

Pulp And Paper Industry in India - Captive Plantations For Survival And Growth

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ABSTRACT:-- The paper describes the current status and the future growth potential of the pulp and paper industry in India, which is not in tune with current international trends. Acute and growing shortage of wood-based fibrous raw materials is the major stumbling stock limiting installed capacity utilisation and future growth of the pulp and paper industry. Statutory ceilings on agricultural land holdings and restrictions on the participations of corporate sector in reforestation of degraded forest lands virtually preclude raising of captive industrial plantations. This paper highlights urgent need for innovative policy changes supported with fiscal incentives and tax benefits to encourage corporate sector and individual investments in plantations on degraded forest lands and reclaimable wastelands, which currently account for 130 million ha or 40% of the geographical area of the country. Measures for sustainable development of forest resources and substantial improvements in land productivity are outlined.

Industrial plantations, based on improved planting stock, will promote growth of the pulp and paper industry, leading to self-sufficiency through self-reliance. Substantial indirect benefits from industrial plantations, like large scale employment opportunities to be generated for the rural poor and contribution towards greening of the country, restoration of ecological balance and amelioration of the environment, are highlighted. Massive outflow of scarce foreign exchange on imports of pulp and paper can be avoided, and in fact, the country can achieve potential for earning substantial foreign exchange through export of paper products, standing up to stiff international competition.

INTRODUCTION

Paper is an essential commodity required for communications, literary pursuits, packaging and a variety of other applications. The per capita consumption of paper in India during 1994-95 has been around 3.6 kg/annum, which is extremely low compared to the world average of 45.6 kg. Nearly 16% of the world's population in India consumes 1.2 % of the paper produced. Even many developing Asian countries have considerably higher per capita

consumptions of paper, e.g. 10 kg in Indonesia, 20 Kg. in China, 34.5 kg in Thailand and 80 kg. in Malaysia (Anon.96).

Demand for cultural and industrial varieties of paper as well as newsprint will continue to grow

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with the increase in population, improvement in living standards, literacy rates and industrialisation of the country. However, current status of the pulp and paper industry in India is not in tune with the emerging international trends because of acute shortage of wood-based fibre, outdated technology/equipment and uneconomic small size of many units. With the liberalisation of economy ushering in a new era, there is great potential for development and growth of the pulp and paper industry, provided we tap the vast potential for securing future supplies of high quality fibrous raw materials in a cost effective manner through technology based plantations.

CURRENT STATUS OF PULP AND PAPER INDUSTRY

As per recent study by the Joint Committee of the Paper Industry, India(JCPI), segment wise installed capacity during 1994-95, and production of 380 paper and paperboard mills in the country is summarised below (Anon.1992):

(Million Tonnes)			
Category of mills	Installed capacity	Effective capacity	Actual production 1990-91
Wood based	1.47	1.14	1.07
Agro based	1.06	0.94	0.70
Waste paper based	1.17	0.83	0.74
	3.95	2.91	2.51

Consumption of paper during 1994-95 was 2.54 million tonnes. Installed capacity for newsprint in India during 1994-95 was 0.4 million tonnes, actual production 0.3 million tonnes and consumption 0.69 million tonnes (Singhania,1996).

There has been no green field investment for the establishment of new wood-based pulp and paper units in the country for nearly a decade on account of uncertainties about sustained availability of fibrous raw materials. There are serious constraints for the future growth of agro-based and waste paper based units because of narrow product range, uneconomic size, outdated technology, lack of chemical recovery and effluent treatment facilities, fluctuations in international prices of waste paper and market pulp, and uncertainties about long term availability of cereal straws and bagasse because of alternative uses.

DEMAND PROJECTIONS

The Development Council for Pulp, Paper and Allied Industries (Development Council), in a comprehensive study during 1990, projected compound growth rate of 5.2 % for paper and paperboards and 5-6.1% for newsprint during 1991-2000. The projected demand, estimated at 3.17 million tonnes of paper and paperboards and 0.94 million tonnes of newsprint during the year 2000, will increase to 4.42 million tonnes and 1.83 million tonnes respectively by the year 2010 (Singhania,1990). However, ICICI report expects the demand for paper and newsprint to be 4.66 million tonnes by 2000 AD. The paper industry associations expect much faster growth in demand rising to 5.3 million tonnes for paper, paperboards and newsprint by 2000 AD. Recent forecast by FAO places the projected demand for paper and paperboards in India at 5.7 million tonnes by the year 2010 (FAO, 1993).

