



Part C

SUSTAINING CLEANER PRODUCTION

8.0 Cleaner Production Issues in Egypt

The textile mills in Egypt may be categorised into:

- Large, old, government owned mills which use traditional processing methods (these are among the largest contributors to pollution but are also the main producers of textiles).
- Newer units which tend to be smaller and adopt newer technologies.
- Medium sized mills moving towards adoption of newer production technologies.

Among the older mills, most use heavily polluting processes such as hypochlorite bleaching, aniline dyeing and pigment printing using kerosene. Equipment varies from the very old and obsolete to modern equipment in the newer mills. Fully automated equipment is used to some extent in the spinning and weaving sub-sectors but are not widely used in wet processing, even in newer mills.

The chemicals used in the Egyptian textile industry should be screened to exclude those which are severely polluting and/or banned and substituted with safer alternatives. For example, Benzidine-containing dyestuffs, bleaching agents liberating chlorine or chlorine dioxide, materials containing heavy metals (e.g. metal complexes dyestuffs, finishing catalysts, salts), formaldehyde or ammonia releasing agents are commonly used and need to be regulated. In addition, starch based materials (e.g. sizing agents) must be partially or fully replaced by reclaimable/low BOD materials.

It is thus clear that control of the processes and the products towards ensuring a cleaner industry is essential if the textile market has to compete in the international market.

8.1 Barriers to CP Adoption in Egypt

Even though some initiatives have been adopted by the textile sector towards adoption of CP, there still are a number of barriers to its adoption in Egyptian factories. These barriers relate to:

- Economic concerns.
- Technology and technical skills.
- Cultural concerns.
- Quality considerations.
- Information dissemination.

Examples of Barriers to CP Adoption in Factories:

- ⊗ Lets think about this later.
- ⊗ Its good to talk about but will not work in practice.
- ⊗ It just will not work.
- ⊗ We do not have the time for this.
- ⊗ Has anyone done this before?
- ⊗ What is wrong with the present system?
- ⊗ We are already doing this!
- ⊗ You do not understand the problem.
- ⊗ Talk to someone else. This is not my field.
- ⊗ We are too big/too small for this.

Implementation of a CP programme will involve the assessment and quantification of emissions, economies and efficiency. In Egypt, emissions (mainly liquid discharges) have received the most attention but in future, greater emphasis must be placed on seeking economies to:

- Minimise the use of energy, water and raw materials.
- Improve the efficiency of operating practices to ensure the best use of materials.
- Reduce the volume of waste being generated.

In this way, the profitability of a business will increase whilst its adverse impact upon the environment will diminish.

8.1.1 Economic Barriers

Economic barriers can occur when a company believes it does not have the financial ability or sufficient incentive to implement waste minimisation.

Similarly, the low costs associated with the abstraction of water and the disposal of wastes means that there is little incentive for companies to make savings in these areas.

8.1.2 Technical Barriers

Experience in Egypt has shown that many companies are well aware of local pollution problems but have little appreciation of the wider environmental issues. However, the level of knowledge is limited so that there may be a belief that a subject is well understood but in practice is poorly applied. This problem is compounded by a generally poor quality and low availability of up-to-date technical information.

Changes in the way in which a company operates will frequently present technical difficulties such as:

- Lack of suitable information.
- Concern about changes to product quality and customer acceptance.
- Retrofitting of processes causes shutdown of existing operations.
- New operations may not work.
- There is insufficient space to easily accommodate any additional equipment.
- Adverse employee reactions.

Unlike other countries, there are very few textile experts who could provide objective technical assistance to the industry on, for example, eco-friendly processing. The chemical suppliers dictate the market and the production trends. Awareness of CP is very low among a number of these chemical suppliers except for large multinational chemical companies. Thus between the textile industry and the chemical and equipment suppliers there is no middle level interface of technical experts who could advise industry on the choice of technology, raw materials, chemicals, environmental management etc. that would ensure eco-friendly processing.

Textile machinery is not produced locally and there are no technical skills for local manufacture of such equipment. Hence the industry has to depend on used and at times obsolete equipment from other countries.

Most of the textile mills in Egypt do not have effluent treatment plants. Water and energy are subsidised and hence there is no pressure on the textile mills to practice conservation of these resources. Groundwater is being extensively exploited, as this is the main source of water for the textile industry. The lack of effluent treatment plants will also result in disposal of effluent to receiving water bodies or on land. This could lead to widespread contamination of the groundwater.

Other infrastructure related issues are the inadequacy of testing facilities for purity testing of dyes, chemicals and fabric testing. There are also no testing facilities for quality assurance and verifications, which are essential requirements for the process of achieving eco-labels.

