Case for the Establishment of a National Research Institute for Pulp and Paper in India

Dr. S. O. Shukla*

The need for a national research institute in India devoted exclusively to the pulp and paper industry has never been more acutely felt than at present. The demands for almost every grade of paper are daily escalating ; the mass of technical problems, peculiar to Indian conditions, is fast mounting ; and above all, the availability of foreign exchange to solve these problems is almost nil. Under these circumstances intensive research in pulp and paper, both fundamental and applied, alone can provide the answers. The object of this paper is to highlight this need, and to outline a proposal for the establishment of such an institute in India.

In keeping with the rapid strides India is taking in her economic development programmes under the Five-Year Plans, the pulp and paper industry has not lagged behind any other. In fact the progress has been very remarkable, production rising to 185,000 tonnes or by 64 percent in the First Five-Year Plan period, to 350,000 tonnes (target) or by 85% in the Second plan period, and is expected to reach 580,000 tonnes (leaving a shortage of 120,000 tonnes in production against the Third plan target) or by about 70 percent.

The consumption of paper and boards, which stood at 242,000 tonnes in 1951-52, rose to about 644,000 tonnes in 1964. This increase in consumption, considered along with the population increase from 360 million in 1951-52 to 460 million in 1964, gives a corresponding increase in per capita consumption from 0.7 kg. to 1.4 kg. However, when this figure is compared with that for advanced countries like U.S. A. (208 kg.), Sweden (139 kg.) Canada (135 kg.), West Germany (87 kg.) and Japan (58 kg.) it is abnormally low. If our per capita consumption is to be increased to 7 kg. by 1980-81, this will mean an expansion in production to total of 4.25 million tonnes annually, with an approximate break-up as follows :

	1950-51	1980-81
Paper and Boards	168,000	3,000,000
Newsprint	50,000	650,000
Chemical Pulp, Mill and Straw Board etc.	24,000	600,000
	242,000	4,250,000
Per capita consumption	0.7 kg.	7.0 kg.

Such a goal calls for the establishment of about 130 more mills, each of 100 tonnes daily capacity. This would require a total investment of about Rs. 1,300 crores. At the existing level of manufacturing facilities available in India, the foreign exchange component would be not less than Rs. 700 crores. Thus during the next 15 years, an average annual investment of about Rs. 85 crores including imports of foreign machinery worth about Rs. 45 crores will have to be provided for the pulp and paper industry.

The cellulosic raw material requirment for producing 4.25 million tonnes of paper annually would be close to 10 million tonnes. The existing known resources of bamboo, exploited in the best possible way could provide only about 2 million tonnes annually to the paper industry. Similarly, with the 3.5 million tonnes of bagasse available from sugar mills all over the country, there would still be a gap in the raw material requirement by about 4.5 million tonnes. This shortfall would thus perforce have to be met by exploiting all locally available cellulosic raw material such as hardwoods, which could provide about 3.5 million tonnes annually, an other agricultural residues like rice-straw, wheat-straw, linseed stalks, jute-sticks, and various types of grasses to make up the balance.

With the exception of a few mills, almost all pulp and paper manufacturing units in the world use conventional woods, bamboo, or bagasse or hard woods in admixture with long fibered pulp. The setting up about 80% of new paper mills in India using pulp made almost exclusively from hitherto untried raw material like bagasse, hard woods, jute sticks, rice and wheat straws, grass etc. virtually calls for the creation of a new technology to slove problems so far unforeseen. While it may be possible to use foreign know-how whenever available (which at the same time would

mean expending valuable foreign exchange), it would be more appropriate and advisable to have an institution in India itself where these problems could be solved. The same argument holds true for design and manufacture of machinery also.

The big upsurge of industrial activity under the three Five-Year Plans so far has created in its wake several problems. Attention during the Second & Third Five-Year Plan periods has been concentrated mainly on heavy industries, giving comparatively scant attention to agriculture. This has in turn given rise to an acute food shortage all over the country. Imports of heavy, capital-intensive machinery, and various other manufactures, besides food, have created a sharp decline in our foreign exchange balances from about Rs. 1,000 crores in 1950-51 to nearly Rs. 250 crores in 1964-65. Various measures have thus had to be adopted to reduce imports, to make do with indigenous manufactures as far as is practicable, and to boost our exports in order to bloster the country's balance of payments problems.

