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Training Course on Coconut Wood Building

Philippines, 20-28 February 1985

UC/RAS/84/267

Mission report* (Course on coconut wood building).

prepared by

Agro-industries Branch
Division of Industrial Operations

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*This document has been reproduced without formal editing.

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1. INTRODUCTION

UNIDO has been involved in the processing and use of coconut wood since 1982, when it became associated agency to the FAO-project 'Regional Coconut Wood Training Programme' (DU/RAS/81/110). UNIDO provided the services of the secondary wood working expert, Mr. V. K. Sulc, who contributed to the training programme and supervised the construction of low cost houses made of coconut wood based on traditional designs from the region. He also supervised the strength testing of full-sized sawn wood at the Forest Products Research and Development Institute Los Baños, Philippines, and provided liaison to the creation of full architectural drawings and plans for a low cost housing system using coconut wood which was prepared by the architectural firm of Gregorio Santa Maria, Manila.

The success of this project was such that two small projects (SI/PHI/83/ 801 and SI/PHI/84/801) were implemented. Their objectives were to build prototype houses of coconut wood in Davao and Lucena City to demonstrate not only to the Government Authorities but also to the architects, builders and engineers that coconut wood could be a reliable structural material.

As part of the activities of SI/PHI/84/801, the Counterpart Agency, together with the professional bodies of architects, builders and civil engineers organized a national seminar to publicize the potential of coconut wood and to disseminate some of the relevant technical information. This led to the suggestion from Mr. Ivan Pluhar, SIDFA based in Manila, that UNIDO try and organize a group training seminar and study tour further to disseminate this information within the region.

Thus project UC/RAS/84/267 was approved which included the travel of Mr. R.M. Hallett, Agro-industries Branch, to the Philippines to help conduct the course and study tour and make various presentations on UNIDO's behalf. It was expected that during this mission discussions would be held with Government officials and representatives of the private sector involved in construction on the prospects for introducing coconut wood and in fact the light timber framing techniques into the country. This was also a natural follow-up to discussions held with Filippino participants in earlier training courses on this subject. (Timber Engineering Workshop, Australia, May 1983, US/INT/81/222 and Introduction to Timber Engineering Training Course, New Zealand, May 1984, UC/RAS/84/005.)

All of these have led to increasing awareness both of the UNIDO substantive staff and amongst professionals in the country of the potential for much more use of timber in construction and the deficencies in current practice.

2. PURPOSE OF MISSION

The purpose was to attend a seminar arising from the work in both small national projects, to assist in the conduct of project UC/RAS/84/267, and to plan regional activities in this field with participants. It was also intended to monitor the results of the two national projects and to discuss follow-up on a national scale.

3. COMMENTS AND RESULTS

3.1. UC/RAS/84/267

A total of 16 participants took part in the course (9 from this project and 7 from project DP/RAS/82/012: Regional Network in Asia for Low Cost Building Materials Technologies and Construction Systems (RENAS BMTCS). See annex 1 for the list of participants. Most were well qualified although some seemed somewhat apathetic, but all attended the full course and study tour and took an active part in the proceedings.

A few had more experience in coconut wood use and timber frame housing techniques and timber engineering than the Fillipino hosts, but this provided a valuable interchange of experience. Unfortunately, neither an engineer nor architect was assigned to this project from the Ministry of Human Settlements who could have benefitted considerably from this exchange of experiences from the group. He or she could also have made a useful input concerning traditional and current architectural and civil engineering practices in the country.

The Aide-mémoire for the training course is attached as annexe 2 and gives the programme followed for the participants during the seminar and study tour. The schedule of activities for the seminar is found in annexe 3.

The seminar itself was very successful, especially politically, and got together several organizations, which otherwise might not have done so, to seek solutions for mutual problems. These included representatives of the Philippine Coconut Authority, the United Architects of the Philippines, the Philippine Institute of Civil Engineers, the Philippine Constructors Association and the Ministry of Public Works and Highways (the Hon. Minister A. P. Canlas gave the key note address). In his speech he mentioned that coconut wood had been used for schools by his ministry and that the supply of normal structural woods was decreasing and this emphasized the need to use local building materials as much as possible. He stated that "Coco lumber promises to be cheaper than wood", and supported Government efforts to develop cocowood as a structural material, especially since local products were often better than the imported ones.

He referred to the work done at the Zamboanga Research Center (ZRC), saying that coconut wood was similar to Apitong except for modulus of elasticity and shear and recommended it for trussed rafters and joists following a soaking in 5% CCA solution for two or three days. He also referred to the two recent typhoons which underscored the need to use cocowood and mentioned that a co-operative housing programme for government employees in Mangahan would use cocowood for 5,000 to 6,000 houses required.

The Governor of Quezon province, Eladio Caliwara, replied to this opening address by pointing out that Quezon province was the biggest coconut producer with some 34 million trees on 284,380 hectars of plantation. 60% of these were more than 60 years old and mostly were very tall, some up to 100 years old and no longer productive. He pointed out that disposal problems added to replacement problems especially following typhoon felling and clearing for building sites. Some 175,000 stems were cut for transmission lines in Quezon and other provinces within the last year or so.

He pointed out that the project in Lucena City needed some 210 stems for the demonstration house which was built beside the Governor's mansion and that this resource should be most suitable for houses and other processing industries. The statement made on behalf of the Executive Director of UNIDO, Dr. Khane, is included as Annex 4.

