The Role of Forest Products Research in the Utilization and Conservation of Our Forest Wealth

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The forest, distinct from all its other services and benefits, supplies a basic raw material—wood—which from the earliest times has furnished mankind with necessities of existence and with comforts and conveniences beyond number. Forests will return maximum values to the people of the Philippines, only if they are fully and profitably utilized and conserved—in vigorous condition of timber crops.

The relative importance of the different values varies with the character and location of the forest and with the stage of culture of the people who use it. In earliest history the chief forest value was derived from its wildlife which provides both food and clothing. As civilization advanced, wood products became increasingly valuable, and for many centuries forest value was almost considered synonymous with timber value. Only recently have environmental values become fully understood, and it took a lot of forest destruction to drive home their importance. Perhaps even yet the lesson has not been fully learned. It cannot be said that these values are greater than those of wood products, but there are places where they may be.

While the growing of timber on these lands for the many products demanded by modern civilization represents the more tangible economic value or use, the mere production of an increased timber supply does not satisfy the demands of economic forestry. The utility of value of wood must also be maintained and increased. The better adaptation of wood to modern consumption requirements is a matter of direct concern to consumers, whose proper housing and standards of living are bound up with the satisfactory use of wood products; to workmen, who need the hundreds of millions of pesos in wages furnished by employment in the woods, the sawmills, the plywood mills, and broadly diversified fields of wood construction and manufacture; to local communities, towns, cities, provinces, and the nation, all of which have a vital interest in stable revenues from forest, forest lands, and successful forest industries. The forest resource of this country being almost wholly government owned, to the nation belongs the responsibility for its wise conservation and utilization which requires a broad program of research.

Forest products research must aid in solving many difficult problems, such as:

1. How to create values for the residues that develop during the logging and the conversion of trees and other forest products into articles of commerce.
2. How to secure useful service from the numerous tree species that are now used little if at all.
3. How to utilize more efficiently the smaller-sized and second-growth trees which will form the bulk of vegetation of cut over-areas.
4. How to secure greater service and economy from wood through selection of material, control and modification

of its properties, improvement of new and better methods of wood fabrication and conversion.

5. How to find methods of prevention and control of insects and fungi injurious to woods and wood minor forest products in order to reduce the degrade of logs and lumber, and to prevent the deterioration of wood structures and wood products.
6. How to place at the disposal of wood industries the results of research through dissemination and consultation.

The research program can be restated for more comprehensive description of each group as follows:

1. *How to create values for the residues that develop during the logging and the conversion of trees and other forest products into articles of commerce.*—From the felling operation wood waste begins to appear and the same can be observed in every subsequent step in the progress of processing and conversion of the wood to its ultimate useful form with the result that 2/3 to 3/4 of the volume of the average standing tree is lost as waste. The volume of waste depends upon the kind of timber and the character of the final product manufactured, which is less in products like poles or piles that require little effort to prepare them for use than in wood turning and other articles where more elaborate operation in cutting and shaping are necessary. Through improvements in equipment, processes, and methods of handling and conversion, waste may be considerably reduced. Another fertile field exists in finding profitable uses of low grade material and unavoidable conversion wastes. All of these contribute to the substantial increase of percentage of the tree and of the forest crops converted to profitable use. This will readily reflect in enhancing the value of the log and affording greater financial returns to the timber producer or processor besides lowering the costs to the consumer.

The finding of increased uses for low grades of logs, lumber, and timber which are hard to dispose of, even at a price that will return the money unavoidably invested in them, is in effect a forest conservation measure. It tends to extend the life of the wood supply and makes the practice of forestry an attractive venture.

2. *How to secure useful service from the numerous tree species that are now used little if at all.*—One of the many problems we are confronted with is how to find uses for the thousands of tree species which are practically unmarketable, because their form, size or properties are either unknown or not so desirable for conventional uses as those of the so-called commercial species. During the past fifty years, many of these "wood species" once considered useless have found ready markets not because of forest depletion but largely because of the removal of old prejudices or disadvantages through technological research. Dao (*Dracontomelom dao*) is one of the best examples. About sixteen or eighteen years ago no one would think of using this wood. But once its physical properties have been determined and a drying schedule was worked out, dao became No. 1 glamour wood of the Philippines that, because of its beautiful figure and grain, has easily captured a dominant position in local as well as foreign markets as a cabinet wood.

Inherently, the wood of many of these unpopular species is valuable for many purposes once their characteristics and properties are known and they would be freely used if the preferred species were not so readily available. While it could be expected that forest depletion will continue to bring additional little used species into fuller use, their utilization can be greatly accelerated by research effort to remove the technological obstacles that makes them undesirable or unmarketable. It is here where the activities of the Forest Products Laboratory can be directed to advantage to reduce the technical difficulties to a minimum, and make the entire wood crop of our forest into accept-

able raw materials for industries. This has a far reaching effect in simplifying the problems of silviculture and forest management to the end that the ever illusive sustained-yield forestry will yet have a permanent place in the scheme of tropical forest administration. Developments such as these can assist greatly in the preservation and perpetuation of industries and the communities that grow around them and the ultimate conservation of the forest resources, and thus have a highly salutary effect on our national economy.

