section.

The Tropenbos Foundation was created in June 1988 from the Tropenbos Programme Commission which terminated officially on that date. The Foundation will proceed with the activities started earlier by the Programme. The basic purpose of Tropenbos is the funding of a management strategy for sustainable land-use of tropical forest areas based on an understanding of the interactions between climate, vegetation and soil.

The Tropenbos Foundation annual report (1988) noted that a Board and a Scientific Advisory Committee (SAC), to be nominated in 1989, is to

have responsibility for all activities in the framework of the Tropenbos Programme. It is envisaged that the board will consist of six members. The SAC will be made up of approximately six members, both Dutch and non-Dutch. Its office, located in Ede, is responsible for operational activities.

The internationalization of the Programme, founded on its original philosophy, will slow down as funds made available by participating Dutch ministries have been limited. However, its first goal is to establish cooperative links with scientific organizations not yet involved with Tropenbos in its on-going research projects.

Tropenbos has funded projects on tropical forestry in Colombia, Gabon, Indonesia and the Ivory Coast. Research activities will be established in Guyana if financial resources are available. Besides the funding of research projects, its activities will include training. As noted by the Tropenbos Foundation annual report (1988), Brazil was supplied with two scholarships.

United Kingdom/Overseas Development Administration (UK-ODA)

Net official development assistance from UK to developing countries and multilateral agencies amounted to $1.86 billion in 1987, ranking eighth among DAC countries and accounting for 0.28% of the GNP. Bilateral technical cooperation expenditures were $462 million in that year. There was a sharp rise the following year, 1988, of 21% in real terms to £2.6 billion, representing a ODA/GNP ration of 0.32%, the highest it had been since 1985, when Britain experienced a decline in foreign aid. Recent additions to the aid budget have considerably increased available development assistance resources.

The Overseas Development Administration (UK-ODA) is responsible for managing the entire UK aid programme to developing countries. It is part of the Foreign and Commonwealth Office and is headed by the Minister of Overseas Development. The headquarters is divided between London, England, with responsibility for bilateral and multilateral cooperation, and East Kilbride, Scotland, with responsibility for recruitment and administration of personnel under its overseas programmes. Total UK-ODA personnel is approximately 1,600.

As part of this programme ODA has commissioned the Oxford Forestry Institute (OFI) to act as the Resource Centre for forestry and to manage its Research Strategy in Forestry and Agroforestry. The Natural Resources Institute (NRI) is an agency of ODA and maintains ODA's Corps of Specialists in Forestry (some twelve professionals) and manages several overseas assistance projects.

The main aim of UK aid is to improve the living conditions of people in the Third World. Priority is given to the poorest developing countries, poor people and their basic needs. Thus health, education and agriculture make up the basis of its cooperative programme. Marked attention is paid to training, sanitation, housing, developing and conserving the environment and to infrastructure including roads and energy. While recognizing the very important role played by aid in the welfare of poor countries, UK-ODA stresses the need for other measures of equal or greater importance, such as fair trade policies for developing countries and the adoption of policies by developed as well as developing nations to reduce the burden of debt and encourage sustainable economic growth.

British aid is usually made available as technical cooperation or in the financial form. TC has been carried out by providing experts from UK and training local people. Most of the financial aid is used to cover new capital investments and to allow existing projects to continue.

ODA (1989) stressed its concerns about deforestation and reafforestation, including the effects of climate changes, and is pursuing the following goals:

- to direct more of its aid to forestry;
- to make more funds available for forestry;
- to encourage more funding for forestry projects from British NGOs;
- to continue to support training and institution-building in developing countries;
- to continue working closely with UN bodies such as UNEP and through the FAO Tropical Forestry Action Programme and ITTO agreement.

One of the tasks of UK-ODA is to assess continuously the current situation in a number of developing countries to determine where the most urgent needs are. Based on these studies and on appraisals of the proposals, financial resources can be set aside for a particular country. Discussions then follow between UK-ODA and the recipient country to determine which projects suit the most urgent needs. All proposals are subject to economic, financial and technical appraisal. Amounts over £1.5 million require the approval of the UK Minister for Overseas Development.

The main responsibility for management rests with the recipient government or its agents/institutions. UK-ODA monitors the projects periodically up to the final evaluation report.

UK-ODA has supported the forestry project "Research on rainforest regeneration in Maraca" in Brazil. In addition, a new programme for TC on forestry research, mostly centred in the Amazon region, started in 1990.

The United States of America/Agency for International Development (US-AID)

The US is the single largest source of development assistance in the world. In 1987, ODA disbursements totalled $8.95 billion and rose 6 percent in 1988 to $9.77 billion, representing 0.20% of GNP. Official bilateral disbursements for technical cooperation, in 1987, were $1.749 billion, second only to France. The February 1989 US Memorandum to the DAC states that US development assistance efforts have been and will continue to be constrained by the size of the Federal budget deficit.

Bilateral aid is managed by the Agency for International Development (US-AID), established in 1961. It is part of the Department of State and is headed by an Administration. Its headquarters, in Washington, D.C., includes the Office of the Administrator, the Office of the Executive Secretary, a Board for International Food and Agricultural Development staff, seven staff Offices, six Functional Bureaux and three Geographic Bureaux. The staff Offices and Bureaux are responsible for specific tasks. Some of the functional bureaux of relevance to this section are Science and Technology Bureau (S&T), Program and Policy Coordination (PPC) and External Affairs. The three geographic bureaux comprise: Africa; Asia and Near East; and Latin America and Caribbean.

A national support organization, the International Fund for Agricultural Research (IFAR) was established in 1986 in order to diversify and broaden the financial support base in the US for agricultural research. Current IFAR efforts focus on: developing cooperative research projects;

promoting international agricultural research; and exploring the use of blocked currencies and debt purchases to generate funds.

The main purpose of US development assistance is to promote its interests abroad, along with objectives such as institution-building, technology transfer (including research and development in agriculture and forestry) and assisting private sector growth. It covers all major sectors, such as agriculture, health education, human resource development and energy. Research and development in agriculture and forestry are significant components.

Assistance is provided worldwide in the form of loans or grants to selected countries to finance technical advisory services, engineering and economic feasibility studies, engineering design, construction services and equipment procurement.

The US is not currently providing as much bilateral assistance to Brazil as it did in the 1960s. US supported projects are listed in a subsequent section.

5.3 NON-GOVERNMENTAL ORGANIZATIONS (NGOs)

The Union of International Associations (1986) distinguishes three types of international organization: intergovernmental organizations (IGOs), international non-governmental organizations (INGOs) and multinational enterprises. The Union has a set of seven rules to identify an INGO relating to aims, membership, structure, officers, finance, autonomy and activities. The United Nations Economic and Social Council (ECOSOC) has a more simple definition for INGOs: "any international organization which is not established by intergovernmental agreement shall be considered as non governmental for the purpose of these arrangements, including organizations which accept members designated by government authorities, provided such membership does not interfere with the free expression of views of the organization". Grainger (1984) notes that there are many different types of NGO with a wide range of purposes and activities, such as:

- development aid agencies, which may provide either financing, material, technical or personnel assistance, or any combination of these (e.g. the Rockfeller Foundation);

- organizations concerned with education, research and/or training;

- professional associations (e.g. the Commonwealth Forestry Association and Sociedade Brasileira de Silvicultura (SBS);

- special interest pressure groups (e.g. Friends of the Earth).

DAC country contributions to NGOs involved in development are in the order of $3.5 billion, which was approximately 10 percent of official aid in 1986 as estimated by OECD/DAC (1987). It also reported many features about NGO assistance, such as: much of the activities are either through or in cooperation with NGOs of the recipient country; they can work with local or regional governments; their experts often charge less; and they tend to direct their assistance toward the poorer elements of the community. These organizations usually raise money for their work from voluntary and private sources, in addition to receiving grants from country governments and multilateral agencies.

The significant role of NGOs in international cooperation can be clearly identified in the World Bank (1988) and OECD/DAC (1987, 1988) annual reports as well as in the information given by UNEP (1979) and from

other sources. IDRB considers these organizations cost-effective in implementing social service and income generating projects among poor communities and as providing a good source of project ideas. It stresses that non-governmental organizations have contributed substantially to the Bank's policy on social costs of adjustment and environment. A Bank-NGO Committee provides a useful annual forum for policy discussions. The OECD/DAC (1987) reports the deep roots in aid community partnership with NGOs and notes that NGOs have influenced the agenda of ODA programmes.

The World Bank (1988) has prepared, for the guidance of its staff, an operational manual concerned with collaboration with NGOs aimed at encouraging the development of contacts with those organizations. It examines the types of collaboration and advantages and constraints of working with NGOs.

UNEP (1979) declares itself satisfied with the growth in number and effectiveness of NGOs . The United Nations General Assembly gave UNEP a specific mandate to work with non-governmental organizations, recognizing the crucial role they played in stimulating governments to convene the UN conference on the Human Environment in Stockholm which recommended the foundation of that agency.

Cassen & Associates (1986), who extensively studied aid, note that NGOs probably administer the largest part of technical cooperation provided directly to poor communities. In their view, they are more effective agents of change than governments due to their commitments to community involvement and their reliance on local staff. However, these types of organization have disadvantages, such as a preference for welfare rather than development activities and a tendency to operate with minimal management and often without conventional financial accounting in addition to resisting collaborating with governments if that might lead to loss of their independence. They consider also that generalizations about the effectiveness of NGOs' work cannot be made as some assessments have found their performance to be extremely variable. According to these authors, the work of such organizations has not been as widely recognized as it should; nevertheless they have a marked potential for development assistance.

The International Council for Research in Agroforestry (ICRAF) and the International Tree Crops Institute are noted by Grainger (1984) as examples of NGOs whose main concern is with forestry. Other international NGOs are reported by him as specialized in environmental issues and having occasional "campaigns" on forest-related topics. He states that organizations of this type, in the DAC countries, have supported the cause of forest conservation rather than afforestation. In his view, the constraints on the effectiveness of NGOs in promoting, funding and implementing afforestation programmes include poor general awareness of the problem and lack of coordination between NGOs and governmental and multilateral agencies.

Although these campaigns raise awareness of environmental problems and help to overcome them, they do not disclose the full truth about these issues. Many are commonly based on strong emotionalism, or even hysteria, and consequently tend to be fallacious. Thus, incorrect data are frequently used and information that should also be shown, as the other side of the coin, is not even mentioned. Scientific facts are often mixed with non-proven claims.

Many developing countries have been portrayed as the villain of mankind, as if they were the only ones in the world with environmental problems. However, insufficient attention has been paid to the possible causes of these problems. Politicians and the general public in many developed countries ignore, or pretend to ignore, the fact that their countries have attained their present standards of welfare in parallel with forest clearances as well as serious pollution from a wide variety of sources

which are still continuing. It has not yet been explained that financial resources which should be used to prevent deforestation resulting from logging and burning are instead allocated to deal with the debt burden. Neither has it been made clear that this heavy burden has originated mainly from financial and economic measures and policies established by the developed/industrialized countries, which reflect negatively on the activities and earnings of Third World countries.

FAO (1988) records the publication of the booklet "Expanding role of non-governmental organizations (NGOs) in national forestry programmes" which summarizes the views and recommendations emerging from three regional workshops on NGO involvement in Africa, Asia and Latin America. These meetings aimed at increasing the role played by these organizations in forestry sector.

The following section will examine briefly those NGOs which have provided aid to the Brazilian forestry sector along with those which have the potential to do so. It will also refer to those which have been more conspicuously influencing or trying to influence the aid policies of donor agencies on forestry or forestry-related projects in Brazil.

Friends of the Earth International (FoE)

Friends of the Earth International was founded in 1969 by David Brower to generate a new sense of responsibility to the environment and ensure that environmental issues are publicly debated. Its headquarters are in San Francisco, California, USA.

There are national groups established in sixteen countries which carry out the activities of the organization with considerable collaboration among them. However, it is not clear whether these are organized internationally (Union of International Associations, 1986). Presently, they are carrying out a campaign to save the tropical rainforest. Leaflets handed out by the UK - Earth of Friends reveal that the campaign has the following purposes:

" - to use consumer policy to encourage sustainable management of forest resources;

- to stop financial institutions funding irresponsible development projects in the tropics;

- to lobby transnational companies who are responsible for opening up and polluting rain forests;

- to assist the forest-dwelling people and others in their fight against forest destruction."

Friends of the Earth and similar organizations try to ensure that consumer countries only import timber produced from forests managed on a sustained-yield basis. They have also been putting considerable pressure on international development agencies to stop them from financing projects which may lead to deforestation. Organizations such as ITTO have been lobbied to channel more money into sustained-yield management projects.

International Union for Conservation of Nature and Natural Resources - now called World Conservation Union - (IUCN)

IUCN, founded in 1948, is the world's largest international membership alliance devoted to conservation. Its membership includes both

governmental agencies, private institutions and NGOs. Membership dues provide the majority of unrestricted financial support and bilateral aid agencies largely fund its field projects.

The basic structure of IUCN comprises a General Assembly and a Council. The General Assembly is made up of representatives from its member bodies: 58 national governments, 121 government agencies, 336 national and international non-governmental organizations. The Council is composed of a President, 24 Regional Councillors, 5 co-opted Councillors, and 6 Chairmen of Commissions. These are elected by the General Assembly, except for the co-opted Councillors who are appointed by the elected Council members.

Its headquarters is located in Gland, Switzerland, and according to the Union of International Associations (1986) operates with 80 staff. IUCN has three Centres under its management: the Conservation for Development Centre, in Gland, Switzerland; the Environmental Law Centre, in Bonn, Germany; and the World Conservation Monitoring Centre, in Cambridge, UK, which provides information on endangered species, parks, critical sites and species in trade.

IUCN's objectives are to:

- promote sustainable use/management of natural resources;
- provide information and monitor the environment;
- undertake research and analysis in conservation of biodiversity;
- devise action plans to reverse environmental destruction;
- identify and preserve critical sites for conservation of biodiversity;
- provide an advisory role for impact of projects on endangered species and fragile ecosystems.

IUCN achieves its basic objectives through the following: monitoring nature conservation worldwide, and drawing the attention of concerned organizations to the existing problems, for action; planning conservation action at the levels of strategy, programmes and projects using the information obtained from monitoring; promoting conservation action in the field by all types of organizations through dissemination of information; and providing assistance and advice necessary for the achievement of conservation action.

IUCN also serves as a scientific and programming body for the World Wide Fund for Nature (WWF), helping in the design and management of its projects. It is also in close cooperation with UNEP.

A World Conservation Strategy was prepared by IUCN in 1980, commissioned by the United Nations Environment Programme (UNEP) which, together with WWF, provided funds for its preparation and implementation. This Strategy Programme aims at helping to achieve sustainable development through the conservation of natural resources. Identification of conservation action priorities, proposals of effective ways of achieving the proposed objectives and education are the basis of the strategy.

Membership fees, grants from bilateral and multilateral agencies make up the IUCN funding which has also had support from WWF and UNEP.

IUCN has been active in Brazil, as reported in a subsequent chapter.

International Union of Forestry Research Organizations (IUFRO)

IUFRO was established in 1890 to 1892 as a non-governmental organization. Its main purpose is to promote international cooperation in scientific studies embracing the whole field of research related to forestry, by facilitating exchanges of ideas, methods, data and results among individual researchers throughout the world and by creating and maintaining contacts between Member organizations. Membership includes some government, university and private research institutions, comprising 15,000 affiliated scientists, in one hundred countries.

The International Council is the supreme authority, regulating the affairs of IUFRO. It is composed of one representative and a deputy representative from each country which has at least one Member Organization. It normally meets only when a IUFRO Congress is in session, to establish major policies and to elect a President, two Vice-Presidents and nine Executive Board Members.

The Executive Board is responsible for the operational activities of IUFRO and is made up of the President, two Vice-Presidents, the immediate Past President, the Treasurer, the Secretary, the Divisional Coordinators, nine members from geographical regions and up to four additional members. Members are distinguished scientists from member organizations of whom President may appoint two after their approval by the Executive Board. The Board meets during the IUFRO Congress and normally once every year between Congresses. Observers may be invited by the President and FAO may appoint a representative to attend meetings but they are not entitled to vote. IUFRO activities are carried out through the six following Divisions whose main function is to provide an organizational link among Subject Groups and Project Groups and also between these Groups and the Executive Board:

Division I	-	Forest Environment and Silviculture
Division II	-	Forest Plants and Plant Protection
Division III	-	Forest Operations and Techniques
Division IV	-	Planning, Economics, Growth and Yield, Management and Policies
Division V	-	Forest Products
Division VI	-	General Subjects

Each Division comes under a Divisional Coordinator assisted by one or more Deputy Coordinators. Scientific activities are carried out by Research Groups of which there are two types: Subject Groups and Project Groups. The allocation of Subject Groups and Project Groups to Divisions is decided by the Executive Board. Subject Groups deal with problems falling primarily within the scope of one Division and Project Groups deal with problems which extend substantially beyond the scope of any one Division. Each Subject Group and Project Group will normally have a Leader and one or more Deputy Leaders. Either of these Groups may contain Working Parties, as required, to complete specific tasks within the Groups' programme work. Each Working Party will normally have a Chairman and one or more Co-Chairmen.

Proposals for the creation of Research Groups should be submitted to the Divisional Coordinator as they are established by the Executive Board on his recommendation. Proposals for meetings should be submitted to the Group's Leader or directly to the Divisional Coordinator.

IUFRO has a permanent Secretariat in Vienna, Austria, with provision of facilities by the Austrian Government. It is administered by the IUFRO Secretary assisted by a very small staff. It is worth noting that the large

number of IUFRO activities carried out throughout the world is possible due to the division of work among its members.

Basically, IUFRO operates by facilitating exchanges of ideas, methods, data and results among research scientists and Member organizations, by encouraging the establishment of common programmes of research cooperation in their execution, by recognizing outstanding contributions of scientists through various awards and by development assistance. Its functions are also exercised by periodically summoning meetings which may be combined with excursions and by cooperating with national and international organizations, especially with FAO.

IUFRO activities in developing countries have expanded since 1983 with the implementation of its Special Programme for Developing Countries (SPDC), which basically has aimed to identify regional forestry research needs of high priority in developing countries and to provide training and improved flows of information.

IUFRO is funded by membership subscriptions. Brazil has eight forestry entities as members. Any individual member is entitled to join one or more of the Research Groups.

The Nitrogen Fixing Tree Association (NFTA)

The Nitrogen Fixing Tree Association (NFTA) is an international non-profit organization whose objective is to encourage more and better use of nitrogen fixing trees (NFTs) for small farmers in the developing tropics. It acts as a catalyst to research, development and use of NFTs to help meet the need for fuelwood, fodder, fertilizer, timber and other wood products and assists organizations and people to plant and use the best available NFTs (NFTA, 1988).

The governing body is a Board of Directors made up of five members from developed and developing countries. The Association's headquarters is located in Waimanolo, Hawaii, USA, with a staff of twelve. It has a world-wide network of more than 1440 Associates in 103 centres.

NFTA operates by providing technical advice, training, research guidelines and high quality seed of selected varieties of priority NFTs. It also carries out its own research in key areas such as the breeding of varieties for increasing yields and tolerance to acid soils and colder environments. A Cooperative Planting Programme, with 268 trials in sixty countries, assists people to determine the best NFTs for their local environment.

The Association is funded by contributions from members and grants from donors. Its public support and revenue, in 1989, was estimated at $367,222 and total expenses at $333,384.

Pan American Development Foundation (PADF)

PADF is a non-profit, private voluntary organization, established in 1962, in the US, supporting development activities and strengthening the private sector in Latin America and the Caribbean. It operates through programmes on micro-enterprise development, vocational training, health services, agroforestry and special projects.

The Foundation governing body is a Board of Trustees formed from a maximum of forty-five members, which meets at least once a year. Its members are drawn from public and private service in Latin America and the US. Five senior officials of the Organization of American States (OAS) have ex-officio representation on the Board. An Executive Committee supervises the operations. It has a supporting staff of seventeen.

Foundations and institutes from thirty American countries comprise PADF membership. The headquarters is located in Washington, D.C.

PADF operates by providing financial support (grants, loans and guarantees), technical services (assistance, studies and research), and material services (equipment, tools and machinery). It has managed an agroforestry and rural development programme since 1981.

Activities are financed by contributions from individuals, OAS, and from US corporations and foundations together with income from interests on loan programmes, investments of cash resources and fees for technical and material services.

An agroforestry project has been supported by the PADF Brazil.

World Wide Fund for Nature - formerly World Wildlife Fund - (WWF)

WWF was founded in 1961 with the main purpose of conserving world living and non-living natural resources. It works closely with IUCN which gives advice on policy (Union of International Associations, 1986).

An International Council, meeting annually, and a Board of Trustees make up WWF's basic structure. Membership is composed of international members and also twenty-four national affiliates in twenty-four countries. Brazil was not a member until 1986. A staff of fifty provides the administrative support. The headquarters is located in Gland, Switzerland.

It operates by making grants to individuals and institutions as well as by supporting educational programmes, conferences, lectures, courses and publications. Its efforts emphasize endangered species endangered ecosystems which are representative. WWF activities include a campaign launched in 1982 to save tropical rainforests.

A total of sixty-eight million Swiss francs was made available by national affiliates in 1983.

Jointly with INPA, WWF is currently supporting a long-term (20+ years) research project, "The Minimum Critical Size of Ecosystems" (MCSE), in central Amazonia, north of Manaus, of species loss in a size series of forest patches, ranging from 1 to over 10,000 ha. (Prance & Lovejoy, 1985). WWF has also supported forestry projects in Brazil together with the US Conservation International.

INTERNATIONAL FORESTRY COLLABORATIVE RESEARCH

The main concern of research institutions has usually been how and where to get financial support for their activities. However, the operational form of executing research is equally important. This is especially true when money is scarce and facilities and trained personnel are limited, which characterizes the usual condition in developing countries. Thus, to surmount this situation collaborative or joint research has been adopted at national and international level. It is, therefore, worth providing essential information on the general principles, basic types and variables involved in collaborative forestry research. A few examples of its operational forms will be briefly examined. This is aimed at helping institutions interested in establishing or participating in such arrangements.

Collaborative work of institutions to deal with specific research topics aimed at overcoming common problems characterizes networking. It has been very common in agricultural research and widely adopted by European countries during the colonial period, as well as in the US since the 1920s as noted by Plucknett and Smith (1984). In the forestry sector this form of activity is more recent, although IUFRO has adopted an informal type of collaborative work since its foundation at the end of the last century. However, a more formal kind of joint research has been added to IUFRO's activity since the creation of the Special Programme for Developing Countries (SPDC) in 1983.

The formation of country blocks along with a growing globalization of the world economy have already been discussed. They tend to bring about the integration of an increasing number of activities including research. The Programme of Science and Technology for Development of the Commission of the European Communities which promotes and supports networking is a good example of such a tendency, as it is based on the existence of the EEC. Agencies like IDRC and the World Bank also encourage and support collaborative research along, with entities such as CGIAR (Consultative Group on International Agricultural Research). The CGIAR guides and supervises the activities of thirteen existing International Agricultural Research Centres (IARCs), e.g. CIAT (Centro International de Agricultura Tropical), CIMMYT (Centro International de Mejoramiento de Maiz y Trigo), ICRISAT (International Center for Agriculture Research in the Dry Areas) and IBPGR (International Board for Plant Genetic Resources). Their activities in developing countries are largely based on networking and are supported by a number of bilateral and multilateral donors such as IBRD and IDB.

Collaborative research arrangements such as networking and twinning were also recommended by the International Task Force on Forestry Research which recommended improved coordination of international forestry research under the auspices of donor entities. At their meetings in 1990 and 1991 the CGIAR agreed to accept conditionally ICRAF as a member and to establish a new institution for forestry research.

6.1 TYPES OF COLLABORATIVE RESEARCH

Forestry research can be executed in different ways to overcome existing problems. The basic forms are the traditional or individual and the collaborative. In the **traditional approach** the institution individually carries out the usual steps of the research process, such as: assessing the problems; establishing strategies and priorities; drawing up the project with

appropriate methodology; and implementing and extending the results to the users. Funds are made available by local (national) and/or international donors. Although assistance in the form of consultancy or equipment may be obtained from donors, sharing of problems and common efforts with other institutions does not occur.

Collaborative research involves informal or formal cooperation between institutions having a confluence of interests and/or common problems. Collaboration may include the sharing of information, materials, services, professional personnel and equipment, individually or in combination. Contributions of staff, training, materials, equipment or financial resources could occur if one institution belongs to a developed country.

Based on the number of participants, collaborative research may be carried out through twinning or networking arrangements. Nevertheless, there is much overlap between the two forms, depending on the particular project being considered. A number of institutions in developing countries currently adopt both approaches.

Concepts of collaborative work are found in Burley (1987) who recognized three main types of arrangement. In his view, **networking** is an informal or formal arrangement of cooperation between institutions with similar conditions and without the immediate resources for finding solutions to these problems individually. **Twinning** is an agreement between two institutions to strengthen one of them by the contributions of staff, equipment, training, materials or finance from the other. **Multiple twinning** is the arrangement characterized by one institution giving support to several institutions or, vice-versa, receiving support from several.

Twinning of institutions was studied by Cooper (1984) from many different points of view, including factors to be considered in determining the most appropriate situations for adopting this mechanism, design of services to be rendered, logistical and administrative support and human behaviour. An outline of possible contractual arrangements is also provided by this author. The most common form of twinning is where an institution in a developed country supports another in a developing country. It has usually been adopted between universities as part of an institution-building process. There are many examples of this, such as Oxford Forestry Institute (OFI), UK, and Moi University, Eldoret, Kenya; OFI and the Forest Research Institute of Malaysia; University of Freiburg (Germany) and Federal University of Parana/School of Forestry; and Ohio State University (USA) and University of Sao Paulo/ Escola Superior de Agricultura Luiz de Queiroz.

Networking has been widely adopted for tree breeding and its basic guidelines and structure are already well established (Burley & Cossalter, 1988; Burley & Barnes, 1988). A number of examples can be found in Burley (1987, 1989) and in Salleh & Tuck (1986), such as the Central America Tropical Pines Networking led by OFI and the ASEAN-Australian Forest Tree Improvement Programme.

Successful and recent examples of networking in Latin America are the CAMCORE Programme, Madaleña Project and EMBRAPA's Eucalyptus Breeding Project. CAMCORE activities are carried out by research institutions and private companies in Latin America and North America whose main concern is with tropical pines seed collection and tree breeding. There are nineteen entities involved, from nine countries, led by North Carolina State University, USA.

Camino (1989) summarized the Madaleña Project which is financed by AID/ROCAP and executed by CATIE (Centro Agronomico Tropical de Investigacion Y Enseñanza), Costa Rica, in collaboration with the national forestry institutions of Central American countries (Guatemala, El Salvador,

Honduras, Nicaragua, Costa Rica and Panama). The purposes of this networking include species/provenance trials and tree breeding of existing materials, silvicultural and management studies along with the development of a data base of silvicultural information.

EMBRAPA's network on eucalyptus tree breeding is an example of successful and unique collaborative research, which in spite of being national has international dimensions. It comprises 57 provenances of 12 species from seeds collected individually from 1015 trees. A total of 247 provenance/progeny trials have been established in 59 different locations. The project also includes basic populations and is spread all over the country in a wide variety of soils and climates, from the tropical Amazon region in the Equator up to the temperate boundaries of Uruguay at a latitude of 32 degrees south. The total experimental area is approximately 699 hectares. The work is being shared by 28 participants (22 private forest companies and 6 official government institutions) as well as universities.

In order to carry out the project, EMBRAPA's National Forest Research Center (CNPF) adopted an innovative form of network operation. The species were assessed by the participants with the Center's assistance. This assessment was based on a number of previous provenance trials and on the performance of commercial plantations established all over Brazil. EMBRAPA sent out one of its tree breeding experts to collect the seeds in Australia with the assistance of CSIRO. The final project was drawn up by CNPF taking into due account the partners' different aims and their technical contributions. To maximise seed utilization, seedlings were produced in only five of the participants' seed orchards, which were located in appropriate regions of the country. Participants collected and transported the material according to the design and established needs. Combined analysis has been accomplished by CNPF as well as individual analyses by the interested participants. The initial costs of the project including seed collection, estimated at $200,000, were borne by EMBRAPA with partial financial assistance from the World Bank. The other expenses such as planting, maintenance, fire control and data collection are covered by the participants. CNPF is responsible for combined analysis of the data.

The identification of general types of arrangements for collaborative research is relatively easy as it is fundamentally based on the number of partners. It is a very difficult task, however, to define operational forms or systems of forestry networks. Perhaps, a share-information type is the only very characteristic and immediately recognized one. It is adopted by IUFRO, where information is mainly shared through meetings, tours, correspondence and publications. Its work is fundamentally grounded on the interest and goodwill of its members. Researchers are encouraged to participate through their own resources.

Collaborative research involves a number of variables which can (and in practice are) combined in many different ways, producing a wide variety of operational systems. Thus, they are normally recognized by the name of the leading or coordinating institution. The operational systems may be influenced by the supporting donor as well. Burley (1989) has attempted to classify the existing operational forms of networking and identified four major types:

1) collegiate voluntary type (e.g. traditional IUFRO *modus operandi*);

2) invitational type with little financial support (e.g. OFI);

3) institutional type with considerable financial support (e.g. ICRAF);

4) catalytic type (e.g. IUFRO SPDC).

Based on such subjective criteria many other distinct forms could be similarly identified, as, for instance, the CAMCORE type already quoted. In this "type", participants equally fund the enterprise which is carried out in Latin and North America. The basic objective of this networking is to preserve the genotypes of coniferous species in Central America and Mexico through the collection of seeds, which are planted in preservation banks on land belonging to the individual cooperators in the host country. An equally important activity is tree breeding of species/provenance agreed upon by all partners. The leading institution collects the seeds which are shared by the cooperating entities. Trials are established under the same experimental design for a combined data analysis. Sharing of information is accomplished through annual meetings and through periodical publications as well as field trips and workshops conducted on cooperator properties. In seven years, up to 1987, 5,000 mother trees of 20 species of coniferous and hardwoods had been collected.

Joint research projects promoted and funded by the Commission of the European Communities could be another such type of collaborative research. They offer a unique form of cooperative work where only recognized institutions with well-established expertise and an adequate level of equipment are eligible. A joint project is carried out by institutions sharing common problems under the leadership of a principal proposer. Each part is responsible for one aspect of the work. The principal proposer provides the linkage between partners and the Commission. He allocates the funds made available by the Commission to the partners and has overall responsibility for the submission of all technical progress reports and statements of expenditures to the donor. The leader has also the task of preparing a joint report to the Commission.

The Madaleña Project, described above, is a further example of collaborative forestry research. It has its own variables adjusted to the local circumstances and to donors' requirements.

Due to the reasons pointed out, it would be of minor advantage to attempt a comprehensive classification of operational forms of collaborative forestry research. Nonetheless, to help institutions intending to lead/establish networking as well as ones wishing to participate it is worth summarizing the major operational variables involved:

- funding
  . (external, internal/local)
  . (permanent or temporary)

- services provided or received
  . assessment of problems
  . drawing up the project (methodology, design)
  . establishing the project
  . collection of data
  . analysis of data
  . dissemination of information
  . training

- materials, equipment and facilities provided or received

- leadership or coordination
  . formal or informal, initial phase or all phases, with or without provision of resources and/or services

- number of institutions involved

- nature of what is shared (information, materials and/or personnel)

- operational form of the project design and submission of proposals to donors (e.g. under the coordination and assistance of a leading institution, by participants individually to sponsor or prepared by the leader and divided into parts for participation of institutions)

- requirements of the donor

It should also be noted that many of these variables can be considered separately or in combination. Some of them can change in extent, for instance degree of coordination.

