EFFLUENT PROBLEM FROM INDIAN PULP & PAPER INDUSTRIES AND PROBABLE REMEDIES

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1 Today worldwide concern is environmental pollution of the industries even more concern than N-Weapons and India is not free from the concern of environmental pollution. This dangerous pollution may be out of modern living standard, Industrialition, Construction of Sky Scrapper buildings,deforestration, urbanisation which causes the ecological disbalance in nature. Even in India most holy rivers became so heavily polluted that they became a menance to aquatic life and human inhabitants.

Country like India is not only facing environmental problem by over Industrialisation but also may be due to lack of knowledge of common people and their proper awareness of pollution.

The environmental pollution mainly from two sources water and air and the Indian Pulp and paper Industry is having the major contribution towards pollution of water.

The demand for Paper and Paper board is estimated to 1.8 million tons per annum by the end of five years plan and will touch about 3.0 million ton per year by 1990.

2. SOURCE OF ENVIRONMENTAL POLLUTION BY PAPER INDUSTRIES

The big mills are based on conventional Raw Materials bamboo and wood and are contributing 60 % of the total production and demand of bamboo and wood is much more than its regeneration, leading ecological disbalances. Indian paper industry needs 2.5 tons to 3.0 tons of cellulosic raw materials per ton of finished paper having much more lower yield than of advanced countries due to lack of technical know-how and proper equipments.

To keep the ecological balance. The immediate following steps are to be taken.

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a. High yield pulping technology
b. Maximum use of annual agricultural residues.
c. Existing and forth coming mills are to find out their ways and means of raising man made plantation of suitable first growing species as an integral part of investment.

Thus in future recycling of fibres, use of annual agricultural residues, cropping of fast growing and high yielding plant, man made forests seems to be proper answer to meet the fibre demand as well as to reduce fast growing ecological disbalance.

Sources of water effluent in an integrated pulp paper mill based on conventional Raw Materials.

a. Log and Chipper house
b. Digestor Section.
c. Pulp washing and bleaching section.
d. Paper machine section.
e. Chemical preparation section.
f. Chemical recovery section.
g. Boiler house.
h. Employees Floors washing.
i. Dust from Boiler chimney.

The pulp and paper industry is scattered throughout the country while most of the big pulp and paper mills are adopting Kraft process and small mills are adopting soda process and at each and every stage writing and printing paper mills are consuming 300-350m^3 of water per ton of paper and bulk of its comes out as a waste and discharged as effluent. For that reason most of big paper mills are situated on the bank of perennial rivers which provide fresh water and accept waste water from the mill. The material balance of bamboo and wood based paper mill shows that only about 42 % of Raw material is recovered in form of Pulp, about 46 % burnt in chemical recovery furnace, 4.5 per cent discharged as solid waste. 45 % as dissolved organics and about 3 % as a suspended solid in waste water.

In case of paper mills based on agricultural residue, the pulp yielded is average 36 % and solid waste is 9 % the rest is about 55 % contains mostly organic substance which goes into effluent.

TABLE -1

TYPICAL ANALYSIS REPORT OF EFFLUENT

CAPACITY : 10,000.00 TPA (VARITIES OF KRAFT PAPER)

TABLE - II

NO.	SAMPLE	pH	COD mg/l	BOD mg/l	T.S. mg/l	TDS mg/l	SS mg/l
1.	Machine back water before primary clarifier	5.5	1000	550	1260	750	800
2.	Machine back water after primary clarifier	6.0	250	185	730	614	216
3.	Pulp Mill + Machine back before primary	8.0	1600	930	3200	2520	740
4.	Pulp Mill + Machine back water after primary clarifier	8.2	1300	575	1400	1000	220

Presently there are 211 small pulp and paper industries with production capacity from 3-30 TPD in our country (as on 1.1.85 as per DGTD list). More number of industries are under various stages of installation and planning. In general the existing pollution control measures are unsatisfactory due to lack of proper technical know how, improper design lack of maintenance caused the highest in this country magnitude of pollution.

The probable measures to minimise water and air pollution economically in the Pulp and Paper Industries.

The paper Industry must strive hard for in plant control measures at each and every point to reduce the pollution load before being discharged into external waste disposal facilities by imparting the following methods.

1. The new technology must be developed for efficient plant control.
2. To use efficient fiber and chemical recovery system in the plant.
3. Maximum reuse of back water into the system.
4. Oxygen pulping and bleaching.
5. Multistage bleaching and diffusion washing in a single tower.
6. Making various mill process charge to facilitate closing up the water system.
7. The segregation of black liquor from other back water and wasted water in small paper mill and new technique to be investigated for suitable chemical recovery system for agro based mills.
8. Constant research and development efforts to be made to reuse the waste and to reduce the cost of treatment for the survival of small paper mills as a whole.
9. To minimise the air pollution, oxidation of black liquor, elimination of direct contact evaporation, efficient dust collection system and scrubbing of va-pours to be incorporated in the plant.
10. Lastly, the central govt. must not leave the entire responsibility to the industries to protect the environment but to come forward with the financial help for the pulp and paper industry for their survival in this country.

PROBABLE QUANTITY AND CHARACTER OF EFFLUENT OF PULP & PAPER INDUSTRIES BASED ON CONVENTIONAL RAW MATERIAL

TABLE - 1

		Log and Chipper House	Digester system	Pulp Washing + Bleaching Section	Paper Machine section	Chemical Preparation Section	Chemical Recovery Section	Boiler House	Employee + Floor Washing	Total Waste Water
		M^3/T	M^3/T	M^3/T	M^3/T	M^3/T	M^3/T	M^3/T	M^3/T	M^3
Waste Water		10-15	15-20	120-170	60-80	10-15	5-10	5-10	20-30	260-350
Colour		Mudy	Dark Brown	Brown	White+ Coloured	Mixed white & Coloured	Light Brown	Muddy	Mixed	
pH		6-8	9.5-10.5	6.0-9.0	5.0-6.5	6.5-9.5	7.5-9.5	7.5-8.5	8 - 8.5	
Suspended Solids	Mg/l	250-500	150-200	160-200	500-1000	80-120	300-650	1000-1200	200-800	300-450
Total solids	"	500-1000	1200-2800	2000-3200	800-1200	150-200	1500-3200	1500-2000	300-1000	1400-2200
BOD	"	60-80	450-500	150-200	100-200	50-75	120-200	60-80	1000-1500	250-350
COD	"	150-350	1500-2000	600-800	800-1200	200-350	300-600	200-350	700-1200	700-900