CHAPTER 6
ROLE OF CENTRAL LEATHER RESEARCH INSTITUTE IN THE DEVELOPMENT OF LEATHER INDUSTRY IN INDIA

6.1 ABOUT CSIR & CLRI

"These are the temples of tomorrow" is a statement by Pandit Jawaharlal Nehru, the first Prime Minister of the Republic of India and the architect of modern India and this was referred to the National Laboratories of the Council of Scientific and Industrial Research (CSIR), the premier industrial research agency that came into being over fifty years ago. As the Prime Minister, Nehru was the President of CSIR and was quite proud of his association with scientists whom he believed were the agents of change (1). The Central Leather Research Institute (CLRI) located at Chennai (formerly Madras) in Tamil Nadu is one in the links in the chain of the national scientific laboratories in India which functions under the CSIR. Coming into existence in 1952, it is the largest among leather research institutes in the world, both in quantum and quality of manpower. CLRI focuses mainly on the development of appropriate technology, building up technically trained manpower and conducting fundamental and applied research. To put it rightly the institute's activity revolves around all kinds of research and development activities that pertain to leather and leather product industry in India. Its principal task is to transform an ancient craft-ridden and traditional trade into a modern technology-driven and progressive leather industry through a constant addition of technological innovations. The specific objectives of CLRI include

→ Performing research of excellence in the relevant areas of biological, chemical, leather technology and engineering services.

→ Development and transfer of appropriate technology for the production of different types of leather, leather products, leather chemicals and equipments for the production of finished leather and leather products.

→ Providing education and training to the students at undergraduate, graduate and postgraduate and doctoral levels as well as to the professionals drawn from the trade and
industry to meet the manpower requirements of the leather industry of India and developing countries.

- Conducting market research and techno-economic surveys for technology planning for leather and allied products industries.
- Rendering technical assistance and consultancy services to the leather industry.
- Collecting and disseminating national and international information on leather and allied industry.
- Transferring technologies to the leather industry which is spread across the length and breadth of the country by extension activities by the Institute as well as through its Regional Centres for Development and Extension established at Mumbai (Bombay), Ahmedabad, Kanpur, Jalandhar and Calcutta. CLRI grid extends not only across the national but through international agencies on the global network. The Institute has links with TNO (The Netherlands), The British Leather Corporation (BLC-UK), SATRA (UK), CTC (France), UNIDO (Vienna), CESECA (Italy) and IRDLAI (Indonesia).

6.2 ORGANISATIONAL STRUCTURE OF CLRI

With regard to organisational set up of CLRI, the following chart illustrates the organisational structure of the institute.

The institute has under its roof 649 scientists, technologists and administrative staff with rich core strength in R&D for leathers and allied areas. Its campus hosts a well-stocked reference library, a museum, a modern auditorium besides a number of other facilities the details of which are given as follows:

6.2.1 TANNERY

The Institute's pilot tannery offers many services to the industry in terms of training to tannery executives on ad-hoc basis for better orientation of leather manufacture, annual retainership facilities, job work on machines, chemical testing for the industry, new processes according to international demands and market are shown to tanners whenever the situation demands it, industry-tannery interaction and assistance in trouble shooting. In addition to all the above, the head of tannery stated that they bring along with them leathers from international fairs, display them, invite tanners to inspect and get briefed on their economics.
and market demands. During the annual Leather Research Industry Get-Together (LERIG), an annual get-together of tanners and leather researchers held in CLRI campus; facilities are offered to those who desire to exhibit and demonstrate new processes and products. In short, CLRI’s pilot tannery is a model tannery where evaluation of chemicals, dyes and biocides is undertaken apart from delivering the above cited benefits.

6.2.2 LEATHER GOODS & LEATHER GARMENTS AREA

This area is known, now, as Centre for Leather Accessories Development (CLAD). It was first set up as a Leather Goods Unit, gift from UNIDO, with modern machines for training students. This was one of the earliest leather goods training centres and was well utilized by the industry. New sections were added later and now it has a leather garments training facility which was started in 1993 on the pattern of the internationally well known French Institutions. From my discussions with this section and after seeing the available facilities, I came to the conclusion that there is tremendous scope for development of leather goods industry, as India is self-sufficient in raw material (finished leather), manpower, infrastructure and skills that can be properly channelised for the benefit of the leather sector and the economy as a whole.