The closing ceremonies featured an address by the Hon. Minister Rolando de la Cuesta, Chairman, Philippine Coconut Authority, which made an important statement on Government policy with regard to coconut wood utilization. In his speech he strongly supported the initiatives of the private sector in bringing coconut wood into commercial use and hoped that coconut wood would become acceptable in the local market in competition with traditional wood species and that it would become a principle house construction material for mass housing. He also believed that from this initiative would come an expansion of the labour market and the consequent harnessing of available labour skills. He stated that the Government would cause the formulation into specific policies of the following:

(1) The inclusion of cocowood in the list of commercial species approved by the Philippines Government for domestic processing into lumber and lumber products and as substitute for traditional wood species like Yakal, Guijo, white Lauan, red Lauan, Tanguile and other commercially accepted species under the Philippine Mahogany group of species commonly used by the building and construction industry.

(2) The use of coco lumber in mass housing projects in anticipation of the sizeable quantities of coconut tree stems that will become available as we implement the Coconut Replanting Programme; and

(3) the felling of cocotrees aged 60 years and above only." His full address is reproduced as annex 5.

Between 60 and 70 participants registered and paid to attend the seminar aside from those participating within the United Nations projects. These were well balanced between Government officials and private sector representatives interested in the potential use of coconut wood for buildings.

In the author's view, there was too much research work presented ambivalently with too few confident statements made concerning how coconut wood should be converted, dried, preserved and how buildings should be designed to use timber in general. Thus the background documentation prepared for the seminar gave a mixture of research results and description of the experimentation rather than clear results, conclusions and advice for people

unfamiliar with the research world. It also pointed up the lack of familiarity with timber frame housing construction as it is known and so widely used in North America, Northern Europe, Australia and New Zealand. This caused a confusion (in the statistical sense) between the problems of using coconut wood and the more general problems of using timber in construction. There was also too much dwelling upon the project experience per se than in giving results and recommendations.

The seminar also brought out the conflicting views on what constituted low cost housing and it was apparent that the UNDP/UNIDO design was more a low cost urban house than a low cost rural house. Thus, too much time was spent in discussing what constituted a low cost house rather than on how to build them.

The study tour was well organized by the Ministry of Human Settlements (MHS) regional network project (RENAS-BMTCS) but there was no professional input from them nor benefit to them because of this. The visit to the local sawmill highlighted the poor quality of domestic processing when compared with the facilities available in export sawmills.[1/] The only criticism from the participants was the lack of space on the buses provided.

The visit to Forest Products Research and Development Institut (FPRDI) in Los Baños served to open the eyes of participants to the extent of work done on coconut wood in the Philippines, but also showed the lack of dissemination of this information. This apparently was being rectified with a "Mature Research Bulletin No. 2" being planned for coconut wood only. FPRDI also had plans for more consultancy work and exposure to the industry under the new Director Mr. Tesoro.

Regarding the visits to the Southern Philippines Development Authority (SPDA) in Davao and to the project sight at Lucena City, see sections 3.2 and 3.3 below.

1/ This problem continued during the summer and caused considerable delays in project SI/PHI/84/801.

It should be noted that the hospitality provided by the organizers for the international participants was very generous and it was only through hard negociation that UNIDO was permitted to host an evening event to reciprocate under the SI/PHI/84/801 budget.

3.2. Southern Philippines Development Authority (SI/PHI/83/801)

A list of comments concerning design and construction of this prototype house made by Mr. Hallett and participants were given to the project consultant and architect who were also responsible for the Lucena House and were discussed with General Antonio N. Venadas, Administrator, SPDA, as were their plans to make use of the technologies. It should be pointed out that these were from outsiders with no appreciation of the complex political and local problems associated with building such a prototype structure and that considerable success was achieved through its construction which certainly drew valuable attention to the subject. It seemed that the SPDA would make use of the technology for much cheaper rural low cost housing and other types of buildings and they looked forward to more information as experience was gained in other parts of the Philippines with coconut wood use.

The project itself highlighted the problems of local conversion which also existed for other timbers as well. For example, if nails are substandard then there is not so much a problem of difficulty in nailing coconut wood but a difficulty in finding good nails. For this project the sawnwood was of excellent quality but was ruined by local planing and profiling. Therefore the finish and the execution of the building was very bad although the builder was working under a strong time limit imposed by SPDA for its opening.

There was some misunderstanding between UNDP Manila and the Counterparts on the one hand and UNIDO, Vienna, on the other over objectives of this first project. In the Philippines it was considered most important to show that coconut wood could replace other traditional wood species in as many applications as possible; whereas UNIDO believed that the more important objective was to show that coconut wood could simply be used to build low cost houses. This situation was complicated by some changes directed by the SPDA, for example,

even though expensive rafters were used in the roof, ceilings were insisted upon made of V-grooved boards, ceiling were requested on the balconies and stairwells, and an expensive bar was installed, all of which raised the costs which were not reported separately at the seminar.

Other comments concerning the design and execution were:

- 45° mitred corners were used throughout, which increased the costs of profiled wall boarding;
- There was poor detailing on the balcony lower rails which would likely lead to early rot;
- Inside stairways should not have been used, especially at the rear, since these greatly increased the costs and introduced the need for expensive masonry surrounds;
- For low cost rural (as opposed to urban) housing, kitchen and bathroom should be on the ground to avoid expensive masonry as with stairwells;
- The ceiling should have been left off so that the house was open to the rafters thus increasing ventilation in hot weather especially;
- The unnessesary corners should have been avoided in the design;
- The balconies sliding doors opened in such a way as to cover the living-room windows;
- Double skinned doors wereused rather than single skinned at the request of the SPDA.

Not all of these were within the control of the project but should be noted for future reference.

It is likely that the SPDA will try low cost rural designs, possibly using treated coconut wood poles at approximately Pesos 30,000 for 50 m^2 and so achieve more acceptable results.

On other matters related to coconut wood use in this region, the Davao Gulf Lumber Company representative expressed concern over log supply and was willing to saw coconut wood to cover fixed costs of their large sawmill. This would make the resource much more likely to be used since their good equipment would produce good quality lumber which could even be stress graded and properly dried.

