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Steering Industrial Development Along a Sustainable Path: An Arab Perspective

[EXECUTIVE REPORT]

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DRAFT

Steering Industrial Development Along A Sustainable Path: An Arab Perspective [*]

1. Industrialisation, Environment and Development in the Arab Region: A Brief Outlook (CSD 6/2 para. 1, TOR 6/I, vii, viii, x)

Environmental degradation in the Arab Region is attributed to increased pollution associated with rapid industrial development, improper end-of-pipe (EOP) treatment of the generated wastes, difficulties in monitoring emissions and enforcing environmental regulations, lack of expertise for management of remediation systems, and lack of machinery for strategic planning for waste minimisation and integration of cleaner production (CP) in production process.

To overcome pollution problems in the congested Arab cities, Governments have opted to establishing new industrial cities (NICs) away from existing communities. Manufacturing enterprises in NICs are relatively modern and rapidly growing; and pollution prevention measures are adopted during the course of industrial development. On the other hand, industries in the old cities possess an aging industry, with limited investment available for improving or expanding existing manufacturing plants.

Box (1)
Environmental Degradation due to Discharge of Untreated Effluents in Industry-intensive Cities: Case Study of Alexandria, Egypt

Industrial development in Alexandria Metropolitan Area AMA has grown significantly during the last three decades to benefit from inter-industry linkages and the supporting infrastructure in this prime industrial centre. Whilst industrialisation is encouraged to advance economic growth and to improve standards of living in AMA, the rate of change accentuates the impacts on public health and water resources.

Manufacturing industry in AMA accounts for about 16.8 percent of the Egyptian industrial activities. Environmental degradation is manifested in deteriorated water resources, and adverse public health conditions. Industrial effluents discharged into the city sewer system, or directly in the sea, drainage canals or Lake Maruit is estimated at 1.7 million m3 per day; pollutants include chromium wastes from tanneries, oil from petroleum and edible oil refining, black liquor from pulp and paper mills, and hazardous chemicals from dyestuffs and textile finishing plants. Solid wastes of various industrial activities amount to about 1.63 million tons per year. Despite successful reclamation schemes for some industrial residues, several recyclable materials are being disposed of incorrectly giving rise to serious environmental problems, in addition to loss of potentially marketable products.

Hazardous residues cause severe environmental degradation. effects are more serious than those caused by municipal wastes. The prevailing malnutrition, inferior socio-economic standards and hypersensitivity of citizens in industrial areas lessen the tolerance exposure limits of most toxic substances; a grim fact which adds to the misery of workers inhabiting the squatters around cities.

The region presently experiences economic stagnation, which causes rising deficits and growing foreign debt ($ 147 billion in 2003). Forecasts are bleak for quick economic recovery or solving the acute problems

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of unemployment and social services, particularly in non-oil Arab countries. However, recent hikes in oil prices reflect positively on balance of payment of oil-producing Arab countries.

Unemployment and underemployment represent major challenges in the region. The average rate of unemployment presently exceeds 20 per cent of the total work force. There is an excess supply of unskilled job seekers coupled with a scarcity of skilled workers.

As population increases and the regional economy expand, so does the supply and demand for consumer goods. Evidence indicates that change in consumption and production patterns is necessary to conserve environmental amenities and secure sustainability of natural resources in the region. This is achieved in some Arab countries through instituting proper economic incentives, inspiring public participation and promoting sustainable industrial development. However, responses and actions need to consider the large variance that exists between different Arab countries.

Scarce freshwater is the top priority concern in the Arab countries, which is characterised by hyper-arid to semi-arid climate conditions. The main driving forces for water problems are the burgeoning population; the accelerated development and competition for water in the urban, industrial and agricultural sectors; ineffective water management policies, and the highly volatile regional peace and security situation.

Recently, Arab industry recognised the need to avoid or minimise waste generation through introduction of new CP technologies. Businesses and decision-makers presently regard pollution prevention as a dynamic concept that implies gradual development of technical expertise and enhanced management of environmental problems. This trend has resulted in progressive improvements in patterns of production and consumption, with an ultimate goal of achieving sustainable development of Arab industry

The Arab labour force is estimated at 110 million in 2003, with about 17% or 18.5 million workers in the industrial sector. Labour statistics indicate that industrial work force did not increase significantly during the past decade despite steady growth in industrial production. This is attributed to the growing reliance on capital-intensive rather than labour-intensive industries. This in turn caused significant increase in labour productivity as shown in Table (1).

Table 1: Per Capita Share of Industrial Production in the Arab Region
(US $)

Year	1990	1995	1996	1999	2001	2003
Per Capita Industrial Production	728	663	741	683	862	974
Per Capita Extractive Industries	502	423	490	425	594	704
Per Capita Manufacturing Industries	226	240	251	259	268	270
Per Capita Industrial Productivity	11491	9481	10752	10575	13030	15297

Source: Unified Arab Economic Reports (2000, 2004).

The total Gross Domestic Product (GDP) of the region grew considerably in the last decade, reaching about $ 723 billion in 2003. Value added and share of industrial sector in GDP during the period 1999-2003 is shown in Table (2).

Table 2: Value Added and Share of Industrial Sector in GDP of the Arab Region ($ Billon)

Year	Extractive Industries		Manufacturing Industries		Total Industrial Share	
	Value Added	%share in GDP	Value Added	%share in GDP	Value Added	%share in GDP
1999	119.2	20.0	70.3	11.8	189.5	31.9
2000	189.7	28.1	74.3	11.0	264.0	39.1
2001	164.7	25.1	74.4	11.3	239.1	36.4
2002	166.1	25.1	75.5	11.4	241.6	36.5
2003	204.4	28.3	78.6	10.9	283.0	39.1

Source: Unified Arab Economic Report, (2004)

The share of exports and imports in 2003 is $ 303 billion and $ 198.7 billion, respectively (4.1 percent and 2.5 percent of the global market respectively). Percentages of industrial to total exported goods and the rate of growth during the period of 1995-2001 in various regions are shown in Table (3).

Table 3: Percentage of Industrial to Total Export of Goods and Growth Rate Relative to Total Exported Goods during 1995-2001.

5HJLRQ	***Growth Rate of Industrial to Total Exported Goods***	***Percentage Industrial to Total Exported Goods***
Arab Countries	*-33*	*31*
$VLDQG3DFLILF	*1.2*	*78*
(XURSHDQG&HQWUDO$VLD	*1.2*	*55*
(XURSHDQ8QLRQ	*0.3*	*82*
$PHULFD/DWLQ	*1.7*	*47*
South Asia	*-19*	*78*
6RXWKHUQ$IULFD	*-20*	*34*

Source: World Bank. 2003. World Development Indicators, CD-Rom

To promote export of industrial goods, Arab countries seek participation in regional and international trade agreements. However, slow progress is observed in achieving compliance with the commitments and obligations of these agreements. Table (4) shows the status of Arab countries with respect to membership of free trade agreements.

In this region, industrialisation is mostly based on the exploitation of exhaustible natural resources. Oil and gas resources in the Gulf States, Libya, Algeria and Egypt, are playing an important role as exports and as supporting inputs for energy-intensive, value-added industries that are proliferating throughout these countries. Mining and processing of industrial minerals and metals has increased alongside of fossil fuel extraction and is considered an important source of foreign currency in the region. Extracting iron in Algeria and Libya represents 6 percent of the extracting industries outputs, while extracting phosphate in Morocco, Tunisia, Egypt and Syria represents about 12 percent of the total extracting industries outputs. Mining in general (metallic and non-metallic ores) accounts for 18 percent of extracting industries in the Arab Region.