6.2.3 SHOE DESIGN AND DEVELOPMENT CENTRE

Shoe design and development centre of CLRI, came up to give full emphasis to the footwear research and fashion areas. The footwear industry began to take notice of the facilities available at this centre for training, assistance to footwear makers in designing, feedback of latest information, colour forecast from abroad on fashions and other areas. The centre has a sophisticated testing lab with modern machines, CAD/CAM systems and their quick eyes in locating the best in the world markets and acquire them. The testing machines, equipments and tools are available for the students at all levels. Apart from offering training in Pattern making and Designing, cutting and clocking, assembly and stitching, lasting and finishing training courses are also offered in higher areas like operators-cum-supervisory course, M.V.S. (Master of Vocational Science) and M.Tech. in footwear. In addition to all this, there are short term courses ranging from one week to 12 weeks. The experts of this centre often visit units in various parts of India for extending technical help.
6.2.4 POLYMER DIVISION

This division was set up in 1976. As stated by this division, polymers play an important role in leather processing right from tanning to finishing. The division has sophisticated lab and equipments. It appears to me as a high-technology area and the work appears more fundamental. This division has contributed to the development of very essential products to tanners like Polytan. These products as stated are more or less the major card for finished leathers and products manufacturing. It is further stated that polymer research in CLRI can be comparable to similar activities in developed countries. In short, polymers have application in textiles, leather and other industries.

6.2.5 INDUSTRIAL ORGANIC CHEMICALS

This area covers of three main branches: viz. organic chemistry, leather chemicals and synthetic organic chemistry, besides pure and applied research. This lab contributed to the development of newer blends with available tanning materials and utilisation of waste material into valuable products for the industry and has also done considerable work on vegetable and synthetic tanning materials. In addition, the lab undertakes the testing of banned items for their toxic levels. Development of eco-friendly products is one of the major activities of the lab. One of the recent developments in this division as cited, is the black-pigment from waste myrob. It was tested and evaluated and has proved to be an ideal black pigment for leather. The scientists of this division have been offering technical assistance for setting up of an extract plant which is bound to save the country substantial foreign exchange.

6.2.6 BIO-SCIENCES DIVISION

In this lab, the former byproducts lab and many other subjects have all been clubbed together under this division. There are four areas, viz. Bio-products, Bio-materials, Collagen and Bio-technology. This division is very important as it deals with the various uses of the carcass recovery products besides research on the most important branch of leather industry - collagen, its structure and uses.

(a) Bio-products Lab

This lab undertakes valuable jobs on utilisation of by-products of animals and has developed technical know-how for many products. The head of this lab stated that if the technology had been marketed by an able salesman, earning in foreign exchange from this
industry alone would have gone up by several millions. Unfortunately, the industry had not come forward to take note of the technologies available here. What is more attractive in this lab. is the “Collagen sheets”, developed by the scientists of CLRI to cover third degree burns. It is stated that such work was done only in India and that too in CLRI while in USA they were based on synthetic material. Another attractive thing was the bio-bone. This is what it said about it. Surgical implant for osseoinduction and osteosynthesis in orthopaedic surgery, maxillofacial surgery and periodontal surgery. This means that it is an implant bone substitute for various types of replacements. Being made from nature it is friendly to humans and the recipe had been cleared by American Hospitals and Orthopaedic surgeons will take note of it.

(b) Biomaterials

In this lab., one gets information on how collagen is used as a biomaterial. It is used to control drug-delivery systems for diabetic patients and can be called as a life prolonger. It can also be used for making heart-valves, for replacing hard tissues and generation of newer ones. They are presently working on collagen as cosmetic materials. The high water binding capacity of collagen resulting in moisturizing effect in skin cream helps skin appearance to a great extent. In this, collagen helps to make a good shampoo. By using this product the hair becomes soft, smooth, lustrous, glossy, easy to comb, free from static electricity when dry and above all they impart substantively to the hair. The following list supplied by this division shows by-products and their applications in drugs, medicines, replacements and other areas.

