CHAPTER 10

SUMMARY AND CONCLUSION

Tanning industry has attracted severe and critical scrutiny in the last few years on account of National and International concerns for environmental protection. The industry was left with very little time to cope with the landmark judgement handed out by the highest judicial forum in the country upholding the polluter pays principle. The tanning industry had also to cope with the ban imposed by western countries on environmentally harmful substances such as benzidine azo dyes, PCP etc. The industry has to gear up to meet the stringent requirements specified by the importing countries and by individual importers in the form of eco labels and eco marks. All these pressures have led the leather industry in the country through a series of rapid changes in the past five years.

The various initiatives in this direction may be grouped into two parts. The first part of measures relates to improvements in the treatment of effluents from the tanneries and the CETPs are major initiatives in this sphere. Improved treatment technologies have also been experimented and recommended based on the efficacy. The second part of the initiatives relates to the introduction of cleaner process technologies to reduce the pollution load. A number of such cleaner technology options have been evaluated during the study and recommended for adoption.
The major conclusions and recommendations are summarised as follows:

1. Review of the working of the CETPs indicates mismatch between the planned capacities and the effluents collected at the plant during operation. This leads to either non-attainment of treatment standards or excessive operational cost. To avoid such problems for the newly developed industrial complexes the CETP system needs to be planned on modular basis.

2. For selection of treatment plant site and treatment technology, study on techno-economic aspects including topography, capital investment, final mode of disposal of treated effluent, operation and maintenance cost, land requirement, availability of skilled manpower and influence of the treatment cost on the production of leather is necessary.

3. Cost sharing among the units attached to the CETP should be based on pollution load, which will induce adoption of cleaner process technologies.

4. Financial audit for the CETP is essential with a view to introduce effective monitoring system, focussing on the quantum of inputs such as chemicals relating it to the quality of the effluents collected into the CETP.

5. Preventive maintenance is one aspect, which needs to be introduced in the management of CETPs to avoid breakdowns. CETP maintenance shall include proper plan and schedule of the operations of the physico chemical and biological units and
proper plan for preventive maintenance, breakdown maintenance, overall maintenance and reconditioning.

6. Management of the CETPs should be entrusted to technically competent persons.

7. Government may consider supporting efforts towards upgradation of the CETPs wherever required.

8. The technology options available for controlling TDS and solid waste management need to be considered for adoption in the tanning sector with commitment of industry and support of government.

9. Suitable financial support mechanism should be formulated to help small-scale seasonal units in the tanning sector.

10. Closed anaerobic units with provision to generate bioenergy such as UASB is preferred to open anaerobic lagoons for the upgradation as well as for new units.

11. Tertiary treatment of activated carbon or reed bed may be considered instead of using chemicals like ferrous sulphate, ferric chloride etc.

12. Through proper chrome management quantity of chromium as \( \text{Cr}^{3+} \) in sludge on dry weight basis can be brought down from the level of 1 to 2% to 0.2 to 0.5%. The reduction of chromium in sludge to less than 0.5% will make the sludge from tannery effluent treatment plants as non-hazardous as per the latest
guidelines of the Ministry of Environment and Forests and the disposal problem can be minimised.

13. Use of treated effluent, with TDS and chloride levels at less than 5000 mg/l and 1000 mg/l respectively, for irrigation of some non-edible plants, is a good possibility. Apart from providing a source of income, such plantations may help the ETP/CETP to reach zero discharge situation.

14. Viable cleaner technologies to reduce the volume of wastewater discharge, TDS, chromium, sulphide and other toxic chemicals may be widely disseminated by providing commercial scale demonstration units and continued training programme through the organisations like CLRI, UNIDO etc.

15. Integrated approach of combined biological treatment for domestic wastewater and tannery wastewater after primary treatment may be explored in urban towns similar to the systems operating in Kanpur and Bangalore.

16. Sea discharge of the treated tannery waste water, which meets standards except for TDS, chlorides and sulphates is a feasible option which can be considered by states like Tamil Nadu.

17. Major R & D efforts are necessary in the area of reducing pollution load, sludge and TDS management and also towards further reduction in water consumption, keeping in view the anticipated water scarcity in the not so distant future. A paradigm shift may even be possible for the tanning industry through path breaking technology innovations rendering tanning more environmental friendly.
The blue print presented in this thesis comprehensively deals with different cleaner technology options and management issues, which may be useful to the industry, to the regulators and to the government in their efforts to promote sustainable growth in this sector.