Table 4: Membership of Arab Countries in Regional and World Trade agreements

Country	Greater Arab Free Trade Agreement	Agreements with Developing Countries	Agreements With Developed Countries	World Trade Agreement
Jordan	*	*	*	*
UAE	*	*	*	*
Bahrain	*	*	*	*
Tunisia	*	*	*	*
Algeria				Applied
Djibouti		*		Applied
S. Arabia	*	*		Applied
Sudan	*	*		Applied
Syria	*			
Somalia		*		
Iraq	*			Observer
Oman	*	*		*
Qatar	*	*		*
Kuwait	*	*		*
Lebanon	*			Applied
Egypt	*	*	*	*
Morocco	*	*	*	*
Mauritania				*

Source: Background papers, Source: Annual Meeting of the Arab Organization of Industrial Development and Mining, Khartoum, Dec. 2004.

Percentage share of extractive and manufacturing industries in GDP in Arab Countries in 2003 is shown in Table (5).

Countries with diversified economies of the region (Egypt, Syria, Tunisia and Morocco) continue to focus on traditional industries such as food processing, and textiles. There has also been a gradual shift towards the production of intermediate and oil-based industries in the Arab oil producing countries, particularly chemicals, petrochemicals, fertilisers, plastics, and energy-intensive industries. While this could signal the development of the sector and an increase in upstream linkages, concern remains of the potential environmental impacts of increased production in these new pollution-intensive activities. The value added and the percentage share of major industrial sectors in Arab Countries are shown in Table (6).

Table 5: Percentage share of Extractive and Manufacturing Industries in GDP in Arab Countries in 2003 (Million US$)

	Extractive Industries % of GDP		Manufacturing Industries % of GDP		Total Industry %of GDP	
Country	**Value Added**	**%Share of GDP**	**Value Added**	**%Share of GDP**	**Value Added**	**%Share of GDP**
Jordan	265.0	2.7	1,396.0	14.0	1,661.0	16.7
UAE	25,632.	32.0	10,919.	13.6	36,551.	45.6
Bahrain	2,421.0	25.2	1,043.0	10.9	3,464.0	36.1
Tunisia	967.1	3.6	4,883.1	18.2	5,850.2	21.7
Algeria	23,888.	36.1	4,384.9	6.6	28,273	42.7
Djibouti	3.4	0.5	14.1	2.3	17.5	2.8
S. Arabia	81,639.	38.1	21,743	10.1	103,382.	48.2
Sudan	1,516.0	8.0	1,064.0	5.6	2,580.0	13.5
Syria	4,163.0	19.5	912.0	4.3	5,075.0	23.7
Iraq	1,099.8	4.7	1,799.2	7.7	2,899.0	12.4
Oman	9,062.4	42.0	1,781.8	8.3	10,844.	50.2
Qatar	11,763.	57.6	1,401.0	6.9	13,164.	64.4
Kuwait	19,440.	46.6	3,010.6	7.2	22,450.	53.8
Lebanon			1,646.7	9.1	1,646.7	9.1
Libya	12,244.	57.5	890.1	4.2	13,134.	61.7
Egypt	5,765.5	8.1	12,972.	18.3	18,737.	26.4
Morocco	714.2	1.6	8,061.4	18.2	8,775.6	19.8
Mauritania	121.3	11.0	86.1	7.8	207.4	18.9
Yemen	3,651.1	31.6	560.0	4.8	4,211.2	36.4

Source: Unified Arab Economic Report (2004).

Industry in the Arab Region has four basic features:

1) Considerable complementarities exist across countries of the region that can be exploited to their advantage if their industrial strategies are coordinated in such a way as to encourage the comparative advantage of the individual countries while promoting the growth in interregional trading.
2) Arab countries are still concentrating on extractive or primary processing of their raw materials (e.g. oil and gas in Libya and Algeria, Phosphates and other ores in Morocco, and agro-industry in Syria). The opportunity to raise value added from further processing of primary materials is substantial (e.g. downstream petrochemicals, plastics, metal products, textile etc).
3) The relatively small capital good industry and the importance of building up this viable sector in countries like Egypt, Morocco and Tunisia. While these countries have growing capital goods, they still heavily rely on imports of basic components and only concentrating on local assembly of such goods.
4) Export performance of manufactured goods is poor while deficit in trade balance is high; export promotion policies may remedy this situation.

Table 6: Value added of and Percentage Share of Major Industrial Sectors in Arab Countries

Country	Value Added Million US$	Food Industry	Textile & Leathers	Chemical& Petro-chemical	Mach-nary	Others
Jordan	1,396	18	6	31	8	37
UAE	10,919	9	10	52	15	14
Bahrain	1,043	6	4	19	2	69
Tunisia	4,883	19	32	27	11	11
Algeria	4,384	19	7	11	14	49
Djibouti	14.1					
S. Arabia	21,743	15	1	39	18	27
Sudan	1,064					
Syria	912.0	27	29	2	30	12
Iraq	1,799					
Oman	1,781	24	12	32	15	17
Qatar	1,401	7	17	47	14	15
Kuwait	3,010	7	3	77	2	11
Lebanon	1,646	28	15	8	18	31
Libya	890					
Egypt	12,972	18	14	25	21	22
Morocco	8,061	33	22	17	11	17
Mauritania	86.1	43	3	11	23	20
Yemen	560.0	29	5	14	10	42

Source: Unified Arab Economic Report (2004).

Box (2)
Selected Development Indicators in the Arab Region and Japan, 2002

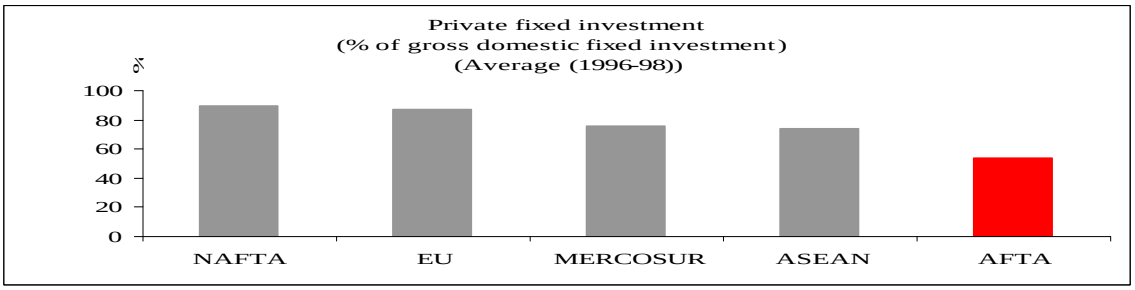
	Arab World	World %
Population	282 Million	4.5% (Japan 2%)
GNP	600 billion USD	2% (Japan 16%)
R&D	1 billion USD	0.2% (Japan 22%)

Source: Arab Region Roundtable on Harnessing Science, Technology and Innovation for Sustainability, Third World Academy of Sciences, Dubai, April 2005.

