

PROJECT APPRAISAL REPORT (PAR)

PAGE 1

931-0607 (1)

1. PROJECT NO. 931-17-995-607-72-3167903	2. PAR FOR PERIOD: 1/7/75 TO 5/1/76	3. COUNTRY Worldwide	4. PAR SERIAL NO.
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5. PROJECT TITLE
Utilization of Secondary Species from Tropical Forests

6. PROJECT DURATION: Began FY 1975 Ends FY 1979	7. DATE LATEST PROP 10/16/74	8. DATE LATEST PIP None	9. DATE PRIOR PAR None
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10. U.S. FUNDING	a. Cumulative Obligation Thru Prior FY: \$	b. Current FY Estimated Budget: \$ 230,000	c. Estimated Budget to completion After Current FY: \$ 346,000
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11. KEY ACTION AGENTS (Contractor, Participating Agency or Voluntary Agency)

a. NAME Forest Products Laboratory, Forest Service, USDA	b. CONTRACT, PASA OR VOL. AG. NO. AG/TAP-925-3-75 Formerly TA(AG)03-75
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I. NEW ACTIONS PROPOSED AND REQUESTED AS A RESULT OF THIS EVALUATION

A. ACTION (X)			B. LIST OF ACTION	C. PROPOSED ACTION COMPLETION DATE
USAID	AID/W	HOST		
		FPL	Complete experiments on color sorting of wood chips	10-1-76
		FPL	Conduct research on critical maximum wood density (not included in original plan of work)	10-1-76
		FPL	Prepare detailed plan of action for Phase III - Dissemination and Application of results.	11-1-76
	X		Review and approve plan of action for Phase III	12-1-76
	X	FPL	Prepare second interim project appraisal report (PAR)	1-31-76

D. REPLANNING REQUIRES				E. DATE OF MISSION REVIEW	
REVISED OR NEW:	<input type="checkbox"/> PROP	<input type="checkbox"/> PIP	<input type="checkbox"/> PRO AG	<input type="checkbox"/> PIO/T	<input checked="" type="checkbox"/> PIO/P
PROJECT MANAGER - TYPED NAME, SIGNED INITIALS AND DATE			MISSION DIRECTOR - TYPED NAME, SIGNED INITIALS AND DATE		
Walter F. Parham W.F.P. 5/14/76			Henry A. Arnold H.A.A. 5-19-76		

Utilization of Secondary Species from Tropical Forests - Narrative

The purpose of this project is to promote utilization of unutilized secondary species of mixed tropical hardwoods and create useful products as well as employment in LDCs. This project was begun in January, 1975 and is planned for completion by September 30, 1978. It was an outgrowth of a research and feasibility study funded under PASA TA(AG)2-73 "Survey of Knowledge Regarding Properties and Uses of Secondary Tropical Woods." It is jointly funded by AID and the Forest Products Laboratory (FPL), Forest Service, U.S. Department of Agriculture.

The specific objectives are:

(1) To conduct research, develop and test a commercially feasible processing system for using naturally occurring tropical hardwoods as a source for producing pulp, paper, paperboard, fiberboard and particleboard. Residuals not acceptable for any of the forest products will be used to provide energy requirements for the processing system.

(2) To design a "pre-investment package" based on the technical processes developed under (1), apply it in three or more LDCs in Asia, Africa and Latin America and publicize, demonstrate and disseminate the package to potential investors (selected LDC governments, banks, donor agencies, private enterprise), to prove the commercial viability of constructing and operating processing plants based on the new technology, and stimulate actual and future investments.

A basic premise of this research project is that to successfully utilize the large number of species occurring in nature in heterogeneous tropical hardwood forests requires departure from the conventional

species-by-species determination of wood properties and that a more fruitful approach is the development of a non-taxonomic, species-tolerant utilization system in which the identity of individual species is unimportant and to a large degree lost. Selective log cutting and sorting problems would not be essential in this new approach. The natural wood mixtures however, would be harvested and processed with due regard to resource management, conservation principles and application of the best available techniques for protection of the environment.

The review of this project was conducted in Washington, D.C. by Walter Parham and Edward P. Cliff, Forestry Consultant. The contracting Agency (FPL) did not participate directly in the appraisal but in reaching their conclusions the reviewers drew heavily on trip and progress reports prepared by project personnel and subcontractors, the First Annual Project report, and the minutes of meetings of the Steering Committee.

Overall Appraisal

The work on the project is progressing satisfactorily and according to plan. The research design is providing the information and data needed to meet the objectives of the project. With one exception, to be mentioned later, all work has been within the scope presented in the Research Project Statement. No complications have been encountered which would interfere with or restrict the application of the findings to a commercial system.

