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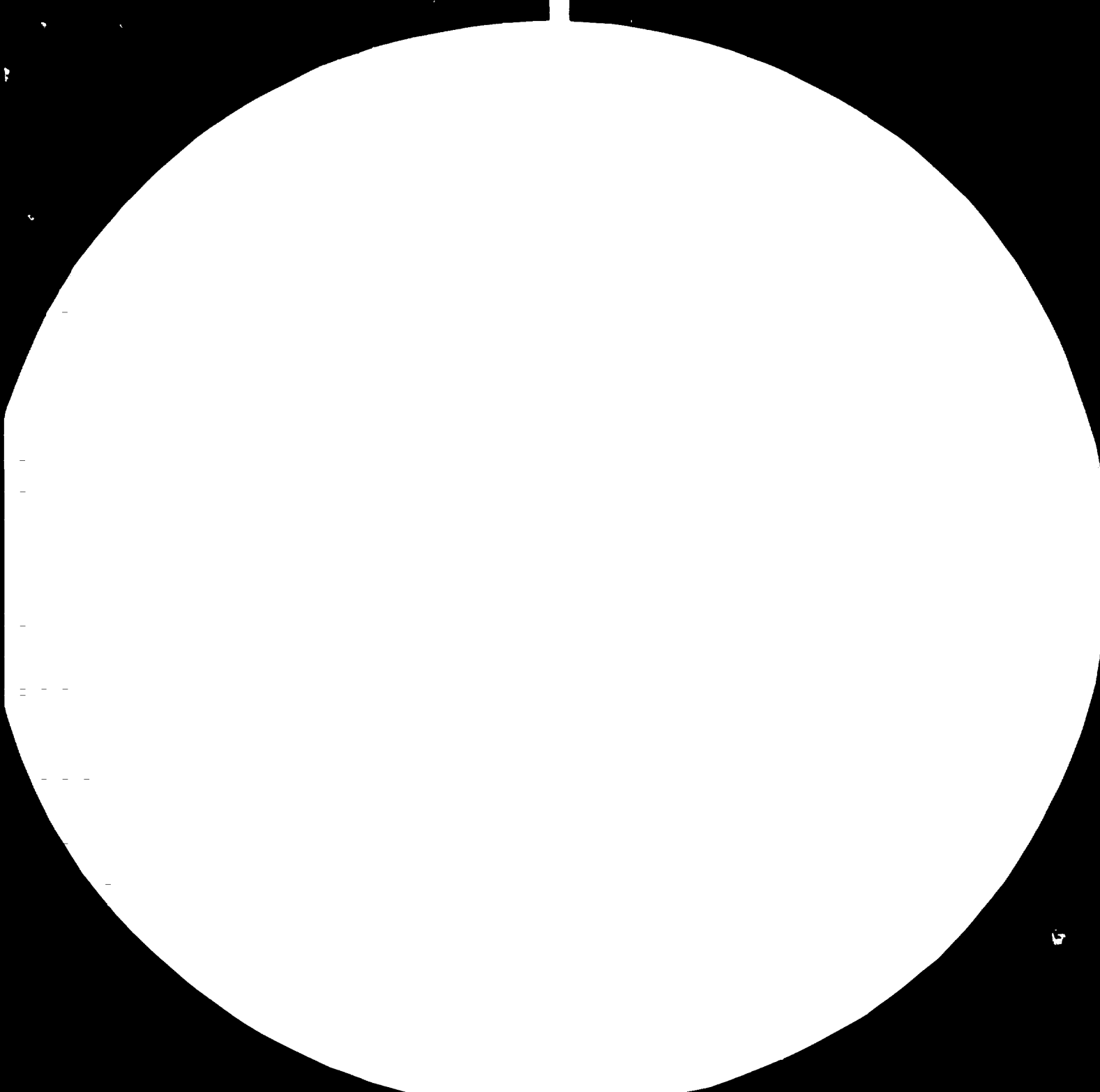
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Model No. 1000
Serial No. 1000

1000
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UNITED NATIONS INDUSTRIAL
DEVELOPMENT ORGANIZATION

Division for Industrial Studies
Sectoral Studies Branch

10 March 1983

Sector Study Methodology Meeting II
Vienna, 28 February - 2 March 1983

12541

SUMMARY
OF THE PROCEEDINGS OF THE MEETING

Tuija Vihavainen
K. Kantharupen

This summary is for the restricted use of participants of the meeting.

SECTORAL STUDY METHODOLOGY MEETING II

Vienna, 28 February - 2 March 1983

General framework and introduction to meeting

1. The Second Sectoral Study Methodology Meeting was convened in the VIC, 28 February to 2 March 1983 to discuss a suggested study programme for the wood and wood products industry.
2. In the introduction to the meeting it was emphasized that it should concentrate on the methodology of the studies. It was further explained that this meeting was the second of a planned series. A meeting on the study programme for pharmaceuticals was held 1-3 December 1982 and a meeting concerning the capital goods industry would follow later in 1983. The purpose of the present meeting was therefore twofold: The Secretariat sought concrete advice on the methodology for the sectoral studies in the wood and wood products industry sector but also on how to organize and run methodology meetings in the future.
3. It was stressed that the meeting was purely informal and that all participants were invited in their personal capacity. Invited participants, UNIDO consultants and UNIDO staff participated in the meeting on equal terms.
4. UNIDO activities, particularly the System of Consultations, were described at the outset of the meeting. The way in which technical assistance, studies and the System of Consultation interact, was explained. It was stressed that the aim of the meeting was not per se to prepare for the First Consultation but only to give advice on the study programme. It was explained that it would only later be decided, what document would actually be presented to the Consultation Meeting. It was further explained that the studies would have also other uses inside and outside UNIDO.
5. It was agreed by the participants that there would be no formal report on the meeting but that an oral summary would be presented on the final day. In addition, the Secretariat asked that a critical evaluation of the discussions

should be drafted by two participants in the meeting. It was requested that these drafts should reflect their personal impressions and experience. The meeting also agreed to proceed, as suggested by the UNIDO Secretariat, discussing the topics as presented in the proposed agenda, and elaborated in the background document entitled "Discussion Paper Concerning Questions of Methodology for Studies of the Wood and Wood Processing Sector".

6. This summary of the proceedings contains the following elements:

- A summary report and critical evaluation of the discussions at the meeting prepared by UNIDO consultants (Annex I).
- Discussion paper concerning questions of methodology for studies in the wood and wood products sector (Annex II).
- Draft outline for the First World-wide Study on Wood and Wood-processing Industry (Annex III).
- A list of participants (Annex IV).

7. This material is presented only to the participants in the meeting and to interested parties within the UNIDO Secretariat. It is presented for information only and does not entail any acceptance of the views presented in the consultants' papers by the UNIDO Secretariat as a whole or by the Sectoral Studies Branch. The comments made during the discussions will, however, be guiding the future work on the study programme.

8. The Sectoral Studies Branch expresses its warm gratitude to the participants, the consultants and colleagues from sister branches within the Secretariat who all contributed to a very constructive and extremely useful discussion.

ANNEX I

SECTORAL STUDY METHODOLOGY MEETING II WOOD AND WOOD-PROCESSING INDUSTRIES

Part 1 - Tuija Vihavainen

SUMMARY AND EVALUATION OF THE DISCUSSIONS

1. Introduction

The objective of the meeting was to give advice and ideas assisting the preparation of the First World-Wide Study on Wood and Wood-Processing Industry. The meeting was due to concentrate mainly on the methodology of the studies, even if the discussions on the methodology of course cannot be separated from the contents of the study items.

The main objective of the First World-Wide Study on Wood and Wood-Processing Industries is to provide basic material for the evaluation of the possibilities to establish and promote wood products industries in developing countries. The draft document will serve as a background document for the First Consultation of the Wood and Wood Products Industry to be held in Helsinki, Finland, in September 1983. Thus, in preparing the study, the aims and needs of the consultation must be considered. The Global Preparatory Meeting for the Consultation, held in Vienna in January 1983, recommended that the issues to be presented at the Consultation be:

- development of primary and secondary wood processing industries
- measures to promote the use of wood and wood products

On the other hand, the study will not only serve the needs of the consultation but will be made into a publication that will be useful for policy makers, various organisations and the industry itself. For these purposes, the draft study will be tested at the consultation and the final document accomplished thereafter, taking into account observations made at the consultation.

2. Summaries of discussion items

2.1 Overview of sector

The discussion concentrated on raw material supply and forest products demand, division of supply/demand between developed and developing countries and projections for the future.

It was agreed that the study should start with a review of the present and future resources. Generally, the resources were given much more treatment than the demand. It can be questioned, if the matter should be the other way round and the review on present use and future needs for wood products taken as a standpoint.

