



## **UNIDO's Activities in the Leather-based Industry**

With Special Reference to

### **Application of Cleaner Production and Pollution Control**



UNIDO has been dealing with specific problems of the leather industry since its early years, when the organization operated as the *Industrial Development Centre* within the UNITED NATIONS Secretariat in New York. Soon after the establishment of UNIDO (1966) and the setting up of its Headquarters in Vienna (1967), the *Light Industry Section* was organized (1969) and a leather technologist was employed as a staff member responsible for coordinating technical assistance. This was primarily implemented under the United Nations Development Programme (UNDP) funding as part of individual country programmes. Initially, the main focus of UNIDO's interventions was hides and skins improvement, tannery operations upgrade, and establishment and strengthening of leather development centres. The footwear and leather products industries of developing countries gained increasing attention, and in 1971 an additional specialist was employed to look after projects in these parts of the world. The UNIDO leather programme was formulated and implemented through the **Leather Unit, consisting of one to three staff members at the time**, within the *Light Industry Section* (reorganized later as Agro-based Industry Branch, presently operating within the Programme Development and Technical Assistance Department – PTC, Agro-industries and Agri-Business Development Support Branch – AGR, **Agro-industries Technology Unit** – AIT).

The value of technical assistance projects implemented in developing countries in Africa, Asia and Latin America, as well as – though to a limited extent – in centrally planned economy countries (today countries with transitional economy) has been US\$ 80 million, i.e. an average of US\$ 3.81 million/year between 1989 and 2010. These projects have focused on improving capabilities and performance in the collection of hides and skins, in leather processing (tanning), and in the manufacture of footwear and other leather products (such as leather goods, gloves, leather garment, upholstery and sports goods). While these projects were primarily funded by UNDP until the late 1970s, the vast majority of technical assistance has been financed through special purpose contributions offered by UNIDO donor member states during the past two decades.

The four decades of the UNIDO leather-based industry development programme covered the following areas:

- Providing **direct assistance to industrial units** (primarily private, small- and medium-scale enterprises, or SMEs) in evaluating business opportunities, finding or establishing markets (niches), building product ranges, improving production methods and product quality, enhancing productivity, and developing labour and managerial skills.
- **Developing human resources** by:
  - elaborating and implementing comprehensive *professional training systems*;
  - establishing and/or rehabilitating national, (sub)regional and international training-cum-service *institutions*;
  - implementing experts *meetings, workshops, seminars* and special *training courses* in design, technology and management related areas;
  - initiating, organizing and monitoring *cooperation* among training, service and Research & Development centres operating in developing **and** industrialized countries.
- **Environmental protection and pollution control directly related to leather processing and leather products manufacturing through the:**
  - Implementation of cleaner tanning methods such as hair-save unhairing, float recycling and/or chrome recovery, improved efficiency of dyeing and finishing, use of safe chemicals/auxiliaries, reducing salinity etc.
  - Waste minimization and conversion of solid wastes into saleable by-products.
  - Design, construction, and operation of tannery Effluent Treatment Plants (ETPs) with particular emphasis on common, low cost systems for SME clusters (CETPs).
  - Handling and safe disposal of solid wastes and sludge.
  - Promotion of the eco-labelling concept.
- Preparation of **publications** and maintaining **databases** of leather-related marketing and trade, design and product development, technology, pollution control,



information sources and quality requirements, as well as training opportunities.

- Integration of **social aspects** (gender development, occupational health, safety at work) in technical assistance activities.
- Maintain the dialogue with, and support of, the world leather-based industry sub-sector through the **Leather Panel Meetings**.

**The Main features** of the UNIDO Leather Unit's operations since its inception are:

- *technical orientation* in formulation and execution/implementation of assistance programmes addressing problems on the "shop-floor level" and offering *practical* solutions in product development, technology, production control and marketing;
- *integrated programme approach* on the global, sub/regional and national level in addressing the actual needs of developing countries in technical assistance, i.e. providing services dealing not only with the mainstream of the technology, but also giving sufficient attention to the sectoral strategies, (physical and human) infrastructure, support industries, environment protection (including legislation), marketing and management;
- *output orientation* providing visible and measurable results in the assisted production units and institutions;
- *direct involvement of staff members* in projects by performing specific expert's jobs (i.e. working as consultants) as well as authors/lecturers in international scientific meetings, congresses etc;
- *pilot solutions* that bring about the much needed multiplication effect and that are applicable beyond the direct recipients' plants;
- *extensive training* of recipients of TA in different forms: on-the-job, national/regional, workshops, panel discussions;
- *practical technical papers*, manuals, guides, and studies on specific issues in the sector.