Mr. Hallett also paid a visit to BNH Lumber Company whose owner and General Manager Mr. Rual Hontiveros had attended the training course at Zamboanga, since they stocked sawn coconut wood. This was available in reasonable sizes in two qualities "good" and "form" with or without preservative treatment (consisting of CCA dipping). The good grade sold for 3 or 3.5 Pesos per board foot if treated, whilst the form quality sold at 2.5 Pesos per board foot untreated.

Mr. Hallett also visited Davao Wood Preserving Company Incorporated and spoke with Mr. Paulino Pedronio, accountant, to learn of their experience with preservative -treatment of poles. They have apparently been pressure treating utility poles with CCA since 1977 and other species since 1964. To treat poles they remove the bark and 8 inches of the core part of the stem a both bottom and top and insert a plug to prevent too much CCA from being absorbed. Retention is one pound per cubic foot and the costs are approx. 4 Pesos per board foot. Their plant is in Bunawan, 22 km north of Davao center.

The company has also built many of their own rest houses of coconut wood as well as administrative buildings, staff houses and the Davao Gulf Club including many structural components.

They also stated that they had had no problems with 15 years of treatment and also that the Atlantic Gulf and Pacific Corporation in Manila had 30 years experience treating Lauan and Apitong with creosote. The DWPC had also tried dip-treating Lauan veneer for roofing in low cost buildings with some success which indicates that this could be an interesting possibility for low cost housing in areas near export plymills. Finally, Mr. Pedronio mentioned that a company in Manila manufactures a CCA type wood preservative under the name of ATOM.

3.3 Lucena City House (SI/PHI/84/801)

As with the first prototype house in Davao, there were mixed motives affecting the design and building of this house. UNIDO's understanding was that prefabrication and other timber species as well as other building materials were to be used to the extent that savings could be made and a more logical design developed to suit local building conditions, but again this prototype was, in our view, over-designed from both the engineering and cost points of view. For example, there were three central posts of yakal which duplicated the load bearing function of the rather heavy bolted roof trusses. There was some question as to whether this would be a duplex, i.e. divided, house or whether it would be a single unit used for training or other institutional uses. This undoubtedly affected the decision as to type of interior partition used and also whether or not a half loft would be appropriate.

On the other hand the concept of using prefabricated roofing panels was good and outside stairs were used this time, no doubt with considerable savings. Other comments were made such as, that nail-on plates should have been tried for roof trusses rather than bolts which would have allowed prefabrication of trussed rafters on the site that the width of the model could have been reduced to allow the use of plain rafters in sizes which were obtainable; that tongued and grooved or V-grooved boards should have been avoided so that the processing difficulties experienced in Davao would not reoccur; and finally, that treated coconut wood poles might have been tried rather than concrete ones shaped to look like coconut palm stems.

The builders were then experiencing considerable difficulty in processing the coconut wood with the poorly equipped local sawmilling and conversion facilities which underscored the need to upgrade this sector if any large-scale programme of coconut wood used in building is to be contempleted. Nevertheless, this project has served as a very good illustration of coconut wood use and was a focal point for the participants at the national seminar in Lucena City.

3.4 Second seminar on coconut wood building in Davao

During the study tour visit to the SPDA, General Vanedas showed keen interest in dissemanating the information on coconut wood processing within his region and offered to host it at the excellent facilities of their central

office complex, (km 12 Catalunan Pequeño) near Davao. Consequently, Mr. Hallett drafted a programme with engineer Pio J.A. Velasco, which was discussed and agreed also with Mr. Haratio Brion, Gregorio Santa Maria, and Ivan Pluhar. This was to be more oriented toward giving results and firm recommendations and positive statements on coconut wood's potential rather than research experience. It was also planned to have shorter papers and technical notes to hand out rather than long papers with more emphasis on presentation and discussion amongst participants which would hopefully include more industry representatives. It was also recommended to divide into two groups - one concerned more with conversion of coconut wood and the second more with engineering design and building problems. Mr. Hallett also recommended that a demonstration at the Davao Gulf Lumber Company, to show how easy coconut wood was to saw with good equipment, would be useful as would a field visit to inspect CCA treated coconut wood utility poles in the vicinity.[2/]

4. OTHER BUSINESS

4.1 Philippines timber construction

Although timber has been used in construction for many years in the Philippines, during the last 30 or 40 years concrete block designs have become known as traditional and there is no widespread use of light timber framing. A visit was made to Gang-Nail Philippines, Inc. in Metro Manila, to get their views on timber especially trussed rafter usage based on their experience with 12 licencees in the country. Their opinion is that rural low cost housing is probably not suited for Gang-Nail trussed rafters but that these would be suitable for urban buildings. These would be acceptable, as wood nail-on plates as long as there were ceilings to hide them. Apitong is the main species and is quite durable which is fortunate since preservation did not seem to be properly carried out mainly through lack of drying beforehand. Furthermore, no preservation standard exists in the country and even experienced architects apparently do not specify retention or penetration levels when calling for "preserved timber".

2/ The second seminar was run in April and all reports were that it was more successful than the first and stimulated much interest.

The representatives Messrs. Acosta and Bernal were interested in making informal trials using coconut wood and nail-on plates with galvanized clout nails which may be possible without predrilling.

4.2 Codes and design

Mr. Hallett discussed with architects G. Santa Maria and Cesar Caliwara the lack of a light timber framing code. They were impressed at the example of the Australian code (AS 1720) and were in favour of discussing with other influential engineers and architects the creation of a timber design group aimed at fostering and promoting the use of timber and eventually drafting a code on similar lines including low cost concepts. This latter was felt to be particularly important owing to the recent Bill 220 (whose aim was to encourage the use of traditional and local available building materials) and the use of coconut wood in buildings.

