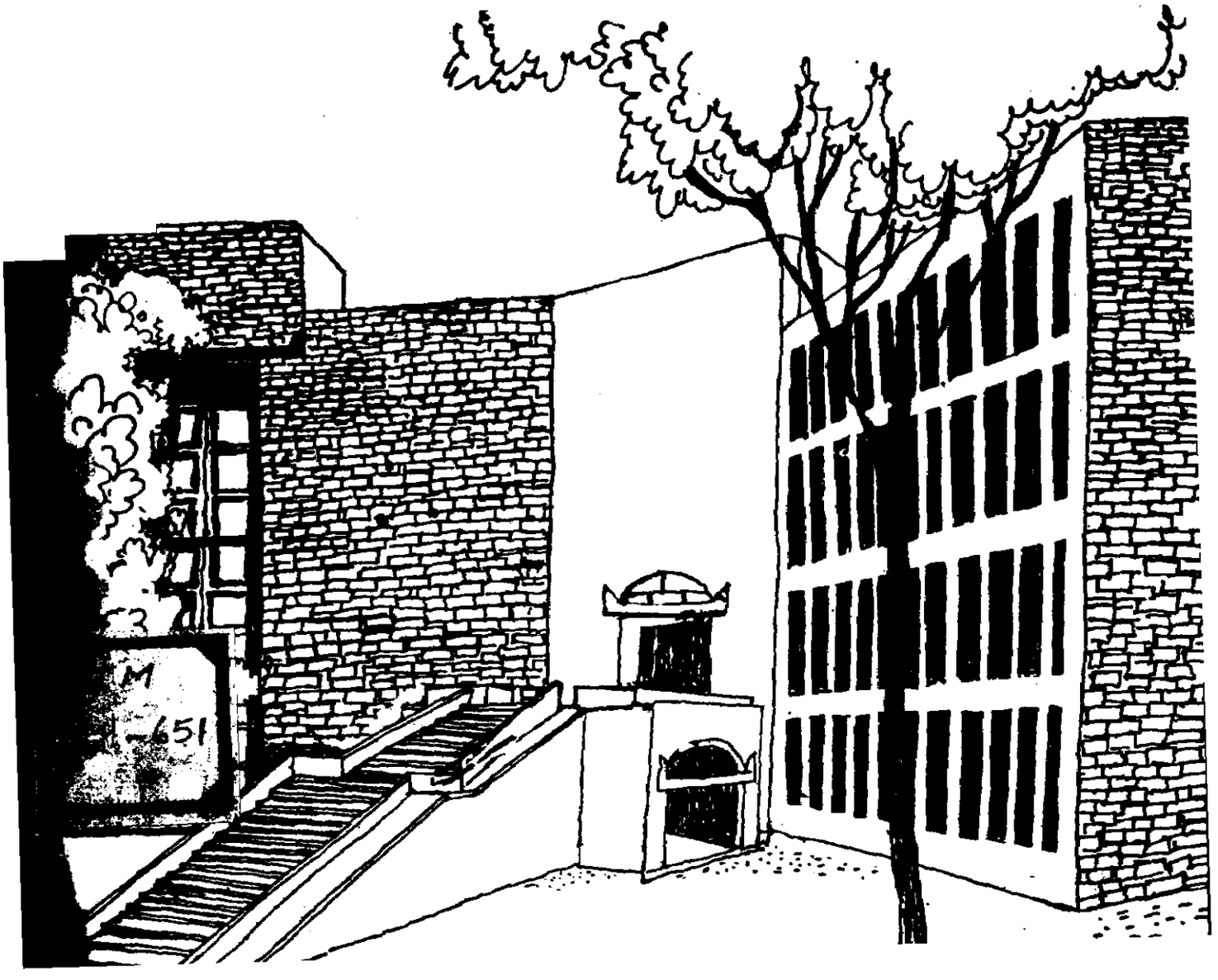
भारतीय प्रबंध संस्थान
IIM
AHMEDABAD

Working Paper



PRICING POLICY OF FOREST BASED CELLULOSIC RAW MATERIALS FOR THE PAPER INDUSTRY IN INDIA

By

Tirath Gupta

W P No. 651

December, 1986

INDIAN INSTITUTE OF MANAGEMENT
AHMEDABAD-380015
INDIA

PRICING POLICY OF FOREST BASED CELLULOSIC RAW MATERIALS FOR THE PAPER INDUSTRY IN INDIA

Tirath Gupta

1. The Setting

The forestry system in India with nearly 23 per cent of her geographical area contributes less than two per cent to the Gross Domestic Product. This is attributed to a number of reasons including under pricing of forest produce used by the manufacturing sector, rights and privileges of the local people, and inadequate policy support. At the same time, numerous policy statements have emphasized that forests in the country should meet the community's basic requirements (not necessarily demand) for fuelwood, industrial raw materials, amelioration of climate/maintenance of environmental quality, regulation of water flows, soil conservation, etc.

It can even be argued that the long gestation period of most tree crops, the vast expanse of forests, and the synergy effects of the quality and extent of vegetation are some of the reasons for state ownership of forest land. That, in turn, could be a reason for inadequate thought to pricing policy of forest produce. This, of course, cannot continue for long. The subject has gained added importance with the growth of processing industries over the last 40 years, and decline in forest wealth.

This study deals with pricing policy of forest based cellulosic raw materials for production of cultural and industrial papers in India. The focus is on bamboo and mixed woods which have been and continue to be the most important basic inputs for the industry.

For the supply of these materials, the state governments and the pulp and paper producing companies have been entering and continue to enter into formal and informal agreements. These specify duration of supply of agreed quantities of bamboo and pulpwood, the royalty rates per tonne of the materials, the extent of periodic revision in royality rates, procedures for weighment, etc. Based on a review of past and current practices in a cross section of three states of the Indian Union, and discussions with many concerned and knowledgeable people, a few observations on these aspects could be made.

1. By definition, royalty can be charged for use of government property for harnessing a naturally occurring produce. Thus, royalty is not the price of the forest produce but the two terms have been used interchangeably. Moreover, a logical basis for fixing the royalty rates has not been specified, but the process has been made out to be of great consequence. Till the recent past, the lessors emphasized their desire to be fair/reasonable/just to the lessees and argued for adequate royalty rates to cover the recurring costs of forest administration, maintainance and protection, and a marginal profit on the capital employed.[1/] Likewise, the lessees also emphasized on being fair and straight forward and argued for low royalty rates to allow a reasonable and proper return on their investment. Neither side has been sure of the reasoning which resulted in protracted negotiations and wits across the table. The consequent loss of time and money cannot be calculated as little of the meetings' proceedings has been made public [Kothari, 1971, p.293].

---

1. Professional economists and managers label the returns to capital as interest.

It has also been alleged that as soon as a forest department (FD) ascertained that adequate quantities of cellulosic materials tc regularly feed a paper mill were available from a specified catchment, the powers-that-be initiated negotiations for the lease.They either finalized the deal or identified a lessor with an understanding to settle the royalty rate(s) at a later date. The FDs were formally consulted but their suggestions on royalty rates were usually dubbed as unreasonably high [Sagreiya, 1971, p.537].

It should, therefore, not be surprising if royalty rates of pulpable materials have varied significantly amongst states and amongst paper producers within the states, and the variations cannot be explained by differences in timings and duration of the agreements. Such practices must also indicate that the products from natural forests were treated as almost free goods and the revenues from royalties were construed as net surpluses.

2. In addition to the low royalty rates, the state governments have been offering numerous financial concessions and other facilities tc the forest based industries. The presumption has been that enhanced opportunities for productive employment would keep the local people away from destructive practices vis-a-vis the forests, and the incremental revenues emanating from a broadened tax base could be ploughed back to enhance the productivity of forest land [Sicom, 1970]. But these have rarely been valid or practiced.

3. In the initial stages of development of the industry, the agreements were stipulated to be valid for 30-40 years. In some cases, their renewal for similar <u>periods</u> (not period) was provided

for. The agreement periods were, however, reduced to around 20 years towards the middle of 1960s, and to 10 years in the late 1970s. The main reasons for this trend appeared to be the perceptions of absolute scarcity of forest produce in the foreseeable future, and changes in the socio-politico environment.

4. Up to the late 1930s, at least some FDs also commited themselves to lease out additional forest areas if those earmarked did not generate the required quantities or even the desired quality of bamboo. Though such commitments have not been made in the recent past, yet little attempts have been made to systematically assess the productive potentials of the leased natural forests.

5. There are significant differences in the methods and basis of weighing the produce: actual weighment at the factory gates and/or in the forest depots, different running lengths per tonne of bamboo, different number of bamboos per tonne, and varying volumes per tonne of the materials. In cases of actual weighment of bamboo, the bases of weights have varied: air dry weight, sun dry weight, and weight with full moisture. There have been continuous battles of words between the parties on this issue, but reliable data on outputs of scarce goods with multiple values are not available.

6. In the initial stages of growth of the industry, only a few of the agreements provided for periodic upward revisions in royalty rates, and the extent of stipulated periodic increases were marginal. Even the marginal revisions were not always effected. But such revisions have been substantial and more frequent in the recent past. On the whole, royalty rates of bamboo between 1940s and 1970s

were revised at intervals of 5-10 years, and the rates thus revised were 10-20 per cent higher than the preceding levels. On the contrary, royalty rates prevailing during the early 1980s were 300 to 400 per cent higher than those during the middle of 1970s.