Biomaterials based on natural and synthetic macro-molecules

Drug delivery systems

- Collagen - Anti cancer drug conjugates
- Collagen - poly(HEMA) hydrogels cancer chemotherapy
- Gelatin Microspheres
- Collagen films (Glaucoma)
- Collagen-Kanamycin conjugates (Tuberculosis)
- Collagen-Liposomal composites (Leprosy)
• Collagen-Synthetic polymer hybrids (Contraception)
• Collagen-Polymer composites (Protein and Peptide drugs)
• Transfer delivery systems (Hypertension)

**Soft and Hard Tissue Replacements**

**Soft Tissue Replacement**

• Vascular prosthetic materials (Reinforcement of umbilical cord vein with synthetic polymers)
• Hard valves (Regulation of Biomineralization)
• Burn and wound cover dressings (Collagen sheet, modified human placenta for infection free wound healing)

**Hard Tissue Replacement**

• Osteogenic and bone filling materials (collagen-hydroxyapatite composites containing anti-bacterial agents for infected bone fractures)
• Trachea repair and regeneration (collagen-hydroxyapatite composites)
• Chemoembolization (Microspheres, hydrogels)
• Hemoperfusion (Polymer coated activated charcoal column)
• Antithrombogenic surfaces (Haparin grafting onto the material surface)
• Immobilization of therapeutic enzymes (streptokinase, urease and trypsin)

(c) **Collagen**

It is said that wonder material can be obtained out of hides and skins, which helps in variety of products which can be produced with collagen as the base. It is explained that this material is a human friendly material and in whatever form we use it, it can only help and create no side effects. One of the important discovery of this lab. is the culture of collagen for sheets to cover third degree burns. This work as explained by this lab. was a very difficult job but the able scientists of CLRI have done it with success.

(d) **Bio-physics**

This lab. is equipped with facilities for electron-microscopy studies. In this division, bio-physical studies on collagen and leather are undertaken. This lab. concentrates mostly on
the fundamentals of collagen structure. The application of collagen crosslinking is for biomedical use.

6.2.7 PROCESS DEVELOPMENT AND DESIGN

This section gives concrete shapes to process technologies in the form of designing and development of any project, e.g. a tannery with various production capacities, a chemical plant or whatever may be in those lines, this section helps in giving a reject to proceed with the construction. It appears that nothing is impossible in this section as it is fully equipped with able scientists, sophisticated instruments and computers but it is a question as to how far the industry is fully aware of the facilities available for utilization. This section has done wonderful work in designing treatment plants for tannery waste water.

6.2.8 CHEMICAL ENGINEERING DIVISION

Also, this division is fully equipped with very many modern equipments and computers. It concentrates mainly on industrial safety methods, risk analysis factors and related subjects. It teaches us how and why an equipment reaches the bursting point and what safeguards one has to provide for.

6.2.9 PILOT PLANT

This plant is a compact plant set up for production of tanning extracts for evaluation. This plant used to supply hide-powder for tannin extract manufacturers. Though it is not a cost-oriented project, its manufacture was limited only to CLRI. This plant developed products on bench scale level and they do scaling up to produce sufficient quantities for bulk tests. They had offered production facilities for developing fatliquors (natural), fungicides, pesticides, etc. for sister labs. The recent addition of this plant is the new plant for enzymatic unhairing. This test house is indeed a very useful facility for manufacturers of tanning materials, leather chemicals etc.

6.2.10 LEATHER MISSION

The Leather Mission is concerned with enriching already available technology and helping the industry to utilize the valuable reservoir for its various activities. The Leather Mission has been widely publicised and its activities are familiar to one and all. It has a budget and it is wise to the philosophy that anything given free has very little value. Therefore, the Mission invites user bodies to contribute a share of the project. The Mission
has a team to plan and finalise projects. It employs competent engineering force to execute and monitor progress with keen eyes.

6.2.11 ECONOMICS RESEARCH DIVISION

This division was started in 1961 with the following objectives:

- To provide authentic and reliable data/information base for leather and allied industries.
- Analysis, interpretation and preparation of action plans and blue prints for the development of leather industry.
- Execution of techno-economic and socio-economic studies
- Preparation of feasibility reports for setting up of production units
- Conducting of overseas market intelligence studies and assessing the scope for exports.
- Preparation of plan documents on leather and allied industries to serve as basis for policy makers.