8.1.3 Cultural Barriers

Many companies are over-manned in comparison to international norms. This may lead to a lack of individual responsibility and a perception that no individual can achieve change. In many factories, this is compounded by an autocratic management structure with all

instructions coming from the top so that workers do not accept personal responsibility for change.

Resistance to change and friction between personnel may introduce barriers and can be caused by:

- Lack of senior management commitment.
- Lack of awareness of corporate goals and objectives.
- Poor internal communication.
- Restrictive employment practices.
- Inflexible organisational structure.
- Bureaucracy inhibiting change.

8.1.4 Quality Considerations

The lack of quality (defined in this context as fitness for the purpose) of many products is common and consistency is poor. Down-graded products are common but still finds market outlets in Egypt. Where companies have export markets, customer demands often ensure that production methods are better controlled.

There is a need to establish a quality culture within companies and whilst ISO 9000 is widely recognised it is poorly understood. Too often it is regarded as a marketing aid and not as a management tool for maintaining quality, improving efficiency and reducing wastage. However, where a company is considering ISO 9000 it can be used as a vehicle to assist in implementing change within an organisation.

8.1.5 Information Dissemination

To date, information concerning CP opportunities has not been readily available. There are no independent associations dedicated to providing technical assistance and information to industry, government departments and others involved in the industry. No formal centre exists which could serve as a clearinghouse of information and as a counselling centre for the promotion of CP in the country.

In the dissemination of information, language can be a barrier as all documents, manuals etc. have to be translated into Arabic to ensure that the information is available to the widest possible audience.

8.2 Overcoming Barriers to Cleaner Production Implementation

8.2.1 Economic Factors

Economic arguments are all too often the only justification given for a change within an organisation. There is little doubt that in a business sense, profitability is the most significant factor but company profits have little short term effect on the way in which individuals respond within a company.

If individuals perceive a threat to their livelihood, and there is a chance that they may lose their jobs, this will be a strong motivator as it has a direct bearing on their ability to satisfy their physiological needs for water food and shelter. But making more money for their employers and shareholders is rarely a strong motivator and other more intangible factor such as pride, status, achievement etc. are more significant. Once people feel personally secure and safe they become more concerned with the wider environmental issues such as global warming and damage to the ozone layer. The quality of life is as important, if not more so, than the economics alone.

However, any recommendations made have to be financially sound and will include:

- Monitoring to determine the full cost of pollution control, waste management, etc.
- Cost/benefit calculations and pay back periods for investments.
- Target setting, based on true data, to achieve reductions in usage of materials.
- Identification of potential liabilities through a failure to control an environmentally damaging activity.
- Details of environmental funds, customs and tax credits, fixed interest loans to encourage cleaner technologies, etc., if/when these are available.
- Identification of cost savings.
 - ⇒ **Action:** Reduce wastage of raw materials.
Effect: Raw materials costs decrease.
 - ⇒ **Action:** Reduce the volumes of waste generated.
Effect: Waste treatment, transportation and disposal costs decrease.
 - ⇒ **Action:** Reduce labour time spent monitoring and handling waste.
Effect: Valuable labour time can be channelled elsewhere.
 - ⇒ **Action:** More efficient use of energy.
Effect: Reduced electricity, oil and/or gas bills.
 - ⇒ **Action:** More efficient use of water.
Effect: Reduced water bills where relevant and potential knock-on effect regarding effluent volumes and associated costs.

Taking these actions will also reduce long-term environmental liability and insurance costs.

There are other, wider environmental benefits such as less fossil fuel being burnt at power stations, less need for landfill for solid wastes, etc.

8.2.2 Technical Factors

This is the area in which the company personnel will feel most at home since they know their business well. It is also the area in which they can be highly conservative. To overcome initial reservations, personnel will need to be shown that CP can be very successful. This can be achieved through:

- Source of up-to-date information from within the company and outside.
- Identification of training opportunities.
- Pilot scale projects prior to major change.
- Reviews of customer requirements.
- Involvement of all relevant departments in the planning process.
- Use of well-tried technology wherever appropriate.
- Examples of successful applications in other businesses.
- Provision of work instructions, safety data sheets, duty of care for hazardous wastes.

8.2.3 Cultural Factors

A large number of surveys have been conducted in a variety of countries as to the factors which contribute to the quality of life of an individual. Invariably the list includes a number of essential factors which are in order:

- Good education.
- Clean/healthy environment.

- Personal/family health.
- Good social relationships.
- Money.
- Employment.

Individuals will also describe a wide range of other factors including moral and spiritual values, freedom, peace of mind, stable government, etc. The significant factor is that money, in itself, is not a prime motivator and companies can encourage change through a wide variety of techniques.