This does not mean that the royalty rates are being determined on the basis of a set of logically specified and accepted principles. The complexities of the task have been enhanced by a confluence of variables: unsurpassed growth of forest based industries including pulp and paper, perceptions of acute scarcities of bamboo and mixed woods, rising prices of the traded portion of forest outputs in general and of timber and bamboo in particular, an unprecedented desire on the part of the forestry system and the state governments to enhance revenues per unit of the forest outputs, spurt of thoughts pertaining to conflicts between objectives of environmental quality and enhanced output of tangible goods.

One consequence has been that the sellers and buyers of forest based cellulosic materials are indirectly testing their bargaining powers.[2] Another, undesirable consequence has been an environment of mistrust and confusion whereby unconscious and conscious attempts have been made at evading the issues as evidenced by arguments that

- Royalty of bamboo/hardwoods be fixed at the time of inception of a paper mill on the basis of the mill's capacity to pay
- Any increase in royalty rates would result in a threefold increase in paper production costs [Bhandari, 1971, p.66]

---

2. Relative strength of the parties to an economic transaction is a necessary consideration in pricing a product or service but it cannot suffice for that purpose in the long run.

- Royalty rates must be kept low as pulping costs have increase due to enhanced use of hardwoods which use more chemicals pe unit of the input [Bhandari, 1971, p.66]

- Pulpwood growing forests should be leased for long periods on th lines of leases of bamboo growing areas [Mehta, 1981, p.56]

- The industry's requirements for pulpwood should not be compare with alternative uses as each tonne of it used for pape generates 7.7 mandays of work against nothing in case of its us as fuelwood, and for each tonne of paper the industry pays a least Rs.2,700 by way of excise duties and other taxes [Raina 1982b, p.16]

- Excise duties and other taxes be reduced to enhance th industry's capacity to pay higher prices of forest produc [Mukherji, 1982, pp.44-45]

- If the industry agrees to pay a fair price of cellulosi materials, management of pulpwood forests can be separated fro timber growing activity [Seth, 1982b, pp.90-91]

- Prices of cellulosic materials is a non-issue as the price of th finished products would go up if the industry pays more [Singhal 1982, pp.38-39]

These statements cannot stand the test of logic and practicability and could suffice to show the need for further studies to

i) asses the demand for and potential supply of forest based cellulosic raw materials for the paper and paperboards industry in India in the foreseeable future, say, by AD 2000

ii) assess the logic and feasibility of the various bases that have been suggested for pricing the raw materials of forest origin, and

iii select a basis for a long term pricing policy of forest outputs used as raw materials by the pulp and paper industry.

The first of these issues is a prerequisite for an objective discussion on the other two, and has been studied separately. A review of the literature showed that the demand for paper and paperboards in India over the last three and a half decades has been substantially overestimated [Gupta, 1986b]. [3/] Based on this review

---

3. Newsprint has not been covered.

qualititative observations on the markets for these goods, and discussions with knowledgeable people; it has been estimated that the demand in the foreseeable future may rise by a maximum of 4.0 per cent a year. This means that without imports and without any attempts at demand management, the markets for paper and paperboards in the country should be in equilibrium with a gradual rise in production to 2.7 million tonnes by AD 2000.[4/]

It has also been reasoned that out of the total estimated production of paper and paperboards by the turn of the century, at least 1.0 million tonnes would be based on unconventional sources of cellulose; and bamboo and hardwoods may have to support a maximum of 1.7 million tonnes of the industry's outputs [Gupta, 1986c]. With a 40:60 mix of these materials, and with the chemical pulp process, the industry's demand for bamboo and mixed woods should be a maximum of 1.70 and 2.70 million tonnes, respectively [Gupta, 1986c].[5/]

It has been further reasoned that with modest but sustained efforts, the mean annual output from at least 50 million hectares of India's forests can be raised from 0.5 m^3 per hectare to at least 1.2 m^3 per hectare. That would mean a total output of 60 million m^3 of timber and fuelwood of which the latter may be 40 million m^3 or 10 million m^3 more than the current output [Ibid].

---

4 Comparative advantages of importing paper or ready pulp were not assessed as the policies favour enhanced indigenous production.

5. The input levels would be significantly lower with other pulping processes such as mechanical or chemo-mechanical. Changes in these directions are expected but were not considered.

The industry's estimated demand for mixed woods at 2.70 million tonnes or 2.17 million m^3 would be less than seven per cent of the technically and managerially feasible potential output. This would be still lower with success of the projects/programmes aimed at afforesting revenue wastelands, low productivity community lands, rail-road and roadsides, canal banks, etc.

Supplies of woody materials for pulping may also be enhanced through marginal improvements in harvesting technology and practices so as to reduce the waste, and through vertical integration of some of the wood processing functions [Maslekar, 1980; Raina, 1982b; Thapar, 1982] etc. The term 'plantations' must also not be interpreted in the limited sense of placing nursery raised seedlings in manmade pits and/or on mounds. Attempts at harnessing the established root stock of hardy species with good coppicing power could be relatively more relevant for managing the wastelands in and outside of the regular forests, and for highest biomass production per unit of land, capital, trained manpower, and time. Wood from Acacia arabica and young Prosopois juliflora has been assessed as one of the first grade pulping materials [Misra, 1973 and 1978].

The industry's estimated demand for bamboo at 1.70 million tonnes by the turn of the century equals the current consumption. Presently, therefore, some 1.3 million tonnes should be available for all other users. The tension-ridden situation can be adequately eased if annual output is raised to a level where 3.0 million tonnes can be conveniently available for the non-industrial uses. This appeared

feasible through improved silvicultural and biological management of natural bamboo growing areas, and provision of infrastructure to open unharnessed but harnessable forests [Gupta, 1986c].

It has, thus, been concluded that a mixture of conventional and unconventional measures can substantially enhance the outputs of timber, mixed woods, and bamboo within the next 8-10 years; and most of the chosen measures need not be capital and trained manpower intensive. More importantly, conflicts between fuel wood and pulp wood can be eliminated [GOI, 1972, p.16]. A still more important consequence should be dispensation of current tensions amongst the foresters, the administrators, the industry and the policy makers such that objective thinking on a long term policy of pricing (not royalty) the industrial raw materials can be facilitated.

2. Bases for Pricing Forest Based Cellulosic Materials: An Assessment

It has been noted that pricing forest produce was not an important issue till the recent past. Apart from the age old practices of open auctions or inviting sealed tenders for a large portion of the outputs including highly valuable timbers, and high level negotiations for fixing the royalty of materials supplied to the forest based industries, there have been very little efforts at systematic marketing wood and non-wood forest products.

Almost each FD has had a Forest Utilization Officer (FUO) who is expected to handle the marketing activities in the state including liaison with the forest based industries and other users of the produce so as to create demand for it. The FUO's counterpart with

the FDCs is usually designated as Regional Manager Marketing (RMM). These offices are presumably the centres for market related quantitative and qualitative information, but have been largely ineffective. Even the basic data are not readily available. The data are, of course, collected but are redundant by the time they are sorted in prescribed registers [Maslekar, 1980, p.195]. This could indicate the extent to which the forestry system and the governments are really geared to organize the marketing activity: a prerequisite for appropriate pricing of the goods.

Irrespective of the status of the efforts at organized marketing, the concern for pricing the outputs has been somewhat prominent since 1972 when an Interim Report of the National Commission on Agriculture (NCA) observed that i) there have been a lot of subsidized suplies of forest materials to the rural people resulting in an attitude that these goods can be supplied to others without considering the production aspects, and ii) forest materials have been leased to industries for long periods at nominal or heavily subsidized royalty rates presumably to encourage industrial development [GOI, 1972, p.65]. These would be discussed further in section 2.10, but subsequent thinking at the GOI level could be assessed at this stage.

2.1 Thinking at the Government of India Level on Pricing of Forest Produce Used as Industrial Raw Materials

A sub-committee appointed by the GOI to study the issue observed that

- adhocism prevailed in fixing the prices of forest produce used by the paper industry

- forestry was a quasi-commercial sector and was, entitled to an adequate return on the investment without which its developmental activities had been seriously hampered

- the forestry sector should legitimately be assured of the market price of the produce which should not be lower than the cost of production including a reasonanble profit

- the industries are dependent on the forestry system for prime raw materials and should therefore pay reasonable price to sustain the interest of the system and to enable it i) to carry out the needed maintenance and improvement in natural forests, and ii) to raise commercially viable manmade plantations

the royalty of the raw materials was a negligible portion of the price of the finished product and the industry should therefore not grudge any attempt on the part of the forestry sector to get adequate returns on investments, and

the FDCs had to work with borrowed capital and should, therefore, not only be able to recover the capital with interest but also earn an adequate net return [GOI, 1978].

The statements encompass a number of issues and are repetitive. Some of these are even contrary to the facts. For instance, it should be difficult to say that forest development in India has been hampered due to inadequate returns on the investment as the i) investments per hectare of forest land have been extremely low, ii) returns per unit of investment have been extremely high, and iii) the gap between revenues from and expenditure on forestry activities has been continually rising over time [Gupta, 1978].

The sub-committee also recognized/evolved some general principles on the subject. These were that prices of forest based industrial raw materials could be

- fixed on the basis of stumpage price which could be estimated by working backwards from the market price in other uses of such materials

- determined by assessing the delivered cost at mill sites including costs of extraction, transport, etc., and

- revised periodically considering the inflation rate during the intervening period.

It should be noted that the term price has been used while enunciating these three principles. The sub-committee, however suggested yet another principle whereby

- royalty of the produce from natural forests could be determined on the basis of costs incurred on their administration, protection improvement, etc.

The issues were, thus, classified into two categories.

2.1.1 Pricing the Produce from Manmade Forests

It was reasoned that a product from manmade forests should be priced on the basis of its prevailing market price but that price should not be less than the cost of production including land rent, interest at the normal bank rate, and at least 10 per cent net surplus on the investment. This thought has a number of limitations of which determination of the land rent could be most serious.

