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**TRADE POLICY ASPECTS OF ENVIRONMENTAL MEASURES
IN THE ESCWA MEMBER COUNTRIES**



UNITED NATIONS
New York, 1997

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INTRODUCTION*

The link between trade and the environment is of growing concern in developing and developed countries alike and has become widely acknowledged as an issue which must be addressed in international trade forums. It also merits greater attention in the ESCWA region. The trade-off between economic growth and the environment was a major topic of discussion at the United Nations Conference on the Environment and Development held in Rio de Janeiro in 1992. However, the potential impact of environmental measures on trade and, conversely, the effects of trade and trade policy on local and global environmental conditions were not considered intensively during the Uruguay Round of Multilateral Trade Negotiations; the issue was raised instead by non-governmental organizations (NGOs) in various countries requiring public legislation to approve the decisions of the Uruguay Round. The Committee on Trade and Environment, a two-year standing committee established to discuss various trade and environmental issues, was set up partly as a result of such public pressure. According to the arguments of environmentalists and NGOs, increased world trade will have a negative effect on the environment simply by causing more fossil fuels to be burned in transporting a larger volume of goods. In addition, as competitive pressures increase, all countries will have an incentive to undervalue their environmental inputs in order to gain or maintain a competitive advantage in a globalized trading situation. However, the view shared by proponents of free trade and supporters of recent international trade agreements is that economic growth resulting from free trade may be accompanied by greater public awareness of environmental issues and may result in a higher value being placed on the environment, since a clean environment is a normal good, that is, one for which demand increases as incomes increase. Free trade is expected to promote economic growth in developing countries, raising income levels and the demand for normal goods including a clean environment.

The ESCWA region remains a very limited contributor to environmental degradation at the global level. Its environmental problems are, for the most part, local in nature. Concerns exist about the degradation of water, land and air resources, as industrialization is encouraged by economic growth and restructuring policies. Deteriorating air quality in the region is best characterized by Cairo, which is considered one of the worst examples of urban air pollution in the ESCWA region and possibly the world. Industries located in Cairo and nearby cities, as well as the growing transportation sector, have been major contributors to pollution in Cairo. Water, a scarce resource in the ESCWA region, has also been adversely affected by economic growth and industrialization. Though the pollution of the Nile River is the most publicized, water quality has also deteriorated in other rivers and waterways in the ESCWA region for a variety of reasons. When the environment is treated as a "free" input into the production process, the costs of producing the good are actually borne in part by those affected by adverse environmental conditions. The good produced is sold at a price below the true total cost of production and more of the good is consumed. Such costs must be internalized in the production process for an efficient allocation of resources and for sustainable development goals to be met.

The ESCWA region may also be affected by measures enacted by international, regional and national entities to safeguard the environment at the global, regional and local levels. The ESCWA member countries constitute a major oil-producing region, and the economies of most of these countries would be adversely affected by broad-based fuel taxes levied on the basis of carbon content in consuming countries, as proposed by a number of European countries in 1992. Other measures often recommended include eco-labelling and tradable pollution permits, as well as countervailing measures and harmonization measures under the newly established global trading system. Trade-related policies other than specific environmental measures may affect the sustainability of exports from developing countries including those of the ESCWA region. Structural adjustment policies related to exchange-rate depreciation and export promotion may lead to the undervaluation of natural resources in a newly globalized international trading system.

* The ESCWA secretariat gratefully acknowledges the efforts of Hosny Khordagui, the ESCWA Regional Adviser on Environment, in reviewing and commenting on this output.

TRADE POLICY ASPECTS OF ENVIRONMENTAL MEASURES

Chapter I of the present study examines the theoretical background of the relationship between environmental measures and international trade. Chapter II reviews the environment-related measures incorporated in international and regional trade agreements and analyses their possible impact. The environmental impact of the manufacture of goods that are widely exported from developing countries is examined in chapter III. The leather and textile industries receive a more detailed examination in chapter IV owing to their potential adverse effect on the local environment and their importance as small-scale industries in some countries of the region. Conclusions and recommendations are provided in the last chapter.

