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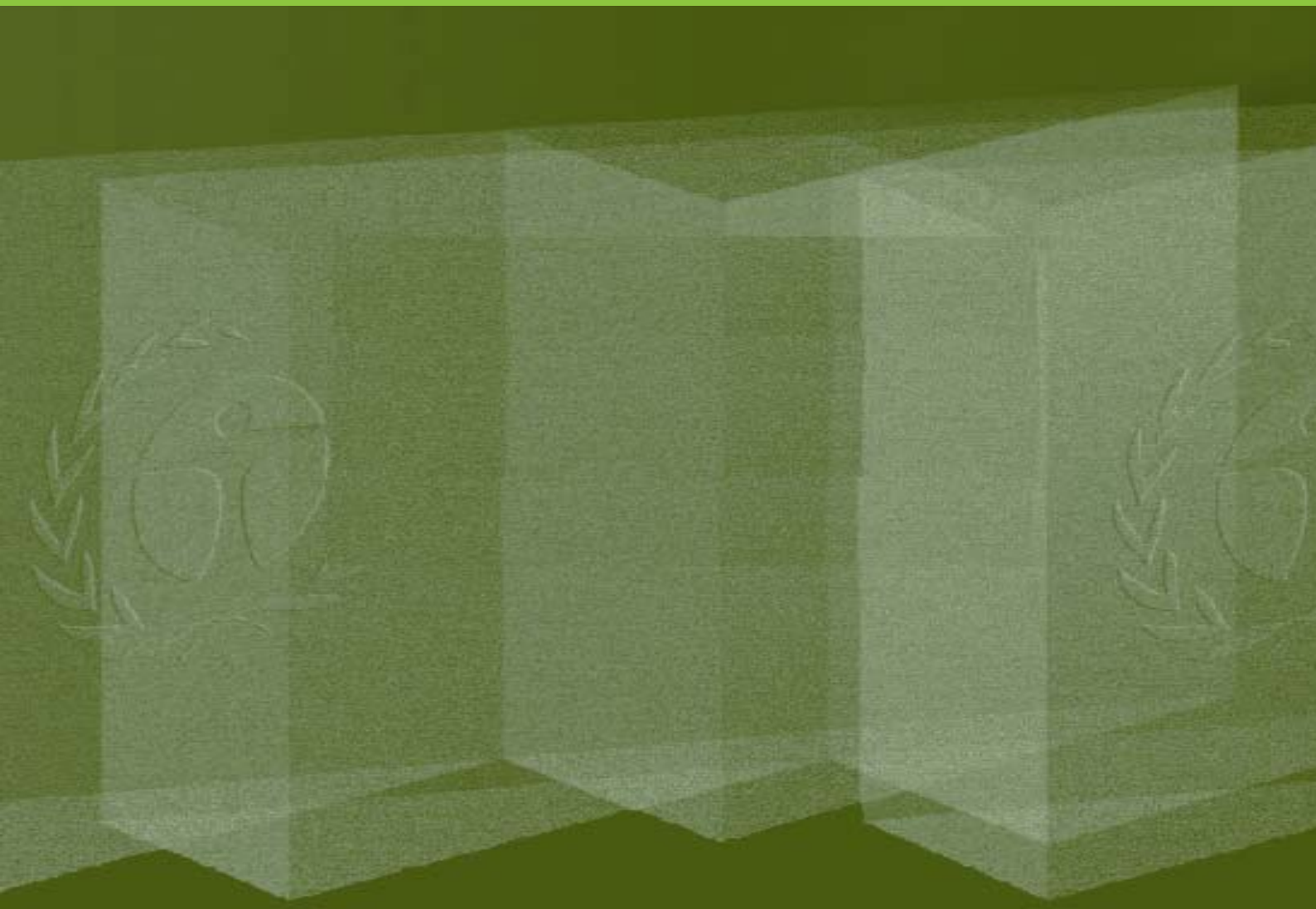

# Internationalising BAT

## Promotion of Best Available Techniques (BAT) in the Textile and Leather Industry in Developing Countries and Emerging Market Economies

Umwelt Bundes Amt
Für Mensch und Umwelt

| TEXTE | 33/2009

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FEDERAL MINISTRY OF THE ENVIRONMENT,
NATURE CONSERVATION AND NUCLEAR SAFETY

Project No. (FKZ) 206 44 301/05
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# Internationalising BAT

## Promotion of Best Available Techniques (BAT) in the Textile and Leather Industry in Developing Countries and Emerging Market Economies

by

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On behalf of the Federal Environment Agency

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| 15. Zusätzliche Angaben | | |

16. Kurzfassung

Im Rahmen des Projekts wurde eine Machbarkeitsstudie vorgenommen, die das Potential untersuchte, das BAT-Konzept in Entwicklungs- und Schwellenländern zu verbreiten. Die Studie fokussierte sich dabei auf die Sektoren Textil- und Lederindustrie und hier wiederum auf die Hauptlieferanten Deutschlands und der EU: auf China, Indien und die Türkei.

Das Vorhaben bestand aus fünf Arbeitspaketen:

- Identifikation von strategischen Partnern für die Anwendung von BAT in der Textil- und Lederindustrie in Entwicklungs- und Schwellenländern (Arbeitspaket I).
- Identifikation notwendiger Schritte zur Verbreitung der BAT (Arbeitspaket II).
- Identifikation von Anreizsystemen und Hindernissen (Arbeitspaket III).
- Erarbeitung eines Konzepts für das Umweltbundesamt zur Verbreitung der BAT der Textil- und Lederindustrie in Entwicklungs- und Schwellenländer (Arbeitspaket IV).
- Die gesamte Umsetzung und Koordinierung des Projekts in enger Zusammenarbeit mit dem Umweltbundesamt (Arbeitspaket V).

17. Schlagwörter

Beste Verfügbare Techniken, Entwicklungsländer, Schwellenländer, Textilindustrie, Lederindustrie, Umweltpolitik, Politikdiffusion, Globale Wertschöpfungsketten

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16. Abstract

In the context of this project, a feasibility study has been performed, which researches the potential for diffusion of the BAT concept in developing countries and emerging market economies. The study has scoped the potential for diffusion of BAT by the example of the textile and leather industry. The focus lies on the main suppliers of the German/European market, which are China, India and Turkey.

The project consisted of five work packages:

- Identification of strategic partners for the application of BAT in the textile and leather industries in developing countries and emerging market economies (work package I)
- Identification of necessary moves for their diffusion (work package II)
- Identification of incentive systems and obstacles (work package III)
- Elaboration of a concept for the Federal Environment Agency on the diffusion of BAT in the textile and leather industry in developing countries and emerging market economies (work package IV)
- The whole implementation and coordination of the project in tight collaboration with the Federal Environment Agency (work package V)

17. Keywords

Best Available Techniques, Developing Countries, Emerging Market Economies, Textile Industry, Leather Industry, Environmental Policy, Policy Diffusion, Global Value Chains

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# Glossary

**AFIRM:** The Apparel and Footwear International Restricted Substances Management

**BAT:** Best available techniques

**BREF:** BAT reference document

**BOD:** Biochemical oxygen demand

**CETP:** Common effluent treatment plants

**CIS:** Commonwealth of Independent States

**COD:** Chemical oxygen demand

**CLE:** Council for Leather Exports

**CLRI:** Central Leather Research Institute

**CPCB:** Central Pollution Control Board, India

**ETP:** Effluent treatment plants

**EU:** European Union

**ILDPS**: Integrated Leather Development Program

**IPPC:** Integrated Pollution Prevention and Control

**NGO:** Non-governmental organisation

**OPT:** Outward processing transactions

**REC:** Regional Environmental Center for Central and Eastern Europe

**R&D:** Research and development

**RSL:** Restricted substance lists

**SEPA:** State Environmental Protection Administration, China

**SMEs:** Small and medium-sized enterprises

**SPCB:** State Pollution Control Board, India

**TDS:** Total dissolved solids

**TNPCB:** Tamil Nadu Pollution Control Board

**TTGV:** The Foundation of Technology Development, Turkey

**TUBITAK:** The Scientific and Technological Research Council of Turkey

**TUF:** Technology Upgradation Fund (TUF)

**UNIDO:** United Nations Industrial Development Organization

**WTO:** World Trade Organization

**WWTP:** Waste water treatment plant

# Preface

The Federal Environment Agency commissioned Adelphi Consult to carry out the project "Promotion of Best Available Techniques (BAT) in the Textile and Leather Industry in Developing Countries and Emerging Market Economies". The goal of this project was to identify options and develop concepts for strengthening the use of BAT in the textile and leather industry in developing countries and emerging market economies. The project took the form of a feasibility study looking at opportunities for promoting the best available techniques in three selected developing countries and emerging market economies. The feasibility study identifies:

- Potential partners for promoting BAT
- Structural approaches for the diffusion and application of BAT

On this basis, it then develops:

- Concrete proposals for the further diffusion of BAT

In accordance with the terms of the contract, the study is explorative in nature. It is based primarily on input from external experts and interviews with people working for companies in the textile, leather and related industries, test laboratories, relevant authorities, government ministries and various international bodies, and industry associations based in Germany, other EU countries, Turkey, India and China.

The authors would like to thank the more than 70 individuals who generously made their time and expertise available for interviews. We hope that this study will also be of interest to them.

We are particularly grateful to the external experts who contributed to the project. Dr. Harald Schönberger shared key insights into the textile industry with us, carried out numerous interviews in Germany and other EU countries and contributed some important ideas to the formulation of our conclusions. Dr. Jürgen Hannak played a vital role in the project, shaping the study with his expert knowledge of the leather industry, his critical perspective and creative suggestions. The interviews in Turkey were carried out by Ms. Selma Özcan, who also contributed to the chapter on Turkey. The interviews in China were performed by Dr. Gerhard Weihs and Ms. Magali Menant, and Ms. Menant also wrote part of the chapter on China. Brigitte Zietlow and Christian Löwe from the Federal Environment Agency supervised the project closely and made numerous helpful suggestions. Finally, we are grateful to Ms. Ute Holzmann-Sach for her editorial assistance.

Berlin, November 5, 2008

Walter Kahlenborn

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# 1 Introduction

## 1.1 General background

The EU's Integrated Pollution Prevention and Control (IPPC) Directive 2008/01/EC of January 15, 2008[1] – henceforth referred to as the "IPPC Directive" – forms the basis within the EU of the permit procedure for industrial installations of particular environmental relevance.[2] The aim of the IPPC Directive is to create a high level of protection for the environment as a whole. To this end, it covers not only emissions in the different environmental media but also production processes, striving to minimise the use of resources and energy and other burdens on the environment caused by industrial installations, both during their operation and following closure. The IPPC Directive is based on the concept of Best Available Techniques (BAT), the equivalent of the traditional "state of technology" concept in Germany. EU Member States are required to implement the IPPC Directive in national law and ensure the existence of rigorous approval requirements on the basis of best available techniques.

The IPPC Directive states that permits must include certain requirements, in particular emission limit values (article 9 (3)). These requirements are to be based on the best available techniques, although these techniques are not individually prescribed. The permit procedure must also take into account the technical characteristics of the installation concerned, its geographical location and the local environmental conditions.

The best available techniques are described in BAT reference documents (BREFs). The process for drawing up a BREF takes place through an exchange of information organised by the Commission in accordance with article 17 (2) of the IPPC Directive. The Commission has delegated the coordination of this exchange to the European IPPC Bureau, which is located in the facilities of the Institute for Prospective Technical Studies in Seville, Spain. For this reason the exchange of information is called the "Sevilla Process". The BREF is drafted in a technical working group which includes national experts and representatives from industry, environmental organisations and EFTA countries. In addition there is a super-ordinate information exchange forum (IEF) tasked with supervising the process of information exchange and supporting the evaluation of the implementation of the BREFs in the Member States.

The Sevilla Process has been modelled dynamically and includes a regular update of the BREFs to the latest state of technology. Under article 17 (2) of the IPPC Directive, the results of the process have to be published every three years. The development of the first BREFs began in 1997. Due to changes in the state of technology, these and all other BREFs are subject to regular revision. According to the current timetable of the Commission, the updating of all BREFs issued to date should begin by 2013 at the latest.

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1 This is the codified form of Directive 96/61/EC of September 24, 1996. The numbering of the articles cited in this study refers to the codified form of the IPPC Directive.

2 See the BAT website of the Federal Environment Agency: www.bvt.umweltbundesamt.de

Significant variation exists in the national implementation of BREFs. In some countries such as Sweden, BREFs are used directly by the relevant authorities; in Germany on the other hand they are used mainly to inform regulations released at the national level. Other countries again, such as Ireland, follow a somewhat intermediate path (Emmot et al. 2000). In addition to these differences in implementation approach, individual decisions within the permit procedure can lead to different interpretations of BREFs depending on the technical expertise of the authority in question. This means that requirements at least partially vary in strictness in different countries in practice.

These differences in implementation detract from the prospect that the IPPC Directive quickly creates a level playing field for European industries, one of the goals of the Directive. They also put the Directive's goal of ensuring a high level of environmental protection throughout the European Union at risk. The Commission is attempting to counteract this risk with a comprehensive plan of action that includes the amendment of the IPPC Directive itself.

From an international point of view, the problem of differences in the level of requirements is greater still. To improve their competitiveness, European companies increasingly import products from outside the EU, especially from developing countries and emerging market economies. These products are then finished in the EU, or sold directly. Often no comparable requirements for environmental protection in industrial production exist in the countries outside the EU. The EU can issue common product requirements which ensure that the imported products meet European health and environmental protection standards. However, this can only influence industrial production in non-EU countries indirectly.

The increase in global outsourcing of different stages of the production process by European companies puts pressures on the high level of environmental protection throughout the EU. In addition, increasing production for the EU market can have severe consequences for environmental and health protection in the exporting countries. This situation is highly pronounced in the textile and leather industries, where imports make up a large and growing part of the European market. These industries have a high degree of global integration. At the same time, they use a large amount of water, chemicals and energy, and cause a high level of environmental pollution.

In this context, the diffusion of BAT in countries outside the European Union would appear to be desirable. It would support environmental and health standards within the EU and at the same time provide an opportunity to improve these standards in non-EU states. These two opportunities are particularly large in the case of the developing countries and emerging market economies that are active in the global market for textiles and leather. Diffusion of BAT to these countries could be based on the recommendations and standards that have been elaborated by the EU in the BREFs.

## The textile industry and tanneries BREFs

The BAT approach is limited to production on an industrial scale. In the case of the textile and leather industry, this means that only certain plants are regulated, and only above a certain capacity. The definition is given in Annex I of the IPPC Directive.

**Textile industry:** In the textile industry, the Directive covers "Plants for the pre-treatment (operations such as washing, bleaching, mercerisation) or dyeing of fabrics or textiles where the treatment capacity exceeds 10 tonnes per day".

**Leather industry:** In the leather industry, the Directive covers “Plants for the tanning of hides and skins where the treatment capacity exceeds 12 tonnes of finished products per day”.

Both the leather tanning and the textile finishing industries are largely made up of small and medium-sized enterprises (SMEs), although the degree of concentration and consolidation differs by sector.

Processes in the leather tanning and textile finishing industries are largely wet processes, so the main input is water and the main output of waste is waste water. In both industries, the waste water has a high chemical and biological oxygen demand as well as a load of hazardous substances. Other common issues in both industries are energy efficiency, air and solid waste emissions and pollution from incoming materials.

In the BREF Textiles Industry covers three sectors:

1. Wool scouring
2. Textile finishing (excluding floor covering)
3. The carpet sector

Within each of these sectors, a variety of wet processes are applied. Best available techniques are elaborated for each of these processes. In addition, there are some generic BAT such as selection and use of chemicals, water and energy management, etc.

In the BREF Tanning of Hides and Skins specifies four steps in the production process of a tannery:

1. Storage and beamhouse operations
2. Tanyard operations
3. Post-tanning operations
4. Finishing operations

These process steps are carried out successively. Some of the process steps can be outsourced; after the first two stages there is an intermediate product (wet blue) that can be traded, and there is also a tradable intermediate product after the third stage (crust). Like the BREF Textiles Industry, the BREF Tanning of Hides and Skins lists BAT for both generic issues and specific processes that are carried out in the individual production stages of a tannery.

## Main environmental concerns in the textile and leather industry

As laid out in more detail in the textile industry BREF, the main environmental concern in the textile industry is waste water, both in terms of its volume and the pollutants it carries. Other potentially significant impacts on the environment come from air emissions, energy consumption, solid waste and odours. In developing countries there is also a problem with noise emissions within companies, as described in the chapter on China below.

