

# Practising Green : Century Pulp And Paper

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## ABSTRACT

*Over the last few years there has been a "GREENING" of the markets with the focus shifting towards improving the Environmental Quality of production and providing Environmentally sound products using cleaner technologies.*

*Century Pulp and Paper has certain Green Practices, systematically adopted and integrated into the over all production process to derive benefits in terms of a clean environment and reduced inputs. The paper outlines the Management steps taken towards successful accreditation for ISO-14001 EMS and cleaner production options to minimise energy and level of pollutants in effluent. Various schemes of recycling and utilisation of by products practised, the Effluent Treatment schemes followed and the Socio-Forestry/Green Belt Development Plan executed, are discussed.*

## INTRODUCTION

Integration of Environmental Quality Management into Policy Programmes is the key to sustainable development route to progress. In the recent years the environmental issues have assumed greater significance and terms like 'Clean' 'Green' and 'Closed' continue to have preponderance over a wide spectrum of activities. Pulp and Paper Industry has also been focus on these issues with emphasis on cleaner production technologies and resource conservation. Application of an integrated, preventive environmental strategy to processes & products can lead to an overall efficiency and a clean environment.

Century Pulp and Paper is an integrated Pulp and Paper Unit having three fibre lines with installed capacities of 31,320 TPA Rayon Grade Pulp, 37,250 TPA Writing and Printing paper based on Eucalyptus & Bamboo and the latest 84,600 TPA Bagasse based paper unit. With an efficient Effluent Treatment scheme incorporated right from the inception well established and upgraded over the years, the company focused it's attention to the 'Waste Minimisation' and a 'Pollution Prevention' route. The endeavours made towards

motivating the workforce and adopting changes in the plant and processes towards resource conservation have facilitated the company to be certified for ISO-14001 EMS and being widely recognised for it's efficient handling of environment matters.

## CENTURY'S GREEN EFFORTS

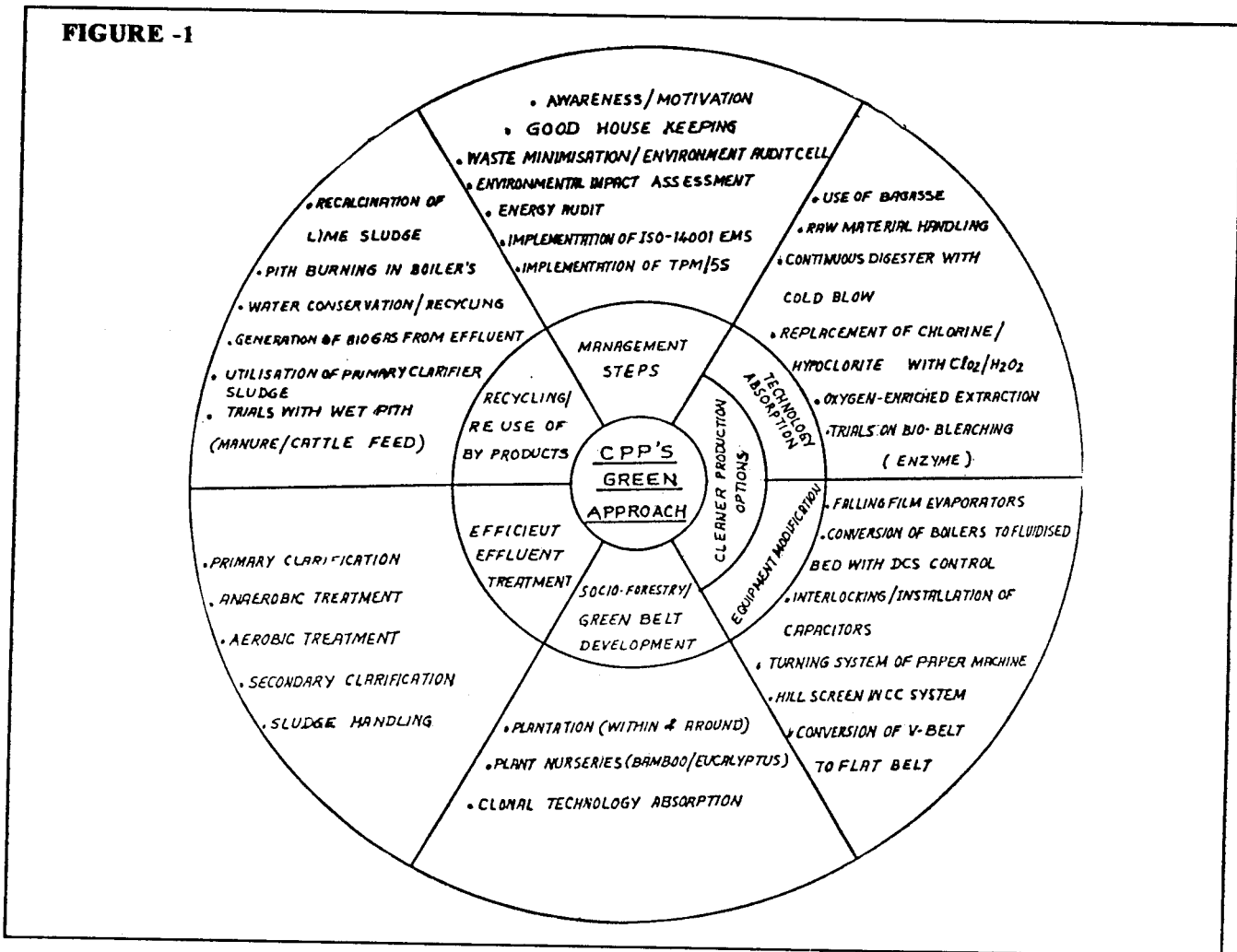
The Approach followed towards implementation of an effective environmental Programme is shown in Figure - I. Systems introduced, changes incorporated, and a Mill wide Awareness drive to motivate employees at all levels have been the contributing factors towards it's success.

