

Slovak Cleaner Production Centre

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Environmentally Sound Technology diffusion seen by UNIDO

UNIDO's HOLISTIC AND SECTORAL CP STRATEGY

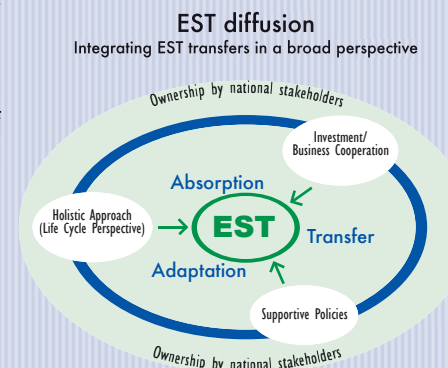
Open trade, international investment flows, information technology and global environmental concerns are the key elements of the current multilateral order. New integrated concepts have to be applied to ensure progressive and environmentally sound development based on private sector-led productivity gains in developing countries and countries with economies in transition. The holistic and sectoral Cleaner Production (CP) strategy of UNIDO aims at providing efficient technical support to those countries and at assisting them in facing the challenges of the 21st century.

The CP strategy has been developed based on the long-standing experience UNIDO has obtained in promoting CP and the reforms UNIDO has undergone during the last years. Since 1992, UNIDO has established National Cleaner Production Centres and Programmes in 30 developing countries and countries with economies in transition. In total the programme has raised over 30 million US\$, more than 60% from the main donor countries Austria and Switzerland. Cooperation with other UN organizations, e.g. UNEP, ILO, has been and will continue to be a major element of UNIDO's Cleaner Production Programme.

It concentrates on improving economy wide productivity in a sustainable manner and enabling developing countries and countries with economies in transition to expand their share in world trade and advance towards social improvement and poverty alleviation.

In order to reach the above mentioned goal, UNIDO's CP strategy focuses on the two areas of intervention where it has a competitive advantage:

- the diffusion of quality and productivity enhancing Environmentally Sound Technologies (ESTs) and
- market access through the fulfilment of the requirements of the international markets thanks to UNIDO's holistic and sectoral CP approach and a combination of CP and related elements (CP and quality, EMS, health and safety, labour and other issues).