While the performance of the region's industry is mostly heterogeneous, few countries were able to set up competitive industries using modern technologies that enabled vertical and horizontal linkages to sound industrialisation in the future. The majority, however, were not able to absorb technological advances and maintaining a competitive edge. A clear example is the sub-optimal performance of industries like pharmaceuticals; textile and engineering in Egypt and Syria that existed for a long time but failed to invest in research and development (R&D) and to increase their share in the regional and international markets. The result is that substantial industrial sectors in the Region are failing to achieve sustainable growth that generates employment, profits and hard currency. **(TOR 6/vii)**

The private fixed investment as percentage of gross domestic investment in the Arab Free Trade Agreement (AFTA) Zone is still low compared with other regional agreements as shown in Figure (1).

Figure 1: Share of Private Fixed Investment in Gross Domestic Investment



Source: World Bank, World Development Indicators, 2003.

In addition, industrialisation in most Arab countries is still promoted by policies, which defies the concept of sustainability. These policies comprise protection against competing imports, financial subsidies, credits, and discrimination in Government procurement in favour of public sector industries. **(TOR 6/vii)** These policies are responsible for creating some of the worst polluting industries such as mining, heavy chemicals, and iron and steel. Other industries, which are not inherently polluting have become so because of the obsolete technology and outdated manufacturing practices; notable examples include food processing, textile finishing and machinery. Much of the industries that have developed in these circumstances enjoy Government protection for running inefficient and unprofitable businesses.

The current process of structural adjustment in the Arab countries provides a real opportunity for economic reforms and enhanced industrial growth, and thus leads to increased competitiveness and improved environmental quality. For oil-based Arab countries, rationalisation and diversification of the industrial base is evident. For the non-oil-based countries, the decline in foreign exchange earnings necessitates the adoption of more drastic economic reform measures. The Competitive Industrial Performance Index (CIPI) of selected Arab countries is low compared to similar developing
countries as shown in Table (7).

Table 7: Ranking Economies by Competitive Industrial Performance Index in 1998

Country	CIPI Rank	Country	CIPI Rank
Singapore	1	Bahrain	42
Taiwan	15	Tunisia	45
S. Korea	18	Morocco	53
Mexico	23	Saudi Arabia	54
Poland	34	Egypt	57
Argentina	35	Oman	59
China	37	Jordan	63
Turkey	38	Algeria	74
South Africa	40	Yemen	85

Source: UNIDO Scoreboard Database.

SMEs in the region constitute diverse activities such as textile finishing, food processing, furniture manufacture, formulation of chemicals, etc. The availability of land for industrial and housing developments demand for cheap consumer goods, and abundance of unskilled workers, encourages development of simple-technology SMEs in provincial towns. High-technology enterprises such as electronic equipment assembly, metallurgical, and chemical manufacturing industries are usually confined to metropolitan locations.

The “cascading” of products through different socio-economic levels of society is a common practice in most Arab countries, where the market for second-hand products is thriving. However, cascading tends to loose ground in some affluent societies in the region (e.g. Gulf countries) where individual wealth increases

to a point beyond which basic needs are met. As these affluent societies pass this point, there is a greater tendency to use virgin products, and the market for used goods become smaller.

Down stream processing of secondary products of SMEs comprises broad range of products such as detergents, cosmetics, tanned leather, plastic moldings, toiletries, pesticide formulations, ceramics, converted papers and beverages. The processing facilities are often located within the boundaries of urban settlements in areas with readily available utilities and supporting services. The main hazardous residues generated from these facilities are likely to be spent lubricating oils, used organic solvents, spent catalysts, electroplating liquors, and hide cuttings contaminated with chromium. Both liquid effluents and solid hazardous residues are either discharged to municipal sewers or to water bodies; solids may be incinerated dumped with domestic wastes wherever immediately convenient, No proper hazardous waste landfills exist in Arab countries, few on-site containment facilities operate in large-scale facilities in the Gulf States **.(TOR 6/ii)**

The complete enumeration of the hazardous substances present in industrial wastes would run into thousands. They include detergents, solvents, cyanides, heavy metals, organic acids, nitrogenous substances, fats, salts, bleaching agents, dyes, pigments, phenolic compounds, tanning agents, sulphides and ammonia. While almost all branches of the Arab industry generate wastes, a few major groups are likely to produce hazardous residues requiring special handling.

The chemical industry manufactures inorganic, organic, and synthetic chemicals as well as fertilisers and synthetic fibres. The generated residues invariably mixtures of varying physical and chemical complexity, they are often toxic, non-biodegradable and/or persistent in the environment. Metallurgical industries emanate considerable hazardous residues in the form of slags, slurries, sludges and spent liquors from pickling, anodising and electroplating processes. Other industries, which produce hazardous residues include petrochemicals, batteries, paint and pigment electric and electronic components, pharmaceuticals, paper and textile finishing.

2. Cleaner Production and Environmental Management in the Arab Industry: A key to Sustainable Industrial Development (A21 30.12, TOR 6/ vi)

For Arab industrialists, CP means conserving raw materials and energy, eliminating toxic raw materials, and reducing the quantity and toxicity of emissions and wastes. For environmentalists, it means reducing the environmental impacts of the product throughout its entire life cycle. CP also involves improved management techniques, new forms of work organisation, and efficient alternatives to established production practices. In essence, CP is important to enhance workers attitudes and management approaches as will as improving production technology.

In major Arab industries (Oil, Petrochemicals, Iron, Fertilisers,.etc.) applying a wider concept of life cycle assessment (LCA), CP is extended to cover all links in the chain of actors who are responsible for the development, production, distribution, consumption, and disposal of products.

Concepts of industrial ecology are relatively new in this region. Through this new approach, several companies can work together, to exchange waste for reprocessing, in situations where prevention at source is either uneconomical or not technically feasible.

Some countries are promoting free trade zones -which comprise new industries with relatively new CP technologies- as an alternative to attract investment and lead to higher and more diversified exports. An example of this trend is the Qualifying Industrial Zone (QIZ) export model introduced by the United States to the Middle East in the mid-1990s. The QIZ offers the benefits of the US-Israel Free Trade Area Implementation Act of 1985 to include exports from geographically circumscribed areas, specifically those countries that are not at war with Israel.

At present, QIZs only exist in Jordan, though under US legislation it is permitted to establish such schemes in both Egypt and Palestine. In fact, the process of doing so in Egypt has currently been launched by an American-Egyptian-Israeli agreement, signed in Cairo on 14 December 2004.

Industrial Environmental management (IEM), is widely regarded by the Arab industry as an effective tool to improve production processes and materials, and to achieve efficient waste minimisation and recycling. The system aims primarily at compliance with environmental regulations. It provides Arab industrial managers with proper means to improve environmental performance to comply with applicable legislation. Synergy occurs between CP, LCA and IEM on the one hand, and total quality management (TQM) on the other. **(A21 4.21, TOR 6/viii).**

To sum-up, most Arab countries still faces serious obstacles in employing CP due to:

- Competing demands for scarce resources makes it difficult for the business community to consider long term investment in CP even when the benefits are known;
- Financial institutions lack a system for economic evaluation of CP projects and thus are reluctant to fund them;
- Traditional macro-economic policies and social attitudes obscure the benefits of, and act as a disincentive to CP;
- The legislative and administrative mechanisms do not encourage application of new CP initiatives in industry. The complexity and sheer number of environmental regulations that focus on compliance, rather than voluntary initiatives for pollution control place industrial managers in reactive mode. With the limited resources available for environmental protection, industry is not willing to devote resources to "non-mandated" measures for CP and pollution prevention;
- Industrialists still consider CP technologies as costly systems that involve complex operations unsuitable to local conditions. Most entrepreneurs are not convinced that CP could bring direct benefit to their manufacturing operations;
- CP may conflict with existing manufacturing practices. Materials and processes in use may be less costly than the environmentally friendly CP alternatives.
- Governments, particularly in time of budget shortfalls, are not willing to provide sufficient funding to ensure sustaining CP activities in public sector industries, and
- Evaluating the effectiveness of CP programmes can be a frustrating experience because the results are typically long-term and are often difficult to measure in quantitative terms.