6.2 FACTORS FOR SUCCESS IN COLLABORATIVE RESEARCH

Plucknett & Smith (1984), examining collaborative work in agricultural research identified seven main principles for success in networking:

1. "The most important is that the problem be clearly defined and a realistic research agenda drawn up"

2. "A second essential element in a viable collaborative effort is that the problem be widely shared. Only when participants feel that they are likely to gain from the venture will they be motivated to contribute."

3. "The third principle then follows that strong self interest underpins productive networks; effective networking cannot be mandated."

4. "Participants [must] be willing to commit resources, such as personnel and facilities."

5. "Outside funding [must] be available to facilitate the birth of networks and to keep them functioning for at least the first few years."

6. "Participants [must] have sufficient training and expertise to make a contribution."

7. "Networks need to be guided by strong and efficient leaders who have the confidence of the participants."

Local institutional stability should also be included as an important factor in any developing country participation. As forestry research usually requires a long period of time, frequent replacements of technical or decision-making staff, which is common in a number of these countries, could impede or halt local networking.

Nine main groups of problems in the existing forestry research networks were listed and examined by Burley (1987) and Burley & Barnes (1988): choice of species or topics; identifying the leading centre; identifying network participants; encouraging active participation and providing resources; communication and feedback; plant material; amount of material for comparative testing; experimental design; and comparability of assessments.

In the view of Sene (1989), based on African experience, the reasons for regional collaborative forestry research are: similarities in geography, ecology, history and institution; political background; better use of limited resources; and synergy effects. Analyzing the item resources, he points out the need for personnel stability along with the existence of adequate amount of funding at an appropriate flow as essential factors for the success of collaboration. He has also underlined the points that should be considered to obtain consensus on regional projects priority setting:

- the theme should interest the majority of countries in a homogeneous region;
- the project should take into due account the institutions' other local or regional projects;
- the project should be significant to country development;
- there should be opportunity for contribution from each national institution involved.

Success of collaborative forestry research requires a great deal of partner participation in all phases of the project, including assessment of problems/topics, setting priorities and drawing up the project. The division of labour among institutions should be discussed and agreed upon. Well planned and coordinated preparatory meetings are important to overcome existing problems among institutions and to make clear the significant and poorly understood items. A project outline should be allowed to circulate among future partners and their observations should be taken into due account.

6.3 ADVANTAGES OF NETWORKING FOR DEVELOPING COUNTRY INSTITUTIONS

The major advantages of collaborative research are to reduce costs, minimize duplications and boost research efficiency. Some other specific significant benefits of networking (Burley, 1989) are: combined analysis of data to examine interaction effects and plasticity of genotypes; publication and dissemination of results; and the training of research staff. Collaborative agricultural research was analyzed by Plucknett & Smith (1984) who noted that benefits are especially valuable to countries with limited funds and scientific manpower. They include the following as networking benefits: saving of time and money; upgrading the effectiveness of national programmes; workshops and training plays a crucial role in this effort; networks use existing facilities and staff rather than erecting buildings and acquiring additional personnel; donors generally regard networks favourably since the problems are likely to be widely shared and a consortium approach provides for the efficient use of funds; adoption of a common methodology permits more effective training as well as dissemination and use of results by user groups.

Despite the number of benefits that may be offered by collaborative research it should be kept in mind that networking and twinning are nothing more than auxiliary operational tools for achieving results and generating technologies under certain unfavourable conditions. They are successful when the institutions have the capacity to manage them. This refers mainly to qualified personnel of well administered entities who are able to take the best advantage of this kind of approach. Otherwise, only the other partner institutions, and mainly the leader one, will benefit from

it. The point is that networking and twinning themselves cannot overcome the existing problems of institutions and countries.
Depending on the operational form of networking, participation in the whole process should be total and should begin at the earliest possible time. For instance, in tree improvement projects, it is essential to share the whole process of assessment of species/provenances. If this sharing does not occur, future obtained data may only be of real significance to the leader/coordinating institution (for basic research and/or other purposes) as only it usually has the capacity to collect and analyze widely distributed data.

Networking tends to increase the technical and resource gap between participants and the leading institution. Depending on networking arrangements, more gains and prestige are achieved by the leading entity, often in the developed country, due to it receiving more donor support. Thus this becomes a vicious circle: stronger institutions are financed to establish and/or to participate in collaborative research in order to assist weaker institutions (in the developing countries); the stronger centres with the means and the capacity are in a better position to take advantage of networking and further improve their capabilities. In this process, improvement of weaker developing country institutions occurs, but at a much smaller extent.

Burley (1987), in his considerations about the problems of networks, noted that for most of the existing international networks the leading centre is located in a developed country remote from the plantation sites as well as from the natural origin of species. Nevertheless, in his view this is a reflection of the support given by local donor agencies to international development by encouraging their own national institutions to carry out research for the benefit of developing countries. In spite of this, it would be worth assessing the amount of financial resources made available by national and multilateral donor agencies to networking led by centres both in the developed countries and in developing countries, together with an estimate of the benefits to institutions in both groups of countries. However, this is not in the scope of this work.

To overcome this situation, it is crucial to identify and encourage centres in developing countries to assume a new role as leading institutions in international collaborative forestry research. This would present a challenge to multilateral and bilateral agencies which in fact want to improve forestry research worldwide as a significant part of the development process.

Training is the key factor to break the vicious circle. Thus, the training component of networks should be given significant attention. Trained personnel can take the best advantage of any kind from collaboration. Availability of facilities, equipment and material has never been a guarantee of achieving aims, unless they are put to good use by a well qualified staff. The institution building component of networking should always make possible the transfer of the highest technology adopted in the project.

NEW PERSPECTIVES OF INTERNATIONAL FORESTRY COLLABORATIVE RESEARCH

New perspectives for enhancing forestry research in developing countries through international institutional coordinating and funding mechanisms have emerged with the inclusion of international forestry research in CGIAR's mandate. This has materialized mainly due to efforts of entities such as the World Bank and IUFRO. These organizations have played a crucial role in a long crusade to convince donors to create and support a new system; its efforts as well as activities of the International Task Force on Tropical Forestry Research are reported. An overall view is presented of the CGIAR which will expend funds estimated at more than $200 million for agricultural research in 1990. Documents and events pointing out the need for strengthening research and forestry development in developing countries have already been reviewed by Callaham (1988) in his work on an expanded proposal for the International Council for Forestry Research and Extension (INCOFORE) system.

This chapter intends to provide information which will lead to a better understanding of the new international coordination and funding mechanisms for the Third World. It also aims at helping developing country forestry research organizations in planning their international collaborative research activities and in obtaining financial support.

7.1 A NEW SYSTEM: IUFRO EFFORTS, THE INTERNATIONAL TASK FORCE AND BELLAGIO CONFERENCES

IUFRO activities have expanded since 1983 with the creation of its Special Programme for Developing Countries (SPDC). SPDC's basic objective has been to identify urgent forestry research and training needs in developing countries. It was created in response to suggestions of the World Bank/FAO paper "Forest research needs in developing countries: time for a reappraisal?" (World Bank/FAO, 1981) presented at the XVII IUFRO World Congress in Kyoto, Japan, in 1981. This paper suggested reformulations of IUFRO's structure, proposed an International Research Secretariat and drew the attention of donor agencies to forestry research needs in developing countries. Specifically, it proposed that steps should be taken to extend IUFRO's activities into developing countries and to strengthen its capability in the dissemination of research information and general technical backstopping of research. These suggestions were endorsed by the Kyoto Congress Final Recommendations which proposed that the World Bank and FAO should jointly explore ways and means of implementing these recommendations and that steps should be taken to strengthen national forestry research institutions and to improve IUFRO's capability to serve developing country needs (WRI *et al*, 1985).

From 1984 to 1988, the SPDC organized regional workshops in Asia, Africa and Latin America with the basic purpose of identifying priority needs for forestry research in the developing countries together with the preparation of regional collaborative research proposals to be submitted to donors. Training courses have also been organized and offered to participants from developing countries. A small number of networking projects derived from the SPDC meetings have obtained support from national governments and aid agencies.

SPDC work has been effective but its efforts have remained below the needs of developing countries mainly due to its small staff and

insufficient funding. To cope with this situation the idea of establishing an International Council for Forestry Research and Extension (INCOFORE) to institutionalize coordination and funding worldwide emerged from IUFRO in 1985. The envisaged structure would be small and operating without any legal charter and entirely by common consent as is the case of CGIAR. It would have evolved from SPDC and basically would have consisted of a Secretariat, Board of Councillors and Regional Advisers. However, there was no support from the international donor community for either this proposal or an expanded version developed for IUFRO by Callaham (1988).

An international meeting on tropical forestry was held in 1987 at Bellagio, Italy, under the auspices of the Rockfeller Foundation, UNDP, the World Bank and the World Resources Institute (WRI) to examine global action to reduce deforestation. Among the conclusions (WRI 1987), was a recognition of the inadequacy of the existing forestry research system to overcome the present problems. Along with ten recommendations, the Conference proposed that an International Task Force should immediately be organized to prepare specific suggestions for policy responses, funding strategies and institutional mechanisms to implement these and related proposals. A second Bellagio Forestry Conference to be held in 1988 was also proposed.

The International (Bellagio II) Task Force on Tropical Forestry Research was convened in February 1988, in the UK, under the auspices of the Rockfeller Foundation, the World Bank, UNDP and FAO. "The Task Force was asked to 1) assess the potential benefits from a significant expansion of investment in research, 2) identify priority research opportunities, and 3) define and recommend appropriate institutional mechanisms to guide and coordinate an expanded global research effort to meet the potentials and the opportunities" (Holmes *et al.* 1988).

The conclusions of the Task Force include the following: significant additional investment in high priority forestry research has the potential for making substantial contributions to human welfare in addition to helping development efforts in other fields such as agriculture and energy; the current present weakness of national research systems in developing countries will be a major constraint to increasing research efforts and overcoming the existing problems; and an expanded research effort will not succeed unless there is an international focal point for addressing this weakness through financial and technical assistance.

After analyzing each of seven institutional options the Task Force recommended the establishment of an International Tropical Forestry Research Council (ITFRC) to provide a mechanism for channelling and coordinating international funding and technical assistance to improve forestry research in tropical countries. In the view of the Task Force the most suitable arrangement would be similar to CGIAR but comprise a small international research council instead of a large consultative group of donors. The structure proposed consisted of a Council of Trustees, an Executive Secretariat, a Forestry Technical Advisory Committee (FTAC) and Regional Coordinators. The Executive Secretariat would assist the Council and the Committee. The Council would govern the entire system answerable to a Donor Group formed by a consortium of interested sponsors of tropical forestry research. The operational work of the enterprise would be carried out through the existing regional and national institutions, building on their activities and simultaneously increasing their research capacity.

The Council's operational costs were estimated at $3 million per annum. External funding needed to accomplish the proposed tasks was envisaged to rise from $46 million reported in 1986 to about $90 to $100 million annually by 1995.

"In the view of the Task Force, none of these three bodies [CGIAR, FAO and IUFRO] should control the Council, but the linkages are,

nonetheless, so important that it is recommended that each should nominate a member for the Council of Trustees" (Holmes et al. 1988). However, both the IUFRO and Task Force approaches were to establish the new Council and the Tropical Forestry Research Programme as a complete entity even it would eventually be absorbed into the CGIAR system.

The Tasks Force proposal was examined at the Bellagio II Conference, held in the United Kingdom, at the end of 1988. It was attended by seven multilateral agencies, fourteen donor countries, two private foundations and participants from eight developing countries (including Brazil) as well as NGOs. Buckman (1989) and Fugalli (1989) noted that Bellagio II was a major event for international forestry research.

The meeting endorsed the five priority research areas proposed by the Task Force:

- agroforestry and watershed management
- natural forest ecology and management
- tree breeding and tree improvement
- forest products utilization and marketing
- policy and socio-economic research.

7.2 INCLUSION OF FORESTRY RESEARCH IN CGIAR'S MANDATE: WILL THIS BE ADVANTAGEOUS FOR DEVELOPING COUNTRY INSTITUTIONS?

As a consequence of the Bellagio II Conference Recommendations, the CGIAR decided to include forestry research in its mandate as part of an expansion of the CG system. The decision was made in the Canberra meeting, May 1989. The Technical Advisory Committee (TAC) was instructed to report to the Group, in November 1989, on appropriate mechanisms for providing the entity with technical advice covering all aspects of its expanded interest (CGIAR, 1989). It is worth underlining that seven international agencies, fourteen donor countries and two private foundations besides NGOs took part in that Conference.

Because of disagreements between ICRAF and TAC none of the eight proposed organizational options for incorporating forestry research into the system obtained consensus agreement. Discussions continued through 1989 and 1990, until the mid-term meeting of the CGIAR in Paris in May 1991, when the Australian Center for International Agricultural Research (ACIAR) agreed to act as implementing agency for the CGIAR to establish a forestry entity within the CG system (CGIAR 1991).

This will not be thoroughly discussed here because it is beyond the scope of this work. Only a few general comments will be made. It is believed the new system will not be established and functioning before 1992 as the matter has been dealt with cautiously and moved slowly. But, the decision to be made will be inadequate if it does not focus on strengthening the national forestry research institutions. A central forestry research centre cannot properly cover all the research needs of the regions. Before a new system is established, a small central coordinating entity should be installed as soon as possible, to fit the urgent needs of the developing countries.

CGIAR's decision will provide a new approach for international collaborative forestry research in developing countries. However, the actual benefits to them will depend on the policies, guidelines and mechanisms to be adopted by the CGIAR's Board of Trustees and the mandate of the new Centre. For the time being as the new Centre is not defined and functioning, a number of questions can be raised such as: will operational forestry activities be carried out based at the CGIAR's International Centres, as has been done in the agricultural research system? What will

be the relative participation of national and regional forestry developing country institutions in the new system? Would these institutions be actually and significantly strengthened through this new approach? How much will be the share of developing nations' forestry research institutions in the CGIAR's total financial resources?

Although forestry research is now represented in the TAC, of crucial importance is the existence of a significant representation of forestry research, or members concerned, in the Consultative Group. Otherwise forestry will be overshadowed by agriculture. The Task Force should have noticed this fact because its final report points out that the proposed Council and Tropical Forestry Research Programme "must function as a complete entity whether it stands alone or is eventually absorbed into the CGIAR's system". Certainly, it was concerned about competition between forestry and agriculture for funding within the system. Strengthening of existing national forestry research systems and their institutions is of paramount importance.

For all the matters already discussed as well as for those which follow it is worth learning more about the CGIAR.

7.3 CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH (CGIAR)

The CGIAR is an informal association of forty multilateral and bilateral donor organizations, private foundations and International Agricultural Research Centres (IARCs). It was formed in 1971 by FAO, UNDP and the World Bank to support an international agricultural research system aiming at improving the quality and the quantity of food in developing countries.

The CGIAR system comprises the Consultative Group itself, together with its Secretariat, the Technical Advisory Committee (TAC), together with its Secretariat, and the International Agricultural Research Centres (IARCs) which are the operational entities of CGIAR's enterprise.

The Consultative Group is composed of:

- donor members, i.e., voluntary international donor agencies and private foundations which provide significant grants for agricultural research in developing countries (there is a minimum contribution to qualify for membership);

- representatives of ten developing countries elected biennially from the five regions of the world.

The Group operates by establishing general guidelines and policies together with encouraging and coordinating funding for the system. Its Chairman is provided by the World Bank from its senior staff.

The Consultative Group's Secretariat has significant tasks in the system and also carries out the administrative activities of the entity in addition to being responsible for all matters not handled by TAC and its Secretariat. The tasks of the Group's Secretariat include: to facilitate implementation of its decisions; to advise on plans to meet future financial requirements; to ensure the system is being provided with adequate resources; and on behalf of the Group and with advice of TAC, to ensure that the resources provided to a Centre are being used according to the CGIAR's established policies. The Secretariat is located at the World's Bank headquarters in Washington, D.C. It is formed from ten regular staff members of the Bank working full-time. All Secretariat costs are borne by the World Bank.

The TAC originally comprised fifteen distinguished agricultural scientists drawn approximately equally from developed and developing countries. Membership was increased to eighteen at the 1989 Canberra meeting to include five forestry representatives. TAC's size will be revised again by CGIAR in 1991. Its functions include monitoring and reviewing Centres Programmes, advising the Group on international research matters; identifying policy issues for the attention of the Group; and encouraging the creation of an international network of research institutions and the effective interchange of information among them. Members are appointed by the Group on recommendation of the Co-sponsors for a two-year term of service. A number may serve another term, totalling four years. TAC meets three times a year and is served by a very small Secretariat based at FAO, Rome. Members of both Secretariats regularly visit Centres and attend Centre Board meetings as observers.

The International Agricultural Research Centres (IARCs) are the operational units of the CGIAR enterprise. They are responsible for activities to overcome problems of food production in developing countries. The strategy of each of the IARCs is global and has emphasized commodity mandates, but is now becoming increasingly eco-regional. Plucknett & Smith (1982) noted that their mission is to help strengthen the efforts of national programmes of developing countries through initiatives such as training courses, collaborative research and improved germplasm collection and not to compete with them. Each IARC is governed by a fully autonomous Board of Trustees with international membership. Legally, they are not responsible to the Consultative Group, any donor or country except on specific issues agreed on grant contracts. However, a number of Trustees are nominated by the CGIAR. The IARC Directors meet regularly to improve coordination and cooperation among themselves. Despite being linked to CGIAR, they are autonomous and therefore responsible for their own resources in order to meet the objectives established in their mandates. Their research policies are established in agreement with recommendations from the Board of Trustees and TAC.

Except for three specialized service centres established in the US, Italy and the Netherlands, the other IARCS are located in developing countries:

CIAT	Centro Internacional de Agricultura Tropical (Cali, Colombia)
CIMMYT	Centro Internacional de Mejoramiento de Maiz y Trigo (El Batan, Mexico)
CIP	Centro International de la Papa (Lima, Peru)
IBPGR	International Board for Plant Genetic Resources (Rome, Italy)
ICARDA	International Centre for Agricultural Research in the Dry Areas (Aleppo, Syria)
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics (Hyderabad, India)
IFPRI	International Food Policy Research Institute (Washington, D.C., USA)

IITA	International Institute of Tropical Agriculture (Ibadan, Nigeria)
ILCA	International Livestock Centre for Africa (Addis Ababa, Ethiopia)
ILRAD	International Laboratory for Research of Animal Diseases (Nairobi, Kenya)
IRRI	International Rice Research Institute (Los Baños, Philippines)
ISNAR	International Service for National Agricultural Research (the Hague, Netherlands)
WARDA	West African Rice Development Association (Monrovia, Liberia)

As a procedure, the programme together with the budget of each Centre is submitted to the CG Secretariat for approval before the beginning of the budget year. CGIAR donors contribute to the funding of the approved programme, but each donor decides the amount it will make available (usually more than $0.5 million). They also choose which Centre or particular activity will be supported. Funding is provided either as core funding, which is unrestricted or special or project funding, which is restricted. Special IARC projects outside the programme may, also, be funded by the donors.

The World Bank (1988) noted that donors' contributions to the CGIAR system were $209 million, including $33 million from the Bank, in 1987. Brazil has supplied $1 million project funding to five Centres of the system which deal with commodities and services relevant to its specific interests (EMBRAPA, 1989) and has carried out collaborative work with IARCs mainly through EMBRAPA, its official agriculture and forestry research organization.

BRAZIL'S FEATURES CONCERNED WITH INTERNATIONAL COOPERATION ON FORESTRY RESEARCH AND DEVELOPMENT

Brazil is the fifth largest country in the world, with an area of 851 million hectares. It extends 3770 kilometres from 5 degrees latitude north, to 33 degrees latitude south and a similar distance from east to west. The climate ranges from tropical humid in the Amazon Basin, tropical semi-arid in the Northeast, to subtropical and temperate in the central and southern regions. The population is estimated at 147.4 million, of which 60 percent is concentrated in the south and southeast of the country. The population density varies enormously, from 0.6 person per square kilometre in the Amazon region to more than 110 in the state of Rio de Janeiro. Over 56 percent of the population lives in urban areas. The population has been estimated to have grown at an annual average rate of 2.1 percent in the period 1985 to 1990.

A number of distinct elements affect the Brazilian forestry sector beyond the wishes of institutions, foresters and the people in general. It is crucial to examining them before carrying out any forestry enterprise or international cooperation project on research and development to prevent serious mistakes in its planning and implementation. To understand how such projects fit into Brazil's forestry sector and their compatibility with the economic and social needs of the country as well as the reasons for their failure or success, it is essential to review some features of Brazil related to the scope of this work. Thus, vegetation and forest resources are examined together with institutional and operational structures, legislation and environmental problems related to forestry and the organization of forestry research.

8.1 THE ROLE OF THE BRAZILIAN FORESTRY SECTOR

Forestry plays a significant role in the Brazilian economy. Statistics from the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA) have indicated that the gross national product generated by the forestry sector has been approximately three to four percent in the last decade. Exports of wood products increased from $299 million in 1978 to more than $1 billion in 1988.

Furthermore, it is estimated that wood has produced about twenty percent of the total primary energy in the country. Charcoal, as a heating and reducing agent, is extensively used in the steel industry, accounting for forty percent of the national pig-iron production. The Brazilian forestry sector has been sustaining over 400,000 permanent jobs for unskilled labour as well as supporting highly qualified technical personnel.

8.2 VEGETATION AND FOREST RESOURCES

The total forest and woodland in Brazil amounted to 514 million hectares of which 357 million were closed forests in the 1980s, as estimated by the World Resources Institute (WRI) and the International Institute for Environment and Development (IIED, 1989). The closed tropical rain forest, the "cerrado" and "caatinga" are the most important types of forest as far as timber resources are concerned. The remaining closed deciduous "Mata Atlantica" and the temperate forests in the South are relatively small in area and mostly protected by law for conservation purposes. Man-made

forests have been playing a significant role in the Brazilian forestry sector and in the nation's economy and will also be briefly examined.

Amazon tropical rainforest

The Brazilian Amazon closed tropical rainforest is estimated at 200 million hectares, based on Araujo *et al.* (1986) who have summarized a SLAR (side-looking airborne radar) survey in the region, carried out by the RADAMBRASIL project. This area represents twenty-six percent of the country and one third of the total world tropical rainforest.

Two types of closed tropical rainforest can be distinguished: the closed forest of the "terra firme" or upland area and the closed forest of the "varzea" or floodplain areas. For a long time the "varzea" forest was the main source of wood supply due to its easy accessibility by rivers. Thus, it was logged more intensively than the upland areas. Upland or "terra firme" forests, with their many species of present and potential commercial value, remained mostly intact up to the 1970s, largely because of their distance from the rivers and their consequent inaccessibility.

The construction of new roads in the Amazon region, especially in the 1970s, together with sizeable agricultural/livestock projects, government financed colonization efforts, mining, and the construction of hydroelectric plants with huge water reservoirs, has led to an increasing rate of deforestation. The most commercially valuable timber species in such areas are logged before clearing the land. They are currently the main source of wood supply, especially in the states of Para, Goias, Rondonia and Mato Grosso.

About ninety-one percent of the upland forests in Amazonia grow in a low fertility soil which is generally deep, acid and well drained. A closed cycle of uptake, deposition and uptake observed in the tropical rainforest is responsible for the seeming paradox of the largest biomass in the world existing on very low fertility soils. These soils become quite fertile upon the clearing and burning of the forest, but with the high temperatures and heavy rainfall, leaching and erosion tend to rapidly degrade the unprotected soil. However, fast growing natural regeneration takes place in the cleared areas which are left unattended and a new forest (secondary forest) is normally formed.

The Amazon forest has a huge timber volume. It is estimated at nearly 165 cubic meters per hectare or a total of over thirty-three billion cubic meters of timber. This volume, however, is made up of species of which only seven are currently being exported and twenty-four marketed nationally, as reported by Galvao (1981). A review by Mercado & Campagnani (1988) indicates that there are approximately four hundred potential commercial timber species in Amazonia, of which less than forty are currently accepted by the national market and still fewer exported.

"Cerrado"

The "cerrado" is a savanna type of vegetation characterized by well spaced trees interspersed with shrubs over grassy land. It extends over 140 million hectares, most of it in the central west and southeast regions, and the climate is distinguished by a pronounced dry season. This vegetation has been cleared for agriculture as well as for fuelwood and charcoal production for the iron and steel industry. It has an estimated volume of twenty-six cubic meters per hectare totalling 3.9 billion cubic meters of wood. The "cerrado" region has been growing in importance for grain production besides being the area where reforestation has taken place most intensively.

"Caatinga"

"Caatinga", or thornbush, is the typical vegetation of about ninety million hectares of the inland Northeast. It is characterized by ligneous, low, thorny, deciduous and succulent plants. This formation is associated with arid and semi-arid climates identified by a pronounced dry season. Droughts are recurrent and especially severe in the arid regions. Wood volume of the "caatinga is low and estimated at ten cubic meters per hectare making up a total of approximately 0.9 billion cubic meters. Its wood is currently used mainly for fuel. Certain areas are already in a process of desertification.

Man-made forests

Around the middle of the century large areas of the natural forests of the developed South and Southeast had been cleared for agriculture, grazing or as a source of lumber and raw material for charcoal production. The natural forest resources of these regions were heavily depleted. Reforestation activities were still incipient and the total man-made forests amounted to approximately 500,000 hectares in 1964. To face this bleak situation, in 1966, the Brazilian Government enacted a fiscal incentives law to stimulate reforestation. Its purpose was to provide a sound raw material supply for existing forest industries and the planned expansion of pulp and steel production for internal and external markets.

Since its establishment, the fiscal incentives law has undergone a number of modifications which gradually increased the participation of interested companies in the total costs of the projects. In the beginning, financial resources effectively applied to approved projects of afforestation or reforestation were allowed to be discounted from income tax up to the amount of fifty percent. The fiscal incentives for reforestation from the practical point of view ended in 1987.

In response to tax incentives, reforestation increased rapidly and plantations were established at rates of up to 400,000 hectares a year. Simultaneously, new local technology brought wood yields of over sixty cubic meters per hectare per year in eucalyptus stands, although the average was significantly lower: fifteen to twenty cubic meters. Presently, the total man-made forests in Brazil comprise an area estimated at 3.8 million hectares (Suchek, 1989) made up largely of *Eucalyptus, Pinus, Araucaria* and *Acacia.*

8.3 STRUCTURE OF THE BRAZILIAN FORESTRY SECTOR

The institutional structure of the Brazilian forestry sector can best be traced and examined by starting with the first forestry code which was passed in 1934. This remained in force until 1965, when it was replaced by a new code more appropriate to the new national forestry situation. This code is still in effect except for some modifications introduced by the new Brazilian Constitution enacted in 1988.

The 1988 Brazilian Constitution has been considered comprehensive and up to date from the environmental point of view and offers the legal means for the conservation and rational use of forests in the country.

Specific legislation on fiscal incentives to reforestation and reafforestation and on wildlife protection were passed in 1965 and 1966. Formed from distinct bodies within the Ministry of Agriculture, the Brazilian Institute for Forestry Development (IBDF) was founded in 1967. Its main objectives were to plan and carry out forestry policies and to execute, or ensure the execution of, measures aimed at rational utilization, protection

and conservation of renewable resources according to the legislation in force.

IBDF was reasonably well placed in the ranks of Brazilian governmental entities in terms of independence, power and funding. However, there was overlapping of functions and consequent disagreements between IBDF, the Fishery Development Institute (SUDEPE), the Hevea Development Institute (SUDHEVEA), under the Ministry and Agriculture, and the Environment Secretariat (SEMA), under the Ministry of the Interior. Because of this, and also in response to a recognized need for a better organized and stronger entity to deal with all environmental and forestry related matters, in 1989, the Brazilian Government created the Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA). It was formed from these mentioned organizations, taking over their roles, with responsibility for state forest land allocated for forestry purposes as well. IBAMA is under the Environment Special Secretariat (SEMAN) which is directly under the Brazil's Presidency.

A limited number of states, Sao Paulo, Minas Gerais and Parana, have their own forest services. Recently, Rondonia has created its own forestry institution.

Besides its formal/governmental component, the Brazilian forestry sector also includes:

- wood based industries with exports of over one billion US dollars;
- reforestation and related private companies which have planted more than four million hectares of fast-growing species in the country;
- a number of different types of NGOs.

The NGOs include the "Sociedade Brasileira de Silvicultura" (SBS) which considers it represents the entire forestry sector since it is made up of members from most branches of forestry activity; the "Sociedade Brasileira de Engenheiros Florestais" (SBEF), a professional entity; and the "Associação Brasileira de Reflorestadores" (ARBRA), composed of members from private reforestation companies. Other examples of very strong NGOs are the "Associação Brasileira de Carvão Vegetal" (ABRACAVE), with membership from the charcoal production/consumption area, and the "Associação Brasileira de Celulose e Papel", which represents pulp and paper producers. More recently, environment related NGOs such as "SOS Mata Atlantica" and a Foundation, "Fundação Pro Natureza (FUNATURA)", which receive support from foreign NGOs, have been very active. Other important components of the Brazilian forestry sector are schools of forestry and forestry research organizations.

Induced by the uncontrolled clearing of the Amazonian forest, in 1988, the Brazilian government created a national programme called "Programa Nossa Natureza". It aimed to establish the required conditions for conservation of the environment and for a rational utilization of the Brazilian Amazon by integrating the efforts of all governmental and non-governmental entities operating in the region together with all components of Brazilian society. However, except for the creation of IBAMA its activities have been significantly reduced for political and economic reasons.

8.4 LEGISLATION AND ITS ENFORCEMENT

Brazilian forestry legislation includes the forest code and a number of laws, regulations and rules which are often revised. In the opinion of Abilhoa & Galvao (1986), who have examined this in a study concerned with

rural development in Brazil, the legislation is very complex and often not properly enforced or obeyed for many different reasons.

Nevertheless, it provides a sound basis for environmental protection and rational utilization of renewable natural resources by, for example, the creation of national parks, biological reserves, national forests and areas of permanent preservation. Apart from environment conservation, the forest code deals with the use and exploitation of natural and planted forests as well as the consumption of industrial roundwood and its replacement through reforestation. It also establishes a policy of multiple use of the federally owned national forests for social, technical and economic purposes.

According to Brazilian legislation, the owner has full rights of use, enjoyment and disposal of the land. However, the forest code describes eight special situations where an area must be preserved, such as along streams and around lakes, water reservoirs and springs; hunting grounds and living space for the indigenous people in their regions are also included. Forest clearance is limited to up to 50 percent of the total property area in the Amazon region and 80 percent in other regions. Exploitation of natural forests must be executed according to management plans approved by the national forestry agency. In practice, however, this is rarely done.

As noted by Abilhoa & Galvao (1986), land ownership has very distinct features in Brazilian forestry activities. In the South and Southeast, the wood processing companies which exploit native trees usually own the land, including the forest, and build their mills close to the forest. In this case, jurisdiction over land ownership and possessions does not fall under forestry legislation, but rather the Civil Code. More than eighty percent of Brazilian Amazon forests is in nominal public ownership by federal or state governments. Most of this land should be considered "terra devoluta", i.e., no decision has been made about its future use and the government has the ownership of all unappropriated land. In Amazonia, private ownership usually occurs close to villages, along the few existing roads and colonization projects.