### Tannery Pollution Control

Pollution control with special reference to implementation of cleaner technology has been, and continues to be, the main focus of UNIDO's activities in the field of leather processing. **Annex I** provides an overview of [Common] Effluent Treatment Plants ([C]ETP) designed, established and/or upgraded through UNIDO's projects. Cleaner production applications include green hide and skin processing (supply of raw material from slaughterhouses without preservation, i.e. salting), water management (use minimum volume of process water), recycling (e.g. in liming), hair saving (to reduce dissolved solids in effluent) and chromium recovery (after tanning), application of environmentally chemicals (e.g. enzymes) etc. Special attention is also given to occupational health and safety (OHS) in tanneries.

The first project was implemented in a Brazilian R&D institute that specializes in leather technology. There, a pilot ETP was created to study various treatment technologies and to optimize and fine-tune processes to be used in case of different leather processing methods. Tannery pollution control was an important part of the regional leather industry development programme involving 10 East-African countries between 1990 and 2002. A special programme was implemented in eight South-East Asian countries between 1993 and 2002. One of the major results of these programmes is the fact that some developing countries acquired the know-how of tannery pollution control and now provide valuable services locally and to other developing countries as part of the South-South cooperation.



**[Common] Effluent Treatment Plants**  
Designed, Established and/or Upgraded  
through the **UNIDO Leather-based Industry Programme**

PLANT	PLACE/ COUNTRY	VOLUME, <i>m</i> <sup>3</sup> / <i>day</i>	SERVICES PROVIDED	REMARK
Pilot & demonstration plant, Tannery School	Estancia Velha, Brazil	≈ 120	Design, construction, start up & operation	Full treatment, several parallel systems, including DAF, lagooning, trickling filter, membrane filtration etc.
Pilot & demonstration plant, LEATHER DEVELOPMENT CENTRE, KIRDI	Nairobi, Kenya	≈ 10	Design, construction, start up & operation	Mainly for training purpose
ALPHARAMA TANNERY	Athi River, Kenya	= 300	Design for upgrading	
NAKURU TANNERY	Nakuru, Kenya	500	Design and purchase of equipment	Primary treatment
SAGANA TANNERY	Sagana, Kenya	≈ 420	Design, construction, start up & operation	Primary treatment and design of secondary treatment – also served as a training & demonstration plant
BATA TANNERY	Lusaka, Zambia	≈ 180	Rehabilitation/ upgrading	
SINTRAPEL TANNERY	Tete, Mozambique	≈ 100	Design, construction, start up & operation	Full primary and biological system
LIWONDE TANNERY	Liwonde, Malawi	≈ 50	Design, construction, start up & operation	Primary (physical-chemical) treatment only
BURTAN	Bujumbura, Burundi	≈ 100	Upgrading, operation	Primary treatment
MOSHI TANNERY	Moshi, Tanzania	1,000	Design and purchase of equipment	Primary treatment



PLANT	PLACE/ COUNTRY	VOLUME, <i>m</i> <sup>3</sup> / <i>day</i>	SERVICES PROVIDED	REMARK
LAKES TANNERS	Dar-Es-Salaam	500	Design	Primary treatment
AFROTAN	Dar-Es-Salaam	1,000	Design and purchase of equipment	Primary treatment
MOROGORO TANNERY	Morogoro, Tanzania	1,000	Design and purchase of equipment	Primary treatment
MWANZA TANNERY	Mwanza , Tanzania	1,000	Design	Primary Treatment
CETP Kasur	Kasur, Pakistan	= 13,000	Design, equipment, construction, advice in start up	Primary treatment and lagoons
CETP San Benito	San Benito, Columbia	≈ 5,000/ 10,000	Design	Primary treatment
CETP Sukaregang	Garut – Jawa Bart, Indonesia	≈ 300	Design	Full primary and biological treatment (SBR)
GAMBIRAN	Jogyakarta, Indonesia	≈ 100	Design	Full primary and biological treatment
CETP Magetan	Magetan – Est Java, Indonesia	≈ 250	Design	Full primary and biological treatment
(C)ETP Da Chang	Shanghai, China	≈ 8,000	Rehabilitation & upgradation	Full primary and biological treatment
Nanjing	Nanjing, China	≈ 1,400	Upgradation design, operation	Full primary and biological treatment
Xian	Xian, China	≈ 2,400	Upgradation, operation	Full primary and biological treatment
CETP Zablatani, tannery cluster	Damascus, Syria	≈ 5,000	Design	Primary treatment
CETP Pallavaram, tannery cluster	Tamil Nadu, India	≈ 3,000	Design, start up & operation	Full primary and biological treatment
CETP Ranitec, tannery cluster	Ranipet – Tamil Nadu, India	≈ 4,000	Design, some equipment, start up & operation	Full primary and biological treatment