## MANAGEMENT STEPS

Certain management steps to involve the total workforce and motivate them to adopt clean practices have had a catalising effect to the speedy implementation of various schemes. Some of these are outlined as:

**Century Pulp and Paper**  
**Lalkua, Nainital, (U.P.)**

**FIGURE -1**



- Display of the unit cost of various inputs at prominent places.
- Institution of Award for the Best 'House keeping' declared on Safety Day.
- Institution of Awards for poster, slogan and essay writing competition and an 'Environment Friendly' shield for the Best performance on Environment Front.
- Formation of a core group during 1991 comprising members from different sections with an objective to identify areas of losses in various sections, prepare action plans and implement schemes. The scope covered conservation of Heat, Power, Water, Condensate and Alkali etc.
- An Environmental Audit Cell comprising of three members to take elaborate plant rounds to:
  - Check losses of Alkali/Water/Fibre.

- Highlight Process inefficiencies.
- Arrange immediate corrective measures.

This approach paid dividends in form of selection of the company by CPCB and NPC as a 'Model Unit' for the 'Waste Minimisation Audit' amongst the Pulp & Paper Industry in the country.

**ENVIRONMENTAL IMPACT ASSESSMENT**

Company has been getting a comprehensive 'Environmental Impact Assessment' conducted periodically on the long term impact on Ground water, Ambient air quality, Hydrogeological survey and impact on crop yields etc. Within a radius of 10 km of the plant to ensure effectiveness of the control measures and to improve/rectify the scope where required. These studies have been quite helpful in assessment of present trends and the future course of actions for further improvement. An important part of this exercise is to study the yields of various crops irrigated with effluent

**TABLE-1**  
**CENTURY PULP AND PAPER**  
**GHANSYAMDHAM (LALKUA)**  
**ENVIRONMENTAL IMPACT ASSESSMENT**  
**EFFECT OF EFFLUENT ON CROP YIELD**

CROP IRRIGATION	AVG. YIELD (QUINTAL/HECTARE)		GAIN
	NORMAL WATER IRRIGATED	EFFLUENT MIXED WATER IRRIGATED (Paha Nalla)	
PADDY	37	44	(+) 6
WHEAT	27	30	(+) 3
SUGAR CANE	577	668	(+) 111

mixed water. comparative data of yields irrigated with normal vis-a-vis effluent mixed water in the vicinity of the mills is given in Table no.1.

have been implemented while the rest are under various stages of implementation. These schemes are expected to effect an Annual savings of Rs. 268.73 lacs to the company.