Specific Comments on Progress to Date and Future Plans

Phase I - State-of-the-art Review

1. Substantial progress has been achieved on this phase, particularly on the literature survey and examination, analysis and reaffirmation of the

body of knowledge and present progressing technology and practice.

2. A review of the economic policies of LDC tropical countries which could affect opportunities for forest product enterprises is being conducted by a graduate student at the University of Wisconsin under the guidance of Professor L. Christenson and T.H. Ellis, FPL staff economist. This is planned for completion by September 1976.

3. Plans are in the development stage to enter into a contract with the Industries Development Commission of the Philippines to sample the market for products covered by the project and to survey potential markets for minor forest products resulting from recovery of extractives from some of the wood species.

4. Initial contacts have been made with government agencies and research institutions in LDC countries where the research results might be applied and where cooperation is desired. Numerous informal discussions exchanging pertinent information have occurred with representatives of international organizations (UNDP, FAO), industry, the academic community, scientific institutes and consulting firms active in LDC countries.

These kinds of contacts and information exchange, as well as onsite observations and additional economic and market surveys will of necessity have to be continued and expanded on through into Phase III--the dissemination and application of results.

5. Drs. David Smith of Yale University and John Ewel, University of Florida have been awarded Research Agreements to survey the literature and assess the current knowledge concerning the ecological and environmental implications of commercial utilization of humid tropical forests. This work is to be completed by September 1976. The results to date reveal an

extremely limited amount of useful information on scientifically based silviculture and potential environmental impact of commercial utilization of moist tropical forests. The geographic distribution of available information is spotted.

The Project Plan does not include provisions or funds for conducting silvicultural or ecological research. Most of research needed in these fields would require expenditure of large amounts of money over considerable time in many locations in the tropical world. About all the FPL can do is to identify and recommend the most generally recognized conservation principles and the best available techniques to minimize the adverse environmental impacts of timber extraction. A full Environmental Assessment would be required before AID would consider support for any commercial utilization of this project.

6. The technology of dealing with air and water pollution from pulp and paper and other timber processing plants is well advanced and the FPL is in a good position to make sound recommendations for preventing or minimizing air and water pollution in applying the manufacturing systems developed by its research.

Phase II - Research and Development

1. Work on this phase of the project was started early in 1975 and has progressed simultaneously with work on Phase I. Laboratory personnel made two trips to Southeast Asia (Philippines, Indonesia, New Guinea) to select an area for wood procurement, make initial contacts with potential cooperators, and to make arrangements for special studies. This was supplemented by an authorized trip of Dr. R.A. Skok, University of Minnesota and member of the Steering Committee, to the Philippines. Arrangements were made with the Industries Development Commission of the Philippines (FORPRIDECOM) for procurement and shipment of wood samples. Another contract with FORPRIDECOM provides for a study of chip storage.

2. Exploratory laboratory tests were made at FPL of kraft and neutral sulfite semichemical pulping of three different simulated "life zone" mixtures of chips of 50 Philippine hardwoods with the following significant results:

- Kraft pulps, with quality equal to or better than American hardwood kraft pulps, were made from all three mixtures.
- Air classification of wood chip mixtures can further improve the quality of kraft pulp--by at least 15 to 20 per cent in the case of mixtures simulating the dry and moist "life zones" by the removal of the high and ultra-high density wood.
- High-yield kraft pulping with 25-30 per cent screenings for use in manufacturing corrugating medium appears to be a feasible method of producing both corrugating medium and linerboard with only one pulping process. This gives promise of considerable savings in the manufacture of material for corrugated packaging material in a single pulpmill system.
- Neutral sulfite semichemical pulps made from the three mixtures appear to be suitable for manufacture of corrugating medium.

3. Laboratory tests of newsprint manufacture from mixtures of Philippine hardwoods established that acceptable quality newspaper can be made from (1) 100 per cent Philippine hardwoods consisting of 70 per cent thermomechanical pulp and 30 per cent kraft pulp, and (2) 80 per cent hardwood thermomechanical pulp and 20 per cent long-fiber sulfite pulp.

4. Light colored woods are required for production of mechanical pulp for newsprint, FPL attempted, without success, to classify chips by

color sorting using a technique based on transmitted light. Another technique used commercially to sort glass and potato chips will be tried before reaching a decision on the feasibility of optical color sorting. (Color sorting by optical techniques was not provided for in the original plan of work.)