2.1.1A Problems in Determining Rent of Forest Land

In economic parlance, any factor of production earns rent when the income received by it is higher than the minimum amount necessary to retain it in the current occupation. Rent can, thus, be earned when and where the supply of a factor of production is scarce. In spite of its scarcity, however, this concept cannot be applicable to forest land due to the legal constraints on its alternative uses.

The lease money charged from the FDCs can also not be treated equal to land rent as some of the most productive forest areas have been allocated to the FDCs whereas lease rents have rarely exceeded

Rs.20-25 per hectare a year. In fact, land rent payable by the FDCs has been a non-issue in as much as matters relating to its fixatiom have been pending for over 10 years in some cases.

A representative figure of land rent can, however, be arrived if i) a policy to lease forest land to non-governmental organizations (NGOs) and other private parties/individuals for raising tree crops for their own use and/or for the market is accepted, and ii) a sizeable number of organizations and individuals seek licences for such uses of the forest land.

2.1.2 Pricing the Produce from Natural Forests

The sub-committee suggested that the royalty rates of raw materials emanating from natural forests should be fixed on the basis of the prevailing market price of the produce subject to a minimum equal to the replacement cost which, in turn, must account for land rent, and costs of administration, protection, regeneration, infrastructural development and maintenance, etc; and cost of other investments at the normal interest rate.

Besides the problems in determining i) land rent, and ii) the prevailing market price of the produce; there would be additional difficulties in practising this suggestion. For instance, the cost of protection has to be an important function of the prevailing socio-politico dynamics. Similarly, regeneration costs would vary with management practices but such costs per unit of output need not increase with intensive management.

2.1.3 Revision in Royalty Rates

In both situations, revision in prices/royalty rates was suggested every three years without any ceiling on the extent of revisions. This may be logical but not practicable. The buyers' perceptions have to be one of the important considerations in an exercise for fixing administered prices.[6/]

Moreover, trends in wholesale price of the forest produce under consideration or of comparable products were suggested as the basis for periodic revisions. Implications of using one of these bases would most likely be different from using the other, and there can be an endless debate between the parties. The debate for identifying a 'comparable' commodity for the purpose can even be inconclusive in an environment of mistrust and confusion.

A number of other approaches for pricing the cellulosic materials of forest origin and for periodic revisions of such prices have been suggested. The logic and feasibilities of each of these can be assessed in the context of accepted principles and practices for pricing economic goods and services.

2.2 Prices Based on Some Past or Current Royalty Rates

One thought has been that a government can fix the price of the materials at any given time by considering i) some past and/or current royalty rates in the state of its jurisdiction, and/or in

---

6. It is not a coincidence that huge investments have been made in consumer and producer goods industries in the public sector, and there has been a long debate on administered prices of the outputs in spite of heavy losses on the activities. See: GOI, 1986.

the neighbouring states; and ii) the general rise in prices during the intervening period. This implies that the past and current royalty rates were objectively determined, but that is not valid. The principle, cannot, therefore, be relevant even for revising the royalty rates leave aside determining the price of the materials.[7/]

2.3 Prices Equal to Rent of the Forest Land

Another thinking has been that the price of forest produce must equal the land rent. This is the minimum that the system must expect for the produce from natural forests. The industry can, of course, not think of anything more favourable. But this is neither logical nor practicable for reasons discussed earlier.

2.4 Prices Based on General Price Index or cost of Living Index

It has also been suggested that prices of the forest based industrial raw materials be linked with the general price index or the overall cost of living index. These indices cannot be the basis for initially fixing the administered price of any good. Their use may be considered for periodic revisions, but even that may not be logical and practicable for at least two reasons.

1. There can be an acrimonious debate on the choice between the indices. That may impede consideration of substantive issues. More importantly, such indices are known to fluctuate substantially within short periods, and prices of forest products do not bear a strong causal relationship with those of consumer goods such as edible oils, foodgrains, textiles.

---

7. Difficulties pertaining to an agreement between the concerned parties on the choice of commodities for computing the changes in prices during the intervening period, and on the weights to be assigned to the chosen commodities have been discussed earlier.

2. Even within forest products, prices of pulpable materials cannot be linked with those of, say, timber. Demand for the latter is derived from demand for a different set of goods and services which need not have a direct relationship with those variables from which the demand for papers is derived. Moreover, considerable fluctuations in timber prices which prevailed till the middle of the 1970s cannot be ruled out for the future particularly if i) the efforts at plantation forestry succeed to the desired and expected extent, and ii) acceptable substitutes for timber continue to be developed. It can even be argued that the environment for forestry development in India may not be ripe till the prices of forest products are stabilized.

2.5 Prices Based on the Paper Producers' Capacity to Pay

Some people have suggested that the royalty rates should be fixed at the inception of a new manufacturing unit and those should be commensurate with their capacity to pay after ensuring a reasonable profit for the enterprise. This cannot be valid.

i. In spite of adequate care and close scrutiny, the initial financial projections made by a firm are liable to change due to changes in supply and price of substitute goods, consumer preferences, emergence of competitors, tax policies, import/export policies, structure of national and international markets, prices of inputs other than those under consideration, production technology, etc. Profit levels and capacity to pay for inputs would depend on entrepreneurial ability and aptitude to keep pace with such changes, and adopting these as the bases for pricing the raw materials could amount to rewarding inefficiencies.

2. Royalty of cellulosic materials accounts for a very small portion of the total cost of paper production. The situation need not change with objectively determined prices in situ. A major portion (up to 90 per cent in some cases) of these costs is and may continue to be incurred on harvesting, bundling, stacking, transportation, storage, etc. Marginal improvements in the management of these activities can substantially reduce the total costs even with higher in situ prices.

3. Inputs such as chemicals, coal, electricity, oil, form substantial portions of the total cost of final goods. The industry has argued that its capacity to pay more for the forest based inputs has been reduced by unprecedented rise in prices of the other inputs. But, there is considerable scope for reducing the quanities of these inputs per unit of the final outputs,[8/] and to reduce the tangible as well as intangible costs.

Considerable R and D effort at the industry and institutional levels is, of course, required. Pay back period of the resources allocated for the purpose should be short, but the relative shares of different entities in raising these resources has been a ticklish issue. It can be thought that the contribution of manufacturing units with zero or low depreciated values must be relatively higher. Another thought could be to charge proportionately higher

---

8. Consumptiopn of caustic soda and chlorine varied amongst mills between 39 kg and 141 kg, and 33 kg and 150 kg per tonne of white printing paper [Raina, 1982a, p.9]. Similarly, electrical energy consumed per tonne of paper varied between 1,290 and 1,985 KWH [ICICI, 1981].

prices from those who use relatively higher quantities of chemicals, power, water, etc., per unit of final outputs. Some norms would have to be fixed but that may not be difficult.

2.6 Price as a 'A' Portion of Cost of Production

A so-called simple formula such as DCM = R or P + E + T

Where

DCM = Cost of the goods delivered at mill sites
R or P = Royalty or price in situ
E = Harvesting and extraction costs including overheads, and
T = Transport costs including overheads

has also been suggested. DCM is considered as a fixed portion of the cost of paper production, and must be determined at the initial stage of determining and/or revising the in situ price by using representative data for E and T. Thus, the in situ prices of the materials can be determined once i) the proportion of their cost in the total of the final product(s) is agreed, and ii) data on representative or acceptable estimated costs of extraction, transport, overheads, etc. are available.

This means that prices of the materials in situ should either be reduced with any increase in the associated costs, or the industry must be convinced to bear with a higher proportion of the cost of these materials. But there would be several problems in

- arriving at a basis of standard costs of production of final outputs
- fixing agreed portions of the cost of cellulosic materials in the total costs of final outputs
- arriving at representative costs for harvesting, handling, and transporting the materials to the mills; and

controlling the handling costs once fixed or persuading the paper making companies to absorb a higher proportion of costs on account of cellulosic raw materials.

2.7 Prices as 'A' Portion of the Final Product Prices

It has also been suggested that the prices of woody materials used by the industry can be floating so as to form a portion of the prices of final outputs. Suggestions for such prices in situ have varied from 1 to 3 per cent [Kothari, 1971, p.293; Sagreiya, 1971, p.558]. The thought could appear logical but not administratively and managerially feasible.

1. It would be extremely difficult to specify a portion of paper prices which the parties would accept as the due share of woody materials, and the time consuming rhetoric between them would continue. The situation may even be used to enhance the prevailing confusion by those who may derive some short term gains.

2. There are significant variations amongst paper mills with respect to the i) product mix, and ii) the input mix including non-woody cellulosic materials. The policy objective has been to encourage the use of the latter.[9/] Though the cellulosic materials are largely substitutable, yet quality of the products and their prices would be a function of the type, quality, and the mix of these materials in the furnace. Finding quantities and prices of different types of paper and paperboards produced by each unit would also not be

---

9. Enhanced use of each of these materials may have different financial, administrative, managerial and social implications. An assessment of that policy is, however, not within the scope of this study.

easy. More importantly, depending on the supply situation, equity or differentiation in prices of different types of the materials may be desirable but would be difficult to administer.

2.8 Price as 'A' Share in the Profits of Paper Producers

This suggests that price of woody raw materials can be equal to a predetermined share in the profits made by the pulp and paper manufacturers. The thought has its origin in an interpretation of royalty (not price) as the prerogative of the governments as the land owners to claim a share in the natural product from the natural wealth in return for allowing a person or organization to use it [Waheedkhan, 1971, p.559]. But, it has also been argued that the natural produce can be divided into two broad categories:

i) product from those natural assets which are almost unutilizable or from those which the governments are not prepared to develop due to limited demand, high investment requirements, etc.; and

ii) naturally occurring produce needed (not necessarily demanded) by a majority of the people [Ibid, p.559].