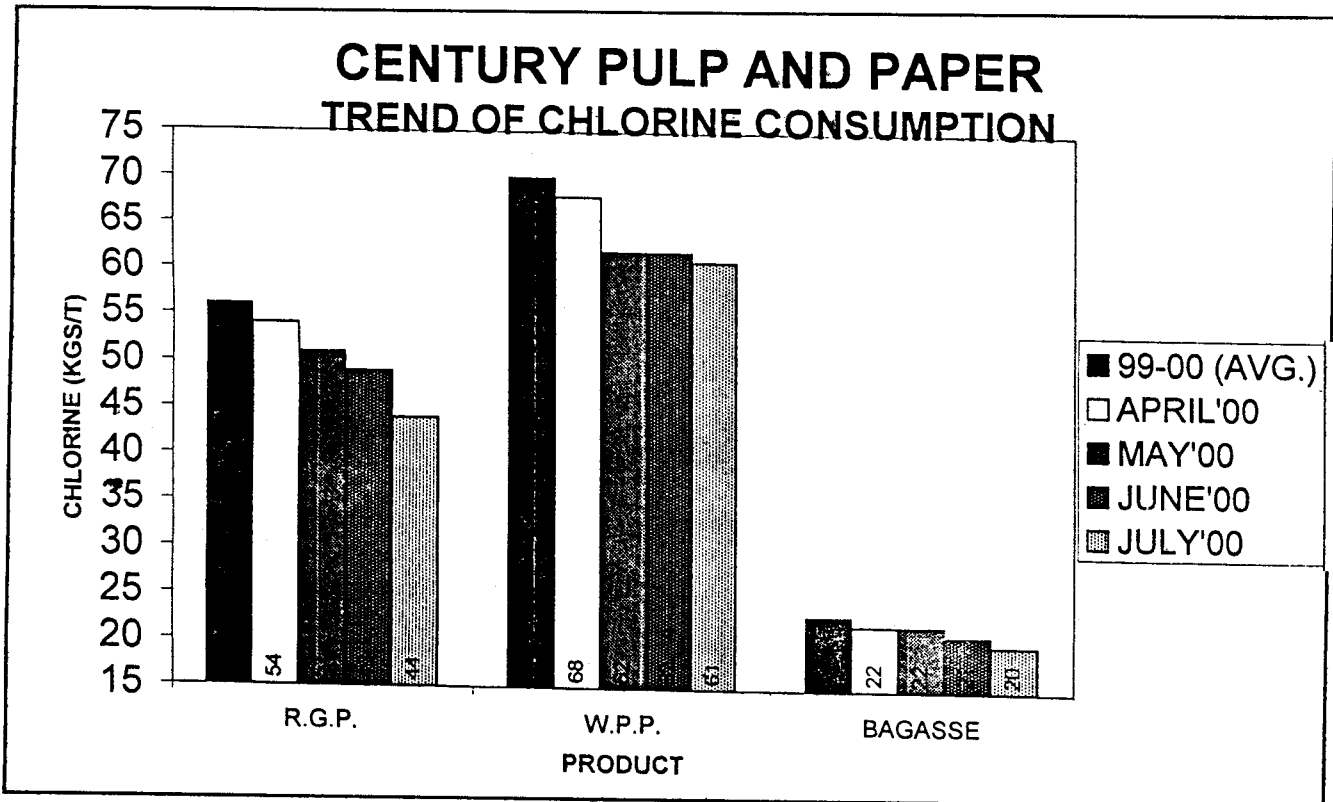
**ENERGY AUDIT**

The company got a detailed Energy Audit conducted through C.I.I. during early 1999 wherein 79 energy saving schemes were identified. Some of these

**ISO 14001**

The combined effect of the above measures gave an impetus to company's efforts in getting ISO-14001 certification for its EMS. With the implementation of

**FIGURE -2**



**TABLE-2**  
**Findings of the Enzyme Treatment on Pulp Bleaching**

Particulars	Kappa No			Brightness	P.C.	Viscosity
	Unbleached Pulp	C/D	A-Ext.	%	No.	cp.
Blank	17.8-19.2	9.84-11.44	8.05-9.32	84.9	1.06	5.05
Enzyme Treated	16.6-18.8	7.36-9.92	4.96-5.60	86.8	0.53	4.98
@ 500g/T UBP						
Hypo II	16.81-19.04	9.04-9.76	4.52-5.67	86.2	0.56	5.08
Eliminated (i.e. 1% Cl <sub>2</sub> )						
H <sub>2</sub> O <sub>2</sub>	17.53-18.48	9.56-9.73	4.69-5.18	85.0	0.92	4.95
Eliminated (i.e. 0.5%)						

EMS under the ISO format, the methods, monitorings and records became more systematic and transparent. Company's Environmental Policy, showing Management's firm commitments to safeguard environment is available to general public. The certification has resulted in an overall improvement in Environmental Performance & systems, housekeeping and a high morale of the employees.

Century is now persuing with the efforts to imple ment TPM in it's operation towards continual improvements.

### CLEANER PRODUCTIONS OPTIONS

- The company's expansion of the Paper Plant was planned on an eco-friendly concept based on Bagasse, an agricultural residue for manufacture of writing & printing papers including light weight coated varieties.
- The unique Bagasse Handling system i.e. pile builder supplied by Beloit, U.K is one of it's kind, for preservation of Bagasse under Anaerobic conditions and to avoid degradation during storage.
- Continuous Digester supplied by Sunds Defibrator, Sweden with Cold Blow to curb process emissions.
- Adoption of Chlorine - Di-Oxide and Oxygen - enriched extraction stage in the Bleaching

sequence for reduced levels of A.O.X in the effluents. The AOX levels in Bagasse Based Paper Plant are reported around 1 kg/ton of paper, a likely limit to be fixed by the governing agencies in near future.

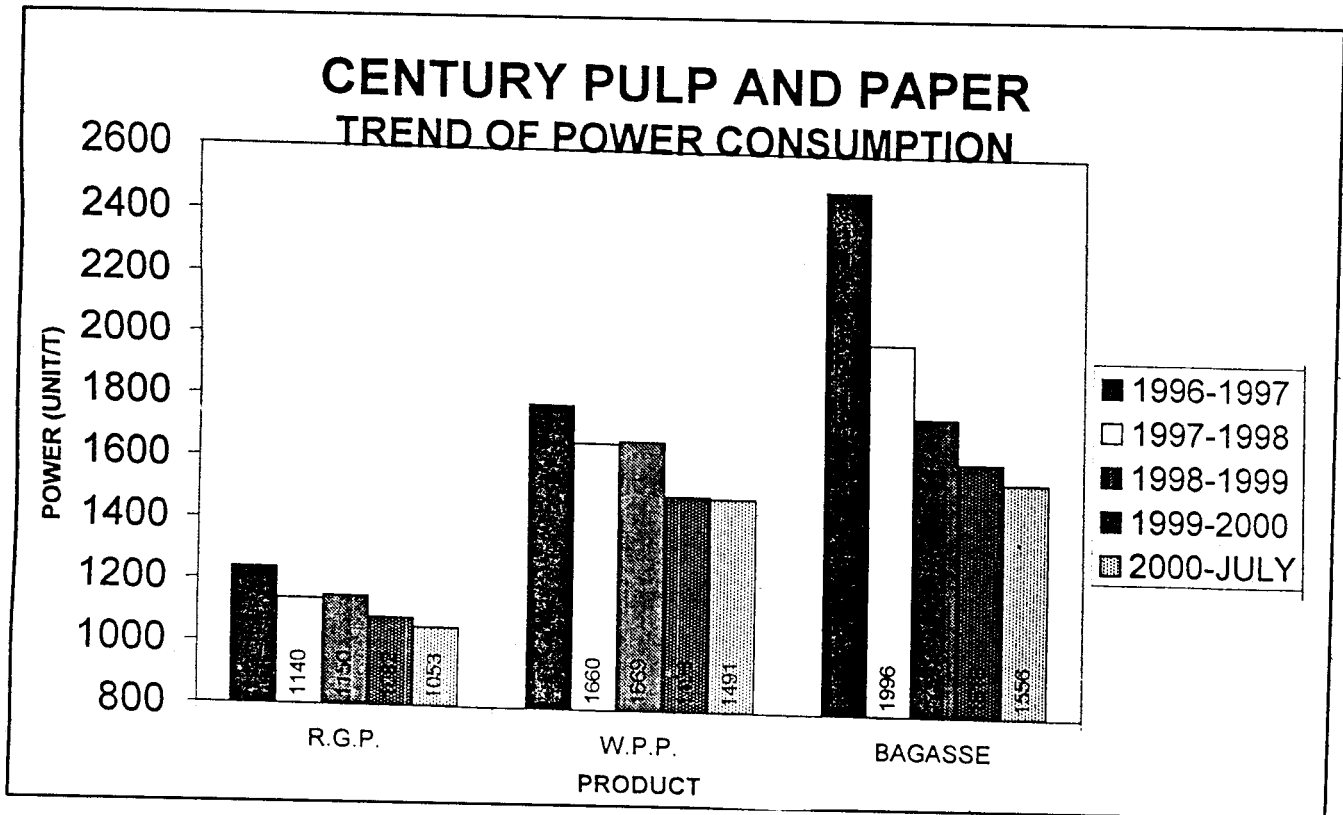
- High efficiency thick stock pumps for minimum Energy requirement in Bleaching Plant.
- Introduction of ClO<sub>2</sub> and H<sub>2</sub>O<sub>2</sub> in old pulp plant (WPP) for improved Brightness and reduction of Chlorine consumption. The Chlorine consumption pattern during the past few years is shown in Figure -2.

