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Forestry/Fuelwood Research and Development (F/FRED) Project

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INTRODUCTION

This interim progress report focuses on two aspects of the F/FRED Project that have particularly evolved during the reporting period: the practice of holding National Organizing Meetings in each participating country, and the project's activities in the social sciences. A comprehensive report detailing overall project progress will be prepared in September 1988.

The plan for the National Organizing Meetings (NOMs) developed in the spring of 1987, with the aim of clarifying and developing national research objectives and plans in each country, as well as selecting national representatives to the F/FRED Research Committee. With a forum for developing research priorities for each country participating in F/FRED, the task of coordinating regional research becomes much more feasible. Both on the national and regional levels, the NOM process acts as a tool for network development.

F/FRED's activities in the social sciences have advanced toward a full integration with activities in the biophysical sciences. At the same time, the project is enhancing institutional and national research capabilities, and leading regional research into the development of standard methods to facilitate intraregional analyses of socioeconomic and institutional patterns regarding the adoption and improvement of MPTS management practices.

Together, these activities illustrate the network development and research planning and support roles of the F/FRED Project. For a complete discussion of project workplans and scope of activities, please refer to the F/FRED-Asia Progress Report, September 1987.

PROGRESS OF F/FRED ACTIVITIES IN THE SOCIAL SCIENCES

1.0 Introduction

An important element of the Forestry/Fuelwood Research and Development (F/FRED) Project is the development of a single research network of foresters, agriculturalists, and social scientists¹ for the purpose of improving the condition of the small farmer in Asia. A single research network allows relevant results of social science research to be directly applied to the improvement and development of multipurpose trees.

1.1 Social Scientists as Advocates for the Small Farmer

Social scientists working in rural development tend to have at least two principal roles. The first, and more common, is to analyze social processes and institutions affecting development (e.g., land tenure, markets, bureaucracy). The second role -- more valuable to the process of development -- is to diagnose social and economic conditions that assist or hinder change. In this role the social scientist works with experts in other disciplines to identify feasible interventions and means to implement desired changes.

The F/FRED project facilitates social scientists involved in forestry-related research in taking on this second task. F/FRED offers social scientists the opportunity to explain to officials and scientists in other disciplines the conditions, needs, opportunities, and constraints faced by the designated beneficiaries of MPTS research -- the rural poor. In this sense, the applied social scientists act as advocates for the rural poor, assuring that their concerns and circumstances are properly considered by forestry researchers, policy makers, and program managers.

To be effective in this role, the social scientists must present these concerns in terms that scientists in other fields understand. To this end, F/FRED fosters the development of improved communication between the social and biological sciences. This effort includes increased information exchange among scientists within the MPTS Research Network, and integration of MPTS information from both fields in the project's Information and Decision Support System (IADSS).

¹For the purposes of this discussion, "social sciences" include anthropology, economics (in particular agricultural, forest, and natural resource economics), and sociology (rural and development sociology).

The opportunity for interdisciplinary communication should not be underestimated. Many researchers in forestry and agriculture mistake poor communication across disciplinary borders for a lack of applicable research in related fields of social science. Increased communication can remove this misconception and fill important gaps of knowledge.

For example, foresters often cite the use of shifting cultivation practiced by forest-dwelling peoples as the cause of extensive forest degradation. Yet findings from a considerable body of social science research show that illegal logging practices and encroachment by settled agriculture both figure more prominently in the destruction of forests than shifting cultivators, who depend on a regenerating forest for their livelihood.

To bring these and other relevant findings to the attention of other scientists and officials through various network forums is the task and challenge that F/FRED offers to social scientists. Foresters and agriculturalists can use knowledge of socioeconomic patterns and the consequences of research to target their research efforts most effectively for farmers' adoption of results. Policy makers and project managers need to know conditions that can make for successful implementation programs.

1.2 Social Sciences in Agricultural Research

A few examples from the recent history of social science activity in agricultural development point to areas where they may make similar contributions to forestry development.

- o Economists studying traditional farm practices found them cost-effective, given constraints faced by poor farmers. They provided the recognition that modifications of traditional practices, not overhauls of the traditional system, offer the only effective means for changes in farm management.
- o Applied anthropologists discovered that local culture and rituals have a great influence on people's preferences for certain species and varieties of crops, timing of farm tasks, and other aspects of farming. Measures for agricultural change must take these into account.
- o Sociology research showed that larger landholders benefited more from the green revolution than small-holders and tenants who could not afford the improved technologies. This understanding led to a shift in research to develop other technologies targeted to this group.

Involvement of social scientists in the orientation of forestry research can result in a better awareness of research goals than that of a conventional research program, in which maximum

productivity is the prime goal. This conventional focus may overlook many critical social and political consequences, as recent articles have observed with reference to agricultural research in the United States. In the U.S., agricultural research traditionally has focussed almost exclusively on increasing productivity and economies of scale. The resulting technologies have reduced the ability of the small farmer household to compete with large corporate farms. Had research programs accounted for economic and social factors, the technologies developed may have had different consequences.

1.3 Existing Capability for Social Science Activity in MPTS Research in Asia

The number and capability of applied social scientists working on issues related to farm and village forestry varies considerably among the countries in the F/FRED-sponsored MPTS Research Network. The Philippines, with its strong tradition of applied social science research, has brought the greatest number of social scientists into F/FRED activities. Thailand follows closely, both in number and capability of its researchers. Nepal has few applied social scientists, but they rank among the most competent in the region. In almost all of these countries, social scientists have a broad interest in natural resource issues, with forestry only one of their areas of expertise.

India approaches the Philippines in number of social scientists working on forestry and natural resource issues, although they are proportionately fewer. Bangladesh, Indonesia, Pakistan, and Sri Lanka have only a few social scientists working the field. Burma, Malaysia, and Taiwan have a very few indeed.

F/FRED's activities in involving social scientists in the MPTS Research Network activities reflect this distribution. Most activities to date have taken place in Nepal, Philippines, and Thailand. A second tier of effort includes Indonesia, Malaysia, Bangladesh, and Pakistan. Significant Indian and Sri Lankan involvement in F/FRED social science activities began with a regional workshop held in Nepal in April 1988.

1.4 Strategy for Developing Research Capabilities

The nature and extent of F/FRED's involvement in the social sciences will continue to reflect and build on the existing capacity for applied social science research in each country. The F/FRED Project aims to improve the regional capability for research by coordinated improvement of national and institutional research capabilities. These capabilities develop through training and research support activities, and through networking with other scientists.

In the Philippines, Thailand, India, and Nepal, major network activities support collaborative research across national borders, interdisciplinary research and training, policy-oriented studies, and development of standardized methods for comparative research. This allows biological scientists easy access to relevant social and economic information and publications. F/FRED workshops and seminars help facilitate this exchange.

F/FRED plans particular efforts in Bangladesh, Indonesia, Malaysia, and Sri Lanka to develop capacities through training and the provision of small research grants.

2.0 Network Development

A major project activity has been to identify applied social scientists working in the field of forestry issues in the region, and involving them in National MPTS Organizing Meetings and other network activities. The results of this effort have shown themselves in both the increased representation of social scientists on the network's Steering and Research Committees, and in discussions at the workshop to inaugurate network activity in the arid and semiarid environmental zone held in Karachi, Pakistan, November 16-19, 1987.

At the Karachi workshop, papers concerned with social and economic aspects of MPTS research made up a significant proportion of those presented. In discussions of a set of network field experiments, participants expressed increased interest in making the trials relevant to small farmers, and eventually conducting network trials in farmers' fields.

The process of identifying and involving regional social scientists culminated in the workshop held in Kathmandu, Nepal, April 24-29, 1988. At this workshop, nearly 60 economists, anthropologists, sociologists, and foresters from Asia and other research organizations worldwide mapped out a collaborative program of research, with a short-list of topics to be studied using a common methodology throughout the region.

2.1 Integrating Disciplines in the Network Structure

The MPTS Research Network is guided in its sponsorship of regional research by the MPTS Research Committee. The Research Committee structure, as revised and approved by the Steering Committee, ensures that one-third of its members are social scientists from different countries in the region.

Representatives to the Research Committee meeting in Malaysia, April 4-9, 1988, presented the results of discussions in the National MPTS Organizing meetings. Of particular interest were the national research priority topics related. Among the topics, most countries listed marketing studies and studies to study

indigenous species already used by farmers as areas where research is needed. This recognition of the importance of socioeconomic studies -- in spite of the disappointing attendance of social scientists at a number of the NOMs -- is a good indication that interdisciplinary collaboration is a research goal desired by network participants.

2.2 Theme Meetings

F/FRED co-sponsors workshops for the exchange of information and research results concerning the improvement and use of MPTS among researchers in the region. The first such workshop, entitled Multipurpose Tree Species for Small Farm Use, took place in Pattaya, Thailand, November 2-5, 1987. F/FRED co-sponsored the Pattaya workshop with the Food and Agriculture Organization (FAO) and the International Development Research Centre (IDRC). Many of the papers presented at this workshop related closely to social and economic issues. Publication of the proceedings of this workshop is scheduled for later in the spring of 1988.

Planning has begun for a second theme workshop to be held in January 1989. The subject will be Orienting MPTS Research to Small Farm Needs, and is expected to include discussions in the following areas:

- o defining end uses of MPTS on small farms
- o evaluating the market potential for MPTS products
- o orienting MPTS research to small farms needs
- o determining extension and implementation needs

3.0 Training

Training programs create a pool of expertise in specific subject areas. The considerable scope and quality of work in the agricultural social sciences throughout Asia reflects the extensive graduate fellowship programs of A/D/C, IDRC, and the Ford and Rockefeller foundations over the past 30 to 40 years. Similar programs, along with programs for short-term training, can help develop the capacity for social science research in forestry.

3.1 Ph.D. Fellowships

In conjunction with the Department of Forestry at Michigan State University, the F/FRED Coordinating Unit has selected six candidates for Ph.D. study at MSU. This regionwide selection process screened over 100 applicants. As shown in Table 1, three of the six F/FRED fellows have specialties in the social sciences. The Michigan State program is intended to develop integrated researchers accustomed to interdisciplinary collaboration. Because the research and dissertation write-up

will take place in each fellow's home country, their research should be applicable to the regional research goals of F/FRED.

Table 1. F/FRED fellows selected to study at Michigan State University.

<u>Name</u>	<u>Institution</u>	<u>Field of Study</u>
Y.M. Wickramasinghe Economics	Maha Illuppallama Agricultural Research Station, Sri Lanka	Agricultural
T.M. Kibriaul Khaleque	Dhaka University, Bangladesh	Anthropology
Vitoon Virayasakultorn	Thailand	Rural Sociology
Madhav Karki	Institute of Forestry, Nepal	Forestry
Ernesto Guiang	Philippines	Agroforestry
Lilian Gadrinab	BIOTROP, Indonesia	Forestry
<u>Alternates:</u>		
Keshav Kanel	Department of Forest, Nepal	Forest Economics
Laxman Kunnal Economics	University of Agricultural Sciences, Dharwad India	Agricultural
Rodel Lasco	UPLB, Philippines	Silviculture
Kanit Muangnil	Forest Industry Organization, Thailand	Forest Management

3.2 Short-Term Training

Short-term training courses have been developed to integrate social science studies with forestry. Cesar Nuevo of the Institute of Forest Conservation, University of the Philippines at Los Banos (UPLB), has worked with F/FRED to develop the

curricula for two courses to be given in June. One course will present issues of social science research to foresters, while the other will acquaint social scientists with forestry methods and systems. The Coordinating Unit solicited names of candidates to participate in these courses from each network institution, and will select least 15 candidates to attend each course.

F/FRED also has co-sponsored short courses in the social sciences. With Kasetsart University, USAID/Thailand, and the United Nations Environment Program (UNEP), F/FRED co-sponsored a national-level training course on Economic Valuation of Watershed Management Projects. This training took place in Thailand in March 1987, and included mid-level foresters and others working on forestry and conservation programs in major watershed areas.