The waste water problem arises because the textile industry largely employs wet processes to treat textile goods. Most of the emissions stem from substances that are already present on the raw materials before they reach the finishing mill, including pesticides, impurities,

knitting oils and preparation agents. Removing these substances produces a very high chemical oxygen demand (COD) as well as various non-biodegradable and to some extent hazardous substances. The specific waste water loads and pollutants they contain depend on the process in question. The textile industry BREF lists the following problems as typical:

- Waste water from wool scouring contains a high concentration of organic substances and pesticides. The pesticides can include phosphates and chlorine compounds
- Desizing of cotton produces a large volume of waste water with a very high COD
- Certain bleaching processes lead to high concentrations of adsorbable organic halogen compounds (AOX)
- A strong alkaline effluent is produced if the waste water is not re-used after mercerising
- In the dyeing process, the level of emissions depends very much on the particular process and the type of fibre used. Pollutants originate from the dyes themselves and from the auxiliaries used, such as dispersing agents. In addition to a high COD level, metals, toxic substances, salts, etc. may result
- Emissions from printing processes originate chiefly from paste residue and various waste gases
- Continuous finishing processes produce a low level of waste water emissions. However, they can lead to a variety of residual liquors that have a high COD concentration and may contain highly toxic, non-biodegradable substances
- Washing produces various emissions (depending on the previous processes and detergents used) and can involve a high level of water and energy consumption

As in the textile industry, waste water is one of the main problems in the production of leather. In addition the industry produces a large amount of solid waste, both from fleshing and from later tanning processes (including trimming and shaving). The tanning industry BREF gives an example of a conventional chrome-tanning process for bovine salted hides using approximately 500 kg of chemicals. This process produces approximately 15 to 50 $m^3$ of waste water with a contaminant load of 500 to 520 kg, plus an additional 450 to 730 kg of solid waste and 40 kg of air emissions.

The waste from chrome tanning differs for each process step. Waste water is produced mainly by the beamhouse, tanyard and post-tanning operations. Waste gas is produced mainly by the finishing operations. The biggest environmental pollution in the waste water is its chemical oxygen demand (COD) and biochemical oxygen demand (BOD). The waste water also contains chrome and sulphide.

Mineral and vegetable tanning processes are also found. To a large extent, mineral tannage requires similar chemical inputs to conventional tannage; vegetable tannage on the other hand uses different chemicals, causing different environmental pollution.

## 1.2 Objectives and scope of the project

In the context of this project, a feasibility study has been performed which researches the potential for diffusion of the BAT concept in developing countries and emerging market

economies. The diffusion of BAT should accomplish an improvement of the environmental and health conditions in developing countries and emerging market economies, and in the long term support international harmonisation of environmental standards, thereby creating equal competitive conditions (i.e. a level playing field) for European industries. Based on the examples textile and leather industry the study investigates the potential for the diffusion of BAT. The focus lies on the main suppliers of the German/EU market, which are China, India and Turkey. The objectives of the project are to identify strategic partners for the diffusion of BAT and to determine the necessary measures for the diffusion of BAT in the textile and leather industry in developing countries and emerging market economies. In this context, the project also investigates the existing incentive systems and prevailing legal, administrative and social conditions for the application of environmental technologies in both sectors in the target countries.

## 1.3 Methodology

Adelphi Consult and a team of external experts carried out the following work in relation to the feasibility study:

**Preliminary work and research:**

- Identification of strategic partners for the application of BAT in the textile and leather industry in developing countries and emerging market economies **(Work Package I)**
- Identification of necessary moves for the diffusion of BAT **(Work Package II)**
- Identification of incentive systems and obstacles **(Work Package III)**
- Elaboration of a concept for the Federal Environment Agency on the diffusion of BAT in the textile and leather industry in developing countries and emerging market economies **(Work Package IV)**
- The entire implementation and coordination of the project, in close collaboration with the Federal Environment Agency **(Work Package V)**

**Work Package I**

Adelphi Consult carried out systematic research in cooperation with its contacts in national organisations to identify possible partners (“relevant actors”). The identification was carried out by means of systematic research of business associations, external trade organisations, global trade companies, firms and associations in plant construction, international and national organisations in development cooperation, organisations involved in the promotion of technology transfer, secretariats of international environmental agreements and regulatory bodies. The research also included state, half-state and non-state actors who are important for the relevant framework in the target countries. Through extensive preliminary research it was established to what extent the different organisations were involved in the diffusion of BAT in the target countries. Contrary to the original plan, this initial stage of the project involved dozens of interviews, as being the only way to access the required information. This initial research formed the basis for drawing up the lists of potential interview partners for Work Package II.

**Work Package II**

On the basis of the lists drawn up in Work Package I, relevant interview partners were selected in consultation with the Federal Environment Agency. The subsequent interviews, together with additional research, indicated the points of focus for current and future activities with potential partners, and what resources these partners could bring to a future collaboration with the Federal Environment Agency. They also indicated possible incentive systems and obstacles in the target countries.

For the preparation of the interviews, two questionnaires were drafted (one for each sector). These questionnaires were developed with the entire team. The questions focused on relevant positions and points of focus of the potential partners, and the research of possible incentive systems and obstacles to the implementation of BAT in the target countries from the point of view of the partners. The questionnaires were used flexibly depending on the local situation, the existing knowledge of interview partners and the type of organisation.

**Work Package III**

Work Package III identified and evaluated possible incentive systems and obstacles for the international diffusion of BREFs and the implementation of BAT on all levels of the value and supply chains. All starting points for possible incentives or obstacles were included systematically, for every country, and for each industry. The following categories were differentiated for this purpose:

**A. Incentives and obstacles set by the state**

- Legal and administrative framework conditions, including their implementation
- Economic instruments, such as subsidies or tax incentives
- Informational instruments, such as information campaigns, federal environmental labelling and information centres
- Further instruments of the state

**B. Incentives and obstacles set by business**

- Improvement in the image of international leading firms
- Changes in production
- Changes in factor costs (energy/raw materials)
- Requirements of the buyer/purchaser or contractor
- Insufficiency of information

**C. Incentives and obstacles set by society**

- Requirements for labour protection and security
- NGO pressure

**Work Package IV**

On the basis of the previous work packages, Adelphi Consult, in close collaboration with external experts and the Federal Environment Agency, drafted detailed proposals for promoting the application of BAT in the leather and textile industry in developing countries and emerging market economies.

The countries and sectors the proposals relate to were determined on the basis of the evaluation of the previous work packages. The proposals present the relevant actors in specific terms. They show how these actors could be involved in the process of promoting BAT in developing countries. They also explain which structures (Internet platforms, knowledge portals, seminars, international conferences and bilateral environmental agreements) are available in the target countries and how they can be used for the diffusion of BAT. Furthermore, they identify operational measures for the optimal use of BREFs and describe how potential incentive systems can be created and possible obstacles removed.

The proposals also contain suggestions for how a successful collaboration with the relevant actors could be implemented, since involving the partners is a key condition for the diffusion of BAT and the export of innovative environmental technologies. For the promotion of knowledge and technology transfer, for example, delegation trips could be organised and consulting networks created in the countries concerned. The proposals also describe the fundamental conditions required for their implementation to be successful.

**Work Package V**

The project was discussed in detail with the contractor on an ongoing basis, in parallel with the work. In this way it was possible to draw on the extensive expertise of the contractor for the project. At the same time, the project could be flexibly and accurately adjusted in line with the contractor’s requirements.

# 2 Market structure and situation of the leather and textile industry

## 2.1 Underlying market structures

The world market for leather and textiles has a high degree of horizontal integration in the areas of design, retail and branding. The level of vertical integration, by contrast, is lower and much more varied. There are brands and retailers that have some production facilities of their own in addition to contracts with third parties, but generally production is outsourced. On the other hand, the degree to which the production chain is outsourced differs. A large retailer or brand can, for instance, supply the input material, design and detailed technical instructions and outsource only the assembly of the product. In general such transactions are called **outward processing transactions (OPT).**

In the case of the clothing industry, the production stage carried out by the contracted party is known as cut, make and trim production. The materials, cut and packaging are provided by the contractor and only the cutting, sewing, folding/arranging and packing remains with the contracted party. Alternatively the retailer or brand can also only supply the design and some material specifications and let the contracting partner determine the rest. Contracted parties that produce for a large retailer or brand can in turn be vertically integrated to varied degrees.

In the production process for both leather and textiles, the processes that are relevant for the BAT approach are generally carried out at the penultimate production stage. In the textiles sector, this stage takes place in textile finishing plants. In the leather sector, it takes place in leather tanneries. The products from these industrial plants go towards the final production stage, which is assembly. The penultimate production stage can also be vertically disintegrated, as intermediate products can be traded following certain steps in the production process.

## 2.2 Textile markets in Europe

The European Union market for textiles and clothing showed a trade deficit of over EUR 35 billion in 2005. However, there are large differences between the clothing and textile sectors. There is a small and declining surplus in the textile sector, offset by a large and growing deficit in the clothing sector. The development of the overall trade balance, as well as the trade balance with China, India and Turkey, is shown in Figure 1.

The export deficit with both Turkey and China between 2002 and 2005 rose much more rapidly than the overall trade deficit for textiles and clothing. Exports from the EU to Turkey and China, however, increased in the period. The increase in the deficit with regard to these countries is due to rising imports which displaced imports from other South East Asian countries, notably Hong Kong, Taiwan, South Korea and Indonesia. Imports from Japan and the United States also fell steeply in the period, and imports from Morocco and Tunisia decreased slightly. On the other hand imports from Romania and Bulgaria increased, and imports from Bangladesh also rose strongly.

**Figure 1: EU trade balance in textiles and clothing**

| EU25 trade balance (EUR million) | 2002 | 2003 | 2004 | 2005 | Change 2002/2005 |
|---|---|---|---|---|---|
| **Textiles and clothing** | -27,956 | -25,956 | -31,802 | -35,643 | 27% |
| **Textiles** | 3,774 | 3,664 | 3,820 | 3,172 | -16% |
| **Clothing** | -31,731 | -33,260 | -35,621 | -38,814 | 22% |
| **China (total)** | -11,234 | -13,884 | -15,615 | -21,938 | 95% |
| **India (total)** | -4,403 | -4,319 | -4,576 | -5,355 | 22% |
| **Turkey (total)** | -6,320 | -8,584 | -8,781 | -9,272 | 47% |

*Source: Eurostat*

China, Turkey and India are now the largest suppliers of textiles and clothing to the EU. In 2005 they made up a total of 51% of EU imports. China had a share of 30%, Turkey 14% and India 7%. Of these three, China and India received a particularly large boost in their exports to the EU in 2005 due to the expiration of quotas under the Agreement on Textiles and Clothing of the World Trade Organization (WTO). This rise in imports seems to have had some negative impact on the EU textile industry, as industry turnover in 2005 fell by almost 5% compared to 2004 (EURATEX). Exports, however, increased slightly. This means that the increase in imports displaced some of the production for the domestic market. A report from the High Level Group on Textiles and Clothing, an institution set up by the European Commission, speculates that the effect of the expiration of the quota regime had already been largely anticipated by the textile and clothing industry, since job losses were no higher than in previous years (COM 2006a). However, this report does not take the decline in turnover into account, which was high compared to previous years.

In 2006, turnover in the textile and clothing industry increased to approximately EUR 202 billion. Part of this EUR 4 billion increase went into exports, which grew by more than EUR 2 billion to EUR 39 billion, but the rest went into the domestic market. Nonetheless, imports still gained in relative importance as they increased by over EUR 8 billion to EUR 81 billion. A rough calculation of the size of the domestic market in the EU can be made by subtracting exports from industry turnover and adding imports. This yields a market size of about EUR 245 billion in 2006.[3] Currently imports make up a third of the total market. The share of imports will be much higher in clothing and lower in textiles. A Communication from the Commission in 2003 stated that the share of imports in the clothing sector of the EU15 was 42% (COM 2003). It can be expected that the share of imports will continue to grow.

Although the industry increased its turnover in 2006, both the amount of jobs and the number of enterprises in the EU25 continued to fall. Employment decreased by nearly 5%. This is a lower rate than in 2005, when employment fell by 6.9%. The number of companies decreased by 5.7%, which is not a notably lower decrease than in previous years. On the other hand, there is a small sign of a turnaround in the level of investment, which stabilised in 2006 after falling in the previous years.

[3] This is roughly the same as the size of the market in 2004 according to EURATEX estimates. The size of the textiles and clothing market has been stagnant or increasing marginally for some time.

**Figure 2: EU25 textile and clothing industry**

| EU25 Textiles and clothing | 2004 | 2005 | 2006 |
|---|---|---|---|
| **Industry turnover** | 208 bn | 198 bn | 202 bn |
| **Exports** | 36 bn | 36 bn | 39 bn |
| **Imports** | 69 bn | 73 bn | 81 bn |
| **Market size** | 244 bn | 234 bn | 245 bn |
| **Companies** | 165,000 | 155,000 | 147,000 |
| **Employees** | 2.3 m | 2.2 m | 2.1 m |

*Source: EURATEX (rounded figures, monetary values in euros)*

The **organisation of the value chain for the international trade in textiles** differs depending on the country. In India and China, the entire production process up to the point of assembly is mostly carried out within the country. In smaller South-East Asian countries, Eastern Europe and some Mediterranean countries there is a much higher degree of "vertical specialisation". The countries often carry out only one step in the production process, and input material as well as intermediate goods can be traded across borders multiple times before the finished product is sold (Nordås 2004). In Turkey, there is a somewhat intermediate level. This difference in the degree of vertical specialisation means that there are implications for the EU when trade shifts towards countries with a low degree of vertical specialisation, such as India and China. EU producers are much less likely to supply intermediate products to these countries than to countries with a high degree of vertical specialisation, especially when the latter are located in close proximity to the EU market.

Imports into Europe are dominated by the retail sector and large brand names. Figures from the mid-1990s indicate that the retail sector received half of all imports and the major brands another 20% (Gereffi 2001). Within the retail sector, large chains have an increasing market share. The percentage of sales generated by small retailers in the EU15 markets declined from 48% in the year 1988 to an estimated 37% in 2000. This was caused by the growth of specialised chains, whose market share increased from 18% to 26% (Dunford 2004). If the trend has continued, which is likely, small retailers will now have a share of only around 30% of the market. The overall situation in the USA is broadly similar. However, in the US, supermarkets and hypermarkets such as Wal-Mart and K-Mart play a much more important role than in Europe, where specialised chains make up a very large share of the market, as mentioned above (Gereffi 2001).

The continuing growth in importance of globally active corporations, as well as large name brands that exist mainly as design and marketing firms, has led to a different kind of functioning of the market. The market is now dominated by these large companies who can arrange the value chain to maximise their profitability (Dunford 2004). The suppliers are increasingly dependent on these major firms and engage in long-term contracts with them. Because the large corporations and brands generally have detailed requirements in terms of design and materials, there is a high level of information exchange between them and their suppliers, and the suppliers can build up extensive specialist know-how. This in turn means that it is not easy for the large corporations to switch suppliers, as production would need to be rearranged or reorganised.

The dominant mode of production for China, Turkey and India is full package supply, in which the final supplier in the product chain takes care of acquiring the input materials, in accordance with the specifications of the buyer for the final product. As more production shifts towards China and India in particular, larger and more vertically integrated suppliers might emerge, changing the relations in the global value chain. China, Turkey and India are also trying to move more towards developing their own design and branding, but it remains to be seen to what extent this will be successful with regard to the EU market.

## 2.3 Leather markets in Europe

In the leather industry, the trade deficit of the European Union is much smaller than in the textiles industry in both absolute and relative terms. However, the size of the deficit is increasing quicker than it is in the textiles industry. Within the leather industry, there are three main sectors: a) hides, skins and leather; b) articles of leather, such as bags, purses, gloves and assorted vanity items; and c) footwear. The development of the overall trade balance, as well as the trade balance by sector and the trade balance with China, India and Turkey, is shown in Figure 3.

**Figure 3: EU trade balance in the leather industry**

| EU25 trade balance (EUR million) | 2002 | 2003 | 2004 | 2005 | Change 2002/2005 |
|---|---|---|---|---|---|
| **Total** | -796 | -1,339 | -1,047 | -2,388 | 200% |
| **Hides, skins and leather** | -93 | 83 | 599 | 506 | -642% |
| **Articles of leather**[4] | -134 | 76 | 238 | 256 | -291% |
| **Footwear**[5] | -569 | -1,497 | -1,884 | -3,150 | 453% |
| **China (total)** | -1,640 | -1,582 | -1,549 | -3,031 | 85% |
| **India (total)** | -1,171 | -1,083 | -1,100 | -1,192 | 2% |
| **Turkey (total)** | 71 | 91 | 72 | 34 | -53% |

*Source: Eurostat*

The overall trade deficit of the EU is smaller than its trade deficit with China. The EU is thus running a trade surplus with the rest of the world. The overall trade deficit, however, has increased quicker than the deficit with China. The growth in the overall deficit can be attributed exclusively to footwear; in the other sectors the deficit has been turned into a surplus after 2002.

