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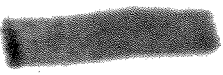
**The Use of Demand Projections in an
Under-Developed Country, and an
Outline and Appraisal of Methods
of Projecting the Demand for
Forest Products**

by
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Sommaire en français

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ABSTRACT

The importance and use of projections of future demand for forest products in under-developed countries is pointed out. Two methods of forecasting are outlined and discussed. The organization and classification of data are outlined and an estimation of the amount of work involved in carrying out a project is given. Several examples of projects that have been done in various countries are mentioned and a brief bibliography is included.



CONTENTS

	<i>Page</i>
INTRODUCTION	7
PREPARATION OF A MODEL	8
EVALUATION OF METHODS OF FORECASTING	9
ORGANIZATION OF PROJECT	12
EXAMPLES OF WORK	12
SUMMARY	13
SOMMAIRE	13
BIBLIOGRAPHY	14

The Use of Demand Projections in an Under-Developed Country, and an Outline and Appraisal of Methods of Projecting the Demand for Forest Products¹

by

D. A. WILSON²

INTRODUCTION

The development of the natural resources of a country is one of the most productive fields for promoting economic growth. Forest resources have played and are playing important roles in development in many countries of the world, providing on the one hand, opportunities for industrialization and on the other needed raw materials for various sectors of the economy. Careful attention to the use of forest resources is necessary since the flow of wood products from them is variable and since forests provide several benefits in addition to wood. In particular, the protective role of forests is of prime importance in some regions. However, only requirements for wood as a raw material are considered in this paper.

The supply of wood within a region or country may be altered both in quantity and quality. In a region of mixed forest of many species the cutting of one or a few species may result in forest stands becoming dominated by species which are less desirable or more difficult to use. On the other hand, forests of desirable species may be established by plantation on suitable areas. The establishment of forests is costly and requires capital and labour that can be used for other developmental projects. They must, therefore, be justifiable by the return they make to the economy of a region or a country in comparison with alternate uses of funds. Evaluations of such investments can be made only if realistic estimates of the requirements for wood are available. Short term estimates of forest products requirements are needed for development of existing resources by the installation of converting plants and to establish priorities for plants. In some forest products industries, (for example pulp and paper and building boards) the minimum economic size plant will produce more than present requirements of some countries and it is important to establish the level of the economy or the time at which such plants may be justified. Reliable estimates of the consumption of each of the various forest products and of roundwood in total are needed, therefore, for the allocation of resources within a country.

The time or target date for which the estimates are to be prepared should receive careful consideration. In the forest products field many projections have been made for 15, 20 and 25 years. In some studies, both for developed countries and countries under development, additional projections of 40 to 50 years have been made. It should be noted that, generally speaking, the longer the

¹ Originally prepared for the United Nations Conference on the Application of Science and Technology for the Benefit of the less Developed Areas, Geneva, Switzerland, February 1963.

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projection period, the less accurate will be the estimates. Care should be taken not to choose a target date too far in the future, or to prepare estimates on the basis of a level of economic activity greatly different from current levels. In countries in which a speed-up in the pace of development is expected, there will likely be rapid technological change. In these circumstances it is desirable to make detailed estimates of specific uses for only a relatively short time ahead. Estimates being made as a basis for the establishment of manufacturing plants need not be made for a period too far in the future. In many instances detailed estimates for 10 years ahead will be found to be appropriate and it is questionable if it is justified to prepare detailed estimates for countries under development for more than 15 or 20 years ahead. On the other hand, broad estimates for a longer period may be useful for determining the amount of forest appropriate for a country.

PREPARATION OF A MODEL

In making economic projections, a useful assumption is that economic development occurs as a rate of increase from a base. Therefore, a knowledge of the current level of consumption of wood and wood products is a necessary starting point for the estimation of future requirements. This knowledge will also serve to reveal opportunities for industrial development and improvements in resource allocation. The per capita consumption of forest products and the pattern of end-use consumption vary widely from country to country. The level of income, the distribution of urban and rural population, the degree and type of industrialization and other factors, all affect wood products consumption. In addition, availabilities of forest resources suitable for use and of alternate materials have an important effect on the quantity used.