The main obstacle to greater use of timber framing in especially rural use is the need for all building materials to have a 25 years service life - even non-load bearing parts. This was discussed at a meeting with the Ministry of Human Settlements - Bliss Development Corporation, Vice President Pedro Raralio, Jun. and engineers on his staff, where it was clarified that a structural frame (that could be mortgaged and insured) could be built separately and that in-fill panel partitions and roofing materials could be made on a self-help basis in cooperatives or in small family groups. The MHS has some experience with coconut wood building but many of their projects are concrete "half boxes". Their guidelines call for a minimum family income of Pesos 1,500 per month to qualify for credit. The concept of houses on stilts or poles was apparently acceptable and the engineers were most interested in UNIDO's recently published "popular manual on wooden house construction (ID/330)" and felt that this approach should be pursued.

The allowable working stresses for coconut wood as evaluated by CSIRO Australia, following in-grade tests in Los Baños were given to the MHS staff as well as to architect Santa Maria and engineer Espiloy at Los Baños.

4.3 Technical issues

A few questions were considered still to exist regarding coconut conversion and use, namely: the corrosion of nails due to either the coconut wood itself or the CCA preservative treatment; the internal splitting with nailing; and the scale of sawing and preservation operations best suited to the kind of conversion programme that should be developed for the country.

The UNIDO Secretariat views are that the great majority of technical questions have been resolved and that the need now is for a widespread programme to upgrade local sawmilling and preservation facilities and to disseminate knowledge on how to build with timber of any species but with emphasis on the particular problems associated with coconut wood.

5. CONCLUSIONS

The seminars served to alert many engineers and architects to the potential not only of coconut wood but also of timber frame construction in the Philippines and a great deal has been learned from the building of the two prototype houses in Davao and in Lucena City.

There is a great need to disseminate technical information generated by these projects and by the Zamboanga Research Center. It is gratifying to note that the current policy of the Forest Products Research and Development Institute, Los Baños, is to increasingly emphasize dissemination of information and technical consultancy or extension services in their work programme.

Basic timber engineering needs promoting and a timber design group should be created to investigate barriers to greater use of both coconut wood and timbers in general and to coordinate technical submissions to standards and legislature bodies dealing with the subject.

Coconut wood must be included in the National Structural Code for Buildings List of Species (table 3.04(a)).(Refer to the closing address by the Hon. Minister de la Cuesta - annex 5.)

Referal standards must be reviewed and revised as appropriate in so far as they wrongly and adversely affect wood due to lack of technical awareness.

Some comments by the participants on the seminar/study tour are included in the group terminal report done under project DP/RAS/82/012.

UNIDO's views on coconut wood are that it must be subjected to industrial processing with proper care taken and control exercised so that reliable building materials are produced. Then with careful supervision, really low-cost rural houses and farm buildings can be built.

ANNEX 1

LIST OF PARTICIPANTS

NAME AND COUNTRY	TITLE AND NAME OF COMPANY	ADDRESS
INDONESIA		
EMAN Nayohan Habel	Architect Department of Public Work	II Martadinata VI Dendengan Luar Manado North Sulawesi
SUWANDOJO Siddiq	Building Structural Designer and Researcher	Institute of Human Settlements (IHS) Jl. Taman Sari 84 Bandung
KIRIBATI		
TANENTOA Inatio	Architect, Technical Services	Public Works Department Betio Tarawa
YOUNG William T.	Chief Engineer	Ministry of Works and Energy P.O. Box 498 Betio, Tarawa
MALAYSIA		
ABDUL HADI B. Endut	Architect	School of Housing, Building and Planning University Sains Malaysia Minden, Penang
MOHD SHUKARI Midon	Senior Research Officer	Forest Research Institute Kepong, Selangor

NAME AND COUNTRY	TITLE AND NAME OF COMPANY	ADDRESS
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SEYCHELLES		
NADEF F.R. Green	Accounting/Marketing Supervisor	P.O. Box 332 Victoria Mahe
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MCNAUGHTON Norman	Works Engineer	Public Works Division Ministry of Communic ons and Works Funafuti
TAVAU Teii TAVAU	Assistant Agricultural Officer	Ministry of Commerce and Natural Resources Funafuti

NAME AND COUNTRY	TITLE AND NAME OF COMPANY	ADDRESS
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January 1985

TRAINING COURSE
ON
COCONUT WOOD BUILDING

Organized by the United Nations Industrial Development Organization and the Regional Co-ordinator Low Cost Building Materials, to be held in the Philippines, from 20 to 28 February 1985.

AIDE-MEMOIRE

Background and Purpose of the Training Course

Coconut stems represent a very large and hitherto underutilized natural resource, which in some small island countries is the only indigenous source of building timber. The general objective of this project is to develop and promote the use of coconutwood in buildings, especially prefabricated housing. It is expected to acquaint architects, civil engineers, builders and specifiers from the region with the latest progress made in the conversion of coconut stems into building products, and in the design procedures and construction techniques used in the Philippines for low - to medium - cost housing using prefabrication and other timber species as appropriate. It will also foster interchange of experiences amongst professionals in this field.

Furthermore, it is intended to promote rural development and assist in providing basic shelter needs, as well as alleviate phyto-sanitary problems related to disposal of residual coconut stems.

UNIDO has followed up the considerable work undertaken at the Zamboanga Research Centre on coconut stem conversion with two small projects to demonstrate how coconut wood can be used in building. The first (SI/PHI/83/801) resulted in a prototype house for the Southern Philippines Development Authority in Davao, and the second (SI/PHI/84/801) involves modifying the original designs and incorporating both other timber species and an appropriate degree of prefabrication.