5. FPL feels that it would be appropriate to further develop the thesis that there may be a critical maximum wood density which directly relates to each product's performance and that this additional information would help them design a better processing system and a more precise mathematical model. This would be a second departure from the original plan. The reviewers agree that this additional work would be desirable and that FPL should proceed with it.

6. Analysis of the barks of the 50 Philippine hardwoods showed that some of them have extremely high silica content. This establishes the need for debarking of the logs prior to chipping and indicates some potential difficulties in adopting the whole-tree chipping or utilization concept.

7. Preliminary testing of laboratory produced fiberboards from the three "life zone" chip mixtures gave results similar to those found for pulp and paper, i.e. mixtures with significant quantities of ultra-high density wood produced substandard quality boards.

8. Particleboards from three or more mixes of tropical woods are being processed in the pilot equipment at the University of Minnesota. This work will be completed by October 1976.

9. The research completed and in progress is of a preliminary nature to more clearly delineate the next phase which encompasses pilot

plant trials of pulp, paper, paperboard, fiberboard and particleboard for testing and evaluation against commercial standards. It is expected that this will establish the viability of using the processes in enterprises in LDCs. This work, using the Philippine woods, is scheduled for completion by October 1976.

10. In February and March, 1976 FPL survey teams visited Africa and Latin America to select sources from which to procure new wood supplies to be used to verify the results from the Philippine woods. Arrangements have been made for the collection and shipment of suitable sample batches of mixed tropical hardwoods from Ghana and Colombia.

Phase III - Dissemination of Results and Application in LDCs.

1. In this phase, the data and information gathered in Phase I and II will be used to design potential operating systems and prepare pre-investment feasibility reports for a range of enterprises in the three project locations in Asia, Africa and Latin America. The final report, covering both technical and business aspects, will be disseminated to LDC countries, cooperating agencies, potential investors, industries, etc. Seminars will be carried out in LDCs and the U.S. to promote interest and support in construction of full scale production facilities. Most of the work in Phase III will be done in the third year of the project.

2. The approved plan of work does not include details regarding the specific steps that will be taken in carrying out Phase III. It is not clear just how FPL intends to go about preparing the feasibility studies and other elements of the "pre-investment packages". Making pre-feasibility studies starting from scratch can be expensive and time consuming. For example, a prefeasibility study for a major pulp and paper mill which

meets requirements of the international development banks or UNDP will cost from \$50,000 to \$75,000. A full scale pre-investment feasibility study, including engineering designs, may cost several millions of dollars. Obviously, this is far beyond the level of funding for the entire mixed tropical hardwood utilization research project.

3. It is recommended that FPL consider ways of accomplishing the objectives of Phase III at costs within the project budget. This might include utilizing pre-feasibility or feasibility studies already made by others for proposed conventional pulp and paper or integrated manufacturing complexes in LDCs and modifying them to incorporate the processes developed by the research. This would require cooperation of the countries or agencies for whom the studies were originally made and possibly the consulting firms that made them. Another possible approach might be to start with known or estimated costs of constructing conventional pulp and paper, fiberboard and particleboard plants of different capacities and estimating the additional costs as well as economic benefits which would result from modifying the conventional systems to incorporate the new processes developed by the research. This too would require help of consultants and cooperation of others.

Undoubtedly, there are other approaches or shortcuts that might be followed or used which should be considered by FPL.

4. It is recommended that FPL prepare for its own guidance and for AID's information a detailed plan of action including time schedules, estimated costs and specific steps to be taken, to carry out Phase III of the project. This should be submitted to the Project Manager and the Steering Committee for consideration and comments not later than November 1976.

Future Project Appraisals

Another appraisal of this project should be made, in collaboration with FPL in January 1977 as the project enters its final phase.

Key Questions

A. Project Inputs

1. Are key inputs being supplied according to plan? Yes. Funding by AID and contributions of technical personnel, services and equipment use by FPL are substantially as originally planned. Satisfactory arrangements have been made for cooperation with LDC's and international organizations.
2. Are assumptions regarding supply of inputs still valid? Yes. However, this review raises the question of possible inadequacy of resources for Phase III of the project, particularly for making feasibility studies and preparing the required "pre-investment packages". The scope of this work and details of how it will be accomplished need to be more definitely defined.
3. The rate of performance of the action agency (FPL) against the plan is satisfactory.

B. Transformation of Inputs to Outputs

4. Given the answers above, is the management hypothesis that the totality of resources applied to the project will be sufficient to produce the predetermined outputs by the specified target dates still valid? Yes, with the possible exception of Phase III. We have recommended FPL prepare a more detailed plan of work for accomplishing this phase within the limits of the present overall budget.
5. Is the approach or course of action originally selected still the most appropriate? Yes.