According to a recent study by High Powered Committee on Pulp and Paper Industry set up by Government of India, per capita consumption of paper is slated to grow from current 3.6 kg to 5 kg by year 2005. Demand projection by this Committee are:

Year	Paper & Paperboards	Newsprint	Total
1995-96	2.7	0.73	3.43
2000-01	4.0	0.90	4.90
2005-06	5.4	1.09	6.49

(SAY 6.5)

- Demand is growing at 8% per annum - certain segments (special writing and printing paper and packaging varieties) likely to grow more than 12 %.
- To meet growing requirements, India would need an additional capacity of 1.7 Million Tonnes by year 2000 and 3.5 Million Tonnes by year 2005 at 80% capacity utilisation (Singhania, 1996).

COST OF IMPORTS

Unless effective measures are initiated for securing long term supplies of wood-based raw materials for the pulp and paper industry, there will be ever increasing gaps between demand and

supply of paper/newsprint. Based on the 1990 report of the Development Council, the projected shortfall will be nearly 1.6 million tonnes during 2000 AD and 3.1 million tonnes during 2010 AD. Import bills, as estimated by the Development Council, will be of the order of Rs.19,690 million for 2000 and Rs.42,760 million for 2010 as per details given in the following table (Singhania, 1990):

Year	Demand (Million Tonnes)	Production (Million Tonnes)	Shortfall (Million Tonnes)	Import Cost (Million Rs)
2000	4.112	2.560	1.552	19690
2005	5.045	2.762	2.283	29930
2010	6.297	3.154	3.143	42760
2015	7.981	3.325	4.656	64190

A recent study by Expert Group constituted by Industry indicates that shortfall in supply based on projected demand and possible production may be much larger i.e. 1.7 million tonnes for 2000-01, 2.5 million tonnes for 2005-06, growing to 3.6 million tonnes by 2010-11 and 5 million tonnes by 2015-16 (Gopalaratnam, 96).

Actual cost of imports will be many times higher because of escalation in prices, possible higher demand and unfavourable changes in exchange rates. India can ill-afford such heavy drain of scarce foreign exchange resources on import of commodities like pulp and paper in which the country does have the potential to become self-sufficient. Imports also mean surrendering potential domestic employment opportunities and indirect environmental benefits to the exporting nations. Therefore, any strategy based on meeting the shortfalls through imports must be rejected.

STATUS OF THE FORESTS

Recorded forest area in India is 77 million ha and actual forest cover 64 million ha or 19% of the geographical area. Well stocked forests cover 39 million ha or less than 12% area compared to the accepted optimum norm of 33.3% envisaged in the National Forest Policy. Reserve forests in the entire country comprise 54% of recorded forest area and protected forests cover 30%. 31 million ha or nearly 40% of recorded forest area is degraded open forest and scrub area (Anon, 1993). Forests have very low growing stock, @ 65 cum/ha compared to the

world average of 110 cum/ha. Likewise, MAI is very low at 0.5 cum/ha/yr compared to the world average of 2.1 cum/ha/yr.

Forests are under intense biotic pressures and major factors contributing to degradation are illicit removal of firewood in headloads, theft of valuable timber, excessive and uncontrolled grazing, fires, and in certain areas shifting cultivation. Lack of adequate investments in forestry sector, inadequate policy reforms and poor R&D and technological inputs are other contributing factors. Most of the community/village forests have disappeared and pressures are mounting on remaining 39 million ha of forests with crown cover density more than 40%.

Depletion of tree cover results in excessive soil erosion, contributing to promotion of wastelands, flash floods, silting of riverbeds/reservoirs, loss of biodiversity and inadequate recharging of underground aquifers. Total extent of degraded forests and wastelands needing urgent reclamation/reforestation measures is 130 million ha in India, i.e. 40% of the geographical area. Restoration of green cover and substantial improvements in land productivity are most essential for narrowing the gap between future demand and availability of firewood/timber/wood-based products, sustaining the momentum of green revolution and life support systems, environmental amelioration and ecological balance, conservation of biodiversity, precious soil and water resources, and prevention of floods and desertification.