The top three external suppliers for the EU market differ for each of the three sectors that make up the leather market:

[4] HS (Harmonised System, the European classification system for goods) Chapter 42 minus non-leather suitcases, bags and purses.

[5] HS Code 6403

- **Export of hides, skin and leather to the EU:** In this sector, Brazil leads with 16% of the total, followed by the US with slightly less than 8% and India with slightly more than 6% on a total of around EUR 3.1 billion
- **Leather articles:** The trade in leather articles is dominated by China, which supplies around 41% of all EU imports. India follows with just under 21%, and Switzerland is the third largest supplier with around 10% of EU imports on a total of approximately EUR 3.2 billion
- **Leather shoes:** Here again China leads with around 36% of exports to the EU, followed by Vietnam at just under 22% and India at less than 9% on a total of around EUR 5.8 billion. The European Commission adopted anti-dumping measures for leather shoes against China and Vietnam in March 2006 (COM 2006b)

The import market for hides, skin and leather is much more diversified than the other two markets, which show a very high level of concentration.

The global supply chain for leather has different characteristics from the market for textiles. China runs a large and growing trade deficit in the hides, skins and leather sector, where it is the world's largest importer, followed by its Hong Kong special administrative region. The EU runs a combined surplus of nearly EUR 0.8 billion with these two partners. In Vietnam, imports also seem to play a large and growing role; however, recent statistics are not available. India, on the other hand, imports practically no hides, skins and leather and runs a large surplus in this market as well in leather articles and leather shoes (ITC/Eurostat). China's leather industry has a much higher level of vertical specialisation than its textiles industry, shown by the larger share of imports. The strong vertical specialisation indicates that in China, OPT manufacturing for big retailers and brands in the leather industry probably plays a more important role than it does for clothing. In India, on the other hand, the low level of vertical specialisation indicates that full package supply is probably the dominant mode of production.

In the leather shoe market, there are a few very large brands: Nike, Adidas and Puma. Leather shoes are an important part of their product range, especially football shoes in the case of the European market. These brands are exempted from the anti-dumping measures mentioned above. Retailers can also carry their own collections, as in the case of the German retailer Deichmann, and there are a few branded manufacturers/retailers such as Clarks and ECCO, both of whom however retain ownership of the offshore factories that produce for them. Some retailers and brands also carry large collections of leather articles, such as bags, purses and vanity articles.

# 3 Europe – initiatives by main actors

**Major brands and retailers**

There are a number of global players in the textiles, clothing, leather shoes and articles of leather industries who have a major impact on the value chain as buyers of finished products. Indeed, their designs and specifications for finished products shape the value chain to a large extent. These leading firms include:

- **Branded retailers,** such as Hennes & Maurits (H&M), C&A, Gap, Marks & Spencer, plus sporting and lifestyle apparel and shoes brands such as Nike, Adidas and Puma
- **Large mail-order firms,** such as Otto and Quelle
- **Clothing brands,** such as Levi's
- **Luxury clothing and accessory brands,** such as Luis Vuitton and Gucci
- **Super- and hypermarket companies that sell home products and clothing,** such as Carrefour, Tesco and IKEA

Many large companies are already involved in networks dealing with environmental and social issues. In particular:

- Adidas is a member of the **World Business Council for Sustainable Development**
- IKEA, H&M, Gap, Nike, Adidas, Marks and Spencer, and Levi Strauss & Co. are members of **Business for Social Responsibility (BSR)**
- H&M, Nike, Gap and Levi Strauss & Co., plus five other companies are also active in a working group of BSR called the **Sustainable Water Group,** which focuses on water management in the apparel and textile supply chains
- Nike, Adidas, Puma, Gap, H&M, C&A, Levi Strauss & Co. and Tesco, along with five other companies, are all members of the **Apparel and Footwear International Restricted Substances Management Group (AFIRM),** which deals with restricted substance lists (RSL) for products. This represents the coordination of product requirements, but product requirements also have an effect on production processes

As part of the study, interviews were carried out with a number of these leading firms. It became apparent that there are very different levels of commitment to environmental protection in the supply chain. All of the companies are concerned about making sure that the products delivered to them abide with or surpass existing product requirements. They contractually require their suppliers to comply with their RSL. This allows them to shift some of the responsibility down the supply chain. However, it mainly serves to ensure that their suppliers comply with the legal restrictions on the use of chemicals, as significant monetary and reputation damage can occur if a company has to take a large amount of products off the market. Although there is significant coordination of the RSL of the individual companies in AFIRM, they still differ in some details.

**Figure 4: The BSR Sustainable Water Group**

**The BSR Sustainable Water Group (previously Apparel Water Quality Working Group (AWQWG))**

**The Group was set up to develop global industry standards for water quality,** mainly with regard to waste water disposal, for textile mills and laundries. It has formulated **requirements** with regard to **17 water quality parameters,** including:

- Temperature
- pH level
- Chemical and biological oxygen demand
- Solids
- Heavy metals

The working group also provides guidance on how to carry out testing for these parameters, including fact sheets.

**Members of the group (as of fall 2008) are:**

- Coldwater Creek Inc. (US Retailer)
- The Gap Inc.
- H&M
- J.C. Penny (US retailer)
- Levi Strauss & Co.
- L.L. Bean, Inc. (US mail order firm)
- NIKE, Inc.
- Nordstrom, Inc. (US retailer)
- Timberland (outdoor wear and shoe brand, also active in the EU)

**More information on the AWQWG can be found on:**
http://bsr.org/reports/awqwg/BSR_AWQWG_Info-Sheet.pdf
http://www.bsr.org/membership/working-groups/resources/SustainableWaterGroup_Fall%202008.pdf
http://www.bsr.org/membership/working-groups/sustainable-water.cfm

**Figure 5: The AFIRM Working Group**

**The Apparel and Footwear International Restricted Substances Management (AFIRM) Working Group**

The AFIRM Working Group was formed to create a global information exchange platform for retailers and brands on developments regarding RSL. The platform brings together experts on various topics in the industry related to RSL, who can exchange experiences and formulate benchmarks.

**Concrete work has been done on the following:**

- Developing a “master table” of the RSL of seven different companies
- Sharing materials from laboratory audits
- Training suppliers
- Developing scenarios on REACH

**Members of AFIRM (as of spring 2009) are:**

Adidas, Ann Taylor (US retailer), C&A, Gap Inc., H&M, Levi Strauss & Co., New Balance (shoes/sportswear brand), Nike, Puma, R.E.I. (US consumer cooperative), s.Oliver (German retailer), Tesco, and Timberland.

The AFIRM Working Group is facilitated by the Phylmar Group.

**More information on AFIRM is available on:** http://www.afirm-group.com and http://www.phylmar.com/apparel-and-footwear-international-rsl-management-working-group

The interviews also revealed that not all companies have made efforts to promote cleaner production in the supply chain beyond what is necessary for their RSL, or are interested in doing so. Among the companies that have installed requirements, there are different levels of monitoring, ranging from simply requiring documentation of the installation of waste water treatment facilities for instance to insisting on analyses by independent local laboratories, or even carrying out their own random tests. They also have different sets of requirements: some companies have specific requirements just for waste water treatment, while others have a much broader range of environmental requirements relating explicitly to the entire production process.

The companies also have different ways of dealing with non-compliance. Some take a strictly cooperative approach, making great efforts to help their suppliers meet the requirements and trying to choose environmentally conscious suppliers in the first place. Other companies apply graduated sanctions, from warnings to reduced orders to cancelling contractual relations entirely.

As a general rule, all companies also have suppliers who do not carry out the relevant stages in the production process themselves. Moreover, none of the companies has the ability or willingness to monitor the supply chain in a comprehensive way, as this would be too costly.

Requirements for cleaner production, such as a requirement to install waste water treatment facilities at textile finishing plants, are generally not welcomed by suppliers. They see such requirements as reducing their flexibility on the market, and they have to put in further effort to ensure that their upstream suppliers comply. In some cases local officials are also opposed to such requirements.

Even where no such opposition exists, many problems arise in practice. It is often the case that requiring installation of a waste water treatment plant is insufficient, as suppliers might still find it preferable not to operate it, or simply lack the necessary skills. Improving technical skills among suppliers in the field of environmental protection is therefore seen as important. However, running large-scale training programmes would require large amounts of resources, and the leading firms are hesitant to spend more than they already do. They also lack the manpower and sometimes the technical expertise that would be required.

There is opposition among some of the leading firms who have requirements for the supply chain to far-reaching harmonisation of practices. This can partially be explained by differences between the leading firms in how they organise their supply chains. Some firms have much deeper interdependencies in their relations with their suppliers than others. This makes it more costly to switch suppliers, reduce orders, or even damage relations. In this light, the firms will prefer to determine the manner in which they deal with enforcement on an individual basis. On the other hand, some leading firms also mentioned harmonised enforcement as an option. Given these different views, a harmonised approach would no doubt only be possible through some sort of voluntary structure.

The level of knowledge of the BAT approach varied greatly for the experts interviewed. Some knew the IPPC Directive and the BAT approach well, while some were completely unfamiliar with them. This lack of awareness was mirrored in some individual cases in interviews with representatives of other branches of industry, as well as industry associations. Some of the standards developed by the industry are, however, similar to the BAT standards, and some of the approaches they have taken are also similar. The values of the BSR Sustainable Water Group for waste water discharge, for instance, are similar to BAT values, although not

completely identical. Thus the values of the BSR Sustainable Water Group are end-of-pipe values, whereas the BAT approach looks also at the production processes. Moreover, the values do not specify limits on total waste water discharge, meaning that they could also be met through dilution. As further examples, the AFIRM working group develops “benchmarks” and some firms apply “best industry practices”. While these approaches are similar to using best available techniques, they are not entirely the same.

Although the concept of using BAT is not completely foreign to the leading firms, then, it is an integrated, detailed approach which might provide a level of harmonisation beyond what they would be willing to carry out. However, it could be used as a starting point for increased coordination between the leading firms and for cooperation between the firms, government bodies (over here and in the target countries), the EU and international institutions. The leading firms were particularly interested in the following elements:

- Capacity building, awareness raising and training programmes for experts and individual suppliers, also mentioned as a “training the trainers” programme
- Exchange of information and data as well as provision of technical know-how and expertise
- Development of benchmarks on the basis of best practices or BAT
- Promotion of common standards, or at least further cooperation in the development of standards. Prioritisation of techniques to be implemented was also mentioned
- Further coordination of monitoring and cooperation to extend monitoring could be an option, since firms indicate limitations in their resources for monitoring

Further coordination and cooperation efforts among the leading firms could build on existing structures, or at least be organised along similar lines.

**Industry associations**

The European industry associations that were contacted and which are affected by the IPPC Directive to the extent that their members’ activities are in areas covered by the BREFs, knew about the BAT approach and were themselves involved in drawing up the BREFs. Some other industry associations that were contacted had a low level of awareness of the BAT approach, and a number of them specified that the approach was also largely unknown to their members.

This low level of awareness of the BAT approach might be due to the fact that the BREFs only cover certain activities within the overall production chain. This shows that to date there has been little communication about the BAT concept vertically across all stages of production.

The industry associations that were contacted were sceptical about the idea of exporting the BAT concept to other countries. From experience, they said that environmental regulations were misused in China, for example, to put European companies at a disadvantage compared to their own state-run enterprises. In the past this had led to distortions of competition, and they were against repeating this experience with the BAT concept. Some industry representatives considered the introduction of properly enforced regulatory conditions along European lines to be an essential precondition for successfully exporting the BAT concept.

This scepticism was not shared by the machinery sector, which would seem to have an interest in diffusing the BAT concept outside Europe in the increased opportunities it would create for selling technologies. Concretely, interest was expressed in cooperation on awareness-raising activities in international trade fairs in Europe and Asia, as well as in participation in machinery symposia in Asia.

# 4 BAT in target countries

As an introduction to the detailed country descriptions and analyses that follow, this section presents a short review of the basic situation in respect of BAT in the three target countries examined in this study: Turkey, India and China.

The level of awareness and the state of legislation with regard to BAT differs widely between the three countries:

**Turkey:** In Turkey, BAT is somewhat familiar among official institutions, research institutes and industry associations. This is because Turkey is preparing the ground for implementing the IPPC Directive as part of its negotiations for joining the European Union, which means that the BAT approach will eventually be implemented in Turkey. The current legislative framework is not entirely optimised for the implementation of BAT. For instance, some of the interviewees pointed out that the permit procedure is too fragmented. In addition, a few voiced concern over the specific way in which the IPPC Directive would be implemented.

**India:** In India, the BAT approach is generally not known. However, there are some related initiatives and legislation from the government and international institutions to stimulate technological upgrading and the development of "cleaner production". The focus in the textile and leather sector is on a few concrete end-of-pipe technologies such as waste water treatment. There is, on the other hand, a clearly established procedural framework for the establishment of industrial plants. In the procedure, a number of environmental permits are required for the establishment of an industrial plant, as well as in some cases an environmental impact assessment.

**China:** China is largely in the same position as India. There are some laws and initiatives on cleaner production and technological modernisation, however they focus mainly on end-of-pipe technologies. Some of the concepts used in regulation in China are somewhat similar to BAT, but generally set lower standards than BAT and do not take the same integrated approach.

In China and especially in India, there is a feeling that technologies need to be appropriate for local needs and capacities, and European technologies will often need to be adapted in order to fulfil that role. Other developing countries and emerging market economies will likely be more similar to China and India than to Turkey. However, the fundamental difference between these countries and China, India and Turkey is that in these three countries all steps of the production process are carried out. Other developing countries and emerging market economies, especially in Asia and Northern Africa, depend much more on supplies of intermediate goods from abroad.

Although there is legislation on environmental issues in Turkey, China and India, enforcement of that legislation is often lacking. This is seen as a major issue by European firms, associations and institutions, but also by many in the countries themselves. Lack of enforcement can be due to weak institutions and corruption. The problem of weak governance structures is a common one in developing countries and emerging market economies (Gereffi 2005: Lecture 3).

# 5 Turkey

## 5.1 Overview of the textile industry in Turkey

Turkey is a rapidly developing and industrialising nation. The textile sector is the driving force for the export industry, and the country has become one of the key worldwide players in this sector in recent years. Turkey is currently the second largest exporter of textiles to the European Union, second only to China. Its textile industry has the largest production capacity in the EU and the fourth largest in the world. Textiles and clothing represent one of the most important sectors of the Turkish economy, with an annual production value of USD 30 billion and a 23% share of total export volume in 2006. There are more than 35,000 textile and clothing companies in the country, 68 of which were among the 500 largest companies in Turkey in 2006. In addition, 33 textile and clothing companies are quoted on the Istanbul Stock Exchange (Export Promotion Center of Turkey, undated).

The Turkish textile and clothing industry needs to adapt to the rapidly changing and increasingly competitive international conditions. From 2008 onwards, with the termination of the import quotas imposed on China by the EU, international trade in textiles is subject to general WTO rules. Turkey, which was not subject to such quotas, thus loses its relative advantage over China.

Looking at the different areas within the textile sector, the following picture emerges. In 2006, Turkish **textile exports** were worth USD 5.6 billion and accounted for 5.6% of total exports. The EU was the main export market, with a share of 44.5% in 2006 and a value of USD 2.5 billion. Within the EU, the biggest export market is Italy, accounting for USD 588.7 million in exports (Export Promotion Center of Turkey, undated). Among the main export product groups are knitted fabrics, cotton woven fabrics, synthetic woven fabrics and blankets. Exports of home textiles were worth approximately USD 2.1 billion in 2006.

The Turkish **clothing industry** is the fourth largest supplier in the world, with a share of 4.3% of the global market. It is also the second largest supplier to the EU.

**Figure 6: Clothing exports from Turkey**

| | |
|---|---|
| Share of worldwide clothing exports | 4.3% (4th place) |
| Share of worldwide knitted clothing exports | 5.2% (4th place) |
| Share of worldwide woven clothing exports | 3.3% (6th place) |
| Total value of clothing exports | USD 11.7 bn |
| - Knitted clothing and accessories | USD 6.9 bn |
| - Woven clothing | USD 4.7 bn |

The Turkish clothing industry has a worldwide share of 5.2% in knitted clothing exports and Turkey is ranked fourth among the exporting countries. In woven clothing exports it has a worldwide share of 3.3% and is ranked sixth among exporting countries. In 2006 the total value of clothing exports was USD 11.7 billion, up 6% on the previous year. The sector

exports around 60% of production. Approximately 80% of the clothing exported is cotton clothing. Knitted clothing and accessories make up 60% of total clothing exports and have an export value of around USD 6.9 billion; the remaining 40% is accounted for by woven clothing worth approximately USD 4.7 billion (2006 figures).

