

**CENTRE FOR SCIENCE & TECHNOLOGY OF THE NON-ALIGNED AND  
OTHER DEVELOPING COUNTRIES  
(NAM S&T CENTRE)**

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**INTERNATIONAL TRAINING WORKSHOP  
ON  
DEVELOPING KEY PARAMETERS FOR ENSURING SUSTAINABILITY  
OF LEATHER SECTOR IN DEVELOPING COUNTRIES**

**ORGANISED BY**

**NAM S&T CENTRE, NEW DELHI  
&  
CSIR-CENTRAL LEATHER RESEARCH INSTITUTE (CLRI), CHENNAI**

**28-31 JANUARY 2019  
CHENNAI, INDIA**

**BRIEF REPORT**

The leather is a major component of a chain of activities, starting from dead animal to value-added consumer products. Ecological and environmental concerns associated with the water and energy consumption during leather processing, the economic benefits and social empowerment provided by this industry are closely linked. Sustainability today is thus an important issue for this sector. The leather sector is innovating by way of new products, processes and end-of-pipe treatment systems, while maximizing raw material to product turnover. A basket of technology is available for each stage of leather processing. The best way forward would be developing country-specific key parameters for ensuring sustainability of the leather sector.

In order to focus on the above issues, the *Centre for Science & Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre), New Delhi* jointly with the *CSIR-Central Leather Research Institute, Chennai, India* organised an **International Training Workshop** on “**Developing Key Parameters for Ensuring Sustainability of Leather Sector in Developing Countries**” in Chennai, India during **28-31 January 2019**.

The four day International Workshop successfully held at the CLRI, Chennai was a dynamic event held with the objective to discuss currently available technologies and methodologies in the Leather Sector and other enablers that would have a positive impact on social, economic, environmental and technological aspects influencing the sustainability of the leather industry in various parts of the world. The participants of the Workshop are actively involved in identifying key challenges towards sustainability of the Leather Sector in their respective countries.

The Inaugural Session commenced with an address to the delegates by **Dr. B. Chandrasekaran**, Director, CLRI, who welcomed the participants and briefly highlighted the importance and growth of Leather Industry in India, and contribution of CLRI towards the Leather Sector, thereby emphasizing on CLRI's association with the developing countries. **Prof. Dr. Arun P. Kulshreshtha**, Director General, NAM S&T Centre, in his address presented the genesis of the event and also briefly described the activities of the NAM S&T Centre, an inter-governmental organisation headed by him. During his address, he also introduced **Dr. Amitava Bandopadhyay**, the Director General (Designate) of the NAM S&T Centre as his successor. **Dr. Amitava Bandopadhyay**, then briefly addressed the delegates, welcoming them for the Workshop. An inspirational address was then made to the audience by **Shri NR Jagannathan**, President, Indian Leather Technologists Association (ILTA) (South) who specified how leather designs and quality can be upgraded to bring out the best, and drew attention by comparing CLRI to a temple of learning and praised CLRI for its significant contributions to Leather Research. **Dr. G. Thyagarajan**, Former Director of CLRI in his address then pointed out about the India Leather Week, 2019 to be held during January 29 – February 3, 2019 and briefly discussed the triple helix structure - Collagen, on which CLRI is currently working upon. The Vote of Thanks was delivered by **Dr. J. Raghava Rao**, Chief Scientist, CLRI, Chennai and Coordinator for the International Training Workshop. The Opening Session concluded with the presentation of the Anga Vastram and an official group photograph.

The participants of the workshop included 68 scientists, experts and professionals from 14 developing countries including Bhutan, Cambodia, Egypt, Ethiopia, Indonesia, Mauritius, Nigeria, Nepal, Palestine, South Africa, Sri Lanka, Zambia, and Zimbabwe and the host country India.