The forecasts for the world consumption of wood products are more uncertain than the forecasts for the supply. The consumption is linked together with general economic growth and especially with the growth of the building sector. A world market study for wood products would be needed. In such a study, the advantages and disadvantages of wood products and their ability to compete with other building materials in future should be analysed.

The document presented in the meeting forecasted over 60% growth in the consumption of industrial roundwood for processing within the period of 25 years (1975-2000). It seems obvious that the forests will be able to supply the demand at least quantitatively. In the analysis, the main focus should be on the aspects of accessibility and quality of the raw material and its suitability for the processing concerned.

About 63% of the forest resources are in developing countries, their share of industrial roundwood production being at present only 21%. Thus the growth in the future demand of wood products would strongly support the development of the wood product industries in developing countries, provided that the accessibility and quality of raw material will meet the demands. Aspects and implications of increasing the use of tropical hardwood for wood products should be studied.

An element affecting the future demand for wood products is the demand in developing regions, where the relative growth potential is higher than in developing countries. The potentials lie mainly in two sectors, the transportation communication field (electricity poles, railway sleepers etc.) and the building field. Because the use of wood in constructions lacks tradition and often is subject to prejudices in developing regions, promotive programmes and actions are needed to increase its use. Special emphasis must be put on developing products and construction methods suited for tropical countries and preservation measures to increase the service life of wood constructions.

Increasing the use of wood products in developing countries would have a favourable effect on the development of export industries too. Domestic use will help to increase the material efficiency of the industries and create knowledge and reference useful for the export.

2.2 The economic analysis

The problems connected with relevant and reliable data (production costs, unit costs, trade data, transport costs, prices, etc.) were identified, but few solutions could be suggested to overcome these problems. Standard classifications have weaknesses from the user's point of view, there are discrepancies between data from different sources and particularly data from developing countries is inadequate. Because this problem must be general in all the fields of industry, UNIDO could look into means of promoting data collection in developing countries.

A historical trend to note is the increasing price of raw material (sawlogs) with either stable or falling product prices (sawnwood, plywood) over the same period, the difference obviously being covered by increase in the productivity of the processing. Exercises to extrapolate this trend to the future will raise questions very essential to the evaluations of the profitability of increasing wood products industries in developing countries.

The question where wood products should be processed is a very complex one, and too much generalization in the answers should be avoided. The

question is subject not only to economical but also to political considerations. The division between north and south is an oversimplification of the matter, because the production related factors vary widely inside both regions. These factors include raw material, capital cost, labour cost, transport cost, facilities to support the industry, auxiliary materials, market considerations etc.

A very important finding is that, on processing certain wood products, there is a high substitutability among labour, capital and material costs. Another important aspect is that the market, either domestic or export, will strongly affect the economic considerations.

In order to increase their market share, developing countries must be able to establish production which is competitive with that of developed countries. For primary wood processing, raw material price and the efficiency of production are of greatest importance. Means should be considered to improve the recovery and more efficient use of wastes in developing countries. Transport costs are a large part of primary product production costs.

For secondary products to export markets, quality is most important. The prices of the products are less dependent on the world market prices and transport costs, although important, play a minor role in comparison with primary products. The marketing of products needs much effort and new ways and channels. The products subjected to more non-tariff barriers than primary products.

As the developing countries are forecasted to increase their market share in processing, the implications for developed countries should also be discussed.

2.3 Technology, production costs and capital requirement

The system approach used in the background document on technology and technological development in the wood processing sector was considered successful taking into account the number and diversity of affecting factors and their interactions.

In developed countries, wood products industries are today characterized by rapid changes both in products and in technologies. In the field of technology, the applications of the development technique have most affected the processing.

Because of the rapidity of changes, not only technology transfer but also technological forecasting is of growing importance in the field.

Technological development will inevitably affect the developing countries as well, but the speed by which the developing countries should try to apply new technology is one of the main discussion items. There are differences between developing countries in capacities to receive technology. It was strongly underlined that the level of technology used should be appropriate to regional endowments, labour and management skills and maintenance possibilities. Failures have occurred in developing countries in cases where too sophisticated technology has been applied. On the other hand, conditions in faster developing countries are changing dynamically and skills are improving, which must be adequately foreseen when new investments are made.

The analysis presented on technological considerations for developing countries will supply useful guidelines for policy and decision makers. In the evaluations, the above mentioned substitutability between raw material, capital cost and labour should be borne in mind. It was also emphasized that the wood processing field offers a wide range of scales and levels of technology to be chosen from according to the particular conditions. Even very small, low technology mills may be economical when producing products for a restricted local market. When producing primary products for export market, bigger mill size and higher technology will be needed to achieve adequate efficiency in production. For the production of secondary products for export, also smaller mills can be viable, if producing special products which satisfy the needs of customers.

To assist decision makers in developing countries, not only somewhat theoretical considerations but also collected practical experience and case-studies are needed. Case-analyses would allow to learn from the past and diminish the risk of repeating failures.

UNIDO should assist in assessing various technologies. The most important aspect in technology transfer is to assist industry in developing countries in the selection of appropriate technology for local and export production.

An inventory of available hardware and a data bank of available technologies were suggested. Practical means of technology transfer in the form of licensing or other contractual agreements and joint ventures should be more closely studied. Transfer of technology between the developing countries should also be sought.

The need for training is great in all levels, both for labour and for management skills. UNIDO should look into possibilities of promoting technology fairs in developing countries.

The lack of research and development in developing countries is one of the general constraints for the development of the industries. Technology needs not only be transferred but also modified to match the needs of developing countries. Research efforts in the field of wood product industries should be directed to the special problems of tropical countries, including processing of tropical hardwoods, problems connected with commercially less accepted species, development of wood products for tropical conditions, developing substitutes for imported raw materials (e.g. tannin adhesives to substitute for petroleum-based glues) and developing local production of auxiliary materials. Means of establishing and providing funds for the research needed should be sought.

2.4 Considerations relating to health and safety

Forestry and woodworking are relatively dangerous employment fields as can be seen from the rate of accidents and cases of occupational diseases. Health and safety considerations shall therefore be included in the world-wide study. Proper designs of machinery and training of workers using cutting machines, dangerous chemicals, etc. would be the most important means to avoid accidents. The costs of safety measures are not always necessarily high and e.g. training of workers to use the machinery properly will at the same time improve the efficiency and quality of work.

2.5 Environmental considerations

One of the favourable characteristics of mechanical wood processing industries is the relatively very low pollution hazard.

Because the risks for biological wood deterioration are high in tropical regions, there is a greater need for chemical preservation both in forestry and in processing industries. The need for temporary preservation concerns transport and storage of raw material and products. Impregnation of wood is often necessary for constructional uses in tropical countries. Current wood preservatives are all toxic chemicals with potential health and environmental risks. With proper, inexpensive measures, these risks can be substantially diminished. It should be noted that in the impregnation industry mainly closed processes producing no waste waters are used. However, because many of the present preservatives are under critical evaluation of health and safety authorities, research and development work is needed to find better suited alternative chemicals.

2.6 Energy

The energy need of wood processing industries can be considered fairly low, especially that of sawmilling. It is very important to many energy deficit countries, that a high share of the energy needed can be produced by burning of the wastes of the process.

Conversion of wood fuel to thermal energy gives relatively high efficiency with low investment costs. Instead, the conversion of wood fuel to electric energy gives very low efficiency and requires high investment cost. Further research and development work would be needed to improve the latter.

The needs to improve the economic efficiency of wood processing have lately initiated much research work in energy-saving views in developed countries, and this has already resulted in practical measures and savings in the industry. The most important phases for potential savings are drying processes.

It is important to note that the possibilities to use wood wastes for energy in the secondary wood industry are much smaller than in the primary industry. On the other hand, the energy needs of the secondary industry are extremely diverse.

General considerations of the use of wood as fuel, not related to wood processing industries, can be left outside the study.

2.7 International trade

The preliminary results presented on the historical analysis of international trade flows and methodologies to be used were interesting and rather in-depth treatment of trade aspects in the study was recommended. More disaggregation of data and e.g. separation between hardwood and softwood would be needed. It would be interesting to follow the flow from raw material through stages of further refining into final products identifying the added values in processing, but no suggestions for necessary methodology and data could be made.

The tariff and non-tariff measures in the world trade of wood and wood products are an important item for discussions in the consultation. The document presented in the meeting showed that tariff duties on wood products are relatively high and the Tokyo Round reductions are smaller than for all products. The investigation of the tariff effects in the international trade is thus of importance.

Information on trade barriers between the developing countries is especially scarce.

The non-tariff measures are very numerous and difficult to investigate. It can be noted that various standards, approval schemes and quality control requirements in developed countries can have an effect as non-tariff barriers especially for constructional wood products.