Turkey has been increasing its share in the main markets in recent years, especially in the EU, which has high standards and sophisticated customer needs. Germany, the UK and the Netherlands are the most important markets for Turkish clothing exports. Turkey's market shares in these countries are 25% (Germany), 18% (UK) and 7% (Netherlands). In 2006, Turkish clothing companies exported to over 170 countries in the world, although the EU25 remained the main export market, accounting for over three quarters of all exports. Overall, the clothing sector is the second most important export sector for Turkey after the automotive sector, which has gained momentum in recent years.

The Turkish textile and clothing industry plays a significant role in world trade. It has the capability to meet the high product standards required internationally and can compete in international markets in terms of quality and breadth of product portfolio (Export Promotion Center of Turkey, **www.igeme.gov.tr**, Sector Info pages, Clothing industry).

## 5.2 Overview of the leather industry in Turkey

The Turkish leather sector has a history dating back over 500 years. Initial efforts to modernise the industry began in the 1970s, but significant progress on a real industrial scale did not begin until the mid-1980s.

In 2005 the Turkish leather industry produced around 5.4 million units of leather wear, 5.8 million tonnes of stout leather and 41 million pairs of leather shoes. In addition it produced leather articles with a value of USD 23.1 million (Export Promotion Center of Turkey, www.igeme.gov.tr, Sector Info pages, Leather Wear industry).

**Figure 7: Leather goods production in Turkey**

| Leather goods | 2003 | 2004 | 2005 |
|---|---|---|---|
| Stout leather ('000 tonnes) | 6,378 | 6,469 | 5,893 |
| Leather wear products ('000 units) | 6,297 | 5,775 | 5,419 |
| Leather articles (USD million) | 23.7 | 24.3 | 23.1 |
| Leather footwear (million pairs) | 53 | 48 | 41 |

*Source: State Planning Organisation of Turkey*

There are nearly 1,500 companies in the Turkish leather sector, employing around 23,000 people. Leather manufacturers are mainly located in Istanbul (Tuzla), Izmir (Menemen), Tekirdağ (Çorlu), Uşak, Denizli, Bolu (Gerede), Bursa, Balıkesir (Gönen), Isparta, Hatay and Manisa (Kula). Istanbul (Zeytinburnu) is considered the most important trade centre for the Turkish leather wear industry.

Turkey can now produce all the machinery and 90% of the chemicals it needs for the production of leather. It also exports these items.

The leather sector's export value was over USD 761 million in 2006 and its share in total exports was 0.9%. The most important item exported was leather wear products, with a share of 32.2% of total leather goods exported in 2006 (Export Promotion Center of Turkey, www.igeme.gov.tr, Sector Info pages, Leather Wear industry). More than half of Turkey's officially recorded leather exports come from sales to tourists.

Exports of leather wear were mostly directed to the Russian Federation and other Commonwealth of Independent States (CIS) countries through shuttle trade. However, following the economic crisis in the Russian Federation in 1998, the industry started to look for new export markets. It now exports to over 100 countries, including the USA, Spain, Canada and Scandinavian countries.

Exports of leather wear were valued at USD 245 million in 2006. The majority of exports were to Germany (27.3%), France (13.7%) and the Russian Federation (8.6%). Other major markets were the USA, Spain, the Netherlands and England (Export Promotion Center of Turkey, www.igeme.gov.tr, Sector Info pages, Leather Wear industry).

Besides leather wear, the Turkish leather products sector (leather belts, suitcases and handbags) is also highly developed. Exports of these products increased by almost 18% between 2005 and 2006, achieving a value of USD 95.8 million in 2006. The majority of these leather goods were exported to the USA (18.7%), England (17.2%) and the Russian Federation (13.4%). Other major markets were Germany, Italy, China and Canada (Export Promotion Center of Turkey).

## 5.3 BAT awareness and related projects

Most of the Turkish institutions spoken to (15 interviewees in total) demonstrated a certain level of awareness of the BAT approach. This included public organisations and authorities such as the Ministry of Environment and Forestry, as well as private sector organisations such as the Textile Employers Association and the Textile Dyeing and Finishing Industrialists Association. They have all been active in developing a common understanding of the IPPC Directive and establishing basic awareness of BAT. For instance, in 2003 the Textile Employers Association translated and published the IPPC Directive and the relevant BREF in cooperation with the Textile Dyeing and Finishing Industrialists Association. Other organisations such as the Regional Environmental Center for Central and Eastern Europe (REC) and the Middle East Technical University have been active in demonstrating new technologies, running training programmes and implementing projects.

The Ministry of Environment and Forestry has carried out a capacity-building project on adopting the IPPC Directive. The purpose was to develop a framework for IPPC legislation and a blueprint for the institutional infrastructure needed for the implementation of the Directive. The activities of the Ministry are ongoing. A second project has been initiated with the following goals:

- Preparing an implementation strategy for the IPPC Directive
- Developing communication between the relevant institutions and authorities

- Carrying out the implementation strategy
- Running pilot plant studies and capacity-building programmes

Full membership of the EU would mean Turkey being required to adopt the IPPC Directive. However, Turkey is also considering a negotiation period like that for other EU Member States. To date, the efforts of the Ministry and involvement of the private sector have been insufficient for BAT to be implemented. The main issue is that the current permit system is not integrated. First, the necessary structures need to be established in the country. Although the Ministry has taken the initiative in this regard, the interviewees stated that the private sector also needs to be involved.

Representatives of the Ministry interviewed in the study also believe that new structures are needed, and that they would benefit greatly from the experience of other Member States who have already been successful in this respect. They are very interested in cooperating with the Federal Environmental Agency in Germany, as they suspect it has the best experience in this area. The Turkish Ministry of Environment and Forestry is currently undergoing restructuring and is keen to benefit from the experience of the Federal Environmental Agency, ideally within the framework of a project.

*Planned activities*

In the interviews, representatives of the Turkish Ministry of Environment gave details of their approach to promoting BAT. The Ministry has prepared a new project and proposed the Scientific and Technological Research Council of Turkey (TUBITAK) as the source of funding. The project involves drawing up BAT guidelines for the sector and furthering their implementation in industrial facilities. It is expected to begin in 2008.

The project sets itself a number of goals. Thus it aims to identify the framework conditions which favour cleaner production and at the same time determine any obstacles to the further application of cleaner production. The project will look at research, the legal framework and implementation in equal measure. Its main focus will be on the following areas:

- Identifying the potential support of the Ministry of Environment, the Ministry of Industry and other institutions for promoting cleaner production
- Identifying existing and planned instruments for promoting cleaner production
- Identifying legal structures that would promote cleaner production
- Identifying existing human and other resources in this field
- Carrying out further research into the existing technical, legal and administrative capacity, and comparing capacity and applications on an EU and international level

Interviews with TUBITAK and the Middle East Technical University showed that both organisations are open to new projects in this area. The interviewees thought that more demonstration projects could be useful for the textile and leather sectors. More projects in different sub-sectors could also encourage companies to employ BAT, especially if the results were similar to those seen in one cotton factory, for example, where water consumption decreased from 7,000 to 5,000 tonnes per day thanks to BAT measures.

Awareness of environmental issues and BAT appears to be much higher in the textile sector than in the leather sector. This could be because the leather sector is still suffering from the

drop in exports caused mainly by the crisis in Russia and so is currently more preoccupied with marketing campaigns aimed at winning back its markets.

## 5.4 Possible drivers of BAT

Pressure from buyers appears to be the main driver for the spread of BAT in Turkey. The representatives of the Turkish textile and leather sector said that they take the necessary measures to comply with buyers' requirements in the environmental area. They would like to be sure this also happens in other supplying countries such as India or China, but they doubt the same environmental criteria apply. They also said that they would be happy to employ BAT if it gave them some advantage over their competitors in other countries. Thus they would support the initiative for employing BAT if their European buyers took this into consideration in their buying decisions, giving them an edge over their Asian competitors.

A further key factor in promoting BAT is state regulation. This is particularly relevant in the case of Turkey, since the country is making preparations for implementing the EU legal framework in any case, as already mentioned.

Turkey already has a system of legislation for preventing and controlling environmental pollution. The aim of these laws is to reduce air, water and ground emissions, albeit with separate licences and issuing authorities for each area. Since 2004, licenses have been issued by the municipalities, special provincial administrations and the Ministry of Environment (Environmental Impact Assessment reports). The regulatory conditions are not in line with EU standards.

The main regulations are:

- Special Provincial Administration Law No. 5302
- Municipalities Law No. 5393
- Metropolitan Municipalities Law No. 5216

The Ministry of Environment is working on draft regulation to change the permit system. An initial draft has been sent to the associations of the different sectors for comment.

The private sector is in need of an effective information exchange with relevant government bodies, which does not exist at the moment. There should be a central point for this purpose, which might be in the Ministry, equipped with qualified staff competent in all issues relating to BAT.

Financial support is perceived an important factor in helping promote BAT. At present, such support is lacking. There are incentives for research and development projects by SMEs and also larger companies. These kinds of projects are funded either by TUBITAK or the Foundation of Technology Development, Turkey (TTGV). However, Turkish business people are not used to project culture and therefore sometimes have difficulty completing the funding procedures.

Some interviewees also suggested issuing interest-free environmental loans as a useful way of promoting BAT.

*Eco-labels*

According to interviewees, there is no domestic demand for products with eco-labels in Turkey. The industry is in favour of introducing eco-labels but the public does not know much about them. Public awareness of environmental issues must therefore be raised. The Ministry of Environment plans to launch a project on eco-labels and is looking for suitable partners. It has already organised a seminar on this topic together with organisations such as Ekotex and believes that this kind of information campaign is useful. It also plans to organise further seminars and conferences at which organisations such as Ekotex could inform participants about labelling.

A government incentive exists for the Oeko-Tex Standard 100. Under this incentive scheme, 50% of the certification costs are subsidised by the Undersecretariat of Foreign Trade (www.dtm.gov.tr). The procedures to be followed are sometimes complicated or difficult, however almost all companies who receive the certificate do apply for support under the scheme.

Together with the development of public awareness for eco-labels, it was suggested that eco-labels should be made a legal requirement for the textile sector. The regulations could be strengthened by implementing the necessary controls. However, nothing concrete is planned in this area at present.

## 5.5 Possible obstacles

The interviews revealed that environmental protection is generally perceived as a cost factor. Companies need to be shown that using BAT can bring them savings and decrease their operating costs. There are no special incentives for using BAT in Turkey. The funds or special credits from TUBITAK and TTGV for R&D projects are open both to SMEs and larger companies, but the companies have to design and realise a project in full – something that is particularly difficult for smaller companies. Moreover, to benefit from this type of funding projects must involve an innovation of some sort, as only projects of this nature are supported by funding from these organisations.

According to interviewees, Turkey lacks the infrastructure for applying BAT at the moment. Representatives of the Middle East Technical University said that companies do not have the necessary capacity; for example, selecting the best available techniques would mean carrying out many different kinds of tests, which is difficult for companies in the textile and leather industry. Currently, changes generally take place as follows: universities kick off the process with research work and then private consultancy companies enter the market and show companies how they can apply the modernisations in their operations.

Some interviewees were in favour of regular controls of facilities by the Ministry of Environment. The Ministry does in fact have some kinds of controls or audits, but they are mainly limited to certain regions close to Istanbul. In production areas such as Maras in East Anatolia regular controls are almost completely lacking. A system and a structure must be put in place for appropriate monitoring. As already mentioned, the permit system also needs to be integrated. However, the Ministry of Environment lacks the know-how and experts needed to establish the necessary structures at present.

Some private sector representatives such as the Textile Dyeing and Finishing Industrialists Association believe that if IPPC and BAT are left to the public sector they will not be applied in practice, or at least will take a long time coming. Interviewees suggested involving the private sector and applying best practices.

## 5.6 Future requirements for promoting BAT

Incentives and appropriate credits are particularly effective ways of promoting BAT. Demonstrations of best practices can also be helpful, such as the project in the cotton factory mentioned above. Information about projects like this would help enlighten the sectors about the advantages of BAT.

There is a need both for more experts and for improved know-how of current experts in the public and private sectors. Information campaigns and training sessions would be extremely helpful for promoting BAT. BREFs and BAT guidelines for different sub-sectors could also be very helpful in supporting those who want to use BAT. These documents might also serve as a sort of roadmap for the application of BAT.

The main goal is creating the right structures for BAT. What these structures are is a question currently being studied by the Ministry of Environment within the context of the IPPC project. Although the project is not yet over, it already appears that more work will be needed to identify and build the right structures.

## 5.7 Conclusions

There is a high level of awareness regarding BAT in Turkey and there are ongoing efforts to raise awareness and promote the use of BAT. However, the BREFs are highly complicated and further capacity-building work is needed, both for companies and for the relevant government bodies.

An information centre or some sort of institute would be useful for helping the private sector to apply BAT. At present there is no body which can act as a contact point for companies interested in BAT or those who require some sort of support.

Although both the public and private sectors have a positive approach, a mechanism is needed for establishing suitable structures and systems. Cooperating with international organisations would speed up the work of the public sector. Good examples from other countries would also be extremely helpful.

The private sector is interested in BAT, and would be even more interested if it saw that applying BAT would give it a competitive edge in international markets. Turkish leather and textile sector organisations are somewhat hesitant since they believe that environmental protection by suppliers is on a lower level in countries such as India or China than in Turkey. The sector would be willing to switch over to new, cleaner technologies if it gave them a positive image in their target markets.

More BAT demonstration projects with favourable results would encourage companies to take the initiate in this field. Guides of some sort would also help them implement BAT in their own factories. The larger companies are expected to be the pioneers.

An integrated permit procedure, strict and consistent controls plus a clear allocation of responsibilities between the different official agencies and authorities would also make a major contribution to helping the implementation and application of BAT.

# 6 China

## 6.1 Overview of the textile industry in China

China has the world's largest textile and clothing industry. Its export volume rose by an annual average of 16.8% between 1970 and 1999 (People's Daily, 2000). Textile and clothing exports contributed approximately USD 36 billion to China's exports in 2006, the largest export markets being the USA and Europe.

The main environmental problems related to the textile industry are waste water, waste gas and noise. Of these, waste water is the biggest problem in terms of its impact on the environment. The table below gives the figures for waste water generation by the textile industry in recent years. From the mid-1990s, the total amount of waste water discharged by the textile industry annually has been over 1.1 billion $m^3$, which accounts for over 6% of all the waste water from Chinese industry and makes textiles one of the top ten polluting industries. The chemical oxygen demand (COD) is around the 300,000 tonnes mark, which accounts for roughly 5% of the total COD of Chinese industry.

**Figure 8: Waste water from the Chinese textile industry, 1998 to 2002**

| Year | Waste water | | COD | | Waste water discharged directly into the sea (tonnes m) | Achievement of standard (%) |
|---|---|---|---|---|---|---|
| | Textile industry (tonnes m) | Share of total industry (%) | Textile industry (tonnes '000) | Share of total industry (%) | | |
| 1998 | 1,101.28 | 6.43 | 369.6 | 4.62 | 72.56 | 59.49 |
| 1999 | 1,212.40 | 6.14 | 361.2 | 5.22 | 72.40 | 63.38 |
| 2000 | 1,256.49 | 6.47 | 384.6 | 5.46 | 94.21 | 77.91 |
| 2001 | 1,326.98 | 6.55 | 249.3 | 4.10 | 55.71 | 91.61 |
| 2002 | 1,366.00 | 6.59 | 271.5 | 4.65 | 26.57 | 93.80 |

The four main sources of waste water from the textile industry are waste water from dyeing, chemical fibre production, wool scouring and dissolved fibre waste. Of these, dyeing is the main source of waste water pollution. Comprehensive statistics are lacking, but dyeing companies alone discharge about 3-4 million tonnes of waste water every day.

### Waste gas

Waste gas from the textile industry comes mainly from the about 20,000 coal boilers installed. Around 85% of these boilers meet the national soot disposal standard. The following table gives the figures for waste gas production by the textile industry (figures relate to companies with annual revenues of over CNY 50 million).