Despite these apparent obstacles, a more sustainable business in the long-term is anticipated to change its perception of the environment from a liability issue that costs money into an integrated aspect of its products, and its business strategy. Both Governments and the business community should demonstrate their commitment to CP by instituting proper environmental policy, allocating personnel, time and financial support for environmentally conscious processes and products.

3. Institutional Measures to Enhance Industrial Sustainability (CSD 6/ para. 16, A21 4.21)

3.1. Integration of Industrial Sustainability in Environmental Action Plans (CSD 6/2 para. 7)

Most Arab countries (Algeria, Egypt, Morocco, Syria, Tunisia, and GCC countries) have recently adopted National Environmental Action Plans (NEAP). These plans are reinforced in some instances by corresponding strategies for industry modernisation, following the principles of sustainable development. Some of these NEAPs have also included explicit requirements for environmentally friendly technologies, as in Egypt, or the appropriate use of resources, as in Algeria.

In the scale of environmentally preferred options, the minimisation of waste generation at source is the first priority, followed by recycling and as a last resort EOP. The component of minimisation is advocated in waste management projects such as the PRONAGDES in Tunisia that establishes the reduction of waste production and their noxiousness, along with recovering and re-utilisation, as one of its specific targets. Concerning energy conservation and efficient use of resources, specific programmes have been implemented by Egypt and Lebanon through the support of the Global Environment Facility (GEF).

Most national action plans aim to promote sustainable industrial development trough implementation of one or more of the following measures:

- Greater integration and rational use of process inputs;
- Modification, adaptation or improvement of production processes,
- Improved production efficiency and/or reduction of waste generation;
- Application of proven processes or equipment originally developed for another industry in a different manufacturing activity; and
- Selection of proper processes and techniques that recognise and maximise inter-process compatibility or synergistic effects.

Despite these efforts, interventions for sustainable industrial development are yet to reach the desired level in most Arab countries. While several countries have initiated and/or implemented CP demonstration projects and awareness events, most of these initiatives are donor-funded and short-lived. To ensure sustainability of activities, their *local ownership* should be secured.

A step forward in this direction is the establishment of National CP Centres (NCPCs) in Tunisia, Algeria, Egypt and Morocco, as well as regional centres such as Cairo Regional Centre on Training and Transfer of Technology under the Basel Convention and Barcelona RAC/CP under the auspices of MAP. The role of these centres is vital for providing technical assistance and training on environmentally sound technologies and proper management of wastes.

The strategies of NEAPs embody the following principles:

- Promoting conserving resources (renewable and non-renewable) in manufacturing industry, through efficient utilisation, recycling, substation, and development of new and less consumptive technologies;
- Improving environmental quality through effective control of activities that pollute or degrade the receiving environments, and restricting future industrial developments that may pose health hazards or diminish the quality of life;
- Ensuring that industrial development and its physical infrastructure is in harmony with the natural environment and relationships are based on balanced and mutual enhancement; and
- Achieving tangible targets including reduction in consumption of natural resources, avoiding use of toxic and harmful substances, improving production systems, and product design to enhance competitiveness and improve quality of the manufactured goods.
- Encouraging *voluntary agreement* between Government and industry to ensure optimal use of resources for sustained implementation;
- Enhancing *co-ordination* among manufacturers, Government agencies and financial institutions;
- Providing *human resources* for administration and operation of CP projects; and
- Encouraging community participation in decisions concerning industrial development.

To motivate active public participation, few Arab countries are adopting new promotional activities such as:

- Instituting responsible care programmes for environmentally conscious industries;
- Instating an excellence promotion programme (accreditation based on efficiency and effectiveness) for industrial facilities achieving significant reduction of pollution releases and employing effective measures for waste minimisation; and
- Developing a mechanism for the public right to know for dissemination of information regarding industry initiatives, achievements in CP and waste management, and health and environmental improvements due to application of CP measures.

Recently, emphasis is placed on improving waste reprocessing and recycling practices in Arab industry. Waste recovery schemes for spent chemicals, solvents, acids, alkalis and heavy metals are installed in locations where such constituents in industrial effluents are generated in large amounts.

As an example, the Egyptian Government is embarking on a comprehensive plan to relocate pollution-intensive SMEs from populous cities to other accessible desert locations, and provision of centalised treatment of processing effluents in the new locations.

The centralised treatment serve two important purposes: (a) eliminating environmental risks associated with discharge of polluted industrial effluents; and (b) enabling reuse of the treated water in developing green areas within the industrial estates and providing a valuable source of secondary water for downgraded industrial uses.

The second approach involves provision of assistance to new industries specialised in reprocessing of wastes from the existing plants as a feedstock for their production processes. Several central facilities are presently in operation for re-distillation of spent solvents, reprocessing of oil-based sludges, and for collection and remanufacturing of waste paper, catalysts and plastics. Most foundries use industrial scrap from the neighbouring facilities as raw material for their operations.

However, an obstacle to implementing programmes of waste recovery in the region is the preference given to EOP treatment, which prevents recovery of marketable constituents from wastes. Another obstacle is the non-selectivity of most technology presently available for recycling industrial wastes, and absence of centralised treatment of industrial effluents, particularly those generated from the widely dispersed SMEs in urban settlements.

3.2. Legal Instruments for Promotion of Sustainable Industrial Development (CSD 6/2 para.7, TOR 6/vii))

Revision and amendment of environmental legislation received attention in recent years. Egypt, Lebanon, Syria and Tunisia have comprehensive articles in the environmental laws on industrial waste management. In the mean time, legislation has been drawn-up on prevention and reduction of waste in the Gulf States, Algeria, Morocco, and Libya. Inmost Arab Countries, the Environmental Agency is responsible for regularly inspecting industries, which generate polluted releases, and for drawing up voluntary agreements concerning industry compliance.

Despite efforts to enact integrated legislation for environmental protection and waste control, scant attention is given to promoting pollution prevention and sustainable environmental management practices as opposed to waste treatment (Command and Control CAC) regulations. In many instances, the legislation does not give due regard to technological developments, consumption patterns, and the need to conserve scarce natural resources of the region**. (CSD 6/2 para. 16)**

Box (3)
Centralised Treatment of Effluents in Cairo Tanneries Relocation Project

There are 320 tanneries in Old Cairo. These are predominantly artisan workshops, with insufficient and often obsolete machinery. Their production lacks a rational organization, and the spaces they occupy are completely inadequate for running a modern production cycle.