This further means that the royalty rate of any of these categories of the natural produce should have no connection with or bearing on their market prices but should be fixed on considerations such as living standards of the people, the stage of industrial development of a nation/state [Ibid, p.560][10]. This logic has been used to argue for varying royalty rates of pulpwood with varying situations. The reasoning is explained with three examples.

---

10. The author also states that royalty is only a token price primarily to assert the governments' rights over the natural produce. This is contrary to his main arguement.

Serial Number and Description	Royalty of the produce as share in the Users' profits (Percentages)
1. Forests where the produce is not sufficiently utilized	Nominal
2. Forests where industries are sufficiently utilizing the produce	Less than 50 per cent
3. Forests where processing units have established to a saturation level and keen competition exists to locate additional units	More than 50 per cent

[Ibid., p.561]

Once again, the suggested basis is neither logical nor practicable even for determining royalty rates, not to think of prices.

1. Royalty has been defined both as the land owner's i) share in the natural product under consideration, and ii) share in profits from the natural product. The two cannot be equated. Conceptually, normal profits of the lessee of a natural produce have to be accounted as a part of the cost of harnessing the natural produce. Even if the lessee does not undertake any processing, above normal profits/rent can accrue due to a positive difference between the average price received and the average cost incurred per unit of the natural product. Price, in turn, would depend on many variables including place and time utilities. There is also a probability of losses. Thus, above normal profits or net surpluses are a return to the risk bearing/entrepreneurial ability of the lessee, and the governments cannot claim a share in them except through direct taxes.

2. The governments may like to reserve a share in the natural product not merely to assert their ownership rights over the land/ natural wealth but also to meet the rights and privileges of the local people. This has been the case with almost all formal agreements between them and the paper manufacturing companies.

3. The structure of the industry has substantially changed and could continue to change with time. There are significant differences in advantages/disadvantages with respect to location, size, age, technology used, extent of capacity utilization, types and mix of paper and paperboards produced, etc. amongst the manufacturing units. A majority of the pulp and paper making companies have also adopted the pattern of multi-product firms such that monitoring the profits per unit of different types of paper and paperboards would be extremely difficult.

4. Profitability of integrated pulp and paper making units should change with changes in the mix of cellulosic materials, but the suggested basis could retard the policy objective of encouraging enhanced use of unconventional materials and pulpwoods. It must be noted here that the basis under discussion was suggested for fixing the royalty of pulpwoods, and its applicability to bamboo was not discussed possibly due to the differences in the manner of supplying the two types of materials for the same purpose.[11/]

---

11. Mixed woods sold for pulping are harvested, sorted, and stacked by the FDs/FDCs whereas the paper mills carry out harvesting and all subsequent operations on bamboo from the leased natural forest areas except in one state.

5. Even if the principle is accepted, there can be no precise formula for fixing the share of the governments/forestry system in the profits earned by the paper producers. There may also be a debate whether the share of the governments should be in profits before or after taxes. Necessity of continued dependence on negotiations may be obvious.

6. Assume that the share of the producers of woody materials in net surpluses of paper manufacturers is fixed. There would still be complications in determining bamboo and hardwood prices as i) the proportion of these materials in the furnace has varied and would continue to vary, and ii) bamboo, though classified as a MFP, is one of the main products from natural forests while pulpwood is a by-product of the timber production activity.

7. The basis stipulates a direct relationship between the extent of location of processing units in a forest catchment and the degree of competition amongst entrepreneures to locate more of such units on the one hand, and the share of the governments in the entreprenuers'profits on the other. This cannot necessarily be logical or even desirable. The manufacturers can argue that the utility of the natural produce has been enhanced due to their efforts at processing it.

Further, whereas competition amongst entrepreneurs is generally desirable, complications might arise if locating additional industrial units in a given catchment is detrimental to adequate utilization of the existing capital investments. It may also be difficult for the newly established firms to earn even normal profits in the short run due to higher overheads costs.

The latter situation could necessitate lower price of cellulosic materials for the new enterprises compared with the older ones. In fact, such concessions in royalty rates have been extended till the recent past.[12] The suggested principle, however, not only leaves no room for concessions but also necessitates higher than the prevailing royalty rates payable by the new units.[13] This is not to make a case that new mills should be supplied with cellulosic materials at lower prices compared with the older ones. On the contrary, current administrative procedures and practices can be substantially simplified if financial incentives to new industrial units are provided from one window.

8. The practice has been to charge royalty on bamboo and hardwoods in situ. Its conception as a cost of these materials can be totally misleading as the processing firms have to incur other costs which form up to 60 per cent and 90 per cent of the landed costs for mixed woods and bamboo, respectively, and vary significantly amongst paper mills. Therefore, any discussion of price of these goods as a share in the profits from finished products necessitates replacement of the concept of royalty in situ by the concept of price at mill sites, and then working backwards to account for handling and transport costs. General problems in this regard have been discussed earlier. A case by case solution would not be easy.

---

12. The concessional royalty rates for the new pulp and paper mills have not been objectively determined. The concessional rates varied from 33 per cent to 66 per cent of those prevalent, and the concession periods varied between 5 and 10 years.

13. The authors of the suggestion did not appear to be sure of the consistency of their logic. Contrary to this principle for paper and paperboards mills, they reasoned that the newsprint industry faced no competition and should pay only a nominal royalty of Rs.1-2 per tonne of pulpwood [Ibid. p.561].

2.9 Prices Equal to or on the Basis of Market Prices

An enterprise must work according to market forces. This is the ground to say that if the pulp and paper industry can i) afford to buy the fixed assets and other inputs at their market prices, and ii) sells the outputs in open markets, [14] it should also be able and willing to pay for the cellulosic raw materials on the same basis.

As noted earlier, a report of the NCA has been an important stage in this thought process. It observed that the supply of forest materials to industries is heavily subsidized [GOI, 1972, p.65]. The statement has been quoted out of context by different people and organizations. This is not surprising. The term subsidy has had widely different connotations at/in different points of time and situations. However, the most common connotation of the term, also relevant in the present context, is that the administered price of a good is lower than its cost of production.

It must also be recalled that the two most important historical facts behind nominal royalty rates of bamboo in India have been

i) policy interventions to encourage the growth of bamboo based paper industry, [15], and

ii) little investments in managing natural bamboo which was considered to be a weed interfering with the growth of timber.

---

14. The central order whereby a portion of the outputs of white printing paper has to be supplied to the governments at statutory prices is being withdrawn [Anon, 1986].

15. The British Government in India in 1925 levied import duties on certain types of paper, and promulgated the Bamboo Paper Industry (Protection) Act in 1932 [Ahuja, 1980, p.36].

Almost 100 per cent of the woody materials used by the industry i the early 1970s emanated from natural forests. Data pertaining t production costs of these materials have been virtually non- existent, but the costs have been low. Thus,the NCA could not hav used the term "subsidized" in its most general sense. The fact however, remains that the materials have not been appropriatel priced.

Though a pricing policy must take both the demand and supply force into consideration to be able to optimize net revenues for th producers and net surplus/satisfaction to the consumers, ye administered prices of industrial inputs such as bamboo an mixedwoods cannot be equal to their market prices and/or thei prices in competing uses for a number of reasons.

1. In the professional managers' dictionary the term demand refer to effective demand and relates the quantity of a good that has bee or is likely to be purchased at a given price in a given period o time and in a given situation. This is not the same as need o requirements. Similarly, the term supply indicates the quantitie of a good which the producers could be expected to sell at give prices and at given times.

It should be easy to visualize that the demand for woody materials at various price levels is not known. The behaviour of productio costs of woody materials to meet different levels of demand is als not known. These would be the origin of a number of conceptual an real life problems in determining their market prices.

2. Grade specifications of the goods in the seemingly competitive uses are significantly different.. Species and types of bamboo used by households, cottage industries, construction industry, etc. vary not only across but also within the activities. More importantly, bamboo used by the paper industry has been labelled Kachra or non-marketable as it includes all sorts: dry/green/broken/crooked/ diseased.[16] A satisfactory basis to compare the weights and value of industrial and commercial bamboo has yet to be found. The case of pulpwood has been different in the past as the industry was choosy about these materials,[17] but the situation has changed and can be changed further to enhance industrial use of almost any size or type of woods [Gupta, 1986c].

3. The accepted social and real values of both bamboo and pulpwoods differ substantially amongst competing uses which, in turn, vary from manufacture of sophisticated decorative goods to meeting the basic necessities of life. These result in market differentiation for seemingly similar goods; and substantial variations in prices not only due to variations in time, place, and form utilities but also due to rights and privileges of some sections of the users.

In one state, for example, choicest bamboo is supplied at the door steps of basket makers at Rs.55 to Rs.65 per tonne while comparable material fetches around Rs.1,500 and Rs.2,500 per tonne in urban

---

16. A considerable portion of bamboo used for pulping belongs to commercial categories, but the industry has been using it mainly because sorting the produce has not been financially, administratively, and managerially feasible.

17. This has also been the case with at least one other set of buyers: the charcoal makers.

wholesale and retail markets. Similarly, in one district of another state 5,00,000 whole bamboos are brought in by the FD from distances over 1,000 km and supplied to the local people at the nistar rates.[18]

4. The prices payable by bulk consumers and small consumers of a good have never been the same. In some cases, these have not even been comparable. Moreover, the paper manufacturers have been managing all the operations on bamboo used by them while such functions must be performed by the FDs for the other users. The paper making companies also have to supply specified quantities of selected bamboo to the FDs, but the savings in administrative and managemental efforts of the latter have not been costed.