This division, right from its inception is served with competent team of social scientists comprising economists, statisticians and sociologists. The scientists of this group have undertaken a number of consultancy and sponsored projects on the development of leather and leather based industries. These projects are carried out in association with leather technologists, leather product specialists and chemical engineers. The group of Economics Research Division has close coordination and cooperation with the concerned departments within CLRI and also established contacts with institutions like Gokhale Institute of Economics, Pune, Central Food Technological Research Institute, Mysore, the Indian Institute of Chemical Technology, Hyderabad. Apart from successfully completing a number of projects, sponsored and funded by various developmental organisations like the Council for Leather Exports, All India Skin and Hide Tanners and Merchants Association, Small Industries Development Bank of India, State Bank of India, Industrial Development Bank of India, Leather Technology Mission and the industry in general.

This division has to its credit delivered prestigious projects of National and International importance at the instance of the Ministry of Commerce, Govt. of India and the
concerned States Industries Departments, State Leather Development Corporations and Khadi and Village Industries Commission. Similarly, the Economics Research Division has successfully completed research projects coordinated and funded by International agencies like the International Development Research Centre (IDRC), Canada, University of Amsterdam, The Netherlands, United Nations Industrial Development Organisation (UNIDO).

Here is a section, vital to the industry from where industry can draw necessary statistical data.

6.2.12 EDUCATION AND TRAINING

Center for Human and Organisational Resource Development is a centre in CLRI to train, teach, tutor, mobilise, motivate and manage human resources for the leather industry using the best of methods. The Institute is engaged in education and training ever since its inception in 1953. It is stated that CLRI is the only Institute in the world which offers the type of education and training in various disciplines of leather technology. In the Institute research and training go together leading to B.Tech., M.Tech. and Ph.D. degrees in Leather Technology and also M.Tech. and Ph.D. in Footwear Science and Engineering. In addition to the above, CLRI offers Diploma and Certificate courses in various branches of leather technology. The details of all the courses offered by CLRI are highlighted in Appendices.

CLRI has also been serving as an international training centre for leather and leather products sector for FAO, UNIDO, UNDP, CSC and ITC. Likewise, bilateral arrangements with several developing countries have been made in human resource development through manpower training. Trainees from more than 50 countries in Asia, Africa, Far East, Latin America and the Middle East have participated in this programme (3). In the following part, the achievements of CLRI with respect to education and training will be accounted for.

6.2.13 ENVIRONMENTAL ENGINEERING

This department deals with the problems of tanners on treatment of waste water. It has contributed to leather sector by preparing project reports, suggesting eco-friendly processes and chemicals, offering suitable technology, adopting foreign technology to Indian need etc. The major achievements of this department was the chrome recovery and treatment plants designed by the scientists of this department.
6.2.14 INFORMATION SCIENCE, TECHNICAL INFORMATION AND LIAISON, PUBLIC RELATIONS

Each of the above has separate department. Though they are functioning separately, they are all under one umbrella as a model of unity in diversity. Following is the description of each one of them separately.

(a) Information Science

In this department, there are various facilities available, which include a well staffed reference library, xeroxing service, information etc. equipped with sophisticated communication systems like network hooking system.

(b) Technical Information

This department concerned with passing on of technical information, routing enquiries for processing and generally taking charge of arranging press conference, seminars, workshops, liaison with the media and other related activities. This department, in fact, collects material from various labs and coordinates the transfer of technology to the industry. In short, it is an important artery of the Institute which connects CLRI with the industry.

(c) Public Relations

This office does the balancing job at the entrance of the main building of CLRI. This office is also in-charge of transport and guest house. In fact, PRO’s office in any private firm or for that matter in any central government organisation is the entry of other offices.

6.3 ACHIEVEMENTS OF CLRI

The Central Leather Research Institute has helped the leather industry in India directly by offering information, advice and technical guidance through a number of its specialist scientists to the entrepreneurs of leather industry and to the technicians of their units and indirectly by training the technicians themselves. The principle objective of the Institute as stated earlier is to develop the leather industry by developing and transferring technology relating to the manufacture of different types of leathers and the chemicals and machines required in the preparation of finished leathers. The Institute undertakes technical trouble-shooting, trains personnel at all levels, prepares techno-economic and market survey reports relating to leather and leather products and conducts research on the fundamental aspects of leather science. The major contributions of CLRI for the development of leather
industry in India are given in Appendices 6.1 to 6.7 and institutions connected with the leather industry are given in Appendix 6.8.