FUNATURA (1988) reports that the Brazilian Amazon region has seven million hectares gazetted as conservation areas, such as national forests, biological reserves and national parks, which amounts to 1.8 percent of the total area of the region. When this is combined with the reservations for indigenous people, the area is estimated at 25 million hectares, corresponding to approximately 5 percent of the total area of the region. However, the Foundation stresses that there are no boundaries around these areas yet. For this reason, such areas are a preferred target for unlawful activities such as unauthorized mining and logging. The total conservation area in the country is estimated to be 12 million hectares, or 1.5 percent of the total area of Brazil.

In summary: Brazilian legislation is quite comprehensive although certain incentive policies aiming at the development of Amazonia were in some way harmful to the region. The 1988 Brazilian constitution covers all the necessary aspects of environmental protection. Now, comes the real problem: enforcement of the law.

IBAMA, and previously IBDF, is responsible for enforcing environment/forestry law in Brazil. To accomplish this massive task it has established regional offices throughout the country. However, the total staff of IBAMA total personnel is only about 6,000, for all its administrative, technical and operative activities. Furthermore, their duty is to control an area larger than western and central Europe combined. This includes the largest closed tropical rainforest in the world, 2.0 million square kilometres, equivalent to an area exceeding a number of European countries put together. Travelling in the region is always a difficult enterprise with

accessibility posing a serious problem. Transportation is usually by river and a few generally inadequate roads. Reaching properties to control unauthorized forestry activities and enforce the law is a highly demanding task. Aircraft play an extremely important role in the region; they rely on landing strips which are hard to detect and frequently used for illegal purposes, such as clandestine mining, unlawful hunting and other illicit activities. These are also very onerous to control.

In the South and Southeast of the country, responsibility for enforcing the law has been delegated by IBAMA to the existing state forest services or related organizations. This has happened in the states of Sao Paulo, Minas Gerais and Parana. However, the great majority of Brazilian states, particularly in Amazonia, do not have their own forestry organizations and/or the financial resources and personnel to do this.

8.5 ENVIRONMENTAL PROBLEMS IN BRAZIL RELATED TO DEFORESTATION

Environmental awareness in Brazil has followed the general world trend, i.e., it has been growing. The concerns are deeper among the more educated people. As everywhere, most of the uneducated poor are relatively indifferent about environmental threats unless they are directly affected by them. Despite this, the 1988 Brazilian constitution does reflect the current intense world concerns and wishes of the nation on environmental matters.

Deforestation has recently been the major environmental concern in Brazil. A great deal has been written about it worldwide. Therefore, this work does not intend to go deeply into the subject; nor is it the purpose of this text. Only the most significant features which could lead to a better understanding of the characteristics of Brazilian forestry related to international cooperation are noted and briefly examined.

In 1987, total deforestation in Brazil was estimated by SBS (1987) at six million hectares per annum, which is more than twice the area of Belgium. This has occurred in all regions of the country. According to SBS (1987) the situation in the developed regions of the country is critical. The balance between wood production from reforestation and consumption for industrial roundwood, fuelwood and charcoal, sawnwood, panels, pulp and paper has revealed a deficit of 203 million cubic meters in 1986. These deficits lead to clearing of three million hectares per year of natural forests in the more developed regions of the country and in the Northeast, with significant environmental damage.

The distance from Amazonia to the main industrial and consumption areas makes the utilization of its wood for the great majority of uses economically unfeasible. Thus, the "cerrado" type forest has been systematically removed to provide wood for energy and industrial purposes and to expand the agricultural area for internal and external food markets. Charcoal production alone in the "cerrado" region, for the iron and steel industry, requires a total of 92.8 millions cubic meters of wood per year (SBS, 1987).

The "caatinga" in the Northeast has been cleared at growing rates mainly to provide fuelwood for a population of over twenty-five million in an area which experiences periodic and severe droughts. A regional process of industrialization based on wood energy has been worsening the situation. Some localities show a marked process of desertification.

The temperate forests in the South, tropical forest in the southeast and the "Mata Atlantica" along the Atlantic sea coast were mostly removed for agricultural and cattle raising purposes. The state of Sao Paulo, the most developed in the country, which had eighty percent of its area covered by natural forests, has presently only around five percent.

FAO estimated that in 1981, the clearing of tropical forests and woodlands amounted to 11.1 million hectares and of tropical closed forests to 7.3 million hectares (World Resources Institute and International Institute for Environment and Development, 1989). Surveys using Landsat imagery and ground truth data have shown that 4.75 percent of the Amazon rain forest, or 12.36 million hectares, has been lost since 1980. Yet, the annual average of forest clearing has increased. According to the IBDF, based on Tardin *et al.* (1980), from 1975 to 1978, the average was 1.6 million hectares which increased to 2.3 million hectares annually in the period 1978 to 1980. The area removed went up to 2.7 million in 1984.

Presently, there is a controversy over the total extent of the deforested area. Up to 1988, it was estimated to be 217 million hectares by Fearnside (1982) and 35 million hectares by Fearnside (1989b). Cunha (1989), based on INPE's 1988 measurements obtained from Landsat TM images, projected a total deforestation of 27.3 million hectares by 1989. But, Mahar (1988) estimates that the area cleared by 1988 is approximately 59.9 million hectares.

According to Cunha (1989), estimates of total forest clearance by Mahar (1988) and Fearnside (1982) have failed, mainly due to reasons concerned with the use of inappropriate mathematical projection methods. He reveals that there are only two complete evaluations of deforestation in the history of the Brazilian Amazon: INPE's 1980 report (Tardin *et al.*, 1980) and INPE's 1989 report (INPE explanatory note). Other internationally known deforestation predictions have been obtained through mathematical projections.

In 1987, satellite images showed a large area being burned in the Brazilian Amazon. Since then, based on those images, there have been number of worldwide estimates of deforestation and burning in the region. Many of these simply consider that any fire constitutes destruction of closed virgin forests. Cunha (1989) states that the weather satellites, which are responsible for the images, only provide a snapshot of a particular situation at a particular time and do not consider that agricultural practices may include repetitive yearly burning and that deforestation may occur without burning and therefore may remain undetected. Fearnside (1989) has also looked at the causes of misinterpretation of deforestation based on burning which, in his opinion, can be attributed principally to the following: A) the existence of fires does not necessarily mean that forests are being cleared. Pastures and other kinds of vegetation as well as cut down closed tropical rainforest are usually burned as part of the agricultural process in the region and the images were from areas in flames. Therefore, a portion of what was regarded as cleared closed tropical rainforest was not, in fact, so. B) each point of the satellite image corresponds to a 1.1 kilometre square (more than 100 hectares) which tends to be revealed as entirely under the action of fire, even when it is not, for technical reasons related to the sensor saturation. In other words, it over-estimates burning in situations where fire is not acting on the whole image spot.

The causes of deforestation have been widely studied. FUNATURA (1988) indicates settlement projects and agriculture/cattle ranching programmes as the main reasons in Brazil. The World Resources Institute (WRI, 1989) cites the clearing for agriculture to feed growing numbers of people as the main cause worldwide. A second reason is to earn foreign exchange from cash crops and beef. WRI examined more closely the cattle ranching case in Amazonia, pointing out that thirty percent of the total deforestation detected by the Landsat monitoring programme between 1973 and 1983 was caused by ranches. As noted by Mahar (1988), the main immediate causes of forest clearing in the Brazilian Amazon are: small-scale agriculture, cattle ranching, logging, road building, hydroelectric

development, mining and urban growth. Nevertheless, he explains that it is not clear how much deforestation can be attributed to logging, because timber extraction is a by-product of land clearing for agricultural purposes.

Presently, there is a new threat to the forest represented by pig-iron plants which have been established along the railway built to transport ore from the Carajas mine to the sea. They were planned to use charcoal as a fuel and reducing agent. The economic feasibility of these projects appears to be largely based on the use of charcoal produced from natural forests. An annual average of 1.5 million tons of charcoal are needed which is produced from approximately 6 million tons of dry wood.

In Amazonia, logging is by no means the primary cause of deforestation. Logging is usually carried out selectively in the floodplain forests (varzea forests) and in upland forests (terra firme forests) to be cleared for agricultural and cattle raising purposes. Clearcutting, as a specific enterprise to provide logs for wood industries, is not the normal practice.

It should be emphasised that some degree of deforestation is necessary to integrate the region as much as possible in the process of national development. To this end, roads must be opened, forest areas converted to agriculture and dams built to generate hydroelectric power; but, only on an economically and environmentally sound basis. The World Resources Institute and International Institute for Environment and Development (1989) state that conversion of forest land to other uses is appropriate when the alternative use is sustainable and economically more valuable than keeping the land as forests.

It is worth stressing that from the social and strictly administrative point of view, Amazonian deforestation is not, particularly, the most serious environmental problem for Brazil at the present time. Air and water pollution in the large industrialized cities and/or mercury pollution of Amazonian rivers by primitive gold mining processes are more significant problems because they currently affect more people. FUNATURA (1988) estimates that 1.2 kilogramme of mercury is used for each kilogramme of extracted gold and that about 250 tons of mercury has been discharged in the Tapajos river region alone by gold searchers between 1983 and 1988. Fish caught in the region have shown abnormally high mercury concentration and related diseases have been found in the local population. On the other hand, while deforestation/burning is not the greatest environmental problem at the moment for Brazil, its association to global environmental changes has been crucial in international affairs. Development agencies and rich countries often tie aid for Brazil's development projects to Amazonian deforestation/burning. Pressure on this issue has been put on the government and the matter has moved to an international political level.

The political internationalization of the issue can be clearly observed, for instance, in the UK from the speeches of Timothy Eggar (Parliamentary Under-Secretary of State for Foreign and Commonwealth Affairs) and Tam Dalyell (Member of Parliament) to the British Parliament reported by Hansard (1989). Stimulated by the threats posed by deforestation/burning to their own country, they examined the issue with a background of an amazing number of detailed Brazilian internal questions associated, or believed to be so, with the subject. The Secretary also informed Parliament of the British government's actions concerned with tropical rainforest destruction which included extra funds for international collaborative research and the encouragement of British charities to put forward more forestry projects under the joint funding scheme.

Deforestation/burning in Brazil is strongly related to some inappropriate government tax-based incentives aimed at fostering the development of the Amazon region. The World Resources Institute and The

International Institute for Environment and Development (1989), as well as other entities and authors, have pointed out that large incentive cattle ranching policies have destroyed forests and proved to be environmentally and economically unsound. However, the economic situation in Brazil, which has been enormously affected by the external debt burden in the 1980s, is also related to present deforestation\burning. To tackle the problem the Brazilian government has suspended incentives for cattle ranching and increased activities related to enforcement of the environment/forestry law. Consequently, deforestation has been significantly reduced. But, supplementary external financial resources are needed to implement these and related activities properly.

The Amazon region, with its known and as yet unknown total mineral and vegetal resources (Veja, 1989), is the last great tract of underpopulated land in the world. Brazilian government and military forces are aware of this and have been concerned with preserving the region from all forms and degrees of internationalization. Even international cooperation projects for the region have been rejected when considered questionable from the viewpoint of a different sort of underlying interest. The people in general seem to agree with this wariness.

Because of its burning of tropical rainforests, Brazil has been accused of being chiefly responsible for the growing carbon dioxide content in the atmosphere and the consequent world climate warm-up. A few facts should be noted, however, to make clear that the charge is unfair. Mankind releases carbon dioxide into the atmosphere from transport systems, power stations and factories, as well as the burning of forests. According to Eggar (1989), burning of fossil fuels is responsible for 80 percent of net carbon dioxide emissions, while forest destruction (in all the world) at the present rates of burning is contributing ten to twenty percent to this total. Veja (1989), drawing on data from Brookhaven National Laboratory in the United States, notes that carbon dioxide released from fossil fuels in 1980 contributed to 98 percent of the total; forest burning and volcanoes were responsible for only two percent. The same source states that the United States, alone, was responsible for one fifth of the total discharge of the gas in that year. Based on estimates of Marland (1989), cited by Hall & Rossillo-Calle (1989), the USSR, USA and Japan release twenty, twenty-four and five times more carbon dioxide, respectively, than does Brazil. Neither can it be overlooked that developed countries have been accumulating carbon dioxide in the atmosphere for a longer time and at a much higher rate than Brazil. Deforestation and burning at the present significant rate in Brazil is a relatively recent issue.

The point is that deforestation/burning and high concentration of carbon dioxide in the atmosphere should not be dealt with by countries blaming each other. The problem exists and the developed countries must bear an appropriate share in the efforts because they are largely responsible for it. The roots of the issue have to be looked into and support made available to overcome the difficulties.

8.6 ORGANIZATION OF FORESTRY RESEARCH AND FORESTRY EDUCATION

The present Brazilian Forestry research system is complex and highly diversified showing, a lack of formal national coordination. A survey by EMBRAPA's National Centre of Forestry Research (1987) revealed that 139 research entities were carrying out 2,043 trials/projects in the country. Galvao (1982), reviewing the organization of forestry research in Brazil, has classified the entities into five major components: federal government organizations, universities, state related institutions, entities attached to

universities which are supported by private forestry companies and, finally, private forestry companies themselves.

Despite the large number of organizations engaged in forestry research in Brazil, it is largely centred at EMBRAPA's National Program of Forest Research, the forestry schools in Piracicaba, Vicosa and Curitiba, the state forestry institutes of Minas Gerais and Sao Paulo and the Instituto de Pesquisa Tecnologicas (IPT), also in Sao Paulo.

The following are significant **federal government research organizations** or related institutions: IBAMA, EMBRAPA, INPA, and SUDAM. IBAMA is the official Brazilian organization for forestry and environmental matters. Its aims include providing incentives to and encouraging and executing research, according to Decree 97,746 which establishes the objectives and basic organization of the Institute. EMBRAPA, the official Brazil government organization for agricultural research, was established to encourage, coordinate and carry out research for Brazilian agricultural development. It was committed to conducting and coordinating forestry research within its large national system by an agreement with the former government organization for forestry (IBDF) in 1977. However there is no institutional or formal coordination covering all areas of forestry research at national level.

In Amazonia, EMBRAPA, INPA (Instituto Nacional de Pesquisa da Amazônia) and FCAP (Faculdade Ciências Agrárias do Pará) are, presently, the most active institutions and have well trained staff as well as the best potential to execute forestry research in the region. EMBRAPA carries out research through its centres at Belém, Macapá, Manaus and Porto Velho (Rondônia) and also in cooperation with the Jari Project and with Companhia Vale do Rio Doce, in Carajas. EMBRAPA's CPATU centre in Belém is the most important in the region for research on forest management and related disciplines. INPA, located in Manaus, is a federal government institute dealing mostly with environment related research and agricultural studies in Amazonia; it also has a very well equipped wood technology laboratory. FCAP, in Belém, is a federal government education institution offering a forestry degree in the state of Para; it also carries out research, mostly in association with SUDAM.

Also in Amazonia, SUDAM (Superintendência de Desenvolvimento da Amazônia), the official government development agency for the region, executes some silvicultural and wood technology research mostly with the technical support of FCAP and IPT. Museo Goeldi, in Para, deals mainly with the environment and anthropology. Other entities related to state governments, such as IDESP and FUNTAC, in Para and Acre, respectively, are involved themselves in Amazonian forestry development/research issues. FUNTAC (Fundação Território do Acre) has a project supported by ITTO in the Acre Territory. This Foundation receives technical support from EMBRAPA and Museo Goeldi.

As **state related institutions**, the Forestry Institutes in Sao Paulo and Minas Gerais and the IPT should be noted. The Sao Paulo Forestry Institute carries out significant research mostly with fast growing species and has its own planted forests which are managed for production of timber, pulpwood and seed, as well as for environmental purposes. The Instituto Federal de Florestas de Minas Gerais is highly committed to state forestry development through its coordination of a programme on reforestation in medium and small size properties. IPT focuses more on wood technology research including pulp and paper. The Instituto Ataliba Paes in Rio Grande do Sul, EMPARN in Rio Grande do Norte, EPAMIG in Minas Gerais and ENGOPA in Goiaz, all state organizations included in EMBRAPA's National Research System, carry out a significant number of forest research projects as revealed by the National Centre of Forestry Research survey (1987).

IPEF, FUPEF and SIF are **entities attached to Universities supported by private companies.** They are established at the University of Sao Paulo/School of Forestry in Piracicaba, Federal University of Parana/School of Forestry in Curitiba and at the Federal University of Vicosa in Vicosa. They were created basically to make highly qualified university staff available to private forestry companies in need of increasing the productivity of their plantations. IPEF, FUPEF and SIF facilities are used for education and training purposes. Activities of these entities, which are chiefly concentrated in the South and Southeast of the country, deal largely with the production of wood for industrial purposes. EMBRAPA, in spite of having no significant financial support from private companies, has done much work in close collaboration with them, as previously noted.

The **Universities** participate significantly in the Brazilian forestry research structure through the previously described schools at Piracicaba, Vicosa and Parana. Their strength lies in their collaborative work with private forestry enterprises. Participation of the others is less significant and varies according to the human resources and facilities available to them.

Private forestry companies play a prominent role in research on fast growing trees in the more developed regions of the country. They carry out their own research as well as making financial resources and facilities available to research entities which provide technical support in exchange. Government fiscal incentives for reforestation initiated in 1966 have been greatly responsible for this desirable participation. However, it is worth noting that this role is played only by integrated forestry enterprises. i.e., those with forest and wood based industrial components. One example of efficiency is the Aracruz enterprise which won the Wallenberg prize in 1984, the most prized in the world forestry sector. The National Centre of Forestry Research survey (1987) revealed that twenty-five companies were carrying out nine or more projects in Brazil; these included, besides Aracruz, CAFMA, ACESITA, CHAMPION, CAF, DURATEX, RIPASA, SUZANO, KLABIN, RIOCELL and JARI, each possessing their own specialized forest research sections within the companies.

Forestry education at university level is provided by fifteen schools with wide differences in terms of infrastructure and staff qualifications. An average of 350 to 400 professionals have annually obtained their degrees. For this excessive number most schools have neither sufficient trained staff nor adequate facilities (Galvao *et al.*, 1989). Therefore, a number of professionals have not been as well prepared for their future jobs as they should have been.

On the other hand, there are also good schools with highly qualified staff and adequate facilities, especially in the South and Southeast. These have been offering 4 Masters and 1 Ph.D. courses. In 1987, 244 Masters and 8 Ph.D. degrees were obtained (Galvao *et al.*, 1989). The schools offering these are: Universidade Federal do Paraná, Universidade Federal de Viçosa, Universidade Federal do Rio de Janeiro and Universidade Federal de São Paulo/ESALQ (Escola Superior de Agricultura "Luiz de Queiroz"). The Amazon region has only three schools of forestry, one in Belém and two in Manaus, all at undergraduate level. The last two were founded very recently, in 1987.

There are only two medium level forestry courses offered in the South and Southeast of the country and no regular training courses for forestry workers. Professionals of this level are needed in all regions of the country, including Amazonia. Therefore, more schools should be made available in appropriate localities. In contrast, there are too many university level forestry schools. New foresters from the less qualified institutes have

difficulty finding jobs. Most are unsuccessful and usually become engaged in other activities.

INTERNATIONAL FORESTRY COOPERATION PROJECTS IN BRAZIL

The Brazilian forestry sector, as an organized and well defined entity, was established in the 1960s with the creation of the first forestry school in 1960, the edition of a new forestry code in 1965 and the foundation of the Brazilian Institute for Forestry Development in 1967. Therefore, organically structured international cooperation on forestry research and development is relatively recent. The oldest recorded activity of such a type is an FAO project in the Amazon Region started in 1950, as noted by SUDAM (1974).

This chapter reports on the forestry research and development projects carried out in Brazil. A few representative projects from these will be more closely examined.

9.1 SUMMARY OF INTERNATIONAL FORESTRY COOPERATION PROJECTS/ACTIVITIES IN BRAZIL

This summary of international cooperation on forestry research and development in Brazil includes the largest possible number of projects which have been carried out with support from international multilateral or bilateral agencies and NGOs. Whenever possible, projects in preparation at the time of writing are also included.

The task would be easy if such data could be obtained from official Brazilian governmental agencies which have been coordinating ITC in the country. However, SUBIN and ABC do not have a detailed record of activities as needed for the purpose of this report. Therefore, the list is based on information from bibliographies, personal communications and letters as well as a wide variety of other documents in addition to the author's personal knowledge of this type of activity in Brazil.

Forestry projects have been carried out by a number of different Brazilian implementing organizations and many have originated from umbrella type agreements or are components of other enterprises. In this work they are sorted by funding country/national organization or international agency and only essential information is provided. A few will be selected for further examination in a subsequent section.

Finland

Project/Activity: Regeneration, cultivation and timber-harvesting associated with forest plantations in Brazil.
Source of assistance: Finland.
Implementing agency: Finish Forest Research Institute (Finland) and Federal University of Parana.
Form of activities: Research/Exchange of personnel and information/training.
Period of execution: 1985-1989.
Assistance made available: financial/granting of equipment.
Remarks: This is basically a joint research programme comprising 3 individual projects on the regeneration, cultivation and harvesting of Brazilian man-made forests. It was renewed in 1989.

Germany

Project/Activity: Technical cooperation agreement.
Source of assistance: Germany.
Implementing agency: University of Freiburg (Germany) and Federal University of Parana (Brazil).
Form of activities: training/research
Period of execution: 1971-1981.
Assistance made available: Granting of equipment/training/academic personnel/consultancy.
Remarks: This is primarily an institution-building programme established for the forestry area of the Federal University of Parana. The main objectives are the organization of a training and research programme, the training of the forestry staff and the overall development of the forestry course. As part of the agreement, the first Master's course on forestry in Brazil was set up in Curitiba and 78 foresters obtained this degree. It was also the first university in Brazil to offer a forestry Doctoral degree.

USA\US-AID

Project/Activity: Agreement between Purdue University (USA) and the Federal University of Vicosa (Brazil).
Source of assistance: USA/US-AID.
Implementing and/or executing agency: Purdue University (executing agency) and Federal University of Vicosa (implementing agency).
Form of activities: Training.
Period of execution: 1984-1986.
Assistance made available: Financial/consultancy.
Remarks: Purdue University was the executing agency for the Agency for International Development (AID). The agreement includes Brazilian consultancy for the Dominican Republic and a short course on charcoal production and research methods in Brazil. Two of Vicosa's professors were sent as consultants on *Eucalyptus* tree improvement and also on management of dry forest research. The total budget was $55,075.

Canada/CIDA and IDRC

Project/Activity: Technical assistance to the Federal University of Vicosa/Department of Forestry Engineering.
Source of assistance: Canada/Canadian International Development Agency (CIDA).
Implementing agency: Federal University of Vicosa/Department of Forest Engineering.
Form of activities: Training
Period of execution: 1978-1984.
Assistance made available: Consultancy/granting of equipment and teaching and research, related materials/training in Canada.
Remarks: The project was part of a Canadian technical assistance programme in Brazil, defined by a bilateral agreement with the Brazilian Government in 1975. The purpose of the project was to assist the Federal University of Vicosa to develop and strengthen its programme of post-graduate studies and research in forestry science. The project operations included: visits to Brazil by two Canadian professors, one of forest management for 18 months and another of wood energy for 12 months; academic training of Vicosa staff in Canada; provision of research and teaching related materials; and 12 months study tours by staff of

Department of Forestry Engineering. The Canadian budget for the project was C$800,000 (US$701,323).

Project/Activity: Selection of species, provenances and progenies of genus *Prosopis* for the semi-arid region of Brazil.
Source of assistance: Canada/International Development Research Centre (IDRC).
Implementing agency: Brazilian Agriculture Research Corporation (EMBRAPA)/ National Centre of Forest Research (CNPF).
Form of activities: Research.
Period of execution: 1986-1989.
Assistance made available: Financial.
Remarks: This is a grant of C$219,800 (US$159,298) to undertake the project entitled "Prosopis (Brazil)". On the Brazilian side, the National Centre of Forest Research (CNPF) is responsible for its execution and implementation is the responsibility of the National Centre of Agriculture Research for the Semi-Arid (CPATSA); both are EMBRAPA entities. The purpose of the project was to broaden the genetic base of *Prosopis* by identifying other suitable species of the genus, suitable for the semi-arid North Eastern region of Brazil and to improve *Prosopis juliflora*, the principal species currently planted.

Project/Activity: "Diversidade Genetica em germoplasma de algaroba (Prosopis juliflora)".
Source of assistance: Canada/International Development Research Centre (IDRC).
Implementing agency: Brazilian Agriculture Research Corporation (EMBRAPA)/ National Centre of Forest Research (CNPF).
Form of activities: Research.
Period of execution: 1991-1994
Assistance made available: Financial.
Remarks: It amounts to $36,875.80

Inter-American Development Bank (IDB)

Project/Activity: Procensul I/Strengthening agricultural research.
Source of assistance: The Inter-American Development Bank (IDB)
Implementing agency: EMBRAPA.
Form of activities: Research/training
Period of execution: 1977-1983.
Assistance made available: Financial/consultancy.
Remarks: The total financial resources made available were $66.4 million for activities in the South and Southeast of the country except for the "Cerrado" area. Its basic purpose was to improve research infrastructure. This agricultural project had already started when EMBRAPA's forestry programme was established. Nevertheless, forestry research benefited from this IDB project.

Project/Activity: Forestry component of the Project Procensul II, Development Programme for Agricultural Research in South and Central Brazil.
Source of assistance: Inter-American Development Bank (IDB).
Implementing agency: EMBRAPA.
Form of activities: Research/training.
Period of execution: 1985-1990.
Assistance made available: Financial/consultancy.

Remarks: This is basically the second stage of a programme to strengthen agricultural and forestry research and extend farm technology in South and Central Brazil. Among its basic aims is the improvement of research infrastructure. It started with the Procensul I project, previously described.

IDB funding for the whole project amounts to $70.0 million to be repaid in 15 years, including 5 years of grace. Interest charges are 3% per annum. The project includes seven sub-programmes, and forestry is included in the plant research component.

EMBRAPA's Forestry Research Programme has received significant support from this project. This included the construction of a new office and laboratory building for the National Forest Research Centre as well as training, purchase of equipment and vehicles and hiring of consultants. Eight long term training scholarships and 10 short term consultants had already been provided. Based on EMBRAPA (1989), this project's funding for forestry activities may be estimated at $2.9 million which corresponds to 4.1% of the total funding.

Project/Activity: Reforestation Component of the Integrated Rural Development Project (PLANONOROESTE II).
Source of assistance: Inter-American Development Bank (IDB).
Implementing agency: Minas Gerais State Forestry Institute (IEF) and Minas Gerais State Technical Assistance Agency (EMATER).
Form of activities: Forestry-related development activities.
Period of execution: 1980-1987.
Assistance made available: Financial.
Remarks: As noted by Carvalho (1988), 1,885 hectares were planted in 1,300 small properties up to 1988. IDB has provided $0.3 million for the forestry project component.

Project/Activity: Inventory, protection and forest management in Jequitinhonha valley, Minas Gerais.
Source of assistance: Inter-American Development Bank (IDB).
Implementing agency: State Forest Service of Minas Gerais (IEF) and Technical Assistance Agency of Minas Gerais (EMATER).
Form of activities: Development-related forestry activities.
Period of execution: 1987-1992.
Assistance made available: Financial.
Remarks: This is one component of a development project; it consists of measures to protect forest resources, map and inventory the Jequitinhonha valley as a basis for managing the forests and protecting the environment. The whole project funding by IDB amounts to $54 million, of which $0.3 million is allocated to the forestry component.

Project/Activity: Forestry component of a rural small producer project.
Source of assistance: Inter-American Development Bank (IDB).
Implementing agency: State Forest Service of Minas Gerais (IEF) and Technical Assistance Agency of Minas Gerais (EMATER).
Form of activities: Development-related forestry activities.
Period of execution: 1981-1989.
Assistance made available: Financial.
Remarks: The forestry component was provided with $2.2 million. The project includes planting of 28,200 ha of forests for fuelwood production, local construction and industrial purposes.

Project/Activity: Forest Products Research Centre of the Amazonian Research Institute (INPA).

Source of assistance: Inter-American Development Bank (IDB).
Implementing agency: INPA.
Form of activities: Institution-building.
Period of execution: 1982-1988.
Assistance made available: Financial/granting of equipment/ consultancy.
Remarks: IDB has provided $9 million for the project of which the main purpose was improvement of research infrastructure.

The World Bank

Project/Activity: Agricultural Research II Project (BIRD II).
Source of assistance: The World Bank.
Implementing agency: EMBRAPA.
Form of activities: Research/training.
Period of execution: 1981-1988.
Assistance made available: Financial/Consultancy.
Remarks: The World Bank loan amounted to $60 million and the total cost of the project was $264 million. Funding of forestry activities was $1,698,308.30 (EMBRAPA, 1988). This was the second EMBRAPA Project funded by the World Bank. Forestry participation in the first project, 1976-1982, was not significant. EMBRAPA was both the borrower and the implementing institution. According to the agreement, the chief objective of the project was to enhance EMBRAPA's research capability. This included a specific programme on forestry research. This will be discussed in detail in a subsequent section.

Project/Activity: Agriculture research project III (BIRD III).
Source of assistance: The World Bank.
Implementing agency: EMBRAPA.
Form of activities: Research/training.
Period of execution: 1990-1994.
Assistance made available: Financial/consultancy.
Remarks: This project is a continuation of the two previous Agricultural Projects, BIRD I and BIRD II. The Federal Republic of Brazil is the borrower for BIRD I, whereas EMBRAPA is both the borrower and the executing organization for BIRD II. Resources would be transferred by the government to EMBRAPA by means of a subsidiary agreement. However, unlike previous agreements, this one requires Brazilian Government commitment to support and enable EMBRAPA to execute the project. The agreement conditions of the loan state that the Bank is to be provided with satisfactory evidence of allocation of funds to EMBRAPA from the Federal budget, for the project implementation. This should prevent or minimize difficulties in project implementation during a period expected to be one of scarce financial resources.

The main objective of the project is to contribute to the development of the North and Northeast of Brazil which includes research infrastructure improvement in these regions. Environment related activities, including forestry research, will be receiving substantial support. This has been mostly due to World Bank requirements, rather than any EMBRAPA central administration initiative.

Total financial resources amount to $47.0 million, repayable in fifteen years including five years of grace, at the Bank's standard variable interest rate. An amount of $3.75 million is foreseen by the National Centre of Forest Research (1989) for the project's forestry activities. From this total, $115,000 will be made available to CNPF in 1990, according to the 1990 EMBRAPA Annual Working Plan (EMBRAPA, 1989). As noted by the World Bank staff appraisal report, CNPF is responsible for the overall direction of

forestry activities and CPAA (Amazonian Centre for Agroforestry Research) is in charge of the research programme.

Project/Activity: Reforestation component of PRODEMATA (Programme of Integrated Rural Development of the "Mata" Region in the state of Minas Gerais - MG I.)
Source of assistance: The World Bank.
Implementing agency: Minas Gerais State Forestry Institute (IEF) and Minas Gerais State Technical Assistance Agency (EMATER).
Form of activities: Development project.
Period of execution: 1977-1985.
Assistance made available: Financial.
Remarks: The borrower is the State of Minas Gerais. The World Bank made $41.05 million available for the whole project, including the forestry component. Its main objective was to improve agricultural production and social-economic conditions of small and medium sized rural producers through a number of activities including reforestation. In the opinion of Carvalho (1988) the project was successful and the achievements included reforestation of 24,601 hectares (82 percent of the final target) in approximately 14,000 small and medium sized properties.

Project/Activity: Reforestation component of the Second Rural Development Project for Small Farmers - MG II.
Source of assistance: The World Bank.
Implementing agency: Minas Gerais State Forestry Institute (IEF) and Minas Gerais Technical Assistance Agency (EMATER).
Form of activities: Development-related forestry activities.
Period of execution: 1980-1988.
Assistance made available: Financial.
Remarks: The borrower is the State of Minas Gerais. The World Bank provided $32.30 million for the whole project including the forestry component. Up to 1987, reforestation comprised 5,963 hectares in 5,500 small properties (Carvalho, 1988).