5. Use of market prices for pulpable materials would not be logical unless i) the bargaining power of the parties to the transaction(s) are comparable, and ii) a substantial portion of the total output is freely sold. In practice, only a small portion of the total output of bamboo is traded in the open markets. It has even been alleged that the forestry system is thinking as a monopolist vis-a-vis the industry. The industry has also been accused of undermanaging the natural forests leased to them.

6. The industry's argument that it has contributed to the growth and extension of the markets for forest produce has already been noted. It may also be recalled that in the 1940s i) bamboo had

---

18. The right was introduced when natural forests in the district produced bamboo. Its continuation could even be interpreted as a reward to the local people in return for their role, even if small, in depleting bamboo from these forests.

    It has also been argued that such rights should be progressively abolished [Kothari, 1971]. But the matter has received little serious thought.

little economic use and was considered a wild grass, and ii) the governments were keen to invite the users with the thinking that whatever could be received would be a net surplus. Similarly, the foresters in some states were faced with the problem of getting the desired price for mixed wood in the 1970s. These have also been some of the important reasons for continued use of the term royalty of forest produce, adhocism in fixing royalty rates, and significant differences in perceptions of the industry and the forestry system.

This discussion should also suffice to show that market price is a very ticklish concept and raises a whole lot of issues such as types of relevant markets, extent of the markets, types and quality of the produce under reference, use(s) of the produce, and relevant period. To arrive at representative market prices for hetrogenous sets of goods put to multiple uses has been and would be difficult.

2.9.1 Use of Market Prices as a Basis of Royalty: Two Experiences

Irrespective of the weight of the preceding arguments, at least one state government decided in 1982 that royalty (not price) of bamboo supplied to the paper producers should be based on its market prices which, in turn, were to be determined in a prescribed and standard manner to be made known to the purchasers. The process of determining the market price was to

- consider the prices obtained in the open and negotiated sales of such produce affected by the government/FD/FDC during 12 months preceding 6 months prior to the date of commencement of the supply year, but if such sales did not take place during the stated period or if in the opinion of the government the number of the sales and the quantity of the produce sold were not adequate for this purpose, the price(s) in such sales during a period of 24 months preceding the period of 6 months prior to the date of commencement of the supply year could be considered; and such

sales could even be ignored if the government thought that the quantity sold was not sufficiently large to srve as representative for the purpose

- assign weights to quantities of the good sold if there were more than one sales during the chosen period
- assign weights to the differences in distances between the sales points and the purchasers' locations
- consider open and negotiated sales of such produce in one or more adjoining states if no sales of the forest produce took place in the state during the relevant period(s)
- consider the general trend in prices of the forest produce during the relevant period(s); and
- consider any other factor(s) deemed relevant by the government for the purpose.

The concerned government, the FD, and the industrial unit have not been adequately willing to share the relevant documents and data. It is, however, learnt that the government did an ardous exercise and determined the market price of bamboo on the basis of sales of 13,000 notional tonnes (NT) or 9,600 air dry tonnes (ADT) to a paper making company in another state during a preceding 24 month period. On that basis, it was proposed to raise the prevailing royalty rates of bamboo from Rs.50 and Rs. 30 per ADT, respectively, from accessible and inaccessible forest areas to a uniform rate of Rs.230 per ADT starting October 1983. A note pertaining to the basis of arriving at the market price was provided to the lessee, and it was reasoned that the propopsed royalty rate was lower than the market price of industrial bamboo during the preceding year. The parties have had differences of thought since then and the matter is subjudice. The main issue is <u>whether the market price estimated by the government is representative and applicable</u> to the lessee. We could not get the details of the reasoning from either side, but a few general and conceptual issues may be discussed.

1. The market price determined by the government was primarily based on the sale of 9,600 ADT of bamboo during the preceding two years to a paper making company in another state. This was an insignificant portion of the company's total consumption of cellulosic materials during that period. Compared with the royalty of bamboo payable/paid by them to the state of their location, the additional payment to the state under reference amounted to Rs 6,00,000 per year, but this was a very small portion of their cellulosic raw material costs such that the impact on costs per unit of final outputs could have been unnoticeable.

2. Bamboo purchased by a company from a state government with which they do not have regular arrangements may be used to run their paper mills at higher than the rated capacity so as to distribute the fixed costs over larger final outputs. In that case, the marginally higher costs per unit of the raw materials might be adequately absorbed by reduced overhead costs.

3. A paper making company located in another state may be a strong competitor of another company having regular arrangement for cellulosic materials with the state of the latter's location. In that case, the former may choose to purchase from the other state even larger quantities of bamboo at relatively higher prices for a few years. The objectives may be to starve the competitor of the cellulosic materials to gain market leadership, or to merely vitiate the relationship between a government and its regular lessee.

The preceding discussion in this sub-section, and these hypothetical issues could show that the use of market prices as the only basis of pricing industrial inputs could have serious problems. On the contrary, the same state has had the experience of using market price of hardwoods as an accepted basis for fixing the royalty payable by a pulp and paper making company during the middle of 1970s.

Fuelwood and charcoal merchants were the only large scale buyers of the material at that time. The price realized by the forestry system varied from Rs.4 to Rs.13 with an average at Rs.8-9 per standard stack of two cubic m(r). Though the FDC apprehend some problems in obtaining such prices for large quantities of hardwoods on hand, yet the mutually agreed royalty rate (not price) in situ payable by the paper producer was Rs.16 per standard stack.

The logic was that the market price varied widely amongst the forest coups for several reasons including location of the material vis-a-vis the location of the bulk buyers, variations in solid contents of fuelwood, proportion of small and large billets in fuelwood stacks, state of the charcoal market, time of the year (winter/summer) when the material was put to sale, etc. But the paper producer could avail large quantities of hardwoods from an area close to the mills and their landed cost was considerably lower than bamboo in spite of lower royalty rate of the latter.

This could show that, an environment of mutual trust and dependence is a necessary condition for using market price of the material for initiating the negotiations on and arriving at a mutually

advantageous royalty rate. The objectivity of thought has weakened over time, and the issue of revising the royalty of pulpwoods effective late 1970s or early 1980s in the same case has yet to be settled. This can also show the need for redefining the economic relationships between the forestry system and the users of cellulosic materials.

2.10 Prices Equal to or on the Basis of Production Costs

Producers or suppliers of a good normally expect it to sell at a price equal to or higher than the cost of production which includes normal profits. This reasoning was applied to forest produce more than two decades back by a committee of the Planning Commission which argued that the prevailing royalty rates of bamboo could not be a basis for pricing the goods from manmade plantations [GOI, 1965, p.25]. It was further reasoned that if bamboo in plantations could be grown at a cost so as to facilitate a fair profit margin on its sale to the paper mills, suitable forest land could be utilized to augment the supplies in the plains [Ibid, pp.25-26]. Hypothetical examples were used to show that the simplest method to arrive at appropriate costs and minimum royalty rates per tonne of the produce would be to compound all costs till the felling stage of plantations. Besides a mix-up of the cause and effect relationships, at least two other problems with this approach can be noted.

1. The suggestion was to account for all costs including land rent, but the examples used either made no mention of the rent of forest land or it was assumed at zero. This should strengthen the earlier reasoning in this study that determination of land rent would be extremely difficult if not impossible.

2. The choice of a compound or discount rate has been one of the major problems in assessing financial (or economic) feasibility of developmental projects. The committee did not even attempt to approach this issue in spite of their emphasis on adequate returns on investment in manmade plantations.

The next major developments in this thought could be the interim and the final reports of the NCA which suggested that the forester must be guaranteed remunerative prices on the produce supplied to the industry so as to pay for the cost of raising it through manmade plantations including costs of clearfelling, maintenance, and a profit [GOI, 1972, p.67; GOI, 1976, p.27 emphasis added].

At the same time, the NCA emphasized the need to strike a balance in using the produce from bamboo plantations to meet the demand for pulpable raw materials by the industry and the demand of the rural population at 'open market prices. It was also stated that the proportion of the output shares between the different markets would have to depend on industrial growth and capacity of the forester to expand his plantations [GOI, 1972, p.67 emphasis added].

These are vague expressions, but the emphasis on remunerative price of the materials is clear. The Commission even reasoned that the processing units could pay still higher prices for the produce from manmade plantations located within reasonable distance from them as those would result in considerable savings in associated costs compared with the produce from natural forests. It was, therefore, hoped that the parties would take a reasonable view to make the programme of manmade plantations a profitable venture [GOI, 1972, pp.66-67; GOI, 1976c, p.73 emphasis added].

With this background, some issues which may arise from the practice of pricing the materials on the basis of their production costs may be assessed in the context of an experience.

2.10.1 Stumpage Price of Plantation Grown Eucalyptus: A Case

A fairly detailed account of large scale mechanized eucalyptus plantations in the Tarai and Bhabhar Forest Divisions of Uttar Pradesh starting 1962 is available [Misra, 1980a]. This is one of the few such accounts but represents a successful example of raising such plantations in the country in spite of the observed yield at 30 tonnes per hectare per rotation against the initial estimate at 70 tonnes. At the same time, the rotation was reduced from the initial estimate of 10 years to 8 years [Ibid, pp.1-2]. The case is also relevant as the main objective was to produce raw materials for the pulp and paper industry in the state.