Successful trials on Pilot scale as well as plant scales have been completed on Bio-Bleaching (Enzyme) with appreciable reduction in Hypochlorite consumption and improved Brightness of Pulp and Brightness stability. The salient findings are shown in Table-2. This concept on continuous application is likely to reduce the AOX levels appreciably in the effluents. Similar plant trials are planned for our Rayon Grade Fibre line.

By optimising process parameters through DCS and selection of improved technology for power generation and process, it has been possible to cut down consumption of steam, power and coal per ton of product.

The savings are achieved by the following:

**FIGURE -3**



- Installation of double extraction, condensing 21 MW Turbo Generation set (Toyo Denki Japan) for improving own generation and to avoid power interruptions.
- Achieving optimum flexibility in power plant operation by running both our TG Sets in parallel with Grid system which provided gains like:-
  - (a) Control of maximum demand of grid as per the requirement.
  - (b) Improvement in Power Factor of Grid to 0.992 from earlier 0.93: Installation of KVAR Capacitors.
  - (c) Improvement in Thermal cycle efficiency of power plant by upgradation of steam generation process by fluidised bed combustion in Boilers with DCS.
  - (d) Heating of feed water with two stages to improve Thermal Cycle efficiency of power plant by app.1%
  - (e) Introduction of third stage water heating by arresting low pressure vent steam from blow down, start up vents, soot blow, blow down tank

vent steam etc. for low temp. recovery.

- (f) Conversion of one boiler to facilitate pith burning.
- (g) Free flow falling film evaporators with steam economy of 6.10 against 5.0 of old conventional evaporators and also reducing alkali carry over.
- (h) Cascade system of steam heating for paper web in Paper Machine reducing steam consumption to 2.1 t/t Paper from 2.3 t/t earlier.
- (I) Turning system installed on our PM III to reduce wastage of paper, time saving during roll changes and reducing energy consumption for reprocessing.

The consumption trend of power and steam over the past years is shown in figure -3 and Figure - 4.