I. THEORETICAL BACKGROUND

A. THE PROBLEM OF THE COMMONS

References to the environment are often vague and general; however, the term actually encompasses a myriad of goods ranging from air quality to basic public health and sanitation. The environment may be said to fit the classic description of a public good: consumers cannot be excluded, and there is no direct way to charge for its use. Certainly "air" is a valid example of a pure public good, and though emissions are monitored in some countries, enforcing standards, which amounts to preventing certain consumers from utilizing the good, is difficult. Since the good is non-excludable, it lends itself easily to use as a free or costless input into the production process. For example, a factory that pollutes the air as it produces a product is actually using the good air much the same way it does a raw material for which it normally pays a price. Air, however, is free, and its zero price means that it will be overused as an input. Whether this is an export good or one consumed locally, the price charged is lower than it would be if the factory paid for the input air; consequently, more of this good will be consumed than would be the case if the consumer had to pay the commensurately higher price. If it is an export good (or consumed far from the immediate vicinity of the factory), part of the cost of the good will be borne by those adversely affected by the polluted air during the production process rather than by the consumers of the good itself. The overuse of "free", non-excludable resources has come to be known as the problem of the commons.¹

B. ENVIRONMENTAL MEASURES AND INTERNATIONAL TRADE

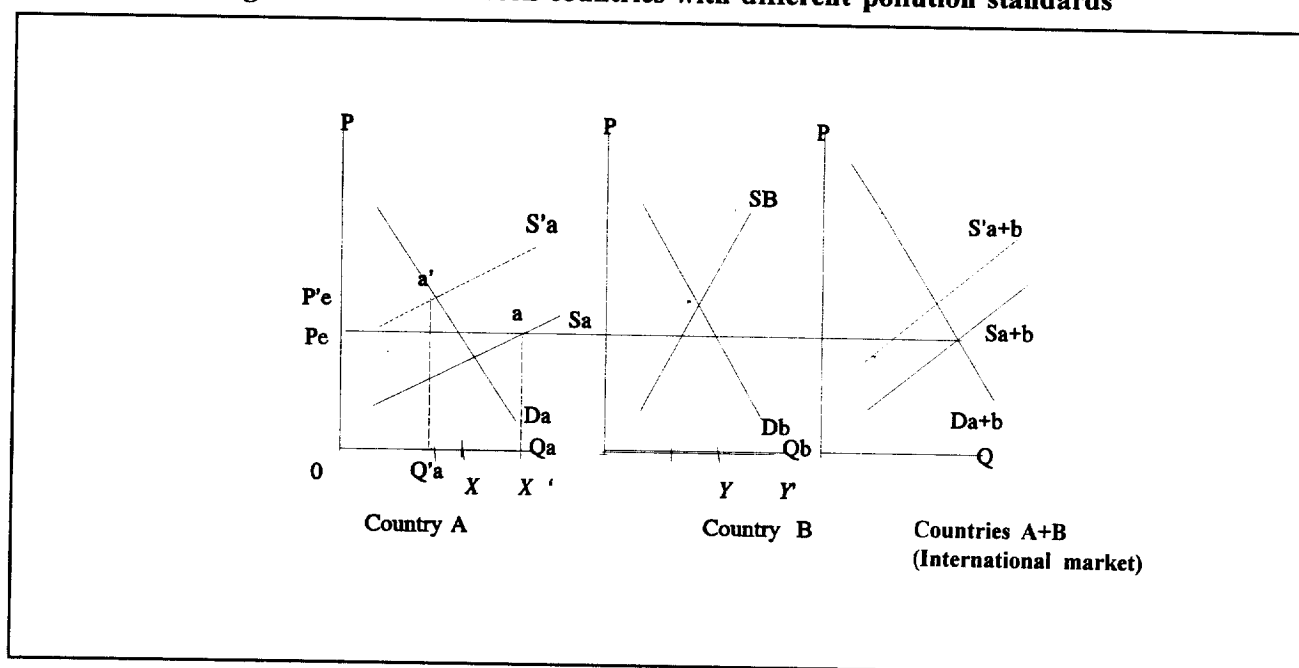
The regulation of pollution by a Government forces the producer or, on a larger scale, the industry to use certain environment-friendly production processes and, if the good is a major export good, ultimately has an impact on the foreign exchange earnings, employment and economic well-being of a country. This is clearly shown in the model below (see figure I), in which two countries produce the same good but use different technologies.² For the sake of simplicity, transportation costs, tariffs and other costs are assumed to be zero. Country A produces the good using a production method which utilizes the environment as a free input, say, by polluting the air. Country B forces its industry to adopt an environment-friendly technology, and its supply curve reflects the higher costs since the environment is no longer a free good. Without trade, in a situation of autarky, consumers in country B would pay a higher price for the good than those in country A but would not have environmental degradation. With trade, however, the equilibrium price is determined in an international market, represented in this model by the demand and supply summations of countries A and B. Here the equilibrium price of P_e is established. Country B becomes an importer of the good, purchasing YY' from country A. Country A will produce more of the good than it will consume at this price (as shown in figure I) and will be a net exporter, exporting XX' of the good.