The area planted in 1962 should have been harvested in 1970-71 but this was not done. An exercise to decide on the principle for fixing the stumpage price of the produce from these plantations was initiated in 1972. Five alternatives were identified and examined by a group of senior forest officers which decided that an adequate rate of return on the investment would be the most relevant and reliable appropach. It was further suggested that a scenario of stumpage prices be used to compute corresponding IRRs to be able to decide on an adequate rate. Once an IRR wss chosen, the corresponding stumpage price chargeable from the industry could be determined.[19/]

---

19. The cause and effect relationship did not seem to be clear.

Data on actual annual costs were available. To appropriately account the yields frpm the first; i.e., the main and the three subsequent copice crops at eight year intervals, one alternative is to choose a cut-off point at any stage of the plantation and estimate the value of the standing crop at that stage. Another relatively simlpler alternative, chosen in this case, is to follow through the activity over its life cycle [Ibid, p.4][20].

The decision makers, however, faced a major problem as a large integrated pulp and paper mill expected in the project area by the early 1970s did not come up, and an existing mill was willing to buy only 75,000 tonnes of the eucalyptus wood a year. It was also feared that harvesting the whole mature crop would saturate the market such tht the produce may either not be sold or the price may fall below the financially viable level.

It was, therefore, thought that though plantations extending over 73,000 hectares (area planted during 1962-65) were overdue for harvesting and additional areas would mature every year, yet annual harvesting be restricted to 2,500 hectares and the rest of the mature crop be held back till 1978 when the anticipated new paper mill could be operative. The IRRs were computed on the basis of an harvesting pattern, but the stumpage price thus estimated was not acceptable to the existing paper making company. The decision to withhold mature crops resulted in higher stumpage price for any choice of the IRR. They proposed that i) the entire plantation area

---

20. Theoretically the supply from an area should be zero at the end of plantation cycle but it can be replanted to maintain the flow of outputs.

be divided into two parts: one for supply of wood to them and the other to the proposed mills, and ii) the IRRs be calculated separately for the two categories. The FD considered it infeasible and inappropriate to sell similar materials at different prices to an existing and a proposed unit, and re-examined the issue.[21]

In the meantime, available data indicated that eucalyptus wood had a ready market at remunerative prices. It was also noted that withholding the wood beyond the rotation age reduced its pulping quality. The revised decision, therefore, was to speedily harvest the areas planted during 1962-66, and thereafter to harvest each area as it matured. It was also assumed that the coppice crops would be harvested in the 9th, 18th, 27th, and 34th years instead of the 8th, 16th, 24th, and 32nd years of a plantation [Ibid, p.5][22]. Columns 1-3 of Table 1 present the relevant data. It must be noted that

- the cyclic rise and fall in total annual outputs from 2,83,000 tonnes to 5,41,000 tonnes could have been avoided if the plantation activity was evenly spread and the crops were regularly harvested
- the cost stream for the period 1962 to 1973 has been compounded to 1974 while both cost and return streams starting 1975 have been discounted to 1974 which was the first year of harvesting
- the IRRs were actually estimated at varying discount rates, but the Table demonstrates the computations only at the chosen discount rate = 14 per cent, and
- the corresponding stumpage price was Rs.74 per tonne of eucalyptus wood.

---

21. If the suggestion was accepted, the price payable by the proposed industrial unit would have been higher whereas quality of the overaged material could be inferior.

22. Reasons for this assumption are not known but it must have a significant bearing on an acceptable IRR/stumpage price.

Table 1: Annual Costs of and Outputs from 124,180 Hectare of Eucalyptus Plantations Raised during 1962-1981 in Uttar Pradesh

Costs: Rs. Thousands
Output: Thousand Tonnes

Years	Annual Costs	Annual Outputs	Costs in 1974 Compounded/ Discounted @ 14%	Outputs in 1974 Discounted @ 14%
(1)	(2)	(3)	(4)	(5)
1 (1962)	378	-	18212	-
2	395	-	16693	-
3	1568	-	58126	-
4	2345	-	76260	-
5	3945	-	112550	-
6 (1967)	3268	-	81765	-
7	3501	-	76847	-
8	5367	-	103315	-
9	4539	-	76664	-
10	4568	-	67652	-
11(1972)	5864	-	76173	-
12	6349	-	72379	-
13	8200	30	82000	300
14(1975)	8603	200	75448	1754
15	10887	200	83721	1538
16	10887	200	73487	1350
17	10887	200	64451	1184
18	12487	283	64808	1469
19(1980)	14559	283	65478	1290
20	14359	283	57436	1132
21	4559	283	16002	993
22.	4559	26	14042	804
23	4195	441	11327	1191
24(1985)	6934	441	14428	1045
25	6934	441	14423	917
26	6934	441	12620	803
27	6934	52	11095	845
28	8271	528	11580	740
29(1990)	8271	298	10173	367
30	4559	298	4924	322
31	4559	274	4331	260
32	4195	454	3482	377
33	6934	454	5062	331

(1)	(2)	(3)	(4)	(5)
34(1995)	6934	454	4438	291
35	6934	454	3883	254
36	6934	541	3398	265
37	8271	541	3557	233
38	8271	298	3143	113
39(2000)	4559	298	1504	098
40	4559	274	1322	079
41	3712	454	965	118
42	3712	454	817	100
43	3712	454	742	90
44(2005)	3712	454	631	77
45	3712	541	557	81
46	3712	541	483	70
47	3712	298	445	36
48	456	298	46	30
49(2010)	371	243	33	22
50	371	243	30	19
51	371	243	26	17
52	371	243	22	15
53	371	243	19	12
54	371	243	15	10
55	371	243	15	10

Total Costs in 1974 = Rs. 1563.045
Total Ouputs in 1974 = Rs. 21.052 tonnes
Cost/Price per tonne of output = Rs. 74.25, say, Rs. 74.

Source : Misra, D.N. 1980a. pp.10-19.

An assessment of this case, a perusal of related literature, and discussions with a cross section of the concerned persons and organizations bring out a number of issues.

1. Till about a decade back, one of the main concerns of the managers of tree plantation projects was to ensure an adequate price of the output, and the current perceptions of absolute scarcity and low prices of woody materials have, at least partly, been a result of inadequate success of forestry development programmes in general and projects for manmade plantations in particular.

2. The observed costs have been substantially higher than those estimated at the time of formulating the projects. Reverse is the case with outputs. These can be the most important hurdles in practising the principle of cost based pricing. To demonstrate the consequences of such differences we did an exercise on the lines of the case discussed here. It was assumed that

- an eucalyptus plantation is to be raised to feed an integrated pulp and paper mill with capacity at 30,000 TPA
- in the mix of cellulosic materials, the pulp mill can use 70 per cent eucalyptus wood = 55,000 tonnes a year
- the eucalyptus plantation can yield 70 ADT per hectare per rotation of eight years such that the paper mill's demand for wood can be met if 800 hectares can be harvested each year 23/
- a total area of 6,400 hectares would be planted @ 800 hectares a year
- the plantation costs in the first year would be comparable to those estimated for the year 1981 in the preceding case but the operations and management costs would be substantially higher, and
- the return on investment should be 14 per cent per annum.

The exercise has been presented in Table 2. The breakeven stumpage price is Rs.33 per tonne against Rs.74 per tonne in the case presented earlier. This is due to differences in yield but, more importantly, due to timely harvesting of mature crops.

---

23. This was assumed in the preceding case. Reasons for the difference between expected and actual yields have not been documented but examples of eucalyptus plantations yielding over 100 tonnes per 10 year rotation are also available.

Table 2: An Example of Estimated Cost of and Outputs from 64,000 Hectares of Eucalyptus Plantations

Costs : Rs. Thousands
Outputs: Thousand Tonnes

Years	Area Planted (Ha)	Plantation Costs*	O + M Costs **	Total Annual Costs (3+4)	Annual Outputs	Present Values using 14% Discount Rate	
						Annual Costs	Annual Outputs
1	2	3	4	5	6	7	8
1	800	980.0	-	980.0	-	980.0	-
2	800	980.0	40.0	1020.0	-	894.5	-
3	800	980.0	56.0	1036.0	-	796.7	-
4	800	980.0	72.0	1052.0	-	710.1	-
5	800	980.0	88.0	1068.0	-	632.3	-
6	800	980.0	104.0	1084.0	-	562.6	-
7	800	980.0	120.0	1100.0	-	501.6	-
8	800	980.0	136.0	1116.0	56.0	445.3	22.4
9	-	-	152.0	152.0	56.0	53.4	19.6
10	-	-	128.0	128.0	56.0	39.4	17.2
11	-	-	128.0	128.0	56.0	34.5	15.1
12	-	-	128.0	128.0	56.0	30.3	13.3
13	-	-	128.0	128.0	56.0	26.6	11.6
14	-	-	128.0	128.0	56.0	23.3	10.2
15	-	-	128.0	128.0	56.0	20.4	8.9
16	-	-	128.0	128.0	56.0	17.9	7.8
17	-	-	128.0	128.0	56.0	15.7	6.9
18	-	-	128.0	128.0	56.0	13.8	6.0
19	-	-	128.0	128.0	56.0	12.1	5.3
20	-	-	128.0	128.0	56.0	10.6	4.6
21	-	-	128.0	128.0	56.0	9.3	4.1
22	-	-	128.0	128.0	56.0	8.2	3.6
23	-	-	128.0	128.0	56.0	7.2	3.1
24	-	-	128.0	128.0	56.0	6.3	2.8
25	-	-	128.0	128.0	56.0	5.5	2.4
26	-	-	128.0	128.0	56.0	4.8	2.1
27	-	-	128.0	128.0	56.0	4.2	1.9
28	-	-	128.0	128.0	56.0	3.7	1.6
29	-	-	128.0	128.0	56.0	3.3	1.4
30	-	-	128.0	128.0	56.0	2.9	1.2
31	-	-	128.0	128.0	56.0	2.5	1.1
32	-	-	112.0	112.0	56.0	1.9	0.9
33	-	-	96.0	96.0	56.0	1.4	0.8
34	-	-	80.0	80.0	56.0	1.0	0.7
35	-	-	64.0	64.0	56.0	0.8	0.6

1	2	3	4	5	6	7	8
36	-	-	48.0	48.0	56.0	0.5	0.6
37	-	-	32.0	32.0	56.0	0.3	0.5
38	-	-	16.0	16.0	56.0	0.1	0.4
39	-	-	-	-	56.0	-	0.4

Present Value of Costs = Rs. 5885.0
Present Value of Outputs = 179.1 tonnes
Cost/Price per tonne = Rs.32.85, say, Rs.33

* Estimated @ Rs. 1,22,500 per 100 hectares as in Table 1.