THE DIFFUSION OF ENVIRONMENTALLY SOUND TECHNOLOGIES

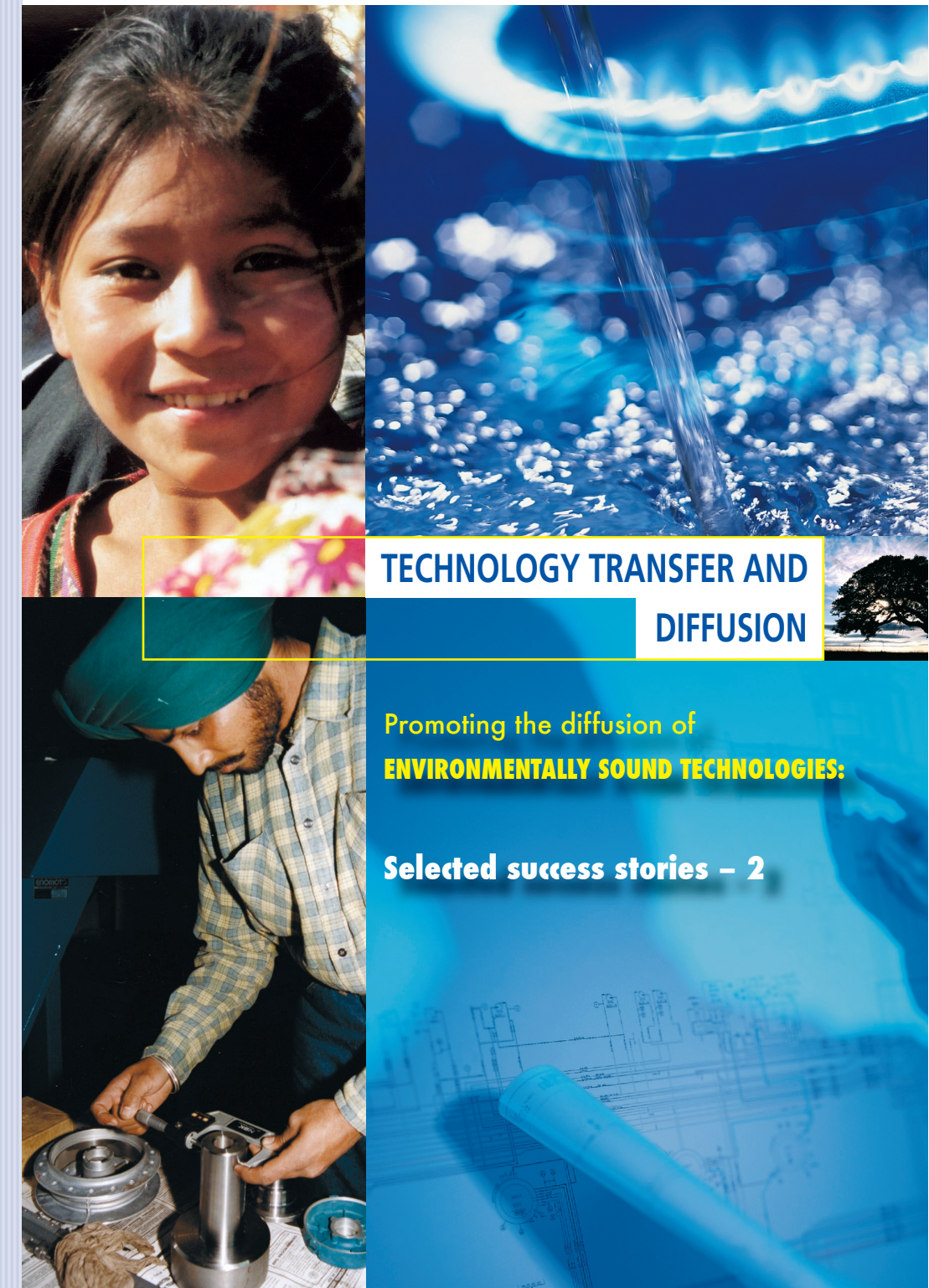
The diffusion of ESTs is a key element for the improvement of productivity in a sustainable manner. It requires the integration of EST transfers in a broad perspective, integrating the following technical, financial and policy dimensions:

- **Life cycle perspective:** the extension of the traditional focus on the improvement of processes to the life cycle approach as developed in UNIDO's holistic and sectoral CP approach;
- **International business cooperation and investment promotion:** the effective transfer of ESTs requires the preparation of bankable investment projects, utilizing either the existing financial mechanisms or supporting the establishment of specific credit lines for EST;
- **Policy advice and technology dissemination:** the existence of incentives and supporting mechanisms is of crucial importance for the diffusion of ESTs. For these mechanisms to reach their maximum effectiveness, country specific Cleaner Production Programmes should be developed through participative mechanisms.

This also includes the integration of EST transfers at company level into a broader sectoral level and the elaboration of **national sector specific CP strategies** by the National Cleaner Production Centres.

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UNIDO CLEANER PRODUCTION PROGRAMME *one step ahead makes a difference*



TECHNOLOGY TRANSFER AND DIFFUSION

Promoting the diffusion of
ENVIRONMENTALLY SOUND TECHNOLOGIES:

Selected success stories – 2



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
economy environment employment



SLOVAKIA

PULP AND PAPER SECTOR

Ms. Viera Fecková

INTRODUCTION

A company, operating in the pulp and paper sector, approached the National Cleaner production Centre (NCPC) in Slovakia in 2001 with the double purpose of maintaining the positive environmental image the company had created and of finding an alternative solution for the high investment required for its wastewater treatment plant. Regulatory bodies were also exerting great pressure on the company to achieve compliance with the future EU regulations and implied liabilities (especially IPPC Directive). In order to reach the goals, the NCPC was asked to support the management of the company in the minimization of its water consumption and in the optimization of the production.



Company site

The project was carried out within the framework of the TEST programme (Transfer of Environmentally Sound Technologies), which is supported by GEF (Global Environment Facility).