Recommendations to overcome cultural barriers will include:

- Company policy and management changes.
- Identification of training needs.
- Identification of incentive schemes which can include financial bonuses, recognition of achievements, employee of the month, issue of certificates.
- Allocation of responsibilities to individuals, goal setting, timescales for change, use of staff suggestion boxes.
- Company news letters, publicity for achievements, involvement of local community.
- Education in wider environmental issues and protection of the global and local environment.
- The use of the company as an environmental (champion) to stimulate other similar companies; the formation of waste minimisation (clubs) within a geographical area or industrial sector to pool ideas and share experiences.
- Religious beliefs of relevance to the protection of the environment.

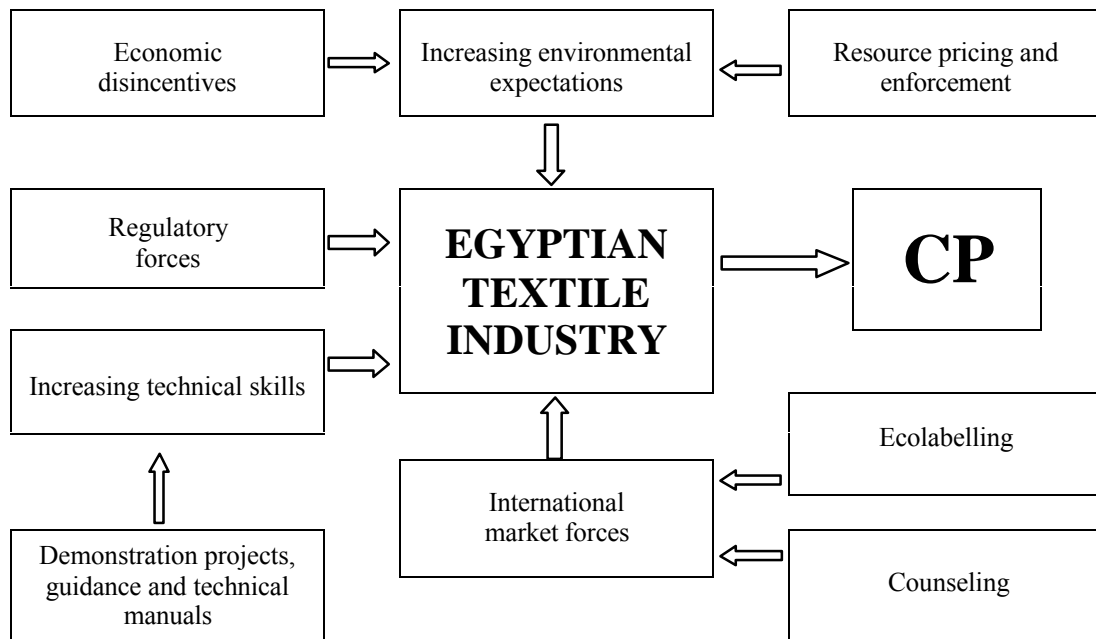
Change in Egypt, as with anywhere else in the world, will occur slowly and by a multiplicity of influences. Motivation is complex and frequently difficult to predict. It is important that any recommendations made are realistic and also consider how the changes can be achieved.

8.3 Promotional Strategies for Adopting CP in Egypt

Development of a strategy for cleaner production entails identification of the (approach) to be adopted (whether product, process, technology or operation related), the (options) available, the (pollution prevention practice) to be adopted (for the sector, specific to Egypt) and finally the (measures) (i.e., the specific demonstration projects for each mill) that should be taken to implement CP.

Given the barriers identified in the previous section, the shift from end of pipe approach to CP in the Egyptian textile industry take a long time to implement, adversely affecting company productivity, causing environmental degradation and a threat to self - reliance. However, as shown in Figure 8.1, a number of factors may help accelerate the (push) of the textile industry towards adopting CP.

Figure 8.1 Push Factors on the Egyptian Textile Industry to Move Towards CP



8.3.1 Policy Options

The policy options need to consider infrastructure issues such as water and energy resources - excessive subsidies on water and energy need to be eliminated and realistic pricing structures developed so that they serve as (push factors) for industry to practice water and energy conservation, thereby facilitating promotion of CP.

In addition to the pricing structure, suitable fiscal incentives also require to be developed by the GOE to promote and encourage adoption of CP methods.

Policy options should target provision of subsidy schemes for Small and Medium-sized Enterprises (SMEs) for the implementation of CP options and establish a system for banning of (dirty technologies) and phasing out banned chemicals.

8.3.2 Capacity Building and Technical Assistance

The experiences from the various SEAM demonstration projects need to be disseminated across the sector. The Guidance Manuals and technical reports and resource materials prepared under the project need to be disseminated to enable other textile mills to implement the CP options. This will bring about a multiplier effect of the demonstration projects.