**Figure 9: Waste gas from the Chinese textile industry, 1998 to 2002**

| Year | No. of co's | Waste gas billion $m^3$) | | $SO_2$ discharge (tonnes) | | Soot discharge (tonnes) | Bug dust dis-charge (tonnes) | Annual coal consumption ($10^4$ tonnes) | | Annual oil consump-tion ($10^4$ tonnes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Burning of fuels | Produc-tion | Burning of fuels | Produc-tion | | | Raw coal | Total | |
| 1998 | 5,477 | 136.7 | 133 | 285,265 | 1,150 | 148,575 | 1,089 | 7 | 1,265 | 74 |
| 1999 | 5,528 | 137.6 | 71 | 246,767 | 417 | 120,652 | 2,260 | 14 | 1,206 | 91 |
| 2000 | 6,077 | 153.4 | 44 | 256,848 | 266 | 119,069 | 2,557 | 18 | 1,385 | 94 |
| 2001 | 6,643 | 182.8 | 109 | 272,908 | 191 | 118,700 | 2,647 | 8 | 1,635 | 89 |
| 2002 | 6,622 | 205.9 | 104 | 239,209 | 597 | 107,399 | 3,813 | 10 | 1,690 | 111 |

In 1998, the 5,477 companies in the textile industry consumed 12.65 million tonnes of coal and discharged 136.7 billion m3 of waste gas by burning fuels, containing 285,265 tonnes of sulphur dioxide and 148,575 tonnes of soot. In 2002, by comparison, 6,622 companies consumed 16.9 million tonnes of coal and discharged 205.9 billion m3 of waste gas by burning fuels, containing 239,209 tonnes of sulphur dioxide and 107,399 tonnes of soot. The waste gas discharged by burning fuels accounts for 95% of the total waste gas produced by the textile industry, and the sulphur dioxide accounts for almost all of the industry total. Pollution from coal-burning is one of the most important environmental problems in China, with the textile industry contributing to it substantially.

Another major source of waste gases is the production process, especially for viscose. This process requires a large amount of sulphur dioxide as its raw material, and the outdated machines used and incomplete control of the process lead to large amounts of waste gases being discharged.

### Noise

Noise is also a major problem in the Chinese textile industry. Because of the use of shuttle looms, noise levels can be as high as 90-106 dB(A).

**Figure 10: Noise levels in Chinese cotton mills**

| Rank | Province | Number of companies | Noise value, dB(A) | |
|---|---|---|---|---|
| | | | Maximum | Minimum |
| 1 | Shanghai | 10 (10) | 105.0 | 102.2 |
| 2 | Jiangsu | 18 (28) | 104.8 | 95.3 |
| 3 | Zhejiang | 5 (6) | 103.3 | 100.1 |
| 4 | Fujian | 3 (3) | 105.0 | 100.0 |
| 5 | Shanxi | 4 (7) | 103.5 | 100.2 |
| 6 | Henan | 10 (12) | 104.0 | 102.3 |
| 7 | Hebei | 6 (9) | 103.9 | 98.9 |
| 8 | Liaoning | 9 (16) | 104.2 | 98.9 |
| 9 | Heilongjiang | 5 (6) | 105.0 | 98.5 |
| 10 | Inner Mongolia | 2 (4) | 103.5 | 101.0 |
| 11 | Xinjiang | 3 (4) | 101.7 | 91.0 |

Average noise levels in Chinese cotton mills are 100-105 dB(A), which is well over the pain threshold. Most of the shuttle looms used are very old which leads to the high noise levels.

## 6.2 Overview of the leather industry in China

China is the biggest leather-producing country in the world, with over 20,000 enterprises engaged in the production of leather or fur products. In 2005, foreign exchange earned by the Chinese leather industry through exports reached a level of USD 32.679 billion, up 19% year-on-year (Li, 2006).

China's position as a leader in leather is due to its various competitive advantages. The largest of these advantages is its ability to take in redundant rural labour, which keeps labour costs low. Currently the industry employs more than five million people and offers 400,000 to 500,000 new jobs every year (ibid). China's other competitive advantages include its integrated industrial/value chain and relatively high processing level compared to other developing countries and emerging market economies. However, it still has to import a lot of cow hides and high-grade leather.

According to statistics, the leather industry is the third most polluting industry within light industry, second only to the paper and brewing industries. Water pollution is the main problem. China has comparatively plentiful access to water, so water use is high. According to an industry investigation in 2005, there are 837 fur and leather manufacturing enterprises, which are responsible for a total of 180 million $m^3$ of waste water and 75,000 tonnes of COD.

In relatively central areas such as Zhejiang, Henan, Hebei and so on, water pollution is increasingly a problem. With growing requirements in terms of environmental protection, this has become a key factor in the development of the leather industry.

## 6.3 BAT awareness and related projects

None of the organisations interviewed as part of the study were aware of the BAT as outlined in the BREFs. All the interviewees expect for one were unaware of the term "BAT". No measures have been carried out by Chinese organisations to promote the application of BAT in the textile and leather sector, nor are any such measures planned. However, all the interviewees had previously carried out activities or projects related to cleaner production and are therefore familiar with environmentally friendly techniques. Recent developments in the legislative area are of particular interest here.

In 2002, the Chinese government approved the Cleaner Production Promotion Law. This law forms the main framework for employing more environmentally friendly techniques. From January 1, 2008 onwards, all enterprises in all sectors have to comply with the legislation. Indeed, many large and medium-sized companies began taking measures aimed at cleaner production earlier on so as to avoid any risk of being closed down if they did not meet the new requirements. In the meantime, more and more consulting companies for cleaner production have set themselves up and are helping companies in the manufacturing industry implement techniques and technologies aimed at raising efficiency in their production processes.

Also of note are the activities of the S&T Standard Department of the State Environmental Protection Administration (SEPA). The Department has drawn up a strategy for constructing a national environmental technology management system within the framework of the 11th Five-Year Plan. This strategy:

- Describes the objectives of the future national environmental technology management system
- Studies the BAT environmental technology management system both in America and the EU
- Analyses problems in the existing Chinese environmental technology management system
- Introduces the structure of the planned system and its **six components:**
  - A dictionary/guidelines on best available techniques (BAT) for pollution prevention and treatment
  - Active policies on pollution prevention and treatment technology
  - Standards for environmental technology
  - An institution for assessing environmental technology
  - Mechanisms for demonstrating and diffusing environmental technology
  - A report on the national development of environmental technology

## 6.4 Possible drivers of BAT

Almost all interviewees thought that the following factors could contribute to the spread of BAT/cleaner production in all sectors, including the textile and leather industry:

- A national policy on energy conservation and pollution reduction
- National laws and ordinances targeting environmental pollution control
- Promotion of cleaner production
- Assessment of environmental impact

However, since detailed measures to implement these national policies and laws at the local level do not exist, some interviewees thought that these factors were just general encouragement, and not sufficient in themselves.

Most of the interviewees mentioned that the financial incentives regulated in the Cleaner Production Law and the Small and Medium-Sized Enterprise Promotion Law could make a significant contribution to the spread of cleaner production.

**Figure 10: Key recent Chinese legislation**

**Law on the Promotion of Cleaner Production**

The Law on the Promotion of Cleaner Production was published in 2002 and took effect in 2003. It contains the following financial regulations favourable to cleaner production:

- **Article 7:** The State Council shall formulate fiscal and tax policies conducive to the implementation of cleaner production
- **Article 33:** A special Technological Development Fund will support the following:
  - Cleaner production research, demonstration projects and training
  - Key cleaner production innovation projects

- Other technological innovation projects listed in the voluntary environmental pollutant reduction agreements

- **Article 34:** Part of the funds that the State will set up for the promotion of small and medium-sized enterprises shall be set aside to support cleaner production
- **Article 35:** With respect to products produced from waste and materials reclaimed from waste, the taxation authorities shall reduce or exempt these from value-added tax in accordance with relevant national regulations

**Law on the Promotion of Small and Medium-Sized Enterprises**

This law was also published in 2002 and took effect in 2003. It contains the following financial regulations favourable to BAT:

- **Article 12:** The State establishes development funds for small and medium-sized enterprises
- **Article 13:** The funds that the State will set up for the promotion of small and medium-sized enterprises shall explicitly be used to support cleaner production in accordance with Article 13 (7)
- **Article 29:** The State formulates policies to encourage small and medium-sized enterprises to:

  - Develop new products

  - Adopt advanced technology, manufacturing techniques and equipment

In addition to the regulations outlined above, the two laws contain special provisions stating that enterprises can receive preferential loans if they adopt or apply cleaner production processes.

Beyond direct legislation, further drivers include programmes and plans implemented by the government to promote environmental protection and the recycling-based economy. The interviews provided only fragmentary information about these policies, programmes, notices and suggestions. This information is summarised below.

### Development plan for a national environmental management system.

During the 9th Five-Year Plan, the National Environmental Protection Administration (now SEPA) began to work out policies for pollution prevention and treatment which also promote the development of new technologies.

There were a number of new developments during the 10th Five-Year Plan. The National Environmental Protection Administration published successively 15 pollution prevention and treatment policies, including policies on waste water produced by the **dyeing industry,** dangerous waste, sulphur dioxide produced by burning coal, diesel vehicles, motorcycles, the **leather and fur industry,** and so on.

### The circular economy (recycling based economy)

The project “Policies and Regulations for Promoting Development of Circular Economy in China” was officially launched in August 2005. This is the second phase of the research on recycling-based economy policy and law development, organised and supported by the World Bank and the Italian government. The first phase led to the creation of the “Circular Economy Promotion Law”.

The National Development and Reform Commission (NDRC) has some tax policies that support the development of the recycling-based economy. It has also issued “energy-efficiency product catalogues” and “suggestions on governmental energy-saving procurement”. These policies include reduction or exemption of taxes on products in the scope of this catalogue, as well as a definition of the products that shall be in the scope of public procurement.

The NDRC and the SEPA have launched a second round of pilot projects on the recycling-based economy. Since October 2005, some 178 projects have been carried out.

### Specific legislation for the leather sector

Recently, in order to control the export of high energy consumption products, high pollution products and resource products, various bureaus have announced restrictions on the trade in raw skins. According to these restrictions, from 1st January, 2006 the import of raw skins and the export of semi-finished and finished leather products would cease. The aim of this restriction is to steer high pollution industries in the direction of technological innovation, thereby enhancing the added value of their export goods. This is in line with the underlying drive in China to develop a more strongly knowledge-based economy. At the same time, it will reduce environmental damage.

In recent years the leather industry has become increasingly aware of environmental protection. More and more environmental protection and clean leather production technologies have been applied in the industry, and waste water treatment technology is becoming mature. Key leather production enterprises have all set up consummate waste water treatment facilities and increased their environmental protection investment gradually. The waste water discharged by the leather industry has been reduced to less than 1% of the total amount in China. Statistics from the China Environment Yearbook 2004 show that the up-to-standard rate of waste water discharge from leather production and fur enterprises above a designated size is over 90% (Li, 2006).

### Eco-labels

With respect to eco-labelling, interviewees mentioned mainly the “China Environmental Labelling Product” system and the enterprise management certification systems ISO 9000 and ISO 14000. Almost all interviewees thought that product labelling and identification systems promote the spread of BAT, but some interviewees pointed out that they should not be the key measure. Some interviewees also pointed out that the labelling systems focus mostly on final products and pay little attention to the production process. However, some were of the opinion that labels could help capture overseas markets and would help promote their own exports.

The State Economic and Trade Commission and the China Light Industry League jointly launched the world's first “Genuine Eco-Leather Mark” in 2003. Twelve leather-manufacturing enterprises were granted the mark at that time. The Genuine Eco-Leather Mark is a proven trademark registered by the China Leather Industry Association with the State Administration for Industry and Commerce. The mark was introduced in response to barriers to the leather trade set by some countries in the form of technical requirements placed on products, and it is intended to open up a “green road” for Chinese leather to enter the European market. The mark guarantees not only the quality of the product and satisfactory after sales service, but also indicates that its content of four special environmentally relevant chemicals meets the Genuine Eco-Leather Standard set by the China Leather Industry Association (People’s Daily, 2003).

The Genuine Eco-Leather Mark is an extension of the Genuine Leather Mark and plays a critical role in increasing environmental awareness, aiming at the sustainable development of leather industry and safeguarding the health of customers. It is used on finished leather and fur products that meet special environmental requirements, stress environmentally friendly features and care about the health of customers. By the end of 2006, the number of products bearing the Genuine Leather Mark was over 450, including shoes, leather garments and suitcases (China Leather Net, 2007).

## 6.5 Possible obstacles

Some interviewees pointed out that the BAT system differs from the current environmental technology management system of SEPA and NDRC in China and that this may cause some problems (e.g. confusion, conflicts) for the spread of BAT.

The main challenge for the implementation of BAT and cleaner production in general remains the enforcement of laws and regulations. Implementing and enforcing the Cleaner Production Law is a case in point, as the lack of consistent monitoring impairs the diffusion and application of relevant technologies.

Furthermore, companies have a low level of technical understanding and management capacity due to a lack of training and promotion. In order to change this situation, the national government and local institutions have initiated programmes for promoting clean production. These should be increased and enhanced, possibly within the framework of international cooperation.

## 6.6 Future requirements for promoting BAT

In general, most of the interviewees – including researchers, governmental officials, cleaner production experts and some sector experts – considered the “requirements of end customers/trading firms” one of the most important factors in promoting BAT. “Reducing factor costs” and “image enhancement” were also mentioned by some interviewees as important incentives.

**Factors which could help the spread of BAT in China include:**

- Adjusting the European BAT system to the Chinese context/situation
- Incorporating the BAT system into the existing environmental standards system
- Considering China's current status with regard to development (development status, regional disparity)
- Cooperating closely with the relevant Chinese authorities
- Paying sufficient attention to productivity efficiency in drawing up environmental protection requirements
- Paying attention to the cost that the enterprises, especially SMEs, have to bear

**Other factors of importance also include:**

- Introducing a permit system into the NDRC project approval process to promote process/technology advancement, control energy efficiency and reduce resource consumption
- Environmental impact is generally assessed by environmental experts rather than special industry experts. Some interviewees therefore suggested involving industry experts in assessing the environmental impact of industrial projects
- Some interviewees recommended an international cooperation project as a starting point for spreading BAT. Given the different ways of thinking involved in the BAT system and China's existing technology management system, it would be a good idea to carry out a study first to find out how the current status in China and industry specifics can be combined for the purpose of spreading BAT. Following this, BAT projects could be developed and implemented
- Promoting green consumption
- The government must lead the way in promoting key requirements with regard to technology standards and industry modernisation. To ensure successful implementation, joint efforts with the enterprises concerned, cross-department cooperation in administrative bodies and promotion by industry associations will be required. The government should also summarise and publicise the experience gained from successful pilot demonstrations within enterprises
- Since BAT relates to both environmental and trade issues, the Chinese government is highly cautious in this area, believing that Western countries could use environmental standards as trade barriers and so influence the export of goods and the development of trade and employment in China. For this reason it is important to define BAT as an environmental protection issue, not a trade issue
- Enterprises that worry about the investment risk in technology upgrading are not willing to carry out technical innovations. The government should compensate or lessen the tax burden of pilot enterprises that take environmental action
- Some experts thought that economic development is more important for China than the environment. People would start to consider environmental protection only when the economy had reached a certain level of development. There is regional disparity regarding the enforcement of the existing regulations and standards, giving rise to

domestic pollution transfer within China: less developed areas are still attracting dirty industries which have been phased out in developed areas

What is required is also awareness creation amongst managers, decision-makers and technicians, as well as for industrial associations, industrial design institutions, engineering consultancies, environmental impact assessment bodies, intermediaries, local environmental protection departments and relevant administrative officials in the leather and textile industry associations. Awareness creation and information dissemination amongst the general population is also important, as are financial measures. Other measures recommended by the interviewees include support for training, EU study tours for government representatives and demonstration projects.

Two interviewees recommended NDRC as the ideal initiator or partner. Three other interviewees recommended industrial associations. Other recommendations included SEPA and the Ministry of Science and Technology (MOST).

An urgent need is felt for international cooperation projects, including feasibility studies, demonstration projects in general and technical demonstrations in pilot enterprises, accompanied by cleaner production audits, training seminars, the issuing of new standards and support for technological industrialisation. Projects could take the form of official assistance from the EU or form part of international cooperation projects. Specifically, they might involve subsidies for technical innovations or industrialisation experiments, a development fund for small and medium-sized enterprises, technical innovation funds or a Cleaner Production Fund.

