

Utilization of Temperate Hardwoods for Pulp and Paper

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Summary

The need for the utilization of hardwoods for pulp and paper industry is stressed. The areas of *ban* oak and *kharsu* oak and their growing stock in Himachal Pradesh forests is indicated. The area under *ban* oak and *kharsu* oak is estimated to be 56,296 and 56,700 hectares respectively and their growing stock is estimated to be 47,49,000 and 44,12,000 cubic metres respectively. These figures of area and growing stock can, however, be taken to be only a rough estimate as most of the oak forests have not been demarcated and surveyed and the growing stock has not been enumerated. An annual yield of 45,000 cubic metres is estimated from oak forests of Himachal Pradesh. While every effort should be made to utilize hardwoods in pulp and paper industry to the maximum possible extent, it is also necessary that conifers should be used only for the manufacture of such products which cannot be manufactured out of hardwoods.

Introduction

Pulp and paper industry will have to be expanded manifold to meet the country's increasing demand for pulp and paper. Efforts are, there-

fore, necessary to increase the raw material supplies from the present level of consumption of about 12 lac tonnes to about 132 lac tonnes of raw material estimated to be required by 1980. In view of the limited resources of coniferous forests and as most of the bamboo forests are already being exploited, additional raw material supplies will have to be arranged from the forests of hardwoods. Recent surveys conducted to assess the availability of hardwoods in the country indicate that there are sufficient hardwood resources to meet the increasing demand of short-fibred pulpwood.

2. The capacity of the existing paper mills can be increased with the utilization of hardwoods growing in or adjoining the areas where from these mills are at present drawing their raw material supplies. Likewise the scope exists to expand the capacity of the newsprint mill already planned in Himachal Pradesh if the existing temperate hardwood resources in this state are also utilized by the proposed industry.

Extent of Temperate Hardwoods in Himachal Pradesh

3. *Ban* oak (*Quercus incana*) and *kharsu* oak (*Quercus semecarpifolia*) are the main temperate hardwood species which can be exploited for pulpwood supplies. *Mohru* oak (*Quercus dilatata*) grows only in scattered and small pockets and cannot be commercially exploited for pulp and paper industry.

4. *Ban* oak grows from an elevation of about 1,000 to 2,500 metres and covers fairly extensive areas in Chamba, Kangra, Mandi, Nachan, Simla, Solan and Rajgarh forest divisions. *Ban* oak is found in other forest divisions also to a limited extent. *Kharsu* oak is found between an elevation of about 2,500 and 3,500 metres, though some scattered patches are also met with at slightly higher elevations also especially on southern aspect. *Kharsu* oak grows on fairly extensive areas in Rohroo, Chopal, Kinnaur, Mandi, Seraj Kulu, Dalhousie and Chamba forest divisions.

5. Unfortunately, information about exact areas under oaks is not available because at the time of forest settlements in erstwhile states, oak forests were not considered to be of much economic value and were, therefore, mostly left as undemarcated forests. These forests were left undemarcated to meet the unrestricted rights of grazing, firewood, fodder and agricultural implements of nearby villages.

6. These forests were, however, declared as protected forests through a general notification in 1952 but most of them have not so far been surveyed and measured. Exact areas of undemarcated protected forests carrying oaks are, therefore, not available. There are only a few demarcated protected forests having oaks. The areas of oaks in undemarcated protected forests have been ocularly estimated at the time of the preparation of working plans.

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7. *Ban* oak and *Kharsu* oak forests have not been enumerated in all the forest divisions. Growing stock figures for these species are, therefore, not available. *Ban* oak and *Kharsu* oak forests of Simla and Chopal forest divisions were enumerated at the time of working plan preparation and growing stock figures for these species are available. The growing stock of *Ban* oak and *Kharsu* oak for other divisions has

been estimated by multiplying the average growing stock per hectare in Chopal and Simla forest divisions by the area under these species in concerned forest divisions. The growing stock thus estimated can be taken to be only as a rough guide.

8. The areas of oaks based on ocular estimates and the growing stock estimated in the manner described above are given in table I.

TABLE I
Area and growing stock of ban oak and kharsu oak in different forest divisions

Sl. No.	Name of Forest division	Area in hectares		Growing stock in cubic metres	
		Ban oak	Kharsu oak	Ban oak	Kharsu oak
1	2	3	4	5	6
1.	Chamba	1,248	1,320	9,000	9,000
2.	Dalhousie	1,784	2,296	13,000	35,000
3.	Bilaspur	50	—	4,000	—
4.	Kunihar	1,452	—	25,000	—
5.	Mandi	13,646	1,926	11,60,000	1,34,000
6.	Nachan	10,199	683	8,67,000	48,000
7.	Suket	3,645	—	2,60,000	—
8.	Kangra	n.a.	11,784	n.a.	8,25,000
9.	Kulu & Seraj	n.a.	15,300	n.a.	10,71,000
10.	Chopal	3,955	1,066	3,44,000	5,96,000
11.	Nahan	1,357	—	1,19,000	—
12.	Rajgarh	12,869	2,630	11,26,000	79,000
13.	Kotgarh	1,932	6,151	1,67,000	4,25,000
14.	Rohru	2,058	12,749	1,82,000	10,49,000
15.	Simla	2,101	795	4,73,000	1,41,000
Total:		56,296	56,700	47,49,000	44,12,000

9. Once the pulp and paper industry starts using the temperate hardwoods, these forests will be properly demarcated and surveyed and will be brought under proper management. These valuable forest resources can no longer be neglected. The undemarcated forests of oaks are already being gradually demarcated and surveyed. Oaks are now enumerated like other species at the time of working plan preparation. Total enumeration of oaks has been done in Chopal and Simla forest divisions at the time of working plan revision. Oaks will be enumerated in the remaining forest divisions as and when the working plan revision work in these forest divisions is taken up.