In such a business and economic climate, the role of a research institute becomes very pronounced; it will not only actively aid existing mills in increasing productivity, but can also develop process for exploiting locally available raw materials; it could assist enterpreneurs by imparting technical know-how and training up personnel; it could design plant and machinery for units using processes developed in the institute ; and most important, assist the country's economy by developing ways and means of conserving valuable foreign exchange.

Paper, although one of the oldest Indian industries, is among the most rapidly developing industries in our economy. It has three distinguishing characteristics—one, its principal raw material is a natural fiber, two, these fibers have a peculiar way of orienting themselves into a continuous sheet ; and three, the paper web is open to different treatments imparting different properties and end uses. This branch of knowledge is therefore, an extremely fertile and versatile field for both fundamental research and applied research and development. The establishment of a national research institute for pulp and paper would thus mark another milestone in India's industrial renaissance.

Scientific research in India, both fundamental and applied, has so far lagged enormously behind that in other parts of the world, as may be seen from the following table :

Expenditure in millions of rupees in 1962

Country	Total	Per capita	Expenditure as % of National income
U. S. A.	80,000	400	3
U. K.	10,000	170	2.7
China	4,000	6	—
India	1,200	2.5	0.32

This disquieting contrast becomes more evident when we compare the expenditure on research and development in the pulp and paper industry in India with that of other countries such as the U. S. A., whose annual expenditure is approximately Rs. 31.2 crores, whereas that in India is only about Rs. 10 lakhs.

At present, besides the research carried on by individual mills, there is only one Government-sponsored facility available for pulp and paper research—the Cellulose and Paper Products Divison of the Forest Research Institute at Dehra Dun. The following figures for expenditure during the last few years give an idea of the volume and quality of work done there.

Year	Expenditure in Rs. lakhs
1958	1.06
1959	0.83
1960	1.70
1961-62	1.88
1962-63	2.18

While its equipment consists of a pilot plant for pulp and paper making and has some instruments for testing and evaluating pulp, paper and boards, it is still only a small branch of the whole Forest Research Institute. In its activities, it would have been a great advantage to utilise the experience of the existing industry as a spring board from which to make further headway. But this is not so. As such very little actual benefit to the industry is accruing from the present set-up and operation of the Cellulose and Paper Products Division of the Forest Research Institute.

In comparison, the research facilities offered by the Japanese Government are considerably greater. There are six full-fledged research institutes in

Japan devoted exclusively to the pulp and paper industry. They are equipped with a wide range of pulp and paper making equipment, such as a Cylinderical Yankee Machine, globular pressure digester, open digester, hydrapulper, disc refiners besides a complete range of standard laboratory equipment for testing pulp and paper. In addition, the Shikoku Branch at the Kaganwe Prefecture has an elect microscope, X-ray difraction apparatus and a photoelectric spectrophotometer. These research units are devoted not only to research and development in pulp an paper from conventional raw materials, but also synthetic fiber paper like the Vinylon paper, purification of alkali lignin to rubber, and investigation of the disposal and utilisation of wastes from sulphite pulping.

It is, therefore, our feeling that if any lasting gain is to be made for the advancement of the pulp and paper industry in India in the coming years, a national research institute focussing its attention in an undivided manner on this industry has to be established. It could be placed directly under the administrative jurisdiction of the CSIR, as are the other twenty-nine research laboratories in India with the difference that this would have to work in close liaison with the paper industry as a whole. Besides the conventional pilot plants for pulp and paper making, and other equipment for testing purposes, it should have equipment for producing and testing coated, impregnated and synthetic papers, a well equipped workshop for fabricating equipment, to create new designs of machinery, an excellent library for reference purposes, facilities for publishing matters of interest to the industry, and be free to undertake research work of a fundamental nature also. Such a research institute may well cost about a crore of rupees to establish, and a few lakhs every year for running it. But the prospects of its contribution to the country's economy are indeed enormous and enough to offset the initial heavy expenditure on setting it up.

As late as a couple of centuries ago, India led the world in various techonological skills. Her contributions in science, mathematics as also in the textile, iron and steel and paper industries are too well known to need repetition. It is high time India girded up her loins and got ready to repeat history. An opportunity, and, perhaps more, a challenge, has now presented itself in the development of the pulp and paper industry. The answer to this could well be found in the establishment of a national research institute for pulp and paper, and its making itself useful by solving the industry's pressing problems in the coming years.