Project/Activity: Minas Gerais forestry development project.
Source of assistance: The World Bank.
Implementing agency: Minas Gerais Development Bank (BDMG) and Minas Gerais State Forestry Institute (IEF).
Form of activities: Development project including institution- building activities such as training.
Period of execution: 1989-1996.
Assistance made available: Financial/consultancy.
Remarks: Funding from the World Bank is estimated at $48.5 million for a total project cost of $100.0 million over the seven and half year period project implementation. This is the most substantial funding for a forestry project by an international agency in Brazil.

More comments will be made in a subsequent section.

Project/Activity: National Environmental Programme.
Source of assistance: The World Bank.
Implementing agency: Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA).
Form of activities: Development and institutional-building. Period of execution: 1990-1995.
Assistance made available: Financial.
Remarks: This project deals mostly with environment itself rather than forestry. However, as there is interaction between the two subjects, it is

reported here. Funding from the World Bank is estimated at $117.0 million. The main objectives of the project are nature conservation and protection through: strengthening IBAMA capabilities and improving its monitoring system; the establishment of a National Environment Information Service; staff training; and the improvement of existing Conservation Units and the creation of new ones.

France/CTFT (Centre Technique Forestier Tropical)

Project/Activity: Technological properties and utilization of Brazilian woods.
Source of assistance: France.
Implementing agency: Centre Technique Forestier Tropical (CTFT)/INPA.
Form of activities: Research/training.
Period of execution: 1983-1990.
Assistance made available: Consultancy and training in France.
Remarks: The purpose of the project includes: tropical rainforest management, determination of the mechanical and physical properties of Amazonian species and improvement of tropical wood characteristics. Part of the work on wood technology is carried out in France by CTFT. Information from CTFT (1989) and Cailliez (personal communication, 1989) reveals that 4,863 million French francs have been spent on this cooperation programme since 1987. This included two senior level consultants, from 1987-1990, as well as one junior consultant during 1987-1989. A graduate course was also given by one of the consultants at the Federal University of Amazon.

UNDP/FAO

UNDP and FAO have played a significant role in ITC on forestry research and development in Brazil. The first registered FAO activity was in 1950. Since then, both organizations have been greatly involved in this type of undertaking. A record of their operations follows, except for the inventories. These are commented on in a subsequent section which examines representative FAO operations in Brazil.

Project/Activity: Advising the Brazilian Government on the Development of the Amazon Basin.
Source of assistance: Special Fund of the United Nations Organization.
Implementing agency: FAO.
Form of activities: Report preparation.
Period of execution: 1951-1952
Assistance made available: Consultancy.
Remarks: This activity, a three-expert-mission, marks the beginning of an FAO Technical Assistance Programme on forestry for Brazil. As noted by SUDAM (1969), the final mission report recommended: the establishment of a Pilot Centre for mechanized forest exploitation and tropical silvicultural studies; the creation of a Pilot Centre for the timber industry including drying, preservation and training of specialized labour; and the foundation of an aerophotogrametry and photorestitution service for forest inventories.

Project/Activity: Assisting and advising the Brazilian government on the rational utilization of the Amazon Forest.
Source of assistance: UNDP/SF (Special Fund).
Implementing agency: FAO.
Form of activities: Research/surveys.
Period of execution: 1955-1982.
Assistance made available: Staff.

Remarks: This is a follow-up of the previous reported project and part of an FAO Technical Assistance Programme for Brazil. Its main purpose was to advise and assist the Brazilian government to introduce silvicultural operations for more rational utilization of the Amazonian forest (SUDAM, 1969). Initially, financial resources for the FAO mission were provided by SPVEA (Superintendencia do Plano de Valorizacao Economica da Amazonia). John Pitt, working on the project from 1955-1960, was undoubtedly the pioneer of forestry research on silviculture and management in the Brazilian Amazon. This activity will be examined in a subsequent section.

Project/Activity: SF/BRA 4. National Forestry School, Curitiba. Source of assistance: UNDP/SF (Special Fund).
Implementing agency: FAO.
Form of activities: Institution-building.
Period of execution: 1962-1969.
Assistance made available: Consultancy/equipment/fellowships.
Remarks: Contribution from UNDP/SF amounted to $1,568,200. FAO was initially requested to support the establishment of a National Forestry School, created by the Brazilian Government at Vicosa, state of Minas Gerais. But the Plan of Operation was changed and FAO activities moved to Curitiba, state of Parana, where another school of forestry was founded. The undertaking started in 1962 and its major objectives include: supporting the establishment of and assisting in running a forestry school of university level and training Brazilian staff in teaching and research. The activities of the silvicultural research station at Curua-Una and the Centre for Research and training at Santarem were absorbed by this BRA 04 project. These Amazonian Centres were created during FAO supported projects carried out in that region between 1950-1962. (Source of information FAO, 1970).

Project/Activity: BRA/025 - Improved production of wood energy and food in traditional agriculture in the state of Parana.
Source of assistance: Government of France.
Implementing agency: ACARPA (Empresa Paranaense de Assistencia Tecnica e Extensao Rural)/FAO.
Form of activities: Research/in-country training/extension.
Period of execution: 1987-1990.
Assistance made available: Consultancy/equipment.
Remarks: This is a trust-fund project funded by the Government of France at an estimated cost of $411,000 of which $140,000 covers the cost of a French associate professional officer. The project aims at increasing the value of small producer forest products through an extension programme. It involves work with *Mimosa scabrella* (bracatinga).

Project/Activity: BRA 71/545 - Programme of Forestry Research and Development (PRODEPEF)
Source of assistance: UNDP.
Implementing agency: FAO/IBDF.
Form of activities: Research/training.
Period of execution: 1971-76.
Assistance made available: Equipment/consultancy.
Remarks: UNDP funding was $2,122,188 (Ferreira, personal communication, 1990). This project included the establishment of regional research offices in Brazil and forestry experimentation on a national basis with support from private companies. It was the first significant effort to create a national forestry research organization in the country. Nevertheless, almost all of the conceptual and methodological components of the experimental activities

were developed by FAO international consultants. EMBRAPA National Programme of Forestry Research took over this research and hired most of the project technical local personnel in 1977.

Project/Activity: BRA 76/027 - Forest development and research, Phase II.
Source of assistance: UNDP.
Implementing agency: FAO/IBDF.
Form of activities: Project design/training/research.
Period of execution: 1977-1978.
Assistance made available: Consultancy/fellowships.
Remarks: Within the framework of this project a pre-investment inventory of 165,000 ha of the National Forest of Tapajos was carried out in 1977. This was the first such inventory ever executed in Amazonia (FAO, 1978a). The project also included long-term academic training abroad. (Sources of information: Carneiro, 1982 and FAO, 1978c.)

Project/Activity: BRA 78/003 - Forestry Development in Brazil.
Source of assistance: UNDP.
Implementing agency: FAO/IBDF.
Form of activities: Research/training.
Period of execution: 1979-1982.
Assistance made available: Consultancy/equipments/financial.
Remarks: The main objective was the development and implementation of a management plan for the National Forest of Tapajos. UNDP funding amounted to $1,145,000 from which consultancy comprised $972,00 and training $35,000 (FAO, 1978b). Activities of this project include: creation of a remote sensing laboratory to monitor changes in forest cover; a management plan for the Tapajos National Forest; collaboration with the INPA wood products laboratory in Manaus; and technological studies of Brazilian woods. (Carneiro, 1982; FAO, 1989; and Ferreira, personal communication, 1990).

Project/Activity: BRA 82/008. Forestry Development - Brazil.
Source of assistance: UNDP.
Implementing agency: FAO/IBDF.
Form of activities: Drawing up plan/in-service training.
Period of execution: 1982-1986.
Assistance made available: Consultancy/equipment.
Remarks: UNDP provided $1,045,657 for the project implementation. It's objective was to assist the Brazilian Government in promoting the modernization and expansion of the Amazon forest sector and the Northeast of Brazil. The project included: supporting the development of the Tapajos National Forest as a model for tropical forest management; wood technology research on "lesser-known" species of the Amazon region; collaboration with the research on wood technology carried out by INPA; training at technical and vocational levels for the staff of the Tapajos National Forest; and the establishment of strategies for the development of forest resources in the Northeast. The Brazilian Forest Cover Monitoring Programme continued to receive assistance from the project. This undertaking marked the conclusion of activities initiated by the project BRA 78/003 on the development of a management plan for the National Forest of Tapajos. The second phase of this project, 1983-1986, was carried out in the Northeast based on the findings of TCP 2202, executed within the framework of this enterprise. (Sources of information: FAO, 1989; Carneiro, 1982; BRA 82 National Direction, undated a, b and c.; and Ferreira, personal communication, 1990).

Project/Activity: TCP 2202 - Forestry Development in the Northeast of Brazil.
Source of assistance: UNDP.
Implementing agency: IBDF.
Form of activities: Plan preparation.
Period of execution: 1983-1984 (3 months).
Assistance made available: Consultancy.
Remarks: This activity was concerned with watershed management in the Northeast of Brazil and carried out within the framework of the BRA 82-008 project. Its general conclusion was that development activity in the Northeast should take into consideration the close relationship among soil-water-plant elements. In addition, planning and execution of activities in the region should be executed in specific watersheds. A field office was initially established at EMBRAPA's Centre for Research in the Northeast Semi-Arid Zone and subsequently moved to Natal in the state of Rio Grande do Norte. (Sources of information: BRA 82 National Direction, undated b and c; and FAO, 1990).

Project/Activity: The impact of development on forest resources in the eastern Amazon region.
Source of assistance: UNDP.
Implementing agency: Companhia Vale do Rio Doce (CVRD)
Form of activities: Survey/research/short-term training abroad. Period of execution: 1986-1990.
Assistance made available: Consultancy/equipment.
Remarks: The main objective is to increase and upgrade water resources in the eastern Amazon region. These are to be achieved through evaluation of the present situation and determining suitable technology for future use when industrial, mining, agricultural and colonization activities are carried out. Objectives also include obtaining information on forest ecology and management. International funding is estimated at $200,335. (Sources of information: ABC 1990?; PNUD, 1990?; and Ferreira, personal communication, 1990).

Project/Activity: BRA 87/007 - Integrated Forestry Development in the Northeast of Brazil.
Source of assistance: UNDP.
Implementing agency: FAO/IBFF (IBAMA)
Form of activities: Research/training/preparing plans/ technology transfer and dissemination.
Period of execution: 1987-1990.
Assistance made available: Consultancy and equipment.
Remarks: This project appears to be evidence of an FAO shift of attention from the Amazon to the Northeast as noted by BRA 82 National Direction (undated b). It is basically an institution-building enterprise funded by UNDP at an estimated budget of $700,000. The project objectives include: reinforcement of the institutional capacity of IBDF (IBAMA) for devising, implementing and managing the forest development programmes concerned with fuelwood production; utilization of natural forest resources; watershed management and improvement of agroforestry activities. It also includes a significant component on diffusion and technology transfer. This appears to be a change in FAO/IBAMA strategy in Brazil. About 57 percent ($405,000) of the total FAO estimated budget was used for hiring international consultants. (Sources of information: UNDP, 1987; and BRA 82 National Direction, undated b).

Project/Activity: BRA 87/012 - Wood processing and furniture industry.
Source of assistance: UNDP.
Implementing agency: SENAI (National Service of Industrial Apprenticeship), FAO and UNIDO (United Nations Industrial Development Organization).
Form of activities: Research/training/surveying.
Period of execution: 1987/1990.
Assistance made available: Consultancy/short-term training abroad.
Remarks: Costs of FAO consultancy is estimated at $40,000 and total funding from UNDP amounts to $199,000. Project objectives include: improving utilization and local wood processing; gradual replacement of traditionally used commercial species by lesser known ones; reducing wastage in timber exploitation and processing; and on-the-job training. (Sources: PNUD, 1990; and Ferreira, personal communication, 1990).

Project/Activity: BRA 89/006 - Strengthening the systematic agro-ecological zoning of the Amazon region.
Source of assistance: UNDP.
Implementing agency: Ministry of Interior (Minter).
Form of activities: Project elaboration/assessment.
Period of execution: 1990-1991.
Assistance made available: Consultancy.
Remarks: Funding is estimated at 500,000. The project has the purpose of preparing the ground for agro-ecological zoning of the Amazon. Its main objectives include: setting up and management of the necessary infrastructure; identification and systematization of available information on inventories, surveys, and zoning which had previously been done to different scales, and dispersed in various institutions; and identification of financing sources for implementation of the project. A TCP mission (TCP/BRA/8852) has completed a follow up project and has been working on an agroecological zoning project for the Amazon. The TCP budget is $173,000. (Sources of information: PNUD, 1990; and FAO, 1990).

United Kingdom Overseas Development Administration (UK-ODA)

A strong financial programme of ITC on forestry and the environment has been recently launched between the United Kingdom and Brazil under the coordination and administration of UK-ODA. In 1990, eight projects were submitted to ABC and UK-ODA and several other proposals are being prepared in Brazil for presentation. One project was approved, in 1990, and is described together with the other seven which are in the pipeline.

There is, as yet, no fixed funding for the programme, but the total grant appears to be substantial.

Project/Activity: Anglo-Brazilian climate observation study.
Source of assistance: UK-ODA.
Implementing agency: INPE, CENA (National Centre for Nuclear Agriculture Studies, Piracicaba, Brazil),Institute of Hydrology (Wallingford,UK) and INPA.
Form of activities: Research.
Period of execution: 1990-1995.
Assistance made available: Financial/consultancy and equipment.
Remarks: This has been approved and estimated funding is £2,200,00. Climate and soil data from several sites in the Amazon will be collected over a five year period to improve understanding of climate dynamics and to assess the accuracy of computer predictions of the consequences of deforestation (Synnott, personal communication, 1990).

Project/Activity: Development of the "Floresta Nacional de Tapajos".
Source of assistance: UK-ODA through ITTO.
Implementing agency: IBAMA
Form of activities: Development/research.
Period of execution: 1990-1995.
Assistance made available: Consultancy and financial.
Remarks: Grant funding by UK-ODA, via ITTO, is estimated at £1,001,000. The project is in the process of being revised and approved by ABC and UK-ODA, at the time of writing. It is concerned with the establishment of infrastructure and management, including harvesting, protection and silviculture on a pilot scale as a demonstration model. The project will be carried out in the National Forest of Tapajos (Synnott, 1989).

Project/Activity: Studies in Amazonian dryland forest.
Source of assistance: UK-ODA
Implementing agency: INPA
Form of activities: Research/training.
Period of execution: 1990-1993.
Assistance made available: Consultancy, equipment and financial.
Remarks: This project is in collaboration with the Universities of Stirling and Bristol. It comprises analysis of distribution and cycling of biomass and mineral nutrients in plants, soil and soil fauna. Funding requested is £925,000 (Synnott, personal communication, 1990).

Project/Activity: Flora of the Ducke Reserve.
Source of assistance: UK-ODA.
Implementing agency: INPA.
Form of activities: Research.
Period of execution: 1990-1993.
Assistance made available: Financial and consultancy.
Remarks: Funding requested is £200,00. This deals with botanical research in the Ducke Reserve (Synnott, 1990).

Project/Activity: Development of the Caxiuanã Biological Reserve.
Source of assistance: UK-ODA.
Implementing agency: Museu Goeldi.
Form of activities: Research.
Period of execution: 1990-1992.
Assistance made available: Financial, equipment and consultancy.
Remarks: £790,000 has been requested. This involves building and equipping a biological and environmental research station in the Caxiuana Reserve National Forest (Synnott, personal communication, 1990).

Project/Activity: Ecology and management of floodplain forest, Combu Island, Belém.
Source of assistance: UK-ODA.
Implementing agency: Museu Goeldi.
Form of activities: Research and extension.
Period of execution: 1990-1992.
Assistance made available: Financial/consultancy.
Remarks: Funding requested is £214,000. This includes biological studies of floodplain forest, economic studies of farm-forest production systems and an extension programme (Synnott, personal communication, 1990).

Project/Activity: Development of aromatic plants and essential oils.
Source of assistance: UK-ODA.
Implementing agency: Museu Goeldi and FCAP.

Form of activities: Research.
Period of execution: 1990-1993.
Assistance made available: Financial and consultancy.
Remarks: Requested funding is £300,000. The project comprises studies on identification of active chemicals in the Amazonian flora, and agronomic trials to domesticate indigenous plants which are suitable for small farms and which yield economic products (Synnott, personal communication, 1990).

Project/Activity: Forestry in Tocantins Project, Maraba.
Source of assistance: UK-ODA.
Implementing agency: IDESP.
Form of activities: Research and extension.
Period of execution: 1990-1993.
Assistance made available: Financial and consultancy.
Remarks: Requested funding is £1,000,000. The project is concerned with agroforestry trials and extension as well as nurseries. The "Centro Agrario Tocantins" and Agricultural Workers Union are collaborating in its implementation (Synnott, personal communication, 1990).

ITTO

Besides the project "Development of the Tapajos National Forest" described under UK-ODA funding, ITTO is responsible for the execution of the following enterprises:

Project/Activity: Study for the marketing of tropical timber and promotion of the consumption of lesser known wood species in international markets: Phase I - Promotion for the Japanese market.
Source of assistance: Information not available.
Implementing agency: IBAMA.
Form of activities: Surveys, preparation of technical documents and dissemination of information.
Period of execution: Two years duration.
Assistance made available: Financial and consultancy.
Remarks: (Based on an ITTO draft proposal). Estimated costs amount to $740,000. Activities of the project include: review of the Japanese timber market; preparation of a list of selected species and preparation of technical papers through literature review; a survey and assessment of the potential for production and trade at producer/export level; preparation of technical material and promotion seminars; and implementation of an operational import and market programme on a pilot scale. The project has been submitted to donor agencies.

Project/Activity: Integrated management of the Acre State Antinari Forest. First phase.
Source of assistance: Information not available.
Implementing agency: FUNTAC.
Form of activities: Information not available
Period of execution: 1989-1991.
Assistance made available: Consultancy.
Remarks: The project's first phase comprises an area of 107,000 ha. Its estimated cost is $1.1 million. IBAMA, INPA and SUDAM are collaborators. (Source of information: Carneiro, personal communication, 1989).

According to Miller (1991) a $240,000 project will be implemented by the Brazilian Association of Plywood Industries. It is a industrial trial research to promote the use of lesser-known species in the Amazon plywood industry.

Japan

Project/Activity: Forestry research in the State of Sao Paulo
Source of assistance: Japan.
Implementing agency: Sao Paulo Forestry Institute.
Form of activities: Research.
Period of execution: 1989-1981.
Assistance made available: Consultancy/equipment.
Remarks: Foreign funding for the project is estimated at $432,000. Its objectives are: to promote adequate watershed management through research at existing experimental watershed stations, and to develop remote monitoring by mapping, stratification and the classification of the vegetation. It is the second Sao Paulo Forestry Institute project, within the framework of watershed management, financed by Japan. The first one was completed in 1986. (ABC, 1990?)

Project/activity: Japan-Brazil agricultural research project.
Source of assistance: Japan.
Implementing agency: JICA/EMBRAPA.
Form of activities: Research.
Period of execution: 1989-1992.
Assistance made available: Consultancy/equipment.
Remarks: Funding is estimated at 37,500 million yen. Consultancy includes the dispatch of seven experts.

Other agencies/activities

Projects which are relevant, but where the available information is incomplete, are reported in this section.

Brazilian institutions have participated in collaborative research supported by the **Commission of the European Communities** as follows:

1) Project dealing with mycorrhization of industrial *Eucalyptus* plantations, led by the CTFT (Centre Technique Forestier Tropical). The total requested from the Commission for its implementation was 411,038 ECU to cover the participation of seven institutions from four countries (France, Brazil, Portugal and the Popular Republic of Congo). The Brazilian organizations are: The University Federal of Santa Catarina and the University Federal of Vicosa, which have requested 55,000 and 50,000 ECU, respectively.

2) The Commission material also notes a project proposed by G. Speidel (Freiburg, Germany) and J.P. Goudet (CTFT, France) which includes studies of silviculture and profitability of Brazilian Forests.

3) Another project proposed by France, INRA and CTFT, (proposal 02004, TSD 171) is to study mycorrhization of eucalyptus in the Congo as well as in Brazil. No direct Brazilian participation is reported in the project proposal.

The following cooperation projects are noted by an FAO (198-?) list:

- **Japan**: Wood products research project;

-**Portugal**: Wood structure and properties of Myristicaceae family (to be completed in 1990);

-**Germany**: 1) Support to the Forest Ranger School in the state of Parana; 2) Support of research in wood technology in the INPA laboratory, Manaus.

-**UNEP**: Fuelwood plantations and the efficient utilization in rural areas of Brasilia; tree nursery and planting of fast growing firewood tree species.

-**United States/NASA** (National Aeronautics and Space Administration): 1) Tropical forest inventory and monitoring of deforestation; 2) Deforestation, floodplain dynamics and carbon biogeochemistry in the Amazon Basin;

-**World Wide Fund for Nature (WWF)/US Consultation Fund**: Minimum critical size forestry ecosystem;

-**International Union for Conservation of Nature** - now, **World Conservation Union (IUCN)**: Surveying of national parks to determine primate densities and conservation requirements.

-**Pan American Development Foundation (PADF)**: Agroforestry outreach.

Based on A.R. de Freitas (personal communication, 1989) the following organizations have also undertaken international cooperation projects:

-**USA/US-AID/Virginian Polytechnic Institute and** IPT (Technology Research Institute of Sao Paulo), totalling $7 million from 1973 to 1978;

-**US-AID/Ohio State University and** University of Sao Paulo/ESALQ Luiz de Queiroz;

Carneiro (1982) also mentioned an agreement between FCAP (Agrarian Sciences School of Para) and the CTFT Centre Technique Forestier Tropical. He commented that for operational reasons the results were not the expected ones.

Apart from the projects already discussed, it would be worth listing the following proposals presented by ABC (1990?) as calling for funding:

-Forestry management in conjunction with the settlement of small-scale farmers in areas of native Brazil nut trees in Tocantins. Institution responsible: Institute of Economic and Social Development of Para (IDESP);

-Timber study in Amazonia. Institutions in charge: CVRD, IPT, INPA and IBAMA;

-Information and training systems for the agro-ecological-economic zoning of Amazonia. Responsible: Ministry of Interior;

-Conservation of natural resources in the State of Acre. Organization in charge: State of Acre Technology Foundation (FUNTAC);

-Monitoring of forest areas used for commercial exploitation. In charge: SUDAM and Agrarian Sciences School of Para (FCAP);

-Tree breeding laboratory. In charge: SUDAM;

In addition to the above proposals, which are shown in some detail in ABC (1990?), another eight were presented informally to UK-ODA in an outline form for preliminary considerations (Synnott, personal communication, 1990).

It must be clear that there are an excess of project proposals for Amazonia. Despite the outstanding goodwill to implement research and development operations in the region, the ability of staff to carry them out should be carefully examined to prevent failures which could affect possible future assistance to the region. More comments on this matter will be made in a subsequent chapter.

9.2 COMMENTS ON INTERNATIONAL TECHNICAL COOPERATION FORESTRY PROJECTS IN BRAZIL

traditional methodologies for the economic evaluation of projects exist; these include the discounted present value, the cost-benefit ratio and the internal rate of return. However, they are not always the best means of evaluation because they do not fully take into account project effectiveness. They would not usually include benefits from: the utilization of marginal soils, reducing pressure on existing natural forests, the creation of new jobs for generally unskilled people in poor regions, and the replacing of marginal agricultural activities. Indirect benefits such as erosion control, prevention of rivers flooding, conservation of fauna, which are very difficult to estimate in economic terms, are not usually included in these traditional economic analyses.

Therefore, rather than going through such types of methodology, a few selected projects will be examined in terms of results and technologies generated, increase of staff, staff training, laboratory construction and supply of equipment, number of experiments and publications as well as new perspectives provided for the country. These are easy and efficient means of estimating the success of an IC project because they are the fundamental basis of future social and economic returns to a country. From these factors, training of personnel plays a critical role in a projects' sustainability and effectiveness. Constraints are also examined with a view to making recommendations to improve the performance of future projects.

Forestry component of the Agricultural Research Project II (BIRD II)

This was the second EMBRAPA Project funded by the World Bank and included a specific programme on forestry research. Participation of forestry in the first project, 1976 to 1983, was not significant as the implementation of research in this area only started in 1978.

The World Bank loan for BIRD II amounted to $60 million and the total costs of the project were $264 million. EMBRAPA was both the borrower and the implementing institution. The interest charge was 9.6 percent per annum on the principal amount of the loan withdrawn and outstanding. Repayment is due after 11½ years including three years of grace. There was a commitment charge of 0.75 percent per annum on the principal not withdrawn and outstanding. The planned funding for forestry activities was $7.53 million but the actual expenditure only amounted to $1,698,308.30 (EMBRAPA, 1988).

The main objective of the project was to enhance EMBRAPA's research capability in three priority regions: the Northeast, North and Central-West. It included the following:

a) activities aiming at strengthening EMBRAPA's information and documentation capability;

b) research infrastructure (offices, laboratories, green-houses, etc);

c) equipment and vehicles;

d) consultancy;

e) a training programme (fellowships for graduate academic degrees and short-term training);

f) establishment and operation of a system to monitor the project implementation and a system to evaluate the proposed research. At a later stage, the project also aimed at setting up a system to monitor and evaluate all the activities of the institution.

The project document and the EMBRAPA (1988) final report reveal the following:

1. Personnel increased by a total of 3054, made up of 481 researchers and 2573 support staff. From this, the forestry programme employed 29 people, comprising 7 foresters and 22 support staff, therefore, less than the incremental estimated at appraisal of 12 foresters and 48 research support staff;

2. The final figures of the project training component were 306 MSc, 225 PhD and 1760 short-term students. From this, a total of 11 forestry researchers were provided with training, 4 at MSc and 3 at PhD level, and 11 short-term students. A higher number was expected by the project appraisal: 10 at MSc and 10 at PhD levels and 27 short- term;

3. Consultancy for the whole project comprised 376 experts, 150 for contracts of one or more years and 226 for less than a year. The forestry component proposal had foreseen 8 short-term consultants, from which only 1 was hired.

4. Infrastructure for the forestry component amounted to approximately $0.153 million from a total of $8 million for the project. The appraisal had estimated $0.825 million.

Expenditures on the forestry component were lower than had been foreseen in the final project proposal and in the World Bank project appraisal for reasons which include:

a) A high level of cooperation with private forestry companies, which supported a large number of shared interest experiments, had lowered the estimated costs of the forestry research programme;

b) other funding sources were used;

c) strong interaction with universities facilitated local informal consultancy for the forestry programme;

d) forestry research was relatively new in the EMBRAPA system.

Other factors, such as new priorities of EMBRAPA's central administration and difficulties in importing logging equipment, had

contributed to a decrease in the development expenditures (infrastructure and equipment). Logging equipment for research concerned with management of the Amazon rainforest was anticipated in the approved proposal,but was not purchased. A greatly needed seed laboratory at Santarem, Para State, was not built because of a lack of goodwill on the part of the National Agricultural Research Centre (CPATU) administration, which was much more concerned with agriculture and livestock than with forestry at that time.

It appears that, in a large, primarily agricultural organization like EMBRAPA, the administrative staff, usually with an agricultural background, tends to favour agronomic rather than forestry activities. Under such circumstances, therefore, those directly in charge of the forestry component should insist upon what was agreed in the original proposals.

The whole project was considered successful by the World Bank and by EMBRAPA (1988). The forestry research component should also be considered to have been effective. Its achievements include:

1. Improvement of the forestry staff pattern. Research personnel increase was 20% (7 more than the previous 34). Graduate degrees abroad were obtained by seven researchers, 4 at MSc and 3 at PhD level (a 100% increase: only 7 had MSc and PhD degrees previous to the project);

2. Increasing the number of projects from 65, in 1982, to 111, in 1987;

3. A number of significant technical results as shown by the EMBRAPA final project report (1988) and by the National Centre of Forestry Research report (1983). These include:
   a. new recommendations for the fertilization of "Acacia negra" which allow net income increases of about 70%;

   b. new improved techniques for "erva mate" seedling production;

   c. more efficient management techniques for fast growing species such as eucalyptus and bracatinga (a legume tree) for fuelwood production;

   d. basic information on vegetative propagation of fast growing species and on selection of exotic species/provenances such as those from the genus *Eucalyptus, Pinus, Acacia, Prosopis, Leucaena* as well as from a number of indigenous plants such as *Cordia, Vochysia* and *Astronium* for plantation in the North and Northeastern regions of the country.

   More details and other results can be found in the National Centre of Forestry Research report (1988).

It is worth emphasizing that immediate financial assistance provided by the World Bank for an unforeseen activity (*Eucalyptus* seed collection in Australia) made possible the implementation of an extremely successful tree breeding/improvement project already described. Unfortunately, such positive achievements had not been mentioned in the EMBRAPA (1988) or National Centre of Forest Research (1988) project completion reports.

The socio-economic project evaluation by Barbosa *et al.* (1988) unfortunately did not analyze the forestry component. The reason appeared to be the absence of a forest economist at the beginning of the project implementation. An economist was hired later as part of the increase in staff proposed by the project.

Minas Gerais Forestry Development Project

The Minas Gerais Forestry Development Project is the only free-standing forestry project financed by the World Bank in Brazil. It amounts to $48.5 million, constituting the largest forestry loan funded by any international donor agency in Brazil.

The project has been included in this section for comments, although at the time of writing it had only recently started, because it appears to be offering a new alternative model for financing industrial forest plantations in the country.

The objectives of the project are:

1. financing the establishment of 165,000 ha of industrial forest plantations and the building of charcoal producing kilns and related infrastructure through a line of credit;

2. planting of 40,000 ha of small woodlot on small and medium size properties;

3. strengthening IEF (State Forestry Institute) management capabilities;

4. environmental conservation through the development of parks and reserves, conservation education and the control, supervision and management of forest harvesting and wood utilization.

The main reasons for launching this project include: the success of previous enterprises financed by the Bank in the state of Minas Gerais: the urgent need of wood for industrial uses; the threat to the cerrado forests in the state; the necessity to increase the measures concerned with environment conservation in the region; and the increasing failure of the existing Federal Government system to finance forest plantations for industrial uses in the country.

The Brazilian Federal Government has gradually reduced financial resources for reforestation through fiscal incentives. FISET (Fund for Sectorial Investment) has recently modified its reforestation programme, which for many different reasons does not offer stimulus to forest plantations where they are needed. There are no attractive alternatives for funding forestry plantations in the country. BNDES (National Economic and Social Development Bank) line of credit, for instance, has been unsuccessful in financing reforestation for a number of reasons.

Appropriate long term loans by official government or commercial banks have been considered for a long time as a valid means of replacing FISET financial resources, based on income tax reduction. However, attempts so far made have been inadequate in establishing a feasible line of credit for the forestry sector to finance industrial plantations.

This World Bank funded project executed by the Minas Gerais Development Bank (BDMG) and the State Forestry Institute (IEF), with the participation of BDMG and commercial banks as intermediaries for credit activities, appears to offer a valid alternative for financing industrial forest plantations in the country. Financing under the project would be:

- up to 80 percent of any sub-project planting costs, excluding land cost, as well as maintenance for up to four years of planting;

- up to 50 percent of the previously referred to costs covered by the World Bank;

- up to an additional 30 percent credit available from other sources such as BNDES and FISET;

- a minimum of 20 percent of plantation costs supported by borrowers' own resources.