As part of the second project's activities the Government of Quezon Province, in co-operation with the United Architects of the Philippines (UAP), the Philippine Institute of Civil Engineers (PICE), and the United Nations Industrial Development Organization is offering a three-day seminar to disseminate coconut wood processing technology and its uses in low-cost housing to the local lumber and construction industries. The sponsors of the seminar, mindful of the importance of the subject to other coconut-growing countries, wish to invite such countries to send their participants to the seminar in order to learn first-hand what developments in this area have taken place in the Philippines.

This Training Course will seize upon the opportunity presented and permit ten architects, builders or engineers from the region to attend the seminar and also to make a study tour within the Philippines to observe and discuss with those responsible, the coconut stem conversion facilities and prototype houses in Davao, Mindanao and similar project work in the Provinces of Quezon and Laguna, as well as to visit the Forest Products Research and Development Institute in Laguna, where coconut stem utilization R and D work has been going on for 14 years. Discussions will also be arranged for participants with Filipino architects and engineers within the Ministry of Human Settlements working on community housing projects (such as the BLISS Housing Project in Los Baños) to learn of their experiences in deciding upon coconut wood as a building material.

Thus a unique opportunity will be arranged to foster the transfer of this important technology. Note: A further seven participants (from Indonesia, Malaysia, Tonga and Tuvalu) will be expected to join the group but funded from the regional project RAS/82/012 - Regional Network in Asia for low-cost building materials, technologies and construction systems.

Participants

Up to 10 fellowships will be awarded to candidates from selected developing countries having significant coconut resources. Governments are invited to nominate up to three candidates who should be fully qualified civil engineers or architects, builders or contractors with an interest in low-cost or social housing, or specifiers or government officials especially concerned with the problems of building and/or making full, rational use of their country's coconut resource. They should in any event be or become familiar with their country's plans with regard to coconut stem use and the processing facilities currently available or being considered. They should furthermore be aware of building regulations, codes and standards relevant to the use of coconut wood and be prepared to make a short presentation on this subject during the course.

Candidates should submit as much detail as practical about their training and educational background, including current and proposed project work, to assist in the selection process.

Participants will attend the Training Course in their individual capacity, although they will have been officially nominated by their respective Governments. They must attend the entire course according to the schedule prepared by the host authorities, and comply with the rules laid down. They

must contribute as much as possible since they and the other participants will all benefit thereby.

Training Course Activities

The Training Course will comprise two parts: (a) seminar and (b) study tour.

(a) attendance and participation in the National Seminar on Technology of Coconut Wood Processing and Utilization of Coconut Wood as Building Material, 20 to 22 February which will:

(i) describe through lectures and visual presentations the techniques of coconut wood processing:

(ii) demonstrate coconut wood processing and milling in a local commercial sawmill:

(iii) explain the designs and the construction techniques used in prefabricated and non-prefabricated houses:

according to the following programme:

SCHEDULE OF ACTIVITIES

1985
20 February, Morning : Registration

Opening ceremonies

Conversion of coconut stems into coconut lumber

A. Coconut stems logging operations

B. Sawmilling coconut logs

Afternoon : Processing and utilization of coconut in the production of secondary wood products

A. Kiln-drying and preservation of coconut wood

B. Woodworks and joinery production using coconut wood

C. Home furnishings using coconut wood

21 February, Morning : Coconut lumber as a building and construction material

A. Design and construction aspects of coconut wood houses

B. Structural aspects of coconut wood utilization

Afternoon : The economics of coconut wood utilization

Participants will spend nights as follows:

(Manila : 18 February)
Lucena City : from 19 to 22 February
Manila : 23 and 24 February
Davao : 25 February
Manila : from 26 to 28 February

22 February, morning : Plant visit and demonstration of coconut wood processing

afternoon : Open forum

Closing programme

(b) participation in a study tour within the Philippines arranged to complement the seminar by demonstrating the technology and various buildings made of or largely of coconut wood, from 23 to 28 February 1985.

It will include travel to Davao, Mindanao to observe the prototype houses built by the Southern Philippines Development Authority (SPDA) with assistance from a previous UNIDO/UNDP project, and the local sawmill whose staff was trained by the project expert to convert coconut wood, plus others as appropriate.

The group will also visit the Forest Products Research and Development Institute (FRDPI) for discussion sessions and travel to other project sites where coconut wood is being processed or has been used in construction. It will be co-ordinated by the Regional Secretariat of the Regional Network (DP/RAS/82/012).

The proposed programme is as follows:

SCHEDULE OF ACTIVITIES

23 February (Saturday)
Morning : Visit to the Forest Products Research and Development Institute (FPRDI) at Los Baños, Laguna.

Afternoon : Land travel from Laguna to Manila.

24 February (Sunday)
Whole Day : Free time/Discuss Group Terminal Report

25 February (Monday)
Morning
(9:00-11:00) : Air travel from Manila to Davao

Afternoon : Visit Prototype Projects of Southern Philippines Development Authority

26 February (Tuesday)
Morning
(7:00-9:00) : Travel from Davao to Manila

Afternoon : Special interest activities

27 February (Wednesday) Whole Day	:	Visit BLISS Projects of the Ministry of Human Settlements in Manila
28 February (Thursday) Whole Day	:	Finalize Group Terminal Report
Evening	:	Closing Programme
01 March	:	Departure for home countries

Language Requirements

The Training Course will be in English and proficiency is therefore required. Candidates whose mother tongue or language of main education is not English must submit a language certificate to this effect (preferably from a recognized institution such as the British Council)before being eligible for consideration.

Medical Certificate

As with all UN group training programmes, a medical certificate attesting to the good health of each candidate is required.

Financial and Administrative Arrangements

A. UNIDO will provide:

1) Round-trip economy class air transportation between the airport of departure in the participants home country and the airport in Manila, Philippines.

2) Local ground and air transport related to the course.