In December 1987, F/FRED co-sponsored, with the Ford Foundation and IDRC, a workshop in the Philippines on Maintaining Upland Development. Mid- to high-level officials and university faculty working on village forest management, community forestry programs, and other upland development activities attended the policy-oriented workshop.

A course on Forestry Research Management, to be given late July 1988 at the Forest Research Institute of Malaysia, also is planned to promote interdisciplinary research.

3.3 Curriculum Development

Development of a regional, interdisciplinary network of researchers depends on adequate national support for interdisciplinary research. The attitudes of schools of forestry, research institutes, and government forestry departments determine, in large measure, this support. Achieving an openness in these organizations to the role of social scientists within their own staffs and in collaborative efforts with other organizations can come through strengthening social science components of forestry education, encouraging interdepartmental programs, and familiarizing forestry officials and researchers with social science methods and objectives.

Plans have been finalized for F/FRED to sponsor a curriculum development activity, culminating in a workshop late in 1988, to survey the curriculum needs of forestry education institutions throughout Asia and propose ways in which they might be strengthened by incorporating consideration of social science aspects/factors. Under a subcontract with Yale University (which will draw on expertise from the University of California at Berkeley), a team of experts will visit each participating institution to gain insights on perceived needs in curriculum strengthening. This activity will start with participation of the team in a meeting coordinated by the FAO regional forester in Bangkok. The meeting, scheduled to take place in June 1988, will

bring together the heads of forestry education institutions to discuss curriculum issues. F/FRED will provide travel funds for several of the deans of forestry attending this meeting.

4.0 Research Support

In addition to creating a "critical mass" of applied forest social scientists, F/FRED aims to address the considerable need of material and financial support for research. Social researchers throughout Asia, including those with a more developed core of scientists, are constrained from conducting independent research on farm forestry by a lack of resources.

4.1 Case Studies Associated with the 1987 Network Trials

The F/FRED regional research agenda includes a program for small grants. A number of such grants have already been administered to support studies in the social sciences. Five social science case studies -- on farmer access to, management, and use of MPTS -- were commissioned in the fall of 1987 to be conducted in conjunction with the 1987 network trials. Two deal with MPTS in Thailand, while one each focus on farmers' use of MPTS in Philippines, Malaysia, and Indonesia. F/FRED will provide the information from these studies to the network field trial cooperators to help them orient research toward end-products and systems of management of interest to farmers. Having the studies center on the same issues over different countries encourages the standardization of methods for comparability across national borders. The Coordinating Unit expects to receive drafts of these studies between May and August 1988.

The second Thai study will identify major social and economic factors affecting the use of trees by poor villagers in three regions of the country where network trials are being conducted. This report, a draft of which is to be submitted to the Coordinating Unit in May 1988, will be useful in planning the introduction of improved species into small farm practices.

A further small grant has been made to complement an FAO grant to study homestead forestry in Bangladesh.

4.2 Case Studies Associated with the 1988 Arid and Semiarid Network Trials

F/FRED plans for a set of case studies similar to those undertaken in association with the 1987 network trials to take place in the countries involved in the 1988 arid and semiarid network trials. The scientists conducting this set of studies will be asked to develop a common methodology to allow for even greater regional analysis than previous studies.

4.3 F/FRED Small Research Grants

At the April 1988 Research Committee meeting, a committee working group planned for the solicitation, management, and selection of small research grants. (For a full discussion of the grant process, see the report of the Research and Steering Committee meeting.) Based on the presentations of national research priorities, the Research Committee developed a list of priorities for the provision of small grants in the social and biological sciences. The Committee agreed that grants should be distributed between the two discipline areas such that successful proposals from each receive no less than 25% of the grant funds. Table 2 shows these priority areas for the social sciences.

4.4 Potential Social and Economic Impacts of Biotechnologies

In conjunction with four F/FRED-sponsored studies on the feasibility of MPTS biotechnologies, consultants have conducted two studies to assess the potential social and economic impacts of the improvement of multipurpose trees through biotechnological means. The techniques studies are tissue culture, mycorrhizae, Rhizobium, and the use of gums and other tree exudates. Those techniques found to have the most promise for small farmers will receive focus. The consultants, from the Philippines and Thailand, conducted field visits in those two countries and Nepal in January-February 1988. Draft reports are due in the spring 1988.

Table 2. Social and economic topics to receive priority consideration for F/FRED small research grants, determined by the Research Committee, April, 1988.

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1. Use of MPTS within indigenous forest and land management systems
 2. Local institutions, beliefs, and customs affecting production and use of MPTS by small-scale farmers
 3. Opportunity costs for small farm use of MPTS
 4. Comparison of social forestry programs
 5. Potential demand for MPTS products produced by small farmers
 6. Financial analysis of MPTS cultivation
 7. Adoptability of MPTS by small-scale farmers
 8. Infrastructure and organization required for promotion of MPTS use
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4.5 Development of Common Experimental Design and Methodologies for Collaborative Social Science Research

At the meeting in Kathmandu, held in late April, 1988, social scientists and foresters from throughout Asia mapped a collaborative, comparative research program on a short-list of topics determined to be most valuable to forestry researchers and program implementors. Of these topics, two emerged as most important for collaboration: 1) existing and potential tree/farm forestry/land use systems; and 2) markets, labor, and unemployment issues. Follow-up activities include: preliminary research on the primary topics by two to four consultants; small meetings to design, in detail, collaborative methods; and contact with other donors to support this research.

This collaborative plan, to receive additional funding and coordinative support from donors such as IDRC, the Ford Foundation, and the Agricultural Productivity Organization (APO) of Japan, provides F/FRED with a basis for substantial, coordinated social science research support. It also provides a foundation for greater cooperation between social and biological scientists in research. A report on the Kathmandu workshop is planned for distribution in the summer of 1988.

4.6 Definition and Design of Minimum Socioeconomic Data Set

At the Kathmandu workshop in late April 1988, researchers discussed the definition and design of a minimum set of socioeconomic factors affecting farm and village forestry to be studied for inclusion in the farm and village forestry database of the Information and Decision Support System (IADSS). The database would provide socioeconomic analyses of the recorded data, and would be able to link with growth and yield data stored in the experiment database for use in integrated analyses of MPTS for small-farm use. The Coordinating Unit will plan small follow-up meetings to yield details of the data set elements.

4.7 Collaboration with CATIE

In connection with the development of the farm and village forestry database and the related socioeconomic database, F/FRED plans to sponsor a socioeconomic information specialist at the Tropical Agronomic Center for Research and Education (CATIE). This person, selected by CATIE, should, in addition to helping in the development of the database, serve as a link in F/FRED's global coordination activities. This coordination also has included the International Council for Research on Agroforestry (ICRAF) and the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Australia.

5.0 Publications

As noted above, communication of results across disciplinary boundaries is necessary for creating an interdisciplinary awareness of MPTS problems. All F/FRED-supported case studies and regional studies will be published and distributed to all network participants as part of the F/FRED Research Series. Some may appear in the project newsletter, Farm Forestry News. As part of its regional collaboration effort, F/FRED has funded editorial services needed to compile the proceedings of an FAO-sponsored workshop on Extension for Community Forestry in Asia.

The Coordinating Unit plans to distribute a summary report of the workshop on collaborative social science research to network participants in May or June, 1988.

6.0 Conclusion

The institutions and countries participating in the MPTS Research Network have varying levels of capability in social science research. F/FRED aims to enhance these capabilities in the area of MPTS research through its program of Ph.D. fellowships and short-term training courses -- including courses on social science concepts for foresters and forestry for social scientists -- and through programs of small research grants. A program of collaborative research, focussing on a few issues important to foresters and program implementors as well as social scientists, will enhance the capability of the region as a whole to perform farm forestry-related social science research.

The project also seeks to improve interdisciplinary collaboration and communication between social and biological scientists. This is taking place through integration of social scientists into the committee structure and activities of the MPTS Research Network, presentation and discussion of socioeconomic issues at network workshops and meetings, and publication and distribution of relevant findings in social science research -- such as case studies conducted in association with F/FRED network trials -- to network participants in forestry and agriculture. The development of an Information and Decision Support System for producing integrated analyses of MPTS systems also is providing a basis for interdisciplinary communication among researchers within the region and globally.

REPORT OF THE FIRST NATIONAL MPTS ORGANIZING MEETINGS

1.0 Introduction

The plan for holding National Multipurpose Tree Species (MPTS) Organizing Meetings in each of the countries in Asia participating in F/FRED came about in the spring of 1987. The plan, unanticipated in the project design, arose in the course of the project to respond to the need for further networking activities on the national level. The NOMs, organized entirely by the participating scientists, have fulfilled a need for interdisciplinary national forums on MPTS, and have already grown beyond the agendas envisioned for them in the plan.

At the same time, the organizing meetings provide the basis for a more effective F/FRED Research Committee structure. The initial network framework, prepared in September 1986, established a Research Committee consisting of scientists from member institutions. The members of the Research Committee were appointed by the Steering Committee. The F/FRED Coordinating Unit and the Chairman of the Steering Committee agreed, however, that the important role of the Research Committee in determining network activities called for a less arbitrary selection procedure. The revised framework allows scientists in each of the participating countries to choose their own representatives to the Research Committee and provides a channel of communication for their representation, through the mechanism of the National MPTS Organizing Meetings (NOMs).

2.0 Objectives

In addition to serving as a mechanism for selecting Research Committee representatives, the NOMs are designed to:

- o provide a forum for the exchange of information and views among scientists working on network-related research
- o develop a national research agenda of network-related topics to be presented by their representative to the Research Committee

("Network-related research" here means research dealing with the use of the F/FRED priority species on small farms, and with the social and economic conditions affecting small farm use of MPTS.)

An objective of future organizing meetings will be to provide a forum for Research Committee members to report on network activities to their national colleagues, and to solicit research ideas for future consideration by the Research Committee. In this respect the NOMs function as a two-way channel for coordinating national and regional MPTS research agendas.

3.0 Meeting Preparation

The F/FRED Coordinating Unit contacted scientists and administrators in each participating country and asked them to serve as coordinators for the organizing meeting in their country. Future NOMs are to be organized by those representatives selected to serve on the Research Committee.

Under the provisions of a professional service agreement (PSA), the Coordinating Unit in Bangkok provided funds for each meeting's expenses and for participant travel. Meeting coordinators were required to fulfill the tasks specified in the PSA's terms of reference. In addition to conducting the meeting for the stated objectives, the coordinators were required to submit the names of the selected representatives, the prioritized research agenda developed, the meeting agenda, a list of participants, and copies of any papers presented at the meeting. Table 1 lists each country's meeting coordinators and meeting dates.

4.0 Results

The first NOMs have successfully taken place in seven of the ten participating countries, with an eighth to take place in India in July 1988. The meetings accomplished the principal objectives set out for them. In all cases, the meetings met with a good reception from the participants, who expressed the strong desire that additional meetings of this type be held in the future. A general consensus held that the meetings should take place once a year.

A list of representatives selected to serve for one year on the F/FRED Research Committee appears in Table 2. The process of selection varied according to country. In Indonesia, Philippines, and Taiwan, the process involved open nominations and ballots. In Malaysia and Pakistan, senior officials selected the representatives after open discussion. In Thailand, the selection took place during a meeting of the National Research Council's Committee on Multipurpose Tree Species.

The meetings provided an effective and efficient means for members of the F/FRED Coordinating Unit to meet with many scientists, and to disseminate information about the F/FRED project. Each meeting's agenda included a presentation by one member of the Coordinating Unit of the F/FRED project and its scope of activities. As a result, the project staff made many new contacts with scientists interested in becoming more actively involved in F/FRED activities.

Table 1. National MPTS Organizing Meeting schedule and coordinators.