C. Project Outputs

6. For output indicators, planned targets and actual performance see narrative and matrix.

a. Was actual performance less than the planned targets?

No.

b. What changes, if any, are necessary in outputs, output indicators, target dates, and assumptions? A more detailed set of indicators is needed for Phase III--dissemination and application of results. FPL should develop such indicators for AID/W review and approval. They are not included in the current matrix.

c. Do action agency reports provide adequate progress data for monitoring and analysis? Yes. Progress and trip reports have been prepared promptly, they are well prepared and readily understood. In addition the Steering Committee has met semi-annually to review progress and make comments and recommendations.

BEST AVAILABLE DOCUMENT

Worldwide Technical Assistance and Research

RDA Natural Resources Assessment and Management

FY 1975/76 Technical Assistance Bureau Program Submission
Project and Budget Analysis Matrix

931-17-995-
Project 607-72-316 Utilization of Secondary Species
No. 7903 Title from Tropical Forests

Contract/PASA Forest Products Laboratory
No. 3-75 AG/TAB-995 Name Forest Service, USDA

Major Country/Countries

Worldwide with principal activities in
Philippines, Ghana, Colombia

Obligation: Initial FY 1975 Final FY 1978

Service : Start FY 1975 End FY 1978

RAC/PROP Status: Project approved thru FY 1978

Section 2(d): Project approved thru FY 1978

Evaluation Scheduled Jan. 77 A
Month Year Type

Project Officer Walter Parham Extension 29371

On-Going Only

Narrative	Objectively Verifiable Indicators																																																											
<p>B1 PURPOSE: 1. State-of-the-art analysis and report on production of pulp and paper from mixed tropical secondary species; analysis of social, environmental, economic and technical aspects. 2. Develop new, feasible, economical and labor-intensive process for using mixtures of tropical hardwoods in production of paper, fiberboard and particleboard. 3. Series of pilot scale tests of the system using wood from Asia, Africa and Latin America. 4. Dissemination and application of results by developing feasibility reports, pre-investment packages, conducting seminars and promoting interest in constructing production facilities in LDCs.</p> <p>C1 OUTPUTS: 1. Installation of new industries or modification of existing industries to make more efficient use of secondary species using the processes and systems developed by the project. 2. More complete utilization of secondary species currently left behind or wasted in timbering and land clearing operations. 3. Creation of more employment in LDCs in timber harvesting and processing. 4. Improvement in economy and foreign exchange position by manufacturing for domestic use and export products now largely imported by LDCs.</p> <p>D1 INPUTS: 1. Grants of \$576,000 to FPL for life-of-project. 2. Contributions of technical personnel, laboratory services, use of laboratory and pilot plant equipment at FPL. Estimated to total at least \$500,000 for entire project. Contributions to date estimated at \$128,000. 3. LDC staff and facilities contribution. 4. FAO, UNIDO, UNDP and other studies.</p>	<p>B2 End of Project Status: 1. State-of-the-art report on processing secondary hardwood species, and present knowledge on environmental, social and economic impacts of harvesting and processing systems used to date. 2. and 3. Successful development of economically sound, commercially feasible and environmentally acceptable new processes for utilizing secondary species of mixed tropical hardwoods. 4. Development of new processing plants in LDCs.</p> <p>C2 Output Indicators: 1. Number of new or existing industries in LDCs which adopt and apply the research results in manufacturing plants. 2. Volumes of secondary species utilized in LDCs as compared with existing situation. 3. Increases in employment in countries adopting the new processes and systems. 4. Profit and loss statements of industries that use the products of the research and changes in foreign exchange position in countries utilizing the new system.</p>	<p>B3 Progress to Date: 1. State-of-the-art review about 75 percent completed. 2. Preliminary scientific investigations on Philippine woods largely completed. Completion date October 1976. Wood samples from Ghana and Colombia being shipped. 3. Pilot tests just starting on Philippine woods. 4. Too early for dissemination and application of results.</p> <p>C3 Progress to Date: (1) through (4). Too early for measurable results. Considerable interest in LDCs visited, industries and international organizations in the research program and the possibilities it holds for future application.</p>																																																										
D2 Budget Summary (in thousands of dollars)																																																												
All Prior Year	(1) (2) (3) (4) (5) (6)* (7) (8)	Personnel Commodities Other Costs Total Expenditures June 30 Pipeline Funding Period Month Year																																																										
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* FY 1975 Congressional Presentation level. ** Estimate

* Expenditures are to be computed on an accrual basis.