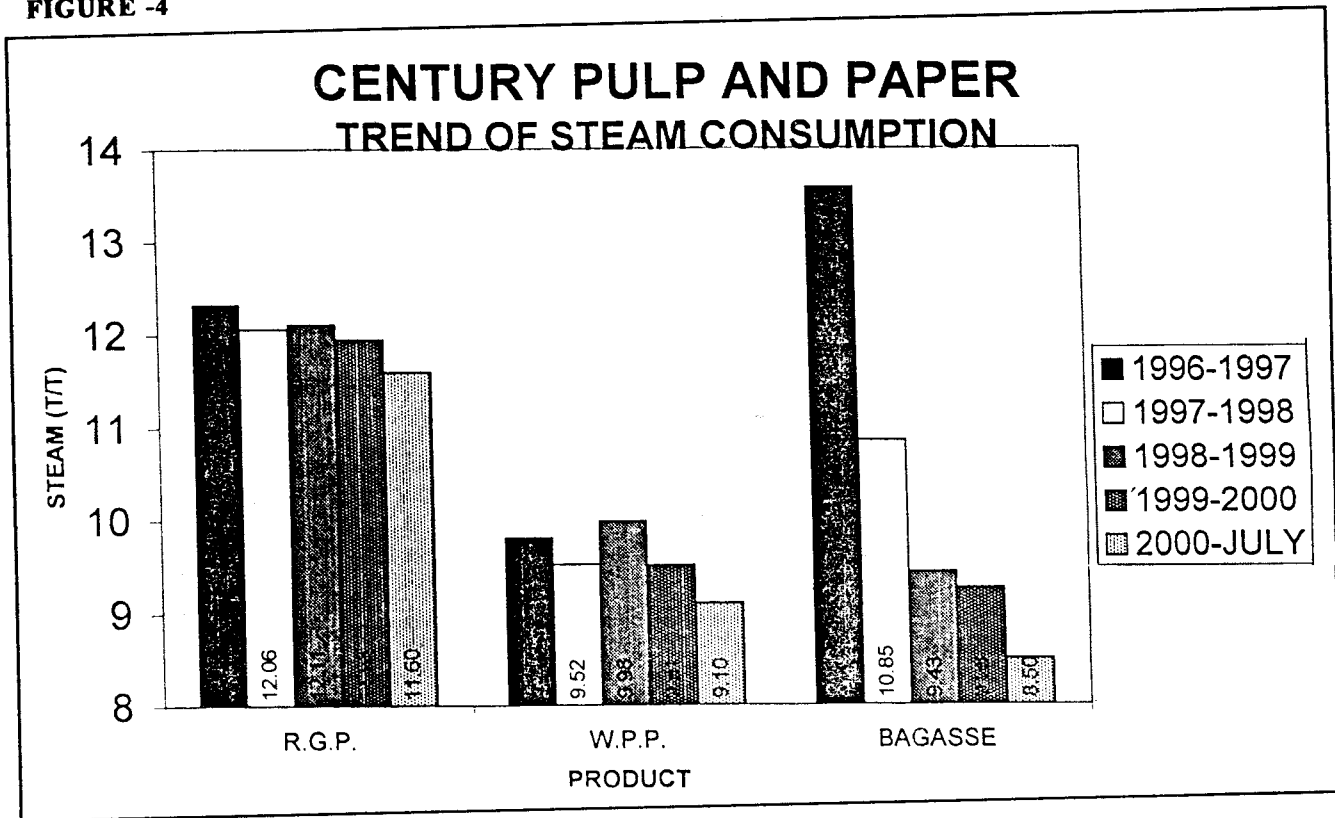
### RECYCLING /REUSE OF BY PRODUCTS

#### SLUDGE HANDLING

A systematic sludge handling system has been adopted by the company; unique features being:

- a) Lime Sludge Recalcination in two nos. Rotary

**FIGURE -4**



Lime Kiln processing app. 350 ton of lime sludge to generate lime.

- b) Pith Burning along with coal in one CF boiler where necessary modifications have been carried out. Saving in coal by way of pith burning is to the tune of 3500 t/month.
- c) Penwalt's Super - D-Canter and Belt Filter presses (2 Nos. each) to handle underflow sludge from primary clarifiers which is utilised for Board Manufacture.

**BIO GAS REACTOR**

The company has installed an ADI-Bulk Volume - Fermenter-Technology reactor for Anaerobic Treatment of Prehydrolysate emanating from Rayon Grade Pulp Plant. The plant on full stabilisation is designed to generate Bio gas to the extent of 3855 m<sup>3</sup>/day which is equivalent to about 1950 kgs. of R.F.O.

**WATER CONSERVATION**

Company has adopted various water reclamation and recirculation schemes to conserve this scarce

resource. There has been a tremendous awareness and growing response from all the persons which has yielded good results. With various schemes successfully implemented, we have achieved a figure of 130-135 m<sup>3</sup>/ton of product. We understand there is still a lot of scope to improve on this front and we are continually striving to make this figure more impressive. Various conservation schemes implemented are shown in Table -3.

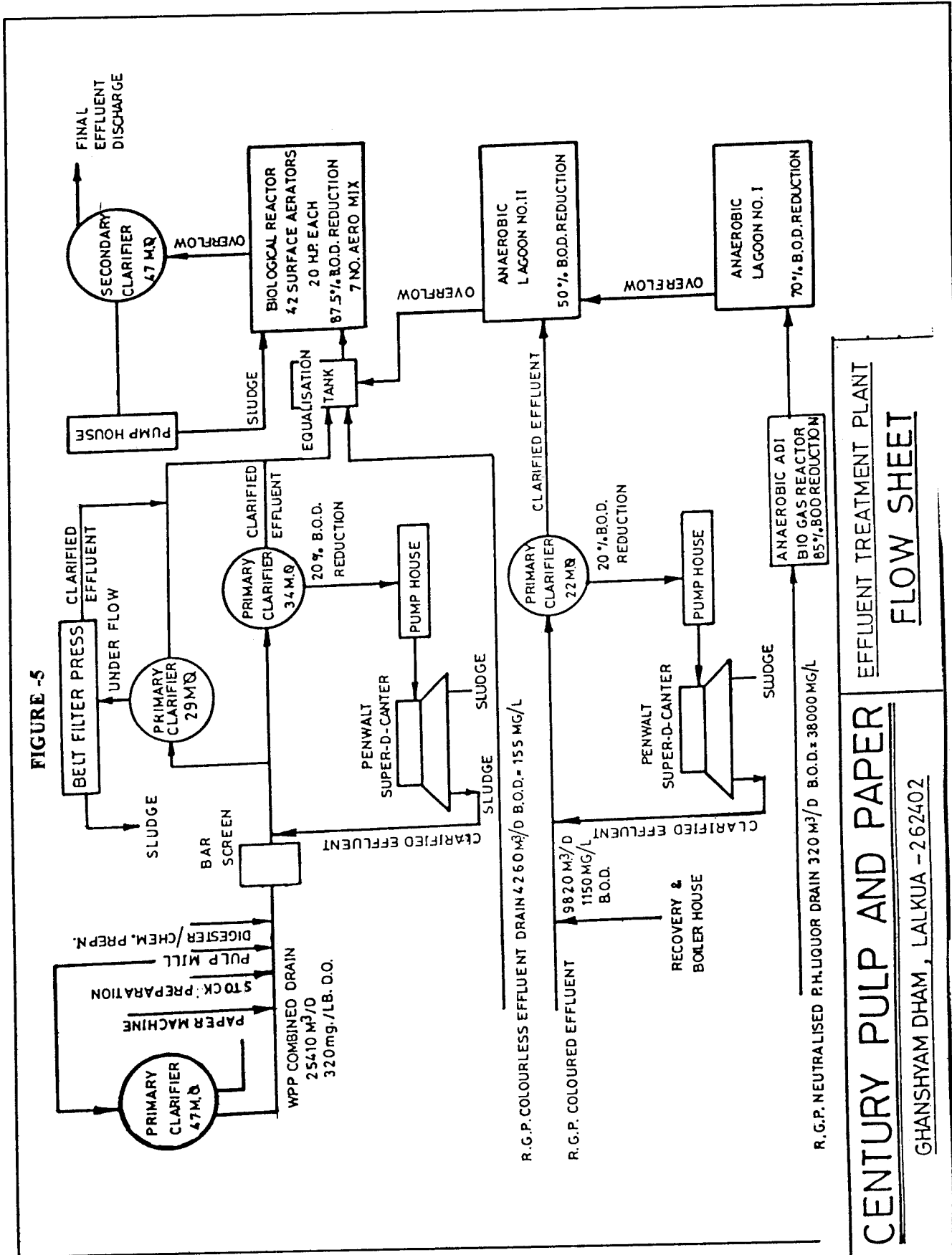
The company is also experimenting with wet pith finding it's way for use as a Manure and Cattle feed with Veterinary Research Institute, Bareilly.