It is also felt that these cooperation projects would be best placed where:

- Local government is willing to offer its support
- Local government can access additional support from national and regional government
- The textile and leather industries are most developed, e.g. in Jiangsu, Zhejiang, Guangdong and Hunan provinces

## 6.7 Conclusions

The Chinese textile and leather industries are keen on new technologies, but only as long as they are compatible with the existing situation in the country. At present the Chinese environmental technology management system and BAT are very different, which would make it difficult to spread BAT in China. There is a need to change the mode of administration, way of thinking and structure of work.

What would lead to greater support for the spread of BAT would be awareness creation amongst enterprises and industrial consumers, plus financial support based on international cooperation projects and EU support for technology aid and capacity building.

# 7 India

## 7.1 Overview of the textile industry in India

The textile industry in India makes a substantial contribution to GDP and constitutes one of the country's major export sectors. It covers a wide spectrum ranging from small-scale to large integrated mills using modern machinery and equipment (CPCB, 2007). India has a total of 2,324 textile companies (ibid).

India makes a major contribution to world trade in cotton yarn, accounting for some 25% of the total. It is the second largest producer of cotton and the third largest producer of cotton yarns and textiles (Guhathakurta et al., undated). The government plays a highly active role in promoting the increasing exports from the country. Between 2004 and 2005, exports from the textile sector went up 23% to almost USD 12 billion. The ready-made garment sector is the biggest segment, contributing over 46% of the total textile exports. Exports have grown at an average of 9.47% per annum over the last decade (VGGIS, 2007).

**Figure 11: Total Indian exports of textiles**

| **Commodities** | **2004-2005 (USD million)** |
|---|---:|
| Ready-made garments | 6,038.69 |
| Cotton textiles | 3,290.31 |
| Man-made textiles | 1,948.72 |
| Wool and woollen textiles | 66.57 |
| Silk textiles | 406.82 |
| **Total** | 11,751.11 |

*Source: Compendium of Textile Statistics, 2006, Office of Textile Commissioner*

According to data from the Directorate General of Commercial Intelligence & Statistics, in 2005 and 2006 the EU and the USA accounted for about 62% of Indian textile exports. The EU is the largest market for Indian exports after the USA. According to data from EUROSTAT, in January to July 2006 India's position in the EU textiles and clothing markets was third after China and Turkey, with a share of approximately 8.1% (GOI, 2007).

**Figure 12: Production statistics for India**

| **Production of fibres** | **kg million** |
|---|---|
| Raw cotton | 4,122 |
| Man-made fibre | 1,023 |
| **Production of yarn** | |
| Cotton yarn | 2,272 |
| Total spun yarn | 3,223 |
| Man-made filament yarn | 1,109 |

*Source: Compendium of Textile Statistics, 2006, Office of Textile Commissioner*

### Pollution problems in the textile industry

The environmental problems typically caused by the textile industry – outlined in section 1.1 of this study – apply equally to India. Waste water treatment in India is mostly limited to primary and secondary processes (mechanical and biological waste water treatment), which are not very effective in the removal of pollutants such as sulphides, colours, heavy metals, etc. The level of environmental pollution caused by the textile industry in India is correspondingly high.

#### Clusters

The concentration of textile and tanning industry in clusters increases the environmental impact on geographically narrow areas. This impact is even more significant given the limited local water supply. Cluster concentration results in large volumes of waste water being discharged to receiving media and causing great environmental pollution.

## 7.2 Overview of the leather industry in India

The leather industry contributes substantially to the Indian economy in terms of income and employment generation. The export of leather and leather products has increased steadily over past decades from USD 47 million in 1956/1957 to USD 2,695 million in 2005/2006 (CLE, 2007). It ranks 8th in the export trade in terms of foreign exchange earnings for the country while meeting 10% of the global requirement for leather and leather products (ibid).

The composition of leather exports from India has changed greatly over past decades. The country has moved from being primarily an exporter of raw materials in the 1960s to first and foremost the source of value-added products in the 1990s. The value-added products at present constitute around 80% of the total exports from the industry, compared to 7% in 1956/1957. The Indian leather industry accounted for roughly 2.5% of the global leather trade in 2004, including non-leather footwear. The industry is organised in five categories: (1) tanning and finishing; (2) footwear and footwear components; (3) leather garments; (4) leather goods (bags, wallets, belts, gloves, accessories, etc.); and (5) saddlery and harness articles. The major production centres for leather and leather products are located in Tamil

Nadu, West Bengal, Uttar Pradesh, Maharashtra, Punjab, Karnataka, Andhra Pradesh, Haryana and Delhi (ibid).

**Figure 13: Indian exports of leather and leather goods**

| Commodities | 2005-2006 (USD million) |
|---|---|
| Finished leather | 606.06 |
| Leather footwear | 786.76 |
| Footwear components | 179.04 |
| Leather garments | 328.44 |
| Leather goods | 649.14 |
| Saddlery and harness articles | 76.40 |
| Non-leather footwear | 68.75 |
| **Total** | **2,694.59** |

*Source: Subramanium (2003)*

### Pollution problems in the leather Industry

Effluent discharged by the leather industry is not adequately treated and causes pollution of the surface and ground water, thus not being suitable for agriculture and human consumption. Unlike in China, effluent is largely discharged in seasonal rivers where it is less diluted.

The current regulations of the Central Pollution Control Board (CPCB) stipulate that sulphides in the effluent should not exceed 2.0 mg/litre. However, the actual concentration in tannery effluents is often in the range of 8.0 to 12.0 mg/litre. Other parameters such as the biochemical oxygen demand (BOD) and chemical oxygen demand (COD) are at least reasonably under control in most tanneries (Subramanium, 2003).

## 7.3 BAT awareness and related projects

The feedback from the 15 interviews indicates that most of the organisations were unaware of the BAT concept and the BREFs in particular. However, most were aware of some of the technologies mentioned in the BREFs since they were also being applied in India.

The BAT concept and BREFs are not being promoted in India yet, either fully or partially. However, a wide spectrum of activities is found that promote cleaner production. The activities include:

- Helping to import less environmentally damaging tanning material such as wattle extract, benefiting a large number of smaller tanners
- Adopting “zero liquid discharge” technology in tanneries regulated by the state of the Tamil Nadu
- Guidance from the Central Leather Research Institutes and other technical bodies on the management of hazardous solid waste in secured landfills

- A few of the organisations are involved in demonstration and training for new technologies and in projects on:
  - Effluent treatment
  - Waste minimisation
  - Replacement of chemical dyes with natural dyes
  - Cleaner tanning techniques for raw skin as well as for the whole leather production process[6]

A few of the institutions have not been directly involved in the promotion of technologies but in the development of ideas and the modification of new technology to the requirements of the leather industry. This includes:

- Roller brushes for removing salt
- Improved furnaces to reduce wood usage (Rajasthan)

Extensive research is also being carried out by organisations such as the Central Leather Research Institute (CLRI) into areas such as:

- Characterising waste water and solid wastes discharged from the leather industry
- Implementing technologies for the treatment of liquid and solid wastes in tanneries in Tamil Nadu, Kanpur, Kolkata and Punjab

Most of the organisations interviewed were unwilling to disclose their future plans since they are still in the planning stages. There was also a reluctance to provide information regarding specific technological interventions.

Demonstration projects carried out by the UNIDO Regional Program Office in several tanneries, combined with dissemination of information, have proven to be very successful in propagating cleaner production.

Site visits abroad, such as that to tannery waste treatment plants in the Netherlands, have been useful in the transfer of advanced technologies to the Common Effluent Treatment Plants (CETPs) in Tamil Nadu.

Furthermore, there is a need for programmes helping the industries to understand their environmental impact and familiarising them with technical measures for reducing this impact.

[6] Including the introduction of reverse osmosis technology and accelerated solar evaporation techniques, reduction of TDS in tannery processing, cleaner tanning technologies, water conservation measures, leather process technology, leather chemicals, effluent treatment, product design and quality standardisation (including by-products), in-house keeping for the leather industry supporting secure landfill for the disposal of solid waste, management of reject from reverse osmosis units, membrane biological reactors, environmental management, and providing substitutes for polychlorinated biphenyl in the leather industry.

## 7.4 Possible drivers of BAT

All the interviewees were of the opinion that the necessary environmental legislation is already in place. Tanneries and textile industries in India are required to comply with the regulations of the Central Pollution Control Board (CPCB) and relevant State Pollution Control Boards (SPCBs). The legislation includes the Water (Prevention and Control of Pollution) Act 1974, the Water Cess Act 1978, the Environmental Act 1986 and the Public Litigation Act 1994. The promotion of Common Effluent Treatment Plants (CETPs) has been a major effort of both central and state governments (Subramanian, 2003).

What poses a problem, however, is the lack of enforcement of laws and regulations. The interviewees believe that there are many reasons for this, including the lack of properly trained staff from the SPCB to carry out monitoring and the absence of proper laboratory facilities for conducting reliable waste water sample analyses, for example. Newer laws are not required; however, further elaboration of laws is needed, as in the case of effluent discharge into CETPs. At present a law related to proper discharge of effluents exists but there are no laws related to the kind of effluents that can be discharged into the CETPs.

Industry-specific “”Minimum National Standards” exist for the environment. The CPCB sets the standards but the regional authorities, the SPCBs, can set more stringent standards if required. Sometimes the state governments make the standards more stringent than those of the CPCB, which according to interviewees is where the problem lies. On occasion these standards are so stringent and impractical that they are difficult for the industry to achieve, even if they wanted to.

Fundamentally, the interviewees believed that the frameworks and laws in the country were conducive to the import of modern technologies.

Buyer pressure more than any other factor appears to be the most important potential driver in the spread of BAT and cleaner production. In a few cases, pressure from NGOs and the public was perceived as being important. A case in point is the public interest in the litigation which was filed in the Supreme Court against the tanneries in the state of Tamil Nadu, as a result of which many tanneries were shut down. All the remaining tanneries in Tamil Nadu now have effluent treatment plants or are linked to CETPs. Interviewees also thought that the industry complied with the specification of buyers and would continue to do so within reasonable limits. The industry would be willing to adopt environmental technologies in line with the BAT approach as long as they could see that this would not put them at a competitive disadvantage.

The interviews revealed that another factor that plays a crucial role in the dissemination and uptake of BAT is the demonstrability of a technology before it is adopted and adjusted to the Indian context. Prescribing specific technologies is not ideal, and it is not a solution for BAT adoption in the long run. Many organisations interviewed, such as the Central Leather Research Institute (CLRI), were willing to participate in demonstration projects.

It was felt by the interviewees that financial incentives such as subsidies and tax concessions could support the promotion of BAT, as could information campaigns.

The industry was interested above all in the following topics: alternative uses of residual salts from the leather process and the proper disposal of residue. These are areas where the industry is interested in future collaborations for technological upgrading.

## Current legislation

### Textile industry

In order to promote cleaner production in the textile sector and for the modernisation of the textile sector, the Technology Upgradation Fund (TUF) scheme was introduced by the Indian government in April 1999. The scheme is intended to facilitate the introduction of state-of-the-art or near state-of-the-art technology in the industry. Existing units with or without expansion and new units are eligible under the TUF scheme.

### Leather industry

Because of the pollution they cause, leather tanneries in India are included in the "red" category of companies. Tamil Nadu has the highest number of tanneries. For a long time these tanneries were causing severe pollution. The early 1990s saw a public litigation being filed in the Supreme Court which forced the closure of many tanneries in Tamil Nadu and made the others adopt measures to combat pollution problems. In 1999, a working group under the chairmanship of the Central Pollution Control Board (CPCB) developed a holistic action plan for the prevention and control of pollution in tanneries. It proposed several far-reaching and long-term measures, including pipeline conveyance of treated waste water, membrane separation, chrome recovery, safe disposal of solid wastes and cleaner production technologies for tanneries (Subramanian, 2003).

Furthermore, the government of India launched the "Modernisation Scheme for the Leather Sector" under the 10th Five-Year Plan (2002-2007) to facilitate the modernisation, expansion and technological upgrading of all segments of the leather industry and to develop leather clusters/parks. The financial assistance under the scheme is an investment grant to the extent of 30% on plant and machinery for SMEs and 20% for other firms. The financial assistance is limited to an equivalent of about EUR 90,000 per company. This assistance is also available to companies investing their own resources over and above the funding ceiling (Integrated Development of Leather Sector (IDLS) Project Implementation Unit (PIU) Tannery Modernisation Scheme, Procedure – contact details – application format, www.clri.org/PME/Infbroch.doc (2007/06/026)).

### Eco-labelling

Most interviewees did not see eco-labelling as an important factor. It was felt that there is a lack of a domestic demand for eco-labelled products since consumers still want to get the best products for the cheapest prices and are unwilling to pay more for eco-labelled products. Some interviewees were of the opinion that if there were buyer demand for eco-labelling, the industry would support it. There is thus a need for generating awareness amongst the public regarding the importance of eco-labelled products.

## 7.5 Possible obstacles

There is a problem of both policy and compliance in India. The interviewees believed that what was required is a national policy on the location of industry, i.e. setting out the conditions under which an industry can be located in a specific area. In the absence of such a policy, industry is located everywhere in the country, thus increasing the problem of pollution.

According to the interviews, economic incentives by themselves do not seem to work. If a practicable and financially viable new technology is available, industry would apply it without the need for any kind of financial incentive. The same goes for information campaigns. What is required is a holistic environmental strategy with proper implementation of the existing legislation and appropriate economic incentives.

If large companies find a technology which would improve their standing in the market and lead to profit, they adopt the technology without any incentive in the form of taxes or subsidies from the government. This is true in the case of large industries which have access to such technologies and can afford them. However, small and medium-sized enterprises require economic incentives. There also seems to be a need for awareness generation regarding specific environmentally friendly production processes and available sources of funding. This can be taken up by the government itself or through possible collaboration with foreign organisations and institutions.

A large share of the textile finishing plants and tanneries in India are SMEs with comparatively low capacity. This means that the BAT standards would not apply to them even under EU law. Accordingly, a programme with intermediate measures will be needed.

The interviews further revealed a lack of official standards with regard to limits on pollution according to production scale. It is essential to have such standards in place in order to control pollution. One of the reasons for their absence could be a lack of expertise on the political/administrative side. Here, India could learn from examples in other countries. At the same time, industry has in some cases set voluntary benchmarks itself, for instance on water use in tanneries in Tamil Nadu.

General problems exist in the area of enforcement. There is a need for continuous monitoring as well as financial and human resources, which the State Pollution Control Boards (SPCBs) do not have. They also lack the capacity for enforcement, and there is a large problem with corruption. There is therefore a need to strengthen the SPCBs.

Another obstacle forms the classification of CETP sludge as hazardous under the Hazardous Waste Management Act 1986 and amendments thereof, irrespective of the chrome content. This impedes the development of options other than landfill.

The current laws according to most of the interviewees tend to be unrealistic given the situation in India. The pollution standards set up by the SPCBs are often stricter than those prescribed by the CPCB. The industry would not comply with these standards, since the cost of compliance is much higher than the cost of non-compliance.

Due to the difference between laws in various states the industry refrains from investing in modernisation in some cases since it is perceived as being too risky and putting companies at a competitive disadvantage compared to their competitors in other states.

Some interviewees thought that a pollution tax would be an ideal mechanism for decreasing environmental pollution. Few economic instruments of this sort are used in the country at present. However, there is an exemption from duties nad taxes for water recycling equipment.

The absence of benchmarks within the country impedes the spread of BAT. At present there is no official mechanism for information sharing or setting benchmarks. This makes it hard to assess the impact of the technologies put in place and also to measure whether the industry is meeting the relevant standards. An information exchange mechanism is required. This could be taken up by the government or the private sector, or with the involvement of both. Organisations such as the CLRI and CLE, which are already closely associated with the industry, could also be involved in the process.

## 7.6 Future requirements for promoting BAT

The interviews presented the following picture: even though there is a policy in place which is conducive for the transfer of technology, the industry needs additional market and policy incentives in order to accelerate and spread BAT in the country. The creation of competitive conditions is required in which active, environmentally aware companies were rewarded. Incentives would also provide an impetus for the industry to start following the rules and regulations. Possible market incentives could include tax benefits or penalties. The existing tax structure could be modified instead of having a separate green tax. Benchmarking of cleaner technologies would also be useful.

Market-based incentive systems are required to supplement the laws. Current instruments are more command and control type. Hence different market mechanisms and infrastructure are required. For these it is important to have the backing of the government.

Banks should take BAT into consideration when setting credit conditions and reward companies that invest in BAT with lower interest rates. Even medium-sized enterprises can be dealt with in this way. The government on the other hand could offer low-interest loans and governmental funds for implementing BAT.