6.4 CLRI AND THE INDIAN LEATHER INDUSTRY

The Indian leather industry has registered a phenomenal progress with 70% of leather made in the country being exported. The leather industry has registered more than 300-fold increase in its export earnings in the last 50 years. In this achievement, CLRI has played a significant and decisive role by serving as the apex scientific body and training centre for the leather industry. Many milestones have been crossed by the Indian leather industry and CLRI has forever been an enabling force in this eventful journey. Nearly 55% of products of synthetic fatliquors in the country now is based on CLRI technology (2). CLRI has a unique record of transferring a large number of technologies to the industry. The major technologies so far transferred include the following:

1. Technologies for Synthetic Fatliquors (Balmer Lawrie & Co., Chennai)
2. Process know-how package for Phosphorylated Fatliquors (Balmer Lawrie & Co., Chennai)
3. High performance tanning compounds - Alutan and Alcrotan (Balmer Lawrie & Co., Chennai)
4. Comprehensive microprocessor based technology package for modernisation of tannery operations (M.A. Khizar Hussain and Sons, Ranipet, Tamil Nadu).
5. Technology package for high exhaust chrome tanning salt (Golden Chemicals Ltd., Mumbai)
6. Technology package for micro processor controlled leaching of vegetable tannin extract (Rallis India Ltd., Chennai)
7. Process know-how package on Trimethoxybenzoic acid (Silver Hills Pvt. Ltd., Attur, Tamil Nadu)
8. Chrome recovery and reuse technologies (Implemented in more than 100 tanneries).
9. Upflow anaerobic sludge blanket (UASB) reactor for tannery effluent treatment at Kanpur (under the Indo-Dutch Programme).
10. Wet air oxidation method for tannery waste water treatment (Chamundi Leathers, Chennai)

11. Development of high quality shark leather (Bay of Bengal Fisheries Development Programme)

12. Technology on Keratin hydrolysate (retanning and filling agent) (Protechem Industries, Pondicherry).

13. Process know-how for a range of acrylic binders (commercialised by more than 10 companies).

14. Know-how on production of collagen sheets (commercialised by EUCARE).

15. Closed pickle loop for near zero-based waste chrome tanning (Paulbro Leathers, Jalandhar).

16. Enzyme assisted dehairing (Implemented in more than 100 tanneries).

17. Design and development of new models of shoes and leather products and technologies for speciality leather chemicals.

18. Newer techniques for processing and finishing of buffalo splits and lower end of leather into utility speciality leathers.

19. Gait analysis and CAD based footwear designs

20. Technologies for speciality leather chemicals.

In addition to the above, CLRI has gained for India a niche status in fashion forecasting. In Modeurop, the success of Indian fashion colour has been astounding in the last two years. Nearly 20-25% of the colours included among the fashion shades of the Ruope are based on Indian dance themes. CLRI is gaining for India a special passion in the development of new designs in footwear and leather products. It is a journey for the able and strong and CLRI is right in the middle.

CLRI in collaboration with the other organisations representing tanners and exporters, annually organising Tanners Get-Together which latter called as LERIG (Leather Research Industry Get-Together). This event is being held annually for a week during the last week of January and the beginning of first week of February. During this leather week, seminars are arranged in which technical experts, economists and personnel in trade and industry discuss the problems facing the industry and offer solutions. The other important event followed after
the LERIG is the India International Leather Fair, annually organised in Chennai by India Trade Promotion Organisation (ITPO). In this Fair, many foreign buyers and manufacturers of machinery and chemicals in foreign countries visit Madras for participation. During the period, the manufacturers exhibit their machinery and try to contact buyers here; and the foreign buyers come to see the products displayed by the local tanners and makers of leather goods and contact the exporters to finalise the deal.

Luckily, this year 1998, I happened to be in Chennai in connection with the present study and I had got an opportunity to attend both the events. In fact, I was highly impressed by the vital role CLRI played and still continuing to play for the development and further development of leather industry in India. The following are the summary of the two events.