<u>Country</u>	<u>Dates</u>	<u>Coordinator Name and Affiliation</u>
India	July 4-7, 1988	Mr. Narayan G. Hegde Bharatiya Agro-Industries Foundation
Indonesia	Dec. 3-4, 1987	Mr. Komar Soemarna Forest Research and Development Center
Malaysia	Dec. 14-15, 1987	Dr. Frances Ng Forest Research Institute of Malaysia
Nepal	Jan. 20-21, 1988	Mr. Ek Raj Sharma Forestry Survey & Research Office Department of Forests
Pakistan	Nov. 11-12, 1987	Mr. M.I. Sheikh Pakistan Forest Institute
Philippines	Oct. 1-2, 1987	Mrs. Aida B. Lapis Ecosystems Research and Development Bureau
Taiwan	Oct. 21, 1987	Dr. Ta-Wei Hu Department of Forestry Chinese Cultural University
Thailand	Nov. 8-9, 1987	Dr. Suree Bhumibhamon Faculty of Forestry Kasetsart University

5.0 Meeting of the Steering and Research Committees

At the April 4-9, 1988 joint meeting of the Steering and Research Committees held in Kuching, Malaysia each of the national representatives reported on the NOM held in their country (see appendices). For the Philippines, this included a copy of the complete proceedings, with papers presented. The report for Malaysia supplies a comprehensive overview of the status of research on the F/FRED priority species in addition to outlining research gaps (see appendix II). In a plenary session, country representatives outlined the research topics discussed at the meetings. The presentations fueled discussion of network priorities on the regional level, and helped to form the basis of plans developed by the Research Committee's working groups later in the week.

Table 2. Representatives selected at the National MPTS Organizing Meetings to serve on the F/FRED Research Committee.

<u>Country</u>	<u>Representative(s) and Affiliation</u>	<u>Discipline</u>
India	Narayan Hegde Bharatiya Agro-Industries Foundation (BAIF)	Agronomy
Indonesia	Komar Soemarna Forest Research and Development Centre	Forestry
Malaysia	Kamis Awang Universiti Pertanian Malaysia	Forestry
	Woon Wang Chuen Forest Research Institute of Malaysia	Forest Economics
Nepal	Ek Raj Sharma Forest Survey and Research Office	Forestry
	Kailash Pyakuryal Institute of Agricultural and Animal Science	Rural Sociology
Pakistan	K.M. Siddiqui Pakistan Forest Institute	Forestry
	Saliheen Khan Pakistan Forest Institute	Natural Resource Economics
Philippines	Roberto Dalmacio University of the Philippines at Los Banos	Forestry
	Cerenilla Cruz University of the Philippines at Los Banos	Economics
Taiwan	Ta-Wei Hu Chinese Cultural University	Forestry
Thailand	Suree Bhumibhamon Kasetsart University	Forestry
	Yongyuth Chalamwong Kasetsart University	Economics

The Chairman of the Steering Committee, Dr. Salleh Mohd. Nor, noted with appreciation the Research Committee's increased representation of social scientists and the greater potential for interdisciplinary collaboration in network activities.

In its discussions, the Steering Committee reviewed the NOM process and the revisions to the network framework proposed in the spring of 1987, and endorsed both. The committee felt the NOMs were useful mechanisms for encouraging national-level networking, and planned for their continuation. The committee's report stressed the effectiveness of the "bottoms-up" approach to regional planning represented by the NOM process, in which regional planners build on agendas developed by their colleagues in national forums.

The Steering Committee recommended that an added responsibility of the NOMs be the preparation and publication of compendiums on the status of MPTS research in each participating country. This recommendation will be taken up by NOM coordinators.

6.0 Conclusions

The national meetings that have taken place distinguish themselves from other networking meetings in two important ways: 1) they were managed entirely by scientists in the region, and 2) they grew to address issues beyond their originally intended scope.

The responsibility for planning, organizing and staging the meetings rested entirely with the Asian coordinators. Asian scientists planned, organized and staged the meetings with a great deal of interest and a minimum of external inputs -- indicators of network success and sustainability. Interest in the Philippines meeting ran high enough to warrant the production of a complete proceedings, including papers presented. Demand for this proceedings quickly exhausted the supply.

The second distinguishing feature of the meetings is that, in addition to achieving the planned objectives, they addressed topics beyond the scope of the original agenda. Participants at the Malaysia meeting, for example, created an ad hoc committee to study the establishment of a permanent MPTS Research Committee for Malaysia. This extension by participants of the meeting forum to address additional topics encourages extended network activities.

The Coordinating Unit was disappointed, however, that there was not a more significant social science component at some of the meetings. (See the first part of this report, describing the social science component of the project, for an overview of the distribution of social scientists working in MPTS issues, by country.) In general, most representatives from the social

sciences were economists. While recognizing the limited number of social scientists in the region working in the field of MPTS research, F/FRED will continue to encourage more social science participation in future organizing meetings. It is clear from the priority research topics put forward by meeting participants that MPTS researchers consider social science research and interdisciplinary collaboration is a desirable goal.

Future meetings will result in more clearly defined and prioritized national research priorities, and in plans for their implementation. Development of such agendas demands more consideration than the first two- to three-day meetings allowed. Such planning also demands an established forum and a common base on which participants can build, which the first series of National Organizing Meetings created.

APPENDICES

SUMMARY OF NATIONAL MPTS ORGANIZING MEETING FOR INDONESIA

1. Introduction

The National MPTS Organizing Meeting for Indonesia was held 3-4 December, 1987 in Serpong, Jakarta. It was sponsored by the F/FRED Project, and organized by Dr. Setyati Sastrapradia, Bioteknologi Research and Development Institute, and Komar Soemarna, Forestry Research and Development Centre.

2. Participants

The meeting was attended by around 25 researchers and government officials from the Forestry Faculty of IPB Bogor, research institutions under the Agency for Agricultural Research and Development, Institute for Research and Development of Biology, the Institute for Bioteknologi Research and Development, Forestry State Enterprise, and the Forest Research and Development Centre.

3. Topics Discussed

The following topics were discussed.

- a. Idea and definition of MPTS for rural community
- b. Research and activities involving MPTS conducted by each institution
- c. Response and suggestions regarding F/FRED MPTS priority species Acacia mangium, A. auriculiformis and Leucaena species
- d. Listing the suggested MPTS of interest

4. Results

- a. Included in the definition of MPTS for the rural community should be that they meet the need of the people or farmers. This comes in view of the fact that most of the farmers in densely populated areas, such as Java, own a small piece of land. Therefore, the "multiple use" of various products of the tree species should be in the form of fruits, fodder, vegetable, medicinal purposes, timber, or fuelwood, or at least the combination of three to four of these, besides their intangible benefits, such as hydro-otological and environmental impact.

- b. Almost all of the participants are involved in work on MPTS, depending on local needs. The Forestry State Enterprise study MPTS in the program of prosperity approach, as well as in the social forestry program conducted through cooperation with USAID.
- c. The *Leucaena* species were accepted by the participants, but some of them could not fully accept that *A. mangium* and *A. auriculiformis* genotypes as priority MPTS for the small farmers, although both species have been introduced and planted by the farmers in certain areas.
- d. More than 30 species have been listed as MPTS, based on their various products. The complete list of the MPTS has been reported to Winrock International. It includes *Leucaena leucocephala*, *Vamanea vaman*, *Verbania grandifolia*, *Tamarindus indicus*, Bamboos, *Albizia falcataria*, *Gliricidia sepium*, *Azadirachta indica*, *Calliandra calothyrsus* and fruit trees, such as *Artocarpus indica*, *Parkia* spp. and *Arenca* spp.
- e. MPTS research and development networking between institutions within Indonesia, as well as between countries within the region, has benefitted all participants.

STATUS OF MULTIPURPOSE TREE SPECIES (MPTS) RESEARCH IN MALAYSIA¹

K. Awang

Abstract

The first part of this paper attempts to highlight some aspects of MPTS research that need greater attention. These include MPTS for fuelwood, vegetable, and fodder production, natural products development, and for urban, ornamental, recreational, and amenity uses. The second part reviews the current research status of the F/FRED species: A. mangium, A. auriculiformis, and Leucaena leucocephala, and identifies gaps for future consideration.

Introduction

Multipurpose tree species (MPTS) is a term usually used to designate any tree species that is deliberately grown at one site and time to produce more than one product or benefit. It also includes those species which are grown for different purposes on different sites. While this immediately identifies a myriad of species with varying research status, one can generalize that the majority of MPTS have not received sufficient research attention. This is true even for the species more commonly planted in land-use systems like Parkia speciosa and Acacia mangium. The exceptions are the few species, like rubber, oil palm and cocoa, that have now become important industrial crops.

The first part of this paper highlights some aspects of MPTS research that require greater attention. This information is drawn mostly from the materials presented at the First National MPTS Seminar held December 14-15, 1987, at the Forest Research Institute of Malaysia (FRIM). Research on general forestry and industrial agricultural crops per se are intentionally excluded. The focus is on those that would benefit to society in general, small farmers, or small industries who may use MPTS in various land-use systems. The second part of the paper reviews the current research status of Acacia mangium, A. auriculiformis, and Leucaena leucocephala, and identifies gaps for future consideration.

¹Presented at F/FRED-Winrock International MPTS Research Committee Meeting, April 4-8, 1988, at Kuching, Sarawak, Malaysia.

SOME ASPECTS OF GENERAL MPTS RESEARCH

1. Fuelwood Production

In the rural areas of Malaysia, there are still many industries that use wood as the principal source of energy. According to Hoi (1987), these include:

- o smoking of rubber sheets
- o tobacco curing
- o pottery, tiles, and brick-making
- o wood charcoal production
- o kiln-drying of timber
- o production of dried shrimps and fish
- o production of noodles, palm sugar, and other food products

These account for nearly 95% of the total wood fuel consumption in the country. Overall, wood only contributes 10% of the total energy requirement of the nation (Mohd. Jalaluddin 1986).

Almost 90% of the wood used in these industries comes from rubber and mangrove species. Other minor sources include Melaleuca cajuputi, Avicennia spp., Exoecaria sp., and sawmill off-cuts of various species. But wood from rubber and mangrove species is becoming less available due to higher demands for other uses. For example, the use of rubberwood as fuelwood dropped drastically from 92% in 1984 to 19% in 1987 (Mohamad Lokmal 1987). On the other hand, production of sawn timber, furniture, and chipboards from rubberwood increased tremendously from 4.6% in 1984 to 91% in 1987. Similarly for mangrove, higher demand in the construction industry is reducing its availability for fuel. Thus, alternative sources or species are required to meet future fuelwood demand.

The following criteria have been suggested in the selection of fuelwood species (Hoi 1987, Mohd. Lokmal 1987).

- 1) adaptability to a wide range of sites and soils
- 2) fast growth, yielding maximum volume in a short time
- 3) coppicing ability after harvesting
- 4) seed readily available at low cost
- 5) denser wood for sustaining a longer period of burning
- 6) ease of handling, with as few thorns as possible
- 7) low ash and sulphur content

Species considered to have potential include: Acacia auriculiformis, A. mangium, Casuarina equisetifolia, Eucalyptus deglupta, Gmelina arborea, Leucaena leucocephala, and Paraserianthes falcataria. Research on these species has been associated with plantations for timber production. Even so, the efforts to date can be described as dismal. For fuelwood

production, the situation is even more desperate. Absolutely no planned research with this objective has been conducted.

2. Rehabilitation of Tin Mining Areas

The tin mining industry has been an important force in Malaysian economic development. Tin mining practices have left large tracts of land barren, amounting to up to 2% of the land area of peninsular Malaysia (Ang 1987). A number of scattered efforts have attempted to rehabilitate the resulting degraded land, including settlement, recreational uses, and agricultural plantation of vegetables and fruit trees such as guava and starfruit. Reclamation for agricultural production requires costly inputs of organic matter and fertilizer. Studies should explore the potential of MPTS production as an economic alternative for this purpose.

Mitchell (1957) reported several promising species for this purpose after three years of experiments, including: Acacia auriculiformis, Fagraea crenolata, Paraserianthes falcataria, Eucalyptus deglupta, Fagraea fragrans, Pinus caribaea and Melaleuca leucadendron. The most recent report of this trial, together with other species, is shown in Table 1 (Ang 1987). C. équisetifolia appears the most promising on sand, while F. crenolata does best on waterlogged slime.