3) Daily subsistence allowance to cover board, lodging and incidentals at the prevailing UN rates at the time of the course.

4) A staff member to help conduct the course.

5) As part of the ongoing project SI/PHI/84/801, three lecturers for the seminar and assistance during the study tour from project experts.

B. The Philippine Government and Professional bodies will contribute as follows:

1) The Government of Quezon Province together with the UAP and the PICE will organize and conduct the seminar. It will provide overall staff support during the seminar. The Regional Secretariat will coordinate the participation of the international participants. It will assign a staff to provide documentation assistance to the seminar staff.

2) The Ministry of Human Settlements through the Regional Secretariat will organize and conduct the study tour. It will provide local ground transport for the international participants sponsored by UNIDO and the Regional Network. The Regional Secretariat will likewise facilitate the preparation of the Group Terminal Report.

3) All expenses related to the preparation and conduct of the Training Course will be borne by the Government of Quezon Province and its co-sponsors, the UAP and PICE. All expenses related to the preparation and conduct of the Study Tour will be borne by the Ministry of Human Settlements.

C. The participants' Governments or his/her employer will be required to bear the following:

1) All expenses in the home country incidental to travel abroad, including those for passport and visas, medical examinations, inoculations and other such, including internal travel to and from the airport of departure in the home country.

2) Salary and other benefits for the participant during the period of the course.

D. UNIDO, the Philippine Government and organizers will not be responsible for the following expenditures in connexion with the participant's attendance at the course:

1) Costs incurred by participants with respect to any insurance, medical bills and hospitalization costs;

2) Compensation in the event of death, disability or illness;

3) Loss of, or damage to personal property;

4) Purchase of personal belongings and compensation for damage caused to them by climatic or other conditions.

NOTE: Participants are not allowed to have family members accompany them. Before submitting an application each candidate should be fully aware of the content of this aide-mémoire.

ANNEX 3

INTERNATIONAL SEMINAR ON
TECHNOLOGY OF COCONUT WOOD PROCESSING AND
UTILIZATION OF COCONUT WOOD AS BUILDING MATERIAL

organized by

The Government of Quezon Province, Philippines

in cooperation with

United Architects of the Philippines
Philippine Institute of Civil Engineers
Philippine Constructors Association
United Nations Development Programme
United Nations Industrial Development Organization

to be held in Lucena City, Quezon Province
20 – 22 February 1985

Venue: City Antigua Building

Mr./Ms. Mr. Robert Hallett

Participant/Guest

SCHEDULE OF ACTIVITIES

19 February – Arrival of Foreign and Local Participants

20 February

9:00 AM – Registration of Participants

10:30 AM – Opening Ceremonies

– Philippine National Anthem

– Welcome Remarks: ..... **Mayor Mario L. Tagarao**

– Introduction of Guests and Participants .. **Engr. Cesar A. Caliwara**

– Opening Remarks: ..... **Mr. Robert Hallett**
Industrial Development Officer
UN Industrial Dev. Organization

– Introduction of Keynote Speaker ..... **Engr. Romeo L. Alcala**
Pres. PICE, Quezon Chapter and
I Eng'ng District, MPWH

– Address of the Keynote Speaker: ..... **The Hon. Min. Aber P. Canlas**
Member of Parliament and Deputy Minister,
Ministry of Public Works and Highway

– Response: ..... **Gov. Eladio A. Caliwara**

12:30 PM – L U N C H E O N – Host: ..... **Dutch Boy Phils. Inc.**

2:00 PM – The Economics of Utilization and Processing of Coconut Wood Components for Low Cost Housing Construction
Resource Person: ..... **Mr. Horatio P. Brion**
Wood Processing Expert
UN Industrial Dev. Organization

2:35 PM – The Design, Capabilities and Potentials of Movable Sawmill for Small Scale Coconut Wood Processing
Resource Person ..... **Mr. Antonio A. Salita**
Science Research Specialist II
FPRDI, Los Banos, Laguna

3:10 PM – Machining Properties of Coconut Wood
Resource Person: ..... **Mr. Arnold P. Mosteiro**
Senior Science Research Specialist
FPRDI, Los Banos, Laguna

3:45 PM – Seasoning and Preservation of Coconut Wood
Resource Person: ..... **Mr. F.R. Siriban**
Senior Science Research Specialist
FPRDI, Los Banõs, Laguna

COCKTAILS-FELLOWSHIP: Host ..... **UAP, PICE and PCA Quezon Chapter**

21 February

9:00 AM – Materials for Preservation, Treatment and Finishing of Coconut Wood and Traditional Lumber Species
Resource Person: ..... **Mr. David D. Bonney**
Senior Vice-President, Dutch Boy Phils, Inc.

9:35 AM – Air-and Kiln-Drying Properties of Coconut Lumber
Resource Person: ..... **Mr. Melencio G. Laxamana**
Senior Science Research Specialist
FPRDI, Los Banos, Laguna

10:10 AM – Industrial Application of Coconut Wood Processing Techniques
Resource Person: ..... **Mr. Horatio P. Brion**
Wood Processing Expert
UN Industrial Dev. Organization

10.45 AM – Basic Research Findings on the Structural Strength Characteristics of Coconut Timber and Boards
Resource Person: ..... **Mr. Enrique B. Espiloy, Jr.**
Senior Science Research Specialist
FPRDI, Los Banos, Laguna

11:20 AM – The Structural Design Aspects of Coconut Wood Utilization in Low Cost Housing Construction
Resource Person: ..... **Engr. Cesar A. Caliwara**
President, TECPHIL
Consulting Structural Engineer

12:30 PM – L U N C H E O N – Host: ..... **Dutch Boy Phils. Inc.**

FREE AFTERNOON

7:00 PM – D I N N E R – Entertainment and Cultural Presentation
Host: . . . . . Quezon Provincial Government

22 February
9:00 AM – Plant Visit and Demonstration
1. Tantuco Sawmill, Candelaria, Quezon
2. Tantuco Planning Mill, Sariaya, Quezon
3. Prefabrication Site, Pagbilao, Quezon
4. Demonstration of Coconut Wood Utilization in Prefabricated Low Cost Housing, Lucena City

12:30 PM – L U N C H E O N – Host: . . . . . Sawmill and Lumber Companies

2:00 PM – Experience in Coconut Wood Utilization Prior to Application of Current Coconut Wood Technology
Resource Person: . . . . . Archt. Aquiles C. Paredes
Fellow, United Architects of the Phils.