Plantation and minimum costs up to the fourth year are between $500 and $800 depending on local planting conditions. Repayment would be up to fourteen years for plantations and four years for charcoal infrastructure. The grace periods are up to seven years, or six months after the first cut, for plantations and one year for charcoal infrastructure. Loans are subject to full monetary correction plus a variable interest rate based on the cost of BDMG funds. However, this interest will be less than 11 percent per annum. All loans above $0.4 million would be submitted to the World Bank.

SEPLAN (The Secretary of Planning) is responsible for coordination, MG for technical/financial analyzes and IEF for supervision/verification. It is hoped that control and monitoring by BDMG and IEF will prevent the previous failures which were observed under the Fiscal Incentives scheme.

It is worth stressing that the fundamental requirements for the success of this type of enterprise include:

- availability and effective use of research generated forestry technology to establish plantations with the required economic yields which would make the repayments possible;

- an appropriate price for the wood produced, since low prices has been a source of complaint in Brazil;

- well structured and experienced local forestry services;

- appropriate development and commercial banks.

According to Machado (personal communication, 1990), the higher costs of financing available from BNDES has discouraged utilization of funds from this source. Consequently, only financing from the World Bank, fifty percent of the total, has been used by the private forest companies.

Other Brazilian States should prepare themselves to establish such industrial forestry plantation financing schemes, supported by their own financial resources together with funding from donor agencies. The Federal Government should also strengthen its capabilities of coordinating the entire process of financing forestry plantations for industrial and environmental purposes in Brazil.

Tapajos National Forest Project

The Tapajos National Forest was created in 1974 based on a preliminary FAO inventory to determine the timber potential of an area along the Santarem-Cuiaba road. It covers approximately 600,000 hectares, representing a significant part of the Amazon forest as far as soil, climate and vegetation are concerned. From this area, 160,000 hectares have been selected to start a programme of licensed commercial logging as well as to study sustained-yield management on a large scale operation. A new inventory was carried out in 1977 to obtain complete data of its timber potential as well as detailed information on soil, topography and composition of understorey. In the same year, a preliminary study on the economic and ecological feasibility of exploitation was executed by FAO experts assisted by Brazilian forestry officers. Following this, a report based on

institutional, ecological, industrial and marketing studies, was submitted to Brazilian governmental authorities with suggestions and recommendations for the rational utilization of the area.

A comprehensive management plan was drawn up by T.W.W. Wood under the auspices of FAO (1980), based on the previously reported data together with information from the research carried out by EMBRAPA and SUDAM. It would start with the exploitation of 1,000 hectares per annum which would be increased later to 4,000 hectares. A 100 percent inventory, localizing and measuring all the trees with 55 cm DBH and above, was executed and the planned roads built.

The project aimed at obtaining an annual timber increase of 2 cubic meters per hectare, and 40 cubic meters in the second harvest 20 years after the first exploitation. At that time, 28 species marketed nationally, and currently exported, were found. The average timber volume comprised by those species was 36.7 cubic meters per hectare, from trees of 45 cm DBH and above. There were also 18 potentially commercial species with an average timber volume of 39.7 to 42.7 cubic meters per hectare.

As reported by Silva (1989), EMBRAPA proposed a research project in 1985, to be carried out in the Tapajos forest, to demonstrate the feasibility of sustained timber production in the Brazilian Amazon. The proposal, basically, included an initial harvested value of 40 cubic meters, suggested as the initial target to be achieved through the felling of 6 trees per hectare, on average. Over-logged and rare species would not be cut, but allowed to remain as seedbearers. Silvicultural treatments would be applied, first after logging and then every 8 to 10 years, aimed at keeping the basal area at between 50 to 70 percent of its original estimate. Silvicultural treatments would be revised every 5 years based on experiments conducted in the same Tapajos Forest.

In order to provide a sound basis for the commercialization and export of timber from the National Forest of Tapajos and the region, IBDF set up a timber terminal in the city of Santarem, approximately eighty kilometres from the Project by a good road. It is also important to mention that the city has eighteen saw mills and a very modern fluvial harbour.

In 1987, ten lots of 100 hectares, corresponding to the first block of 1,000 hectares, were auctioned for logging and management by the private sector as based on the FAO 1980 plan. According to Silva (1989), the size of the blocks were designed to give similar opportunities to small, medium and large companies. Surprisingly, only one company bid for 100 hectares which was logged in that year. As the government does not, itself, intend to carry out the job, the undertaking has been suspended.

Why was it that such a well planned project, to be executed under favourable conditions, had failed? In the view of Silva (1989), there were three main reasons which discouraged companies from bidding for it: the logging rules established by the forestry agency were too restrictive, lack of a long term logging contract and the high price of the removed wood as compared to that usually obtained from farmland. According to Almeida (personal communication, 1990), thirteen companies expressed interest in the project although only one presented a proposal. In his opinion, two measures would make the Tapajos project feasible. The first would be the construction of a harbour at the project location to allow transportation of the harvested logs down the Tapajos river to Belém directly. The second would be to allow the harvesting of species which were not permitted in the first attempt but are currently marketed nationally.

Although these factors could have contributed to the failure of the enterprise, the very real reason for the indifference of private companies is, and continues to be, the existing timber trade structure in the Amazon, which arises largely from inadequate policies and lack of control by the

organizations responsible. The wood processing industries have no need to own the forest nor establish any contract to exploit it. Exploitation of commercial timber trees is predominantly based on local rural people who log them either in the dryland forests or the varzea. The logs are sold to brokers who have contracts to supply the mills. They are usually transported by floating down the river. In regions where roads exist, such as in the northeast of Para, Rondonia, Goias and Mato Grosso, chiefly in colonization projects, the trade is mostly based on logs obtained from forests cleared for agriculture and cattle raising. Furthermore, logs are also obtained illegally through selective cutting from areas which by law must not be logged.

In consequence, timber dealers and the wood based industry in the Amazon region, except for the pulp mills, presently have no need for any kind of forest utilization contract on public land or land ownership. Neither do they have to worry about forest management to run their businesses. It is worth repeating that most of the nation's Amazon forest can be considered "terra devoluta", a Brazilian legal expression meaning that no decision has been made about the future use of the land. Thus, it is under the control of the state concerned or the federal government. This, no less than the already examined difficulties of enforcing the law in the region, is a significant factor encouraging continuity of the present situation.

The forest management pilot project had received technical FAO support from the outset up to the time when IBDF and EMBRAPA could take over the whole enterprise. Thus, continuity from the technical point of view has been assured. Carrying out the enterprise through private companies was the best decision; the government should never undertake a task of this type. Therefore, the project can only proceed successfully if the previously noted major constraints are removed. From the point of view of international cooperation, FAO support to the project may be considered worthwhile. The enterprise is all set up and whenever the overall situation and framework changes it could be carried out successfully by the private sector.

IBAMA has made a project proposal to ITTO for the exploration of 1000 ha. This enterprise, for which UK-ODA is the funding source, basically, aims to provide a demonstration model of management.

FAO projects/activities in Brazil

FAO was the first international agency to carry out significant technical assistance on forestry in Brazil. Some of its activities, which are considered representative in the country, will be discussed. The John Pitt mission, in particular, will be commented upon since it represents a landmark in ITC in the Amazon region and also because many of its observations and recommendations are still valid.

Achievements and constraints of FAO projects: Some examples

In 1950, an FAO consultant visited the Amazon to organize the agency activities in Brazil. Based on expert observations, an agreement on technical assistance was signed between the Brazilian Government and FAO in 1951 and a three-man mission sent to the Amazon region. SUDAM (1974) reveals that, except for a few previous limited reports, such activities were the start of significant studies on the rational utilization of Amazonian forest resources. This mission also marks the beginning of significant ITC on forestry in Brazil.

The main purposes of the first FAO mission were to advise the country on forestry industry, wood processing, training, modernization of

The main assistance priority for FAO up to 1961 was inventories to assess the timber production potential of the forests. After that time, their activities shifted to other forestry areas. The most significant and beneficial change was the inclusion of an extension and technology transfer component in the BRA 87 project which is being carried out in the Northeast of Brazil. Nevertheless, as far as reforested areas and forest products are concerned, any real and significant accomplishments will be very difficult unless an adequate financing scheme is made available so that local rural people are able to adopt the techniques generated and demonstrated by the project.

It should also be noted that research carried out with FAO assistance in the country was essentially based on international consultants until the establishment of PRODEPEF (BRA 45 project). Under such conditions, departure of FAO experts would mean the halting of research, since the local collaborating organizations did not have an adequate structure for research. The lack of properly trained counterparts with institutional full-time commitment to forestry experimentation led to an undesirable discontinuity of activities. It will always be a waste of time and resources trying to implement projects without a certainty of qualified counterparts who can proceed with activities within an appropriate institutional research/development framework when involvement of the assistance agency ends. Despite its being so simple, this well known rule has not always been followed in practice for many different reasons. For instance, this was clearly observed in the FAO activities in Amazonia up to the establishment of IBDF and EMBRAPA. An overall study of factors influencing success of technical cooperation in Brazil will be made in a subsequent chapter.

Cassen & Associates (1986), analyzing international technical cooperation, have pointed out that many projects have been unsuccessful when they install their own administrative units separately from the line organizations of the recipient country's government and institutions. FAO has been evolving this type of arrangement in Brazil. Besides a coordinating office in Brasilia, this international organization also has a field office established in Natal. Although their offices are located within a Brazilian organization, they carry out activities which should be accomplished by IBAMA or by another Brazilian research/development entity. It appears that this arrangement has been adopted to overcome the local organization inability to implement, satisfactorily, activities related to forestry research and extension.

From the view point of project sustainability, i.e. project life and continuity of benefits beyond the time of donors' involvement, it would be advisable to have these assistance activities under an appropriate IBAMA administrative unit, to avoid discontinuity after the end of the FAO project. Although most of the technical staff has been hired by IBAMA (Paveri, personal communication, 1990), further absorption of such parallel administrative/technical arrangements into the institution will cause problems and is unlikely to succeed. If a suitable coordinating unit does not yet exist, a new unit could be set up inside IBAMA to deal with the technical and administrative activities of the project. Nevertheless, this may not be the best solution to the problem. Based on the present national institutional framework, as well as from an organizational point of view, strengthening of local institutions committed to forestry research and/or extension would be preferable, rather than creating new units within entities which are not specialized in these activities and have no adequate structure for such tasks.

Most of the FAO projects in Brazil have a common feature: a high ratio of foreign consultancy. For instance, about fifty-seven percent of the FAO BRA 87 project budget, $405,000, is allocated to hiring international consultants (UNDP, 1987). Despite the fact that technical cooperation may

involve a great deal of consultancy, and many agencies execute their work through consultants, project goals usually can be achieved by different strategies and means. The questions are: are there no qualified Brazilian experts from the Northeast or other regions of the country who could be hired for such BRA 87 consultancies? Could the work be supported by other organizations which would consider local consultancy more readily? These possibilities should always be examined by the agencies as well as by the Brazilian organizations, and mainly by ABC, as a means of offering more stimulus to local foresters and related professionals as well as to strengthen the country's institutions.

Paveri (Personal communication, 1990) reveals that the directorate of the FAO/IBAMA Northeast project has been concerned with the high ratio of consultancy - mostly foreign - in the enterprise. According to him, national consultants should be sought and hired whenever possible.

The training component of FAO projects also deserves some comment. It has been recommended in Agency final reports and has been offered in a variety of forms and proportions, but mostly as short-term training. This non-continuous type is desirable as well as important and should be included in projects whenever possible. But, one should bear in mind that such training cannot replace regular and long-term qualification programmes, which are carried out continuously within the framework of national research/development institutions. These institutionalized qualification programmes also include academic training.

From the previous comments it is clear that: assistance projects should avoid as much as possible replacing regular work done by local institutions - it would be more valuable to provide assistance for their strengthening; and short-term training does not replace long-term regular qualification programmes implemented by local institutions.

Assisting and advising the Brazilian Government on the rational utilization of the Amazon Forest.

This project/activity is within the framework of the FAO assistance programme for the development of the Amazon Basin. From it, only the John Pitt activities will be commented on as they represent a landmark in international cooperation on forestry research and development in the Brazilian Amazon as well as the first significant research effort on this subject in that region. Apart from this, it provides a basis for further estimates for improvements in forestry science knowledge in the region.

John Pitt's report (SUDAM, 1969) includes the following important general information and comments concerned with his consultancy carried out from 1955 to 1960:

- the FAO mission was under SPVEA which supported its activities. However, the local organization did not engage any Brazilian forestry professional;

- there were no Brazilians trained in forestry science in the Amazon at that time;

- destruction of forests was noticeable and Pitt refers to the disappearance of important economic species such as "pau-rosa" (*Aniba duckei*), "cedro" (*Cedrela odorata*), "freijo" (*Cordia goeldiana*) and "mogno" (*Swietenia macrophylla*);

- the annual budget from SPVEA (the only source of financial support to the project) for this work was less than £4,000 per annum, which could only buy four vehicles (jeeps) at that time.

Achievements of this work include: setting up an experimental station in Curua-Una; establishment of research on the application of silvicultural treatments to the forest, from which much information was obtained; species trials; the establishment of nurseries for seedling production in Santarem and Curua-Una for enrichment and planting trials; guidelines for the production of pulpwood through plantations or management of natural regeneration; and local training (which unfortunately was only for a limited number of persons for reasons related to lack of interest by Government institutions and authorities at that time).

During this period, a centre for training specialized labour was also set up in Santarem.

Recommendations of Pitt's report comprise:

- creation of National Forests;
- improving INPA capability in forest science;
- increasing forestry research in Amazonia;
- training of forestry professionals in the field;
- better salaries for the foresters in the region.

The final report also stresses that all silvicultural operations in logging concessions must be carried out by the Government, as international experience has proved their inefficacy when carried out by private enterprises.

The experiments established by Pitt were abandoned for a period of time and some have been lost as valid research. But, a few are still giving information. Another serious problem which has affected that work was the previously mentioned lack of follow-up research. Forest management would be a natural sequence of such activities. However, as pointed out by Galvao (1985), nothing was published on this subject from 1960 until the 1970s (with the work of Dubois published in 1974). Reasons from the Brazilian side embrace: the non-existence of a well structured regional or national institution for forestry research in the region; lack of foresters; and inadequate financial resources. But, above all, this FAO programme/project was poorly planned, chiefly for ensuring sustainability of activities to achieve the basic initial proposed objectives; and this was the fault of Brazilians as well as of FAO.

FACTORS INFLUENCING THE EFFECTIVENESS OF INTERNATIONAL COOPERATION IN FORESTRY PROJECTS IN BRAZIL

A wide range of factors may affect the performance of cooperation projects. This work examines those which have influenced the success of, or possess the potential to constrain, forestry ITC projects in Brazil.

10.1 FACTORS INFLUENCING INTERNATIONAL COOPERATION PROJECTS

In his economic analysis of forestry projects, McGaughey (1980) notes that project appraisal methodologies should help to identify and quantify constraints which limit the effectiveness of a project. He classifies these constraints as follows:

- financial constraints which interfere with availability of funds for project capital and operating expenditures. Sometimes these constraints are difficult to alter because they depend on national political decisions;

- availability of local, trained manpower for project execution;

- local institutional problems which include structural deficiencies, inadequate administration procedures, deficient personnel and financial management and inefficient technical management;

- social constraints, of both historical and cultural nature.

Excessive intrusion of commercial or political motives by bilateral donors as well as over-ambitious objectives of donors and recipients are included as significant potential factors for failure by Cassem and Associates (1986). They also note that donor agencies could avoid repetition of their own mistakes and learn more from other assistance entities through effective communication on this matter. Galvao (1984) indicates that counterparts and consultants are significant factors of failure in forestry research projects in developing countries. OECD/DAC (1972) reports that technical cooperation in education, institution building and agricultural research has shown undeniable success, but, it has also revealed numerous failures. This organization stresses that attempts to transfer methods from industrialized countries to countries with a markedly different level of development and social conditions has been an important factor in project failure.

Basically, effectiveness of TC projects can be assessed by the degree to which they achieve their objectives without harmful side-effects.

10.2 FACTORS INFLUENCING PROJECT PERFORMANCE IN BRAZIL

Factors influencing the effectiveness of ITC projects may occur alone, but interaction of more than one factor is very common. Nevertheless, in this section, whenever possible, they will be examined separately; but more than one will be discussed simultaneously, where necessary.

Project performance, in Brazil, may be influenced by a number of different factors, related to the recipient, the donor or both. They include: unfavourable policy environment; insufficient government contributions to

the project costs; inadequate local implementing institutions; unsuitable institutional framework arrangements to allow collaboration among country organizations; deficient training component; lack of sustainability; insufficient number and quality of counterpart personnel; inadequate selection and uncooperative behaviour on the part of international consultants; and administrative deficiencies in the recipient country and/or the implementing agency.

Policy environment

Project effectiveness requires a favourable national policy environment compatible with its general purposes and objectives. The Tapajos National Forest project, a development/research pilot scale enterprise concerned with the rational utilization of the Amazon Forest, has failed for lack of an adequate policy framework in the region, as already discussed. An unfavourable policy environment has also negatively influenced the forestry component of the BIRD II project, supported by the World Bank, as already examined. Government restrictions on hiring incremental permanent staff, even though they may have benefitted the country as a whole, prevented EMBRAPA from reaching its staff targets and therefore from improving the performance of the project's forestry component.

Government financial contributions

Inadequate government financial contributions have commonly influenced project performance as well. In Brazil, this constraint has been mostly related to the time when funding is needed. Delays in providing scheduled financial resources, especially with high inflation, are crucial for projects dealing with plants and animals, which cannot wait to be planted, fed or cared for.

Capacity of recipient organization

The capacity of a recipient organization to accomplish the proposed research/development tasks is one of the chief determinants of effectiveness. Inadequacy of the local implementing organizations hindered the first efforts of forest research supported by FAO in Amazonia. Capability is made up of various components, such as: a sufficient number of trained personnel, adequate institutional structure (this includes appropriate salaries in addition to stimulus for staff training and qualification) and institutional commitment to forestry research (research should specifically be included in the institution's mandate and actually be one of its basic objectives). Despite the complaint that buildings are vital components of an organization's capacity, they are markedly less important in Brazil than the previously mentioned elements.

Administrative deficiencies

Administrative deficiencies hinder the capacity of an organization to execute a project, as well as to achieve the objectives it was created for, and therefore to fulfil the social reasons for its existence. These deficiencies have many different origins. Some are due to internal elements of the institution, such as untrained staff, inadequate organizational structure and deficient central administration. External influences include: lack of government commitment and support to the institution and/or project; negative interference by politicians in the decisions of

administrators and in the behaviour of technical staff and personnel. A further external influence is the unfavourable economic situation of the country. These, together with other elements, have an effect on organization procedures and activities and ultimately on the project performance.

It is worth noting that a change in central or state governments, for instance after general elections, may lead to replacements of a related organization's administrative staff, regardless of their current performance, i.e., replacement for political reasons. This is common in Brazil and causes a lack of continuity in administration which in many cases reflects negatively on project implementation.

An example of administrative failure, from multiple causes, causing constraints in a project, is found in an IDRC supported undertaking implemented by EMBRAPA/CPATSA/CNPF in the northeast. The problems began with spending too much time on utilizing the funds available in Brazilian currency and a high rate of inflation in the country. The financial resources deposited in US dollars by the Canadian agency were exchanged at increasingly variable rates in local currency, but not immediately used by the CPATSA for the project activities. Since inflation, at that time, was around 15 percent per month the delay, caused by EMBRAPA's administrative failure, resulted in availability of only a part of the original budget. A period of six months reduced the money value by more than 50 percent. Fortunately, the causes of the problems were identified and with the cooperation of the donor agency, measures were taken and the constraints removed.

Institutional framework

The existence of a suitable institutional framework allowing collaboration among institutions with a minimum of bureaucracy is a critical factor of effectiveness when the recipient organization does not have the necessary means to implement the project. In such situations, projects have been carried out with different degrees of effectiveness depending upon the existing arrangements for formal or informal assistance from other collaborating Brazilian organizations. For instance, SUDAM forestry research/development has been deeply dependent on technical support from FCAP, EMBRAPA, IBDF and IPT since it has not had the necessary technical, or even the required support, staff. On the other hand, EMBRAPA's related research on forest exploitation has been based on SUDAM's heavy machinery which often has not been available at the proper time for a number of reasons.

In general, collaboration among organizations from the Federal Government, States and municipalities is very difficult to achieve. Thus, important decisions, such as the setting of project priorities, defining beneficiaries and estimating costs which could be accomplished within the framework of a collective enterprise, are often made by just one of these entities. Subsequently, a project may be hampered by an entity which has not been given the opportunity to share in the decisions and participate in the undertaking.

Project appraisals

Currently, the capacity of recipient institutions and/or the existence of an appropriate institutional framework is becoming increasingly more critical as many different sources are likely to provide assistance to Amazon-based organizations. Worldwide concerns about environmental effects of forest clearance and burning has led donors to make more funds available to this region. Anxious to help overcome these problems and in

need of financial resources, many Brazilian institutions try to take advantage of this situation by preparing and submitting a number of proposals to aid agencies. However, many of these proposals are inadequate from the point of view of national/regional priorities, organizational capacity or institutional arrangements for collaborative work with other country institutions. Both the international donors and the Brazilian Cooperation Agency (ABC) should carry out more careful project appraisals in order to prevent waste of time and national resources as well as to reduce future project limitations and lack of project effectiveness, which could react negatively on further assistance flow to Amazonia. It is worth stressing that waste of time is the worst thing that may happen to a Third World country which intends to lessen the existing gaps with developed nations.

Assessments must take into account all possible constraints and projects should include components designed to overcome obvious deficiencies within an existing organization. The capability of proposing institutions must be fully appraised and, whenever necessary and convenient, arrangements for collaboration among local institutions must be a prerequisite for project approval. Correction of inadequate administrative procedures and structural deficiencies in the recipient agency, besides changing an unfavourable policy environment, should also be accomplished before a project begins.

These suggestions become crucial when considering that: in Brazil institutions usually expect to overcome problems during project implementation for reasons related to an urgent need for funding; the total amount of financial resources provided for aid, rather than achievements, is a common political target; and, as noted by Cassem and Associates (1986), there is a tendency to lend money in order to prevent reduction of an agency's budget - which constitutes a serious threat to project quality.

Consultants

Most of the ITC on forestry in Brazil includes a high ratio of foreign consultants, who consequently become a significant factor in the project's performance. Galvao (1985), examining the generation of forestry techniques in Amazonia, reported that until the establishment of PRODEPEF (FAO, BRA 45 Project), forestry research in the region was almost totally based on foreign international consultancy.

The selection and activities of consultants are crucial to project effectiveness as discussed by Alves & Yeganiantz (1984) and Cassen & Associates (1986). In the opinion of Galvao (1983), projects have failed in developing countries simply because some factors such as the careful selection of consultants have been ignored. He points out the need to select professionals capable of establishing good relationships with their counterparts and others involved in the enterprise. For instance, a consultancy for EMBRAPA in the Tapajos National Forest was severely impaired during the final phase because the expert was uncomfortable about accepting suggestions from that local organization's foresters; nor was he always willing to discuss the technical aspects of his task with them.

Principles concerned with the effective use of foreign personnel in technical cooperation are identified and analyzed by Alves & Yeganiantz (1984). They have classified the consultants as either institution-building or problem-solving specialists who should be selected by different criteria. Institution-building professionals are those concerned with activities of capacity transfer, i.e., of building up a capacity in the host institution/country, for example by adapting or generating new techniques. The authors advise on criteria for their selection which do not rely solely on professional qualifications. These include:

- ability to get along with others and work under unfavourable conditions;

- ability to learn languages;

- capacity to work with various types of professionals as a team;

- family situation including wife's interests and attitudes.

On the other hand, professional qualifications are the criteria suggested by Alves & Yeganiantz (1984) for problem-research-oriented personnel. They also state that the selection of this type of professional "should not be limited to a rather small group of well-established and internationally travelled scientists often available for short-term assignments. Some international technicians who may not have the experience, know-how and curriculum vitae of the established professional elite can be selected from the larger population of scientists." This is absolutely true.

Counterparts

Although the correct selection of consultants is extremely important, without capable local counterparts sound and efficient work is unlikely in the long run, unless the project is very restricted and specific. The counterpart should be a member of an organization institutionally committed to forestry research/development and be specifically assigned to the project. Counterpart participation in as many phases as possible of the project, including experimental design, data analyses and writing-up and presentation of technical papers is stressed by Galvao (1985), as an element that should be considered in projects.

Earlier FAO projects in Brazil have not performed as well as they should have due to lack of continuity and inadequate counterpart staff and unsuitable local implementing agencies. Previous to the FAO BRA 71/545 project, FAO's consultants had counterparts in Brazil who were inadequate in capability, in numbers as well as in forestry research commitment. Hence, when the consultants' assistance had ended there were no adequate staff to take over and proceed with the experimental and development work. Curua Una and John Pitt's activities in the Amazon are good examples of such deficiencies which have already been examined.

In their analyses of the technical cooperation process, Cassen & Associates (1986) list a number of complaints related to expert/counterpart relationships, such as consultants more concerned with their mission rather than training, or too busy with their jobs to spend time on the function of counterparts. The cost, receptivity and quality of experts are also examined. They consider that the quality of United Nations experts is variable among agencies and even among divisions within agencies, and suggest that governments approach more adequate sources when seeking TC for specific projects or subjects.

Training

Formal training plays an important role in TC projects and significantly affects the effectiveness of forestry projects. Contribution to the forestry sector could be more effective and significant if more attention is given to that element. Two types of training are absolutely necessary in research organizations: the formal and regular type, comprising long-term academic education, within an institutional framework which allows full use

of the improved capability of the trained personnel on their return; and regular short-term training as a continuous process of qualification for trained as well as non-trained staff. Depending on the project, both types can be accomplished as part of ITC. Nevertheless, there are projects where only the second type of training is feasible. However, short-term, informal training of technicians, who are not normally employed in the implementing agency, will never be as efficient as the formal and regular academic type mentioned. Furthermore, there has been no guarantee of further employment of technical personnel in the collaborating local organization when they were hired by an executing donor agency specifically to implement a project. This has happened in Brazil.

Project sustainability

Project sustainability is one of the most significant reasons for assistance effectiveness. OECD/DAC (1988), in its DAC principles for appraisal, notes that a project "can be said to be sustainable when it is able to deliver benefits for an extended period of time, after the main assistance from donor has been terminated". According to them, the following factors affect sustainability: commitment and government policies, management and organization, finance, technology, socio structure, cultural state, environment, project design and implementation and external influences. The OECD/DAC also notes that project sustainability must be assessed in all forms of appraisal and provides a list of requirements and tests for this factor which include: a favourable policy environment; clear and realistic goals; adequate maintenance and support systems together with capacity to manage them, once external assistance has been ended; and project design corresponding to the managerial and technical capacity of recipients.

It should also be pointed out that, besides achieving specific objectives, projects should have a catalytic action on further activities within its initial general scope. As already examined, many projects in Brazil have lacked adequate sustainability.

Self-reliance

Cassen & Associates (1986) stress that technical cooperation is an important means for developing staff. They also note that aid recipients have defined the transition to self-reliance as the basic objective of technical assistance, but this remains poorly defined. Yet, it may be defined as the institution/country capability to do without assistance in the future.

It is worth presenting the Cassen & Associates (1986) opinion on this matter. They point out that developed countries, considered to be the most self-reliant, are also the biggest importers of science and technology. Therefore, these authors consider self-reliance as a point of reference by which institutional and skill development could be understood more precisely and objectives established more clearly. Based on this approach, for them, self-reliance is made up of three components. The first is the ability to identify which knowledge needs cannot be achieved locally by the institution/country alone, and then to identify where (country, institutions or scientists) such needs can be met, as well as the ability to know how to acquire, adapt and use them in the country. The second component is the ability to undertake local research, problem solving and policy formulation. Finally, the third element of self-reliance, which they stress as the most important, is the ability to sustain these capacities.

Alves (1984), one of the founders and president of EMBRAPA'S, emphasized that EMBRAPA aims to change the focus of the relationship

between advanced and developing countries from "technology transfer" to "science transfer". EMBRAPA has viewed self-reliance as one of its basic challenges; nevertheless, its research, training and cooperation policies imply the understanding that self-reliance can never be fully achieved and has to be continuously pursued. Appropriate selection and training of future scientists and the creation of rewarding career opportunities are the means proposed by Alves (1984) for building an efficient agricultural research system in the country.

In conclusion, it should be stressed that development of self-reliance is a crucial factor in general project effectiveness and one of the most significant goals to be achieved by developing countries, which intend to reduce the gap with advanced countries. Accordingly, specific deficient knowledge and science should be identified, and the means of transferring, using and maintaining them, undertaken. Whenever possible, forestry research/development projects should aim at self-reliance, in the shortest time possible, as one of their major objectives. The means of achieving it should also be included and clearly drawn up. Yet, one should bear in mind that self-reliance is a relative element and its accomplishment is a continuous, on-going, difficult task.

CONCLUSIONS AND RECOMMENDATIONS

International technical cooperation (ITC) is a significant tool to promote development of the less developed countries. Enhancing peoples's quality of living has been its ultimate purpose, although bilateral cooperation has also been used for commercial and political motives. The Brazilian Cooperation Agency (ABC) is the official government entity in charge of all matters concerned with incoming and outgoing international cooperation in Brazil.

Environment and economic development have been increasingly linked and are matters of growing concern among the developed countries. Therefore, assistance has usually been tied to conservation of nature, and appraisals by donors have taken environmental impact into account in their proposed project activities. Presently, carbon dioxide emission and greenhouse effects offer significant opportunities for technical cooperation on forestry with funding from external debt conversion/debt for nature programmes. However, a better and more comprehensive understanding of the problem by the developed countries is needed. As vital as assistance are international trade under more favourable conditions, with investments accompanied by technology and science transfer to allow developing countries the economic growth to participate effectively in environmental protection and improvement.

Despite some drawbacks, ITC in forestry research and development has been worthwhile for Brazil. Significant achievements have been made, originating from technical cooperation in the country. These are mainly related to technical manpower and organizational strengthening, besides new technologies generated directly from the implementation of projects. Achievements concerned with manpower include: establishment of the first National Forestry School; strengthening the research capabilities of forestry schools; improving the qualifications of technical and support personnel through academic and short-term training locally and abroad; and enhancing the quality and quantity of research through the provision of consultancies. Achievements concerned with research and development embrace the improvement of an organization's research structure through new office and laboratory buildings, equipment, vehicles and civil works in general.

ITC has also made possible the testing of an alternative model for fiscal incentives in financing man-made industrial forests in the state of Minas Gerais. Generation of new techniques, already being utilized in the field, together with increased knowledge of forestry science are other significant benefits of ITC in Brazil.

Since the intention of this work is to make recommendations to overcome constraints, failures originating from cooperation are also reported. Inadequacies were identified and discussed in the previous chapters and the following should be pointed out:

- lack of commitment of local institutions to forestry research and development. (Nevertheless they have carried out some projects in this field.);

- inadequate capacity of many organizations to execute forestry research and development projects;

- deficient counterparts and/or consultants;

- lack of an appropriate training component in ITC projects.

International collaborative research is a useful auxiliary operational mechanism for achieving results and technologies, utilizing the limited existing capacity of the developing countries' institutions. However, depending on the arrangements adopted, more gains are obtained by the developed country organizations, rather than by the developing country institutions. Also, depending on the networking arrangements, the technological and resources gap between the leading entity, often in a developed nation, and participants from less developed countries, tends to increase.