It was suggested to examine also the implications of a potential removing of trade barriers.

3. General recommendations on the world-wide study

The study should clearly concentrate on mechanical wood processing industries. The presentation should be brief, preferably not more than about hundred pages. Background data and detailed information mainly addressed to specialists in the field should be placed in annexes. The study should include an executive summary.

The aspects of forestry, including logging and transport, should be presented very briefly, partly as annexes. Market and trade relations deserve to be upgraded into a chapter. Inclusion of health and safety aspects in the fourth chapter was recommended (ILO preparing the material).

It was strongly underlined in the meeting that the study should be action oriented and especially emphasize the possible actions of UNIDO and other organizations to assist developing countries in developing the use of forest resources and resolving the problems hampering development. Also resources that are available or can be created for this purpose should be identified and discussed. The areas of international co-operation are of particular importance.

A wish was expressed that in the presentation of the industry and technology, less space would be used for the great variety of new panel products and for automation and computer technology, because these will mainly serve readers in the developed countries. More information on the furniture sector was recommended.

As to the conclusions concerning the developing countries, it is very important to remember the great differences between the countries, both for the quality and quantity of timber resources as well as for other relevant aspects.

4. General comments on the meeting

The meeting was well organized and conducted. The number of participants seemed appropriate for the type of the meeting and the attendance of experts from various fields and regions was fruitful for the discussions. However, the relative number of experts on wood processing industries was too low to my

judgement, and possibly the number of participants from developing countries could also have been higher.

Somewhat earlier circulation of the material for the meeting would have been beneficial, especially because assistance was sought to the evaluation of the methodology used, quality of data, availability of additional information etc. Thus the participants could have thoroughly studied the documents with access to their own material files. However, the outcome of the meeting was very successful and provided useful contributions to the subject. The atmosphere was free and informal, and the time table allowed in-depth discussions of most of the items on the agenda. There seems to exist enough material for the preparation of the draft document on the world-wide study. The most important work to be done, apart from finishing some of the sub-studies, is combining the material, finishing the structure of the study and selecting the weights of various topics to be included. The time available for the preparation is very scarce, because the document must be ready for circulation well in advance of the consultation. It might be useful to send the first draft to a group of experts/consultants (possibly the participants of the methodology meeting) for comments before preparing the final draft. The work should be closely co-ordinated with the preparation of the issue papers and other material for the consultation.

Having had the chance to get familiar with the summary of Sectoral Study Methodology Meeting I (pharmaceutical industry), it is interesting to note that there are many similarities in the findings. To mention only a couple of them, the issues of data related problems and case-studies, and methodologies to handle them are raised in both summaries. It is obvious that the experiences from methodology meetings are relevant and can be utilized in the studies of various industrial sectors.

Part II - K. Kantharupan

1. HIGHLIGHTS OF THE DISCUSSIONS

1.1 Scope of the study

It was felt that the study should concentrate on the industrial and processing sector. The forestry sector should only be presented as brief background information in order to place the study in context.

1.2 Demand on the resources

Though there is a drain on current resources, the value of emphasis on the year 2000 is very arbitrary. Wood is renewable resource and plantations and managed wood sources are possible, therefore, fixed time spans should be considered. This will facilitate the updating of the study after a period of time by redefining starting and ending periods.

Due to the nature of the sector, it is easier to estimate the supply of wood resources than the demand on these resources. Learning from other experiences and the advent of plantation forests, supply can probably meet the demand in the future. But the key to this equation is the identification and cultivation of suitable areas and sources to maintain a continuing supply for the processing industry.

Fears may exist that forest land area is being lost daily to other economic activity. However, technology and other facilities exist to produce the output of present forests using only a fraction of the present land area occupied by forests.

1.3 Need for infrastructure

For the efficient use of the available resources, in developing nations satisfactory infrastructure is lacking. Growing of timber is separated by a large infrastructural gap from the end use processor. This results in the use of only a small percentage of the resources. Lack of proper structure to

deliver the wood to the processor inhibits the possibility of growth in the existing wood processing industry or new industry where demand exists. For the lack of demand in the growing areas, the resources are destroyed or efforts are not made to recover the useable resource. Prospects for employment creation in the growing, harvesting, delivery and processing sectors of the economies of many developing countries is lost. For industrialization in the wood processing sector in developing countries, investment in infrastructural development is imperative.

1.4 Wide possibilities of labour substitution

The wood and wood processing industry provides many possibilities for the substitution of labour for capital. This is a very attractive factor in newly industrializing nations which have a large unemployed population. The possibilities for substituting labour for capital might be even greater if locally available and cheaper chemical or organic inputs were used. Also import substitution becomes a definite possibility.

In the secondary processing sector small scale operations can be set up with very little capital requirements. These can be expanded as and when required. The furniture industry is a good example of this.

1.5 Data

Data on the wood and wood processing industry and especially the secondary sector are limited. Available data from developing countries are scant. There are wide differences between the importer and exporter figures.

The use of volumes rather than values may eliminate some of the discrepancies.

1.6 The need for appropriate technology

Wood processing encompasses a wide variety of products and production methods. Resource endowments (raw materials, capital, etc.) also vary widely among countries. It is very essential to match the products and production methods to resource endowments in order to attain optimal efficiency.

The report should provide an inventory of various technologies that are available to the industry and information on how to select appropriate machinery.

To determine the type of technology needed, an important factor to be considered is the market for which the end product is intended. Low technology products may suit the local market but higher quality goods will be required to compete in the export markets, requiring advanced technology. Another factor that has to be considered in the selection of technology is the ability of the labour force to use it effectively.

The experience of multinationals in the transfer of technology between plants in developing and developed nations has to be looked into in order to gain some knowledge on technology transfer. Also technology transfer should be looked at as a South to South transfer first rather than North to South. Available and adapted technology in the new industrialized countries should be assessed first.

1.7 Safety and skills

It was felt that the need for occupational safety and health has to be stressed in the study and the study should look into the safety aspects and their contribution towards increased production and higher morale.

Training of individuals is a key area where focus has to be made. Training is very essential to the success of the new and existing ventures in the developing world.

1.8 Environmental impact

The mechanical wood processing sector is not a major polluter, but the preservative and chemical processing industry contribute heavily to water and air pollution.

Deforestation results in soil erosion and the elimination of a natural barrier to certain types of pollution. Proper evaluation is necessary to determine the trade-off between the cost and the benefit of reduction in pollution.

1.9 Energy

It was felt that energy aspects should not be over-emphasized and that it has to be looked at in the right perspective.

Drying in the processing industry is the largest absorber of energy. Ways should be presented to utilize waste from production to produce this energy. Use of waste materials for the thermal generation of electricity is a possible solution to the problem of supplying energy to remote facilities.

1.10 Trade

Recent trade data reflects a trend towards increased processing in developing countries. This is expected to continue. The model of trade flows discussed should provide useful information. The problems of inadequate data may necessitate greater reliance on case studies. These case studies provide useful information that could be generalized despite the limited data base.

Transport and other trading costs may be quite high even among neighbour nations, because proper channels for the flow of goods may not exist. Goods often flow via a third party miles away. Attention should be given to overcoming this particular difficulty and encourage intraregional trade in the developing world.

1.11 The report

The draft outline presented was acceptable with an additional inclusion of health and safety aspects in chapter 4.

The report should not be a lengthy one and should be action-oriented.

The emphasis on panel products and micro-processors should be low. Efforts should be made to point out the vast forest resources that are being lost to the industry and consumers in remote areas due to market limitations.

2. A PERSONAL VIEW

2.1 Introduction

Purpose of the First World-wide Study on Wood and Wood Processing Industry is to provide the UNIDO System of Consultations the appropriate information necessary to take decisions to meet the target of a 25% share of world-wide industrialization in developing nations by the year 2000.

The Sectoral Studies Branch of UNIDO presented very valuable and informative papers at the methodology meeting. But very few described the current status of the sector in developing world, the obstacles in further industrialization in this sector in these countries and what potential exists etc.

The above goes to show that the wood processing industry is still in a very low stage of development in the developing countries. Though there is activity in this sector, very little information is available from developing countries for evaluation and compilation in the report.

If the purpose of the study is to provide developing nations with information to revamp or establish wood and wood processing industry, a key element is missing - current status of the industry and the constraints. Selected case studies of a few nations would help.

Without going into the methodology meeting and the issues raised therein here again, I will present below some of the personal observations I have after being exposed to wood and wood processing industry in two small African nations.

2.2 Primary Processing

2.2.1 Who is going to bring the wood to the market?

Many countries are endowed with forest resources. But the resource is located away from the user. Adequate infrastructure does not exist by way of proper roads to bring it more cheaply to the user.