The location of these tanneries in prime downtown area and the associated environmental degradation justified the allocation of US$ 150 million for the relocation in a desert location 70 Km away from Cairo. The project that just completed its design phase involves integration of practical cleaner technologies in the tanning operations and construction of centralized wastewater treatment and solid waste management facilities. The CP measures will include:

- Efficient storage of raw hides, this will be done by fleshing before salting then storing the hides in good ventilated stores where temperature is controlled as much as possible to avoid deterioration of the hides.
- The use of reciprocating filters to separate the solid wastes resulting from the liming process.
- The use of modern chemicals and auxiliaries that improve the absorption of leather to tanning chemicals, which reduce the pollutants effluents.
- Glue manufacturing from green splits fleshing.
- Use of modern chemical dosing devices.
- Reduction of the chromium discharge. One of the methods of decreasing the chromium in the plant effluent is by improving the fixation of the chromium during the tanning process.

The maximum quantity of liquid wastes generated from tanneries is estimated to be 22600 m^3/day, the liquid wastes treatment process will rely on the following: (a) Segregation of chrome liquors from tanneries waste. Chrome liquor will be treated in the central treatment plant where chrome will be recovered and reused again in the tanning processes.

Regulatory agencies in the region often lack the necessary resources to ensure compliance; environmental standards are enforced when incorporated in permits or licenses or in situations of gross and/or persistent violations. Extenuating circumstances are often taken into account, particularly when the law stipulates severe penalties, or when enforcement conflicts with powerful interest groups.

Enforcement through CAC commonly takes place using three different approaches: administrative citations, temporary suspension of permits, and prosecution; the three actions are usually enforced in ascending order. The CAC, though effective in achieving compliance, often alienate the regulated industries and tend to encourage EOP over CP approach.

Voluntary compliance action plan (CAP) is requested from large- and medium-size industrial concerns, particularly in Egypt. The CAP identifies violations, the corrective and preventive actions, financing arrangements, and details of work programme with specific time schedule. Punitive sanctions against violators are imposed if the enterprise fails to honour the agreement.

In some cases, high taxes on imports had impeded procurement of the needed equipment for process upgrading and acquisition of new CP technologies **(TOR 6/vii).** In Egypt, Morocco, Syria and Tunisia social problems, primarily unemployment, had somewhat diffused public concern over issues related to environmental protection. Unfortunately, there is no clear evidence, throughout the region that expenditures on pollution abatement have any significant impact on macro-economic indicators.

Enforcement in some instances is impeded due to the overlapping mandates of various Government agencies responsible for health and occupational safety, environmental protection, and industrial development. However, these agencies rarely operate within a co-ordinated enforcement system.

Despite some encouraging developments, the regulatory and enforcement systems are yet to play the desired role for promotion of sustainable development of the Arab industry. The underlying conditions to strengthen the regulatory role in the region include: (a) promoting co-ordination among Government and industry, (b) an increased role in decision making for those most affected by industrial development (private concerns, consumers and local communities), and (c) enactment of a unified industrial permitting system.

The role of financial instruments as a tool to encourage development and application of environmentally friendly measures has been de-emphasised in the regulatory system. The imposition of environmental taxes, fees and other financial sanctions has not been widely used to advance manufacturing practices and discourage generation of wastes. A recent trend to impose environmental surcharge on some potentially polluting products (cigarettes, cement, etc) is a right move in this direction.

The weakening and erosion of exiting pollution control regulations is contributed by several inter-related factors comprising:

- Dynamic evolution of potentially polluting industrial activities,
- Increased complexity of new manufacturing technologies;
- Loop-holes and vagueness of regulations concerning industrial releases which enable violations;
- Transfer and evasion of pollution via other form or media (discharge of polluted water in drainage canals and its ultimate disposal in fresh water ways), and
- Inflation and monetary erosion, which render charges ludicrous.

To overcome these problems, revising regulations encourage preventive rather than corrective approaches. Industrial permitting is being updated to enable incorporation of appropriate environmental measures as a condition for granting the permit for both public industry and private business.

3.3. Economic Instruments to Promote Cleaner Production in the Region (TOR 6/vii)

Institution of a system of charges to be levied on polluters has been significant source that supplement government allocations for pollution control. These additional funds have enabled financing maintenance and operation of sanitary networks and centralized treatment facilities where shortage of public funding is encountered. Levying charges should not necessarily imply the right to pollute, since emission standards remain enforceable.

Imposing the polluters pay principle (3Ps) in Egypt, Tunisia, Syria and other Arab countries, is not favourably accepted by entrepreneurs. However, the 3Ps provides an effective tool to charge the polluters for costs incurred for pollution control. Putting 3Ps in practice involved institution of pollution charges for use of the assimilative capacity of the environment, or to access public sanitary services.

The institution of service charges, as evidence indicates, encouraged polluters to invest in internal pollution prevention projects, and as such, charges acted as a tool for internalizing the costs of pollution. The obvious advantage of a service charge is that it is the polluter who pays for the costs of polluting. The system applied in NICs in Egypt rewards those industries that are clean and efficiently run and penalises those that are dirty and wasteful. The administration of a charge system is relatively easy, requiring only the monitoring of pollution sources.

In most instances, the relatively high charges levied by the sanitary drainage authorities in Arab countries have caused an increase in operating costs for industry. Where the service charges are nominal, industries find it less expensive to continue polluting.

The recent move towards liberalisation of industry in Egypt, Syria, Tunisia and Morocco has brought new concepts, which dictate careful husbandry and utilisation of natural resources, and reduction of

manufacturing wastes. In the cases where competition exists between public industries and the profit-motivated private enterprises, CP alternatives usually receive more attention. However, a noticeable shortage of investment in new CP technologies in Arab industry is attributed to:

- Lack of procedures for assessing intangible economic benefits when comparing various technology alternatives;
- The dynamic nature of new technologies and their costs;
- Lack of complementarities within the production process;
- Inadequacy of industrial infrastructure and scarcity of financing expertise; and
- The prevailing attitudes against expenditures on CP project, particularly those with long payback periods.

In few instances, Governments are securing unrestricted access to water and cheap energy, and even offering hefty subsides to raw materials, to promote investment in industry. Such policies implicitly encourage resources wastage and apathy towards polluting technologies. Unfortunately, subsidisation of material inputs is not conducive to investment in CP technologies, particularly if they require diversions of capital from the lucrative opportunities in industrial expansion.

In instances, where subsides are lifted (Egypt, Tunisia and Morocco) or when manufacturers are charged the actual water and energy costs (Lebanon and Jordan), the industry promptly responded by introducing measures to reduce consumption of material inputs through adoption of CP technologies. The free-market policy presently pursued in several Arab countries has enabled possession of foreign reserve. The trend towards privatisation of public enterprises and the establishment of autonomous business conglomerates (holding companies) permitted poling financial resources and subsequently allocating sufficient funds for investment in CP.

3.4. Recycling of Industrial Residues (TOR 6/ii)

Wastes generated from Arab industries (Food, Chemicals, Textile, Metals, ..etc) are amenable to an economic recovery. Opportunities for precious metal recovery, natural gas generation and production of single cell protein from cellulosic wastes certainly represent practical examples. Appropriate recycling technologies of industrial residues involve comparatively low capital investment, and equipment that is easily operated and maintained.

At present, most large-scale industries employ total recycling systems for cooling applications and multiple-reuse of process water; this reduced water intakes to makeup for process and evaporation losses, and discharges to blow-downs. Through various desulphurisation processes in oil refining, dramatic reduction in the sulphur content of the crude oil is achieved. Moreover, desulphurisation provided an ample source of sulphur for the fertilisers and other chemical industries.