TECHNOLOGY SELECTION AND INVESTMENT

Following the initial review, the Cleaner Production (CP) project was implemented. EST (Environmentally Sound Technologies) and BAT (Best Available Techniques) were identified, and BAT requirements were fully specified for the preparation of the investment documents. UNIDO's financial appraisal software tool COMFAR was used for the investment evaluation. In addition, an integrated management system, compliant with the requirements of ISO 14001, ISO 9001 and OHSAS 18001, was established.

The CP assessment focused mainly on the use of sulphur in the pulping section and water pollution and consumption in the cardboard production. The actions taken to address these issues included the following:

- The change of the main process in the pulp mill, with an upgrade of the chemical recovery plant;
- The increase of the capacity of the paper mill, as well as the utilization of recycled paper as one of the main raw materials;
- The upgrading of the wastewater treatment plant.

ACHIEVEMENTS

The implementation of this technology is currently taking place and the achievement of its full operational capacity is expected for 2005.

The total investment of this project will amount to 76 million US\$, with a payback period of two to three years. The first phase of implementation has been entirely funded by the owner of the company (20 million US\$). The NCPC has also been requested to look for possible funding sources for the complete implementation of the project.

The impacts of this investment have been summarized in the following tables:

ENVIRONMENTAL IMPACTS	Before	After
Paper production (t/year)	173,000	300,000
Recovered paper consumption (t/year)	78,000	220,000
Wood consumption (m ³ /year)	265,000	257,000
Total water consumption (,000 m ³ /year)	7,300	4,800
COD in wastewater (kg/t)	56	2.5
BOD in wastewater (kg/t)	28	0.3

Thanks to the actions taken, the increase in production and the reduction of emissions can be achieved without increasing the size of the wastewater treatment plant (WWTP), thereby avoiding additional investment. The investment planned for the WWTP will be spent on adding biological treatment and upgrading the physical status of existing tanks and other technology units.



INDIA

TEXTILE SECTOR

Mr. P.K. Gupta

INTRODUCTION

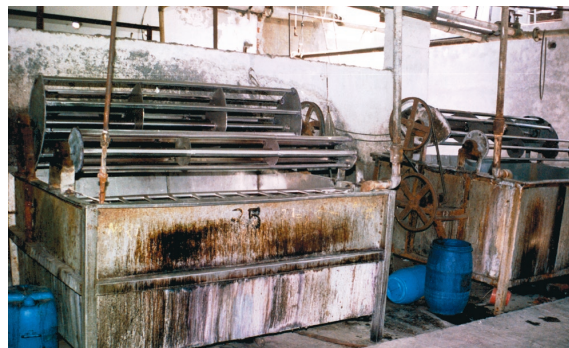
M/s. Sunshine Dyeing (P) Ltd. is a textile company, processing an average of 1,200 tons of cotton knitwear fabric per annum on job order. It is part of a cluster of 60 cotton hosiery processing units located in Ludhiana.

Before the project started, the processing units were under severe environmental pressure due to non-compliance with local water regulations. The pollution load was very high and most of the units had no space for the installation of a wastewater treatment plant, therefore running the risk of closure.

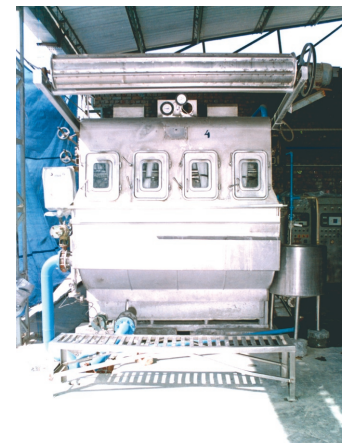
This company was selected in 1996 by the National Cleaner Production Centre (NCPC) India as a demonstration unit in the hosiery sector.

TECHNOLOGY SELECTION AND INVESTMENT

During the Cleaner Production (CP) in-plant assessment, options related to the change of the wet processing technology were evaluated. After a detailed feasibility analysis, M/s. Sunshine Dyeing decided to substitute their winches and cabinet dyeing machines with low and high pressure soft flow jet machines. They purchased and installed three machines, for a total investment of 180,000 US\$ with an overall payback period of 2 1/2 years.