Apart from these two studies on species performance, no other aspects or different species have been reported. From the beginning of 1988, however, the Universiti Pertanian Malaysia (UPM), with funding from the National Academy of Sciences (BOSTID), is exploring the feasibility of using fertilizers, mulching materials, inoculation of rhizobium and mycorrhizae in the establishment of A. mangium and A. auriculiformis on sand tailings. In addition, the F/FRED species and provenance trial plots at UPM are sited on a slime tailing.

3. Fruit Production

Based on increasing local demands, fruit cultivation has good prospects as an income-generating activity. Based on the present rate of population growth, it is estimated that local demand alone will reach a half million tons of fruit by the year 2000.

Malaysia possesses over 100 indigenous and introduced fruit species (Lamb 1987, Zainal Abidin et al. 1987), of which 15 have shown potential for large-scale production. Over 60 species are considered minor fruit trees for their lesser economic potential. Many of these species also yield other products -- such as fuelwood, furniture material, medicines, and dyes -- that add to their economic potential for a small farmer. They may also act as environmental stabilizers (Table 2). Table 3 shows useful processed products produced by some of these species.

Areas worthy of consideration in fruit research are species selection and breeding, agronomic trials, pest and disease control, and orchard management systems (Hassan 1987, Lamb 1987, Zainal Abidin et al. 1987). Because a limited amount of land is suitable for fruit cultivation, orchard management research should be aimed towards integration with other land uses such as grazing, aquaculture, and beekeeping.

4. Trees for Vegetables and Fodder

Many vegetables in Malaysia are obtained from trees, in the form of young shoots, young fruits, or inflorescences (Ng 1987). Some of these species are grown primarily for fruit production (Garcinia atroviridis, Gnetum gnemon) or as ornamentals (Polyscias), yielding vegetables as a by-product. These species also could serve as a source for fodder production (Chen 1987). Production of trees for vegetables has received little scientific attention. Research so far has focused on the cultivation and yield of a few selected species: Leucaena leucocephala, Cajanus cajan, Gliricidia sepium, and Sesbania spp. (Chen 1987).

5. Trees As a Source of Natural Products

Research into various other natural products obtainable from trees has been limited. Many plants in Malaysia are reported to have medicinal uses, either in the form of crushed leaves, decoction, tonics, or boiled twigs (Latiff 1987). Recent phytochemical studies carried out by chemists (Abdul Razak et al. 1981, Goh 1985, Mawardi et al. 1985) show that these trees contain many kinds of natural products useful in pharmacy and pharmacology, such as alkaloids, saponins, and terpenoids.

Starch and sugar are two important products that can be exploited from palms. The starch of sago (Metroxylon sagu) is an important source of food for the rural and forest dwellers. Besides the sago palm of swampy forests, other non-swampy sago palms of potential, such as Arenca pinnata and Eugeissona utilis, can grow on steep slopes and grass-infested areas (Wee and Rao 1982).

Other products include natural dyes, tannins, resins, gums, fats, and oils. The source of almost all of these products has been the forest. Little or no research has studied their agronomic, silvicultural, or horticultural needs for cultivation, although Manurung (1987) has reported some success in the use of stem cuttings for vegetative propagation of S. macrophylla and S. splendida (illipe nuts).

6. Trees for Other Uses

There is tremendous potential for MPTS to be used for ornamental, urban, recreational, and amenity needs. Only a few species have been used extensively for these purposes. Species like A.

mangium, A. auriculiformis, Pterocarpus indicus, Samanea samon, Fragraea fragrans, and Eugenia spp. are commonly planted as roadside trees, in urban parks, on golf courses, in school compounds, and in residential areas.

Many of these have been planted on a trial-and-error basis, based on limited species information. Research per se to examine the various needs of these species for these purposes has received little attention, however.

RESEARCH ON F/FRED SPECIES

1. Acacia auriculiformis and A. mangium

Several species of Acacia, including A. auriculiformis, A. aulacocarpa, A. cincinnata, A. confusa, A. crassicarpa, A. holocericae, A. mangium, and A. richi have been introduced into Malaysia (Barnard and Beveridge 1957, Tham 1979, Selvaraj and Mohammad 1980, Nicholson 1965, Sim 1987). The introduction of A. auriculiformis first occurred in Peninsular Malaysia in 1931, and then into Sabah in 1953. Today the species exists as ornamental and avenue trees in many venues. It is reported to grow well on tin tailings (Ang 1987). Research has also shown that its wood is suitable for pulp (Philips et al. 1979), and its bark is a source of tannin (Abdul Razak et al. 1981).

A. mangium was first introduced into Sabah in 1966 as a firebreak species (Tham 1979), and then brought to Peninsular Malaysia in 1979 (Johari and Chin 1986). Now it has become one of the major industrial plantation species, as its timber is found to be suitable for general utility (Yong 1984) and pulpwood (Logan and Balodis 1982). In addition, it is also widely planted as an amenity tree.

In Malaysia, both of these species have a narrow genetic base (Sim 1984). To widen this genetic base, many new provenances were introduced in the early 1980's. Early assessment of these trials shows that provenances from Daintree and Claudie River in Queensland, and Iokwa and Toko in Papua-New Guinea, are the most promising in terms of height and diameter growth (Jaffirin and Low 1986). Similar trials have begun in Peninsular Malaysia.

The first hybrid between A. auriculiformis and A. mangium has attracted much attention because of its observed improved growth and other desirable characteristics. Controlled pollination, including self, intraspecific, and interspecific crosses between the two species and hybrid A. auriculiformis (Sim 1987). A Ph.D. project on a related subject is now underway at UPM.

Phenological studies have centered on A. mangium in various locations (Sim 1987, Yap 1988 personal communication). Early results from the study at Brumas, Sabah, indicate the following.

- 1) The species flowers early (10-24 months), depending on sites and individuals. With exposed and open canopy, it tends to flower within the first year and fruit more frequently.
- 2) The species can complete 2-3 seed crops in succession within one year, and flowering can extend over the whole year.
- 3) The time of flowering and other phases of development vary not only among different branches of the same tree.
- 4) The pod splits open soon after maturation, but the seeds are not released until the pod has dried.
- 5) The species has two major fruiting seasons: February to March and July to September. Seed production averages about 300 g per tree per year.

Bowen and Eusebio (1981) reported work on A. mangium seed collection, handling, and germination. They suggested that harvesting should start when most pods in the crown are dark brown to black in color. Drying pods at 45 degrees C, lasting an average of 24 hours (black pods) to 48 hours (green-brown pods) is recommended. Seed extraction is best achieved by tumbling the dried pods in a cement mixture for 10 to 15 minutes with blocks of hard timber. Maximum germination can be obtained by first dropping the seeds into 10 times their volume of boiling water for 30 seconds, and then plunging them into 20 times of cold water for 18 hours before sowing. They found that best germination occurred at 25 degrees C.

Some research has studied seedling production from seed, vegetative parts, and tissue culture. For potted seedlings, proper selection of potting medium and fertilizer regime are important cultural practices influencing the quality of seedlings produced. Work at UPM (Kamis and Mohd. Basri 1986, Kamis and Chai 1987) indicates that potting mixtures consisting of sand and peat in the ratio of 1:3 to 2:2, soil and peat in the ratio of 1:3, or sand and soil with the addition of commercial complete fertilizer, are most suitable. In a study to determine the possibility of producing bare-rooted seedlings, Kamis and De Chavez (1988) found that root wrenching and controlled watering were necessary pre-treatments for good survival. The combination of fortnightly root-wrenching and watering every six days was most effective.

Research in vegetative propagation in Sabah to date has included cuttings, grafting, marcotting, and budding (Sim 1987). Cuttings from seedlings less than one year old showed rooting success ranging from 14% to 30%, while those from coppice and one year old trees ranged from 0% to 31.7%. For cuttings taken from coppice, hormone powder seradix 3 gave the best result for soft and semi-hard cuttings. Similar studies are currently being

Table 1. The Growth performance of various tree species planted on tin tailing.

type of tin tailings (age in years)	Species	Diam. (cm/yr)	*MAI ht. (m/yr)	site
sand				
(7)	<i>Acacia aulocarpa</i>	0.85	0.64	FRIM
(2)	<i>Acacia auriculiformis</i>	0.78	1.0	FRIM
(3)	<i>Casuarina equisetifolia</i>	0.78	1.0	Mantin
(1)	<i>Pinus caribaea</i>	0.58	0.68	FRIM
(6)	<i>Pinus caribaea</i>	0.76	0.74	FRIM
(1)	<i>Pinus elloitti</i>	0.59	0.5	FRIM
sandy slime				
(3)	<i>Acacia auriculiformis</i>	1.24	0.8	Mantin
(2)	<i>Acacia auriculiformis</i>	0.62	0.84	FRIM
(5)	<i>Acacia richii</i>	1.02	0.68	Mantin
(3)	<i>Pinus caribaea</i>	1.22	1.0	Mantin
(5)	<i>Pinus merkusii</i>	0.87	0.98	Selayang
slime				
(6)	<i>Acacia auriculiformis</i>	0.99	0.83	Mantin
(3)	<i>Albizia falcataria</i>	1.63	0.91	Mantin
(6)	<i>Fagraea fragrans</i>	0.47	0.41	Mantin
Waterlogged Slime				
(3)	<i>Fagraea crenulata</i>	1.06	1.28	Mantin
(6)	<i>Fagraea crenulata</i>	0.86	0.72	Selayang
(4)	<i>Melaleuca leucadendron</i>	0.7	0.57	Selayang
(1)	<i>Melaleuca leucadendron</i>	0.59	0.6	FRIM
(2)	<i>Melaleuca leucadendron</i>	0.5	0.58	FRIM
(3)	<i>Melaleuca leucadendron</i>	0.51	0.66	Mantin

Source: Ang (1987)

Table 2. Some possible uses of major fruit trees

FRUIT	GARDEN PLANT	TIMBER	LEAVES	FLOWERS	SEEDS
Durian	Seldom	Good	-	+	+
Mango	Common	Possible	-	-	-
Rambutan	Common	Possible	-	-	-
Citrus	Occasional	Poor	+	-	-
Mangosteen	Occasional	Not known	-	-	-
Guaya	Common	Poor	+	-	-
Jackfruit	Rare	Not known	+	-	+
Duku/ Langsat	Rare	Not known	-	-	+

(+) Some possible use known

(-) Unknown

Source : Zainal Abidin et al. (1987)

Table 3: Processed products from some minor fruit tree species of Peninsular Malaysia

Species	Malay name	Processed product
<u>Sandorium koetjape</u>	Sentul	Jam, dried salted snack
<u>Bounea macrophylla</u>	Kundang	Jam, pickle, dried salted snack
<u>Blacourtia inermis</u>	Rukam masam	Jam, jelly, 'halwa'
<u>Mangifera foetida</u>	Bacang	Jam, pickle, nectar
<u>Mangifera petandra</u>	Pauh	Pickle
<u>Baccaurea motleyana</u>	Rambai	Jelly, halwa, vinegar, nectar, pickle, dried salted snack
<u>Tamarindus indica</u>	Asam jawa	Pickle, halwa, concentrate
<u>Averrhoa bilimbi</u>	Belimbing masam	Jam, dried salted snack
<u>Cicca acida</u>	Cermai	Halwa, jam, pickle
<u>Myristica fragrans</u>	Buah pala	Pickle, dried sweetened
<u>Spondias cyntherra</u>	Anra	Pickle
<u>Gnetum gnemon</u>	Melinjau	Crips

Source: Zainal Abidin et al. (1987)

undertaken at UPM. For grafting, A. mangium showed a limited success with patch grafting, and none with cleft grafting. A marcotting study showed a poor result with A. auriculiformis, and a good one (780%) with A. mangium (Sim 1987). On the other hand, success with the patch-budding experiment on A. mangium showed limited success.

Work on tissue culture with A. mangium is currently underway at FRIM and UPM. Although only one report has been published to date (Mohd Basri and Alang 1987), the prospect is quite promising.