**EFFLUENT TREATMENT SCHEME**

An efficient Effluent Treatment Plant based on activated sludge process has been operative right from the inception. The Treatment incorporates Primary Clarification, Anaerobic Treatment with Bio-Gas generation (pH liquor). Biological Reactor with surface aeration and secondary clarification. The underflow of Primery Clarifiers is thickened on Penwalt Super - D-Canter and Belt Filter Presses. The Treatment scheme has received wide recognition from various governing bodies:-

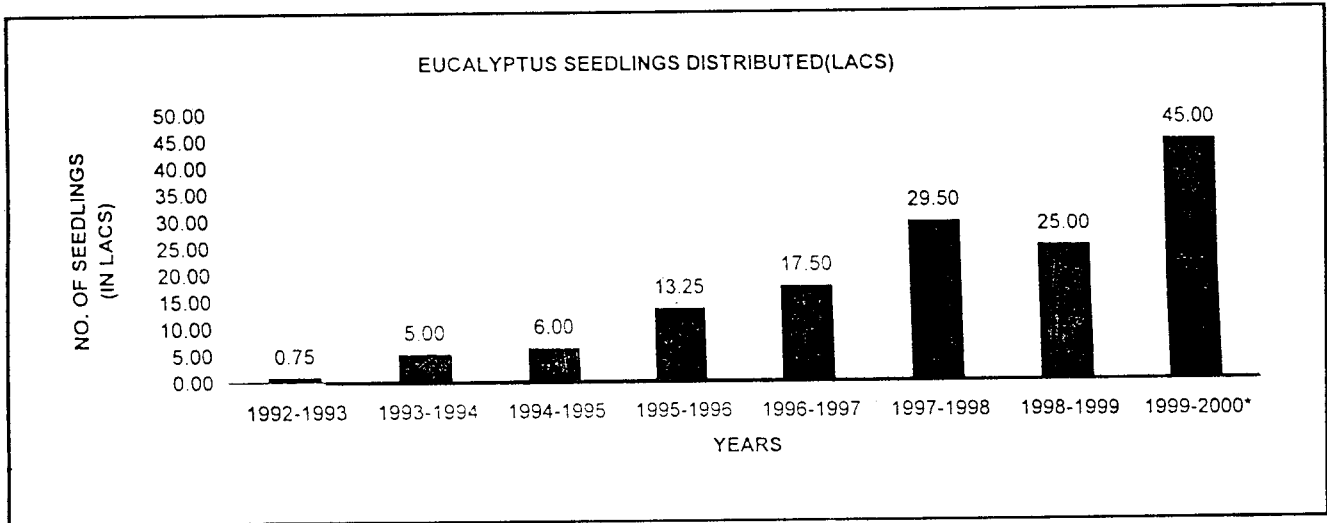
**TABLE-3**  
**CENTURY PULP AND PAPER**  
**GHANSHYAMDHAM - LALKUA**  
**WATER CONSERVATION SCHEMES**