** Basis for the data in Table 1 not understood. Assumed @ Rs. 5,000 per 100 hectares in the 2nd year of each planting and Rs. 2,000 per 100 hectares per year subsequently.

This exercise can indicate that the use of the principle of cost based pricing may necessitate a case by case exercise. Even if the plantation costs per hectare of selected tree/bamboo species may be reasonably uniform,[24] yields per hecatare cannot be so due to differences in survival percentage at the harvesting age, incidence of biotic interference, quality/intensity of managerial input, etc. If price per unit of output is determined in advance on the basis of estimated costs, as it should be, the project authority may not receive the expected returns. On the contrary, if prices are determined on the basis of actual costs, the industry would have to bear the burden of inappropriate planning, or inadequate protection, or insufficient management.

24. This can be possible if the governments agree to compensate/subsidize the concerned organzations for the difference in costs of planting relatively more difficult or degraded areas compared with the productive ones. The policy could serve the objective of improved management and conservation of the most scarce natural resource.

3. Practising the principle of cost based pricing would entail of choice of a discount rate. This has been difficult and may be further complicated by the current administrative culture. Around the middle of 1970s, for example, a state government constituted an inter-departmental committee to recommend a reasonable IRR on the investment in a tree plantation project. All of its members except one agreed that 10 per cent would be adequate while the one insisted that the IRR should be 15 per cent [Misra, 1980b, p.5]. The reasons for the difference were i) conflicting perceptions of relative importance of encouraging the growth of forest based industries and enhancing the flow of money to the state exchequer, and ii) varying interpretations of the words reasonable/adequate/sufficient. Issues like this can, however, resolved through uniform guidelines. One logical basis for the guidelines can be the rate of interest charged by the National Bank for Agriculture and Rural Development.

4. Yet another problem in using cost based pricing could arise from the practice of accounting the net returns from clearfelling natural forests as returns <u>with</u> the manmade crops. Situations can be visualized where returns from clearfelling may meet a major portion of the initial costs of raising the plantations such that the cost per unit of the output may be unrealistically low.[25/]

5. As discussed earlier, the principle of cost based pricing cannot be applicable to outputs from natural forests because the production costs are neither known nor would they be easy to compute. Some

---

25. The accounting procedure is not logical. For details see: Gupta, 1979.

forest officers and administrators not only agree to this but also add that "our" investments in the natural forests have been negligible.

On the contrary, some people have used the concept of <u>replacement cost</u> to say that natural forests have degraded to a point of no return except through manmade plantations and, therefore, the produce from the former must also be priced on the basis of costs of production from the latter. They have, however not been able place the total responsibility for the poor state of forests on the industry. Silvicultural management of leased forest areas has rested with the FDs, and they have always had the authority to modify the forest working rules and practices from to time, and to supervise their due observance.[26/]

A piece of reasoning by the industry complicates the issue still further. It recognizes that the costs incurred to administer, protect, and improve natural forests must be recovered from the sale of outputs. But it further states that natural forests also generate various types of timbers which should yield significantly higher revenues than i) pulpwood which is a by-product, and ii) bamboo which is an understorey crop. The industry, thus, cannot be asked to pay the full costs of managing natural forests. A rational method of apportioning the costs of managing natural forests amongst various products must be found, but that amount to unscrambling a

---

26. An agreement made in the 1930s between a state government and a paper making company provided that the FD could modify the silvicultural rules for the leased forest land in <u>consultation</u> with the lessee. This may be an exception.

scrambled egg. Joint products can rarely be priced to the satisfaction of all concerned. The problems may be unsurmountable in an environment of tensions/mistrust/confusion, and in the absence of adequate data.

6. The industry has also argued that while the costs of raising woody materials through manmade plantations can be a basis for their pricing, the prices should not equal the production costs. Even monoculture forests generate a number of intangible and indirect benefits which accrue to society, and a portion of the total cost of plantations must be attributed to the societal benefits. Very little atempts have, however, been made at quantifying and pricing such indirect and intangible benefits. The industry's argument may still be countered as it also generates negative externalities which are borne by society.

These problems of cost based pricing are, however, soluble. The task can be objectively approached with a realization that the use of this principle would also have some long term advantages for the forestry system, the industry, and the economy.

1. Those responsible for formulation and execution of forestry development projects would have to be considerably more conscious of their roles. Some basic economic principles and norms would have to be observed. Concurrent and ex-post evaluations of projects would also be necessary. As a consequence, productivity per unit of financial investment, of trained manpower, and of the natural rsource systems should substantially improve.

2. The industry can expect to honourably and regularly recieve the required supplies of cellulosic materials which could be handled, transported, stored, and chipped at relatively lower cost per unit. These must also be better suited for pulping. There can be substantial savings in financial and environmental costs of the process.

3. Other factors remaining the same, quality of final outputs can improve at the current costs[27] or at marginally higher costs per unit. The producers should be able to recover the incremental costs, if any, and the consumers may derive higher satisfaction per unit of the expenditure on paper.

3. Towards a Synthesis

The preceding discussions could suffice to conclude that none of the suggested bases for pricing the raw materials of forest origin can fully satisfy the concerned parties. Some of the suggested bases: the industry's capacity to pay, a predetermined share in profits of the pulp and paper producers, a portion of prices of final products, are neither logical nor practicable. On the other hand, a mixture of the bases such as past and current royalty rates, general price index, market price of comparable goods could be used for fixing the administered prices of the produce from natural forests in the short run, i.e., the period necessary to plan and raise industrial plantations to the desired extent. The most viable long run alternative appeared to be manmade plantations for specific manufacturing units in the public and private sectors, and to price the outputs according to production costs.

---

27. This can be more true with the desired changes in production technology.

This should not mean that the total demand for the materials must be met from industrial plantations. It has been reasoned that outputs per unit of productive forest land can and should be enhanced, and the effort does not have to be capital and trained manpower intensive [Gupta, 1986c]. This is also necessary to relieve the current tensions and to be able to objectively assess the issues.

For pricing the outputs from natural forests, the cost of production cannot be the basis for a number of reasons chief among which are i) the difficulties in computing such costs, and more importantly, ii) the prospects of enhancing the outputs at lower marginal costs per unit. Variables such as past and current (not necessarily proposed) royalty rates, changes in prices of other inputs, changes in infrastructural facilities and productivity of forest areas under reference, changes in ex-factory prices of different grades of paper and paperboards, changes in the general price index can and must be considered.

Exercises to assign weights to these variables can be done by the concerned parties. Alternatively, the job may be entrusted to some independent organization(s). This has not been possible for us as the perceptions of the forestry system and the industry are widely different, arguments between the parties have assumed the status of religious debates, judicial interventions have been sought in some cases, there have even been conscious efforts at evading the real issues, and the parties have not been willing to share the relevant quantitative and qualitative information. A few general but essential points can, however, be noted.

1. The long run need not, rather should not, be too long. The reasonir -- that the forestry system should and would retain its status of a major supplier of cellulosic materials, and can design and implement the needed plantation projects within a few years.

2. Considerable portions of the woody materials for use by the industry should continue to emanate from natural forest areas but fixing their prices need not continue to pose difficult problems. Accumulated experiences of pricing the materials from plantation crops should be usable for that purpose. Adjustments can be made for differences in harvesting costs, transportation costs, relevant differences in size and age of the materials, etc.

3. Prices of outputs from manmade plantations need <u>not necessarily be equal to the production costs</u>. Adjustments on the lower or higher side may have to be made to achieve wider socio-economic objectives. For instance, vast scope exists for reducing the consumption of chemicals, coal, power, water, etc., per unit of final outputs. Considerable R & D efforts at the industry and the institutional levels are required to facilitate the desired action. Relative shares of the different entities in raising the required resources has been a ticklish issue. It has been reasoned that the manufacturing units i) which have long since reached the stage of zero or near zero depreciated value of the capital at hand, and ii) which consume relatively larger quantities of chemicals/ power/ water/per unit of final outputs should pay relatively more towards such efforts. Some norms would have to be fixed but the task need not be difficult once with the environment of mistrust is dispensed with.

More importantly, adjustments may have to be made if the production costs are adjudged to be unreasonably high due to structural constraints. In such cases, organizations like the industrial development corporations may choose to subsidize the plantation projects. On the contrary, production costs per unit of output from some industrial plantations could be lower than what the industry can conveniently pay or should pay. This may happen, if i) prime forest land is used for raising the plantations, and ii) the current practice of accounting the costs of and returns from clearfelling natural forests as part of the costs and returns with the manmade plantations projects is continued.