The Overseas participants were from **Bhutan** [**Mr. Tshesum Dawa**, Chief Industries Officer, Ministry of Economic Affairs, Pemagatshel]; **Cambodia** [**Mr. Sokhan Mech**, Director, Sokhandyka Green Co. Ltd., Takhmao] ; **Egypt** [**Dr. Ahmed Nasr**, Associate Professor, Leather Tanning Technology, Desert Research Center, Matariya]; **Indonesia** [**Mr. Niran Raphi Nogaro**, Director, Pt.Esdekatraco, Ged. Cahaya Palmerah, Jakarta; and **Mr. Arifin Kustiawan**, Vice Secretary General, Indonesian Tanners Association, West Java]; **Mauritius** [**Ms. Heista Seeboruth**, Analyst, Ministry of Industry, Commerce and Consumer Protection, Phoenix] ; **Nepal** [**Dr. Bhoj Raj Pant**, Senior Scientific Officer, Nepal Academy of Science and Technology (NAST), Kathmandu]; **Nigeria** [**Dr. Zainab Hammanga**, Director, Investment & Consultancy Department, Raw Materials Research and Development Council (RMRDC), Abuja; **Mr. A.M. Wele**, Deputy Director, Raw Materials Research and Development Council (RMRDC), Abuja; **Dr. Eucharika Ngozi Oparah**, Director General, Nigerian Institute of Leather and Science Technology (NILEST), Zaria; **Dr. Jerry Tagang**, Acting Director, Nigerian Institute of Leather and Science Technology (NILEST), Zaria; and **Mr. Igili Andrew**, Deputy Director, Nigerian Institute of Leather and Science Technology (NILEST), Zaria] ; **Palestine** [**Mr. Mohammed N.Y. Alzatari**, Finisher, Hebron Tanning Leather Factory, Hebron]; **South Africa** [**Ms. Zvikomborero Tangawamira**, Programme Manager, NEPAD SANBio, BioFISA II, Council of Scientific and Industrial Research, Pretoria]; **Sri Lanka** [**Wijesinghe R.D.N.**, Lecturer, Department of Fisheries and Aquaculture, Faculty of Fisheries and Marine Sciences and Technology, University of Ruhuna, Matara]; **Zambia** [**Mrs. Nsama Chilumbu Mataka**, Programme Officer - Promotion, National Science and Technology Council, Lusaka]; and **Zimbabwe** [**Mr. Cosima Togarepi**, Accountant, Ministry of ICT and Cyber Security, Harare].

Further, there were 14 research scholars from the LIDI-Ethiopian twinning program namely, **Mr. Tamiru Albmarshu, Mr. Fanuel Tadasse, Ms. Zinash Mamo, Mr. Bisrat Tesfamichael, Mr. Haftom Girmay, Mr. Simachew Abate, Mr. Shimelis Feleke, Ms. Eden Hailis, Mr. Efrem Eyasu, Mr. W/amanuel W/aferash, Mr. Esinder Yasuwork Ayle, Mr. Hailemariam Tesforn, Mr. Abebaw Debas Birhanie, and Mr. Tesfay Gebrereweris.**

The **Indian participants** included **Dr. Shanmugasundaram G**, Principal Scientist, CSIR-CLRI, Chennai; **Dr. P Thanikaivelan**, Principal Scientist, Advanced Materials Laboratory, CSIR-CLRI, Chennai; **Dr. B Madhan**, Scientist, Honorary Faculty, Anna University, Centre for Academic and Research Excellence (CARE), CSIR-CLRI, Chennai; **Dr. S. Swarnalatha**, Scientist, Environmental Science and Engineering, CSIR-CLRI, Chennai; **Mrs. B. Kanimozhi**, Scientist, CSIR-CLRI, Chennai; **Dr. J. Mahesh Kumar**, Principal Scientist, Honorary Faculty, Anna University, Centre for Academic and Research Excellence (CARE), CSIR-CLRI, Chennai; **Dr. Bindiya Sahu**, Scientist, Honorary Faculty, Anna University, Centre for Academic and Research Excellence (CARE), CSIR-CLRI, Chennai; **Ms. Aafiya Tarannum**, Research Scholar, CSIR-CLRI, Chennai; **Mr. Reganath Rao**, Research Scholar, CSIR-CLRI, Chennai; **Mr. P. Balasundaran**, Research Scholar, CSIR-CLRI, Chennai; **Mr. P. Yuvaraj**, Research Scholar, CSIR-CLRI, Chennai; **Dr. N Nishad Fathima**, Principal Scientist, Inorganic and Physical Chemistry, Honorary Faculty, Anna University; **Dr. K. J. Sreeram**, Senior Principal Scientist, & Head, CLRI-Centre for Analysis, Testing, Evaluation & Reporting Services (CLRI-CATERS), Chennai; **Ms. Vimudha M**, Research Scholar, CSIR-CLRI, Chennai; **Ms. Naisini Ariram**, Research Scholar, CSIR-CLRI, Chennai; **Ms. Sharmila Selvaraju**, Research Scholar, CSIR-CLRI, Chennai; **Mr. Sathish Murali**, Research Scholar, CSIR-CLRI, Chennai; **Mr. Jaya Prakash A**, Research Scholar, CSIR-CLRI, Chennai; **Ms. Sathya Ramalingam**, Research Scholar, CSIR-CLRI, Chennai; **Ms. Pratyasha Barooah**, Research Associate, NAM S&T Centre, Delhi; and **Ms. Gloria Susan Cherian**, Research Associate, NAM S&T Centre, Delhi. The lead speakers and guests included **Dr. P Saravanan**, Chief Scientist, Leather Processing, CSIR-CLRI, Chennai; **Dr. N. K. Chandrababu**, Chief Scientist & Cluster Chairman, Leather Process Technology Division, CSIR-CLRI, Chennai; **Dr. B N Das**, Chief Scientist, CSIR-CLRI, Chennai; **Dr. S. Rajamani**, Chairman, Asian International Union of Environment (AIUE) Commission, Chennai; **Dr. T. Ramasami**, Former Secretary, Department of Science and Technology (DST); **Shri N R Jagannathan**, President, ILTA (South), Gandhinagar, Chennai; **Dr. Thyagarajan**, Scientist, Chemical and Biological Pilot Plants, CSIR-CLRI, Chennai; **Mr. Bogale Feleke**, Director General, Ethiopian Leather Industry Development Institute (LIDI), Ethiopia; **Dr. B. Chandrasekaran**, Director, CSIR-CLRI, Adyar, Chennai; and **Dr. J. Raghava Rao**, Chief Scientist, Chemical Laboratory, CSIR-CLRI, Adyar, Chennai. The NAM S&T Centre was represented during the Workshop by **Prof. Dr. Arun P. Kulshreshtha**, Director General and **Dr. Amitava Bandopadhyay**, Director General (Designate).