Favouring use of virgin materials in some industries is a consequence of economic and technical policies that developed during abundance of energy and natural resources in the region. However, these "*consumptive policies*" are reconsidered to encourage establishment of a specialised secondary industry for reprocessing residues.

Within the context of sustainable industry, secondary products generated from the manufacturing processes are regarded as additional resources to augment existing natural materials. Recycling, reprocessing and eventual utilisation of industrial residues offer potential of returning these secondary materials to beneficial uses rather than their discharge to the environment which causes detrimental effects on man and his amenities. Successful residue utilisation involves (a) rendering recovered products suitable for beneficial use, (b) promoting marketability to ensure profitable operating, (c) employing appropriate reprocessing technology, and (d) creating an overall enterprise that is acceptable and economically feasible.

3.5. Integrating CP in the Industrial Cities/Estates of Arab Countries (TOR 6/v)

Countries of the region have recognised the need to relocate industrial activities away from residential neighbourhoods to avoid adverse health and environmental impacts of the generated wastes and to enable installation of CP technologies in the new manufacturing establishments. Manufacturing enterprises in these new locations are relatively modern and rapidly growing;

Within this context, new industrial cities/estates are being established in unpopulated locations where private businesses can acquire land lots at a nominal fee and benefit from the efficient infrastructure of services including roads, communication, housing, power and water.

Commitment to CP is evident in the new industrial cities (NICs) in Egypt. To avoid industrial pollution in the congested cities, the Government has established 11 NICs during the past 20 years, while over 20 new ones presently under construction. Total investment in the 2500 operating industrial facilities in the NICs has so far exceeded $ 5 billion. A programme for CP promotion in NICs has been launched by EEAA since 1998. So far, the programme has resulted in self-financing of about $ 300 million in pollution prevention and CP projects.

3.6. Management of Hazard and Preparedness for Industrial Emergencies (TOR 6/iv)

Existing procedures for accident prevention in the industry-intensive areas can be improved through hazard control at source, licensing and permitting system for emergency response, and proper zoning. The permitting system of industrial facilities in most Arab countries is non-homogeneous and lacks consistent enforcement. The authorisation system is not compulsory for all hazardous facilities, which obstruct enforcement of proper safety regulations.

Licensing storage facilities for hazardous chemicals, particularly those located in or close to residential areas, is normally based on review of characteristics such as ignitability, corrosivity, toxicity, mutagenicity, or infectiousness; quantity; location and storage procedures.

Some major industrial cities in Tunisia, Morocco and Egypt have established permanent committees on emergency preparedness in industrial areas, with support of the UNEP. The committee usually constitutes representatives of agencies concerned with occupational safety, public health, transportation, and civil defence; industry and representatives of the local community.

Enhancing existing systems for emergency preparedness and hazard control involve in-situ measures such as modification of layout, application of additional safety devices, change in process and equipment, and use of less hazardous materials. Off-site measures include zoning, early warning of the neighbouring community and evacuation exercises. A plan involving combination of these measures is developed for few high-risk areas (large industrial complexes in the Gulf States, Egypt, Libya and Algeria) to enable safe management of hazardous activities and to maintain security to adjacent population.

3.7. Human Resources Development

The shortage of skilled workers represents an important impediment to sustainable development of the Arab manufacturing industry. In several instances, the commitment and facilities were adequate, but execution failed to achieve the planned results, because of a shortage of qualified personnel.

Personnel rules, salary structures, and promotion potentials are critical staffing constraints. Of the cases examined, public industries tied to the Government structure are less able to recruit the needed professional cadre, compared to the private businesses, which have financial resources to offer attractive salary and other employment incentives.

A fundamental change in the existing situation is necessary to eliminate obstacles to employment of effective industrial development plans and to minimise the negative impacts of industry on the surrounding environment. This can be achieved when those responsible for the day-to-day running of industrial facilities, are reached and trained on appropriate CP technologies, economic and environmental benefits of waste minimisation, and the opportunities for savings through material recovery and recycling of water and energy.

While the development of in-house expertise is essential to sustain industrial development, equally important is the development of expertise of consulting firms and the concerned Government personnel. Special attention should be given to training of the enforcement and inspection personnel to become aware of the environmental impact of manufacturing operations and to use the knowledge and experience gained to curb industrial pollution through use of effective CP options, and institution of appropriate regulations and administrative instructions.

3.8. Community Participation (TOR 6/ix)

Community participation in decisions concerning industry, particularly in issues related to pollution prevention and control, is accorded low priority in the Arab countries. Typically, the central Government and local administrations are assuming full control for the planning and regulating industrial activities. Community participation is limited in most instances, to occasional airing of citizen's views and complaints through the media or political parties.

It is therefore necessary to strengthen communication between Government, industry and the local communities, and encourage exchange of views concerning industry actions, which may affect the citizens' welfare or may pose public health risks. Consultation should not be only limited to soliciting views on specific actions regarding upgrading manufacturing practices but rather extended to defining issues and priorities of the production systems and products, evaluating alternatives and selecting cost-effective ones.

Utmost priority should be given to mobilising public participation in the decision-making process. However, experience has demonstrated the need to look for more effective and direct means to secure public participation in monitoring pollution prevention and production practices in the neighbourhood industries. In most instances, local leaders have better knowledge of the real needs and potential capabilities of their communities. If they have say in decisions, it is more likely that the impact stemming from the local community, or adversely affecting it, will be self-adjusting.

3.9. Information Exchange (TOR 6/ix)

Manufacturers in this region usually encounter difficulties when seeking solutions to their technical and environmental problems; access to pertinent information is either limited or unavailable. It seems therefore necessary to establish an information network to collect and disseminate information on advances in CP technologies and institutional issues to entrepreneurs. The type of information must include, among other things, environmental regulations concerning manufacturing; alternative technologies for pollution control; sources of financial aid; environmental training for small-scale industries; potentials for material exchange. The information may be disseminated through newsletters, or extension services.

A cited example of successful information dissemination is the Egyptian Hazardous Substances Information and Management System (EHSIMS). The project provides information on all hazardous materials used in Egypt, with safety data sheets, permission forms, and emergency response guidelines for authorities to use. The project also provides assistance to the relevant agencies (ministries and local administrations) in Egypt to help in the evaluation and approval process of hazardous materials, whose material Safety Data Sheets (MSDS) are submitted from the suppliers. In addition, the Environmental law 4/1994 obliges waste generators to reduce hazardous waste generation through application of CP or hazardous material substitution.

3.10. Eco-labelling in Arab Industry (A21 4.21, TOR 6/viii)

The Arab countries, most notably Egypt, Syria, Jordan and Algeria, have implemented or contemplating measures to help consumers identify environmentally benign products. Eco-labelling is necessary to stimulate public awareness about products, encourage national industries to develop these products, and provide an objective basis for claims concerning environmentally friendly processes and products.

Eco-labels act as a stimulus for application of CP technologies in industry. They also enhance the concept of “sustainable production” where the shared responsibility of society and industry to provide better service with less pollution and more efficiency is materialised. Industrialists in the region have started to recognise eco-labelling as an opportunity to meet emerging environmental concerns and enable entrepreneurial benefits in a competitive market. A range of eco-labelled products such as textiles, home appliances and chemicals are now available in some Arab markets (e.g. Egypt and Syria). Factors that encourage eco-labelling include:

- Legislative instruments which are gradually shifting from probation of hazardous materials and limitations on harmful releases to regulations concerning “extended producer responsibility” and improved life cycle assessment (LCA);
- Increasing influence of industrial customers to improve reliability and environmental soundness of intermediate-products;
- Pressure exerted by the social environment (NGOs, consumer groups, .etc) to improve products’ durability and reliability; and
- Competition to increase environmental score among consumers and end-users.