Due to the lack of attractive outlets the wood resource is put to low value or of no valuable use in the growing area. If avenues exist economically to channel wood into primary and secondary products, the resource will not be lost to the processing industry. The higher price as an industrial resource, would discourage the callous use of the resource may stop. The population in growing areas will find substitutes and put less wood in low value uses because of the price it may fetch when they sell it to industry.

2.2.2 Where is the processing going to be?

When a decision is made on where to locate a sawmill, a very important aspect colors the planner's and the investor's view. Why invest in a sawmill in a particular area if once it becomes fully operational it will deplete the existing forests and will not have any timber to put through a few years down the line. Sawmills are located in population centers and logs are transported at high cost from different areas. If plans are made to designate future plantations or a managed forest area, investment in a sawmill in such a designated area will serve its full purpose and also unnecessary expense will not be incurred in the transport of logs. Only sawn wood would be transported.

Location of sawmills in population centers also result in the waste of energy and the resource. Due to the lack of processing facilities, individuals with business acumen saw the logs by hand and ship it to the user. When it arrives at the user's production facilities it has to be squared processed before using in production.

2.2.3 Other observations

A company which manufactures wood-based panel products had to increase production due to the demand for these products by a tea chest producer. This company had to curtail production of its other wood-based panel products because it was running out of the wood resources. Now production is to supply the tea chest demand until plantations mature to provide adequate wood resource. Wood resource is plentiful in the country but has to be brought down at high cost to the factory. If expensive wood is used, the end cost will not be worthwhile to the panel user.

2.3 Secondary processing

2.3.1 Who will buy the products?

In developing nations, in most cases, furniture is a person's second biggest investment after a house. Though very little capital is required to enter into furniture production, additional capital is required to survive and maintain production. Since purchase of furniture involves quite a bit of money in any country's standard, cash purchase is not possible. An individual has to seek out credit terms. These facilities do not exist in most of the developing countries. Therefore, firms in the manufacturing industry have to extend credit terms in order to sell their products. This result in the manufacturer converting his stock into debts, causing strains on the already short working capital. This is a major cause for many firms in the industry to go out of business.

2.3.2 Who is going to pay for exports?

Export sales are generally on credit w/payment up to six months following shipping. When smaller firms concentrate on export they are saddled with cash flow problems until this money is collected from the importer. Tere is no source of bridging finance for the smaller firms.

2.2.4 Need for skilled managers and advice

When the firms remain small, the need for skill levels are also lower. But when there is growth there is a shortage of middle level management cadres. Advice is available from a heterogeneous group in technology and management. This group sells a variety of technology. Once a particular group leaves the technology they have imported and brought with them as machinery becomes obsolete. The next group of managers or advisors coming in are not used to the existing machinery in the plant since they are from a different nation.

There is a very urgent need for UNIDO to make an inventory of the various machineries that are available in order to avoid costly mistakes.

Machinery purchased at high cost to the company using the scarce foreign exchange reserves of the country lay idle for lack of simple spares and trained individuals to run them.

3. Opportunities

Industrialization opportunities in the wood's and wood processing sector are numerous. Thought should be given to the following at regional or global level:

- (a) Information on the existing resource and future potential.
- (b) Infrastructure development within and without a particular country that will facilitate the flow of the resource and products.
- (c) Inventory of the various technologies available, to facilitate the selection of appropriate machinery for a particular region.
- (d) Training of personnel and updating the skills to suit constantly changing technology.
- (e) Assistance and co-ordination in marketing at the regional and global levels.

Annex II

UNITED NATIONS INDUSTRIAL
DEVELOPMENT ORGANIZATION

Division for Industrial Studies
Sectoral Studies Branch

28 February 1983
ENGLISH only

Sector Study Methodology Meeting II,
Vienna, 28 February to 2 March 1983

Discussion Paper Concerning Questions
of Methodology for Studies in the
Wood and Wood Products Sector

This working paper is for the restricted use of participants of the meeting.

Overview of Sector

The wood and wood products sector of the global economy consists of activities ranging from forest management to production and marketing of various primary and secondary wood products. Annex Table 1 shows the classification of products as defined for the study. While the main focus of the study is on the wood products industry (specifically secondary wood products) in developing countries it is necessary to consider the global forestry and wood system in order to place this sector in perspective.

The distribution of forest resources is described in the UNIDO Overview and Brotchie papers. (The final study document will in this respect rely exclusively on and refer to a special FAO contribution to this study, which will be issued as an integral part of the study). While the figures shown there indicate ample wood resources from a global perspective, they do not show the imbalances at a regional level between the distribution of wood resources and the distribution of consumption in the medium term future. One analysis of this relationship is shown in the FAO study on timber supply and demand through the year 2000. Sources of supply in the years 1970 and 2000 are shown in Tables 1 and 2.

Economic Analysis

These consumption (or demand) figures are based on simple extrapolation of past trends as modified by the judgement of the FAO working group.

This method of trend analysis is not rigorously based on assumptions concerning price trajectories. At this point there is no global model of timber supply and demand which characterizes the price trajectory equilibrating supply and demand. Our understanding is that such a model will emerge from the Forestry Project at IIASA, however this modeling effort will not be completed in time to be of use in the first version of the UNIDO study.

Table 1. Recent situation in forest resources, wood removals and utilization

Region	Forest area Closed forest	<u>Removals</u> <u>Annual average</u> Industrial wood	<u>Apparent consumption</u> Industrial roundwood for processing	Industrial roundwood		Total <u>(in roundwood equivalent)</u>
				Imports -	Exports +	
	(million hectares)		(million m ³)			
<u>World</u>	2,860	1,326 ^{1/}	1,185			
<u>Developed Market Economies</u>	693	704	732	-44	-31	-75
North America	510	436	412	+22	+22	+44
Western Europe	108	200	208	-18	-42	-60
Oceania	50	21	17	+3	-1	+2
Japan	25	36	86	-50	-9	-59
Other	-	11	9	-1	-1	-2
<u>Developing Market Economies</u>	1,222	193	109	+32	+9	+41
Africa	203	33	10	+5	-	+5
Latin America	695	59	47	-	-	-
Far East	310	87	46	+27	+14	+41
Near East	14	14	6	-	-6	-6
<u>Centrally Planned Economies</u>	945	429	344	+12	+22	+34
USSR and Eastern Europe	815	372	287	+12	+22	+34
Asia	130	57	57	-	-	-

^{1/} Includes, in addition to wood for processing, roughly 10 per cent of miscellaneous industrial wood, e.g. pitprops, poles, pilings normally used in the round; more than half is consumed in centrally planned economies.

Table 2. Projected situation, estimates of wood removals and utilization in 2000

Region	Forest area Closed forest	Removals	Apparent consumption		Industrial roundwood	Processed wood (in roundwood equivalent)	Total
		Annual average Industrial wood	Industrial roundwood for processing	Industrial roundwood			
	(million hectares)		(million m ³)		Imports -	Exports +	
<u>World</u>	x	2,085	1,930		-	-	-
<u>Developed Market</u>							
<u>Economies</u>	x	1,093	1,138		- 78	- 52	- 130
North America	x	642	617		+ 10	+ 36	+ 48
Western Europe	x	320	325		- 16	- 59	- 75
Oceania	x	58	41		+ 16	+ 11	+ 27
Japan	x	58	143		- 86	- 32	- 118
Other	x	15	12		- 2	- 8	- 10
<u>Developing Market</u>							
<u>Economies</u>	1,090	365	274		+ 44	+ 36	+ 80
Africa	190	60	28		+ 10	+ 7	+ 17
Latin America	620	124	108		+ 5	+ 10	+ 15
Far East	270	161	128		+ 29	+ 32	+ 61
Near East	10	20	10		-	- 13	- 13
<u>Centrally Planned</u>							
<u>Economies</u>	x	627	518		+ 34	+ 16	+ 50
USSR and Eastern Europe	x	531	444		+ 34	+ 16	+ 50
Asia	x	96	74		-	-	-

x = Not estimated.

Table 3 shows historical prices for various wood products. A useful exercise is to project past prices using simple logarithmic regression. The coefficients reflecting the growth rate in sawlog values along the regression curve are markedly different between Phillipine and West African sawlogs (1.4 versus 2.8 per cent). Trying to explain this might be an interesting exercise in itself. For discussion purposes we may use a growth rate of around 2 per cent for sawlog values. For both sawnwood and plywood we may consider prices to be either stable or falling over this period (at least till 1979).