3. *How to utilize more efficiently the small-size and second-growth trees which will form the bulk of vegetation of cut-over areas.*—The old concept that our forest resource is inexhaustible has lead us to follow forest policy of unregulated cutting which unfortunately made heavy inroads into the stands of timber, leaving practically nothing but stumps and badly damaged residual trees. The fact remains that the prized tree species are all gone, and what is taking their place is something entirely different—mostly small, second-growth less valuable species. What to do with this type of wood is a problem that demands serious consideration. Here is where forest products research can be called upon to look into the possible utilization of these tree species which are now considered as mere "woods". Progress in wood conversion techniques attained by other countries like the United States paves the way for the use of all kinds of wood as raw materials for industries. As a matter of fact, the wide range of non-usable unpopular species can be narrowed down to practically nothing today through the application of modern wood technology. There are already two big companies in the Philippines which are considering the utilization of second-growth species for pulp and fibre boards.

The tapping of the wood crop of second-growth areas may offer an opportunity to develop the forest into its original climax type much faster than letting the natural ecological factors to take care of plant succession. Besides, it afford a ready source of wood supply for other purposes than lumber which will greatly relieve the drain upon the virgin forest, thereby conserving the country's wood supply.

4. *How to secure greater service and economy from wood through selection of material, control and modification of its properties, improvement and better methods of wood fabrication and conversion.*—Wood is now facing a very keen competition with materials such as metals, glass, ceramics, plastics, concrete, and a variety of other products. Wartime developments have made many of these materials more serviceable and attractive than ever before and manufacturers, dealers, and users of wood products are not bound to continue the use of wood unless aggressive action is taken to make wood products more satisfactory, economical, and convenient to the consumer.

Wood, in order to meet its thousands of uses, must be properly selected and that requires intimate knowledge of its properties and characteristics and the extent of its variability within species and among species. It must be selected in accordance with the requirements that it must meet in service. That is, weak wood must not be used where wood of maximum strength is required, heavy wood is not suitable where minimum weight is paramount, wood that decays rapidly is useless where high decay resistance is desirable, and so on.

Among the varied opportunities in forest products research for making natural or improved wood serve the user better are the following:

(1) Reducing the shrinking and swelling of wood.
(2) Improvements in the selection of wood to meet use requirements.
(3) Improving wood house and small building construction to cut costs, increase convenience, and improve serviceability.
(4) Protection of wood against deteriora-

tion in service.

(5) Improvements in the use of wood for fuel and power.

(6) Improvements in seasoning and storage.

(7) Improvements in wood bending.

(8) Improvements in gluing and extending the usefulness of glued products.

(9) Developing new uses for wood through resin impregnation or densification.

(10) Improvements in the use of wood and wood products for shipping containers and packaging.

(11) Improvements in the use of wood for structural purposes.

(12) Improvements in the uses of wood and wood-products in aircraft manufacture.

(13) Assisting in industrial difficulties and related consumer acceptance difficulties.

5. *How to find methods of prevention and control of insects and fungi injurious to woods and minor forest products in order to reduce the degrade of logs and lumber, and tc prevent the deterioration of wood structures and wood products.*—With the increasing volume and diversity of wood uses in the modern era, the aid of research in examining, improving, and developing all kinds of treating processes has become increasingly important The effectiveness and relative costs of many kinds of preservatives in protecting wood against decay, insects and other destructive organism are a rich field of study and experimentations. Research in impregnation processes will pave the way to better treating methods and greater certainty of long-service life of wood at lower cost. It will give an additional benefit in making it possible to give preservation treatment to wood species not before successfully treated.

It is universally recognized that decay is by far the greatest destroyer of wood in service. Practical methods of preventing it will mean large money savings to wood users, more lasting and satisfactory wood structures and utilities, and the eventual curbing of a heavy drain on our forest resources.

6. *How to place at the disposal of wood industries the results of research through dissemination and consultation.*—The result of laboratory research can only be of immediate benefit to the wood industries in particular and to the people in general in proportion to the facilities afforded by the laboratory in the way of disseminating information through publications, reports and other means. Interested parties can avail themselves of information and advice on their wood conversion and wood use problems through technical consultation or by letters of inquiry. Every opportunity must be used to place within the reach of the people directly concerned all the results of forest products research. Then and only then, can the Forest Products Laboratory fulfill its mission of service to the industry, the people, and the nation.

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