230: PM – Experience in Application of Coconut Wood Technology and Utilization at SPDA, Davao City 1984
Resource Persons: . . . . . Engr. Pio J. A. Velasco
Engr. Oscar C. Paradero

3:00 PM – Architectural Design and Construction Aspects in Low Cost Housing using Coconut Wood as Building Material
Resource Person: . . . . . Archt. Gregorio G. Sta. Maria
Project Designing Architect and Consultant
UN Industrial Dev. Organization

4:00 PM – Closing Ceremonies
– Introduction of Guest of Honor and Speaker: . . . . . Atty. Pedro C. Pujalte, Jr.
Board Member, Quezon Province
– Address of the Gues: of Honor and Speaker: . . . . . The Hon. Min. Rolando de la Cuesta
Chairman, Philippine Coconut Authority
– Acknowledgement, Awards and Recognition
– Closing Remarks: . . . . . Dr. Ivan E. Pluhar
Senior Field Adviser
UN Industrial Dev. Organization

Engr. Cesar A. Caliwara
Master of Ceremonies

Seminar Registration Fee . . . . . P. 'er Participant

ANNEX 4

Statement on behalf of Dr. Khane, Executive Director, UNIDO
at the opening of the International Seminar on Technology of Coconut
Wood Processing and Utilization of Coconut Wood as Building Material,
Lucena City, Quezon Province, 20-22 February 1985

On behalf of the Executive Director I would like to congratulate the organizers of this seminar

- Government of Quezon Province and especially Governor Caliware
- United Architects of the Philippines
- Philippine Institute of Civil Engineers
- Philippine Constructors Association

and say how pleased UNIDO is to be involved in this important work.

UNIDO has for some time believed in the potential of coconut wood as a building material, and, since becoming involved in the Philippine Coconut Authority Programme supported by a UNDP/FAO project at the Zamboanga Research Center has tried to emphasize the application of the basic research already done on this material. Our philosophy has been to remove the psychological, administrative and legal/regulatory barriers to its use and to demonstrate how the technology works.

In this, UNIDO has been fortunate in having as counterpart agencies the Southern Philippines Development Authority and the Government of Quezon Province. Furthermore, our efforts have been productive through the fine contributions made by Filipino consultants - Horatio Brion, Gregorio Santa Maria, Cesar Caliwara and their associates. I should also pay tribute to the unstincting efforts of Ivan Pluhar in conceiving these two development/ demonstration projects (in Davao and Lucena) and also the regional project which has brought 16 participants from the region to learn of the path-finding work done here in the Philippines.

I know there are many others whose contributions have made this seminar possible but I must apologize for not being able to name them except to

thank the Regional Secretariat of the Low-cost Building Materials Project from within the Ministry of Human Settlements for making the arrangements for the 16 international participants to be able to benefit from the Seminar and Study Tour immediately following.

UNIDO is conscious of the great need for housing and light framed buildings in this region - and is especially aware of the importance of being able to use coconut stems for this purpose in countries with no other or little forest resources. We hope that this excellent example of technical co-operation between developing countries will bear fruit and lead to follow-up in the form of thousands of buildings made mostly of coconut wood.

Although some of you know what UNIDO is, for the benefit of those who do not, UNIDO is the United Nations Industrial Development Organization dedicated to improving the industrial sector of developing countries. This is mainly brought about by providing technical expertise in particular sectors such as engineering, metallurgy, chemicals or pharmaceuticals, leather or textiles, food processing, or, in this case, wood, including woody grasses.

Our general goal is to increase the share of manufacturing from developing countries to 25% by the year to 2000. In particular, UNIDO sponsors an investment co-operative programme, does feasibility studies, helps governments prepare industrial master plans and assists factories directly. In the wood sector we try to upgrade from artisanal to planned production in series with interchangeable parts and a concious effort to manufacture quality items for stock rather than do custom orders only. UNIDO co-operates with other UN agencies such as FAO, when primary processing is involved, or with the ITC for marketing.

Some examples of UNIDO's work in the structural use of wood have been: a system of prefabricated modular low-cost wooden bridges has been developed and prototype bridges built in Kenya, Honduras, the Central African Republic Madagascar, and current projects are in Dominica, Ecuador, Bolivia, Peru and Nicaragua. In Sri Lanka we have helped develop the use of rubberwood for finger jointed glued-laminated beams and trussed rafters. UNIDO has organized

specialized technical training courses for architects and engineers in timber engineering and timber structures in Australia, New Zealand, and Central America. We are especially interested in convincing architects and engineers that timber offers great potential as a structural material and thus this international seminar fits in nicely with our programme.

Ladies and gentlemen I wish you every success in your seminar!

ANNEX 5

Address of the Guest of Honor and Speaker,
the Honorable Minister Rolando P. de la Cuesta, Chairman,
Philippine Coconut Authority, at the closing ceremonies
of the International Seminar on Technology of Coconut
Wood Processing and Utilization of Coconut Wood as Building Material
at 4:00 p.m., Friday, February 22, 1985
at the City Antigua Building, Lucena City.