The overall programme of the Workshop was conducted in a total of *six Technical Sessions*, as below:

**Technical Session-1** was chaired by Dr. Eucharia Ngozi Oparah [NIGERIA] and co-chaired by Dr. P Saravanan [INDIA]. Dr. P Saravanan was the lead speaker for this session who talked about the '**Concept of Sustainability**'. The scientific papers presented in this session were on '*Applying Simple Chemical Treatments to Increase Chromium Utilization in Leather Tanning Process*' by Dr. Ahmed Nasr [EGYPT]; '*Sustaining the Small Scale Leather Industry towards Environmental Harmony*' by Mr. Arifin Kustiawan [INDONESIA]; '*Sustainability in Tanning*

*Sector*’ by Mr. Niran Raphi Nogaró [INDONESIA]; *The Cottage and Small Industries (CSIs) in Bhutan*’ by Mr. Tshesum Dawa [BHUTAN]; *Sustainability in Curing of Hides/skins*’ by Mr. M Sathish [INDIA] and *Biotechnology: A Pathway to Industrial Sustainability in Leather Processing*’ by Ms. Pratyasha Barooah [INDIA].

**Technical Session-2** was chaired by Dr. N. K. Chandrababu, [INDIA] and co-chaired by Mr. Sokhan Mech [CAMBODIA]. Dr. N K Chandrababu was the lead speaker for this session who talked about the **‘Sustainability of Leather Processing Industries’**. The scientific papers presented in this session were *‘Leather Industry in Nepal: An Overview’* by Dr. Bhoj Raj Pant [NEPAL]; *‘Value Addition to Leather through Smart Chemicals’* by Mr. A Jayaprakash [INDIA]; *‘Emergence of the First National Leather and Leather Products Policy in Nigeria: Its Implication for the Leather Sector in Nigeria’* by Mr. Igili Andrew and Mrs. Eucharia Ngozi Oparah [NIGERIA]; and *‘Biodegradation of Tannin from Tannery Effluents’* by Ms. Gloria Susan Cherian [INDIA].

**Technical Session-3** was chaired by Dr. B N Das [INDIA] and co-chaired by Dr. Ahmed Nasr [EGYPT]. Dr. B N Das was the lead speaker for this session who talked about the **‘New technologies, trends and innovations in Footwear’**. The scientific papers presented in this session were *‘Multi Functional Chemicals for Sustainability in Post Tanning’* by Ms. R Sathya [INDIA]; *‘Science and Technological Development in Cambodia’* by Mr. Sokhan Mech [CAMBODIA]; *‘Overview of the National Leather and Leather Products Policy of Nigeria’* by Mr. A.M. Wele [NIGERIA]; *‘Status of the Leather Industry In Zambia’* by Mrs. Nsama Chilumbu Mataka [ZAMBIA]; and *‘Factors Affecting Performance of the Leather Industries in Zimbabwe’* by Mr. Cosima Togarepi [ZIMBABWE].