3.11. Treatment of Pollution in Arab Industry (TOR 6/i)

Appropriate remediation (treatment) technologies commonly employed by Arab SMEs are those that require low capital investment, managed by their users, and result in effluents suitable for recycling. They are generally small, more labour than capital intensive, allow individual interventions, and take into account site availability. Technologies acceptable to industry are those that maintained and operated essentially by unskilled labourers with a minimum reliance on outside support.

The requisite sophistication and complexity of the waste remediation technology is inevitable for processes involving large-scale industries. The qualifications of the operators, particularly in the small-scale industries are nominal, limiting the operator to "grass-cutting", or basic maintenance responsibilities.. Progression to complex processes in large-scale facilities necessitates the implementation of microprocessor-based systems.

High-strength industrial wastes are some times amenable to an economic recovery of resource and/or energy related materials. Opportunities for precious metal recovery (metal plating), energy generation (sugar refining) and production of single cell protein from cellulosic wastes (food processing and pulping) represent practical examples that being demonstrated in some manufacturing plants in the Arab countries.

Metal recovery through chemical precipitation techniques realize an advantage in the plating, tanning industries and methane generation is considered feasible from food processing wastes with high biological content. The development of a high protein content waste biomass from paper manufacturing is being experimented in some Arab plants using batch processing.

Since pollution remediation in industry relies on technological advances, obstacles may also exist. These include: the fear exhibited by technical personnel and operators towards dealing with unfamiliar waste treatment methods and technologies; the greater difficulty and labour-intensiveness in waste materials; technological limitations in new processes and their impacts on production processes.

Despite impressive progress, recycling potential of treated wastewater in Arab industry has barely been tapped. Few industrial pollution-control processes recycle water by design. As wastewaters must be treated to a high quality to meet environmental regulations, recycling partially treated water within a plant becomes more economical than paying the high costs of treating discharges to the levels required.

As pollution control standards get more stringent, and cost of fresh water increases, recycling rates tend to grow. This situation is driving several water-intensive facilities to install advanced wastewater treatment systems that permit closing water cycle within the plants with minimum feed from the municipal networks.

In this region, there are few remediation projects of polluted soils in industrial and service locations (e.g. oil, chemical, petrochemicals, metallurgical industries, gas filling stations and military installations). Polluted areas are commonly abundant and left for informal use as landfills. An exceptional example is a remediation project in a mercury-polluted industrial facility in Alexandria, Egypt.. **(TOR 6/iii)**

Box (4)
Mercury Decontamination and Soil Remediation:
Case Study of Misr Chemical Industries

An extensive sampling campaign conducted in the late 1990,s in and around the Misr Chemical Industries plant in Egypt, indicated heavy contamination with mercury. Peak concentrations were 800 ug/l in the Cell Houses (maximum allowable in the work environment is 50 ug/l), wastewaters and sediments contained up to 7500 and 2900 ug/l, respectively. Contamination of the walls, ceilings, and floors of the Cell Houses reached serious levels up to 122000 mg/kg, in some instances.
A remediation project has been implemented; the project involves total demolition of the two Cell Houses, and containment of the contaminated derbies and equipment in a restricted landfill site in a desert site, about 80 km far from the plant at a cost of $ 15 million. The landfill contained an impermeable base and cover comprised of two layers of asphalt concrete and a layer of sulphur to act as a mercury immobilization barrier.

3.12. Zoning Policies and Regional Planning as Tools to Limit Adverse Health and Environmental Impacts of Industrial Development (TOR 6/v)

Absence of effective land use regulations is creating serious health risks in urban areas of the Arab Region. Encroachment of residential areas over the safe boundary areas (Right of way) that should be kept clear under high-tension electricity conveying lines is one example of those health risks induced by the exposure to high electromagnetic fields always present around those hanging cables conveying thousands of voltages.

Pollution induced health effects do not stop at any boundary and air pollutants especially in absence of green areas can affect larger population than anticipated. The severity of air pollutants depends on the combined effects of emission patterns, removal processes, climate, and weather conditions. Climate and weather conditions are particularly important in generation, transformation, and dispersion of air pollutants. In temperate conditions of the Arab Region

Gas station storage underground tanks can be a serious ground water contamination source as they are not frequently maintained or inspected. Garages, workshops and power stations linked with large factories are an added source of soil and underground contamination with petroleum lubricating and burning products. Slaughterhouses and small-scale chicken processing shops also contribute to the ground water contamination leading to increasing concentrations of nitrogen compounds since they are mostly not be attached to a sewer facility.

To ensure safeguarding against health and environmental risks of industrial development, the following zoning and regional planning measures are being contemplated for industry-intensive regions in some Arab countries (e.g. UAE, Oman, and Saudi Arabia):

- Land-Use Plan. This type of plan shows the existing uses to be retained and future patterns and areas for residential, commercial, industrial, recreational, open space or buffer, and public purposes.
- Special Plans. These include neighbourhood analysis and plans for urban renewal, clearance, rebuilding, rehabilitation, code enforcement, housing conservation, preservation of sites and structures, central business, parking, parks and recreational areas, and private enterprise plans and their integration with community plans.
- Environmental Plans. These plans are concerned with the adequacy and needs for water supply, sewerage, solid waste disposal, and air and water pollution controls. They are also concerned with the environment, economic, and social impacts of industrial and commercial activities, as well as the future needs of recreational facilities, and open space. The plans should take into consideration the environmental factors that need to be improved and those that can be developed to eliminate hazardous or annoying conditions while at the same time making a desired improvement. Incompatible or nonconforming structures or uses should be eliminated or adjusted in harmony the environment.
- Urban Renewal and Redevelopment Plans. Financial assistance is usually available from the Ministry of local governments to municipalities that formulate acceptable "workable programmes" for improving urban squatters and blight settlements. The ultimate objective of plans is to secure adequate conditions for urban and industrial growth within city boundaries.

3.13. ISO 14000 (TOR 6/viii)

Arab industries are faced with serious challenges as they try to compete with manufacturers of other countries in the export markets. In the new economic environment accompanying globalisation, Arab industries need to pay attention to enhance actions in the areas of standards, quality, testing, certification, and accreditation. This heightens the importance of international standardisation and related issues, including ISO 9,000 and 14,000, and the application of such standards for accessing world markets[)].

While essentially aimed at environmental targets, ISO 14,000 may also give greater credibility with financial institutions, insurance companies, and consumers. Non-participation could have adverse effects on a firm’s competitiveness. Moreover, a trend is emerging in developed countries to impose environment-stringent requirements on forgiven suppliers, which will drive Arab industry to adopt ISO 14000 to ensure competitiveness.