Although some research on other silvicultural aspects (e.g., spacing, pruning, thinning, fertilizing) of the acacias (particularly A. mangium) are currently underway at FRIM and UPM, no result has yet been reported. Ang (1987) gave some indication on the growth performance of A. auriculiformis on various types of tin tailings, while Mohd Afzal and Zakaria (1984) and Kamis and Mohd Amran (1984) reported on that of A. mangium in trial plots and soils types, respectively, in P. Malaysia. A. mangium also shows variation in growth in different types in Sarawak (Francis Chai 1986). Studies by Lim (1985, 1987) indicate that A. mangium is highly productive in terms of biomass production.

Productivity can be influenced by diseases and pests, and yet negligible effort has concentrated on these. Various diseases have been observed on A. mangium, including seedling damping-off, brown and charcoal root diseases, pink disease of stem, heartrot, and sooty molds on foliage (Noraini 1985, Lee 1985). Of pests, bagworm is known to attack the foliage in isolated instances. Termites are also considered to be a potential danger.

Research on the use of the wood is limited. Apart from two studies on wood (Logan and Balodis 1982, Chew and Jaafar 1986), none has been reported on bark, leaves, or flowers, with the exception of the work done by Abdul Razak et al. (1981). They report that A. auriculiformis bark has a high tannin content.

2. Leucaena leucocephala

The year and location of introduction of this species to Malaysia is uncertain. A bushy variety has become a naturalized weed on roadsides in many parts of the Malay Peninsula (Noraini and Ng 1981). Early trials with this variety have been summarized by Burkill (1935) under the synonym L. glauca. In general, these early trials, carried out on different soils, failed badly. The species could not compete with Imperata cylindrica, and was found useless for reclamation of abandoned mining land.

A later trial with the "Hawaiian Giant" variety showed its acute growth sensitivity to small changes in soil pH (Noraini and Ng 1981). There also was a pronounced increase in foliar

concentrations of Al and Mn with increasing soil acidity. These two elements are known to be highly toxic to plants, and their uptake is known to increase under low soil pH conditions.

Other research on this species has studied its growth response to mycorrhizal inoculation and phosphate application on various soil types (Abdul Rahman 1979, Abdul Rashid 1979) and fodder production (Chen 1987). In a three-year cutting assessment trial on 30 selected Leucaena accessions, 10 were top yielders, as well as persistent accessions being singled out. Total dry matter yield ranging from 12 to 22 tons per ha per year were obtained from a 2 to 3 month cutting at standard height. Observation on root development shows that most of the Leucaena roots run along the 50 cm horizontal soil profile, and seldom reach the 1 m depth (Chen 1987).

REFERENCES

- Abdul Rahman, B. 1979. Effect of mycorrhizal inoculation and soil types on the growth of Leucaena leucocephala C.V. Peru. B.Sc. (For.) thesis. UPM. 57 pp.
- Abdul Rashid, A.M. 1979. Effects of vesicular-arbuscular mycorrhizae and phosphate on the growth of Leucaena leucocephala C.V. Peru on tin tailings. B.Sc. (For.) thesis. UPM. 54 pp.
- Abdul Razak, M.A., C.K. Low, and A. Abu Said. 1981. Determination of relative tannins contents of the bark of some Malaysian plants. Malay For. 44:87-92.
- Ang, L.H. 1987. Some potential tree species for reclamation of tin tailings. Paper presented at First National MPTS Seminar for Malaysia, December 14-15, 1987. FRIM, Kepong. 14 pp.
- Barnard, R.C. and A.E. Beveridge. 1957. Exotic trees in the Federation of Malaysia. Paper presented at the Seventh British Commonwealth Conference.
- Bowen, M.R. and T.V. Eusebio. 1981. Acacia mangium: updates information on seed collection, handling and germination testing. Occasional Technical and Scientific Notes. Seed Series No. 5. FAO/UNDP-MAL/78/009. 26 pp.
- Burkhill, I.H. 1935. Dictionary of the economic products of the Malay Peninsula. Dept of Agric. Kuala Lumpur.
- Chen, C.P. 1987. Trees for farmers: fodder trees. Paper presented at First National MPTS Seminar for Malaysia, December 14-15, 1987. FRIM, Kepong.

- Chew, L.T. and A. Jaafar. 1986. Particleboard from Acacia mangium. Paper presented at the Ninth Malaysian Forestry Conference, October 13-20, 1986, Kuching. 8 pp.
- Francis Chai, Y.C. 1986. Growth of Acacia mangium Willd at Oya Road experimental plantation reserve. Paper presented at Ninth Malaysian Forestry Conference, October 13-20, 1986, Kuching. 8 pp.
- Jaffirin, L. and M.T. Low. 1986. Acacia mangium provenance trial in Sabah. Paper presented at Ninth Malaysian Forestry Conference. 21 pp.
- Johari, B. and T.Y. Chin. 1986. Review of plantation experiences in Peninsular Malaysia. Proceedings of Ninth Malaysian Forestry Conference, Vol. I.
- Goh, S.H. 1985. The search for biologically active natural products. In Ikram, M.S. and Z. Zuriati (eds.), Prosiding Perjumpaan Penyelidik Sebatian Semulajadi ke-2:30-50.
- Hassan, B.M. 1987. Approach to orcharding; tree fruits as multipurpose tree species. Paper presented at First National MPTS Seminar for Malaysia, December 14-15, 1987, FRIM, Kepong. 12 pp.
- Hoi, W.K. 1987. Fuelwood trees for rural industries. Paper presented at First National MPTS Seminar. 13 pp.
- Kamis Awang and M.G. Mohd Amran. 1984. Initial performance of Gmelina arborea Roxb. and Acacia mangium Willd. under plantation conditions. Malay For. 47 (4):255-262.
- Kamis Awang and Mohd. Basri Hamzah. 1986. Effects of potting mixtures and fertilizer on the growth of Acacia mangium Willd. seedlings. Malay. Appl. Biol. 15(1):31-42.
- Kamis Awang and S.H. Chai. 1987. Growth response of Acacia mangium Willd. seedlings to various potting mixtures and fertilizer levels. Malay. For. (In press).
- Kamis Awang and C.G. De Chavez. 1988. Root wrenching and controlled watering improve growth characteristics, water relations and survival of bare-rooted seedlings of Acacia mangium Willd. (Submitted for publication.)
- Lamb, A. 1987. The potential of some wild and semi-wild fruit trees in Sabah and the progress made by the Department of Agriculture, Sabah in establishing a germplasm pool. Paper presented at First National MPTS Seminar for Malaysia. 10 pp.

- Latiff, A. 1987. Some potential of some local tree species of medicinal value. Paper presented at First National MPTS Seminar for Malaysia. 10 pp.
- Lee, S.S. 1985. Tree diseases and wood deterioration problems in Peninsular Malaysia. Faculty of Forestry, Universiti Pertanian Malaysia, Occasional Paper No. 5. 15 pp.
- Lim, M.T. 1985. Biomass and biomass relationship of 3.5 year-old open-grown Acacia mangium. Faculty of Forestry, Universiti Pertanian Malaysia, Occasional Paper No. 2. 13 pp.
- Lim, M.T. 1988. Studies on Acacia mangium in Kemasul Forest. I. Biomass and productivity. (Submitted for publication.)
- Lim, T.K. 1987. Management strategies for control of important diseases of selected fruit trees. Paper presented at First National MPTS Seminar for Malaysia. 18 pp.
- Logan, A.F. and V. Balodis. 1982. Pulping and papermaking characteristics of plantation-grown Acacia mangium from Sabah. Malay. For. 45:217-236.
- Manurung, R. 1987. Sarawak illipe nuts -- an approach towards research on tropical trees. Paper presented at First National MPTS Seminar for Malaysia. 13 pp.
- Mawardi, R., R. Kiew, N.H. Lajis, R. Othman, and R.F. Toia. 1985. A contribution to the phytochemical survey of Peninsular Malaysia. *Pertanika* 8 (3):347-357.
- Mohd. Afzal, A.M. and I. Zakaria. 1984. Forest plantation development in Peninsular Malaysia -- present state of knowledge and research priorities. Proceedings of Seminar on Forest Plantation Development in Malaysia. pp. 106-119.
- Mohd. Basri Hamzah and Z.C. Alang. 1987. In vitro propagation of Acacia mangium from young seedlings. Paper presented at Seminar on Tissue Culture of Forest Species, June 15-18, 1987, Serdang.
- Mohd. Jalaludin. 1986. The energy output for Malaysia. Paper presented at Energy Needs for Industrialization, Kuala Lumpur.
- Mohamad Lokmal, N. 1987. Selection of fuelwood crops. Paper presented at First National MPTS Seminar for Malaysia. 15 pp.
- Nicholson, D.I. 1965. A note on A. auriculiformis A. Cunn. ex-Berth. in Sabah. Malay For. 28:243-244.

- Ng, F.S.P. 1987. Trees for vegetables. Paper presented at First National MPTS Seminar for Malaysia. 10 pp.
- Noraini Ahmad. 1985. Current potentially dangerous diseases of plantation trees and ornamental trees in Malaysia. Paper presented at Symposium on Status of Forest Pests and Diseases in Southeast Asia, May 13-15, 1985. Laguna, Philippines. 10 pp.
- Noraini, Ahmad and F.S.P. Ng. 1981. Growth of Leucaena leucocephala in relation to soil pH, nutrient levels and rhizobium concentration. Malay. For. 44:516-123.
- Phillips, F.H., A.F. Logan, and V. Balodis. 1979. Suitability of tropical forests for pulpwood: mixed hardwood, residues and reforestation species. Tappi. 62:77-81.
- Selvaraj, P. and B. Mohamad. 1980. A checklist of plantation trials in Peninsular Malaysia. Research Pamphlet No. 79. Forest. Dept. Penin. Malaysia. 100 pp.
- Sim, B.L. 1984. The genetic base of Acacia mangium Willd. in Sabah. Paper presented at Joint Meeting of IUFRO Working Parties on Provenance and Genetic Improvement Strategies in Tropical Forest Trees, Mutare, Zimbabwe.
- Sim, B.L. 1987. Present research status on hybridization and vegetative propagation of A. mangium and A. auriculiformis in Malaysia. Report of Sabah Softwoods Sdn Bhd. 26 pp.
- Tham, C.K. 1979. Trial of Acacia mangium Willd. as a plantation species in Sabah. Forest Genetic Resources Information No. 9. Forestry Occasional Paper 1979/1 FAO. Rome. pp. 32-35.
- Wee, Y.C. and A.N. Rao. 1982. Current and potential plant resources of the tropical rain forest. In Srivastava, P.B.L. et al. (eds.), Tropical Forests -- Source of Energy Through Optimization and Diversification. UPM, Serdang, pp. 115-125. 397 pp.
- Yong, C.T. 1984. Compensatory forest plantations in Peninsular Malaysia. Proceedings of Seminar on Forest Plantation Development in Malaysia. pp. 35-44.
- Zainal Abidin, M., A. Rukayah and N. Abdul Wahab. 1987. Fruit trees for farmers. Paper presented at First National MPTS Seminar for Malaysia. 21 pp.

SUMMARY OF NEPAL'S NATIONAL MPTS ORGANIZING MEETING

The Forest Survey and Research Office under the Department of Forests, organized a National MPTS Organizing Meeting, held January 20-21, 1988, in Kathmandu. The main purposes of the meeting were:

- o to select two country representatives, one each from the biological and social sciences, to serve for one year on the Research Committee as proposed by the F/FRED Project
- o to provide a forum for the exchange of information and views on network-related research
- o to develop a country research agenda for the selected country representatives to present to the Research Committee

Altogether 25 participants attended, representing: the Forest Survey and Research Office (FSRO), Department of Forests (DOF), Forest Research Project (FRP), the Department of Livestock and Animal Health, Department of Agriculture, Institute of Forestry (IOF), Institute of Agriculture and Animal Science (IAAS), Community Forest and Afforestation Division, Hill Forest Development Project, Terai Community Forestry Project, Lumle Agriculture Centre, and Winrock International/Nepal. Charles B. Mehl from the F/FRED Project presented the F/FRED Project activities and the role of its Research Committee to the participants. Reports on MPTS research for small farmers were given by some of the participants.