6.5 33rd Leather Research Industry Get-Together (LERIG)

The 33rd Leather Research Industry Get-Together (LERIG), being an annual event, was organised by CLRI to discuss various problems of Indian leather industry and find solutions for them. This year’s event was held from 2-4 February 1998. The theme of which was “Strategic Management for Indian Leather Industry (SMILE). It aimed at providing a forum for the development of a consensus to seek excellence in the Indian leather industry. The programme included group discussions and lectures on cost effective technology, productivity, financing and poster presentations of new results. A panel discussion led by decision makers from the Government and Industry zeroed in on challenges and constraints limiting the value realisation from Indian leather and leather products. The programme of LERIG was divided into various sessions as follows:

(a) Panel Session

This session was organised as a curtain raiser for the LERIG-98. It served as an issue raising forum by the Panelists from three major groups viz. Material and Planning, Production and Technology and Finance and Marketing. They have brought forth some of the issues that could be deliberated during LERIG-98. The important issues raised on each subject are as follows:

To overcome the growing demand-supply gap, augmentation measures that includes better animal husbandry, import of raw material, breeding of exotic species, better utilisation of raw material. Enhancing unit value realisation that includes upgradation of leather and
splits, composite leather, meeting fashion demands, recycling of leathers, quality assurance management systems, better utilisation of Indian strengths to market need for better coordination between product and training sectors and need for rural trade integration. Production and technology which includes productivity issues is it low? If low why? Technology status in India, is it globally competitive? Are we realising its full potential, if not why? What ails? possible changes in 2010 in technology/production status; could we forecast how to approach? India vs. other nations benchmark; which one to adopt Chinese (quantum based) or Italian (quality based); modernisation issues; investment needed in machines, manpower, technology; models for modernisation; estimate for fund needs; innovation chain; how do we set up? how do we foster? how do we capitalise Indian material resource? technology choices for production systems; environmental protection, eco-label/proactive issues; improving technology status, methods; role of agencies like Government, industry and research; Policy support, dereservation, labour policy, fiscal incentives, taxation policy, fund mobilisation support for technology mobilisation; role of CLRI/CLE and industrial association, role of training bodies; mechanism of strategic management for technology/production systems; actions needed to match Indian technology with the world; best organisation models, mass vs. fashion, sizing of production systems; specialisation for value addition, professionalism/mind-set/institutional support for technology, skill and technique vs. knowledge and technology, core competence matching; finance and control.

Finance and marketing: This includes better inventory control just in time, fund requirement for modernisation/expansion, cost control professionalism, focused market, brand building, value driven vs. value disciplined markets and selling vs. marketing.

Based on the above views, issues for the brainstorming sessions to be held on 4th Feb. 98 for evolving action plan were identified. They were, selection of models - Chinese vs. Italian. Strengthening indigenous raw material base vs. importing higher quality leathers for bridging demand-supply gap. A comprehensive National Data on quality differentiated material resource position for the leather sector. Relative importance of domestic vs. imported market. Management models based on family vs. professionalism. Job work vs. marketing culture. Reasons and solutions for shortage of finance. Fund needs for
modernisation of hardware technology and mobilisation for working capital. Vertical integration vs. product specialisation, the role and effect of government policies. HRD issues on technology, production management and marketing. Need for operation management and policy research. Need for scientific study and strategic action plan document, integrating all needs of the industry.

(b) Session on Material Management

The panel discussion was followed by the deliberation of issues pertaining to material management in a separate session. While emphasising the issues raised during the panel session, following views also emanated during the presentation and the subsequent deliberations. Modified warehousing policies, need for focused imports, need for raw material knowledge base at national and international level, CLRI and CLE to jointly develop, need for list of accredited supplies, need for objective grading and need to prevent degradation.

(c) Session on Production Management

The issues emerged during the session on production management are: need for scientific assessment and constraints by an operation research team and setting up of model units, focus on equity foreign collaboration, sharing of best practices, men, machines and management - a wholistic approach, need for engineering the environment.

(d) Poster Presentation and Exhibition

The poster session and exhibition included 19 poster presentations and 6 industrial exhibits highlighting recent technology development for the benefit of the industry. That was the end of the first day of LERIG-98.

The second day began with the B.M.Das Memorial Lecture delivered by Dr. R.A. Mashelkar, Director General, Council of Scientific and Industrial Research. He spoke on Indian innovation movement and the challenges of the next millennium. He highlighted the various technological revolutions that took place in India during the last 50 years. He termed the advances made on the leather front in the country as a brown revolution.

(e) Session on Technology Management

The summary of views that emerged from the session are: measures for technology management, material management and technology innovation, need for design innovations
in product sector, wider product range, coupling strengths in material resources with production and business management and tools to improve unit value realisation, technology improvisation and better resource utilisation.

(f) **Session on Innovation**

The points that emerged from this session include education vs. innovation, technology status vs time and the management and water management - vital issues for future.