S. No.	Activity	Area of Application	Approx. Water achieved
1.	Recirculation of sealing water in 14 Nos. vacuum pump.	WPP pulp mill, paper machines	150M <sup>3</sup> /Hr
2.	Reuse of paper m/c. back water Pulp Mill	WPP pulp mill	100M <sup>3</sup> /Hr
3.	Recycling of bleaching stage back water	WPP pulp mill & RGP pulp mill	120M <sup>3</sup> /Hr
4.	Recovery of vacuum pump sealing water and Ammonia Compressor.	RGP	80M <sup>3</sup> /Hr
5.	Reuse of Sheetting M/c. back water for unbleached pulp dilution.	RGP	60M <sup>3</sup> /Hr
6.	Recovery of cooling water from coal fired boilers & BHEL Recovery Boiler.	Power House and Chemical Recovery	60M <sup>3</sup> /Hr
7.	Recovery of cooling from bagasse PM-III.	Paper M/c. II	100M <sup>3</sup> /Hr
8.	Recirculation of cooling water from Lime Kiln.	Chemical Recovery	30M <sup>3</sup> /Hr
9.	Reuse of foul condensate from old evaporator for general use and floor washing	Chemical Recovery and Power House	60M <sup>3</sup> /Hr
10.	Reuse of foul condensate from new Evaporators of Chemical Recovery Plant.	RGP & WPP Brown Stock Washing.	120M <sup>3</sup> /Hr
11.	Reuse of WPP Unbleached Thickener back water into Bagasse Wash Plant.	Bagasse wash plant	80M <sup>3</sup> /Hr
12.	Reclamation of PM-III & Stock back water and reuse of same after clarification into bagasse washing.	Bagasse wash plant	400M <sup>3</sup> /Hr
13.	Reclamation of PM-I & II & Stock back water & reuse of same after clarification for Bagasse washing & WPP Pulp.	Bagasse wash plant	150M <sup>3</sup> /Hr
14.	Reclamation of Chips Washing and chipper back water.	RGP Plant	80M <sup>3</sup> /Hr

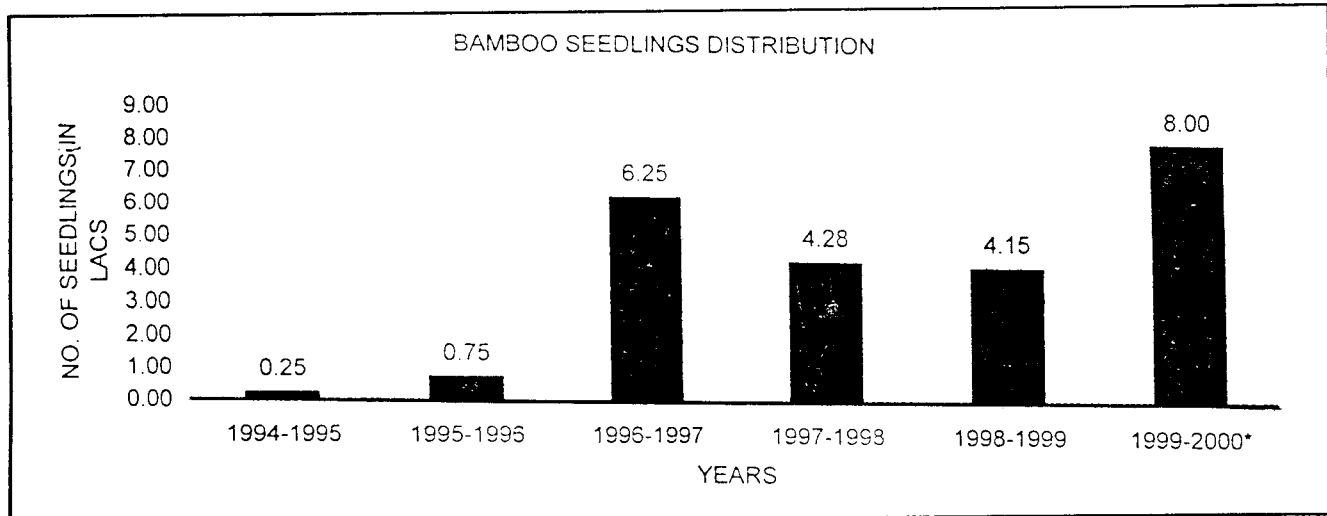




**FIGURE -6**



**FIGURE -7**



- Selection for the Mill visit of delegates under United Nation Environment programme.
- Selection by CPCB/NEERI for conducting studies for formulating MINAS for Pulp and Paper Industry.
- Selection as a 'Model' for Waste Minimisation Audit by CPCB/National Productivity Council.
- Awarded Prize at the India International Trade Fair, New Delhi.
- Inclusion of Waste Minimisation Schemes in the World Bank Data Base.
- Bio Gas Reactor selected as Pioneer Work and

declared Demonstration Project by Ministry of Env. & Forest for granting subsidy of Rs. 66 Lacs under IDBI/ World Bank Scheme.