The first step in preparing forecasts is to decide on a model of the economic sector under review. This model will determine the form under which data are to be collected and classified. Two general systems of forecasting are possible—aggregate and detailed. In the first, consumption in broad categories is related to over-all economic parameters and projection of the parameters will provide an estimate of future requirements of wood products. In the second method, detailed analysis is made of each important product in each of its main uses. By determining the trend of the economic sector in which the product is used and the intensity of use of wood in that sector, a projection of consumption can be developed. A general knowledge of the use of wood products is necessary background for deciding the type and form of model suitable. If this information is not available, a pilot survey of users and potential users should be carried out to provide it. Concurrent with estimates of the quantity of wood products used, the basic factors describing the economy should also be determined. A comparison of per capita consumption of wood products and per capita measures of economic activity with comparable data for neighbouring areas may reveal important differences in the level or pattern of consumption. Such differences as may be revealed will be due in part to factors that may be measured by over-all economic parameters but will be due also to the availability of wood products and of alternate materials and their relative prices—in other words, supply factors.

In preparing the model, an attempt should be made to make it conform to models of the total economy where such are available. Most countries now have projections of total economic activity prepared on a national accounts basis, or input-output approach. It is not possible to comment on these complex fields herein. There is an extensive literature on the subject. It should, however, be mentioned that the purpose of broad category analysis and projections is to determine needed developments in institutions, basic services and materials,

training of labour, transport systems, needed investment funds, etc. While not fully suitable for projection of specific products they provide the basic framework for the projection model.

EVALUATION OF METHODS OF FORECASTING

Two general methods of preparing projections are discussed below.

(a) In the aggregate method of forecasting, the consumption of wood products in a relatively small number of categories is estimated for the target year on the basis of changes in general economic activity and the relationship of the amount of wood used to these changes.

(i) The classification of wood products may be a simple breakdown such as the following:

Fuelwood

Wood used in round form

Wood for conversion by sawing or peeling

Pulpwood

(ii) The amount of each group of products used in each of a number of sectors should then be determined. The sectors chosen for analysis should be those used for projections of the total economy if available. The following sectors have been used in over-all studies and are suggested as possible categories for analysis.

—Government sector

investment

consumption

—Private sector

Agricultural segment

investment

consumption

Non-agricultural household segment

investment

consumption

Industrial segment

investment

consumption

Forest products enter into both consumption and investment to an important extent, and the above breakdown should be a useful one.

(iii) The method involved in this type of projection is first to determine the quantity of forest products used in each sector. Second, the trend of use over time relative to activity in each sector should be established. This may be done using statistical relationships if a record of use for a period of years is available. A projection of activity in each sector and the trend of use of wood products can be combined to form an estimate of future use. In cases in which the past trend of consumption is not available, the trend of use in each sector will have to be established by judgement. The opinions of knowledgeable persons will be useful in this regard. Also a comparison of per capita consumption or consumption per unit of expenditure in each sector with comparable data for other areas can be used in establishing the probable trend.

(iv) For purposes of projecting requirements for specific commodities or groups of commodities there are two shortcomings to this approach. First there will usually not be sufficient historical information to establish relationships between product use and economic

parameters. Second, the method does not make adequate allowance for technological change. Despite these shortcomings the procedure may be appropriate in certain cases and will at least provide a broad estimate of forest products needs which may be useful as a first approximation.

(b) The second method—the detailed approach—will be found necessary for the evaluation of specific development projects such as investment in manufacturing plants and building of roads to open up unused forest areas. This method requires careful preparation, first to cover all important products, and, second to cover all significant uses. A general knowledge of the use pattern in a country is necessary for this step and the specific breakdown used depends on the particular conditions in the country for which the study is being carried out.

(i) A useful primary classification is one which groups products by the type or form of wood used. Thus, current reporting of forest products on a world basis makes the first separation into fuelwood and industrial wood. Taking the less developed countries as a whole, fuel is the most important use for wood, accounting for nearly three-quarters of annual removals. Wood used for fuel is generally of low quality or small sized. Most of it probably cannot be transferred to industrial use. Nevertheless, since it does constitute a drain on forest growing capacity, estimates of the amount of wood used for this purpose are necessary.

(ii) Industrial wood may be classified further on the basis of the qualities required for different uses. Uses requiring minimum sizes or specific qualities should form a class. Wood used in round form accounts for a significant proportion of wood consumption. Poles and piling, posts, mining timbers and similar products require minimum size and strength properties and certain species are preferred for them. Logs for conversion to veneer, plywood and sawn products must be of minimum size for efficient operation. Thus, estimates of sawnwood and plywood consumption are necessary. Wood for pulping has smaller size requirements and there is some variation in the wood species best suited for different pulp and paper products. Building boards, for example, have different fibre requirements from printing papers. However, in the case of pulp products, only total consumption should be analyzed at first. If the total suggests possibilities for the production of specific products, further studies can be carried out.