(g) **Session on Finance Management**

The various points that have emerged during the deliberations include better working capital management, bridge loans by banks to overcome short term problems, Leather Bond scheme to generate funds, conversion of firms to limited concerns, separate norms by banks/financial institutions for leather industry and modification in primary and collateral security requirement.

(h) **Session on Change**

The third day programmes of LERIG commenced with a session on “Change” featuring a lecture on the changing options on environmental management delivered by Programme Coordinator of UNIDO.

(i) **Session on Marketing**

The second session on the day was on marketing management. The issues raised were - change of government policy, need to supply products as per market demand, lack of competence in challenging mass production systems, need to encourage domestic market and season oriented marketing practices.

(j) **Tanners Forum**

It was an important event of LERIG-98 in which the leading industry representatives participated. Elucidation of views of the industry giving future directions for the institute activities formed the major objective of this forum. The salient outcome of the forum are need for better upgradation of technologies, technological guidance for appropriate modernisation of tanneries and modernisation inputs for process equipment and material handling systems.
Brain Storming Session

The three days deliberations on various issues were given focus during the brain storming session which had panelists drawn from various sects of industry, policy makers, trade associations, representative and media. The views summed up in this session were - CLE along with CLRI to go for detailed survey on raw material availability, quality including international resources and present the same in the form of a data base within one year time period, data base on human resource availability for the entire leather sector, amendments to taxation policies on finished leathers and machineries for modernisation/upgradation, development of appropriate organisation models most suited for Indian leather sector leading to a brown (leather) revolution and to take inputs from the society, institutions and industry, incorporation of professionalism in leather sector management and changes to lending norms to facilitate working capital management. In the end, it was decided to bring out consensus action plan based on the recommendations derived from the session. A statement of SMILE 98 was placed and voted unanimously. The LERIG-98 came to an end with the unique function “At Home”, at CLRI campus.

6.6 13TH INDIA INTERNATIONAL LEATHER FAIR, 1998

The Thirteenth India International Leather Fair (IILF, 1998), India’s premier Leather Show was held at Chennai from 5th to 9th February 1998. It was organised by India Trade Promotion Organisation (ITPO) and co-sponsored by the Council for Leather Exports and featuring Germany as the partner country. The Inaugural Function of the Fair heard the announcement that 14 out of 20 colours chosen by the Modeurop Congress in Germany last week for the Summer-Spring seasons of 1999 came from India. A total of 119 colours made by 10 tanneries were presented by India in the congress. The Fair regarded as a mirror reflecting the growth and diversification of the leather industry in India as well as the latest technologies available the world over. The participation at IILF, 98 numbering 345 companies included 100 companies from 30 foreign countries like Australia, Argentina, US, UK, Italy and Japan, apart from the partner country, Germany. The Fair has been grouped into various specialised sections including “Techno Town”, encompassing all kinds of machineries and chemicals, “Foot Hills” covering shoes and shoe components, “Apparel Avenue” focussing on leather garments, “Fashion Avenue” displaying leather goods.
accessories besides projecting the trends in the fashion industry and "Hide Park" highlighting the finished leathers. Over 20,000 business visitors as stated by ITPO have visited the Fair. The participants felt that the participation from abroad was inadequate. But the Fair was successful in conveying the advances made in the Indian leather industry to the world.

6.7 CONCLUDING REMARKS

The development of the Indian leather sector from a mere trade in raw hides and skins at the time of Independence to the fourth largest foreign exchange earner for the national economy is indeed legendary. As evident from the above cited achievements, the role of CLRI, of course, in effecting this progressive growth of the leather has been traceable and tangible. CLRI has been able to provide support of critical/innovative technologies leading to the development of expertise and human resources through direct role in education and training not only in India but also in many other developing countries, in addition to its assistance in evolving supportive technology, policies. Thus, it can be concluded that CLRI has had a very interesting and useful part that is reflected in its direct and indirect contributions to the development of leather industry in India. But, still it has a challenging role to play in shaping and figuring out a bright future to Indian leather industry in order to take its due position in the global map of leather industry. It is for the industry to fully realise the benefits it can get from CLRI and should be aware of the strengths and its intention to help.

REFERENCES

2. Ibid, p.11
5. Ibid, p.257.
8. Note: Major information/data used in the write up of this Chapter have been collected directly from various Departments/Divisions of CLRI.