In order to overcome those drawbacks of collaborative research, from the view point of developing countries, it is recommended:

- to identify and encourage research and development centres in the developing countries to assume a new role as leading institutions in international collaborative work. This should be a task of international multilateral, as well as recipient country, agencies;

- the earliest total participation of the developing country organizations in the whole process of establishing the network, including decisions on planning, setting up and implementation strategy and priorities;

- to include, whenever possible, a significant and adequate training component;

- to make possible, through appropriate arrangements, the transfer of the highest technologies used in the projects.

Forestry research has been included in the CGIAR's mandate. This offers new perspectives for enhancing forestry research in developing countries. However, benefits depend on the policies, guidelines and operational mechanisms which will be adopted by the CGIAR. Creation of new CGIAR centres in any number, type or different location will be useless if the existing national forestry research institutions are not strengthened. Improvement of the local research structure of the developing countries should be a major objective to be achieved.

This work also reviews features of Brazil concerned with ITC on forestry research and development. Forestry plays a significant role in the Brazilian economy. It has generated between three and four percent of the GNP in the 1980s and exported more than 1 billion US dollars per year in the same period. The total forests and woodland is estimated at 514 million hectares, of which 200 million is Amazon tropical rainforest. Man-made forests comprise approximately 3.8 million hectares.

Brazilian forestry legislation is very complex and often not properly enforced and obeyed for a number of reasons. Nevertheless, it provides a sound basis for environmental protection and rational utilization of renewable natural resources.

Deforestation rates had increased up to 1987, but not at the exaggerated figures given by many authors. The best estimate of the total Amazonian tropical rainforest loss appears to be 27.3 million hectares by 1989 (Cunha, 1989). The most significant causes of deforestation are agriculture and cattle ranching. Logging is not a primary cause of deforestation since timber extraction has usually been a by-product of land clearing for agricultural purposes. It should be pointed out that Brazil is not the only, nor the major, country responsible for the increasing carbon

dioxide content in the atmosphere. Therefore, the developed countries must bear an appropriate share of the efforts to overcome this problem because they are largely responsible for it. Although Brazil is very concerned about the clearing and burning of forests, from the environmental and social point of view, there are equivalent or more urgent and serious problems for the country, such as air and water pollution in the south and southeast, and mercury contamination from the gold mining process in Amazonia.

In 1987, forestry research was carried out by 139 Brazilian entities of different types with a wide range of capabilities. The total number of trials/projects was 2,043 in that year. Private companies play an important role in this type of activity. Twenty-five are reported, by the National Centre of Forestry Research (1987), as executing and/or supporting forestry experiments in the country.

Under the present circumstances, there is an excess of forestry schools in the country, a total of fifteen, with widely different capabilities. Consequently, an unreasonable number of students, 350-400 per year, have obtained degrees, but most of them do not find jobs. On the other hand, there are an insufficient number of medium level forestry schools. In general, there is a lack of regular training for forestry workers.

Fifty-eight ITC projects and activities which have been carried out in Brazil since 1951 are also reported. Of these, seven are noted by ABC (1990) as calling for funding and four representative ITC projects are more closely examined.

A number of achievements and drawbacks can be noted from the project records. In the state of Minas Gerais, a forestry development project supported by the World Bank offers a new alternative model for financing industrial plantations in the country. It envisages replacing fiscal incentives funding mechanisms which were available up to 1986. Depending on the results obtained, this new model could be adopted in other states and in the whole country. However, fundamental requirements for success are:

- availability, as well as effective use of, forestry technology generated by research, to establish plantations with the needed economic yields which will make the repayments possible;

- an appropriate price for the wood produced, since low prices have been a source of complaint;

- very well structured and experienced state forestry services;

- appropriate development and commercial banks;

- improved coordination capability and commitment of the Federal Government and related agencies to the enterprise.

Inclusion of extension and technology transfer activities in the BRA 87/007 FAO assistance project, carried out in the Northeast, is a significant shift in FAO and IBAMA's strategy in the country. But, appropriate financing schemes should be made available to local rural people, if a significant increase in reforested area and forest products are envisaged to come from the use of technologies generated by, and other activities of, the enterprise.

Up to 1973, all FAO activities in Brazil were based on foreign consultants with no adequate counterpart which resulted in a lack of project sustainability. The BRA 71/545 brought about significant changes in strategy with the hiring of local staff, fully committed to the project

implementation. However, parallel arrangements to administer and carry out the projects outside the local collaborating organization have been adopted; this is not advisable in medium or long-term programmes. Absorption of such structures tends to cause problems that impair a project's sustainability. It would be preferable to establish and develop the structure needed to implement the undertaking within the collaborating institution. Yet, such tasks could be accomplished by other local entities with less support, instead of by new unities established parallel to, or within, organizations which do not posses adequate structure.

Hiring local consultants has not been a common practice in ITC projects in Brazil. Nevertheless, it is a powerful means of stimulating local professionals. Furthermore, projects can benefit from the national consultants' better knowledge of the region. Project approval by ABC should consider their inclusion in cooperation projects, whenever possible.

Factors affecting the effectiveness of ITC in Brazil are: policy environment, government financial contributions, capacity of recipient organizations, administrative deficiencies, institutional frameworks, project appraisals, consultants, counterparts, training, sustainability and self-reliance.

The capacity of an organization to accomplish tasks is made up of a variety of components. The most important are: an adequate number of trained personnel; adequate institutional structure (including appropriate salaries and stimulus for staff training); and institutional commitment to forestry research and/or forestry development.

Administrative deficiencies hinder the ability of an organization to carry out a project. They most commonly arise from: inadequate organizational structure; deficient central administration; lack of government commitment and support to the institution and/or the project; negative interference by politicians; and the economic situation of the country. Replacement of an organization's administrator for political reasons, without regard to their current performance, has resulted in lack of continuity in management and has reflected negatively on project performance.

Collaborative work is not an easy accomplishment in Brazil. The effectiveness of ITC projects, however often depends on suitable institutional arrangements for collaborative work, if the recipient organization does not itself have all the necessary means to implement the project. Bureaucracy in such cases should be reduced to a minimum. This is vital in countries where institutions, anxious to overcome existing forestry problems, do not possess the necessary personnel or structural resources.

Consultancy has been a significant component of the total assistance provided by donors. Hence, it is crucial to get the most advantage possible from it, and selection of consultants is a very major matter in ITC. Institution-building consultants, besides having professional qualifications, should be selected by criteria which include ability to work in a team and, accordingly, the facility to establish good relationships with counterparts and other personnel involved in the project. Problem-research-oriented personnel should also be sought from outside the small group of internationally well-known and well-travelled scientists, as Alves and Yeganiantz (1984) advise. This can lead to equally good and often even better achievements.

Full commitment by the counterpart institution to forestry research, together with a specific assignment to the undertaking, is essential for project effectiveness. Furthermore, counterparts should participate in as many phases of the enterprise as possible, beginning with the initial drawing-up of the project to the final analyses of results and presentation of technical papers.

Worldwide concern with the environmental effects of forest clearing and burning in Brazil has led international donors to make funds available to the country. In order to avoid wasting extremely valuable time and the nation's scant resources, project appraisal should be carried out properly. The capacity of the proposing institutions needs to be fully assessed and constraints removed before a project begins; these drawbacks mainly relate to administrative deficiencies, inappropriate institutional framework and collaborative work arrangements as well as unfavourable policy environment. The inclusion of project components designed to overcome the existing organizations' deficiencies is recommended. The Brazilian Cooperation Agency, ABC, plays a crucial role in this process, together with donor agencies.

Training has been offered in a variety of forms and proportions through ITC projects. Short-term training, however, cannot effectively replace long-term training, offered as part of regular academic educational programmes by institutions committed to forestry research and development. This type of extended education is recommended as a major component of cooperation projects, especially if the recipient organization is short of qualified personnel.

Many projects in Brazil have lacked adequate sustainability. Factors which could mitigate against the benefits from projects, over an extended period of time after donor assistance has ended, should be identified and overcome.

Self-reliance should be a major target of institutions and developing countries, and must always be pursued even though it can never be fully achieved. The inclusion, in the projects, of the necessary mechanisms for its achievement is recommended. Yet, one should bear in mind that self-reliance is a relative element and its accomplishment a continuous, on-going and difficult task.

BIBLIOGRAPHY

ABC. 1989. Agência Brasileira de Cooperação. Brasília: Ministério das Relações Exteriores (Leaflet).

ABC. 1990?. Technical Cooperation in the area of environment. Brazilian Cooperation Agency, ABC. Brasilia. (Undated, probably 1990). 75p.

Abilhoa, A.S.T and A.P.M. Galvão. 1986. Forestry legislation and Rural Development in Brazil. Report prepared for FAO. 33p. (Manuscript).

Almeida, R.R. 1990. Tapajos National Forest Project. (Personal communication).

Alves, E.R.A. 1984. Brazil's program for development of agricultural researchers. In: *Brazilian Agriculture and Agriculture Research*, L. Yeganiantz (ed.). Brasilia. EMBRAPA.

Alves, E.R.A. and L. Yeganiantz. 1984. Making effective use of international personnel. In: *Brazilian Agriculture and Agriculture Research*, L. Yeganiantz (ed.). Brasilia. EMBRAPA. pp. 151-160.

Araujo, A.P. de, Jordy Filho, S., and Fonseca W.N. da. 1986. The vegetation of the Brazilian Amazon. In: *Proceedings of the 1st Symposium of the Humid Tropics*. Volume II Flora and Forest. EMBRAPA-CPATU. Documentos 36. Belém-Pará. pp. 135-152.

Barbosa, M.M.T.L, M.M. Mota and A.F.D. Avila. 1988. Projeto II EMBRAPA-BIRD. Avaliação socio-econômica. EMBRAPA. 276p. (Manuscript).

BRA 82 National Directorate. (undated a). Folha Informativa. Informativo No. 04. Brasilia. (Published by the National Directorate of the BRA 82 Project). 16p. (Manuscript).

BRA 82 National Directorate. (undated b). Folha Informativa. Informativo No. 06. Brasilia. (Published by the National Directorate of the BRA 82 Project). 18p. (Manuscript).

BRA 82 National Directorate. (undated c). Folha Informativa. Informativo No. 07. Brasilia. (Published by the National Directorate of the BRA 82 Project). 23p. (Manuscript).

Buckman, R.E. 1989. Bellagio II- A late-breaking story. *IUFRO News*, No.61. pp. 2-3.

Burley, J. 1987. International forestry research networks- objectives, problems and management. *Unasylva*, 39 (3-4). pp. 67-73.

Burley, J. 1989. Options for forestry research network. Proceedings of a meeting of IUFRO subject group S6.06, Management of Forestry Research, April 17-19, 1989. Alice Holt Lodge, Farnham, England. June 1989.

Burley, J. and R.D. Barnes. 1988. Genetic improvement of selected tree species. IUFRO SPDC Regional Planning Workshop for Eastern and Southern Africa, Lilongwe, Malawi, October, 1988. Oxford, U.K.; Oxford Forestry Institute. 42p. (Consultancy background document).

Burley, J. and C. Cossalter. 1988. Report on tree improvement. IUFRO SPDC Regional Planning Workshop for Eastern and Southern Africa, Lilongwe, Malawi, October, 1988. Oxford, U.K.; Oxford Forestry Institute. 10p.

Caillez, F. 1989. CTFT projects in Brazil. (Personal communication).

Callaham, R.Z. 1988. An expanded proposal for the INCOFORE system (International Consultative Organization for Forestry Research). Vienna, Austria; International Union of Forestry Research Organizations. 80p.

Camino, R. de and Velozo. 1989. Expanding forestry research for developing countries. Changes and Opportunities for Latin America. Proceedings of a meeting of IUFRO subject group S6.06, Management of Forestry Research, April 17-19, 1989. Alice Holt Lodge, Farnham, England. June 1989.

Carneiro, C.M.R. 1982. A importância dos projetos de cooperação técnica internacional para o setor florestal brasileiro.- Com especial referência aos projetos da FAO. Conferência III Seminario Técnico Florestal, Brasilia; IBDF. Belo Horizonte, Minas Gerais, Brasil. 16p.

Carneiro, C.M.R. 1989. FAO's ITC projects in Brazil. (Personal communication).

Carvalho, J.C. 1988. O programa de florestas para fins energéticos do Estado de Minas Gerais. Belo Horizonte, Minas Gerais, Brasil. Trabalho elaborado para a FAO. 35p. (Manuscript).

Cassen, R. and Associates. 1986. Does aid work? Report to an intergovernmental task force. Oxford, Clarendon Press. 381p.

CGIAR. 1989. Highlights. CGIAR Secretariat. Washington, D.C.; Consultative Group on International Agricultural Research. July/Aug. 1989. 8p.

CGIAR 1990. CGIAR Donors' Handbook. Washington, D.C.; Consultative Group on International Agricultural Research, Secretariat. (24 country, 11 international organization and 3 foundation reports, + 5 annexes)

CGIAR 1991. Summary of discussions and decisions. CGIAR mid-term meeting, Paris, May 1991. Washington, D.C.; CGIAR Secretariat.

Cooper, L. 1984. The twinning of institutions: its use as a technical assistance delivery system. Technical Paper 23. Washington. D.C.; World Bank. 46 p.

Cunha, R.P. 1989. Deforestation estimates through remote sensing: the state of the art in legal Amazonia. Presented at the Conference on Amazonia: Facts, problems and solutions. Proceedings of a symposium organized by the USP and INPE held at the University of São Paulo,

S. Paulo, July 31 - August 2, 1989. University of São Paulo. Brazil. p 240-273.

CTFT. 1989. Annual report on activities in Brazil. Nogent-surMarne, France; CTFT.

Eggar, T. 1989. Speech at the British Parliament. Tropical Rainforest. March 13, 1989. From HANSARD. (Proceedings of the House of Parliament).

EMBRAPA. 1988. II Projeto de Pesquisa Agropecuária (Bird II). Relatório de avaliação final. Volume I. Brasilia, Brazil; EMBRAPA. 124 p. (Manuscript).

EMBRAPA. 1989. Plano Anual de Trabalho 1990. Brasilia; EMBRAPA. (Manuscript).

EMBRAPA. 1989. Sistema CGIAR. Brasilia; Empresa Brasileira de Pesquisa Agropecuária. 3p. (Manuscript information from DTC).

Emmerij, L. 1989. Terceiro Mundo: Conceito e realidade. Seminário Política Internacional e Cooperação. FUNDAP/USP/CEDEC. S.Paulo, Brazil. 17p.

Eurofi. 1988. Development aid: a guide to national and international agencies. London, U.K.; Butterworth and Eurofi (UK) Ltd. 587p.

Europa Publications Limited. 1989. The Europa World Yearbook 1989. Vol. I, Part one: International Organizations. London, U.K.; Europa Publications Limited, 1526 p.

FAO. 1951. Constitution, rules and regulations. Rome, Italy; Food and Agriculture Organization of the United Nations. 100p.

FAO. 1970. National Forestry School, Curitiba. Report on projects results, conclusions and recommendations. Terminal report FO: SF/BRA 4. Rome, Italy; Food and Agriculture Organization of the United Nations. 51p.

FAO. 1978a. Forestry development and research Project, Brazil. Inventories for Amazonian forestry development. Report prepared for the Brazilian Government. Technical Report No.8. UNDP/FAO/IBDF. FO: DP/BRA/76/027. Rome, Italy; Food and Agriculture Organization of the United Nations. 37p.

FAO. 1978b. Forestry development in Brazil. Project document, UNDP/FAO/Bra/78/003. Rome, Italy; Food and Agriculture Organization of the United Nations. 24p.

FAO. 1978c. Project progress report, UNDP/FAO/BRA/76/027. Rome, Italy; Food and Agriculture Organization of the United Nations. 30 p.

FAO. 198-? (annually updated). List of multilateral and bilateral grant and loan assistance. Forestry projects/ Programmes in developing countries. Rome, Italy; Food and Agriculture Organization of the United Nations. (Two loose pages concerned with Brazil).

FAO. 1980. Management Plan for the Tapajos National Forest, UNDP/FAO/BRA/78/003, Technical Report No.2. Rome, Italy; Food and Agriculture Organization of the United Nations. 92p.

FAO. 1985. FAO, the first 40 years. Rome, Italy; Food and Agriculture Organization of the United Nations. 155p.

FAO. 1988. Desertification Control Bulletin. No.17. Rome, Italy; Food and Agriculture Organization of the United Nations. pp. 51-52.

FAO. 1989. Forestry development in Brazil. Project findings and recommendations. Terminal report FO: DP/BRA/82/008. Rome, Italy; Food and Agriculture Organization of the United Nations. 32 p.

FAO. 1990. Catalogue of recently completed on going and pipeline projects technically assisted by FAO in Brazil. Brasilia, Brazil; Food and Agriculture Organization of the United Nations. 18 p.

FAO. (Undated). Forestry for development. FAO Forestry Department Report. 15p. (undated, reports up to 1982)

Fearnside, P.M. 1982. Deforestation in the Brazilian Amazon: How fast is it occurring ? *Interciência* 7(2). pp. 82-88.

Fearnside, P.M. 1989a. Processos predatórios na floresta tropical úmida da Amazônia Brasileira. Estudos Avançados. Universidade de São Paulo. Janeiro/Abril. 3(5). pp. 21-35.

Fearnside, P.M. 1989b. Deforestation in Brazilian Amazonia. Contribution for G.M. Woodwill (ed). The earth in transition: Patterns and process of impoverishment. Cambridge University Press, New York (in press).

Ferreira, H.B. 1990. UNDP/FAO Forestry projects in Brazil. (Personal communication).

Fishlow, A. 1989. Enfrentando o século XXI: o desafío das relações econômicas. Seminário Política Internacional e Cooperação.FUNDAP/USP/CEDEC. São Paulo. Março 1989. 12p.

Flexa de Lima, P.T. 1989. Paper presented in: "Seminário de cooperação técnica internacional - O papel da ABC". Ministério das Relações Exteriores, Brasília. 7p. (Manuscript).

Freitas, A.R. 1989. Cooperation Forestry projects in Brazil. (Personal communication).

Fugalli, O. 1989. Highlights from Bellagio II. *IUFRO News*, No.61. pp. 2-3.

FUNATURA. 1988. Alternativas ao desmatamento na Amazônia. Recomendações do Encontro de Trabalho - Alternativas ao Desmatamento na Amazônia. 2-3 Fev. 1988. Brasilia, Brazil; Fundação Pró-Natureza. 31p.

Galvão, A.P.M. 1981. Forestry in Brazil. World forestry in the 1980's. Forestry technology. Japan Forestry Technical Association. Tokyo. Special Edition. No.466; 23-27.

Galvão, A.P.M. 1982. A organização da pesquisa florestal no Brasil. Anais do Simpósio sobre educação em engenharia florestal na América Latina. Curitiba, Brazil; Universidade Federal do Paraná. pp. 161-168.

Galvão, A.P.M. 1983. The IUFRO family in Latin America and the Caribbean. Presented at the IUFRO Executive Board Meeting, Manaus, Brazil. 5p. (Unpublished)

Galvão, A.P.M. 1985. A geração de tecnologia para a utilização racional da floresta Amazonica. Brasilia, Brazil; EMBRAPA. 9p. (Presented at a Seminar on Forest Management. Carajás, Pará. January 1985)

Galvão, A.P.M., L.E.G. Barrichelo and M.A.R. Nahuz. 1989. Situação presente do setor florestal brasileiro: Pesquisa e Ensino. São Paulo, Brazil; Sociedade Brasileira de Silvicultura (SBS). (Manuscript).

Goodland, R.J.A. 1989. Environment and development: progress of the World Bank (and speculation towards sustainability). Division Working Paper no. 1989-5. Washington, D.C.; World Bank, ENVRS. 17p.

Goodland, R.J.A. 1990. Carbon dioxide release and sink-forests. (Personal communication).

Grainger, A. 1984. Increasing the effectiveness of afforestation projects in the tropics involving non-governmental organizations. *International Tree Crops Journal* 3(1). pp. 33-47.

Gregersen, H.M., R. de Camino Velozo, P.R.R. Kio and P. Oram. 1989. International and regional organizations and networks involved in tropical forestry research: stock taking. (Report prepared for TAC by an Ad Hoc Panel). Rome, Italy; Technical Advisory Committee of the CGIAR.

Griffin, K. 1988. The pros and cons of alternative development strategies. *The OECD Observer*. N.150. Feb/Mar 1988.

Hall, D. and F. Rosillo-Calle. 1989. CO_2 Cycling by biomass: global bioproductivity and problems of deforestation. Paper presented at the Conference: Amazonia: Facts, problems and solutions. July 31-Aug 2 1989. University of São Paulo, Brazil.

Hansard. 1989. Tropical Rain forest. Parliamentary debates (Hansard), House of Commons official Report. March 13, 1989: 158-173.

Holmes, G.D. and twelve others. 1988. A global research strategy for tropical forestry. Report of an international task force on forestry research. New York; The Rockefeller Foundation, the United Nations Development Programme, the World Bank and the Food and Agriculture Organization of the United Nations.

IDB. 1984. Guidelines for the preparation of loans applications. Sector: Forestry Development. Washington, D.C.; Inter-American Development Bank. 59p.

IDB. 1989. Annual Report 1988. Washington, D.C.; Inter-American Development Bank. 162p.

ITTO. 1989. Draft annual report for 1988. Yokohama, Japan; International Tropical Timber Organization. 48p.

IUFRO. 1990. IUFRO Statutes. Vienna, Austria; International Union of Forestry Research Organizations. 58p.

IUSF. 1987. United Nations Environment Program (UNEP). Newsletter IUSF. No.26. pp. 4-5.

JICA. 1988. Annual Report 1988. Tokyo, Japan; Japan International Cooperation Agency. 139P.

Lampreia, L.F.P. 1989. A política externa brasileira. Simpósio "Política Internacional e Cooperação". FUNDAP/USP/CEDEC, São Paulo, Março 1989. 12p.

Lundgren, A. L. 1989. The management of large-scale forestry research programs and projects. Proceedings of a meeting of IUFRO subject group S6.06, Management of Forestry Research, April 17-19, 1989. Alice Holt Lodge, Farnham, England. June 1989.

Lundgren, B. 1987. ICRAF's first ten years. *Agroforestry Systems* 5. Martinus Nijhoff Publishers, Netherlands. pp. 197-217.

Machado, M.A.C. 1990. Minas Gerais Forestry Development Project. (Personal communication).

MacGaughey, S.E. 1980. Investment criteria for agricultural and rural development projects. Economic Analysis of Forestry projects: readings. FAO Forestry Paper. Rome, Italy; Food and Agriculture Organization of the United Nations. pp. 1-62.

Mahar, D. 1988. Government policies and reforestation in Brazil's Amazon Region. Working Paper No.7. Washington, D.C.; World Bank Environment Department.

Marland, G. 1989. Reforestation: Pulling greenhouse gases out of thin air. *Biologue*, April-May: pp. 14-18.

Martin, E.M. 1972. Development Cooperation. Efforts and policies of the members of the development assistance committee. DAC Report.

Mercado, R.S. and S. Campagnani. 1988. Exportações da floresta amazônica. In: Anais do I Encontro Brasileiro de Economía Florestal. Curitiba, Paraná, Brazil. 23-27 May 1988. Curitiba, Paraná; Embrapa-CNPF. pp. 43-73.

Miller, G. 1991. International Tropical Timber Organization meets. *Import/Export Wood Purchasing News*, 17 (4). p 10.

National Centre of Forestry Research. 1987. Pesquisas florestais em andamento no Brasil - Terceiro levantamento. Curitiba, Brazil; EMBRAPA/CNPF.

National Centre of Forestry Research. 1988. Avaliação dos resultados do projeto BIRD II. Curitiba, Brazil; CNPF. 7p. (Manuscript).

National Centre of Forestry Research. 1989. Conservação de recursos amazônicos. Curitiba, Brazil; CNPF. 2p. (CNPF proposal for BIRD III forestry activities) (Manuscript)

NFTA 1988. Annual Report 1988. Hawaii, U.S.A.; Nitrogen Fixing Tree Association. 17p.

ODA. 1989. British Overseas Aid. Anniversary review 1989. London, U.K.; Overseas Development Administration. 119p.

OECD/DAC. 1972. Development cooperation. Efforts and policies of the members of the development assistance commmittee. DAC report by Edwin M. Martin.

OECD/DAC. 1987. Development cooperation. Efforts and policies of the members of the development assistance commmittee. DAC report by Joseph C. Wheeler.

OECD/DAC. 1989. Development cooperation. Efforts and policies of the members of the development assistance commmittee. DAC report by Joseph C. Wheeler.

Oliveira, D.W. 1989. Paper presented in: "Seminário de Cooperação Técnica Internacional - O papel da ABC". Brasilia, Brazil. 3p. (Manuscript).

Paveri, M. 1990. FAO forestry projects in Brazil. (Personal communication).

Plucknett, D.L. and N.J.H. Smith. 1982. Agricultural research and third world food production. *Science* 217, 16 July. pp. 215-220.

Plucknett, D.L. and N.J.H. Smith. 1984. Networking in international agricultural research. *Science* 225 (4666), 7 September. pp. 989-993.

PNUD. 1990?. Projetos do PNUD na área ambiental. Brasilia, Brasil; PNUD. 14 p. (Undated, probably 1990)

Prance, G.T. and T.E. Lovejoy. 1985. Key environments in Amazonia. In collaboration with IUCN. Oxford, U.K.; Pergamon Press.

Quesada, A.U. 1989. Greenhouse economics: global resources and the political economy on climate change. Washington, D.C. 15p. (Manuscript provided by R.J.A. Goodland, the World Bank/ENVRS)

Ribeiro, G.L. 1989. Paper presented in: "Seminário de Política Internacional e Cooperação". FUNDAP/USP/CEDEC. Sao Paulo. Março 1989. 13p. (Manuscript)

Ricupero, R. 1989. A Economía Mundial e a América Latina. In: *Folha de São Paulo*, 11 Aug. 1989.

Salleh, M.N. and C.H. Tuck. 1986. Regional opportunities for networking: the FRIM experience. In proceedings: First Network Workshop of the Forestry/Fuelwood Research and Development Project. Bangkok, Thailand; Winrock International Institute for Agricultural Development. pp. 33-40.

SBS. 1987. A conservação da natureza e o patrimônio florestal Brasileiro. Sao Paulo, Brazil; Sociedade Brasileira de Silvicultura. 14 p.

Scott, G. and T. Reid. 1988. A guide to European Community grants and loans. Newbury, Berkshire; Eurofi. 367p.

Sène. E.H. 1989. Managing multinational research projects to solve problems in developing countries. Proceedings of a meeting of IUFRO subject group S6.06, Management of Forestry Research, April 17-19, 1989. Alice Holt Lodge, Farnham, England. June 1989.

Silva, G. do C. 1967. Geopolítica do Brasil. Rio de Janeiro, J. Olympio. 266p.

Silva, J.N.M. 1989. The behaviour of the tropical rain forest of the Brazilian Amazon after logging. Oxford, U.K. (D.Phil Thesis, Oxford Forestry Institute, Department of Plant Sciences, Oxford University)

SUBIN. 1978. Manual de cooperação técnica. Brasilia, Brazil; SEPLAN. 20p.

Suchek, V.I. 1989. Alternativas de industrialização de madeiras de reflorestamento. 10º Encontro Nacional de Reflorestadores, Atibaia, S.P. Brasil. 39p.

SUDAM. 1969. Relatório ao Governo do Brasil sobre a aplicação de métodos silviculturais a algumas florestas da Amazônia. Superintendência do Desenvolvimento da Amazônia (SUDAM). Ministério do Interior. Dept. de Recursos Naturais. (From a 1960 report by John Pitt translated into portuguese). 104p.

SUDAM. 1974. Levantamentos florestais realizados pela missão FAO para Amazônia - 1956/1961. Superintendência de Desenvolvimento da Amazônia (SUDAM), Ministério do Interior, Dept. de Recursos Naturais. Vol 1.

Synnott, T.J. 1989. Management and silviculture of tropical moist forest in Brazil: the scope for technical cooperation. Oxford, U.K.; Oxford Forestry Institute. 12p. (Manuscript) (Unpublished).

Synnott, T.J. 1990. UK-ODA forestry projects in Brazil. (Personal communication.

Tardin, A.T. *et al.* 1980. Sub-projeto desmatamento, Convênio IBDF/CNPq-INPE 1979. Relatório INPE-1649-RPE/103. 49p.

Tillman, G. 1988. Association of Universities and Colleges of Canada. A guide for the Canadian University Research Community. Association of Universities and Colleges of Canada, International Division. 39 p.

The Tropenbos Foundation. 1988. Annual Report 1988. Ede, Netherlands; the Tropenbos Foundation. 16p.

UNDP. 1987. Project document. Integrated Forestry Development in the Northeast Brazil. Brasilia, Brazil; United Nations Development Program. 26p. and appendices.

UNDP. 1988. World Development Annual Report. New York, N.Y.; United Nations Development Program. 32p.

UNDP. 1990. Directory of departments and offices of the United Nations Secretariat. United Nations Programmes, Specialized Agencies and other intergovernmental organizations dealing with non-governmental organizations. New York, N.Y., Office of the Under-Secretary-General for Political and General Assembly Affairs and Secretariat Services. United Nations. 22p.

UNEP. 1979. The United Nations Environment Programme. Nairobi, Kenya; UNEP. 66p.

Union of International Associations. 1986. Yearbook of international organizations, 1985/1986. Munich, Germany. K.G. Saur. 22nd. edition.

United Nations. 1969. Assistance for economic and social development available from the United Nations system. A handbook of criteria and procedures. New York, N.Y.; United Nations. 83p.

USDA Forest Service. 1990. Handbook of Tropical Forestry Organizations. USDA Forest Service.

Veja. 1989. Amazônia: onde está a verdade. Editora Abril. Rio de Janeiro, Brasil. Edição 1,086. Ano 22, No.26. Julho 1989.

Wheeler, J.C. 1987. Development cooperation. Efforts and policies of the member of the development assistance committee. DAC Report.

Wheeler, J.C. 1988. Development cooperation. Efforts and policies of the member of the development assistance committee. DAC Report. 254p.

World Bank. 1978. Forestry sector policy paper. Washington, D.C.; The World Bank. 65p.

World Bank. 1988. The World Bank annual report 1988. Washington, D.C.; The World Bank. 207p.