10. Oak forests may not be worked on sustained yield basis for the supply of pulpwood because it will be desirable to convert most of these areas into coniferous forests. *Deodar* and *chil* can be planted in *ban* oak areas while *Kharsu* oak forests can be converted into spruce or silver fir forests depending upon the elevation and site factors. The size of the annual coupes or in other words the annual yield from such areas will, therefore, depend on the pace of replacement of oaks by conifers which will be determined by the physical and financial resources available for the purpose. Some of the oak forests will have to be managed to keep them permanently under oaks.

11. All the oak forests will not be available for exploitation for the production of pulpwood because of the local requirements of firewood, charcoal and agricultural implements required to be met from these forests and also because of the fact

that all these forests will not be within the economic reach. It is estimated that about 50% of *ban* oak and *kharsu* oak areas may be exploited for pulpwood supplies. With a conversion period of 100 years, an annual yield of 45,000 cubic metres of oaks in the standing volume can be expected from Himachal Pradesh. All this volume will, however, not be available as pulpwood. Timber should be extracted from *Kharsu* trees for utilization in other industries and only such portions of the trees, which cannot yield timber, should be used as pulpwood.

Suitability of Hardwoods for Pulp and Paper

12. Technological advances have made it possible that the hardwoods can to a large extent be used for the manufacture of most grades of paper. Hardwoods are highly desirable for the manufacture of writing and printing, magazine and tissue papers, staff boards and corrugating medium. In these products high strength is not necessary and hardwood pulps can be used to the extent of even 80-90% for the manufacture of these products. For the manufacture of such products in which high tear resistance and impact strength is required, hardwood pulps can be used only to a limited extent. The fact remains that hardwoods can be used for the manufacture of pulp and paper and these should be used to a greater extent by the pulp and paper industry in India.

13. Large variability of the anatomical, morphological and physical properties of hardwood species found in India is mainly responsible for their limited use by pulp and paper industry. A number of hardwood

species grow mixed and their cooking in mixture present some difficulties. From economic considerations these species will have to be cooked in mixture because the exploitation, sorting, handling and pulping of these species separately will be very costly and may render the utilization of these hardwoods uneconomical.

14. Fortunately, temperate hardwoods are quite few in number and occur in almost pure stands. Their utilization by pulp and paper industry should, therefore, not present such technological and practical difficulties as may be expected in case of tropical hardwoods which grow in heterogeneous mixture.

15. Trials conducted with *ban* oak and *kharsu* oak at Forest Research Institute, Dehradun showed that these are suitable for the manufacture of wrapping paper, writing and printing paper and rayon grade pulp. Oak pulp can thus replace coniferous pulp required to manufacture these grades of paper or rayon grade pulp.

Exploitation of oaks for Pulpwood Supplies

16. Exploitation of oaks for pulpwood will be economically feasible only from such areas where there are extensive areas under these species or where these forests adjoin the belt of coniferous forests. All the main valleys in this state have been opened by motor roads and even the coniferous raw material will be transported by road from many areas. From such areas the pulpwood of temperate hardwoods can also be transported by road and the cost of extraction and transport of such pulpwood will not be very

much different from that of coniferous pulpwood. The exploitation operations for the extraction of hardwood pulpwood need also not be necessarily mechanised where labour may be available in sufficient numbers. It should be economical to split the felled trees *in situ* and transport the split wood and branches by Donald Gravity Ropeway down to the motor road. If need be, more than one spans of Donald Gravity Ropeway can be installed for taking the wood to motorable road. With this system, it will not be necessary to construct as much length of motorable roads as may be necessary if mechanised logging is introduced and the pulpwood is transported by trucks right from the forests.

Suggestions

17. The use of oaks in pulp and paper industry is greatly facilitated because of the fact that they grow in the same region, where conifers grow. Oaks and conifers can be simultaneously exploited and fed to a paper mill. Long fibred chemical pulp should be manufactured out of coniferous pulpwood for mixing with short-fibred pulp to be obtained from oaks. As *ban* oak and *kharsu* oak grow almost as pure stands, there should be no such problems in their case as may arise out of cooking of mixed tropical hardwoods. For any project to be based on coniferous raw material it should, therefore, be a pre-condition that oaks will also be used along with conifers. The sale of coniferous forests and oak forests for pulp and paper industry should, therefore, be in the form of a package deal and no supply of coniferous raw material should be guaranteed if the mill is not prepared to utilize hardwoods.

18. While every effort is to be made to encourage utilization of hardwoods by the pulp and paper industry it has also to be ensured that coniferous raw material is not used for the manufacture of such products for which long-fibred raw material is not required and which can otherwise be manufactured from hardwoods. Rayon grade pulp, for example, can be manufactured from

hardwoods and no coniferous raw material should be wasted for the manufacture of rayon grade pulp. If our valuable coniferous raw material is wasted for the manufacture of such products which can be manufactured out of hardwoods, serious short supply of long fibred chemical pulp from indigenous sources is imminent. It needs no emphasis that the utilization of hardwoods

in India depends to a great extent on the availability of long-fibred chemical pulp from coniferous raw material. The slogan should, therefore, not only be "utilize maximum hardwoods for pulp and paper" but also "conserve coniferous raw material for the production of such products which cannot be manufactured out of hardwoods".