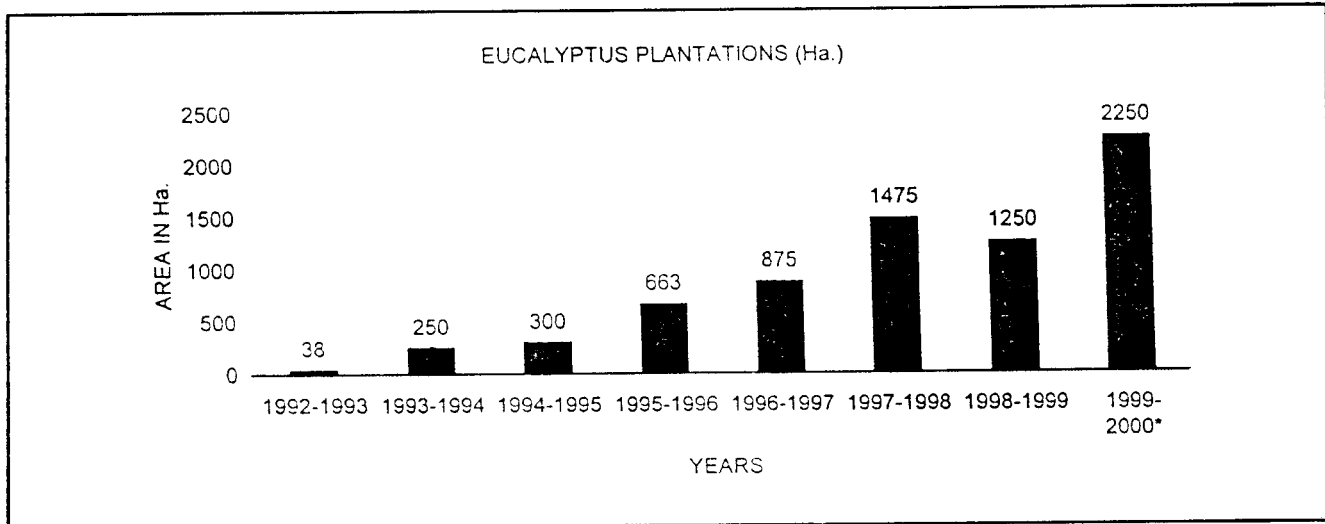
- Selection as 'Model Unit' under USAID by CII for Environmental Management for implementation of ISO-14001.

A schematic flow sheet of Treatment Scheme is shown in Figure -5.

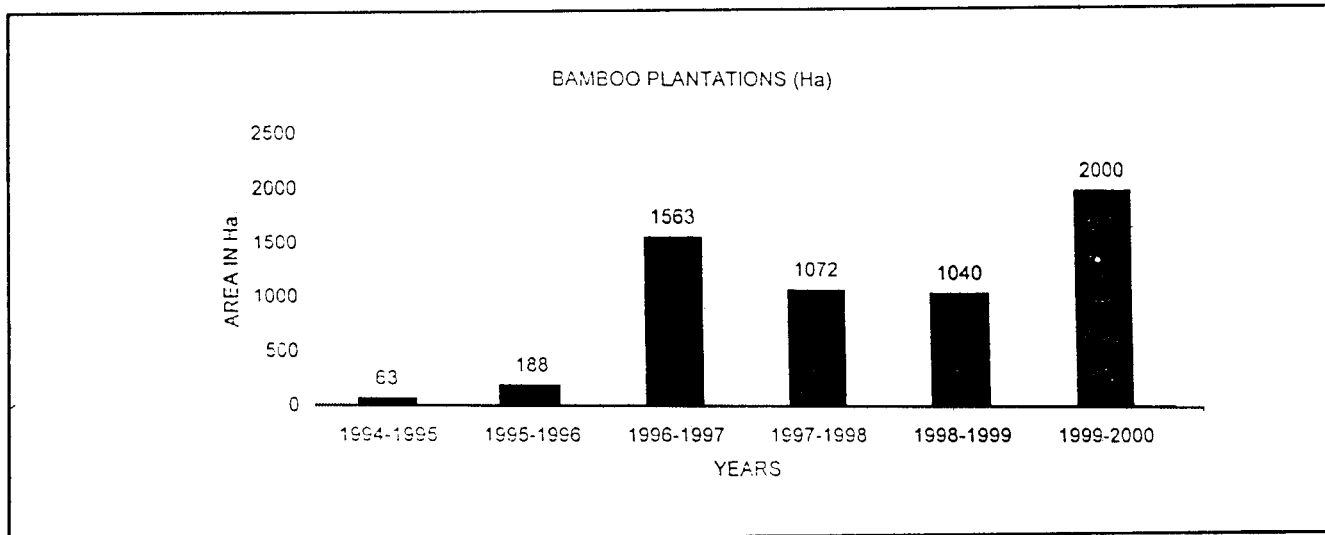
### **SOCIO-FORESTRY/GREEN BELT**

With an objective to propagate plantation towards sustainability, the company has launched the Socio Forestry Programme in Nainital & adjoining districts with help of Private Farmers by distribution of high

**FIGURE -8**



**FIGURE -9**



quality seedlings of Eucalyptus and Bamboo and offering necessary technical guidance.

Century has also made a modest beginning by adopting Clonal Technology for improving the planting stock of Eucalyptus & Bamboo. Three Mist Chambers have been set up for production of ramets under controlled temperature & humidity. About 100 CPTS (candidate plus trees) have been selected for being tested at Lalkua and Lalpur.

The No. of seedlings distributed under the programme are shown in figure no. 6&7.

The area coverage by Eucalyptus and Bamboo Plantation over the past years are shown in figure

no. 8&9.

Lack of vacant land in the catchment area offers a bottleneck for propagating the plantation activities on a larger scale.

Various Plant species including Aromatic Plants have been planted extensively in the colony and ETP areas.

**CONCLUSION**

Company's Green Efforts have yielded great benefits-both tangible and intangible with an overall improvement in efficiency & productivity and a high employee morale. Waste Minimisation and a proactive

approach towards a systematic Environmental Management can improve the bottomline of a company's profitability. With the focus shifting sharply towards clean & green operations, it has become imperative that the industry adopts such systems, integrate into the overall operations and continually improve upon the same; based on the technological upgradation.

### **ACKNOWLEDGEMENTS**

The authors express their gratitude to the Management of Century Pulp And Paper for their guidance and permission to present the Paper at IPPTA seminar. All the help offered by Mr. V.S. Yadav and Mr. P.K. Srivastava during preparation of the Paper is gratefully acknowledged.

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