Table (8): Certification for ISO 14000 in the Arab Countries during 1998-2003

Country	2003	2002	2001	2000	1999	1998
Egypt	195	101	100	78	35	13
Jordan	39	14	10	16	8	2
Kuwait	-			-	-	-
Lebanon	6	5	5	5	4	1
Morocco	6	11	6	4	1	-
Oman	2	6	3	2	1	1
Palestine	1	1	1	1	-	-
Qatar	-	1	1	1	1	1
S. Arabia	10	5	6	6	3	1
Sudan	-	1	-	-	-	-
Syria	34	8	5	3	2	-
Tunisia	18	13	7	3	1	1
UAE	104	92	49	48	36	9

Source: Background Papers, Meeting of the Arab Ministers Responsible for Industry, ALIDMO, Khartoum, Dec., 2004.

4. Conclusions and Agenda for Actions to Steer Sustainable Industrial Development in the Arab Region

4.1. Conclusions

a) Present industrialisation pattern in the region has negative environmental impacts. Industry tends to concentrate in urban and coastal centres, which contribute to overcrowding, poor hygiene, deterioration of water resources, and environmental stresses.

b) Industrial planning does not instigate sustainability concepts and principles to ascertain whether production processes are environmentally compatible or where operation of manufacturing industry impinges on society and environment.

c) The CP interventions are mostly inadequate and still limited to improving manufacturing processes, with little regard to product end uses. Weak linkages exist between industry and the complementary sustainability approaches and tools such as energy efficiency, IEM, LCA, and eco-labelling.

d) Countries of the region are experiencing erratic economic growth and financial sector development; and unsustainable consumer behaviour. These factors influenced development of IEM and integration of environmentally sound technologies in the Arab industry.

e) Industrial managers are rarely involved in formulation of industrial development policies, and setting up of environmental regulations and incentives to promote appropriate low-waste technologies in the Manufacturing sector.

f) Factors such as cost, level of technology, pollution loads, and assimilative capacity of the environment are not considered when setting emission standards and pollution prevention regulations.

g) Absences of economic incentives and regulatory disincentives discourage investment in new technologies despite apparent improvements in product quality and increased productivity of manufacturing processes.

h) Lack of holistic approach for integrating CP principals in the regulatory and economic framework results in conflicts between policy and implementation instruments, particularly those related to trade, investment, and management of natural resources.

i) Human resources development for industry is still lacking in most Arab countries. In addition, co-operation among product-development institutions, planning and regulatory agencies, and industry is inadequate. This in turn affects the responsiveness to environmental protection interventions and reduces the effectiveness of resources utilisation.

j) Management actions often concentrate on remedial measures to control wastes after generation (EOP approach) rather than promotion of preventive actions (CP approach). Additional management barriers include fragmented jurisdictions, inconsistent enforcement and lack of mechanisms for enhancing the multipliers effect and outreach.

k) Planning, design and execution of industrial development are performed independently by various Government agencies and businesses entities, which results in significant discrepancies, ineffectiveness, and wastage of resources.

l) The private sector is not adequately involved in technology transfer and investment in manufacturing of environmental equipment. Further, industry and Government partnership does not involve local communities and financing institutions. Access of SMEs to financial and technical assistance is still difficult.

m) Awareness and commitment of decision-makers, industry personnel, and financing institutions to sustainable industrial development is still low.

n) Most Arab countries are experiencing significant economic transformation with accelerated move to privatise state owned industries. Restructuring is gradually pursued in development policy, planning, financing and operation of manufacturing enterprises. In most instances, restructuring does not explicitly address sustainable production in the implementation programmes.

o) Partnerships between industry, community, and NGOs interventions to promote sustainable industrial development have not made much headway in the region.

4.2. Recommended Actions

a) The advent of new technologies makes it possible for Arab industry to abate pollution at reasonable cost and to integrate low-waste processes in their operations. Governments and businesses should promote application of appropriate environmental technologies.

b) Governments of populated countries in the region (i.e. Egypt, Morocco, Syria, Iraq and Algeria) should encourage employment of labour-intensive, less-polluting technologies, finance plans for modernisation of the state-owned facilities, and decentralise industry to ease the burden on urban centres.

c) Considering the significance of SMEs and the informal manufacturing sector in Arab countries, the development of mechanisms and institutions to extend financial and technical assistance to this important sector is necessary.

d) Recovery of waste materials may alleviate pollution problems and at the same time, provide a substantial source of raw materials. Consideration should be given to establishment of national clearinghouse for the exchange of wastes for recovery and reutilization.

e) Incorporating environmental assessment in the permitting system is essential to ensure that environmental amenities are considered on an equal level with technical and economic considerations in the industrial and service sectors.

f) Strategic interventions at the policy level should target improvements in processes and products through adoption of new approaches of LCA, IEM, and eco-labelling, and institution of innovative financing mechanisms to encourage private sector involvement.

g) Regulations should focus on *voluntary agreements* to employ non-polluting technologies in manufacturing processes, while compliance with emission standards should be strictly enforced.

h) Regulations and enforcement mechanisms should be amended or modified to enable a clear working directive for promotion of sustainable industry. Industry and environmental agencies whether local or national, should be given the power and sufficient resources to encourage businesses to adopt new CP technologies.

i) Emphasis should be placed on market-based instruments rather than mere enforcement of emission regulations. More emphases should be directed to instituting proper economic incentives (e.g. grants, loans, tax waivers and/or direct financing of new initiatives for industry modernisation), and disincentives (e.g. taxing polluting materials, deposits on recyclable goods and fines for non-compliance). The challenge is to mainstream sustainability concepts in the manufacturing processes while devising practical means to cushion the economic impact on industry.

j) Governments should encourage adoption of new low-waste processing technologies through provision of financial and technical support, to manufacturers, particularly for SMEs.

k) Research should contribute to the improvement of industrial practices through development of environmentally compatible technologies, and promoting their application with due regard to cost-effectiveness.

l) Building human skills and mainstreaming new technologies and management approaches should be emphasised in formal technical and business education.

m) Stakeholders of industrial development (decision-makers, industry personnel, investors, environmental institutions) need to establish and communicate sustainable principles and progress indicators that can be applied and understood by all interested parties.

n) The sustainable approaches in the manufacturing sector should be integrated with similar efforts in the services, infrastructure, and resources management sectors.

o) Adoption of a unified system for economic incentives to enhance competitiveness and entra-regional trade among Arab countries. These incentives should be compatible with the goals of conservation of resources and prevention of pollution; incentives that conflict with these goals should be removed.

p) Enhancing demonstration activities among various industrial sectors in the region to foster multiplication. Focus should be on production sustainability and life cycle assessment rather than merely technical retrofitting of manufacturing operations.

q) A regional system for information services should be instituted to act as a delivery mechanism for information concerning legislation, emission standards, cleaner technologies, waste minimisation and IEM. Emphasis should be laid on improving performance of existing information channels, in terms of relevance and user-friendliness to industry and other stakeholders.

r) Providing adequate financial assistance to the ailing public sector industries to ensure their compatibility with the goals of conservation of resources and prevention of pollution, incentives that conflict with these goals should be abolished.

s) Enhancing public awareness and participation through increased flow of information from industry and government to the public, and vice versa. Better understanding of basic environmental concepts and rational utilization of resources can be achieved when the public is given the opportunity to participate in policy decisions and in expressing their views concerning industrial development plans in their communities.

t) Private investments must be encouraged to play a major role in application of new concepts of sustainable industries, particularly in the fields of process modernisation, pollution abatement, hazardous waste management, and materials recycling.

u) Strengthening internal and external monitoring schemes to support environmental enforcement and to enhance efforts for maintaining a clean environment for the benefit of workers and the surrounding communities.