The dyeing units: old (above) and new (right) technology.



The new solar heating system

ACHIEVEMENTS

In addition to the environmental and economic benefits detailed in the following table, the new technology enabled the company to reduce its processing costs and to improve the quality of the product significantly. Moreover, the installation of a smaller sized wastewater treatment plant allowed the company to comply with the local regulations.

	Before	After	Savings (US\$/ton of product)
Water consumption per ton of product	200 m ³	90 m ³	1.1 US\$/ton
Auxiliary chemical consumption	800 kg	500 kg	57 US\$/ton
Steam consumption	3 ton	2 ton	9 US\$/ton
Percentage reprocessing	> 15 %	< 5 %	33 US\$/ton of fabric reprocessed
Cost of water treatment	150 US\$/ton	70 US\$/ton	80 US\$/ton

DIFFUSION OF THE TECHNOLOGY

The equipment was initially imported from Taiwan and Hong Kong SAR, but its high cost was slowing the diffusion of the technology. In 1999, a local equipment manufacturer adapted the technology to the local requirements. This allowed the price to be reduced from 60,000 US\$ to 25,000 US\$.

More than 90% of the units in Ludhiana have now substituted the dyeing technology from winch dyeing to jet dyeing, installing first 60 machines from Taiwan and Hong-Kong SAR and then more than 200 machines from the local supplier.



NICARAGUA

SERVICES SECTOR

Mr. César Barahona

INTRODUCTION

The Cleaner Production Centre (CPC) in Nicaragua established the first contact with the recipient of this Environmentally Sound Technology transfer in May 2001. The company, a hotel in Managua city, can be classified as a medium size enterprise.

The first service delivered by the CPC consisted in a Cleaner Production (CP) in-plant assessment, which identified two main concern areas: energy consumption (190,000 kWh/month) and fuel consumption (39,000 l/year).

The implementation of good housekeeping measures (pipe insulation, valves change, leaking repairs, curtains installation, improvement of rooms isolation, installation of high efficiency lamps) brought a reduction of 7 % in the energy consumption.



The new solar heating system

TECHNOLOGY SELECTION AND INVESTMENT

The most significant results were achieved by changing the water heating system from electrical to solar. Advice was provided to the company in order to identify the type of solar heating system, so that it could be purchased, operated, and maintained within the planned investment budget. The selection of the equipment included an Environmental Analysis of the purchase.

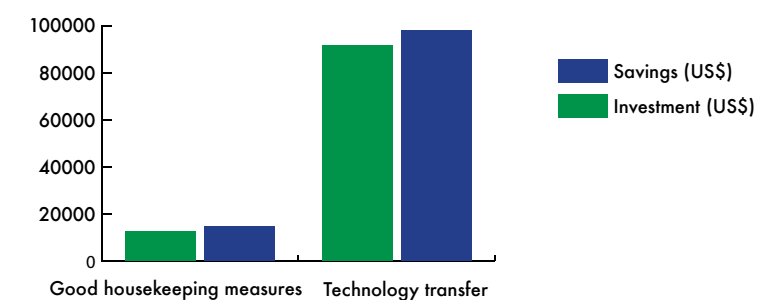
The investment required for this technology transfer from Spain amounted to 91,500 US\$. The consequent savings in energy and fuel consumption have been evaluated at 97,718 US\$ per year resulting in a payback period of approximately one year.

ACHIEVEMENTS

The below graph shows a comparison of the respective investments required and economic benefits achieved by the good housekeeping measures and the technology transfer. Environmental benefits include a reduction in CO₂ emission by an estimated 794 tons.

In addition, the CPC supported the company in the preparation of the financial documents for the loan application. As a consequence, a banking institution granted the capital for this investment with a reduced interest rate of about 9%.

Option	Investment (US\$)	Yearly savings (US\$)	Environmental benefit
Change to solar water heating system	91,500	97,718	-794 tons CO ₂



DIFFUSION OF THE TECHNOLOGY

After this successful implementation the CPC is cooperating with the Clean Developing Mechanism Officer, within the framework of the Kyoto Protocol, for the formulation of a programme promoting the substitution of the heating system in at least 50 more companies.