# Properties and Uses of Priority Timber Species

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## Abstract

Physical and mechanical properties, durability and treatability characteristics of 21 timber species have been collated. Enduses of these species have been evaluated. Based on the various uses, the species have been recommended as priority species for plantation.

সারসংক্ষেপ

২১টি কাঠ প্রজাতির ভৌত ও যান্ত্রিক গুণাবলী, স্থায়িত্ব এবং সংরক্ষণ ক্ষমতা সংগ্রহ করে প্রান্তিক ব্যবহার নিরূপণ করা হয়। বহুবিধ ব্যবহারের উপর ভিত্তি করে এ সকল প্রজাতি বনায়নের জন্য অগ্রাধিকার হিসেবে সুপারিশ করা হয়েছে।

Key words : Enduse, durability and treatability, mechanical property, physical property, priority timber species, seasoning property

## Introduction

Bangladesh with her high population density and also steady increase of about 2.2 percent per annum, is facing a crisis for timber and fuelwood. The problem gets further aggravated due to the fact that the forests are unevenly distributed and composed of a large number of species. Due to heterogeneity of natural forests, and lack of adequate management, the yield per acre is very low. The growth of natural hill forests is 0.5-1.5 $m^3$/ha/a. The increments of mangrove and sal (*Shorea* sp.) forests are even lower. The yield of plantation forests is 2.5-4.0 $m^3$/ha/a. The productivity of the existing forsts is thus below the minimum level which is unacceptably low by the world standards.

The present total round wood supply in the country is estimated at 7.9 million $m^3$ per annum against the demand of 13.6 million $m^3$ per annum (Anon, 1993). It includes logs, poles, pulpwood and fuelwood. The supply thus fails to meet the demand of sawn wood and industrial wood of the country. The wide gap between the supply and demand of wood is mainly due to the limited forest resource, low productivity and high population density. There are, however, potentials for augmenting the supply of wood in the country. The productivity of the existing natural forests can be increased considerably by intensive management. The genetically superior propagules of suitable species may also be used for plantation in order to increase the productivity of forest

produce. However it needs a longer time to achieve this objective.

There are more than 500 timber species in the country. The species differ widely in their appearance, and in different technological properties. The use of only a few of these timber species is known, and these species are thus being extensively used. A majority of the species is either left unutilized or improperly utilized. Research is thus needed to avert this situation. It may play an important role for increasing the productivity of the forest both in quantity and quality. It may also improve the conversion and utilization of forest products, and thus help develop the forest potentials.

## Priority species

The selection of timber species is one of the major issues in the national plantation programme. Out of a large number of species, a search for a few species of desired characteristics is a difficult task. But if it is based scientifically, it becomes easier. There are criteria for selection of species. The enduse, adaptability, ease of propagation, relatively fast-growing and free from pests and diseases are the major criteria. The enduse is considered to be the prime basis for selection of suitable timber species. The following are the timber species which may be selected as priority species:

1. Teak *(Tectona grandis)*
2. Gamar *(Gmelina arborea)*
3. Chapalish *(Artocarpus chaplasha)*
4. Champa *(Michelia champaca)*
5. Chikrassi *(Chukrasia tabularis)*
6. Garjan *(Dipterocarpus turbinatus)*
7. Telsur *(Hopea odorata)*
8. Dhakijam *(Syzygium grande)*
9. Jarul *(Lagerstroemia speciosa)*
10. Silkoroi *(Albizia procera)*
11. Lohakat *(Xylia dolabriformis)*
12. Mahogany *(Switenia macrophylla)*
13. Neem *(Azadirachta indica)*
14. Toon *(Toona ciliata)*
15. Kadam *(Anthocephalus chinensis)*
16. Keora *(Sonneratia apetala)*
17. Raintree *(Samanea saman)*
18. Jackfruit *(Artocarpus heterophyllus)*
19. Mango *(Mangifera indica)*
20. Simul *(Bombax ceiba)*
21. Sissoo *(Dalbergia sissoo)*

## Properties

The first criteria for selection of timber species is its usefulness, i.e. , enduse of the timber species. For evaluating the enduse the technological properties need to be known. Thus, different properties like physical and mechanical, seasoning, treatability and durability of 21 priority species have been collated (Akhtar *et al.* 1992 , Ali *et al.* 1972, 1980, Bhattacharjee *et al.* 1987, Latif *et al.* 1978, 1989, Sattar 1981, Sattar *et al.* 1980, 1992, 1995, Sattar and Bhattacharjee 1983, Yakub and Bhattacharjee 1980, 1983, Yakub *et al.* 1972, 1978) are presented in Table 1.