Given these figures, a number of questions arise

1. Are these growth rates sufficient to justify the investment costs necessary to access increasingly remote, increasingly difficult to log, and, to some extent, lower quality timber resources from which these supplies are to come?
2. Given the higher raw material costs that these trends show, to what extent on the demand side may we expect to see substitution of other materials for wood in final products? For example,
 - i) greater use of material harvested and material left standing or down in the forest
 - ii) substitution of reconstituted materials
 - iii) substitution of other raw materials, e.g. metal, plastic
 - iv) substitution of other goods and services in final demand - eg. a change in the proportion of income going to housing and furniture

These considerations are particularly important in the building and construction sector which accounts for about half of industrial wood use.

Table 3.

Prices of tropical sawnwood, plywood and sawlogs

Table A1. Sawnwood (US\$/cubic metre).

Year	Malaysian ^a	
	Current \$	Constant 1978\$
1958	74.3	230.8
1959	68.0	210.5
1960	84.9	257.3
1961	68.6	206.0
1962	71.8	218.2
1963	76.5	231.1
1964	82.5	245.5
1965	81.4	234.6
1966	73.1	208.9
1967	76.9	216.6
1968	84.1	252.6
1969	90.2	268.5
1970	92.9	248.4
1971	92.5	228.4
1972	109.5	244.4
1973	156.1	289.1
1974	143.1	212.0
1975	166.4	213.6
1976	168.1	212.3
1977	154.1	177.5
1978	205.4	205.4
1979 January-June	325.6	

^aDark red Meranti, standard density, cif French ports.

Table A2. Plywood (US cents/sheet).

Year	Philippines ^a	
	Current \$	Constant 1978\$
1963	83.3	251.7
1964	64.7	192.6
1965	61.1	176.1
1966	73.6	210.3
1967	80.0	225.4
1968	79.4	238.4
1969	84.4	251.2
1970	103.1	275.7
1971	81.8	202.0
1972	95.4	213.0
1973	188.8	349.6
1974	152.7	226.2
1975	121.6	156.1
1976	147.8	186.6
1977	165.1	190.2
1978	189.5	189.5
1979 January-June	240.7	

^aLauan, 3-ply, extra, 91 cm x 182 cm x 4 mm, wholesale price Tokyo spot.

Table A3. Sawlogs (US\$/cubic metre).

Year	Philippines ^a		West African ^b	
	Current \$	Constant 1979\$	Current \$	Constant 1979\$
1955	25.3	90.7		
1956	24.4	84.4	36.0	124.6
1957	23.5	78.6	33.2	111.0
1958	22.4	74.4	33.2	110.3
1959	26.4	87.7	29.5	98.0
1960	29.0	94.2	34.8	113.0
1961	30.0	96.8	39.3	126.8
1962	32.9	107.5	37.5	122.6
1963	32.1	104.2	39.1	127.0
1964	27.4	87.8	39.5	126.6
1965	31.7	98.5	39.5	122.7
1966	33.3	102.5	38.0	116.9
1967	35.6	107.9	37.5	113.6
1968	36.5	118.1	42.0	135.9
1969	35.2	112.8	49.6	159.0
1970	37.2	108.1	43.0	125.0
1971	38.0	102.2	44.5	119.6
1972	37.6	91.7	52.5	128.1
1973	65.6	134.2	133.6	273.2
1974	78.6	129.1	120.5	197.9
1975	59.3	84.6	126.6	180.6
1976	79.6	111.5	142.3	199.3
1977	89.8	117.1	158.8	207.0
1978	91.8	104.0	191.3	216.7
1979	160.2	160.2	211.5	211.5
1980 January-June	201.8		247.6	

^aLauan for plywood and veneers, length over 6.0 m, diameter over 60 cm, average wholesale price in Japan. ^bSapelli, high quality, fob Cameroon. Source to Tables A1- A3: World Bank, *Commodity and Price Trends*, Johns Hopkins, Baltimore, 1980.

Source: Raj Kumar, "World Tropical Timber Trade: Economic Overview": Resources Policy, September 1982.

3. To what extent will higher productivity in the processing of raw materials as evidenced for example by falling plywood prices, and also by the introduction and widespread acceptance of knockdown and other mass produced furniture, and prefabricated housing serve to offset increased raw material prices and so hold down prices for wood based end-use products? The overall issue of technological advance and production costs is discussed in greater detail later.

A topic which must be considered in connexion with the literature on natural resources economics is that of where raw materials should be processed. In terms of wood and wood products this discussion relates to the implications for economic efficiency, employment effects, foreign exchange requirements or earnings, and capital requirements of shifting the processing of wood from timber importing to timber exporting countries.

The following discussion addresses some of these considerations with respect to the wood sector.

The most important consideration in terms of the wood sector is the effect of processing on reducing shipping costs. The magnitude of this effect is most pronounced in converting logs to sawn wood, but applies to other products as well.

Another consideration is that certain wood processing activities are labor and raw material intensive and capable of functioning efficiently on a small scale. In particular saw mill operations and some secondary processing facilities such as for wooden furniture do not seem to show significant economies of scale. This means that facilities can start small and expand as capital and markets become available.

Another factor tending to favor processing in the raw material producing country is the potential for greater utilization of harvested material. This is not just a case in favor of primary processing but holds for secondary processing as well. This is because higher utilization tends to mean use of waste for say particle board production, but the most likely use of particle

board is on the home market which implies a larger secondary processing sector.

Offsetting this is the fact that certain wood processing sectors are capital intensive, require a highly skilled labor force, and need the support of a moderately developed industrial and service sector to supply inputs and provide transport and marketing facilities.

At the more detailed operational level, many factors come into play. For example, there are different log requirements for operating a sawmill and a log export operation, both with respect to inventory or log flow and log characteristics - e.g. size, species, etc. Local processing would seem to mean more efficient utilization of forest resources, in that each hectare of forest would yield a higher volume of usable material, since lower quality materials could be harvested and processed if the total transport cost to the final user were lower. Waste materials could be processed into fuel, panels, or other products if the processing facility were located at a point sufficiently close to the market for the products. This implies the existence of a local market for those products which are not competitive in the export market. Generally, the products made from sawdust and chips are in this category since transport costs represent a high proportion of the total value of the product. This is also the case for sawn timber of low quality. This does not imply necessarily that final products should be marketed locally since of course they may be further processed into final goods that are competitive in the export market.

Another aspect which needs to be considered is whether substitution of domestic processing for export of logs would allow as wide a range of different materials to be utilized. Typically, the production of sawn timber from logs requires an essentially continuous supply of logs with specific characteristics which match the sawmill's capabilities. The range of materials which can be accommodated by any given mill can be enlarged, but this tends to increase costs per unit of throughput. The same argument holds with perhaps even greater force in terms of processing primary products into secondary products. For the efficient operation of a furniture plant, it is necessary that very specific raw materials be available.

Economic efficiency and higher utilization of forest resources are not the only factors that must be examined in assessing the implications of local processing of raw materials. Other critical factors are employment and overall economic development. Here also the relative benefits of investing in the wood sectors or in other sectors will vary with individual circumstances. The most promising approach may be to compare capital-labour ratios since the availability of capital is often the limiting factor in providing employment in developing countries. If the raw materials are in a form that can be readily converted to inputs for local sawmills then sawmilling is an attractive investment. The capital required per job is fairly small and the savings in shipping costs are large. The development of the sawmilling sector in developing countries attests to this. Not all log export flows, however, are capable of being converted to an efficient flow of input into a sawmill operation. As mentioned above, it is necessary to have over a long period an even flow of material that has the characteristics for which the mill is designed. The same sort of discussion holds for other products. However, there are some differences. The principal difference is that the gains in terms of transportation savings are much smaller for the secondary wood products sector. Even for knockdown furniture, the saving in material shipped is probably less than 20-30 per cent over shipping the raw material.

Production costs and capital requirements

A. Overview of technological conditions in the sector

The sector utilizes a wide range of levels of technology from sophisticated, highly automated, composite panel plants to manual production of sawn timber, cement-fibre boards, house framing and components and hand crafted furniture. The matrix of timber products and technological levels of processing is indicated in Table 4. A prime purpose of increasing the level of technology is to reduce unit costs (and increase quality of output) and this generally requires also an increase in scale. Ranges of plant size appropriate to various levels of technology are indicated in Table 5. The distribution of production costs is shown in Table 6.

In the composite - veneer (Comply) and OSB plants, capital - labour and capital-material ratios are higher than for plywood and gypsum board plants. The Comply and OSB plants offer the advantage of utilizing more of the tree and thus providing more product and more value per unit of forest resource. They are particularly suited therefore to large forest resources where quality is variable or where there is a scarcity of high quality timber suited to veneer or sawn timber production.

On the other hand, sawn timber, plywood, mineral bonded boards, housing, construction and furniture production offer a wider range of scales and levels of mechanization to suit the range of conditions in developing countries. Each may be produced in highly mechanized plants with various levels of automation or in smaller semi-mechanized or largely manual plants - depending on scale, end use, skills and resources available.