(iii) For each product, the most important present and potential uses should be identified as a basis for analysis. A classification along the following lines may be found suitable:

—Fuelwood

Household sector

Industrial sector

—Wood used in round form

Agricultural sector

Non-agricultural household sector

Mining industry

Communication industry

Other industries

—Sawnwood

Agricultural sector

construction

other uses

Public sector
 construction
 other uses
Industrial sector
 construction
 other uses

—Plywood—Breakdown as for Sawnwood

—Pulp and Paper products

It may be found that current consumption in one category is too small to justify a separate estimate and the quantity can be included in a miscellaneous category. On the other hand specific uses based on a special application or local industry not common to other regions may require separate analysis.

- (iv) After the specific uses for which estimates are to be prepared have been established it is necessary to determine in detail the use pattern which now exists. In most cases this will require a survey of users. The survey should be designed so that all relevant information regarding the use of the product will be gathered. Such information includes the availability of the wood product in question, building or manufacturing techniques being used, availability of alternate materials, relative prices of competing materials, the availability of trade skills needed for its use and other relevant factors. The intensity of the survey will depend on the variability of use between different units of the economy. In most cases a stratification of the population will be found desirable. Stratification by rural and urban, by income level, and by region of the country are possibilities. Information that can be used to establish probable trends in utilization of wood products should also be gathered in the course of the survey. Information of this type can probably best be supplied by knowledgeable persons in each industry and by officials closely in touch with developments in each sector.
- (v) With the information gathered by the survey it will then be possible, using a projected level of the sector for a future date and the trend of use in the sector, to prepare an estimate of consumption.
- (vi) In analysing current use patterns and preparing future estimates, supply aspects should be brought into the analysis. The price of wood products relative to prices of alternate materials will affect the level of consumption. Judgement should, therefore, be made as to the probable trend of relative prices and these should be used in establishing the consumption estimate.
- (vii) With the completion of estimates for each type of product it is customary to convert each to a roundwood basis, that is express each unit quantity in terms of the quantity of timber as removed from the forest required to make it. In these units the various products can be added together to give the total wood requirements of the economy. Such estimates are, however, only useful for purposes of broad evaluation of the forest resources and decisions regarding supply should be based on specific products.
- (viii) It is important at this stage to be certain that all projections conform to projections of the over-all economy. Wood products are used widely throughout the economy and enter into both consumption and investment. Projections should be totalled on the basis

of consumption and investment, and checked for agreement with projections of broad sectors of the economy. Comparisons of the estimated quantities with levels attained in other countries at similar levels of economic activity also provide a check on the projections. The results of the project will probably reveal specific industrial opportunities or products which will justify further study for investment evaluation. It should also be noted that new projections will be required periodically, possibly every 10 years.

ORGANIZATION OF PROJECT

Projects of this nature should be carried out by people experienced in the field. For an under-developed country for which no previous estimates have been made, a team of three or four experienced workers would be required for about two years. It is desirable to have a person with a knowledge of forestry and forest products as a member of the team. If such persons are not available within the country, assistance for this type of work can be obtained from the Food and Agriculture Organization of the United Nations, from other agencies of international bodies or by hiring persons from other countries. In addition to the project leaders, personnel will be required to carry out surveys. These latter can be obtained from within the country, possibly from an agency which has carried out other survey work, or personnel may be trained for the assignment. Clerical workers are also necessary for compilation of data and typing of reports. Provision should also be made for follow-up studies. The cost of a project of this nature can only be estimated when the amount of work necessary has been determined.

EXAMPLES OF WORK

Only brief reference to work in this field can be made here.

- (a) A series of studies of forest products requirements has been done by the Food and Agriculture Organization. Studies on a regional or continental basis have been made for Latin America, the Asia-Pacific Region and Europe. Of more direct interest are studies that have been carried out for certain countries, and useful examples are the studies for Uganda, Tanganyika and Kenya. A very complete analysis for an advanced economy is the section on requirements in the report for the United States published in 1958 by the U.S. Department of Agriculture, Forest Service—*Timber Resources for America's Future*. Studies of other commodities also provide useful background and outline techniques that may be used. The United Nations publication *Manual on Economic Development Projects* outlines a number of such studies.
- (b) For techniques applicable for analysis of the total economy, of the many articles and books on the subject, the following two are mentioned as useful examples: *Programming Techniques for Economic Development* published by the United Nations and *Regional Economic Planning* published by the Organization for European Economic Cooperation.
- (c) The books and reports listed in the bibliography should provide adequate background for requirements studies, although works on statistical methods, construction techniques and other specialized subjects may be required in the course of carrying out the project.