On the second day of the meeting, the two country representatives were selected and agreed upon by general consensus. The representatives selected were Mr. Ek Raj Sharma, Chief, FSRO, and Dr. Kailash N. Pyakuryal, Dean, IAAS.

Lively discussion of the national MPTS research agenda followed. The following points were agreed upon at the end of the meeting.

- 1) The MPTS Research Network has selected priority species for the initial research in two climatic zones. They are Acacia auriculiformis, A. mangium, Leucaena leucocephala, and Melia Azedarach for the humid and sub-humid tropics. For the arid and semiarid tropics, the network has chosen A. nilotica, Dalbergia sissoo, Eucalyptus camaldulensis, and Azadirachta indica for the arid and semiarid tropics. Most of the participants felt that Nepal would benefit with the addition of species to the list. A. catechu and Bombax ceiba were suggested for consideration by the Research Committee.

Other species from the middle hills and mountain regions of Nepal could also be added.

- 2) Discussion also focused on what sorts of biological/silvicultural on-farm research are important. It was agreed that such research should be carried out in two steps: the first on government- or community-owned land, and secondly on farmers' land, to verify results. The participants agreed that the research should be economically feasible, technically sound, and acceptable to local farmers.
- 3) Presently, three institutions in Nepal (FSRO, IOF, and IAAS) have become formal participants in the MPTS Research Network through Memorandums of Understanding or Letters of Agreement. These institutions will conduct network-related MPTS research independently and in collaboration with other institutions in the country. There may be other institutions also interested in future network research. To participate, they do not need to be formal participants. The coordination between various institutions in the country will be required, for which one of the institutions will be proposed as the coordinator. The main role of the coordinator will be to collect and disseminate the results from network trials among the participating institutions in the country, and also among the network countries through the F/FRED project. It was suggested that FSRO take this role. The meeting concluded that the heads of FSRO, IOF, and IAAS should meet to decide this matter.

MPTS RESEARCH PRIORITIES OF PAKISTAN

K. M. Siddiqui

The first national MPTS research priority Committee meeting was held at Pakistan Forest Institute, Peshawar, in November, 1987 in association with F/FRED. The meeting was attended by research scientists of forestry research institutions, Pakistan Agricultural Research Council, and others. The discussions were confined to identifying species and research areas for network trials under the F/FRED Project. Individual presentations were made in the meeting to explain the network trials system, farm forestry systems and integration of biological and social research. Dr. Lee Medema informed participants of the activities of the F/FRED Project to date.

Discussion centered around the issue of the selection of tree species for the MPTS Research Network in Arid and Semi-arid regions. The F/FRED Research Committee identified the following species for this purpose in its meeting in Bangkok in September 1986:

Semi-arid: Dalbergia sissoo
Acacia nilotica
Eucalyptus camaldulensis

Arid: Acacia nilotica
Prosopis cineraria
Prosopis juliflora

The participants were of the view that in addition to the above species, a number of other species, such as Ailanthus, Robinia, and Zizyphus, could also be included in the network trials. Farmers are already planting these species on a large scale on their farmlands. It was explained that a broader network of research trials is being envisaged under the project, and that until the network is established the number of species has been kept to a minimum. The first network trials would enable scientists of the region to gain experience in establishment of region-wide trials and information exchange, activities which have not previously taken place. The activities of the F/FRED Project need not be confined to establishment of network of research trials. The scientists and institutions in a country could initiate studies of their interest on their own with the assistance of F/FRED, such as establishment of facilities for seed collection, processing and storage. Further, the Project in

future years may undertake studies of other species as well such as interactive provenance trials.

Organizational matters regarding activities of F/FRED Project in Pakistan were also discussed. Dr. K. M. Siddiqui and Mr. Saliheen Khan were elected to serve as members of the project's Research Committee. The arrangements of the forthcoming regional meeting on MPTS research, held in Karachi, November 16-19, 1987, were also finalized.

MULTIPURPOSE TREE SPECIES RESEARCH: STATUS AND PRIORITIES
IN THE PHILIPPINES¹

C.A. Cruz and R.V. Dalmacio²

1. Status of F/FRED Project-Supported Activities

- 1.1 Four Filipino institutions are involved in F/FRED Project Network through formal Memorandum of Understanding (MOU) or Letter of Agreement (LOA). These are listed in Appendix IX.
- 1.2 There are seven different activities which the F/FRED Project has supported to date. These include the F/FRED-funded MPTS species regional network trials being conducted by ERDB in Caranghan, Nueva Ecija, and by Visayas State College of Agriculture (ViSCA) in Baybay, Leyte.
- 1.3 F/FRED Project Plans for the Philippines, October 1987 to December 1988 include the following activities.
 - a. MPTS network species trials, including psyllid research
 - b. Improved linkages, e.g., through "flowering" arrangements between institutions which have MOUs in the Philippines and institutions in other countries participating in F/FRED
 - c. Sponsorships of network meetings and "travelling workshops" to different MPTS network trial sites
 - d. Support for publication and dissemination of F/FRED-funded research
 - e. Support for trainings, such as suitable Filipino Ph.D. fellowship candidate(s) and short-term training courses
 - f. Support for suitable proposals for small research grants

¹Paper presented at F/FRED MPTS Research Committee Meeting, held April 4-8, 1988 at Kuching, Sarawak, Malaysia.

²Assistant Professor, Department of Forest Resources Management; and Assistant Professor and Chairman, Department of Silviculture and Forest Influences, respectively, of the UP at Los Banos, College of Forestry, College, Laguna, Philippines

- g. Technical assistance through the provision of short-term consultants to assist the Department of Environment and Natural Resources (DENR) in MPTS research data analysis

The details of the above-mentioned activities are described in the F/FRED-Asia Progress Report (September 1987).

2. Output from the First National Organizing Meeting, held at ERDB, October 1-2, 1987
 - 2.1 There were at least 24 participants representing 14 institutions (government agencies and NGO's) in the Philippines.
 - 2.2 Eight working papers were presented, namely:
 - a. MPTS network trials in Caranglan, Nueva Ecija -- Enrique Crizaldo
 - b. Status of biological research on MPTS in the Philippines -- Roberto V. Dalmacio
 - c. Status of socioeconomic research on MPTS in the Philippines -- Cerenilla A. Cruz
 - d. Small farm uses of MPTS in Luzon -- Rogelio Serrano
 - e. Small farm uses of MPTS in the Ilocos region -- Eric Salamanca
 - f. Small farm uses of MPTS in the highlands -- Alfredo Agpaoa and Vicente Veracion
 - g. Initial learnings on agroforestry -- Gerardo Kitchie
 - h. Small farm uses of MPTS in Mindanao -- Warlito Laquihon
 - 2.3 Four workshop sessions were conducted simultaneously during the meeting. The theme and output of each session are as follows:
 - a. Session 1: Framework of national research and development network. The important output of this group was the proposed organizational structure of the MPTS R&D Network in the Philippines.
 - b. Session 2: State of the Art of MPTS. Different MPTS were identified, including the species studied in the network trials. These include 23 indigenous species and 14 introduced (exotic) species. The status of

research/information was identified for each species and research gaps were also identified.

- c. Session 3: Proposed Research and Development Program on MPTS (1988 - 1992). The proposed R&D program is shown in Table 1.
- d. Session 4: Selection of country representatives to the F/FRED Research Committee. For the year 1987-88, Dr. Roberto V. Dalmacio and Dr. Cerenilla A. Cruz were selected by their peers to represent the Philippines on the F/FRED Research Committee. Drs. Dalmacio and Cruz will represent the biological sciences and socioeconomic sciences, respectively.

Table 1: Five-year Research and Development Program on MPTS (1988-1992)

Project No.	Year					Expected Output
	88	89	90	91	92	
1. Benchmark Information Generation a. Biophysical b. Socio-economics	x	x	x	x	x	1. Information generation and update on MPTS in terms of site factors and delivered at the end of the program.
2. Crop Production and Management a. Nursery techniques/mass planting stock production for MPTS b. Species and provenance trials c. MPTS cropping systems d. Nutrients requirements/nutrient cycling, re-cycling e. Site improvement/amelioration technology f. Erosion control	x	x	x	x	x	2. Technology generation on nursery techniques cropping systems, nutrient requirements/cycling, re-cycling, site amelioration, technology transfer, and soil erosion and control on MPTS.
3. Gene Conservation and Improvement a. Species and provenance trials b. Seed orchard/production and establishment c. Tree and varietal improvement d. Germplasm distribution system	x	x	x	x	x	3. Production of high quality germplasm and development of germplasm disease systems to the end users.
4. Protection of MPTS a. Pests/diseases and control/prevention b. Weed/fire control	x	x	x	x	x	4. Technologies generation on biological/chemical/genetic controls of pests and diseases and other injuries agencies on MPTS.
5. Harvesting/Utilization/marketing a. Harvesting and regulation technology b. Utilization/pruning/post harvest technology c. Marketing				x	x	5. Technologies generation on harvesting technologies, user and marketing of MPTS.
6. Training and Extension a. Training b. Extension	x	x	x	x	x	6. Produced the degree holders who shall have working knowledge on MPTS.
7. Technology Transfer	x	x	x	x	x	7. Transfer of technologies especially to small farmers.

REPORT ON MPTS RESEARCH IN TAIWAN

T.W. Hu

The National MPTS Organizing Meeting for Taiwan took place in October, 1987. While no final decisions for an agenda of research priorities resulted from the meeting, a review of existing research reflects national MPTS priority topics.

Psyllid Control

Present research for the control of the psyllid insect pest include:

- a) breeding and genetic improvement programs involving the testing of introduced genotypes (Leucaena leucocephala K636, Leucaena esculenta, L. pallida, L. retusa, L. diversifolia K410 and K411) to determine psyllid tolerance, and hybridization to couple tolerance with such characteristics as fast growth (selected provenances of L. leucocephala with L. diversifolia, L. pallida). Programs include field tests of the selected genotypes and production of psyllid-tolerant propagules on a commercial scale.
- b) studies of natural enemies, focusing on 3 species of Ladybird beetles and several kinds of spiders.
- c) biological control programs exploring the potential of psyllid control through parasitic fungi (Conidiobolus sp., Paecilomyces sp.).

Research and Planting of Eucalyptus spp.

Species and provenance trials are underway for 12 species including E. grandis and E. camaldulensis, as well as studies of mixed plantations of Eucalypts and nitrogen-fixing species, and spacing trials of E. grandis.

Pulp and paper companies have carried out commercial plantings of Eucalyptus species.

Research on Acacia spp.

Scientists are studying various Acacia species for adaptability, optimal spacing, and end uses. Intercropping studies of small diameter logs (15-20 cm) with Shitake mushrooms show promise for adoption by small farmers.

REPORT ON THE NATIONAL SEMINAR ON THE RESEARCH AND DEVELOPMENT
OF MULTIPURPOSE TREES IN THAILAND¹

S. Bhumibhamon, Y. Chalamwong²

Background

1. The depletion of forest resources in Thailand, resulting from uncontrolled human activities, has become an important issue because of its detrimental effects on the ecosystem, which is important for the agricultural production system, and because it disturbs the economic situation. Therefore, the National Forest Policy Committee has concluded that the forest area of Thailand should be divided into conserved forest (15%) and exploited forest (25%).

2. In 1986, conserved forest consisted of 52 national parks (26,576.26 km²), 56 forest parks (1,435.72 km²), 29 wildlife sanctuaries (21,726.73 km²), 41 non-hunting areas (300.47 km²), 2 wildlife parks (24.55 km²), 5 botanical gardens (10 km²), and 42 arboreta (31.27 km²). The total area of conserved forest has almost reached the planning figure of 15% of the total area of the country. At present, the conserved forests are being disturbed to varying degrees, and thus require strict protection.