## Uses

Based on the properties, the enduses of the priority species have been evaluated. In the list

**Table 1. Physical, seasoning and mechanical properties and durability and treatability characteristics of priority timber species.**

| Species | Specific gravity based on OD weight. and AD volume | Shrinkage (%) from green to airdry | | | Kiln drying time (green to 12% m.c.) day | Ease of drying | Modulus of rupture (airdry kg/cm$^2$ | Modulus of elasticity (airdry) 1000kg cm$^2$ | Durability | Treatability |
|---|---|---|---|---|---|---|---|---|---|---|
| | | R | T | V | | | | | | |
| Teak | 0.59 | 1.8 | 3.0 | 4.8 | 8.0 | Easy | 1008 | 131 | Highly durable | Not treatable |
| Gamar | 0.42 | 1.3 | 2.2 | 4.1 | 14.0 | Difficult | 554 | 76 | Highly durable | Difficult to treat |
| Garjan | 0.71 | 2.5 | 4.9 | 8.1 | 10.0 | Moderate | 1067 | 151 | Durable | Easy to treat |
| Telsur | 0.62 | 2.1 | 4.6 | 8.1 | 11.0 | Moderate | 982 | 119 | Durable | Easy to treat |
| Dhakijam | 0.72 | 2.3 | 4.7 | 8.3 | 12.0 | Moderate | 805 | 112 | Durable | Not treatable |
| Chapalish | 0.47 | 1.2 | 2.5 | 4.9 | 6.0 | Easy | 661 | 90 | Highly durable | Difficult to treat |
| Champa | 0.56 | 1.6 | 3.0 | 5.0 | 9.0 | Easy | 920 | 127 | Moderately durable | Not treatable |
| Jarul | 0.57 | 2.6 | 4.7 | 8.1 | 10.0 | Easy | 887 | 106 | Durable | Difficult to treat |
| Silkoroi | 0.69 | 1.9 | 3.4 | 6.1 | 10.0 | Moderate | 805 | 113 | Durable | Treatable |
| Chickrassy | 0.57 | 1.5 | 3.0 | 5.1 | 10.0 | Easy | 888 | 117 | Highly durable | Not treatable |
| Toon | 0.43 | 1.3 | 2.8 | 4.3 | 7.0 | Moderate | 693 | 102 | Highly durable | Not treatable |
| Jackfruit | 0.48 | 1.5 | 3.1 | 3.5 | 6.5 | Easy | 701 | 64 | Highly durable | Moderately treatable |
| Neem | 0.54 | 1.7 | 4.0 | 4.3 | 7.5 | Easy | 1014 | 149 | Highly durable | Difficult to treat |
| Mango | 0.54 | 1.7 | 2.8 | 4.3 | 6.5 | Easy | 775 | 68 | Not durable | Easy to treat |
| Lohakat | 0.82 | 2.5 | 4.9 | 4.3 | 12.0 | Difficult | 1447 | 178 | Highly Durable | Difficult to treat |
| Mahogany | 0.52 | 1.5 | 2.6 | 5.1 | 8.0 | Easy | 597 | 100 | Durable | Treatablity not known |
| Kadam | 0.44 | 1.5 | 2.9 | 3.1 | 4.5 | Easy | 472 | 74 | Not durable | Easy to treat |
| Keora | 0.54 | 2.0 | 5.0 | 8.2 | 7.0 | Easy | 699 | 95 | Durable | Moderately treatable |
| Raintree | 0.57 | 1.1 | 1.6 | 4.2 | 8.0 | Easy | 642 | 80 | Durable | Moderately treatable |
| Simul | 0.34 | 1.4 | 3.7 | 5.1 | 6.0 | Easy | 378 | 68 | Durable | Moderately treatable |
| Sissoo | 0.71 | 2.8 | 4.5 | 6.7 | 8.0 | Moderate | 984 | 110 | Durable | Difficult to treat |

R = Radial, T= Tangential, V= Volumetric , m.c. = moisture content

there are well known species which have been commercially exploited from a long time, but there is a score of species which are comparatively new. The traditional and potential uses have been discussed below :

1. Teak *(Tectona grandis)*

There is probably no other timber in the world which can be put to such a great variety of uses as teak. Because of its unique dimensional stability, graceful grain and colour, teak is an excellent timber for prized furniture. It is particularly suitable for house construction, door, window, flooring, wall panelling and many other purposes. In round form, it is used as pole, post, and rafter. Teak is thus rightly termed as an all purpose versatile wood.