Thus there is a substantial range of substitution possible between capital and labour, and also between capital and material quality and cost in the case of the composite plants. There is also room for substitution between materials and labour: In the case of gypsum board, fibre glass in mat form has been substituted for loose vegetable fibre (e.g. sisal), in order to substantially increase labour productivity at the expense of material costs (fibre glass \$1600/t, loose sisal \$500/t).

Traditionally, the level of technology in wood construction has been low; although off the construction site, higher technologies are appropriate: Pressure treatment for preservation is a prerequisite for many species to be exposed to weather or ground contact. Kiln drying is often used for joinery and structural materials and stress grading is used to establish strength properties. Timber connectors such as gang nails have facilitated a small industry in prefabricated roof trusses.

Further mechanization is feasible in the off-site manufacture of building components, e.g. windows, doors, roof trusses, cupboards, benches, fabricated beams, and of course wood based panels as already discussed. Similar mechanization occurs in the manufacture of furniture and utensils for the house.

On the construction site, the use of small powered hand tools (saws, drills, planes, etc.) is increasing and building hardware is being designed to suit this change.

B. Potential for technological transfer and the development of new technology

Each of the processes and products above has direct relevance to developing countries. As shown previously, demands for timber products in the developing world are expected to grow substantially over the next two decades. Opportunities for export of processed timber are also expected to increase as national policy constraints on log exports continue to take effect.

The demands, therefore, will be for large volume export quality production and large and smaller volume production to meet domestic needs. Thus a range of technologies is expected to be appropriate from large scale, highly mechanized and even automated plants needed to meet export and large urban market demands, to small scale regional production to satisfy local markets, less accessible to products from the larger plants.

Various modes of transfer of these technologies must also be considered from partnership arrangements with larger firms in the developed world and agreements on a government to government basis, to purely local enterprises

financed from development funds. Further technological developments must also be taken into account.

The cost of the micro processor is continuing to fall and its capabilities continue to develop, so that a greater degree of automation and process control can be expected. Furthermore, each of the production processes considered above is effectively a batch process. Hence there is scope in many cases for development of new continuous process technologies, providing further potential economies of production.

Hence there is scope not only for continued improvement and automation of present primary processes but also for change to new processes with the promise of further potential economies of production. The scope for technological development at the secondary level is less because of the greater diversity of processes and products involved, but continued mechanization can be expected.

Standardization and modular co-ordination are useful concepts here and facilitate scale economies. Prefabrication of housing has less advantages and only a small market share.

To develop these industries, information on properties of a wide range of tropical timber species is required. Information on sizes, strengths and durabilities etc. is also necessary for acceptance by various groups, e.g. architects, engineers, and regulatory authorities.

In fact, a substantial investment in information on timber construction is warranted to ensure its acceptance by the building industry and its clients. This is particularly important as timber construction creates the major potential demand for the products of primary timber processing.

Other potential areas for further development include

- (i) integrated composite panels
- (ii) moulded composite beams for longer spans, and
- (iii) durable external sheeting material.

Table 4. Levels of technology appropriate to different processes

Production process	Large automated plant	Highly mechanized production	Partly mechanized	Largely manual processing
Sawn timber	X	X	X	X
Plywood	X	X	X	
Comply	X	X		
Oriented strand board (OSB)	X	X		
Medium density fibre board (MDF)	X	X		
Hardboard	X	X		
Cement fibre board		X	X	X
Gypsum fibre board		X	X	X
Housing construction			X	X
Furniture	X	X	X	X

Table 5.
(1981 costs)

Production process	Plant size range annual production (m ³ x10 ³)	Capital cost range (US\$x10 ⁶)	Unit production cost range (\$/m ³)	Technology level	Labour productivity (m ³ /cap/day)
Plywood	50-100	25-34	201-178	High-Med	1.1-1.6
Comply	125	50	140	High	1.8
OSB	75-100	30-38	146-137	High	2.5-2.6
Hardboard	7.5-75	7-32	330-180	Med	0.6-2.2
Gypsum board	.75-3	.1-.2	223-184	Med-Low	0.8-1.4

Table 6. Comparison of production costs over various plant sizes and products
(1981 costs)

Item	Product								
	Plywood		Comply	OSB	Hardboard		Plaster board		
Plant size annual production (M ³ x10 ³)	50	100	125	75	100	33	75	.75	3
Capital cost US\$ x10 ⁶	25	34	50	30	38	17	32	.1	.2
Production costs (\$m ³)									
Wood/fibre	85	85	38	41	41			60	60
Adhesive	13	13	26	35	35			15	15
Labour	40	28	24	18	17			70	46
O/H	64	52	49-57	52	44			77	60
Total	201	178	138-146	146	137	210	180	222	181

Annex Table 1.

Description of Standard Industrial Trade Classification of wood-processing products in terms of their relationship to the International Standard Industrial Classification System.

<u>ISIC 3311</u>	<u>SITC</u>
SAWMILLS, PLANING AND OTHER WOOD MILLS	
Wood waste, shavings and sawdust originating in sawmills including sawdust briquettes	241.1D
Railway sleepers produced by sawmills	243.1B
Lumber, sawn lengthwise, etc., conifer	243.21
Lumber, planed, tongued, grooved, etc., conifer	243.22
Lumber, sawn lengthwise, etc., non-conifer	243.31
Lumber, planed, tongued, grooved, etc., non-conifer	243.32
Wood in the form of powder, chips or shavings for use in dyeing and tanning, produced by sawmills	292.1D
Veneer sheets	631.1
Veneer wood and plywood (including blockboard, laminboard and battenboard)	631.21A
Celular wood panels	631.22
'Improved' wood	631.41
Reconstituted wood (particle boards)	631.42
Wood paving blocks	631.81
Unfinished sawn staves	631.82B
Chipwood and uniform sized wood shavings produced by sawmills	631.83B
Drawn wood, match splints, etc.	631.85
Wood wool (excelsior) and wood flour delivered by sawmills	631.86A
Wood beading, moulding, etc., produced by sawmills	631.87A
Builders' woodwork and prefabricated buildings of wood (including doors, sashes and ready-cut wooden parts of buildings with or without fittings and accessories and assembled parquet flooring panels)	632.4
Other articles of wood made by sawmills, e.g., shingles	632.89A
Fair-ground amusements consisting chiefly of transportable buildings of structures of wood	894.5A

Annex Table 1 continued

<u>ISIC</u> 3312	<u>SITC</u>
MANUFACTURE OF WOODEN AND CANE CONTAINERS AND SMALL CANE WARE	
Wood waste from the manufacture of wooden and cane containers	241.1E
Chipwood produced by manufacturers of wooden and cane containers	631.83C
Boxes, cases, crates, complete, new, whether or not assembled	632.1A
Cooperage products (excluding staves falling within heading 631.82)	632.2
Cases and boxes of wood, reed or rattan generally of careful construction and good finish made by manufacturers of wooden and cane containers	632.73A
Wooden travelling chests, trunks, etc., made entirely of wood except for fastenings and closures	632.89B
Straw envelopes for bottles, screens and panels of willow and osier and similar coarse matting such as mats used for horticultural purposes	657.8C
Cases of wood designed to hold a specific instrument	861.99A
Plaits and similar products of straw, osier, willow, cane, rattan, reed, chipwood, strips of unspun vegetable fibre	899.21A
Baskets, panniers, hampers, travelling bags, shopping bags, birdcages, lobster pots, rug beaters, table mats, etc.	899.22A
Hand sieves with wooden frames and non-metal mesh	899.27A

Annex Table 1 continued

ISIC 3319	SITC
MANUFACTURE OF WOOD AND CORK PRODUCTS	
NOT ELSEWHERE CLASSIFIED	
Wood waste from the manufacture of wood and cork products n.e.s.	241.1F
Crushed, granulated or ground cork, and waste of natural or agglomerated cork	244.01B
Cork in blocks, plates, sheets or strips, etc.	244.02
Saddlery of wood	612.2B
Panels of marquetry and inlaid wood	631.21B
Wood flour other than from sawmills	631.86B
Wood beading, moulding, etc., produced by manufacturers of wood and cork products, not elsewhere classified	631.87B
Picture and mirror frames of wood	632.71
Household utensils of wood	632.72
Domestic or decorative articles of wood including small articles of furniture such as coat and hat racks, lamp bases and decorative boxes and containers made by manufacturers of wood and cork products, n.e.s.	632.73B
Tools, handles, shoe lasts, etc. of wood	632.81
Spools, cops, bobbins, etc. of turned wood	632.82
Articles of wood, n.e.s., made by manufacturers of wood and cork products not elsewhere classified, e.g., ladders, oars and paddles, yokes for livestock, coat and skirt hangers, etc.	632.89C
Articles of natural cork	633.01
Agglomerated cork and articles thereof	633.02
Taps and cocks for fitting in bung holes, wooden	719.92A
Pulleys, wooden	719.93A
Footwear made entirely of wood	851.03B
Abacuses of wood and school rulers, measuring rods and other non-precision devices of wood	861.93A
Truncheons, life preservers, weighted canes made in wood-working establishments	894.32A
Butt stocks and other wooden parts whether finished or only roughly shaped	894.33A
Slates made from wood coated with powdered slate or any other coating suitable for writing	895.92A
Wooden parts of articles falling within headings 899.41 and 899.42, e.g., handles, including blanks identifiable as unfinished handles and stocks for whips	899.43A
Butt stocks and other wooden parts for guns, rifles or carbines, whether finished or roughly shaped in wood-working establishments	951.03A