BIOMASS DEMAND AND SUPPLY SITUATION

Productivity of forests in India is reckoned at 32 million cum/yr on sustainable basis. Actual removal, including unauthorised removal of firewood and timber, is substantially higher. Current deficit of biomass, as estimated by National Wastelands Development Board, is 340 and 682 million tonnes of dry and green fodder respectively, 15 million cubic meters industrial timber and 195 million cubic meters firewood (Anon, 1993a)

Demand for wood is bound to rise continuously because of growth in population, improvement in living standards and industrialisation. Projections by

FAO indicate that India's requirements in the year 2010 will be around 344 million tonnes of fuel wood and charcoal, 37 million cum of industrial roundwood, 33 million cum sawn timber, 5.7 million tonnes of paper/paperboards and 1.3 million tonnes wood-based panel (FAO, 1993). Most of the wood-based industries, like pulp and paper, veneering and plywood, hardboard and safety match units, are facing increasingly large deficits between requirements and supplies of wood-based raw materials from forests which are owned and managed by state governments.

PLANTATIONS - THE OBVIOUS STRATEGY OF CHOICE

The only obvious alternative strategy which the country must pursue vigorously is that of self-reliance and achieving self-sufficiency by securing future raw material supplies through technology based and intensively managed plantations. Industrial plantations will have the following distinct advantages

- secure increasing requirements of high quality wood-based fibre in a cost effective manner within the vicinity of the existing and future pulp and paper mills
- generate ample employment opportunities for the rural poor in raising, maintenance and harvesting of plantations and running of new pulp and paper mills
- contribute to greening of India, environmental amelioration, maintenance of ecological balance, effective conservation of soil and water resources and prevent further land degradation
- save large amounts of precious foreign exchange on imports of pulp and paper and create potential for export of these value added products in future.

STRATEGIES FOR SUSTAINABLE DEVELOPMENT

Despite current shortages and declining forest resources, the country has the potential to attain self-sufficiency in wood for industrial and domestic

usages on sustainable basis simultaneously maintaining the environmental equilibrium. Concerted efforts and urgent policy initiatives are required for restoring the green cover of India, improving land productivity and production. Sustained drive for intensively managed plantations is required for environmental amelioration, soil and water conservation, sustaining life support systems and creating raw material base for wood-based industries. innovative policy changes and long term sound strategies, as follows, are required with immediate effect, as our nation cannot afford further loss of time.

- restoration of growing stock of forests to optimum levels
- innovative changes in government policies to involve corporate sector and encourage private initiative for raising tree plantations
- allocation of degraded plantable lands to wood-based industrial units for long term development of plantations based on contemporary technology and scientific management
- suitable fiscal incentives and tax benefits for encouraging long term investment in plantations
- urgent replanting of degraded forest areas with appropriate species and provenances matching the site and environmental conditions
- scientific management, effective protection measures, and adequate/timely inputs
- use of improved, genetically superior seed from plus trees or seed orchards for raising nursery stock
- development of fast growing, disease resistant, locality specific clonal planting stock for species amenable to vegetative propagation ensuring fairly wide genetic base
- improved nursery practices, including culling of inferior seedlings, use of high quality putting mixture and containers with root trainers
- well planned investments, with accountability for results
- appropriate package of practices for management of plantations depending upon the species and site conditions

- inoculation of planting stock with appropriate soil and water conservation measures and irrigation of plantations wherever possible
- research and development support for the plantation programmes for continuous improvement of the planting stock and package of practices
- sound silviculture and management practices appropriate to site conditions and species chosen for planting
- long term tree improvement and breeding strategies to support plantation projects

RECLAMATION/RESTORATION OF WASTELANDS AND DEGRADED FOREST LANDS

25 million ha of forest area has less than 40% crown cover density. In addition, 6 million ha forest lands are with sparse scrub vegetation. Total area of degraded forest lands and wastelands needing urgent reclamation/restoration measures is 130 million ha - almost 40% of the geographical area of India. Reclamation/restoration/replanting and maintenance costs will be around Rs.30,000/ha. That means investment of Rs.150 billion annually for tackling 5 million ha per year. Total amount required for restoration of 130 million ha will be colossal Rs.3900 billion.