4. Success and acceptability of the industrial plantations can be substantially enhanced by

- Selecting the sites in consultation with the industry
- Involving the industry in selection of the tree species
- Rigorously estimating the annual plantation and O and M costs, and seeking the industry's reaction to the reasoning behind the estimates
- Specifying the discount/compound rate for translating the cost and output streams to a common time period, and documenting and sharing the logic for the choice
- Stating the number of rotations and duration of such rotation
- Indicating the estimated outputs per rotation and assuming the responsibility for unexplicable/unexpected shortfalls
- Adjusting the plantation and harvesting patterns to meet the annual requirements of the concerned industrial units
- Ensuring crop harvesting according to schedule so that the estimated time value of money is validated
- Not insisting on accounting for cost items which cannot be quantified with the help of available logic, and which are not likely to considerably affect the cost per unit of the output, etc.

The last of these points has been explained in the context of the problems in determining the rental value of forest land. Some studies in the past assumed it at zero. That is not logical. On the contrary, a conscious decision to ignore the land rent may be justifiable. Similarly, net surpluses or profits which must logically accrue to the forestry system may be ignored in the short run. It would be difficult to find an agreement on 'reasonable' profit levels. Some may be true of net return on investment. It may even be argued that the governments must honour the responsibility to supply the raw materials at the lowest possible cost to the industry which is where it is largely due to past policies and practices.

It can be hoped that the forestry system would visualize the situation as one of unprecedented opportunities, would approach the tasks in a management framework, and would assess the wider social implications of their advise to the policy makers. Alternatively, the industry's reasoning for lease of land to enable them to raise the materials for themselves must be fully and objectively assessed. This is essentially a variant of the principle of cost based pricing and may be chosen if the system is not in a position to supply adequate quantities of the materials at prices fixed in advance for reasonably long periods of time, and also to make a profit for itself in the long run. This should also help in speedier rehabilitation of waste or wasted but productive lands.

References

Ahuja, S.P. (Editor), 1980. Paper Industry in India: Retrospect and Prospects, Institute of Economic and Marketing Research, New Delhi.

Anonymous. 1986. "Paper Control Order Will be Withdrawn", The Economic Times, December 17, Bombay.

Bachkheti, N.D. 1982. "Forest Resources: Keynote Address", in Proceedings: Seminar on Raw Materials for Paper Industry, IMPA, Calcutta, pp. 26-31.

Bhandari, I.M. 1971. "Growth Potential of Paper Industry", The Financial Express, May 18.

Biswas, Souren. 1981. Presidential Address, Annual General Meeting of the Indian Paper Mills Association, Calcutta.

_____. 1982a. "Industrial Plantations: Keynote Address", in Proceedings: Seminar on Raw Materials for Paper Industry, IPMA, Calcutta, pp. 53-56.

_____. 1982b. "Need for Industry Oriented Plantations", in Papers Presented at the Seminar on Raw Materials for the Paper Industry, IPMA, Calcutta, pp. 133-136.

Chugh, K.L. 1982. "Rejuvenation of Bamboo Forests", in Papers Presented at the Seminar on Raw Materials for the Paper Industry, IPMA, Calcutta, pp.63-71.

DCPPI(Development Council for Paper, Pulp and Allied Industries). 1983. 'Energy Audit and Conservation in Pulp and Paper Industry in India, DCPPI , New Delhi, (Mimeo).

GOI (Government of India). 1965. Study on Forecast Raw Materials for Pulp Paper and Newsprint, Committee on Natural Resources, Planning Commission, GOI, New Delhi.

_____. 1972. Interim Report of the National Commission on Agriculture on Production Forestry: Man-made Forests, Ministry of Agriculture, GOI, New Delhi.

_____. 1976. Report of the National Commission on Agriculture Part IX: Forestry, Ministry of Agriculture and Irrigation, GOI, New Delhi.

_____. 1978. Suggested Approach to the Pricing of the Raw Material to Forest Based Industries, Ministry of Agriculture and Irrigation, Department of Agriculture, New Delhi (Manuscript).

_____. 1984. Report of the Working Group to Explore the Possibilities of Raising Industrial (Pulpwood) Plantations, Ministry of Agriculture, GOI, New Delhi, (Mimeo).

_____. 1986. Administered Price Policy: A Discussion Paper, Ministry of Finance, GOI, New Delhi.

Gupta, Tirath. 1978. "Nature of the Environment for Forestry Sector in India", The Indian Forester, 104(2): 787-796.

_____. 1979. Some Methodological and Practical Aspects of Accounting the Returns from Clearfelling the Natural Forests in the Evaluation of Intensive Forest Development Projects", The Indian Forester, 105(5): 321-330.

_____. 1984. "Demand-Supply Management and Pricing Policy for Cellulosic Raw Materials for Paper Industry in India", Indian Journal of Agricultural Economics, 38(3): 291-299.

_____. 1986a. Demand-Supply Management and Pricing Policy of Forest Based Cellulosic Raw Materials for the Paper and Paperboards Industry in India, Centre for Management in Agriculture, Indian Institute of Management (IIM), Ahmedabad (Manuscript).

_____. 1986b. Demand Forecasts for Cultural and Industrial Papers in India: Some Policy Implications, Indian Institute of Management, Ahmedabad, Working Paper No.643.

_____. 1986c. Demand-Supply Management of Forest Based Cellulosic Raw Materials for the Paper Industry in India, IIM, Ahmedabad, Working Paper No.650.

ICICI (Industrial Credit and Investment Corporation of India). 1981. "Energy Utilization and Conservation in India" in Workshop on Energy: Paper and Cement Industries - Summary Proceedings and Papers, ICICI, Bombay.

Jatia, J.M. 1982. Presidential Address, Annual General Meeting of the Indian Paper Mills Association, Calcutta.

_____. 1983. Presidential Address. Annual General Meeting of the Indian Paper Mills Association, Calcutta.

Kothari, P.S. 1971. "Royalty on Pulpwood", The Indian Forester, 97(6): 293-297.

Maslekar, A.R. 1980. A Study of Marketing of Wood Products in Maharashtra, Indian Institute of Forest Management, Ahmedabad, (Mimeo).

Mehta, M.M. 1981. Towards Greater Energy Conservtion and Optimum Capacity Utilization, Address at the 86th Annual General Meeting of the Indian Paper Makers Association held at Calcutta, IPMA, Calcutta.

Misra, D.N. 1980a, Determination of Stumpage Price of Plantation Grown Crops: Case of Eucalyptus in Uttar Pradesh, Programme Office, Indian Institute of Forest Management (IIFM), Ahmedabad, (Mimeo).

_____. 1980b. Pricing of Eucalyptus Wood for Supply to Paper Mills: Process of Decision Making in Government, Programme Office, IIFM, Ahmedabad (Mimeo).

Misra, N.D. 1973. "A Method of Grading Tropical Hardwoods", Pulp and Paper International, June, pp.48-49.

_____. 1978. "Hardwoods Pulping and Paper Making: Indian Experience", Indian Pulp and Paper, October-November, No page numbers.

Mukhherji, A.K. 1982. "Forest Resources: Observations", in Proceedings: Seminar on Raw Materials for Paper Industry, IPMA, Calcutta, pp. 43-46.

Nair, V.S.K. 1982a, "Forestry Programme of Mysore Paper Mills Ltd.", in Papers Presented at the Seminar on Raw Materials for the Paper Industry, IPMA, Calcutta, pp.122-126.

_____. 1982b. "Forest Resources: Observations", in Proceedings Seminar on Raw Materials for Paper Industry, IPMA, Calcutta, pp.51-52.

Parkhe, M.S. 1981. "Introductory Observation" in Workshop on Energy: Paper and Cement Industries - Summary Proceedings and Papers, ICICI, Bombay, pp.6-9.

Raina, M.K. 1982a, A Perspective for Paper, Address at the 86th Annual General Meeting of Indian Paper Makers Association held at New Delhi, IPMA, Calcutta.

_____. 1982b. "Introduction", in Papers Presented at the Seminar on Raw Materials for the Paper Industry, IPMA, Calcutta, pp.1-33.

_____. 1983. "The Paper Industry at Cross Roads", Address at the 87th Annual General Meeting of the Indian Paper Makers Association held at New Delhi, IPMA, Calcutta.

Sagreiya, K.P. 1971. "Royalty on Pulpwood", The Indian Forester, 97(9): 557-558.

Seth, V.K. 1982a. "Industrial Plantations: Observations", in Proceedings: Seminar on Raw Materials for Paper Industry, IPMA, Calcutta, pp. 58-59.

_____. 1982b. "Role of Paper Industry in Meeting its Raw Material Requirements", in Papers Presented at the Seminar on Raw Materials for the Paper Industry, IPMA, Calcutta, pp.84-94.

SICOM (The State Industrial and Investment Corporation of Maharashtra). 1970. Forest Industries: Scope for Development in Maharashtra, SOCOM, Bombay.

Singh, M.N. and Mukherjee, V.N. 1985. "Fibrous Raw Materials for the Indian Pulp and Paperboard Industry", Indian Forester, 91(7):505-29.

Singhal, R.M. 1982, "Forest Resources: Observations", in Proceedings Seminar on Raw Materials for Paper Industry, IPMA, Calcutta, pp. 36-39.

Singhania, Hari Shankar. 1982. "Introductory Observations" in Proceedings: Seminar on Raw Materials for Paper Industry, IPMA, Calcutta pp.4-6.

Thapar, L.M. 1982. "Forest Resources: Keynote Address", in Proceedings: Seminar on Raw Materials for Paper Industry, IPMA, Calcutta, pp.20-26.

Tiwari, K.M. 1982a. "Raw Materials for the Paper Industry", in Paper Presented at the Seminar on Raw Materials for the Paper Industry, IPMA, Calcutta, pp.51-57.

Waheedkhan, M.A. 1971. "Determination of Royalty on Pulpwood", The Indian Forester, 97(9): 558-561.