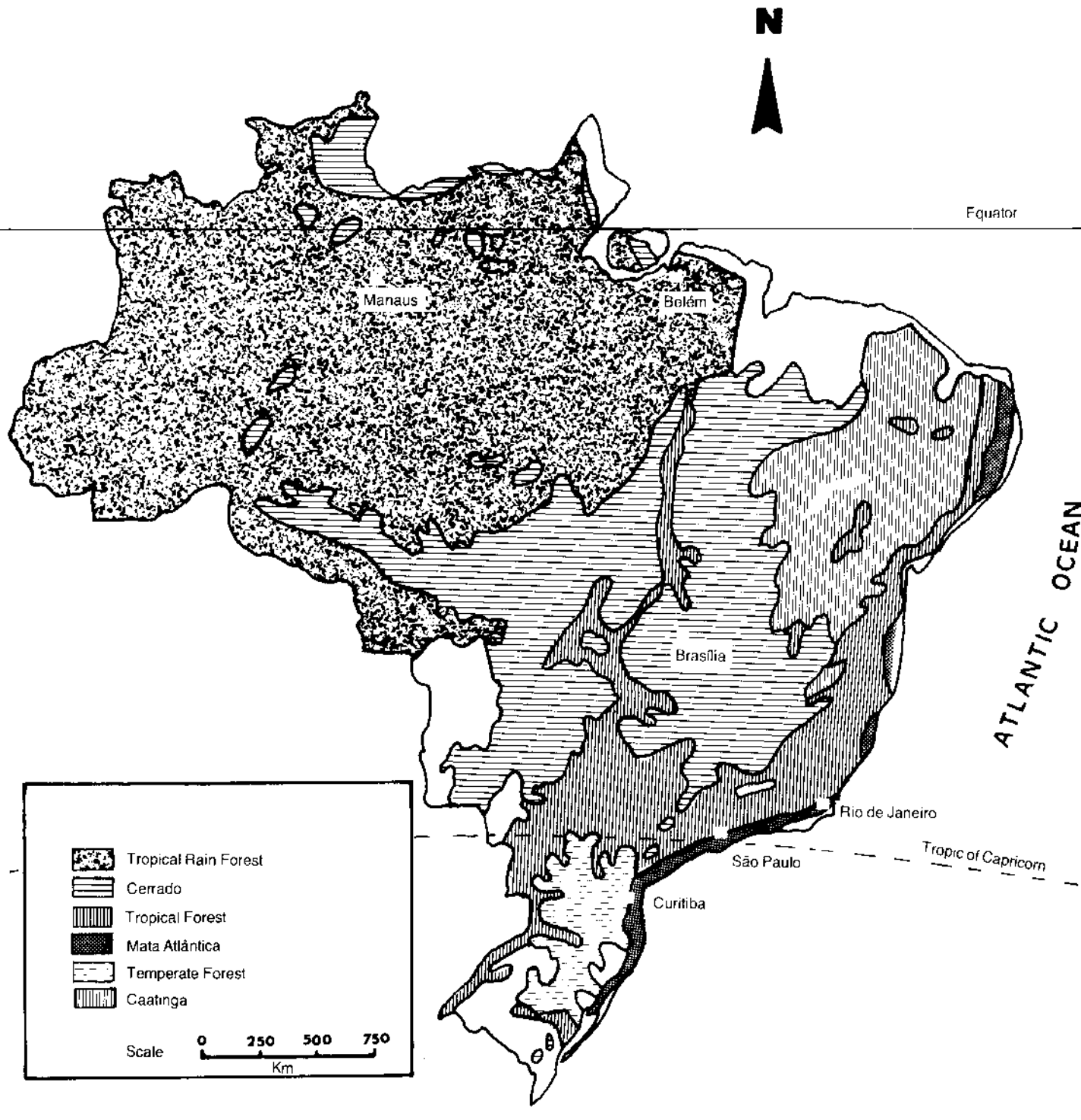
World Commission on Environment and Development. 1987. Our common future - A reader's guide. London, U.K.; Earthscan Publications Ltd. 40p.

World Resources Institute. 1987. Statements and background documents from the Bellagio Meeting on Tropical Forests, Washington D. C.

World Resources Institute and International Institute for Environment and Development. 1989. World Resources 1988-1989. In collaboration with UNEP. Basic Books, Inc., New York, N.Y.

World Resources Institute, World Bank and United Nations Development Programme. 1985. Tropical Forests: a call for action. Part I: the plan. Report of an international task force convened by the WRI, IBRD and UNDP. Washington D. C., World Resources Institute. 49p.

Figure 1- Brazil: Features concerned with forest research



APPENDIX I

LIST OF ABBREVIATIONS AND GLOSSARY OF TERMS

ABC	Brazilian Cooperation Agency (Agência Brasileira de Cooperação), Brasilia, Brazil
ABRACAVE	Associação Brasileira de Carvão Vegetal, Belo Horizonte, Brazil
ACARPA	Empresa Paranaense de Assistência Técnica e Extensão Rural, Curitiba, Brazil
ACESITA	Brazilian forest plantation company
ACIAR	Australian Centre for International Agricultural Research, Australia
AFRENA	Agroforestry research networks for Africa (ICRAF programme)
AGRIS	Agricultural Research Information Service (of FAO), Italy
ALADI	Associação Latino Americana de Desenvolvimento Integrado
ARACRUZ	Brazilian forest plantation company
ASEAN	Association of South East Asian Nations, Philippines
ATSAF	German Council for Tropical and Subtropical Agricultural Research, Germany
BDMG	Banco de Desenvolvimento de Minas Gerais (Minas Gerais Development Bank), Brazil
BFTF	(see ITFFR)
BGCS	Botanic Gardens Conservation Secretariat (IUCN)
BID	Banco Interamericano de Desenvolvimento, USA
BIRD	Banco Internacional para Reconstrução e Desenvolvimento (World Bank)
BML	Ministry of Food, Agriculture and Forestry, Germany
BMZ	Bundesministerium für Wirtschaftliche Zusammenarbeit, Germany
BNDES	Banco Nacional de Desenvolvimento Econômico e Social (National Economic and Social Development Bank), Brazil
CAFMA	Brazilian forest plantation company
CAMCORE	Central America & Mexico Coniferous Resource Cooperative, Raleigh, USA
CAP	Common Agricultural Policy (EEC)
CARICOM	Caribbean Common Market or Caribbean Community, Guyana
CARIS	Current Agricultural Research Information Service (of FAO), Italy
CATIE	Centro Agronomico Tropical de Investigación y Enseñanza, Costa Rica
CCCE	Caisse Centrale de Coopération Economique
CDB	Caribbean Development Bank, Barbados
CDC	Conservation for Development Centre (IUCN)
CEC	Commission of the European Communities, Belgium
CENA	Centro Nacional de Energia Nuclear para a Agricultura (National Centre for Nuclear Agriculture Studies, Piracicaba, Brazil
CENARGEN	Centro Nacional de Recursos Genéticos e Biotecnologia, Brasilia, Brazil
CEP	Commission on Environmental Planning (IUCN)
CEPLA	Commission on Environmental Policy, Law and Administration (IUCN)
CGIAR	Consultative Group on International Agricultural, USA
CI	Conservation International, USA
CIAT	Centro Internacional de Agricultura Tropical, Cali, Colombia
CICS	Inter-Ministerial Committee for Development Cooperation, Italy

CIDA	Canadian International Development Agency, Canada
CILSS	Comité Permanent Interétats de Lutte contre la Sécheresse dans le Sahel, Burkina Faso
CIMMYT	Centro Internacional de Mejoramiento de Maíz y Trigo, Mexico
CIP	Centro Internacional de la Papa, Peru
CIPES	Inter-Ministerial Committee on Foreign Economic Policy, Italy
CIRAD	Centre de Coopération Internationale en Réchérche Agronomique pour le Développement, France
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNPF	Centro Nacional de Pesquisa de Florestas (National Centre for Forestry Research; it is a EMBRAPA's Center), Curitiba, Brazil
CNPPA	Commission on National Parks and Protected Areas (IUCN)
CNPq	Conselho Nacional de Desenvolvimento Cientifico e Tecnológico, Brasilia, Brazil
CNRS	Centre Nationale de la Réchérche Scientifique, France
COE	Commission on Ecology (IUCN)
COFO	Committee on Forestry (of FAO), Italy
CPAA	Centro de Pesquisa Agroflorestal da Amazônia Ocidental (EMBRAPA's Agroforestry Research Centre for the Western Amazon), Manaus, Brazil
CPATSA	Centro de Pesquisa Agropecuária do Trópico Semi-Árido (EMBRAPA's National Agricultural Research Center), Petrolina, Brazil
CPATU	Centro de Pesquisa Agroflorestal para a Amazônia Oriental (EMBRAPA's Agroforestry Research Centre for the Eastern Amazon), Belém, Brazil
CRAI	Commission on International Agricultural Research, France
CSIRO	Commonwealth Scientific and Industrial Research Organization, Australia
CTFT	Centre Technique Forestier Tropical, France
CU	Bangkok coordinating unit of F/FRED (Forestry and Fuelwood Research and Development project), Thailand
CVRD	Companhia Vale do Rio Doce, Brazil
DAC	Development Assistance Committee (of OECD)
DANIDA	Danish International Development Agency, Denmark
DAP	Division Active Project
DCOPT	Department of Technical, Scientific and Technological Cooperation (within the Ministry of Foreign Affairs), Brasilia, Brazil
DEG	Deutsche Finanzierungsgesellschaft für Beteiligungen in Entwicklungsländern GmbH (German Finance Company for Investment in Developing Countries), Germany
DFSC	Danish Forest Seed Centre, Denmark
DGIS	Directorate-General for International Co-operation, Netherlands
DSE	German Foundation for International Development, Germany
DTC	Departamento Tecnico-Cientifico (within EMBRAPA), Brasilia, Brazil
ECA	Economic Commission for Africa
ECOSOC	Economic and Social Council (of UN)
ECSC	European Coal and Steel Commission
EDF	European Development Fund (of the EEC), Belgium
EEC	European Economic Community, Belgium
EIA	environmental impact assessment
EMATER	Empresa de Assistência Tecnica e Extensão Rural (State Technical Assistance Agency), Brazil

EMBRAPA	Empresa Brasileira de Pesquisa Agropecuária (Brazilian Agriculture Research Organization- Ministry of Agriculture; headquarters in Brasilia), Brazil
EMPARN	Empresa de Pesquisa Agropecuária do Rio Grande do Norte (Agriculture Research Organization of the State of Rio Grande do Norte) Natal, Brazil
EMGOPA	Empresa de Pesquisa Agropecuária de Goias (Agriculture Research Oganization of the State of Goias) Goiânia, Brazil
EPAMIG	Empresa de Pesquisa Agropecuária de Minas Gerais (Agriculture Research Organization of the state of Minas Gerais), Belo Horizonte, Brazil
ERDB	Ecosystems Research and Development Bureau (formerly known as the Forestry Research Institute, FORI)
ESALQ	Escola Superior de Agricultura "Luis de Queiroz", Universidade de São Paulo, Piracicaba, Brazil
F/FRED	Forestry and Fuelwood Research and Development project, USA
FAC	Fonds Aide Coopération, France
FAO	Food and Agriculture Organization of the United Nations, Italy
FCAP	Faculdade de Ciências Agropecuarias do Pará (Agrarian Sciences School of Para), Belem, Pará
FDT	Committee on Forest Development in the Tropics (of FAO), Italy
FENR	Office of Forestry, Environment and Natural Resources of the Bureau of Science and Technology, US-AID, USA
FINEP	Financiadora de Estudos e Projetos, Rio de Janeiro, Brazil
FINNIDA	Finnish International Development Agency, Finland
FISET	Brazilian Government fund for sectorial investment
FoE	Friends of the Earth, USA
FORTAC	Technical Advisory Committee on Forestry Research to INCOFORE
FRIM	Forest Research Institute of Malaysia, Peninsular Malaysia
FUNAI	Fundação Nacional do Indio, Brasilia, Brazil
FUNATURA	Fundação Pró Natureza, Brazil
FUNEC	Fundo Especial de Cooperação Tecnica International, Brasilia, Brazil
FUNTAC	Fundação de Tecnologia do Estado do Acre, Rio Branco, Brazil
FUPEF	Fundação de Pesquisas e Estudos Florestais, Curitiba, Brazil
GDP	Gross Domestic Product
GEMS	Global Environmental Monitoring System (UNEP)
GTC	Grupo Técnico Consultivo
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Agency for Technical Cooperation), Germany
IARC	International Agricultural Research Centre, in the CGIAR system
IBAMA	Instituto Brasileiro do Meio Ambiente e de Recursos Naturais Renováveis (Brazilian Institute of the Environment and Renewable Natural Resources), Brasilia, Brazil
IBDF	Instituto Brasileiro de Desenvolvimento Florestal (Brazilian Institute for Forestry Development, now in IBAMA)
IBPGR	International Board for Plant Genetic Resources, Italy
IBRD	International Bank for Reconstruction and Development (World Bank)
IBSNAT	International Benchmark Sites Network for Agrotechnology Transfer, USA
IBSRAM	International Board for Soil Research and Management, Thailand
IC	international cooperation
ICARDA	International Centre for Agricultural Research in the Dry Areas, Syria

ICFR	International Centre for Forestry Research
ICIMOD	International Centre for Integrated Mountain Development, Nepal
ICLARM	International Centre for Living Aquatic Resource Management, Philippines
ICRAF	International Council for Research in Agroforestry, Nairobi
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics, India
ICSU	International Council of Scientific Unions, France
IDA	International Development Association
IDB	Inter-American Development Bank
IDESP	Instituto de Desenvolvimento Economico e Social, Belem, Brazil
IDRC	International Development and Research Centre, Canada
IEF	Instituto Estadual de Florestas de Minas Gerais (Minas Gerais State Forestry Institute), Belo Horizonte, Brazil
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IFS	International Foundation for Science, Sweden
IGO	intergovernmental organization
IIC	Inter-American Investment Corporation
IIED	International Institute for Environment and Development, UK and USA
IITA	International Institute for Tropical Agriculture, Nigeria
ILCA	International Livestock Center for Africa, Ethiopia
ILRAD	International Laboratory for Research on Animal Diseases, Kenya
IMF	International Monetary Fund
INCOFORE	International Consultative Organization for Forestry Research (proposed by IUFRO)
INFOTERRA	International Register for Sources of Environmental Information (UNEP)
INIAA	Instituto Nacional de Investigaciones Agrarias y Agroindustriales, Peru
INPA	Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil
INPE	Instituto National de Pesquisas Espaciais, S. José dos Campos, Brazil
INRA	Institute National de Recherche Agronomique, France
INTECOL	International Association for Ecology
IPEA	Instituto de Planejamento Economico e Social, Brasilia,, Brazil
IPEF	Instituto de Pesquisas e Estudos Florestais (Forestry Research Institute), Piracicaba, Brazil
IPT	Instituto de Pesquisas Tecnologicas (Technological Research Institute), S. Paulo, Brazil
IRRI	International Rice Research Institute, Philippines
ISNAR	International Service for National Agricultural Research, Netherlands
ITAC	International Task Force on Forestry Research
Itamaraty	Brazilian Ministry of Foreign Affairs, Brasilia
ITC	International technical cooperation
ITE	Institute of Terrestrial Ecology, UK
ITF	Institute for Tropical Forestry (of the USDA Forest Service, Southern Forest Experiment Station), Puerto Rico
ITFFR	International Task Force on Forestry Research (convened by the Rockefeller Foundation, the UNDP, the World Bank and FAO for the Bellagio II meeting in November 1988 on tropical forestry research, Wiston House, Wilton Park, UK)
ITTO	International Timber Trade Organization, Japan
IUBS	International Union of Biological Sciences, France

IUCN	The World Conservation Union (formerly, the International Union for the Conservation of Nature and Natural Resources), Switzerland
IUFRO	International Union of Forestry Research Organizations, Vienna. Austria
IUPN	International Union for the Protection of Nature
JICA	Japan International Cooperation Agency, Japan
KARI	Kenya Agricultural Research Institute, Kenya
KEFRI	Kenya Forestry Research Institute, Kenya
KfW	Kreditanstalt für Wiederaufbau, Germany
LandsatTM	Landsat Thematic Mapping
LDC	less-developed country
MAB	Man and the Biosphere Programme (of Unesco), France
MADALEÑA	Central America regional project on tree cropping and fuelwood production, ROCAP-CATIE, Costa Rica
MG	state of Minas Gerais, Brazil
MINTER	Ministério do Interior, Brasilia, Brazil
MIGA	Multilateral Investment Guarantee Agency
MIRA	Manejo de información sobre recursos arboreos, CATIE, Costa Rica
MPEG	Museu Paraense Emilio Goeldi(within CNPq), Belém
MPTS	multi-purpose tree species
NARS	National Agricultural Research Service
NASA	National Aeronautics and Space Administration, USA
NCS	national conservation strategy
NFRS	National Forestry Research Service
NFTA	Nitrogen-Fixing Tree Association, Hawaii, USA
NFTs	nitrogen fixing trees
NGO	non-governmental organization
NRI	Natural Resources Institute, UK (formerly ODNRI)
OAS	Organization of American States, USA
ODA	Official Development Assistance (in UN terminology); also UK Overseas Development Administration (here referred to as UK-ODA)
ODI	Overseas Development Institute, UK
ODNRI	Overseas Development Natural Resources Institute, UK
OECD	Organization for Economic Cooperation and Development
OECF	Overseas Economic Cooperation Fund
OFI	Oxford (formerly, Commonwealth) Forestry Institute, UK
OPEC	Organization of Petroleum Exporting Countries, Austria
ORSTOM	Office de la Réchérche Scientifique et Technique Outre-Mer, France
PADF	Pan American Development Foundation, Washington
PNUD	Programa das Naçoes Unidas para o Desenvolvimento, Brazil
PRODEMATA	Programme of Integrated Rural Development of the "Mata" Region, Brazil
PRODEPEF	Projeto de Desenvolvimento e Pesquisa Florestal, Brazil
RADAMBRASIL	Project of the Ministério das Minas e Energia/ Departamento Nacional de Produção Mineral, Brasilia, Brazil (today in the Ministério da Infraestrutura)
ROCAP	Regional Office of the Central America Programs of US-AID, Guatemala
S&T/FENR	Office of Forestry, Environment and Natural Resources and Technology, US-AID, USA
S&T/RD	Office of Rural Development of the Bureau of Science and Technology, US-AID, USA
SAC	Scientific Advisory Committee (of Tropenbos)

SAREC	Swedish Agency for Research Cooperation with Developing Countries, Sweden
SBEF	Sociedade Brasileira de Engenheiros Florestais, Brazil
SBS	Sociedade Brasileira de Silvicultura, S. Paulo, Brazil
SCMU	Species Conservation Monitoring Unit (WCMC/IUCN)
SCOPE	Scientific Committee on Problems of the Environment
SEMA	Secretaria do Meio Ambiente (Environment Secretariat, now in IBAMA), Brazil
SEMAM	Secretaria Especial do Meio Ambiente (Environment Special Secretariat; under Brazil's Presidency), Brasilia, Brazil
SEPLAN	Secretaria do Planejamento e Coordenação da Presidência da República, Brasilia (Secretary of Planning)
SF	Special Fund (of UN) or SF/UNDP
SIDA	Swedish International Development Authority, Sweden
SIF	Sociedade de Investigações Florestais, Viçosa, Brazil
SLAR	side-looking airborne radar
SPDC	Special Programme for Developing Countries, IUFRO, Austria
SPVEA	Superintendência do Plano de Valorização Econômica da Amazônia, Brazil
SUBIN	Secretaria de Cooperacao Economica e Tecnica, Brasilia, Brazil
SUDECO	Superintendência de Desenvolvimento do Centro-Oeste, Brasilia, Brazil
SUDAM	Superintendência do Desenvolvimento da Amazonia, Min. do Interior, Belém, Brazil
SUDEPE	Superintendência de Desenvolvimento da Pesca (Fishery Development Institute, within Ministry of Agiculture, now in IBAMA), Brasilia, Brazil
SUDHEVEA	Superintendência do Desenvolvimento da Borracha (Hevea Development Institute, now in IBAMA), Brasilia, Brazil
SUFRAMA	Superintendência de Desenvolvimento da zona Franca de Manaus
TAC	Technical Advisory Committee to the CGIAR, Italy
TC	technical cooperation
TCDC	technical cooperation between developing countries
TCP	Technical Cooperation Programme (of FAO)
TFAP	Tropical Forestry Action Plan (published by FAO, 1985); Tropical Forestry Action Programme
TROPENBOS	Stimulerings Programma voor Onderzoek in Tropische Regensbosgebieden, Netherlands
UK-ODA	Overseas Development Administration, UK
UN	United Nations
UNDP	United Nations Development Program, USA
UNEP	United Nations Environment Programme, Kenya
Unesco	United Nations Educational, Scientific and Cultural Organization, France
UNFPA	United Nations Fund for Population Activities; name changed to United Nations Population Fund, USA
UNIDO	UN Industrial Development Organization
UNIFEM	UN Development Fund for Women
UNITAR	UN Institute for Training and Research
UNSO	United Nations Sudano Saheleian Office, USA
US-AID	United States Agency for International Development, USA
USFS	United States Department of Agriculture, Forest Service
WB	The World Bank (with four main components: IBRD, the International Bank for Reconstruction and Development; IDA, the International Development Association; IFC, the International Finance Corporation; and MIGA, the Multilateral Investment Guarantee Agency. USA

WRI	World Resources Institute, USA
WWF	World Wide Fund for Nature, Switzerland

APPENDIX II

LIST OF DONORS AND TECHNICAL COOPERATION AGENCIES

The following (abridged) information was provided by John R Palmer, Director, Tropical Forestry & Computing Ltd., Oxford, UK, and formerly Deputy Coordinator of IUFRO's Special Programme for Developing Countries, Vienna, Austria.

Most of the published catalogues of sources and guides to the preparation of grant proposals can be obtained from:
The Society for Nonprofit Organizations
6314 Odana Road, suite 1
Madison, Wisconsin 53719, USA

The donors and agencies are in alphabetic order of country (the U.K. is listed under "B", Britain)

Research for Development Section
Australian International Development Assistance Bureau (AIDAB)
P. O. Box 887
Canberra City
A.C.T. 2601
Australia
tel: +61 (062) 48-6644 cables: ADAID CANBERRA tlx: 62631 ADAIDAA

Dr. John W. Turnbull
Forestry Program Coordinator
The Australian Centre for International Agricultural Research (ACIAR)
P. O. Box 1571
Canberra City, A.C.T. 2600
Australia
tel: +61 (062) 48-8588 tlx: 62419 ACIAR AA

Dr. Hermann Spirik
Technische Entwicklungshilfe, Sektion VII/2
Bundesministerium für Auswärtige Angelegenheiten
Ballhausplatz 2
A - 1014 Wien
Austria
tel: +43 (0222) ?

Dr. Y. Seyyid Abdulai
Director-General
OPEC Fund for International Development (OPEC FUND)
Obere Donaustrasse 93, Postfach 995
A - 1011 Wien 1
Austria
tel: +43 (0222) 53.16.640 cables: OPECFUND tlx: 1-31734,1-34831 FUND A

Ms. Ikhlass Z. Najib
Technical and Economic Services Department
OPEC Fund for International Development (OPEC FUND)

Obere Donaustrasse 93, Postfach 995
A - 1011 Wien 1
Austria
tel: +43 (0222) 53.16.640 cables: OPECFUND tlx: 1-31734,1-34831 FUND A

Audley A. Espeut
Manager of the Project Coordination and Marketing Unit
Caribbean Development Bank (CDB)
P. O. Box 408
Wildey, St. Michael
Barbados, West Indies
tel: +1-809 61152 tlx: 287 CARIBANK WB

A. M. J. Robbins
DG VIII - Directorate General for Development, Division A/2
Commission of European Communities (CEC/EEC), BERL 9/79
rue de la Loi 200
B - 1049 Bruxelles
Belgium
tel: +32 (02) 235.68.71 cables: COMEUR BRUSSELS tlx: 21877 COMEU B

Thomas Wollersen
Joint Research Centre, Division G-4
DG XII - Directorate General for Science, Research and Development
Commission of European Communities (CEC/EEC)
rue de la Loi 200, B - 1049 Bruxelles
Belgium
tel: +32 (02) 235.09.27 fax: (02) 236.33.08 tlx: 21877 COMEU B

European Investment Bank
Representative Office in Bruxelles
rue de la Loi 227
B - 1040 Bruxelles
Belgium
tel: +32 (02) 230.98.90

M. P. Frix
Agence Général de Cooperation au Dévéloppement AGCD/ABOS
"A.G." Building, 12e étage, Place du Champs de Mars 5
Boite Postale 57
B - 1050 Bruxelles, Belgium
tel: +32 (02) 513.90.60 cables: BELEXTBRU tlx: 21376

M. Goosse
Bureau International du Travail (B.I.T.)
(Bureau de liason de l'OIT avec les communautes européennes)
Rue Aimé Smekins 40
B - 1040 Bruxelles, Belgium
tel: +32 (02) 736.99.16 tlx: 25307

Agência Brasileira de Cooperação (ABC)
Ministério das Relações Exteriores
Anexo I - 8o. Andar
70170, Brasilia, DF- Brazil
tel: 55 (061) 211-6914, 211-6915 fax: 224-0129 tlx: 613564

Dr. Sally Robinson
Science Officer for Forestry and Agriculture, room West 7571
Science and Technology Department, Education and Science Division (STED)
The British Council
10 Spring Gardens, Pall Mall
London SW1A 2BN, U.K.
tel: +44 (071) 930-8466x4317 fax: +44 (01) 839-6347 tlx: 916522 BRICON G

Anthony C. Finch
Forestry Adviser
Commonwealth Development Corporation (CDC)
1 Bessborough Gardens, Pimlico
London SW1V 2JQ, U.K.
tel: +44 (071) 828-4488 fax: +44 (01) 828-6505 tlx: 21431,25849 VELOP G

Professor J. I. Furtado
Secretary
Commonwealth Science Council (CSC)
Commonwealth Secretariat
Malborough House, Pall Mall
London SW1Y 5HX, U.K.
tel: +44 (071) 839-3411 cables: COMSECGEN LONDON SW1 tlx: 27678 COMSECGEN G

Dr. Promila Kapoor
Project Officer
Commonwealth Science Council (CSC)
Commonwealth Secretariat, Malborough House, Pall Mall
London SW1Y 5HX, U.K.
tel: +44 (071) 839-3411 cables: COMSECGEN LONDON SW1 tlx: 27678 COMSECGEN G

Dr. Caroline Sargent
The Director
Forestry and Land Use Programme
Earthscan / International Institute for Environment and Development (IIED)
3 Endsleigh Street, Euston, London WC1H 0DD, U.K.
tel: +44 (071) 388-2117 cables: EARTHSCAN LONDON WC1 tlx: 261681 EASCAN G

William J. Howard
Senior Forestry Adviser
Overseas Development Administration (ODA)
Foreign and Commonwealth Office (FCO)
Eland House, Stag Place, Victoria
London SW1E 5DH, U.K.
tel: +44 (071) 273-0313 fax: (01) 273-0016/19 tlx: 263907 ODMLDN G

M. Aly Cisse
Executive Secretary
Comité permanent Interétats de Lutte contre la Sécheresse dans le Sahel (CILSS)
Boite Postale 7049
Ouagadougou, Burkina Faso

tel: +226 (03) 33078 tlx: COMITER BK

Dr. L. Gilles Lessard
Associate Director
International Development Research Centre (IDRC)
Postal Box 8500, 60 Queen Street
Ottawa, Ontario, Canada K1G 3H9
tel: +1 (613) 996-2321 cables: RECENTRE OTTAWA tlx: 053-3753 RECENTRE

Dr. Ralph W. Roberts
Chief of Forestry Sector, Natural Resources Division
Canadian International Development Agency (CIDA)
Place du Centre, 200 Promenade du Portage
Hull, Quebec
Canada K1A 0G4
tel: +1 (819) 997-6586 cables: CIDA-HULL tlx: 053-4140 CIDA-HULL

Ing. Sergio Salcedo G.
Oficial Regional Forestal
Organización de las Naciones Unidas para la Agricultura y la Alimentación (FAO)
Providencia 871
Casilla 10095
Santiago, Chile
tel: ?

Niels Richter
Coordinator of the DANIDA Environmental Action Plan
Danish International Development Agency (DANIDA)
Ministry of Foreign Affairs, Asiatisk Plads 2
DK-1448 Copenhagen K
Denmark
tel: +45 (01) 92-02-36 cables: ETRANGERES tlx: 31292 ETR DK

Henrik Hvidberg-Hansen
Forestry Adviser
Danish International Development Agency (DANIDA)
Ministry of Foreign Affairs, Asiatisk Plads 2
DK-1448 Copenhagen K
Denmark
tel: +45 (01) 92-00-00 cables: ETRANGERES tlx: 31292 ETR DK

Dr. Tapani Oksanen, Forestry & Forest Industries Adviser
Finnish International Development Agency (FINNIDA)
Ministry for Foreign Affairs
Mannerheimintie 15 C
SF-00260 Helsinki 26
Finland
tel: +358 (0) 1341-6435 fax: 440-857 tlx: 124636 UMIN SF

Dr. Pauli Mustonen, Programme Officer
Finnish International Development Agency (FINNIDA)
Ministry for Foreign Affairs
Mannerheimintie 15 C
SF-00260 Helsinki 26
Finland

tel: +358 (0) 406-077 tlx: 124636 UMIN SF

Dr. Heikki Rissanen
Finnish International Development Agency (FINNIDA)
Ministry for Foreign Affairs
Mannerheimintie 15 C
SF-00260 Helsinki 26
Finland
tel: +358 (0) 406-077 tlx: 124636 UMIN SF

Dr. Jean Clément
Chargé des relations internationales à l'ONF
Office National des Forêts (ONF)
2 avenue de Saint-Mandé
F-75570 Paris CEDEX 12
France
tel: +33 (1) 40.19.58.49 fax: (1) 43.46.19.20,43.41.16.78 tlx: 213832 ONF F

Dr. Jean-Jacques Faure
Chargé de mission "Forêts"
Departement des Forêts et de l'Environnement
Ministère de la Coopération et du Développement
20 rue Monsieur, F-75007 Paris
France
tel: +33 (1) 47.83.11.84 fax: (1) 43.06.97.40 tlx: 202363 COPGEST F

Dr. Arthur Riedacker
Sous-direction de réchérche
Departement des Forêts et de l'Environnement
Ministère de la Coopération et du Développement
20 rue Monsieur, F-75007 Paris
France
tel: +33 (1) 47.83.11.84 tlx: 202366 COPGEST F

Dr. Bernd von Droste
Director, Division of Ecological Sciences
U.N.E.S.C.O.
7 place de Fontenoy, Boite Postale 3.07 Paris
75700 Paris
France
tel: +33 (1) 45.68.10.00 cables: UNESCO PARIS tlx: 204461,270602 PARIS F

Dr. Malcolm Hadley
Division of Ecological Sciences, MAB Secretariat
U.N.E.S.C.O.
7 place de Fontenoy, Boite Postale 3.07 Paris
75700 Paris
France
tel: +33 (1) 45.68.40.71 cables: UNESCO PARIS tlx: 204461,270602 PARIS F

Dr. Olaf Anders
Chief of Forestry and Wood Research Section
Deutsche Stiftung für Internationale Entwicklung (DSE)
Zentralstelle für Ernährung und Landwirtschaft (ZEL)
Wielingerstraße 52, D-8133 Feldafing

Federal Republic of Germany
tel: +49 (081) 57.38-0 tlx: 526436 DSE D

Dr. Dietrich Burger, Chief of Forestry & Forest Industries
Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), Gmbh
Postfach 51 80
Dag-Hammarskjöld-weg 1-2
D-6236 Eschborn 1 bei Frankfurt/Main
Federal Republic of Germany
tel: +49 (06196) 79.14.18 cables: GERMATEC ESCHBORN TAUNUS tlx: 407501-0 GTZ D

Dr. Udo Vollmer, Forestry Adviser
Arbeitseinheit Referat 224 (Umwelt, Forstwirtschaft und Fischerei)
Bundesministerium für Wirtschaftliche Zusammenarbeit (BMZ)
Karl-Marx-Straße 4-6
D-5300 Bonn 12
Federal Republic of Germany
tel: +49 (0228) 53.52.26 tlx:8-869452 BMZ D

Dr. Ulrich von Poschinger-Camphausen
Wiss. Sekretär
Arbeitsgruppe Tropische und Subtropische Agrarforschung (ATSAF)
Hans-Böckler-Straße 5
D-5300 Bonn 3
Federal Republic of Germany
tel: +49 (0228) 4001.312/3 fax: (0228) 4001-311 tlx: 886710 DSEBND D

Dr. Kurleigh King
Secretary General, Caribbean Community Secretariat (CARICOM)
Bank of Guyana Building, third floor
Avenue of the Republic, P. O. Box 10827
Georgetown
Guyana, South America
tel: +592 (02) 69281/2/3/4 cables: CARISEC tlx: 2263 CARISEC GY

Ing. Nicholaas A. de Joncheere
Coordinador de los proyectos de la Comunidad Económica Europea (CEE), Honduras
Colonia Palmira, 4a. Avenida, 126
Apartado Postal 557
Tegucigalpa, D.C.
Republic of Honduras
tel: +504 32-75-98 tlx: 1474 PROIND HO

Direttore Generale
Dipartimento per la Cooperazione allo Sviluppo
Ministero degli Affari Esteri
Palazzo della Farnesina
I-00100 Roma RM
Italy
tel: +39 (06) ?