Annex Table 1 continued

ISIC 3320SITCMANUFACTURE OF FURNITURE AND FIXTURES,
EXCEPT PRIMARILY OF METAL

Wood waste from the manufacture of furniture and fixtures	241.10
Sewing machine cabinets, wood, made by producers of furniture	717.3A
Radio cabinets and television cabinets, wooden	724.99A
Chairs and other seats and parts thereof, except primarily of metal or moulded plastic materials	821.01A
Mattresses and mattress supports and cushions with inner springs	821.03B
Furniture and parts thereof, n.e.s., except primarily of metal	821.09A
Cabinets and cases for gramophones, etc., of wood	891.12A

First World-Wide Study on Wood and Wood-Processing Industry
Draft outline 1/

1. Presentation of the wood and wood-processing sectors and objectives of the study

1.1 Objectives of the study

1.2 Presentation of the sector and its subsectors 2/

Definition of wood and wood-processing industry including presentation of a comprehensive classification of production and trade of the sector; its contribution to the overall economic activities and particularly to the industrial development of developing countries.

1.3 Presentation of past trends and present situation of the sector

The presentation should cover production, employment, investment, world trade, etc. It should also contain global and regional reviews of the supply of wood and the demand from:

- mechanical processing (with the most important subsectors);
- chemical processing (mainly pulp and paper industry);
- the energy sector;
- other sectors.

The presentation should be done in physical quantities as well as in values. If possible, the development over a historical period should be shown. If this is not possible, the situation for one year, or an average of some years of the 1970s should be presented 3/.

-
- 1/ Detailed outlines of each section to be drawn up with sector or area specialists.
- 2/ Specific statistical definitions are given in Annex 1. Deviations from these definitions should be discussed in advance and once agreed upon, clearly specified in the text of the study.
- 3/ Exact time periods to be used in the presentations as well as in the projections to be defined.

2. Wood resources and their use as raw material ^{4/}

2.1 Review of forest resources

2.1.1 Natural forests

Treating, inter alia, various forest types, area distribution (by production classes, exploited forest areas, productive but not yet exploited, unproductive); growing stock of productive forests; ownership pattern of productive forests; management of productive forests; logging intensities/annual allowable cuts of productive forest and end-uses.

2.1.2 Industrial plantations

Cf. 2.1.1

2.2 Logging and transport

Discussing, inter alia, questions concerning:

- ownership (logging policy and objectives);
- utilization contracts (types; special features for both long and short-term agreements; effects of silviculture/management; utilization incentives/disincentives; government charges; harvesting as a link between the forest and industry; infrastructure and transport);
- logging methods (selection of systems and machinery);
- productivity and costs (the effects of various factors);
- logging residues (waste as fertilizer);
- transport methods (selection of, productivity, costs);
- major constraints to efficient harvesting and transport (planning, untrained personnel, finance, silvicultural regimes, natural conditions).

Sections 2.1-2.2 should pay special attention to economic and social constraints in the form of institutional factors (weak forest services unable to guarantee raw material supplies or to monitor concession agreements; inappropriate or inadequate government policies and/or legislation, etc.) and human factors (notably the pressure on forest and land aggravated by policies and/or practices that create adverse conditions for forestry).

^{4/} Whereas the world-wide perspective should always be borne in mind, the emphasis should be on the developing countries. Rule of thumb: 20/80 distribution of attention.

2.3 The use of wood

2.3.1 For processing of wood products

2.3.2 For pulp and paper manufacturing

2.3.3 As a source of energy and use for rural consumption and conversion to non-traditional uses, etc.

Section 2.3 should discuss the characteristics of these user categories, the share of developing countries, and their special requirements and problems faced.

3. Wood-processing industry

3.1 Major characteristics of the industry

This section will review the present situation and economic and social constraints facing developing countries in establishment of wood-processing industry. The following groups will be used ^{5/}

- primary processing, e.g. sawmilling, wood-based panels (veneer sheets, plywood, fiber board, particle board, etc.);
- secondary processing, e.g. wood in construction, wood in packaging, wood in furniture.

In reviewing economic and social constraints on the possibilities for the developing countries to develop this industry the section will analyse factors such as:

- costs and competitiveness (price and price trends, legislation measures influencing costs and/or competitiveness, lack of domestic markets for by-products, lack of industrial infrastructure and services);
- skilled manpower (at managerial and technical level);
- technology (evolution of technology, technology used with interfirm comparison; identification of technological patterns in relevant selected countries; adequacy of technology; origin of machinery and problem of spare parts; channels and agents of technology transfer, including possible incentives and/or constraint caused by legislation; role of research and development on product development; and institutional framework in research and development);

^{5/} The links between the groups of primary and secondary processing and the classification referred to above and in Annex 1 will be clearly specified.

- institutional infrastructure (quality control, standardization, grading, etc.);
- government policy (appraisals of government policies affecting development of the sector, i.e. incentives for national and foreign enterprises, tariff policy, etc.; financial and other specific problems related to the government policies).

3.2 Market and trade relations

This section will review the major aspects of market and trade relations such as: international trade and trade flows; product requirements and product development; trade incentives and obstacles, market information and market research (including market intelligence, promotion, finance, etc.); shipping (use of purpose-built bulk carriers and conference lines and scope for co-ordinated action).

4. Some special aspects of the wood and wood-processing industry

4.1 The energy system: The sector as a supplier and user of energy.

4.2 Environmental aspects

4.3 Others

5. Perspectives towards the year 2000

Two or three scenarios with different assumptions of the development of exogenous key variables, inter alia, those derived from Chapters 2 and 3 above (model and methods to be developed). The chapter should produce global and regional balances for the year 2000, covering:

- the supply of wood;
- the demand for wood: This part of the projections should use reasonable assumptions for the use of wood for energy production and also for pulp and paper manufacturing and for other sectors but should concentrate on mechanical processing;
- trade, also mainly in mechanical processing.

6. Conclusions and recommendations for future work

6.1 The main constraints for developing countries in establishing a wood and wood-processing industry

Based on the review above, the position of developing countries vis-à-vis industrialized countries should be pinpointed and formulated as problems which may be resolved.

6.2 Methods and possibilities for resolving identified problems

6.3 Action required at national, regional and international level, with particular emphasis on UNIDO activities. Items suggested for international co-operation

6.3.1 Objectives, concept and area of co-operation

6.3.2 Forms of co-operation

6.3.3 Possibilities for a long-term agreement between developed and developing countries (or government to government, corporation to corporation, firm to firm, etc