3. Exploited forests are in the form of 135 teak concession areas (87,447.12 km²) and 568 non-teak concession areas (240,660.17 km²). The major part of the reserved forest has been exploited using dysgenic selection and over-cutting. Therefore there is an urgent need for enrichment planting, reforestation in low productive areas, and afforestation on mine tailing areas, saline soils, acid soils, or other problem soils.

4. Until 1986, the area planted by the Royal Forest Department (RFD) increased progressively. The afforested area covered 2,180.19 km² (36.73%), while reforestation in low productive areas was 1046.82 km² (17.64%). Watershed rehabilitation by reforestation covered an area of 1,151.85 km² (19.41%). Reforestation carried out by concessionaires using the concession fee was 1,290.84 km² (21.75%). The Forest Industry Organization also has established a large area of forest plantation

¹Presented at the Research Committee Meeting, F/FRED-Winrock International, Kuching, Sarawak, April 4-8, 1988.

²Members of the National Subcommittee on the Research and Development of Multipurpose Trees, National Research Council, Thailand.

(265.01 km²), while other organizations have planted on a small scale. Farmers or the private sector are allowed poorly-productive reserved forest land for tree-planting, with a total planting area of 22,510.24 ha. Plantations also have been established on private land.

The total number of tree species selected for growing in Thailand reached 99, consisting of 72 native species and 27 exotics. Following the recommendation of the International Union of Forestry Research Organizations (IUFRO) at the Kandy Meeting in 1984, the National Research Council of Thailand in 1986 set up the National Subcommittee on the Research of Multipurpose Trees. This subcommittee, under the responsibility of the National Committee on Agriculture and Biology, has the prime aim of promoting, developing and distributing the research and development component of multipurpose trees. Information related to multipurpose trees has been collected. Another role of the subcommittee is to organize seminars, workshops, and international conferences, and to seek assistance from abroad to promote research and development programs on multipurpose trees.

National Seminar

5. With the financial support of F/FRED-Winrock International, a national seminar on the Research and Development of Multipurpose Trees in Thailand was organized by the National Subcommittee on the Research and Development of Multipurpose Trees, in cooperation with the Division of Research Project Policy and Coordination, National Research Council. The seminar took place in Bangkok, November 9-10, 1987.

6. The F/FRED Coordinating Unit presented an overview of F/FRED, its activities, and research networking, and four panels set up on: the progress of the research and development of multipurpose trees; multipurpose trees and Thai farmers; multipurpose trees and the wood industry; multipurpose trees and conservation.

Choice of Tree Species

7. The meeting considered the need for fast-growing multipurpose trees to serve mankind, and encouraged the government to formulate a sound policy on growing multipurpose trees.

8. The participants of the seminar favored Eucalyptus camaldulensis (31%), Acacia mangium (17.1%), Melia Azedarach (6.8%), Bamboo (5%), Leucaena leucocephala (5%), Tectona grandis (3.4%), Azadirachta indica (3.4%), rattan (3.4%), Casuarina equisetifolia (3.4%), Casuarina junghuhniana (3.4%), Acacia auriculiformis (3.4%). Other species mentioned were Tetrameles nudiflora, Pinus caribaea, Peltophorum dasyrachis, Rhizophora mucronata, Cassia spp., Acacia catechu, Hevia braziliensis, Erythrina spp., Gliricidia sepium, Pterocarpus indicus, and

nitrogen-fixing trees. Participants also recommended Cassia siamensis, Toona ciliata, Swietenia macrophylla, Pithecellobium dulce, Samanea saman, Tamarindus indicus, Artocarpus heterophylla, Eucalyptus urophylla, Melaleuca leucadendron, Combretum quadrangulare, and other medicinal plants.

Research on Farms

9. The meeting recommended growing nitrogen-fixing trees in farm areas to improve soil fertility, though with the farmers selecting trees themselves for their own use.

10. The meeting considered the need for socioeconomic studies related to the growing of multipurpose trees. Giving incentives by providing seedlings to poor farmers was recommended. Problems related to Eucalypt growing were considered to require sufficient public education, so that poor farmers could be in a position to decide for themselves which trees were best to plant.

11. The meeting recommended growing fodder trees in agroforestry systems. The study of this remains at an early stage, and only Leucaena is used on any scale as a fodder tree at present. The meeting also recommended that fuelwood be grown for use on farms, and that responsible agencies be encouraged to play a greater role regarding fuelwood production.

Key Research Areas

12. The meeting recognized eight promising multipurpose tree species and recommended the following key research areas.

Eucalyptus: An improvement program, silvicultural treatments, increased biomass, cutting techniques, environmental impacts of growing the trees, zoning, and roguing.

Acacia: An improvement program, nitrogen-fixing capabilities, and wood utilization.

Melia and Azadirachta: An exploration and improvement program, wood utilization, seed storage, chemical compounds, and resistant varieties.

Leucaena: An improvement program, productivity, resistance to Leucaena psyllid, agroforestry and utilization.

Mangrove trees: Regeneration, fruit production, fruit storage, silvicultural treatment, utilization.

Bamboos: Embryo culture, agroforestry, industrial and household uses, house construction using cheap materials, information centre.

Rattan: Reforestation with fast-growing trees, tissue culture, effective uses.

Cassia: A new multipurpose tree for the Thai farmer -- all aspects of research and development are needed.

13. Concerning conducting research, the meeting recommended an R&D program for problem areas, e.g., E-sarn Kheeo Project (Green Northeast Project), swamp forest, mine-tailing areas, acid and saline soils, and degraded watershed areas, covering a total area of 23.2 million ha.

Research Systems

14. The meeting suggested having a complete research program for improvement of planting materials, propagation, silvicultural improvement, adaptability to climatic changes, harvesting time, and environmental impact assessment (which might be needed in the case of Eucalyptus growing).

Information System

15. The meeting recommended urgent work on information gathering in related subjects (e.g., physical site conditions, soil types, seed used, and other propagated materials, biomass production, planting systems, wood utilization, and marketing). Setting up a mini-information centre was advised.

Research Administration

16. The meeting recommended that the National Research Council of Thailand set up a National Ad hoc Committee on the main MPTS to coordinate the roles of participating agencies. The committee is to formulate an R&D program for selected species. At the present time, three committees have been appointed to be responsible for: the *Leucaena psyllid*, *Melia* and *Azadirachta*, and *Eucalyptus*; while a committee for rattan is under nomination for approval.

17. The meeting recommended that the National Research Council of Thailand provide assistance in looking for research funds for an integrated program, as well as for dissemination of research results.

Planting Systems

18. The meeting recommended using any planting system for multipurpose trees -- along roadsides, along canal banks in living areas, on farms as shelterbelts, and on marginal agricultural land. Trees should be carefully selected for each site.

Industry

19. Due to the shortage of timber supplies, the meeting recommended the growing of multipurpose tree for pulp and paper, veneer, plywood, fibre board, cement board, and gypsum board. It was noted that each species had its own special uses, and that an intensive research plan was required. However, the meeting thought that it would be beneficial if the responsible agencies would provide incentives for land-leasing, soft loans, low export taxes, and improved legal measures.

Future Meetings

20. The meeting recommended a bi-yearly meeting, so that it would be possible to follow the advancement of research programs.

**REVISED FRAMEWORK OF THE MPTS RESEARCH NETWORK
UNDER THE F/FRED PROJECT**

Para 1: Membership/Participation

1.1 Membership in the MPTS Research Network (hereafter referred to as the Network) shall be open to Asian research organizations that have signed, or have expressed the intention of signing, a Memorandum of Understanding (MOU) or a Letter of Agreement (LOA) with Winrock International Institute for Agricultural Development.

1.2 Participation in the Network is open to any and all Asian institutions that are invited to attend meetings of the Network or exchange information with Network members.

Para 2: Organization

2.1 The governing body of the Network is the Steering Committee. The Steering Committee shall oversee the activities of the Network through the Research Committee.

2.2 The Network was formally established in 1987 when six (6) institutions had signed an MOU or LOA.

Para 3: Membership of the Steering Committee

The Steering Committee is composed of:

<u>No.</u>	<u>Member</u>	<u>Term</u>
1	Asian scientist with senior ranking in the International Union of Forestry Research Organizations	indefinite
1	Regional Forest Officer for Asia of the U.N. Food and Agriculture Organization	indefinite
1	Dean of the Faculty of Forestry, Kasetsart University	indefinite
2	F/FRED Network Specialists	one year, without vote
1	USAID-designated F/FRED Monitor for the country in which the Steering Committee meeting is being held	one year, without vote

<u>No.</u>	<u>Member</u>	<u>Term</u>
4	Representatives from the Research Committee, to include a biological and a social scientist from both the Humid and Sub-humid Zone and the Arid and Semi-Arid Zone (one of these will be the Chairman of the Research Committee)	one year

Para 4: Rules and Terms of Reference for the Steering Committee

4.1 The Steering Committee shall meet annually or as needed. Meetings of the Steering Committee shall be called by its Chairman or by the Network specialists at the F/FRED Coordinating Unit in Bangkok, Thailand.

4.2 The Steering Committee shall select a Chairman from among its members. The Chairman shall serve a one-year term.

4.3 Decisions of the Steering Committee shall be made by a majority of at least two-thirds of the voting members present at any meeting.

4.4 The Steering Committee could invite specialists to advise them as and when considered necessary.

4.5 The Steering Committee shall provide guidance and advice to the MPTS Research Network by:

- o establishing policies and strategies
- o planning Network activities
- o guiding and assisting the Network Specialists
- o promoting Network programs and activities
- o approving annual Network progress reports
- o encouraging the global sharing of information
- o carrying out other functions as deemed necessary to implement the MPTS research program

Para 5: Membership of the Research Committee

5.1 The Research Committee is composed of Asian scientists from participating institutions. Each Asian country with participating institutions will be allowed representation on the Research Committee.

5.2 On alternate years, half of the countries with participating institutions will select two representatives to the Research Committee. In order to integrate the biological and social science disciplines on the Committee, one of these representatives must be a biological scientist and one must be a social scientist.

5.3 Ideally, the selection process would be done in conjunction with National MPTS Organizing Meetings held in each country with participating institutions. Where this is not possible, selection will be done by the Chairman of the Research Committee with consideration of the policies and procedures adopted by the participating institutions.

5.4 Non-voting members of the Research Committee include the two Network Specialists from the Coordinating Unit and the USAID-designated F/FRED Monitor in the country where the Research Committee is meeting.

Para 6: Rules and Terms of Reference of the Research Committee

6.1 The Research Committee shall report and be responsible to the Steering Committee.

6.2 The Research Committee shall select a Chairman from among its Asian members. The Chairman shall serve a one-year term.

6.3 The Chairman of the Research Committee shall serve a one-year term on the Steering Committee.

6.4 The Research Committee shall meet regularly as and when needed. Meetings of the Research Committee may be called by the Chairman of the Steering Committee or by the Network Specialists at the F/FRED Coordinating Unit.

6.5 Decisions of the Research Committee shall be made by a majority of at least two-thirds of the voting members present at any meeting.

6.6 The Research Committee shall:

- o plan research activities
- o review and approve research activities
- o coordinate research and other related activities
- o ensure that standard methodologies are used in research and other related activities
- o carry out any other functions as deemed necessary to ensure the success of Network activities

Para 7: National Policies

The implementation of the MPTS Research Network shall take cognizance of national policies.

Para 8: Changes to the Network

The Steering Committee may make changes in the Network as and when considered necessary.