The President
International Fund for Agricultural Development (IFAD)
Via del Serafico 107
I-00142 Roma

Italy
tel: 54-59-1 cables: IFAD ROME tlx: 6146160/2 IFADRMI

Richard A. Owen
F.A.O. Investment Centre
Food and Agriculture Organization of the United Nations (FAO)
Via delle Terme di Caracalla
I-00100 Roma
Italy
tel: +39 (06) 57.97.5310 cables: FOODAGRI ROME tlx: 610181, 610248 FAO I

Ir. J. Matthijs Heering
Coordinator of the Tropical Forestry Action Plan, Forestry Department
Food and Agriculture Organization of the United Nations (FAO)
Via delle Terme di Caracalla
I-00100 Roma
Italy
tel: +39 (06) 57.97.3589 fax: 6799563,57.97.5137 tlx: 610181, 610248 FAO I

Dr. Freezaillah bin Che Yeom
Executive Director
International Tropical Timber Organization (ITTO)
Sangyo Boeki Center Building, 8th floor
2, Yamashita-cho, Naka-Ku
Yokohama 231, Japan
tel: +81 (045) 671-7045/6 tlx: 3822480 ITTO J

Takashi Koezuka
Director, Multilateral Cooperation Division
Economic Cooperation Bureau
Ministry of Foreign Affairs
2-2-1 Kasumigaseki Chiyoda-ku
Tokyo 100, Japan
tel: +81 (0580) 3311x2560

Katsuhiro Kotari
Special Assistant to the President
Japan International Cooperation Agency (JICA)
P. O. Box 216, Shinjuku Mitsui Building 2-1-1
Nishi Shinjuku, Shinjuku-Ku
Tokyo 160, Japan
tel: +81 (03) 346-5311(JICA),5014(direct) tlx: 22271 JICAHDQC J

Yoshio Utsuki
Diretor, International Forestry Cooperation, Forestry Agency
1-2-1 Kasumigaseki, Chayoda-ku
Tokyo
Japan
tel: +81 (03) ?

Ms. Kathleen Landauer
Programme Officer, Development Studies Division
The United Nations University (UNU)
Toho Seimei Building 15-1
Shibuya 2-chome, Shibuya-ku

Tokyo 150
Japan
tel: +81 (03) ?

Dr. R. J. Olembo
Director of Environmental Management
United Nations Environment Programme (UNEP)
P. O. Box 30552
Nairobi
Kenya
tel: +254 (02) 333-930 cables: UNITERRA NAIROBI tlx: 22068/22173 UNEP KE

Bernardo Zentilli van Kilsdonk
Senior Programme Officer for Environmental Management
United Nations Environment Programme (UNEP)
P. O. Box 30552
Nairobi
Kenya
tel: +254 (02) 333-930 cables: UNITERRA NAIROBI tlx: 22068/22173 UNEP KE

Morten Scholer
Directorate for Operations Outside the Community
European Investment Bank
Boulevard Konrad-Adenauer 100
Luxembourg-Kirchberg
L-2950 Luxembourg
tel: +352 4379-7302 tlx: 3530 BNKEU LU

Sr. David I. Blagborough
Asesor Científico
Consejo Británico
Maestro António Caso 127, Colónia San Rafael
Apartado Postal 30-588
06470 México, D.F., México
tel: +52 (05) 566-6144 tlx: 1773093 UKEMMX

Dr. Miguel Caballero Deloya
Vocal Secretario, Zona Norte
Instituto Nacional de Investigaciones Forestales y Agropecuarias (INIFAP)
Insurgentes Sur 694, 9Qpiso, Colonia de Valle, 03100 México, D.F.
Apartado Postal 6-882 & 6-883, Colonia del Valle
06600 México, D.F., México
tel: +52 (905) 687-7429,7474

Ing. Carlos E. González Vicente
Director de Capacitación y Difusión
Instituto Nacional de Investigaciones Forestales y Agropecuarias (INIFAP)
Insurgentes Sur 694, 9Qpiso, Colonia de Valle, 03100 México, D.F.
Apartado Postal 6-882 & 6-883, Colonia del Valle
06600 México, D.F., México
tel: +52 (905) 687-7440

Directorate for Agricultural Assistance to Developing Countries (AHO)
Ministerie van Buitenlandse Zaken
Bezuidenhoutsweg 73

Postbus 20401
2400 EK s'-Gravenhage
The Netherlands
tel: +31 (070) 48.64.86 tlx: 31326

Ir. Arjan Hamburger
Energy Aid Coordinator
Ministry of Foreign Affairs
Postbus 20061
NL-2500 EB Den Haag
The Netherlands
tel: +31 (070) 48.43.04 tlx: 31326

Ir. Kees Van Dijk, Coordinator
Forestry Development Cooperation, Ministerie van Landbouw en Visserij
Statsbosbeheer, Griffioenlaan 2
Postbus 20020
NL-3502 LA Utrecht
The Netherlands
tel: +31 (030) 85.25.68 tlx: 47542

Ir. Egbert Pelinck
Technical Adviser on Environmental Questions
Directorate-General for International Co-operation (DGIS)
Ministerie van Buitenlandse Zaken, Bezuidenhoutsweg 67
Postbus 20061, NL-2500 EB Den Haag
The Netherlands
tel: +31 (070) 34.84.286 fax: (070) 34.84.303 tlx: 31326 AH BUZ NL

Ir. Kees Soels
Head of Research and Technology Section
Directorate-General for International Cooperation (DGIS)
Ministerie van Buitenlandse Zaken, Bezuidenhoutsweg 67
Postbus 20061, NL-2500 EB Den Haag
The Netherlands
tel: +31 (070) 48.43.04 fax: (070) 48.48.48 tlx: 31326 AH BUZ NL

Dr. Erik M. Lammerts van Bueren
Programme Director, The 'Tropenbos' Programme
Stimulerings Programma voor Onderzoek in Tropische Regensbosgebieden
Galvanistraat 9
NL-6716 AE Ede
The Netherlands tlx: 30169 TROPENBOS NL, 47542 LVUTR NL
tel: +31 (08380) 3.88.93 fax: (08380) 2.14.22

Dr. Ian P. Armitage
Manager, International Forestry Group, Ministry of Forestry
c/o Forest Research Institute
Private Bag
Rotorua
New Zealand
tel: +64 (073) 475-899 cables: FRESTRA ROTORUA N.Z. tlx: 21080 FRESTRA NZ

Norwegian Agency for International Development (NORAD)
Ministry of Development Cooperation (MDC)
Victoria Terrace 7

Boks 8142
Oslo - Dept., Oslo 1
Norway
tel: +47 (02) 18.00.00 cables: NORAD OSLO tlx: 16548 NORAD N

Knut Einar Fjulsrud
Head of Division, Det Kongelige Landbruksdepartement
Ministry of Agriculture, Akersgatan 42
Boks 8007 Dep.
N-0030 Oslo 1
Norway
tel: +47 (02) 34.93.72 fax: (02) 34.95.55 tlx: 72969 LDEP N

Barin N. Ganguli (Senior Forestry Specialist)
Agriculture and Rural Development Department
Asian Development Bank
2330 Roxas Boulevard, Metro Manila
P. O. Box 789, Manila 2800
Republic of the Philippines tlx: 400571 ADB PM(ITT)
tel: +63 (02)834-37-31 tlx: 23103 ADB PH(RCA), 63587 ADB PN(ETPI)

H.R.H. Prince Talal bin Abdul Aziz Al-Saud
President
Arab Gulf Programme for the United Nations Development Organizations (AGFUND)
P. O. Box 18371
Riyadh 11415, Saudi Arabia
tel: +966 (01) 441-6240/6257/3218 tlx: 204071 AGFUND SJ

Dr. Ahmad Mohamed Ali
President
Islamic Development Bank (IsDB)
P. O. Box 5925
Jeddah 21432
Saudi Arabia
tel: +966 (02) 33-994/995 tlx: 401137/401407 ISDB SJ

The Director-General
Agency for Technical Cooperation Administration
Council of Ministers Office
Riyadh
Saudi Arabia
tel: +966 (01) ?

Pedro Martínez Garrido
Jefe de Coordinación y Relaciones, ICONA
Ministerio de la Agricultura
Gran Vía San Francisco 35
E-28005 Madrid
Spain
tel: +34 (01) 265-00-12 tlx: 48566 ICONA E

Jefe
Servicio Exterior Agrario
Ministerio de Agricultura, Pesca y Alimentación

Paseo Infanta Isabel 1
Madrid
Spain
tel: +34 (01) ?

Per Björkman
Forestry Officer, Agriculture Division
Swedish International Development Authority (SIDA)
Birger Jarlsgatan 61, Fack
S-105 25 Stockholm
Sweden
tel: +46 (08) 15.01.00 cables: SIDA STOCKHOLM tlx: 11450 SIDA S

Karin v Schlebrügge
Information Officer
Swedish Agency for Research Cooperation with Developing Countries (SAREC)

Klarabergsgatan 23, P. O. Box 161 40
S-103 23 Stockholm
Sweden
tel: +46 (08) 791.21.00 fax: (08) 791.21.99 tlx: 19111 SAREC S

Dr. Werner Hunziker (forestry adviser),
Swiss Development Corporation
Direktion für Entwicklungszusammenarbeit und humanitäre Hilfe
[Dirección de la cooperación al desarrollo y de la ayuda humanitaria (COSUDE)]
Eidgenössischen Departement für auswärtige Angelegenheiten
Eigerstrasse 73, CH-3003 Bern
Switzerland
tel: +41 (031) 61.31.96 cables: AFFETRA BERN tlx: 33151 EDA CH

Ing. Jean Laurent, INTERCOOPERATION
Schweizerische Organisation für Entwicklung und Zusammenarbeit
[Swiss Oganization for Development and Cooperation]
Maulbeerstrasse 10, Postfach 1651
CH-3001 Bern
Switzerland
tel: +41 (031) 26.08.61 cables: INCO 3001 BERN tlx: 912047 INCO CH

Dr. Martin Holdgate
Director General
International Union for Conservation of Nature and Natural Resources (IUCN)
Avenue de Mont-Blanc
CH-1196 Gland, Vaud
Switzerland
tel: +41 (022) 64.71.81 cables: IUCNATURE GLAND tlx: 419605 IUCN CH

Dr. Jeffrey Sayer
Director, Tropical Forest Programme
International Union for Conservation of Nature and Natural Resources (IUCN)
Avenue de Mont-Blanc
CH-1196 Gland, Vaud
Switzerland

tel: +41 (022) 64.91.14 fax: (022) 64.29.26 tlx: 419605 IUCN CH

Peter Poschen
Forestry and Wood Industries Specialist, Industrial Activities Branch
International Labour Office (ILO)
4 route des Morillons
CH-1211 Genève 22
Switzerland
tel: +41 (022) 799.61.88 fax: 798.86.85cables INTERLAB GENEVE tlx:415647 ILO CH

Dr. P. C. Alexander
Executive Director
International Trade Centre UNCTAD/GATT
4 route des Morillons
CH-1211 Genève 22
Switzerland
tel: +41 (022) 99.61.61 cables INTRADCEN GENEVE tlx: 289052 ITC CH

Derek B. Webb
Director Asociado para Ciencias Forestales
División de Agricultura, Alimentos y Nutrición
Centro Internacional de Investigaciónes para el Desarrollo (CIID)
Casilla de Correo 6379
Montevideo, Uruguay
tel: +598 (02) 922-043/5 fax: (02) 920-223

Ralph B. Schmidt
Senior Technical Adviser (Forestry), Room DC1-2024
Bureau for Programme Policy and Evaluation, Technical Advisory Division
United Nations Development Programme (UNDP)
1 United Nations Plaza
New York, NY 10017, USA
tel: +1 (212) 906-5088 fax: (212) 906-5365 tlx: 125980

Timothy S. Rothermel
Director, room FF-1294
Division for Global and Inter-regional Projects (DGIP)
United Nations Development Programme (UNDP)
1 United Nations Plaza
New York, NY 10017, USA
tel: +1 (212) 906-5856,5861 fax: (212) 906-6350 tlx: 125980

Scott Solberg
Programme Manager, The International Tree Project Clearinghouse
U. N. Non-Governmental Liaison Service, Room DC2-1103
United Nations Development Programme (UNDP)
2 United Nations Plaza
New York, NY 10017, USA
tel: +1 (212) 963-3125 cables: UNATIONS NEW YORK tlx: 232422

Jill Carr-Harris
room DC2-1103
U. N. Non-Governmental Liaison Service
United Nations Development Programme (UNDP)
1 United Nations Plaza
New York, NY 10017, USA

tel: +1 (212) 754-3125

The Executive Director
United Nations Institute for Training and Research
801 United Nations Plaza
New York, NY 10017, USA
tel: +1 (212) ?

Dr. Bruce Bayle
Regional Forestry Adviser for the Caribbean
U.S.D.A. Forest Service
Caribbean National Forest
Call Box 2500
Rio Piedras, Puerto Rico 00928-2500
tel: +1 (809) 766-5335 fax: (809) 250-6924

Agricultural Development Division
Project Analysis Department
Inter-American Development Bank (BID)
808 17th Street, N. W.
Washington, D.C. 20577, USA
tel: +1 (202) 634-8000 cables: INTAMBANC

Dr. Stephen F. McGaughey
room 443/A
Chief of Forestry and Fisheries Section
Inter-American Development Bank (BID)
1300 New York Avenue, N.W.
Washington, D.C. 20577, USA
tel: +1 (202) 623-1874, 623-1000 fax: (202) 623-3069 cables: INTAMBANC

Instituto Interamericano de Cooperación para la Agricultura (IICA)
Organización de los Estados Americanos (OEA)
1889 F Street, N.W.
Washington, D.C., USA
tel: +1 (202) ?

Dr. David L. Black
Advisor to the Secretary General
Organization of American States (OAS/OEA)
Pan American Union Building
17th Street and Constitution Avenue, N.W.
Washington, D.C. 20006, USA
tel; +1 (202) ?

Dr. Ian G. Morison
Senior Forestry Research Advisor and F/FRED project manager
Office of Forestry, Environment and Natural Resources (FENR)
Bureau for Science and Technology (S&T)
U. S. Agency for International Development (US-AID)
Washington, D.C. 20523, USA
tel: +1 (703) 235-8956 fax: (703) 235-2890

Dr. Carl M. Gallegos, Chief Forester
Office of Forestry, Environment and Natural Resources (FENR), SA-18, 503-E

Bureau for Science and Technology (S&T) [1601 North Kent Street, Arlington]
U. S. Agency for International Development (US-AID)
320 21st Street, N.W.
Washington, D.C. 20523, USA
tel: +1 (703) 875-4062 fax: (703) 875-4394

Dr. Twig Johnson, Director
Office of Forestry, Environment and Natural Resources (FENR), SA-18, 509
Bureau for Science and Technology (S&T) [1601 North Kent Street, Arlington]
U. S. Agency for International Development (US-AID)
320 21st Street, N.W.
Washington, D.C. 20523, USA
tel: +1 (703) 875-4106 fax: (703) 875-4394 tlx: 440001

Dr. Miloslav Reshciagl, Jr.
Program in Science and Technology Cooperation (AID/SCI), SA-18, 320
Bureau for Science and Technology (S&T) [1601 North Kent Street, Arlington]
U. S. Agency for International Development (US-AID)
320 21st Street, N.W.
Washington, D.C. 20523-1818, USA
tel: +1 (703) ???-???? fax: (703) 875-4394 tlx: 440001

R. D. H. ("Chip") Rowe
Agroforestry Adviser
Agriculture and Rural Development Division
The World Bank, 1818 H Street, N.W.
Washington, D.C. 20433, USA
tel: +1 (202) 473-7579 cables: INTBAFRAD WASHINGTON, D.C.
tlx: (RCA) 248423 WORLDBANK, (ITT) 440098 WORLDBANK, (WUI) 64145 WORLDBANK

Program Coordinator
program area Tropical Ecosystems
U.S. MAB Secretariat
OES/EGC/MAB Room 833, SA-5
Department of State
Washington, D.C. 20522-0508, USA
tel: +1 (202) 632-2816,2786

Dr. David A. Harcharik
Director of International Forestry
U.S.D.A. Forest Service, Room 1208 RPE
12th and Independence, S.W.
P. O. Box 96090
Washington, D.C. 20090-6090
tel: +1 (202) 453-9575 fax: (202) 447-3610,235-3722 tlx: 258521 FSIF UR

Educational and charitable foundations which are known to support forestry, in alphabetic order of country (the U.K. is listed under "B", Britain)

Dr. Jean L. C. Dubois
Coordenador da Rede Brasileira Agroforestal (REBRAF)
Fundação Brasileira para a Conservação da Natureza (FBCN)
Rua Miranda Valverde 103, Botafogo
22.281 Río de Janeiro, RJ
Brazil
tel: +55 (021) 226-5008,286-2296,226-2654 tlx: 021-37984 FBCN BR

Action Aid
P. O. Box 69
208 Upper Street
Islington
London N1 1RZ, U.K.
tel: +44 (071) ?

Stephen King
Project Officer, Africa
The Catholic Fund for Overseas Development (CAFOD)
2 Romero Close, Stockwell Road
South Lambeth
London SW9 9TY, U.K.
tel: +44 (071) 274-9630, 733-7900 tlx: 893347 CAFOD G

Catholic Institute for International Relations (CIIR)
22 Coleman Fields
Islington
London N1 7AF, U.K.
tel: +44 (071) 354-0883

Michael Conway
Programme Coordinator
Nuffield Foundation Fellowship Awards
Commonwealth Institute
Kensington High Street
London W8 6NQ, U.K.
tel: +44 (071) ???-???

Peter James
Programme Director, Overseas Programmes
EuroAction Accord (ACORD)
Francis House, 3rd Floor
Francis Street, Victoria
London SW1P 1DQ, U.K.
tel: +44 (071) 828-7611,12 tlx: 8954437 ACORD G

Simon Counsell & Tracy Worcester
Tropical Rainforest Campaign
Friends of the Earth Limited (FoE)
26-28 Underwood Street, Shoreditch
London N1 7JQ, U.K.
tel: +44 (071) 490-1555 switch, 0336 direct fax: (01) 490-0881

Dr. P. Harris
Head of Overseas Projects
Henry Doubleday Research Association
Ryton-on-Dunsmore
Coventry
Warwickshire CV8 3LG, U.K.
tel: +44 (0203) 303-517

Ms. B. Harvey
Intermediate Technology Development Group Ltd. (ITDG)
Myson House, Railway Terrace
Rugby
Northamptonshire CV21 3HT, U.K.
tel: +44 (0788) 60631

International Voluntary Service (IVS)
(National Office)
Ceresole House
53 Regent Road
Leicester LE1 6YL, U.K.
tel: +44 (0533) 541-862

Overseas Volunteer Programme
International Service Department (UNAIS)
United Nations Association
Suite 3a, Hunter House
57 Goodramgate
York YO1 2LS, U.K.
tel: +44 (0904) 647-799

Agriculture Department
Oxfam
Oxfam House
274 Banbury Road
Freepost
Oxford OX2 7BR, U.K.
tel: (0865) 56777 fax: (0865) 57612 tlx: 83610 OXFAM G

Jerry Adams/ Penny Amerena/ Andy Inglis/ John Nurse
Agriculture Department, Voluntary Service Overseas (VSO)
317-325 Putney Bridge Road
Putney
London SW15 2PN, U.K.
tel: +44 (081) 780-1331,2266 fax: (081) 780-1326 cables: VOLENS LONDON SW15

Peter Ramshaw (Conservation and Development Officer)
Francis Sullivan (Tropical Forest Conservation Officer)
Clive Wicks (Senior Conservation and Development Executive)
World Wide Fund for Nature (WWF-UK)
Panda House, Weyside Park, Godalming
Surrey GU7 1XR, U.K.
tel: +44 (0483) 426-444 fax: (0483) 426-409 tlx: 859602 PANDA G

James Lynch (New Alchemy)
Asociación de los Nuevos Alquimistas (ANAI)
Gandoca, Provincia de Talamanca

Apartado Postal 902
73000 Limon
Costa Rica
tel: +506 25-31-47

Ing. Lautaro Andrade
Director de Programas, Proyecto Ecuador
Meals for Millions / Freedom from Hunger Campaign
Lizardo García 544 y Reina Victoria
Casilla 11224 CCNU, Quito
Ecuador
tel: +593 (02) 54.15.27

Dr. Achim Viereck
Scientific Secretary
German Council for Tropical and Subtropical Agriculture (ATSAF)
Hans-BÖchlerstraße 5
D-5300 Bonn 3
Federal Republic of Germany
tel: +49 (0228) ?

Euro-Action ACORD
Prins Hendrikkade 48
Amsterdam 1001
The Netherlands
tel: +31 (020) ? tlx: 23997 IVEF CH

Global Forest Fund
Postbus 9
NL-6700 AA Wageningen
The Netherlands
tel: +31 (08370) 2.17.77

Dr. Wiebe G. Kloppenburg
BOS-Secretariat
(Foundation for Dutch Forestry Development Cooperation)
Stichting voor Nederlandse Bosbouw-Ontwikkelings Samenwerking
20 Bosrandweg, NL-6704 PH Wageningen
Postbus 23, NL-6700 AA Wageningen, The Netherlands
tel: +31 (08370) 9.53.53

Technical Centre for Agricultural and Rural Co-operation
ACP-EEC Lomé Convention
'de Rietkampen', Galvinstraat 9, Ede
Postbus 380
NL-6700 AJ Wageningen
The Netherlands
tel: +31 (08380) 2.04.84

Dr. Baldensperger
Scientific Secretary
International Foundation for Science (IFS)
Grev Turegatan 19
S-114 38 Stockholm
Sweden
tel: +46 (08) 22.07.60 cables: IFOSCIENCE tlx: 13722 IFOSCIENCE S

Robert d'Arcy Shaw
Director of Special Programmes
Aga Khan Foundation
rue Versonnex 7, Postfach 435
CH-1211 Genève 6
Switzerland
te;+ 41 (022) 36.03.44 cables: AKFGVA GENEVA tlx: 27 545 AKF CH

Piers Campbell
NGO Management Network
International Council of Voluntary Agencies (ICVA)
rue Gautier 13, CH-1201 Genève
Switzerland
tel: +41 (022) 31.66.02 tlx: 22891 ICVA CH

Dr. Christopher Elliott
Conservation Officer, Tropical Forest Conservation
World Wide Fund for Nature (WWF-International)
Avenue de Mont-Blanc, CH-1196 Gland, Vaud
Switzerland
tel: +41 (022) 64.71.81 cables: WWF GLAND tlx: 419618 WWF CH

Dr. Arturo Gómez-Pompa
Director of UC MEXUS (UC Consortium on México & The United States)
Professor of Botany & Plant Sciences
Room 4151, Batchelor Hall
University of California
Riverside, California 92521-0147, USA
tel: +1 (714) 787-3534,4686

Dr. Aaron E. Zazueta
Program Associate, Latin America / Caribbean
Meals for Millions / Freedom from Hunger Foundation
1644 DaVinci Court, P. O. Box 2000
Davis, California 95617, USA
tel: +1 (916) 758-6200

Dr. William R. Burch, Jr.
The Tropical Resources Institute (TRI)
Yale School of Forestry and Environmental Studies
Yale University
205 Prospect Street
New Haven, Connecticut 06511, USA
tel: +1 (203) 432-5119

Dr. Steven E. Sanderson
Director
Tropical Conservation and Development (TCD) Program
Center for Latin American Studies
University of Florida, 319 Grinter Hall
Gainesville, Florida 32611, USA
tel: +1 (904) ?

Dr. Richard Carpenter
Director
East-West Environment & Policy Institute
East-West Center

1777 East-West Road
Honolulu, Hawaii 96848, USA
tel: +1 (808) 944-7111,7555

Dr. Nancy Glover
Vice President
The Nitrogen Fixing Tree Association (NFTA)
P. O. Box 680
Waimanalo
Hawaii 96795, USA
tel: +1 (808)259-8555,8685 cables: NFTAHAWAII tlx: 5101004385 NITRO FX TREE ASN

Dan Martin
Program Officer
John D. and Catherine T. MacArthur Foundation
140 South Dearborn Street
Chicago
Illinois 60603, USA
tel: +1 (312) 726-8000

Dr. D. M. Warren
Center for Indigenous Knowledge for Agricultural & Rural Development (CIKARD)
Technology and Social Change Program
318 Curtiss Hall
Iowa State University
Ames, Iowa 50011, USA
tel: +1 (515) 294-0938 tlx: 283359 IASU UR BitNet: S1.MBW@ISUMVS

The President
W. K. Kellog Foundation
400 North Avenue
Battle Creek
Michigan 49016, USA
tel: +1 (616) 968-1611

Dr. Peter T. Hazlewood
Deputy Director
Agriculture and Natural Renewable Resources Program
Cooperative for American Relief Everywhere (CARE)
660 First Avenue
New York, NY 10016, USA
tel: +1 (212) 686-3110 fax: (212) 696-4005 tlx: 4900009950 CAR UI(ITT)

Program Officer
Harry Frank Guggenheim Foundation
527 Madison Avenue
New York
NY 10022-4301, USA
tel: +1 (212) 644-4907

Dr. Norman Collins
Director of Rural Poverty and Resources Programme
The Ford Foundation
320 East 43rd Street
New York, NY 10017, USA

tel: +1 (212) 573-5000,4778 cables: FORDFOUND NEWYORK

Dr. Thomas R. Buckman
President
The Foundation Center
(Information on foundation and corporate philanthropy)
79 Fifth Avenue, Department MC
New York, NY 1003?, USA
tel: +1 (212) 620-4230

Stephen J. Bass
Warren Weaver Fellow (Tropical Forestry)
The Rockefeller Foundation
1133 Avenue of the Americas
New York, NY 10036, USA
fax: (212) 764-3468
tel: +1 (212) 869-8500 cables: ROCKFOUND NEWYORK tlx: 224862 ROCKFEL (RCA)

Dr. Gary H. Toenniessen
Associate Director of Agricultural Sciences
The Rockefeller Foundation
1133 Avenue of the Americas
New York, NY 10036, USA
fax: (212) 764-3468
tel: +1 (212) 869-8500 cables: ROCKFOUND NEWYORK tlx: 224862 ROCKFEL (RCA)

William S. Moody
Rockefeller Brothers Fund
1290 Avenue of the Americas, suite 3450
New York, NY 10104, USA
tel: +1 (212) 373-4200

Dr. Daniel Katz
President, Kleinhans Fellowship for research in tropical agroforestry
The Rainforest Alliance
295 Madison Avenue, suite 1804
New York, NY 10017, USA
tel: +1 (212) 599-5060

World Neighbours, Inc.
5116 North Portland Avenue
Oklahoma City, Oklahoma 73112, USA
tel: +1 (405) ?

Jon M. Jensen
Senior Program Associate
The Pew Charitable Trusts
c/o The Glenmede Trust Company
229 South 18th Street
Philadelphia, Pennsylvania 19103, USA
tel: +1 (215) 875-3223

Jon M. Jensen
Senior Program Associate
The Pew Charitable Trusts

Suite 501
Three Parkway
Philadelphia, Pennsylvania 19102-1305, USA
tel: +1 (215) 568-3330 tlx: 990335

Dr. Michael W. Sands
Director, Agricultural Sciences
Rodale International
Rodale Institute
222 Main Street
Emmaus, Pennsylvania 18098, USA
tel: +1 (215) 967-5171,8405 tlx: 6502543217 MCI

Dr. Deborah Szekely
President
Inter-American Foundation (IAF)
1515 Wilson Boulevard
Rosslyn, Virginia 22209, USA
tel: +1 (703) 841-3800

Volunteers in Technical Assistance (VITA)
1815 North Lynn Street, Suite 200
P.O. Box 12438
Arlington, Virginia 22209-8438, USA
[VITA Publication Sales
80 South Early Street, Alexandria, VA 22304]
tel: +1 ( ) ?

The Director
Conservation International Foundation (CI)
Country Program Department
1015 18th Street, N.W., suite 1002
Washington, D.C. 20036, USA
tel: +1 (202) 429-5660

The Director
Council for International Development
(small enterprise development PVO)
2812 Woodland Drive, N.W.
Washington, D.C. 20008, USA
tel: +1 (202) ?

Dr. H. Jeffrey Leonard
The Fairfield Osborn Center for Economic Development
(Worldwide Fund for Nature and the Conservation Foundation)
1250 24th Street, N.W., 4th floor
Washington, D.C. 20037, USA
tel: +1 (202) 293-4800

Matthew Perl
Forestry Policy Grants
The Fairfield Osborn Center for Economic Development
(Worldwide Fund for Nature and the Conservation Foundation)
1250 24th Street, N.W., 4th floor
Washington, D.C. 20037, USA
tel: +1 (202) 293-4800

U.S. - Latin American Cooperative Science Programs
and Science in Developing Countries Program (SDC)
Division of International Programs, Room 1212
National Science Foundation
1800 G Street
Washington, D.C. 20550, USA
tel: +1 (202) 357-9563

Geoffrey S. Barnard
Vice President and Executive Director
Latin America Division, International Program
The Nature Conservancy
1815 North Lynn Street
Arlington, Virginia 22209, USA
tel: +1 (703) 841-5300 fax: (703) 841-1283 tlx: 510600 2960

Marvin Weissman
Executive Director
Pan American Development Foundation (PADF)
1889 F Street, N.W.
Washington, D.C. 20006, USA
tel: +1 (202) 458-3969 tlx: 64128

Mark Hathaway
Director
Natural Resources Program
Partners of the Americas
1424 K Street, N.W., suite 700
Washington, D.C. 20005, USA
tel: +1 (202) 628-3300

Dr. John E. Earhart
Senior Fellow for Forestry
World Wide Fund for Nature (WWF-US)
c/o The Conservation Foundation
1255 Twenty-Third Street, N.W.
Washington, D.C. 20037, USA
tel: +1 (202) 293-4800 tlx: 64505 PANDA

Jane MacKnight
Scholarships in Tropical Botany
World Wide Fund for Nature/Garden Club of America
World Wide Fund for Nature (WWF-US)
1250 Twenty-Fourth Street, N.W.
Washington, D.C. 20037, USA
tel: +1 (202) ?

Robert Winterbottom
Deputy Director
Natural Resource Assessments
WRI's Centre for International Development and Environment
1709 New York Avenue, N.W., 7th floor
Washington, D.C. 20006, USA
tel: +1 (202) 638-6300 fax: (202) 638-0036 tlx: 64414 WRIWASH

James Gustave Speth (President)
Dr. Peter T. Hazlewood (Senior Associate, Tropical Forests Project)

Dr. Kenton R. Miller (Program Director, Forests and Biodiversity)
World Resources Institute (WRI)
1709 New York Avenue, N.W.
Washington, D.C. 20006, USA
tel: +1 (202) 638-6300 fax: (202) 638-0036 tlx: 904059 WSH USA