Despite earnest efforts and bold initiatives, government could not achieve target of reclamation/replanting 5 million ha per year. Government alone cannot accomplish this stupendous task, as massive financial, managerial and technological inputs are required. Urgent national task for restoration of wastelands must be accomplished in a time bound manner. Any delay will mean further degradation - often to the point of no return - and escalation of reclamation/restoration costs. Hence, government, must involve all sections of society and corporate sector through innovative policy changes and fiscal/tax incentives for reclamation of wastelands and greening of India.

Annual programme of reclamation/replanting 5 million ha will generate employment opportunities for 2.5 million people on regular basis. On maturity of plantations, 15 million people will get employment

opportunities for harvesting, logging, transport and replanting of 5 million ha annually. With modest annual increments of 5 cum/ha/yr, the timber/wood supplies from 5 million ha per year plantation programme at 10 years rotation will be 250 million cum/yr. With genetically superior, improved/clonal planting stock and intensive management practices, increments of 10-20 cum/ha/yr are achievable. That will revolutionise productivity and yield harvest of 500-1000 million cum of wood annually. Apart from 50 million ha to be reforested in 10 years, balance 80 million ha must be reclaimed and restored to sustainable uses like pasture, horticulture and agriculture depending on land capability.

LAND REQUIREMENT FOR PULPWOOD PLANTATIONS

For meeting the projected demand of 6.5 million tonnes of paper, paperboards and newsprint, as estimated by the High Powered Committee for 2005-06, 12.75 million tonnes of wood will be required on air dry basis assuming 70% wood-based fibre furnish. This requirement will be nearly equivalent to 18.21 million cum solid volume of freshly felled pulpwood. Assuming modest 5 cum/ha/yr productivity from seed route plantations, total land requirement for industrial plantations will be only 3.64 million ha which is just 12% of the degraded forest lands or 0.03% of the total degraded wastelands available in the country. Land requirements can be reduced to half with the progressive substitution of seedlings with improved clonal planting stock in the industrial plantations programme.

Availability of land for intensively managed pulpwood plantations is not a constraint. But access to suitable lands for plantations to be raised by the wood-based industries must be facilitated by the government through appropriate policy initiatives. With pragmatic innovative policies, planned investments, efficient management and technological inputs, India can not only restore wastelands and degraded forests to productivity and achieve self-sufficiency, but also create surplus for export of value added wood-based industrial products.

POLICY ISSUES

The first National Forest Policy was laid down in 1894, which was revised in 1952. The 1952 Policy

proposed classification of forests on a functional basis into Protection Forests, National Forests, Village Forests and Tree Lots. It emphasized the need for evolving a system of balanced and complementary land use. It advocated that the National Forests were to be managed on the principle of progressively increasing sustained yield to meet the requirements of defence, communications and industry.

The National Commission on Agriculture carried out comprehensive review of the forestry situation in the country and made very significant and far reaching recommendations for suitable changes in the forest policy, production forestry, social forestry, forest ecology and other related issues. Some of the important observations and recommendations of the National Commission on Agriculture relating to forest policy, as contained in their 1976, Part IX Report, are as follows (Anon, 1976):

"We are of the view that there should be two pivotal points on which the national forest policy should rest. One is to meet the requirements of goods, that is, industrial wood for forest based industries, defence, communications and other public purposes, and small timber, fuelwood and fodder for the rural community. The other is to satisfy the present and future demands for protective and recreative functions of the forests. All the requirements must be met in full and self-sufficiency achieved as early as possible."

"Since forest based industries are dependent on forest raw materials, interdependence between forestry sector and forest industries is vital. As forest crops can be harvested only periodically, the forest policy should lay down the need for resources planning taking into account the inevitable time lag which may be from 10 to 30 years or more. Integrated planning for raw material production and forest based industry would have to be one of the basis props of future policy. The new policy must take into account the institutional changes and the infrastructure required for utilisation of the forest raw materials from the point of view of self-sufficiency, reduction in net imports of wood - based products and

substantial exports of consumer items, like panel products."