MEMORANDA OF UNDERSTANDING
AND LETTERS OF AGREEMENT

As of April 26, 1988

INSTITUTION	COUNTRY
<u>Memoranda of Understanding (MOU)</u>	
1. Department of Botany, Univ. of New Delhi	India
2. Agency for Forestry Research and Development AFRD	Indonesia
3. Forestry Institutue of Malaysia FRIM	Malaysia
4. Universiti Pertanian Malaysia UPM	Malaysia
5. Institute of Forestry, Nepal	Nepal
6. Ministry of Natural Resources	Philippines
7. Visayas State College of Agriculture	Philippines
8. University of Philippines, Los Banos	Philippines
9. Plantek Int'l (Pte), Ltd.	Singapore
10. Forestry Department, Ministry of Natural Resources	Sri Lanka
11. Forestry Institute	Taiwan
12. Faculty of Forestry, Kasetsart University	Thailand
13. Thailand Institute of Scientific & Technological Research	Thailand
14.* Ministry of Food, Agriculture, and Cooperatives, Gvt. of Pakistan	Pakistan
<u>Letters of Agreement (LOA)</u>	
1. Institute of Agricultural and Animal Sciences	Nepal
2. Economics Faculty of Kasetsart University	Thailand

* Formal agreement between Government of Pakistan and USAID

Appendix IX

INSTITUTION	COUNTRY
3. The Bharatiya Agro Industries Foundation	India
4. Central Mindanao University	Philippines
5. Forest Survey & Research Office Government of Nepal	Nepal
6. National Institute of Wastelands and Rural Development (New Delhi)	India

**SCHEDULE OF F/FRED-SUPPORTED SHORT-TERM TRAINING COURSES
OCTOBER 1987 - AUGUST 1988**

Title: BIOTROP-Kasetsart University Second Regional Training Course in Forest Tree Improvement

**Other sponsors: Southeast Asian Regional Center for Tropical Biology (BIOTROP)
Kasetsart University**

Venue: Faculty of Forestry, Kasetsart University, Thailand

Dates: September 15 - October 30, 1987

Title: Study Tour to Review U.S. Forestry Research Management Practices in Preparation for FRIM Resource Management Training Course

Other sponsors: U.S. Department of Agriculture Forest Service

Venue: Various sites in the U.S., including forest experiment stations in Wisconsin, Michigan, and Pennsylvania, and Washington, D.C.

Dates: September 26 - October 16, 1987

Title: Regional Training Course on Production and Use of Nitrogen-fixing Trees

**Other sponsors: U.N. Food and Agriculture Organization (FAO)
Nitrogen Fixing Tree Association (NFTA)
International Development Research Centre (IDRC)**

Venue: Vieng Tai Hotel, Bangkok, Thailand

Dates: October 21-30, 1987

Title: Maintaining Upland Development

**Other sponsors: Ford Foundation
International Development Research Centre (IDRC)**

Venue: Philippines

Dates: December 1987

Title: Forestry Methods for Social Scientists

Other sponsors: None

Venue: University of the Philippines at Los Banos (UPLB)

Dates: June 6-10, 1988

Title: Social Science Methods for Foresters

Other sponsors: None

Venue: University of the Philippines at Los Banos (UPLB)

Dates: June 6-10, 1988

Title: Tropical Forest Ecology and Management in the Asia-Pacific Region

**Other sponsors: Government of Papua-New Guinea
Government of Australia
UNESCO-MAB
International Foundation for Science**

Venue: University of Papua-New Guinea

Dates: June 20 - July 1, 1988

Title: Training Course in Forestry Research Management

Other sponsors: Forest Research Institute of Malaysia (FRIM)

Venue: Kuala Lumpur, Malaysia

Dates: July 18 - August 5, 1988

BUDGET SUMMARY FOR THE PERIOD ENDING MARCH 31, 1988

Budget Category	Project Total 1985-90	Reimbursement Claimed <u>To Date</u>	
		Amount	% of Budget
I. Salaries and Wages	\$1,581,904	\$564,217	35.67
II. Fringe Benefits	451,665	203,525	45.06
III. Consultants	309,398	157,554	50.92
IV. Overhead	1,079,831	412,064	38.16
V. Travel and Transportation	654,989	346,622	52.92
VI. Allowances and Per Diem	557,775	200,160	35.89
VII. Nonexpendable Equipment	205,647	97,108	47.22
VIII. Participant Training	818,358	10,750	1.31
IX. Workshops, Conferences and Studies	83,456	60,533	72.53
X. Research Grants	507,285	103,309	20.37
XI. Subcontracts	2,424,384	749,288	30.91
XII. Other Direct Costs	273,293	162,880	59.60
TOTAL	\$8,947,985	\$3,068,010	34.29

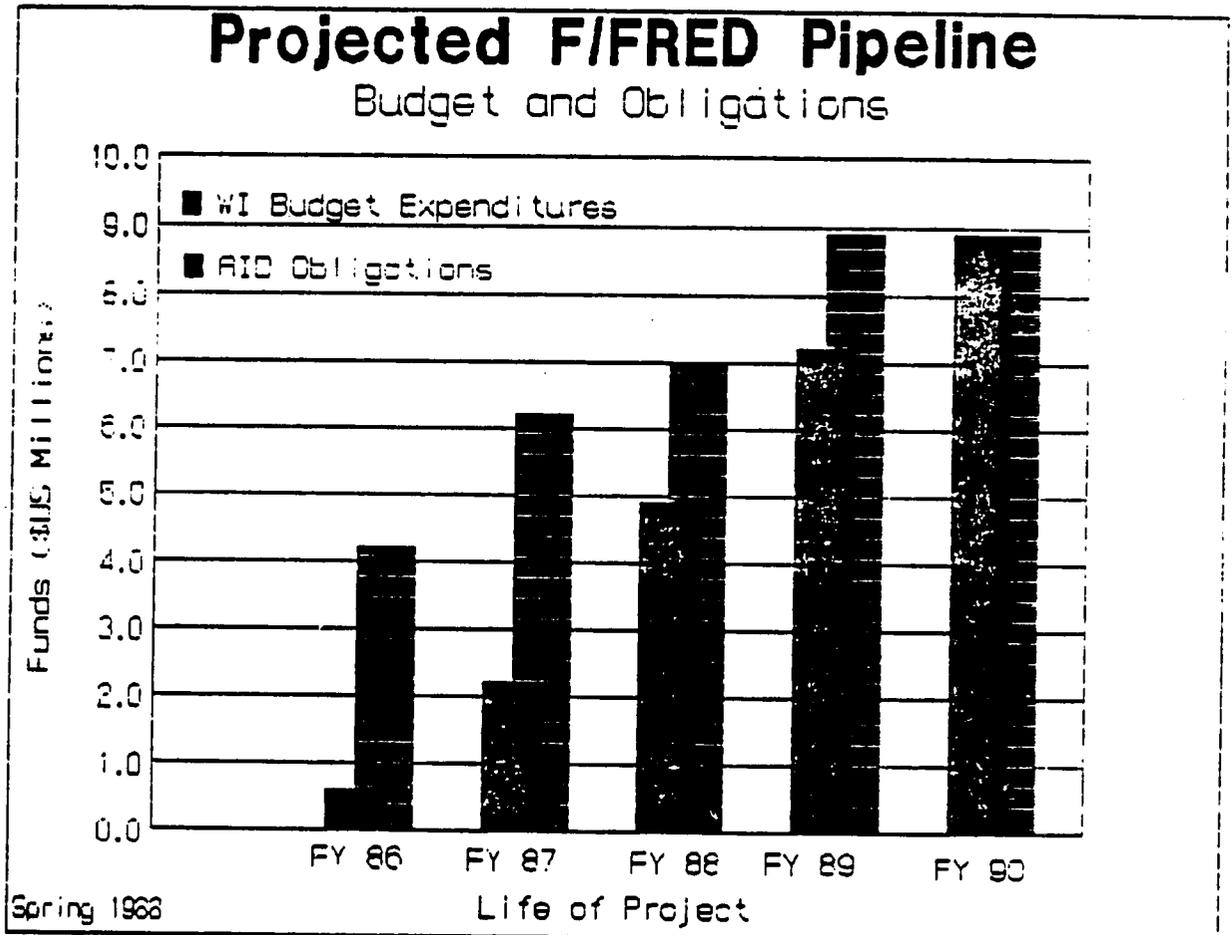


Figure 1. Actual and projected expenditures and A.I.D. obligations (cumulative).

TASK ORDER SUMMARY UPDATI
as of 04/27/88

NO. TASK ORDER TITLE	STATUS SIGNED	COST
*1. Planning Meeting for Species Evaluation	09/28/85	\$ 6,918
*2. MPTS Evaluation and Recommendations for Network Research	05/03/86	\$70,021
*3. Assignment of Computer Specialist to CATIE in Costa Rica	12/31/86	\$18,930
*4. Visit of Tissue Culture Specialist to Thailand	12/10/85	\$ 3,689
5. Planning Meeting for Global Research (Database)	02/18/86	\$ 4,608
6. Participation in East-West Center Forestry Workshop	03/01/87	Per Diem
7. Second Planning Meeting for Global Research (Database)	03/03/86	Consultant
8. Donor Coordination Meeting (Arlington) of Donor Institutions/Agencies	03/03/86	Staff Time
9. Meeting of Ad Interim Steering Committee in Bangkok	03/03/86	Staff Expense
10. Research Grant to Thai Forester	02/20/86	\$ 2,000
11. LFMN Core Group Workshop	7-24-86	\$ 7,038
12. Travel to Establish F/FRED Networks	7-24-86	Staff time travel
13. F/FRED Workshop (Bangkok Sept. 24-27, 1986) into to Asian Forestry Community	07/06/86	\$64,398
14. Psyllid control for leucaena Development and Implementation of Leucaena Psyllid Research Plan (Amendment)	07/29/86 09/17/87	\$15,000 \$79,000
15. Preparation of Handbooks on Agroforestry Research (Volume 1, II, III)	08/06/87	\$183,384
16. Information Distribution and Establishment of Documentation Centers	01/27/87	\$43,600

Task Order Summary Update, continued

17. Network Trials Meeting	10/22/86	\$54,165
18. Continuation of Services of Terence W. Linkletter	12/15/87	\$42,500
19. Implementation of 1987 Network Trials	01/13/87	\$127,000
20. Computer hardware for Kasetsart University Faculty of Forestry	08/20/87	\$10,692
21. Applied Social Science and Workshops and Training	09/17/87	\$260,000
22. Biotechnology Opportunities for Priority MPTS Species	03/04/87	\$73,500
23. Land & Forest Management Workshop	03/08/87	\$ 1,250
24. Establishment of Azadirachta & Melia Research	04/06/87	\$15,000
25. Co-sponsorship of Training Workshops Titled Project Evaluation and Economic Valuation of Environmental Impacts in Watershed Areas"	04/06/87	\$ 2,100
26. Support of Workshop on "MPTS for Small Farm Use"	05/12/87	\$45,000
27. Acquisition of Germplasm for Network Research in Humid and Sub-humid Tropics	04/07/87	\$60,200
28. Development and Implementation of National MPTS Organization Conferences/MPTS Research Committee Meeting for 1987.	07/31/87	\$50,500
29. Participant Travel for Network Building	04/07/87	\$72,500
30. Implementation of Short Term Training Plan	05/07/87	\$14,700
31. Analysis of Networking Activities Relevant to F/FRED	12/18/87	\$19,300
32. Workshop Established Socio-economic Component of Minimum Data Set	12/21/87	\$27,150
33. Study of "Homestead Forests and their Potential for Meeting Rural Energy Needs" in Bangladesh	09/17/87	\$ 1,650

Task Order Summary Update, continued

34. Co-sponsorship of Short-Term Training Courses, Seminars and Workshops	09/17/87	\$45,000
35. Twinning Arrangements for Asian Scientists	09/17/87	\$90,000
36. 1988 Research Grants Program	09/17/87	\$260,000
37. Translation of Important MPTS Research Papers	09/17/87	\$27,240
38. Socioeconomic Database Planning Meeting	09/17/87	\$23,000
39. Computer Hardware for Network Strengthening	09/17/87	\$71,500
40. Organizational Meetings for MPTS Research in the Arid and Semi-Arid Tropics	09/17/87	\$53,020
41. Ph.D. Fellowship Selection	01/19/88	\$26,000
42. Training Specialist	01/25/88	\$63,000
43. Problem Solving Short Courses for Agroforestry Research		\$325,000
44. Not assigned		
45. Field Trials Brochure	04/28/88	\$10,300
46. Support of a workshop on "Strategies and Methods for Orienting MPTS Research to Small-Scale Farm Use."	Pending	\$64,000

* Authorized by memorandum prior to development of T.O. format.