2. Gamar *(Gmelina arborea)*

It is one of the most reliable timbers due to its dimensional stability and durability. It is suitable for furniture, door, window, panelling, planking, cabinet making, boat building and pattern making. It is also suitable for musical instrument, toy and novelty item and other purposes requiring light colour, moderate weight and soft timber.

3. Champa *(Michelia champaca)*

Because of its attractive colour and texture, it is ideally suitable for furniture, joinery and cabinet making. It may be used for door, window, panelling and household equipment. It makes excellent veneer for plywood.

4. Chapalish *(Artocarpus chaplasha)*

It is used for furniture, joinery and cabinet making. It is suitable for light constructional work like door and window. It may be used for boat and ship building. It is good peeling wood and makes an excellent plywood.

5. Chickrassy *(Chukrasia tabularis)*

Being a lustrous and often ornamental wood, it is suitable for furniture, panelling and cabinet making. It may be used for door, window and other constructional purposes.

6. Garjan *(Dipterocarpus turbinatus)*

It is a heavy, hard and strong timber. It is thus ideally suitable for heavy constructional purposes like beam, column and bridge. If treated, it makes excellent railway sleepers. In round form, it is used for transmission pole and post. It may be used for boat and ship building.

7. Telsur *(Hopea odorata)*

It is a typically hard, strong and durable timber. It is thus suitable for constructional purposes. It is used for boat building, bridge work, piling, beam, rafter, masts, cart and many other uses considering its quality of strength and durability.

8. Dhakijam *(Syzygium grande)*

It is a good constructional timber due to its heavy weight and moderate strength. It may be used for door, window and furniture. It is also suitable for boat building, cart and railway sleeper.

9. Jarul *(Lagerstromeia speciosa)*

It is an excellent constructional timber and is in great demand for door, window, beam, rafter and bridge works. It may be used for boat building, railway wagon work, shoe heels, boot lasts and a variety of other purposes.

10. Silkoroi *(Albizia procera)*

Because of its rich chocolate colour and often stripped with darker streak, it offers an excellent figure in wood. It is used for furniture, door, window, panelling and flooring. The decorative veneer can be made from it.

**11. Lohakat *(Xylia dolabriformis)***

It is a heavy, dense, very strong and durable timber. It is, thus, suitable for heavy constructional purposes. It is used for house beam, post and other purposes where higher strength and durability are concerned. It can also be used for railway sleeper and transmission pole.

**12. Mahogany *(Swietenia macrophylla)***

It is an excellent timber for furniture, panelling and cabinet works because of its graceful colour and moderate weight. It is used for musical instruments, jewellery box, printing block, novelty and turnery articles.

**13. Neem *(Azadirachta indica)***

It is a pinkish and lustrous wood with fine texture. It is suitable for furniture, panelling and cabinet making. Because of its high durelibility, it can also be used for light constructional and any other purposes.

**14. Toon *(Toona ciliata)***

It is commonly used for light constructional purposes due to its physical and mechanical properties. It is used for furniture, panelling, bent products, and makes good veneer for plywood.

**15. Kadam *(Anthocephalus cadamba)***

It is one of the most suitable timber species for match box and stick. It is suitable for planking, packing case, and other purposes requiring light weight and easy to work.

**16. Keora *(Sonneratia apetala)***

It can be used for cheap furniture, light construction, planking and packing cases. It is also suitable for making hardboard and can thus be a substitute for sundri *(Heritiera fomes)* which is a common species for making hardboard.

**17. Raintree *(Samanea saman)***

It is used for furniture, cabinet making and constructional purposes because of its dark colour and good texture. It can produce suitable veneer for plywood.

**18. Jackfruit *(Artocarpus heterophyllus)***

It is a popular homestead timber used extensively for furniture and cabinet making. It is also used for door, window and other constructional purpose. It can be employed without any preservative treatment due to its natural durability.

**19. Mango *(Mangifera indica)***

Because of its moderate weight and hardness, it can be used for furniture, planking and packing cases. If treated with a preservative, it can be used for door, window and constructional purposes. It makes good veneer for the production of plywood.

**20. Simul *(Bombax ceiba)***

It is a low density and easily peelable timber. It is therefore, suitable for making match box and stick. It can also be used for light packing cases.

**21. Sissoo *(Dalbergia sissoo)***

It is a heavy, steady, hard and strong timber with graceful colour, It can be used for making furniture of better quality. It is suitable for door, window, beam, flooring and such other purposes. It is used for cart and wheel and general utility works.

## Conclusion

The enduses provide the important information for the initial selection of timber species for the plantation programme. The prioritisation has to be made by due consideration to all other pertinent selection criteria.

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