PLANT	PLACE/ COUNTRY	VOLUME, <i>m</i> <sup>3</sup> / <i>day</i>	SERVICES PROVIDED	REMARK
PRESIDENCY KID LEATHER	Kannivakam – Tamil Nadu, India	≈ 120	Upgradation, start up & operation	Full primary and biological treatment; Reed beds
MEERA HUSAIN	Tamil Nadu, India	≈ 60	Up gradation design, some equipment, start up & operation	Full primary and biological (lagooning) treatment
CETP Sidco Ranipet, tannery cluster	Tamil Nadu, India	≈ 2,500	Upgradation	Full primary and biological treatment
CETP Amburtec, tannery cluster	Ambur – Tamil Nadu, India	≈ 2,200	Upgrading, start up & operation	Full primary and biological treatment (oxidation ditches- carrousel)
CETP Vishtec, tannery cluster	Melvisharam – Tamil Nadu, India	≈ 3,400	Upgrading	Full primary and biological treatment; Reed beds
CETP Vanitec, tannery cluster	Vaniyambadi – Tamil Nadu, India	≈ 2,800	Some equipment	Full primary and biological treatment
CETP Kolkata, tannery cluster	Kolkata/Karai danga – West Bengal, India	≈ 5,000/ 30,000	Design	Full primary and biological treatment
CETP Hazaribagh	Hazaribagh – Dhaka, Bangladesh	= 21,600	Design	Full primary and biological treatment
CETP Bata Atha	Bata Atha, Sri Lanka	= 1,500	Design, equipment, start up & operation	Full primary and biological treatment
TAN-ALIZ TANNERY	Ouagadougou, Burkina Faso	≈ 800	Up gradation design, Cr- recovery	Full primary and biological treatment
AWASH TANNERY	Addis Ababa, Ethiopia	≈ 1,000	Design	Primary treatment and Cr-recovery unit
WALLIA TANNERY	Addis Ababa, Ethiopia	1,000	Design and purchase of equipment	Primary treatment
MODJO TANNERY	Modjo, Ethiopia	?	Design, Pilot Plant	Advanced Integrated Wastewater Ponding System



PLANT	PLACE/ COUNTRY	VOLUME, <i>m</i> <sup>3</sup> / <i>day</i>	SERVICES PROVIDED	REMARK
DIRE TANNERY	Addis Ababa, Ethiopia	1,000	Design and purchase of equipment	Primary treatment
ETHIOPIA TANNERY	Addis Ababa, Ethiopia	1500	Rehabilitation and laboratory equipment	Primary and Secondary treatment
DESSIE TANNERY	Dessie, Ethiopia	700	Design and purchase of equipment	Primary Treatment
HAFDE TANNERY	Addis Ababa, Ethiopia	700	Design	Primary Treatment
BLUE NILE TANNERY	Addis Ababa, Ethiopia	500	Design and purchase of equipment	Primary treatment
NAKARA TANNERY	Windhoek, Namibia	1,000	Design and purchase of equipment	Primary Treatment
IMPONENTE TANNERY	Harare, Zimbabwe	1,000	Design and purchase of equipment	Primary Treatment
MASAKA TANNERY	Masaka, Uganda	700	Design	Primary Treatment
UGANDA FISH SKIN TANNERY	Jinja, Uganda	≈ 30	Design	Primary treatment
CETP Birgunj	Birgunj, Nepal	≈ 500	Design, equipment, start up & operation	Primary treatment
NAKURU TANNERY	Nakuru, Kenya	≈ 160	Design	Primary treatment
KEMBE ESTATE	Kembe, Zambia	?	Design	Full primary and biological treatment
D'ANJEVA TANNERY	D'Anjeva, Madagascar	≈ 600	Design	Full primary and biological (lagooning) treatment
TANORTH TANNERY LTD. (TTL)	Sharada Industrial Estate – Kano, Nigeria	≈ 10,00	Conceptual design	Primary treatment
HUFAWA TANNERY (HF)	Sharada – Kano, Nigeria	≈ 2,000	Conceptual design	Primary treatment
UNIQUE LEATHER	Sharada – Kano, Nigeria	≈ 2,700	Conceptual design	Primary treatment
TRENDS VENERATE LTD.	Challawa Industrial Estate – Kano, Nigeria	≈ 600	Conceptual design	Primary treatment
AFRIMPEX	Sharada – Kano, Nigeria	≈ 750	Conceptual design	Primary treatment



PLANT	PLACE/ COUNTRY	VOLUME, <i>m</i> <sup>3</sup> / <i>day</i>	SERVICES PROVIDED	REMARK
FATA TANNING	Kano, Nigeria	≈ 800	Conceptual design	Primary treatment
CETP Industrial Estate (La Zone Industrielle du Cuir)	Grand Tunis – Tunis, Tunisia	≈ 1,500	Conceptual design	Primary treatment



*Tannery treatment plant, Kasur/Pakistan*



*Tannery effluent treatment plant, Ranitec/India*