**Technical Session-4** was chaired by Dr. S. Rajamani [INDIA] and co-chaired by Ms. Zvikomborero Tangawamira [SOUTH AFRICA]. Dr. S. Rajamani was the lead speaker for this session who talked about the **‘Environmental Sustainability’**. The scientific papers presented in this session were *‘The Development and Production of Bagaruwa Tannin Extracts for The Nigerian Leather Industry’* by Dr. Zainab Hammanga [NIGERIA]; *‘Industrialization of the Leather in South Africa and the SADC Region’* by Ms. Zvikomborero Tangawamira [SOUTH AFRICA]; *‘Situational Analysis of Leather and Leather Products Sector in Mauritius’* by Ms. Heista Seeboruth [MAURITIUS]; *‘A Green Method to Produce Fish Leather’* by Mrs. Rajapakshage Dilani Nuwandhika Wijesinghe [SRI LANKA]; *‘Utilization of Supercritical CO<sub>2</sub> for Leather Manufacturing’* by Ms A Naisini [INDIA] ; and *‘Synergistic Effect on the Physico-Chemical Properties of Leather Tanned With Caesalpinia Coriaria And Parkia Clappertoniana’* by Dr. Jerry Tagang and Mrs. Eucharia Ngozi Oparah [NIGERIA].

**Technical Session-5** was chaired by Mr. Arifin Kustiawan, [INDONESIA] and co-chaired by J. Raghava Rao [INDIA]. Dr. J. Raghava Rao was the lead speaker for this session who talked about the **‘Best Available Technologies for Leather Manufacturing Sector’**. The scientific papers presented in this session were *‘Sustainability Metrics’* by Dr. K. J. Sreeram [INDIA]; *‘Natural Biopolymers for Leather’* by Ms. S Sharmila [INDIA]; *‘Bioplastics from Tannery Waste’* by Ms. M Vimudha [INDIA]; and finally Dr. B Madhan [INDIA] concluded the session informing the audience on *‘International Training Programmes in CLRI’*.

**Technical Session-6** was chaired by Shri NR Jagannathan, President, ILTA (South). In this session Dr. T Ramasami, Former Secretary, DST, delivered a Popular Lecture on **‘Leather : In Sustainable Earth’**.

A short visit was organized on the second day of the Workshop to Pallavaram Tanners Industrial Effluent Treatment Company, and Leather Processing and Manufacturing Units in Chromepet, Chennai. The participants also attended the 52nd Leather Research Industry Get-together and were also taken around the CSIR-CLRI Campus to learn about the various R&D activities undertaken by CLRI and various processes and technologies being developed in the Institute.

The Concluding Session was chaired by **Prof. Dr. Arun P. Kulshreshtha**, DG, NAM S&T Centre and Co-Chaired by **Dr B. Chandrasekaran**, Director, CSIR-CLRI. Extensive discussions were held during this session on the draft Chennai Resolution on '**Developing Key Parameters for Ensuring Sustainability of Leather Sector in Developing Countries**' after which the Resolution was unanimously adopted by the participants for its submission to the concerned ministries, agencies and other authorities in their countries. The Certificates of Participation were then handed over to the participants for the successful completion of the Workshop.

During the Concluding Session, Dr. B. Chandrasekharan, Director, CSIR-CLRI informed the participants that on February 1, 2019, Prof. Arun P. Kulshreshtha, Director General, NAM S&T Centre will hand over the charge of the NAM S&T Centre to Dr. Amitava Bandopadhyay. He briefly recapitulated the enormous contributions of Prof. Kulshreshtha in building the NAM S&T Centre as a major Inter-Governmental Organisation contributing to South-South Cooperation in Science & Technology. Prof. Kulshreshtha received a standing ovation for his contributions.

The participants expressed their gratitude to the organisers and hosts, NAM S&T Centre and CSIR-CLRI for providing opportunities to the participants of various countries to meet, engage, gain and share knowledge at a common platform, and to foster sustainability of the Leather Sector in the developing countries.

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