"It is clear that any strategy for forest development must take into account the goods and services that the forest should provide. Goods and services are both tangible and non-tangible. Production of industrial wood would have to be the *raison d'être* for the existence of forests. Actually it is in this value that many other values that have been claimed or stressed for forests so far can be absorbed. Other tangible benefits are the production of minor forest produce, fuelwood and fodder. Non-tangible benefits are the conservation of soil, moderation of run-off flows, recreation, maintenance of ecological balance, environment and wildlife, though in developed countries parameters are being evolved for evaluating benefits for their economic appraisal."

"The first element of the strategy would have to be production forestry for industrial wood production, supplemented by adequate forest based industries, for which necessary institutional and technical changes should be made."

Unfortunately, these constructive and valuable recommendations are not reflected in the latest National Forest Policy adopted in 1988. The 1988 policy is in fact a defeatist document which does not address the challenges and the problems confronting the forestry sector through pragmatic and bold initiatives. This policy recommends that wood-based industries should meet their future raw material requirements through promotion of farm forestry programmes on small fragmented marginal lands owned by individual farmers.

CONSTRAINTS IN FARM FORESTRY

While farm forestry plantations should be encouraged to supplement industrial raw material supplies, exclusive dependence of wood-based industries on such uncertain and undependable source of scarce raw materials cannot stimulate expansion and growth of pulp and paper industry. Will any entrepreneur invest in promotion of farm forestry plantations on fragmented, small private land holdings and wait for 7-10 years to establish new

wood-based industry.

Scarce land resources are subject to competing land usages and the tree species selected for farm forestry plantations must not only match the site and agroclimatic conditions, but also offer significant improvement in overall economic returns to land owners. The other prerequisites for successful implementation and expansion of farm forestry programmes are as follows:

assured supply of genetically superior, high quality planting stock

effective technical extension services and appropriate package of practices

marketing support and buy back guarantees at remunerative price by promoters/wood-based industries

long term bank finance at reasonable rates of interest

research and development support, including intercropping strategies

Statutory ceilings limit agricultural land holdings in India to low levels. Fragmented and small land holdings, indebtedness of farmers, long gestation period of returns, delays in sanction and disbursement of bank loans are major constraints to expansion of farm forestry programmes (Lal, 1995). These issues should be suitably addressed. Farmers should be free to sell the wood to third parties only if the promoting agency is unable to pay the prevailing market price.

ITC Bhadrachalam Paperboards Ltd has been promoting farm forestry plantations since 1982 and a regular farm forestry project, with NABARD re-finance assistance, has been under implementation since 1989. This project covers 8 districts and upto 1995, 6,185 farmers have been assisted in raising plantations on their marginal lands covering 7,441 ha. Thus, average planting per farmer is 1.2 ha. Such small plantations spread over large geographical area pose immense logistics problems and cannot be an efficient and cost effective method for securing raw material supplies for the wood-based industries. Therefore, captive industrial

plantations will be the only long term solution.

INTERNATIONAL TRENDS

With the opening up of the Indian economy and globalisation of trade, production costs and quality of the product will assume critical importance for survival of industry and securing comparative advantage. Pulp and paper industry the world over is recognising the strategic importance of wood as fibrous raw material and countries with intensively managed plantations of fast growing species like Eucalyptus and Radiata pine will have competitive edge over others because of cost effective and high quality raw materials secured through plantations. Modern technology also demands fairly large size of the pulp and paper units for effective cost management. No wonder that 14 countries, including USA, Canada, Japan, Sweden, Finland, Brazil, Germany, France, Norway, Spain, Portugal, New Zealand, Australia and Chile account for 80% of the world's woodpulp production (Hagler, 1991).