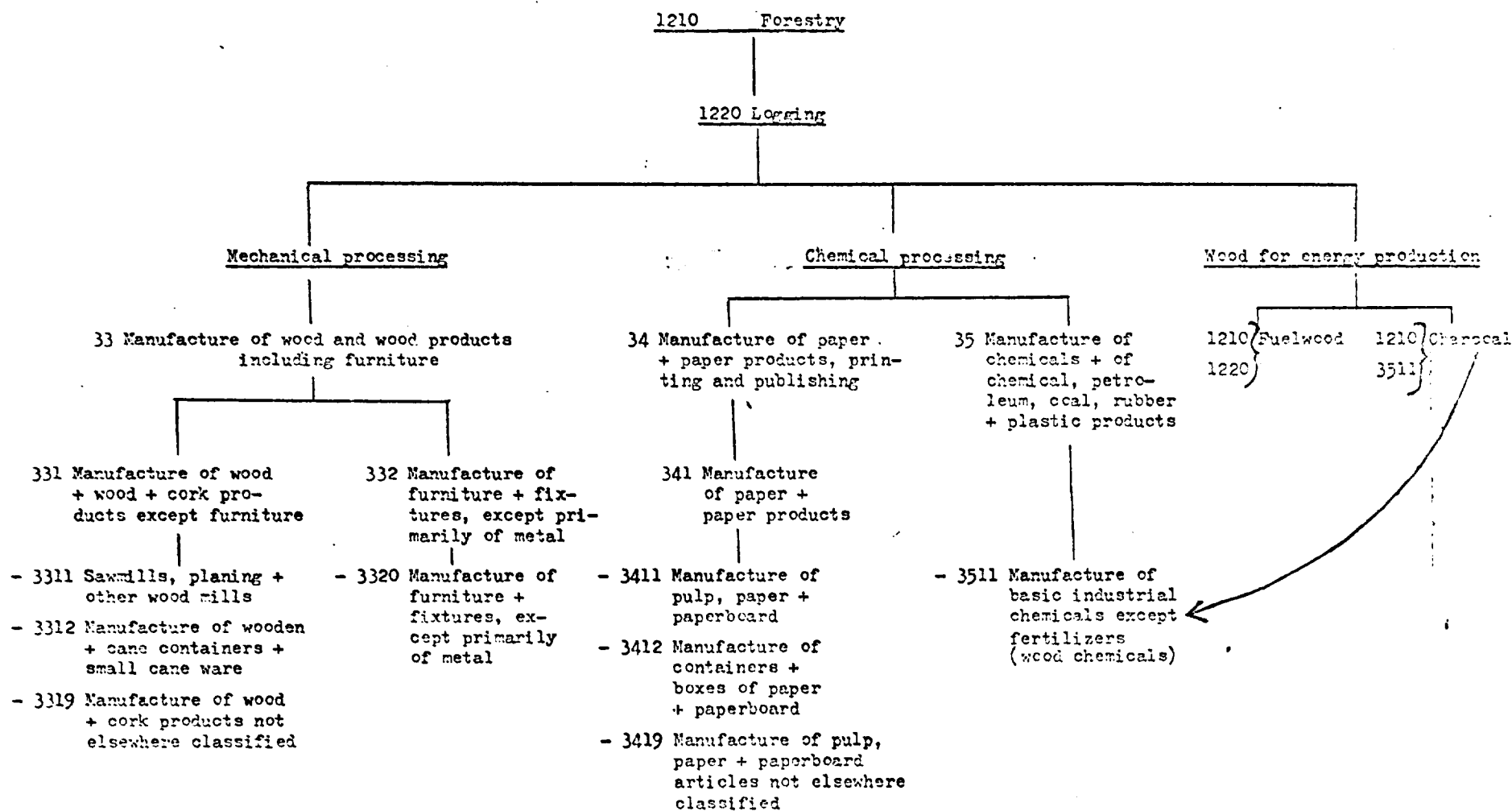
6.3.4 Identification of subregional and regional co-operation activities among developing countries

6.4 Items suggested for international negotiations

6.5 Possible follow up to the first world-wide study

Part of Chapter 6 should be identical with issues proposed for the Consultation Meeting.

FORESTRY AND WOOD PROCESSING SECTORS according to the classification by branches of industry from the INTERNATIONAL STANDARD INDUSTRIAL CLASSIFICATION of all economic activities (ICIS) ^{1/}



1/ The UN-Yearbook of Industrial Statistics, is based on ISIC

Main sections of mechanical wood processing according to the International Standard Industrial Classification of all economic activities (ISIC) and their components according to the Standard International Trade Classification (SITC) Revision 1

MECHANICAL WOOD PROCESSING

ISIC 331 MANUFACTURE OF WOOD PRODUCTS

ISIC 331	SITC
SAWN TIMBER, PLANING AND OTHER WOOD MILLS	
Wood waste, shavings and dust originating in sawmills including dustless shavings	241.10
Railway sleepers produced by sawmills	243.18
Lumber, sawn lengthwise, etc., conifer	243.21
Lumber, planed, lengthwise, etc., conifer	243.22
Lumber, sawn lengthwise, etc., non-conifer	243.31
Lumber, planed, lengthwise, etc., non-conifer	243.32
Wood in the form of shanks, strips or shavings for use in dyeing and tanning, produced by sawmills	243.10
Veneer sheets	631.1
Veneer wood and plywood (including blackboard, laminboard and latherboard)	631.21A
Cellular wood panels	631.22
'Improved' wood	631.41
Reconstituted wood (particle boards)	631.42
Wood paving blocks	631.81
Unfinished sawn staves	631.82B
Chipwood and uniform sized wood shavings produced by sawmills	631.83B
Brown wood, match splints, etc.	631.85
Wood wool (excelsior) and wood flour delivered by sawmills	631.86A
Wood building, moulding, etc., produced by sawmills	631.87A
Builders' workbenches and prefabricated buildings of wood (including doors, arches and ready-cut wooden parts of buildings with or without fittings and accessories and assembled parquet flooring panels)	632.4
Other articles of wood made by sawmills, e.g., shingles	632.89A
Paired-ground assemblies consisting chiefly of transportable buildings of structures of wood	894.5A

ISIC 332	SITC
MANUFACTURE OF VEHICLES AND CARRIAGES CONTAINERS AND SMALL CASE WARE	
Wood waste from the manufacture of wooden and cane containers	241.10
Chipwood produced by manufacturers of wooden and cane containers	631.83C
Boxes, cases, crates, complete, new, whether or not assembled	632.1A
Cooperage products (excluding staves falling within heading 632.2)	632.2
Cases and boxes of wood, reed or rattan generally of careful construction and good finish made by manufacturers of wooden and cane containers	632.73A
Wooden travelling chests, trunks, etc., made entirely of wood except for fastenings and closures	632.89B
Straw envelopes for bottles, stems and panels of willow and osier and similar coarse matting such as mats used for horticultural purposes	637.80
Cases of wood designed to hold a specific instrument	861.99A
Platts and similar products of straw, osier, willow, cane, rattan, reed, chipwood, strips of unspun vegetable fibre	899.21A
Baskets, panniers, hampers, travelling bags, shopping bags, birdcages, lobster pots, rug beaters, table mats, etc.	899.22A
Hand sieves with wooden frames and non-metal mesh	899.71A

ISIC 332 FURNITURE AND FIXTURES

ISIC 332	SITC
MANUFACTURE OF FURNITURE AND FIXTURES, EXCEPT IN PARTIAL OF METAL	
Wood waste from the manufacture of furniture and fixtures	241.10
Sewing machine cabinets, wood, made by producers of furniture	717.36
Radio cabinets and television cabinets, wooden	724.02A
Chairs and other seats and parts thereof, except primarily of metal or moulded plastic materials	821.01A
Mattresses and mattress supports and cushions with inner springs	821.03F
Furniture and parts thereof, n.e.s., except primarily of metal	821.02A
Cabinets and cases for gramophones, etc., of wood	891.18A

ISIC 333	SITC
MANUFACTURE OF WOOD AND CORK PRODUCTS NOT ELSEWHERE CLASSIFIED	
Wood waste from the manufacture of wood and cork products, n.e.s.	241.10
Crushed, granulated or ground cork, and waste of natural or agglomerated cork	241.01B
Cork in blocks, plates, sheets or strips, etc.	242.02
Sundry of cork	632.22
Panels of parquet and inlaid wood	631.21B
Wood floor other than from sawmills	631.52B
Wood moulding, moulding, etc., produced by manufacturers of wood and cork products, not elsewhere classified	631.87B
Picture and mirror frames of wood	632.71
Household utensils of wood	632.72
Domestic or decorative articles of wood including small articles of furniture such as coat and hat racks, lamp bases and decorative boxes and containers made by manufacturers of wood and cork products, n.e.s.	632.73B
Tools, handles, shoe lasts, etc. of wood	632.81
Spools, cops, bobbins, etc. of turned wood	632.82
Articles of wood, n.e.s., made by manufacturers of wood and cork products not elsewhere classified, e.g., saddlers, carns and paddles, yokes for livestock, coat and cart hangers, etc.	632.83C
Articles of natural cork	633.01
Agglomerated cork and articles thereof	633.02
Taps and cocks for fitting in bung holes, wooden	719.92A
Rollers, wooden	719.93A
Footwear made entirely of wood	851.01B
Abscuses of wood and school rulers, measuring rods and other non-precision devices of wood	851.93A
Trancheons, life preservers, weighted canes made in wood-working establishments	894.32A
Bull stocks and other wooden parts whether finished or only roughly shaped	894.33A
Slates made from wood coated with powdered slate or any other coating suitable for writing	895.02A
Wooden parts of articles falling within headings 897.41 and 897.42, e.g., handles, including blades identifiable as unfinished handles and stocks for whips	899.43A
Bull stocks and other wooden parts for guns, rifles or carbines, whether finished or roughly shaped in wood-working establishments	951.03A

SITC revised 1

Sectoral Study Methodology Meeting
Wood Industry
Vienna, 28.2-2.3.1983

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