Interviewees stated that the need for new technologies to improve production in the leather and textile sectors is clearly felt in the country, thus a market for BAT exists. What is of foremost importance is the accessibility, price and adaptability of the technologies in the Indian context. Some specific technology requirements in the future of the leather and textile sectors include technologies to deal with retentates from the reverse osmosis process, effective evaporators for the textile industry, technological alternatives to secure landfill (carbon content <20-25%) and technology for reducing water consumption in soaking and finishing processes.

It was thought that BAT could only be implemented with modifications, since the situation varies from country to country. Direct importation and application might not work in the case of India. There is also a need for awareness generation with regard to new or improved BAT.

Another factor which plays a crucial role in the spread of BAT according to interviewees is the adaptability of technologies and their acceptance by the industry. This could be supported by impact assessments for imported technologies.

## 7.7 Conclusions

There is a lack of knowledge with regard to BAT in India at present, especially among the industry. Of primary importance are:

- Generating awareness of the existence of new technologies
- Improving accessibility to these technologies
- Creating potential sources of financing
- Demonstrating how the new technologies work in practice

Along with actions aimed at industry, there is a need for information dissemination and awareness generation amongst the population at large about the environment and the need for adopting environmentally sound technologies in the textile and leather industries. The people themselves are a key actor, in that they can exert corrective pressure on industry and demand green products. In general, environmental awareness has been on the rise in India over recent years.

Indian industry is willing to upgrade technology provided the technology is adaptable to the Indian context and cost effective. A framework for transferring new technologies in the leather and textile sector in India already exists.

Field demonstration of the technologies and improved access to finances for the adoption of the technology would support the faster implementation of BAT. The larger companies have sufficient funds and have already access to BAT; the challenge is to make BAT accessible to SMEs. The application of technologies in SMEs also requires close technical support to ensure that they are implemented in the correct manner.

# 8 Common factors and approaches in Turkey, India and China

The interviews conducted in the three countries revealed similarities as well as differences. The EU is a major export market for all three countries; hence the suppliers need to comply with the standards set by European importers.

All three countries face major environmental problems in relation to the textile and leather industries. For large companies which have money and access to information, importing technologies to give themselves a competitive edge and improve their image is not an issue. The problem is faced by mostly small and medium-sized enterprises, which make up the largest share of these sectors. They lack the knowledge, know-how and access to information and finances to upgrade their production processes. Moreover, the leather and textile industries are some of the most polluting industries in all three countries.

What is required is a more responsible attitude of the industries in these countries towards the environment, their own countries and their domestic and global consumers. All the interviewees were aware of the need to use better (i.e. clean) technology. Where possible, new technology has been adapted but in most cases, since most companies are SMEs with limited funds and capacities, old and environmentally damaging technologies are still in use.

With increasing environmental consciousness and stricter environmental standards, SMEs too must increasingly comply with the growing expectations and requirements of the importing countries. For this to happen, much of the industry needs to upgrade the technologies it uses. BAT can provide an opportunity for players in the industry to meet these expectations and requirements.

The interviews revealed that the BAT approach is not firmly embedded in the minds of the economic, administrative and political actors in China and India. Turkey, in its effort to join the EU, is more aware of BAT. Thus public organisations and authorities such as the Ministry of Environment and Forestry as well as private sector organisations have developed initiatives to raise awareness of the IPPC Directive and the BAT concept. The Textile Employers Association translated and published the Directive and the BREFs in 2003 in cooperation with the Textile Dyeing and Finishing Industrialists Association. The Ministry of Environment and Forestry in Turkey has also carried out a capacity-building project on the adoption of the IPPC Directive to develop a framework for IPPC legislation and a blueprint for the institutional infrastructure for the implementation of the Directive. The enforcement of BAT in Turkey is planned for when it becomes a full member of the EU.

In China, no measures have been carried out for the publication and adoption of the BAT concept, nor are there any plans to do so. However, activities and projects related to cleaner production have been implemented by many of the organisations interviewed.

In India, as in China, most organisations interviewed were unaware of BAT. However, the majority were aware of some of the technologies mentioned in the BREFs. These technologies are also being applied in India, albeit under the label of “cleaner production”. The organisations interviewed were involved in the transfer of cleaner production technologies and in demonstration and training for new technologies. Extensive research into cleaner production technologies is also being carried out by organisations such as the Central Leather Research Institute (CLRI).

Similar environmental problems are found in all three countries. The textile industry is a sector with high water consumption and strong waste water pollution, in the form of heavy metals and colour discharge, for example. Other pollution occurs from gaseous emissions and energy consumption. In the leather sector, environmental problems include water consumption and waste water pollution as well as waste.

Regarding the presence and implementation of environmental legislation, the situation in India and China is similar, with little implementation of the existing laws and regulations. In the case of India, the current regulations tend to be unrealistic according to most interviewees. The pollution norms limit values set up by the SPCBs are often stricter than those prescribed by the CPCB. This results in standards not being met by the industry since the cost of non-compliance is much lower than the cost of compliance. The situation in Turkey tends to be somewhat better, with companies more likely to implement the rules and regulations.

In all three countries there are significant deficits in the area of implementation. In India there is a lack of regular control regarding the functioning of Common Effluent Treatment Plants (CETPs) and setting up of new industries. In India and China there is a lack of properly trained staff to carry out monitoring and an absence of proper laboratory facilities for conducting analyses of samples. Turkey also has significant deficits in the areas of monitoring and environmental legislation, such as limits on the permitted pollution levels according to the production scale. An additional problem in Turkey is the insufficient information exchange between authorities and the lack of benchmarksfor making comparisons. This makes it hard to assess the impact of the technologies that are in place and also difficult to measure whether the industry is meeting the norms.

A further problem is lack of know-how in the industry. BAT as prescribed in the BREFs would be difficult to implement without adapting the technologies to the local conditions and without considerable investment on the part of the exporters of technology from Europe in capacity building and demonstration of the technology.

What hinders technology adoption is also the lack of financing. Small and medium-sized enterprises in particular have major problems accessing financial instruments such as tax concessions, subsidies and grants. Although programmes such as the Technology Upgradation Fund (TUF) scheme have been launched in India, modernisation is slow. Without easily accessible financial incentives it is difficult to promote the use of BAT.

Measures to protect the environment are generally perceived as costs by producers. Therefore even if the application of BAT is likely to bring some savings and decrease the cost of production, the companies are still unlikely to invest in BAT unless their perception changes. At present, no special incentives for BAT application exist. This is the case even in a country such as Turkey, where there is greater awareness regarding the BAT concept (and the BAT themselves) and much is being done by the Ministry of Environment. In Turkey, funds or special credits for R&D projects from TUBITAK or TTGV are open both to SMEs and larger companies. However, what is required is to have a project and follow the project cycle. This is not easy, particularly for smaller companies. To benefit from this kind of funding the project must also involve an innovation, as the organisations do not fund projects which are not innovative.

Lack of environmental awareness among the industry as well as the general public makes it difficult to make significant progress with implementing environmentally friendly technologies.

Before such technologies can be adopted more widely, awareness generation on a large scale is required. In Turkey such efforts are underway, specifically with regard to BAT, however no such programmes by the government were reported from China and India.

Another factor is the demonstration of the technologies as outlined in the BREFs, which is still lacking in certain areas. Only after successful demonstration would the industry be willing to accept new technologies. Adapting the technology to the country context is also extremely important.

One final problem is the lack of appropriate information with regard to new and available technologies. SMEs in particular often do not have the resources to monitor the development of new, environmentally friendly technologies and invest in them when they become financially or strategically viable. Appropriate channels of communication are needed through which companies can be provided with a fast, reliable and affordable overview of appropriate techniques and potential supplier.

All these factors point towards the inability of the producers in the textile and leather industry in these countries to adopt BAT as prescribed in the BREFs on any significant scale at present. Neither are there proper structures in place for BAT implementation, nor are there tangible benefits from adoption of BAT for producers. At this time, adopting BAT would only cause significant costs for most companies and tie up a large portion of their resources.

# 9 Potential activities for promoting BAT

## 9.1 Introduction

This section examines a number of potential activities ("proposals") for promoting best available techniques (BAT) in the textile and leather industry in developing countries and emerging market economies. First, however, an important distinction must be drawn. The promotion of BAT can involve two quite different approaches which have so far been considered in parallel in this study. One approach would be to transfer the entire BAT concept to target countries as part of the European system of regulation. The other approach would be to place the emphasis rather on exporting the technologies contained within the BAT concept, or to promote the application of these technologies. These two approaches are discussed separately below prior to the formulation of concrete activities for promoting BAT, which builds on this basic distinction.

### 9.1.1 Transferring the BAT concept and IPPC Directive in the form of environmental legislation

Clearly the initial focus of consideration should be on the transfer of the regulatory concept developed in Europe within the framework of the IPPC Directive. Here, again, a distinction should be drawn, this time between the IPPC Directive itself (with its numerous associated specific regulations) and the BAT concept. To some extent the BAT concept can be viewed as a component part of the IPPC Directive; however, in its institutional aspects (i.e. the Sevilla Process) it goes beyond the actual text of the Directive.

In the past, the European Union has successfully exported various environmental regulations to other parts of the world. This has included both individual policies and the product standards they involve. One current example where it is already clear that other countries around the world will adopt the EU regulations in one form or another is REACH, the European Community regulation on chemicals and their safe use. Major emerging market economies are no exception in this respect. The EU is a driving force behind policy diffusion globally, particularly in the area of environmental policy. It is therefore natural that the EU should consider the question of how to transfer the IPPC Directive or sections of it to other countries.

The EU currently has BAT reference documents (BREFs) for 33 different industrial sectors. These BREFs provide reliable, detailed technical descriptions of how to achieve cleaner production in the sectors they cover. They are in English and available free to download worldwide via the Internet. They can be used as a basis for assessments and decision making, as is the case with many international organisations (e.g. the World Bank, the UN-ECE, UNIDO) and countries (e.g. Russia, China). Alternatively, countries which do not yet have a permit requirement in place can introduce a permit procedure for large industrial installations modelled on the IPPC Directive, either by having their relevant authorities issue permits on the basis of BAT (drawing directly on technical documents such as the BREFs) or by making the BREFs mandatory at a national level, as is the case in Germany.

In material terms, then, the right conditions are in place. However, experience with policy diffusion shows that the key factor in marketing policies effectively is the success of these policies in practice in the country (or confederation of countries) they stem from. Thus the German Renewable Energy Law (EEG) was adopted as a model in several dozen countries

worldwide because of its extraordinary success in Germany, and there are many more such examples. There can be no doubt that the IPPC is a well-designed legislative approach. However, its full potential is still not being realised due its varying implementation in different EU Member States and the major deficits in terms of its enforcement, both in the leather and textile sectors and other industries. As long as implementation remains only partially successful, the Directive will not be viewed as a success outside the EU even if its design is perfect. Efforts to transfer the IPPC Directive and the BAT concept thus face an uphill struggle at the present moment in time.

One also has to keep in mind that countries outside the EU will always be hesitant to adopt EU regulations and approaches, especially in the area of environmental policy. This is because they see it as leading to the imposition of specific development paths from outside. The area is a highly sensitive one, and deliberate policy diffusion activities must be handled with extreme care. It should not be expected that the existing regulatory concept can be transferred one-to-one to other country contexts. Major developing countries and emerging market economies such as India and China want to choose their own country-specific approaches, and they are in a position to do exactly that. The most that other countries' regulatory systems can do is to serve an example. This is borne out by the research in the case of China: the Chinese government examined the European BAT concept before it developed and implemented its own regulations in this area. This is not to say, of course, that a country then closes the door to further dialogue on this topic.[7]

Turkey is a special case due to its desire to join the EU. To be accepted as a full member it must implement the *acquis communautaire,* which also means applying the IPPC Directive. Dialogue with Turkey on the transfer of the regulatory concept is therefore both useful and desirable. By contrast, it is not a convincing approach in the case of India and China for the reasons outlined above.

### 9.1.2 Transferring technologies and/or promoting their application

Promoting the application of BAT rather than the whole regulatory concept can be effective. To succeed it must take a different approach, and not attempt to reproduce EU regulations in the target countries. Once again, a distinction must be made. On the one hand, the goal could be to increase the awareness of technology standards and strengthen the use of technologies conforming to BREFs rather than trying to push the whole regulatory concept contained in the IPPC Directive. On the other hand, the goal could be more modest still, aiming to promote BAT-like environmental technologies that are perhaps less effective but cheaper than actual BAT, as a first step towards the eventual establishment of BAT.

In the first case – promoting the application of BAT standards or trying to strengthen the use of relevant technologies – any activities in this direction, especially in developing countries and emerging market economies, will be viewed with scepticism. There are a number of reasons for this. The targeted countries will suspect that the activities in reality serve the interests of European machine and system manufacturers firms in terms of their exports. Even in the case of voluntary initiatives, such activities will be seen as an attempt to gradually introduce regulations that ultimately limit the competitive advantages these

[7] An example is the conference "The IPPC Directive – a model for China?" held early in 2008 in Beijing with representatives of the Chinese environment authorities, the European Commission and several EU Member States.

countries enjoy over their European counterparts, such as low wages and the potential to cope with further environmental pollution.

It should also be borne in mind that there are currently significant problems even promoting the use of environmentally friendly technologies on a lower level than BAT (also see the summary in Chapter 8). Deficits exist in many areas: in terms of legislation, enforcement, financial incentives (from the market or state) and in the level of awareness of those involved, both in companies and administrative bodies.

Potential approaches must tackle this problem of the lack of awareness of BAT. They must include efforts to provide information about BAT and the BAT associated emission and consumption levels.

An enormous number of initiatives to promote cleaner production in recent years and decades fall into the second category, that of promoting technologies as a step towards the eventual establishment of BAT. As shown in the country chapters and comparisons above, it is extremely difficult to make progress even on this more modest front. It is no coincidence that despite the many recent attempts and initiatives that have taken place in the context of “cleaner production” in Turkey, India and China, the situation remains largely unchanged and the application of environmental technologies is still relatively underdeveloped in these countries.

A study of the literature and analysis of the interview results indicate that fundamentally the chances of making progress by means of legislation, such as with the IPPC Directive, are very limited. The legal situation in all three countries is not optimal. However, major gaps in legislation are not the main reason for the low level of take-up of environmentally friendly technologies in the leather and textile industry. The problem is rather the significant deficits in enforcement. These deficits are difficult to overcome, especially from the outside. Better training of monitoring bodies will not help on its own: increased technical and human resources must be made available if the authorities are to do their job properly. In the long term, such resources can only come from the countries themselves. Moreover, even the best regulations have little effect if all the economic incentives are against taking up cleaner production technology, as is the case at present. As long as resource consumption is effectively subsidised, industry will be highly resistant to any government rules that lead to greater environmental protection and reduced resource use.

Germany can do very little to change other countries’ regulations, such as a lack of subsidies for environmental technology or inadequate taxes on environmental pollution. A number of different government bodies in the countries in question expressed an interest in cooperation, but given the nature of the problems as outlined above and past experience of development cooperation in the area of promoting cleaner production in the textile and leather industry, it would not be appropriate to recommend an approach that takes such projects as potential activities. In practical terms, this means that many of the suggestions made by individual interviewees and mentioned in the preceding chapters, such as joint demonstration of cleaner production technologies/BAT and specific proposals for capacity building, are not be pursued in the following discussion. The local actors – industry associations, administrative bodies, academic institutions, etc. – simply do not have the resources to deal with the obstacles that exist. Carrying out actions on an ad hoc basis will not lead to any major breakthrough and individual projects will not be able to change the lack

of economic incentives from the state and absence of sanctions for environmentally damaging behaviour.

Another reason why joint projects with individual industry associations or local authorities have not been developed here as potential activities for the Federal Environment Agency is that the FEA lacks competence in local activities. Indeed, such activities only marginally fall under its area of responsibility. For this reason, it is preferable to choose approaches for further activities that lie closer to the core competencies of the FEA, and this factor has also influenced the identification and formulation of potential activities below.

## 9.2 Specific activities

### 9.2.1 Information exchange with Turkey

*Conditions*

As mentioned above, the conditions in Turkey differ fundamentally from those in India or China. In the case of India and China, there is little point discussing the transfer of the entire BAT concept. Turkey on the other hand has its eyes fixed on full membership of the EU, which means that will have to implement the IPPC Directive, albeit probably after a long transition phase.

Turkey is well aware of this situation and began taking preparatory action some time ago. However, this has revealed a number of problems at the legal, administrative and institutional level which need to be dealt with before the IPPC Directive can be implemented. Turkey would welcome cooperation with foreign agencies, especially those in Germany, to help find solutions to these problems.