Intensively managed plantations, based on selected genetically superior planting stock in land holdings in close proximity to the manufacturing facilities with short rotation harvesting cycles provide superior high quality pulpwood at optimum costs. Uniform raw materials facilitate standardisation of manufacturing processes resulting in higher recoveries and better product. Clonal Eucalyptus plantations based on *E. urophylla* x *E. grandis* hybrid clones by Aracruz Florestal in Brazil is a shining example of what contemporary plantation technology can achieve. The productivity of Aracruz clonal plantations ranges between 45-75 cum/ ha/ yr and the cost of pulpwood delivered at their 1 million tonnes/ annum pulp mill during 1992 was around US\$ 17 compared to US\$ 30/cum for pulpwood purchased from other growers (Lal, 1992).

LAND PRODUCTIVITY

India cannot opt for strategies which are not in line with the international developments as we would not like to be left behind in the global competition. Future growth of pulp and paper industry must therefore be planned mostly on fibrous raw materials to be

secured from intensively managed plantations, for which enough land, genetic resources and manpower are available within the country. Tropical climate of the country is conducive to fast growth rates of suitable short rotation tree species and the genetic qualities of the planting stock can be substantially improved, as already demonstrated by the pioneering efforts of ITC Bhadrachalam in the development of high yielding, disease resistant clonal planting stock of Eucalyptus. Forty two fast growing and disease resistant clones of Eucalyptus have been shortlisted out of 450 clones screened by ITC Bhadrachalam. Productivity of some of these promising clones in rainfed conditions at 7 years age ranges between 23-39 cum/ha/yr compared to 0.5 cum/ha/yr productivity of our natural forests and 6-60 cum/ha/yr in case of eucalypt plantations based on seed route. Vegetative propagation and clonal technology offer substantial advantages, and increasing resort to clonal option should be the strategy of choice. Some of the major advantages to be gained are

- true-to-type progeny and immediate capture of existing useful variation through cloning of selected phenotypes and mass multiplication of tested superior genotypes
- maximum immediate gains in short periods
- better productivity, uniform crop, improved quality and uniformity of produce
- easy to exploit heterosis by cloning of outstanding individual hybrids

BIODIVERSITY/ECOLOGICAL ISSUES

Wood-based industries are often wrongly blamed for depletion of forests. In fact, 80-90% of all wood harvested from the forests is used as domestic fuelwood in India. Intensively managed plantations are also often criticized for encouraging mono culture and inhibiting biodiversity. Clonal research has proven beyond doubt that each tree within the same species is a unique genotype in itself. Genetic diversity in plantations of each tree species therefore is much larger compared to individual varieties of agricultural crops. Intensively managed tree plantations, based on improved seed

sources or a large number of selected clones of suitable species matching the site and climatic conditions, should be the obvious strategy for restoration of degraded lands and substantial improvement of productivity. One ha of clonal Eucalyptus plantations with a modest productivity of 10 cum/ha/yr will save 20 ha of natural forests. Therefore, intensively managed plantations on degraded forest lands and wastelands will in fact conserve biodiversity of the shrinking natural forests and also prevent further degradation of precious soil and water resources.

CONCLUSION

Because of limited and narrow product range, uneconomic size, and lack of chemical recovery/effluent treatment facilities, agrobased and waste paper based paper mills will have only limited role to play in the future development of pulp and paper industry in India. It is debatable whether such units will be viable in future in the face of stiff international competition in respect of high quality products made from cost effective raw materials based on intensively managed plantations.

Therefore, the obvious strategy of choice for our country should be to involve the corporate sector in raising technology based plantations on degraded forest lands and non-forest wastelands, which are available in plenty. Innovative policy changes for permitting the corporate sector either ownership or long term leases of degraded forests and wastelands for industrial plantations should be initiated with immediate effect.

Meanwhile, government should permit joint sector plantations on degraded forest lands. This policy initiative should be supported with suitable fiscal incentives and tax benefits for encouraging corporate and private investments in plantations in view of long gestation period of plantations. Such incentives have achieved wonderful results in developing countries like Brazil and Chile and India should not lag behind.

Apart from securing future supply of high quality industrial raw materials in a cost effective manner, industrial plantations will also benefit the nation immensely through greening of the country,

conservation of soil and water resources, generation of ample employment opportunities, amelioration of the environment and substantial savings in the outflow of foreign exchange. On maturity of plantations, India will not only achieve self-sufficiency in pulp and paper but also be in a position to be internationally competitive to export such value added products.

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