SUMMARY

The development of uses for forest products is a productive field for promoting economic growth in an under-developed country. Forecasts of demand for forest products are necessary for the management of a country's forests and the evaluation of proposals for establishment of manufacturing plants.

The target date for which estimates are to be prepared should be carefully considered and chosen to suit the specific needs of the country. Detailed estimates of specific products should be made in most cases for a relatively short period ahead, 10 or 15 years is suggested, while broad general estimates for longer periods may be useful for planning the amount of forest appropriate for a country.

In preparing estimates, a model of the forest products sector should first be prepared. This should conform to models of the total economy where possible.

A general knowledge of the use of forest products is necessary for the preparation of the model. If existing information on this subject is inadequate for the purpose, a pilot survey of uses should be carried out.

Two general methods of forecasting are possible, aggregate and detailed. In the first, consumption is related to broad economic parameters and the projection of parameters for a future date used for estimating forest products consumption. In the second, detailed studies of the factors affecting the use of a number of different products in each important application are used to project requirements.

A survey of present uses and potential uses is required to provide the information needed for preparing estimates by the detailed method. The classification of the items for which surveys are to be carried out should be based on the type of wood, the amount of wood used and the economic characteristics of the use and sector of the economy.

Forecasts made for the various products may be transferred to a roundwood basis and added together to provide an estimate of total wood consumption.

Studies of this nature require the work of three or four experienced persons for about two years plus personnel to carry out surveys and clerical staff.

Studies of requirements for forest products carried out by the Food and Agriculture Organization of the United Nations and by certain countries are examples that may be used as guides. Studies of requirements for other commodities carried out by agencies of the United Nations and by other international organizations also provide useful background.

SOMMAIRE

La découverte de nouveaux usages pour les produits forestiers est un moyen sûr de favoriser la prospérité économique des pays sous-développés. Pour aménager convenablement les forêts d'un pays, il faut pouvoir estimer d'avance les besoins de ce pays en produits forestiers et savoir apprécier les projets de construction d'usines de transformation du bois.

L'année pour laquelle il y aura lieu de faire des prévisions devra être choisie après mûre réflexion, selon les besoins particuliers du pays. Dans la plupart des cas, il est préférable de faire porter les estimations détaillées de la demande éventuelle de certains produits sur une période relativement courte, soit 10 ou 15 ans, tandis que les estimations sommaires de nature plutôt générale et portant sur un assez grand nombre d'années à venir peuvent être utiles pour déterminer en termes forêts, ce dont le pays aura besoin.

Lors de la préparation de telles prévisions, il faut d'abord dresser un graphique du secteur des produits forestiers. Autant que possible, ce graphique devrait être du même genre que ceux qui ont trait à l'économie globale.

Pour dresser un tel graphique, il faut d'abord connaître de façon générale le champ d'utilisation des produits forestiers. Si l'on ne dispose pas à cette fin d'une documentation suffisante sur cette question, il y a lieu de faire d'abord un sondage des usages des produits forestiers.

De façon générale, on peut faire deux sortes de prévisions, des prévisions d'ensemble et des prévisions détaillées. Dans le premier cas, on envisage la consommation en fonction de grands paramètres économiques et d'extrapolations de ces paramètres à la date future pour laquelle on veut estimer la consommation de produits forestiers. Dans le second cas, on établit les prévisions de besoins grâce à des études détaillées des facteurs qui influent sur l'utilisation d'un certain nombre de produits différents pour chaque application importante.

Pour établir des prévisions détaillées, il faut recueillir les données voulues en faisant un relevé des usages actuels et éventuels. Les produits qui doivent faire l'objet de tels relevés, doivent être classés selon le type de bois, selon la quantité de bois employé et selon les caractéristiques économiques de l'utilisation de chaque produit et du secteur qu'il occupe dans l'économie.

Les prévisions portant sur les divers produits peuvent être exprimées en termes de bois rond et être additionnées pour donner éventuellement une estimation globale de la consommation de bois.

Les études de cette nature exigent le concours de trois ou quatre personnes expérimentées durant à peu près deux ans, ainsi que d'auxiliaires pour effectuer les relevés et le travail de bureau.

Les études des besoins en fait de produits forestiers qu'ont exécutées l'Organisation pour l'alimentation et l'agriculture des Nations Unies et certains pays, sont des exemples qui peuvent servir de guide. Les études des besoins d'autres denrées qu'ont exécutées certaines institutions spécialisées des Nations Unies et d'autres organismes internationaux, constitueront aussi de la documentation des plus utile.

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