Awareness workshops and training programmes need to be organised for industry, government officials, industry associations in the textile sector. The training programmes should be structured to target the following groups:

- **Senior management** of industry and policy makers and decision makers in government on the economic and environmental benefits of CP;
- **Middle level technical and managerial personnel** in industry on production technologies, health and safety aspects;
- **Textile workers** particularly on health and safety aspects.

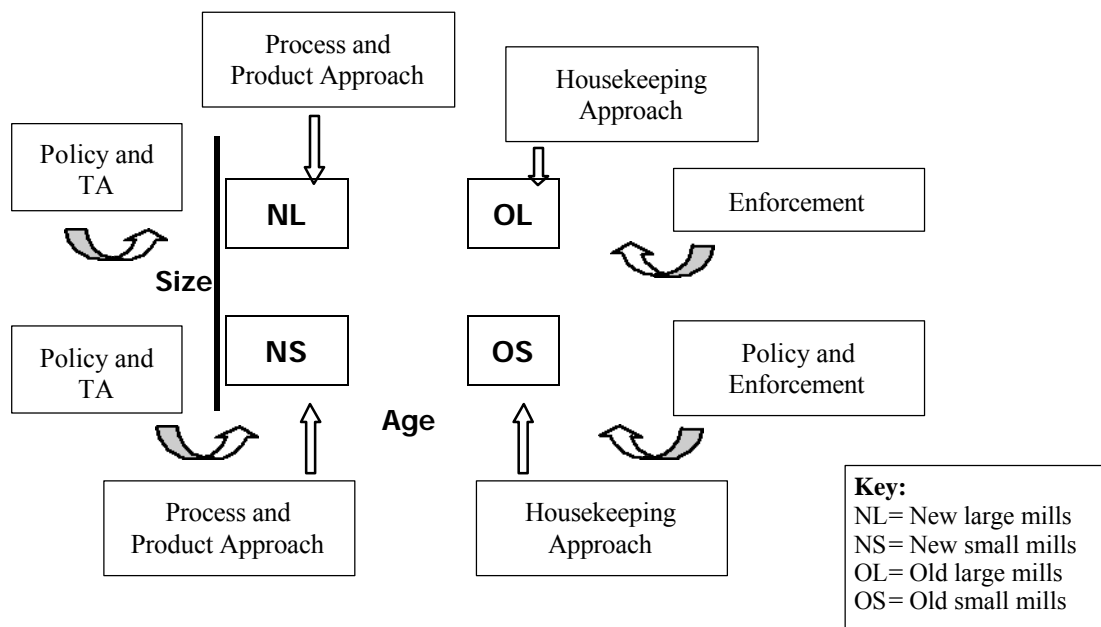
The GOE also needs to support development of counselling centres for CP options targeted primarily at the SMEs.

There is a large deficit in terms of independent technical skills in the textile sector. Consultants or experts who can provide an objective technical viewpoint to industries on choice of processes, technologies and chemicals are limited. As a result of this, chemical and equipment suppliers command the textile processing market in Egypt. Capacity building to create a middle level of such experts is essential. Senior technical personnel from the textile sector who have extensive experience in the industry and who have retired from active service should be targeted for development of such a technical corps.

Capacity building for the sector should also commence at the educational institution level where textile chemistry, textile engineering, cleaner production etc. should be integrated into the curricula so as to build local technical capacity in the sector.

Figure 8.2 presents a strategy that may be applied to the various segments of the textile sector for the promotion of CP. The figure has been developed using the categorisation developed in Figure 7.1. This incorporates the various tools that have been discussed above and the suggested CP approaches that should be applied to the industries in the sector.

Figure 8.2 Suggested Strategy for Promotion of CP



8.3.3 Impact of the SEAM Demonstration Projects

The SEAM project has, through the implementation of the demonstration projects, facilitated the introduction of the technology component of CP into the Egyptian textile industry. This has resulted in demonstrating that the CP options are credible, feasible, economical while enabling pollution abatement.

Some of the achievements of this project have been; award of the ko-*Tex* eco-label to two textile mills (Misr for Spinning and Weaving, Mahalla El-Kobra, a large, public factory and Giza Spinning, Weaving Co., (a small private sector unit) and successful implementation of process modification involving chemical substitution of sulphide and dichromate in the sulphur black dyeing process at El-Nasr, Dakahleya and AmirTex mills.

This however, is the first step in the promotion of CP in the Egyptian textile industry. From this point on the onus is on the Government of Egypt to initiate aggressive promotion of CP. The experience from the demonstration projects has to be scaled and multiplied across the sector.

The Government of Egypt therefore needs to play a major role in providing the necessary push factors to enable Egypt's textile sector to compete in the global market. These factors include:

- Developing suitable policy options.
- Strengthening enforcement strategies.
- Providing support for technical assistance in technology transfer, training and awareness, developing innovative CP options locally for the sector and disseminating the experiences from the project across the sector.

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