*Activity*

A potential project in this area could consist of the following components:

1. An exchange of information with the relevant Turkish authorities by means of a visit by a delegation from Turkey. A number of Turkish experts would visit Germany for a week to meet with experts from the Federal Environment Agency, the Federal Ministry for the Environment, the Federal State Authorities and industry representatives to learn how the IPPC Directive is implemented in Germany. The main purpose of the visit, to be agreed with the Turkish authorities, would be to discuss different options for implementing the IPPC Directive. Visits such as this tend to cost around the low five-figure range. Part of the project would be to draw up a detailed programme in cooperation with the Turkish authorities and agree who would cover the costs of the visit. In this particular case it would probably make sense for the Turkish authorities involved to cover at least part of the costs of the visit, as this tends to increase the commitment.
2. Building on this visit, a number of exchange seminars could be offered at which staff from the Turkish environment authorities would be familiarised in training sessions with the details of the IPPC Directive and its implementation. The training sessions would focus initially on design questions relating to the planning and implementation of the Directive, later moving on to concrete implementation issues. These training

sessions would cost slightly more than the visit by the delegation since course outlines would have to be produced in advance. If the programme lasts several years, which is strongly recommended, the costs would be in the low six-figure range, although this would obviously depend on the number of seminars and participants.

3. Exchanging information about the IPPC Directive could also serve as a basis for addressing other issues. Turkey has expressed interest in seminars on eco-labelling and the possibility of awareness-building in this area in the Turkish market.

*Pros and cons*

+ By its very nature, this proposal does not focus exclusively on the textile and leather sectors. In both sectors, the application of BAT will be promoted if the initiative succeeds in optimising the structures for implementing the IPPC Directive in Turkey. At the same time, the conditions for all the other sectors covered in the Directive will also improve
+ The cost of the visit by the Turkish delegation is relatively low. Costs can be adjusted later on depending on needs and the availability of resources
- The actual level of interest on the part of the relevant Turkish authorities is critical to the project. Experience shows that authorities in developing countries and emerging market economies often express an interest in information exchange as long as they do not actually have to pay for it themselves. When negotiating the joint project, therefore, it must be ensured that the Turkish authorities agree to meet part of the costs, as discussed above

### 9.2.2 Supply the suppliers

*Conditions*

As outlined in Chapter 3, the leading companies in the area of marketing textile and leather goods have already formed a number of networks for dealing with environmental issues relating to suppliers (BSR Sustainable Water Group, AFIRM). These networks are a powerful basis for supporting the use of environmental technologies by their direct suppliers. However, due to the vertical fragmentation of the supply chain, their actions only affect first-level suppliers and not the production stages further upstream, where there is a particular need for action on environmental issues.

For large international corporations, it is difficult if not impossible to implement the company's own environmental policy effectively for all the producers supplying their direct suppliers. What often happens in practice is that large companies shift the responsibility on to their direct suppliers to guarantee adequate conditions among their sub-suppliers and to provide evidence of this. Clearly this is inadequate – a fact that the major corporations are well aware of. It is necessary to develop standards for the stages of production further upstream, and then impose these standards and support the sub-suppliers (often SMEs) in implementing them. However, since the number of upstream sub-suppliers for each of the leading companies in the textile and leather sectors is very large, it is impossible for individual companies to provide the financial and human resources required. What is needed is concerted action.

In the past, companies have been unwilling to cooperate other than in developing joint standards (based on BAT) for direct suppliers. The high cost of reaching companies further up the production chain and companies' wish to preserve their independence have prevented comprehensive steps being taken.

Nevertheless, many companies stated that they would be interested in extending their environmental activities to include upstream stages of production and would support joint projects in this area. A project organised by the Federal Environmental Agency could therefore act as a catalyst for further comprehensive activities.

*Activity*

- Building on the interviews and specific statements made by companies during the interviews, companies should be contacted again to discuss their willingness to participate in joint measures in concrete terms. These initial negotiations should clarify which regions are to treated as a priority for implementing actions at the start of the project and which stages of production should be addressed first
- On this basis, a full project concept should be drawn up which can then be used to recruit further partners in the industry and elsewhere. It is important to decide which local organisations are to support the future programmes and to involve the relevant authorities early on in the planning stages, or at least inform them what activities are envisaged
- Well before the project begins, the suppliers of the companies involved in the chosen regions must be contacted and informed that activities are being planned for upstream production stages. The supply companies should also be subsequently involved in the activities in an appropriate manner
- In a separate work package it should be determined what exactly is required of the target group. A fully harmonised approach does not have the support of all companies who are already involved in the various working groups. More work is needed during the design phase to ensure that everyone is on board and to come up with an approach that reflects the interests of all parties
- Large-scale capacity-building measures should form the core of the project. This means carrying out training sessions for SMEs at the local level. Course outlines need to be designed and trainers identified. A mechanism for evaluating the capacity-building measures should also be built into the project
- Concrete support for the introduction of new technologies is another key area. First it should be established whether, and to what extent, sub-suppliers can or must be helped with the financing of environmental technologies. Next it should be clarified who will meet the costs of the financial support (subsidies, investment grants, low interest-rate loans, etc.) and how financing will be provided in practice. To this end, discussions should be held with financial institutions active in the field of development cooperation (such as KfW Bankengruppe) and with the financial institutions in the country in question
- Of critical importance will be involving the official bodies responsible for supporting development work ("implementing organisations"), since they have extensive know-

how in capacity-building measures as well as the financial resources necessary for co-financing activities to the extent required. The German implementing organisations GTZ and InWent and various other foreign implementing organisations have experience carrying out measures at various stages of the textile and leather industry production chain in many different countries, especially in South, South-East and East Asia. This experience should be leveraged

- The measures outlined above would only be feasible as part of a project extending over several years. Ideally, the project should be broken down into a number of different phases, starting with pilot projects in one, two or three different regions. The results of these projects could then be used as a basis for activities in other areas

*Pros and cons*

+ One advantage of the project is that some of the companies stand to gain significantly from the proposed measures and so can be expected to support them proactively. It will also be possible to build on existing structures in some areas

+ The Federal Environment Agency would primarily be dealing with companies in the textile and leather industry with headquarters in Europe. Not only does this make contacting the organisations easier, it also means that the FEA will not later on be confronted with tasks for which it lacks the necessary competence.

+ As pointed out several times already, in the current situation substantial environmental improvements with regard to the textile and leather processing industry are only likely if strong economic and other incentives can be established. Of the different possible approaches, offering incentives has by far the best chances of ensuring success. The market leaders in textiles and leather have enormous purchasing power and can use this to make their suppliers – and through joint action their sub-suppliers too – meet certain minimum standards. Many foreign sub-suppliers depend greatly or even entirely on major clients over here. This means that major changes at the local level can be achieved by the project, giving it a significant edge over other approaches

- The project relies on major financial input. This could be problematic, as the companies involved will only be able to supply part of the money needed. Companies can provide the project with their environmental expertise and contacts. They can also use their buying behaviour to put pressure on their suppliers and sub-suppliers to participate in the project as required. However, they are unlikely to cover the full cost of capacity-building activities, much less the cost of introducing new technologies for sub-suppliers involved in the project. Consequently, additional partners with strong financial resources will be needed

- Adding to this difficulty is the fact that many development cooperation organisations are in the process of withdrawing or have already withdrawn from activities in the textile and leather industry in the countries in question. There have been numerous projects to improve the environmental and working conditions in these sectors in past years and many people now consider further measures pointless. Others think that the only thing that would have a real impact is major policy changes in the countries in question – changes that cannot be achieved through development cooperation.

Financing measures in the textile and leather sector in countries outside the EU is also increasingly problematic. Particularly at a European level, this has become a highly political field. With major economic downturns in the industry in Europe and the outsourcing of production to countries in South, South-East and East Asia, it is more and more difficult to justify politically any measures in these countries in this section of industry.

In addition to reservations about activities specifically in the textile and leather industry, there are also increasingly reservations about involvement in development cooperation of any sort in India and China. As the economic power of these countries grows, the view in development policy circles is increasingly that the focus of efforts should now lie on other, less developed countries. In concrete terms, this means that the Federal Ministry for Economic Cooperation and Development (BMZ) and its implementing organisations GTZ and InWent lack suitable programme focus areas in India and China where the measures outlined above could be attached, nor are such focus areas planned for the foreseeable future. The same is true for the European Union (EuropeAid). Much groundwork and lengthy negotiations at this level would be needed for the initiative to be successful

### 9.2.3 Name and shame

*Conditions*

Carrying out an initial forerunner project would prepare the ground for more extensive measures later on, creating the necessary conditions and achieving progress on all sides, including companies and development agencies. Indeed, even without follow-up activities a forerunner project would in itself improve the conditions for introducing environmental technologies in the textile and leather industry in India and China.

The level of current activity by leading market players with regard to their suppliers' environmental conditions is highly varied. Some are very involved, while others are not even sure of which international working group they are a member of in theory. Many companies are only really interested in damage limitation, concerned about their name hitting the headlines if poor conditions come to light at their suppliers. This concern for their reputation can be used as a starting point for promoting further activities.

*Activity*

An investigation should be carried out into current activities by the leading market players with regard to environmental conditions at their suppliers and sub-suppliers. This investigation should include both interviews with companies over here and on-site checks of individual suppliers overseas. Both aspects may well cause difficulties: companies do not like talking about their environmental policies since they are well aware of the implications that any deficiencies here can have for the reputation of their brand. At the same time, suppliers in India and China are often highly secretive about their working and environmental conditions because they, too, know how drastic the consequences can be if these conditions come to light.

However, the unwillingness of companies to speak about their environmental policies should not be seen as a critical hurdle. In some cases, analyses of the environmental policies of the

European market leaders are already available, and in any case putting pressure on companies would be an explicit objective of the investigation. For the on-site checks of overseas suppliers, cooperation with local organisations is required. Existing initiatives by NGOs such as inkota and Südwind, which have brought terrible local conditions to light on more than one occasion in the past, should be integrated into the project and the expertise of environmental rating agencies leveraged.

The results of the investigation could be used in a variety of ways. Firstly, they can form the basis for opening up a dialogue with the companies in question, encouraging them to step up their efforts with regard to their suppliers and sub-suppliers and talking to them about the possibility of concerted action with other companies in their sector, supported by the Federal Environmental Agency or other implementing organisations. Secondly, the results of the investigation can be prepared for publication as a way of exerting pressure on the companies. Thirdly, they can be discussed with financial analysts, thereby increasing the pressure on companies from investors to be more active. Finally, the investigation can (and should) be used as a basis for argumentation and a political tool in the effort to find partners in the field of development aid who will support further concerted action.

As mentioned before, even if the investigation does not lead to any concrete later projects (such as “Supply the suppliers”, Section 9.2.2), it would still put companies under considerable pressure and ensure that the ground was well prepared for further actions to implement environmental technologies at suppliers.

For this forerunner project to be fully effective, it should be carefully planned in advance what form the results of the investigation will take and who they will be distributed to. Agreeing to publish the results with a particular media organisation, for example, would be a good way to build up the pressure on companies and establish a credible threat of action.

*Pros and cons*

+ The costs of such an investigation are finite, probably in the five-figure range
- Major difficulties getting hold of information are likely, due to massive opposition from the industry concerned

### 9.2.4 BAT for banks

*Conditions*

KfW Bankengruppe, the Deutsche Investitions- und Entwicklungsgesellschaft (DEG) and other European and international financial institutions are involved in developing and supporting environmental and other loan programmes (e.g. for SMEs in specific sectors of industry) in developing countries and emerging market economies on an ongoing basis. These financing bodies attach great importance to environmental standards being met. The banks they cooperate with are required not only to implement their own system of environmental management but also to ensure that their clients meet environmental standards too, depending on the particular loan programme. For this purpose, local banks are supplied with simple printed guides that they can use as a basis for making loans or pass on to their clients as appropriate. In this sense, banks are good multipliers of information

about environmental technologies and have a certain potential for promoting their application.

The World Bank currently has documents that can be used as a basis for loan decisions. However, they are not ideally suited for specific guidelines, so their use in practice is limited. The BREFs, on the other hand, are much too complicated to be used by banks as a basis for decisions about smaller loans (in the single-figure million range and under).

*Activity*

Using highly summarised versions of the BREFs and existing materials as a basis for comparison, guidelines should be drawn up for use in banks' decision-making processes, in consultation with various banking institutions. The project should be carried out in collaboration with key banks such as the DEG and/or KfW right from the outset. There is already a certain amount of interest and willingness on the part of the banks to cooperate in such a project.

Implementation should involve both the IPPC Bureau in Seville and expert groups. On the basis of consultations with these and other experts, it should be decided which elements of the BREFs are to be included in the short versions. The textile and leather sector would be a good place to begin, with similar short versions being produced for other sectors later on.

Marketing the short versions – i.e. disseminating them to the relevant financial institutions – would form a key part of the project, as would providing follow-up support to ensure that the banks actually use them later on. With this in mind, it would be a good idea to carry out a workshop with relevant banking institutions during the project itself. The institutions involved could also pass on the short versions to other banks around the world via their own networks. Existing working groups involved in cooperation between banking institutions should be involved in the marketing strategy from very beginning.

*Pros and cons*

+ The costs of the project would probably be in the low five-figure range. Even allowing for an international workshop and expanding the project to include sectors other than the textile and leather industry, the usual budget for projects of the Federal Environmental Agency would not be exceeded
+ Although it would be advisable to involve institutions dealing with development policy, the relevant stakeholders and the project itself lie firmly within the Federal Environment Agency's core area of competence
+ The project could be extended beyond the textile and leather industry, thereby making it possible to improve the conditions for the application of BAT in developing countries and emerging market economies in other sectors too

### 9.2.5 BAT on the Internet

*Conditions*

As already discussed, a basic problem for diffusing BAT is that the concept, the underlying documents and to a certain extent the technologies themselves are widely unknown. Improving the marketing of BAT is essential. The IPPC Bureau will most likely be making its own efforts on this front. However, support from the German side could be of crucial importance.

*Activity*

One way of bringing BAT to a wider audience is to improve its presentation on the Internet. To this end, a user analysis should be carried out for the IPPC Bureau's website accompanied by a survey of potential users. The results can be used to come up with a completely new concept for the website, potentially offering different access options for the different target user groups (experts from companies, the press, official bodies, etc.). Content should then be developed for each different area of the website, if no such content currently exists. This content should above all be presented in a user-friendly manner; one option here would be to have a specialist journalist rework all the texts.

*Pros and cons*

+ The project goes far beyond just the textile and leather sector and can exploit the potential of other areas too
+ The project would have a beneficial impact not only on developing countries and emerging market economies but also, perhaps even to a greater extent, within Europe
± Extending the project to areas other than the textile and leather sector would make it possible to improve the conditions for the application of BAT in developing countries and emerging market economies in other sectors too

### 9.2.6 BAT repository

*Conditions*

One of the main objections to using environmental technology is the prevalent belief that it is expensive. This argument is used even where the technology actually leads to cost savings in practice. It can be countered through demonstration projects, which can have a certain impact. However, the most effective way is to use success stories, telling potential users about other companies' positive experiences with the application of BAT. Of course, the sheer number of potential users makes communication on this scale difficult. Here, the Internet can be used as a cost-efficient communication channel.

*Activity*

A BAT repository should be created containing examples of successful applications of BAT. The case collection should follow a standard form and be structured in such a way that

potential users of environmental technology can use them as a guide when carrying out analogous projects in their own companies. The success stories should consist of a description of the technology, its concrete applications, the costs involved and other points that should be noted when applying the technology. They should also name a contact person who can be referred to for tips on implementing the technology.

The BAT repository should contain success stories from right across Europe, in cooperation with the relevant official bodies. Existing databases such as that of Cleaner Production Germany (CPG) can be examined for suitable examples. The Internet site should be linked to other sites of a similar nature.

*Pros and cons*

+ It would make sense for the project to include other industries as well as the textile and leather sector, thereby tapping into additional potential.

± The costs of the project would be in the high five-figure range, maybe into low six figures. The precise cost would depend on the scope of the database and what software needs to be purchased

- Such a database only makes sense if it is constantly updated. The ongoing costs should be taken into account from the outset: unless the continuation of the project after the initial launch is secure, the data will soon become outdated and irrelevant

The activities for promoting BAT outlined in this chapter should be viewed as possible options, a basis for discussing how and in what form future measures might be conceivable. Further examination of specific activities and initial steps taken to implement them will obviously shed further light on how they can be improved and adapted to the current conditions, which may have progressed in the mean time.

Finally, it should be noted that although this study has drawn attention to the not inconsiderable difficulties involved in promoting the use of environmental technologies in developing countries and emerging economies, it has also identified great potential and a strong demand for additional measures. The problems associated with further activities in the areas and countries investigated should not, therefore, discourage those involved from taking further action.

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