Governor Eladio A. Caliwara, the Board Members of the Ouezon Province, Mayor Mario L. Tagarao, our architects, engineers, contractors, members of the United Architects of the Philippines, the Philippine Institute of Civil Engineers, and the Philippine Constructors Association, respectively, our UNDP and UNIDO cooperators, seminar participants - first of all, allow me to say that I am indeed honored and privilieged to be able to close this International Seminar on Technology of Coconut Wood Processing and Utilization of Coconut Wood as Building Material.

More than this, I am deeply gratified to note that this conference marks a milestone in coconut wood utilization. It has served to concretize and transform the results of deep scholastic and quiet research of our PCA Zamboanga Reserach Center into one offering vast pragmatic economic possibilities.

Cocowood utilization has certainly come a long way since its inception in the early 1970s as a mere phytosanitary and environmental protection, an inevitable twin of replanting. We have since then developed a successful and entirely new timber industry that it is no exaggeration to state that with its sustained yield, exceeding the output of diminished natural forests, cocowood has managed to become a new and renewable wood resource.

It would therefore be appropriate to reiterate our many thanks to the Food and Agriculture Organization (FAO/United Nations Development Program (UNDP) for its support technology without which, cocowood research and development techniques would have remained minimal, if not remote.

Many thanks, too, for the subsequent United Nations International Development Organization (UNIDO) cooperating efforts without which the research results at our PCA-ZRC would not have been converted into commercial and industrial uses, the most significant being the use of coco stem as a source of building and construction material.

The UNIDO's design of two low-cost housing units made of coconut wood in Zameoanga in 1982 has since served as the pattern of the model prototype unit constructed at Davao.

This time around, the choice of Quezon Province as venue of another project to introduce forther improvement in the coco prototype house is worth noting. The choice site, as one of two (2) Philippine regions first planted with coconut trees, ranked only with our PCA coconut region VII based in Cagayan de Oro, has 50% of its total coconut population aged over 60 years old.

This means that so much coco trunks can be made available for building materials. Beyond this, the data provides more significance in that we in the Philippine Coconut Authority are in unison that only coco trees aged 60 years and above should be felled for commercial and industrial uses. Moreover, this data provides ample basis for a well-deserved coconut replanting program.

I assume that it is now of common knowledge to everyone in this forum that in September 19, 1984, the President mandated anew the urgent implementation of a long-term coconut productivity program throughout the country giving special emphasis to areas recently hit by typhoons. This means that as you in the private secor fell trees, clear the areas and convert coconut trunks into building materials and other usable forms, you shall ably assist us facilitate the replanting program.

Thus, hand in hand with your deliberate efforts to continue to explore and implement the vast potentials of cocowood, we in the PCA shall zealously and purposefully rise and respond to the presidential mandate. In the process, the stakes of a solid framework for a continuing collaboration between government and the private sector shall be driven deeper.

Our vision therefore of the private sector represented by you - the architects, engineers, contractors and sawmillers - to lead and be at the forefront of the mainstream of this new cocowood technology is seeing fruition.

In you lies the challenge to native ingenuity, the challenge to improve present technology, to expand the nature and dimensions of cocowood utilization.

From your initiative, an information dissemination program on the use of cocowood, and promotion of the use of coco lumber on a commercial scale shall be undertaken.

From your initiative will spring forth acceptability of coco lumber in the local market, subject only to its comparative advantage over prices of traditional wood species.

From your initiative shall spring forth the optimum and economical use of coco lumber not only as prefabricated housing component materials but also as principal house construction material for mass housing.

From your initiative shall spring forth likewise an expansion of labor market demand and the consequent harnessing of available labor skills.

So much of these incentives therefore are open to all who would exert efforts to make cocowood and coco lumber widely-accepted.

We, in the government in turn will indubitable consider, and in co-operative effort with the various concerned government agencies, cause the formulation into specific government policies of the following:

One, the inclusion of cocowood in the list of commercial species approved by the Philippine Government for domestic processing into lumber and lumber products and as substitute for traditional wood species like yakal, guijo, white lauan, red lauan, tanguile and other commercially-accepted species under the Philippine Mahogany Group of species commonly used by the building and construction industry.

Two, the use of coco lumber in mass housing projects, in anticipation of the sizeable quantities of coconut tree stems that will become available as we implement the coconut replanting program; and,

Third, the felling of coco trees aged 60 years and above only.

Indeed, the Government links with the private sector has become more pronounced now and I would add that they have never been or greater importance to cocowood than now.

Without doubt, we, in estimation of our respective roles, are better disposed to confront this new technology. All these needs is merely a constancy of policy direction and thrusts. A presence of a climate that shall strengthen the partnership between government and the private sector and enable us to move expeditiously towards a common vision. What you shall need to amplify current policy orientation, you can up to government assistance. And this we affirm to you.

On the other hand, we shall expect you - the private sector - to continue to engage in enterprise work. For we in the Government have a different role to play. For enterprise work is indeed your realm.

It is my desire, and I am confident, that the Quezon experience be but an initial effort at replicating cocowood prototype houses. That soon the dream of every Filipino to own a low-cost house would not just be a dream of any low-cost house but a dream of one made of a truly indigenous and sturdy "tree of life" - the cocos nucifera.

I am therefore profoundly encouraged by the commitment that has come upon the architects, engineers, contractors and sawmillers of this country as manifested in their commendable effort to join hands in initiating and organizing this conference.

All beginnings to be really valuable and meaningful must have a constancy and continuity of vision and effort. We must therefore unceasingly pursue the goal implicit in our understanding in this seminar, our aims and efforts cannot be less than durable.

Along with the satisfaction that this seminar has brought about is the caution that we must heed - that nagging awareness that we have merely started. That, therefore, we must forge ahead deliberately I trust you and I will continue. And I am certain we shall achieve much.

Thank you and good day!