This analysis provides the basis for the fear of environmental dumping. If country A is a poor country, this might explain its willingness to allow the use of the environment as a free input. The export of the good is not without benefits for country A; employment is created, foreign exchange is earned and,

¹ This term was made popular by Garrett Hardin in "The tragedy of the commons", *Science*, vol. 162 (13 December 1968), pp. 1,243-1,248. However, the problem was addressed by economists earlier; see, for example, H.S. Gordon, "The economic theory of a common-property resource: the fishery", *Journal of Political Economy*, vol. 17 (April 1954), pp. 124-142.

² See William J. Baumol and Wallace E. Oates, *The Theory of Environmental Policy*, second edition (Cambridge, United Kingdom, Cambridge University Press, 1992), chapter 16.

Figure I. Trade between countries with different pollution standards



by traditional economic accounting, economic growth occurs. Indeed, with this simple model it becomes easy to understand the incentives for developing countries to misuse the environment in such a manner. Country B may be a wealthier, or developed, country in which the general public places a higher value on the environment and has pressured the Government to enforce environment-friendly laws. However, in this model, country B is still able to consume the product which has been produced using the environment as a free input at a lower-than-otherwise price. The poor country bears the burden of the consumption patterns of the wealthier country.

Though this simplified model illustrates the impact of different national environmental regulations in a free-trade situation, it ignores the fact that environmental conditions may vary from country to country. While the environmental dumping argument acknowledges different preferences resulting from disparate income levels, these preferences may arise from other causes. Country A, for instance, may be more willing to accept pollution because of its physical or geographic conditions. Perhaps it is relatively pollution-free and its factories are located in areas with no major population centres down wind. Local valuation of the environment must be taken into account if and when international rules are established. The income level of a country, however, is a determinant of its preferences in this regard, and empirical work in this area notes that after a certain per capita income level is attained, more environmental controls are likely to be implemented. Recent estimates point to a threshold annual per capita income level of around \$8,000.³

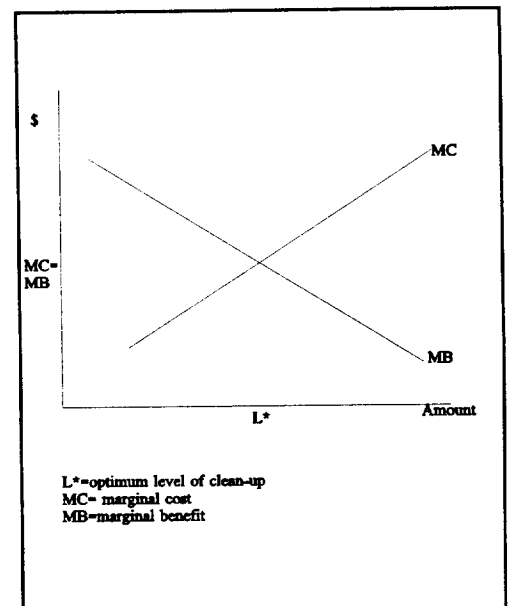
³ Gene M. Grossman and Alan B. Krueger, "Economic growth and the environment", *Quarterly Journal of Economics*, vol. 60, No. 2 (May 1995), pp. 353-373. This phenomenon is sometimes referred to as the environmental Kuznets curve. It has been challenged for a number of reasons, including the measure of pollution (typically carbon dioxide [CO₂]) used in testing the models. See Vivek Suri and Duane Chapman, "Economic growth, trade and the environment: an econometric evaluation of the environmental Kuznets curve", a paper presented at the Fourth Biennial Meeting of the International Society of Ecological Economics, held in Boston from 4-7 August 1996.

If country A decides to implement environmental regulations which force the producers of the good in the above-mentioned model to adopt a pollution-free process, the supply of the good will decrease in country A and in the international market as well, to $S'a$ and $S'a+b$ respectively. The equilibrium price, determined in the international market, rises to $P'e$. In country B, less is imported, since local producers will supply more owing to the higher price, while consumers will buy less, again owing to the higher price. Country A will export less of the good (in this example exports will fall to zero). The revenue accrued from the sale of the good is now represented by the rectangle $OQ'aa'P'e$, having fallen from $OX'aPe$. However, whether this is greater than or less than the revenues associated with no pollution controls is indeterminate, since it depends on the elasticity of demand in the international market. If consumers are not very responsive to a price change, then total revenues will increase; however, if consumers are very responsive to a price change, then total revenues will decline after the pollution controls are effected. Thus, the general equilibrium effects of the measure—or in other words, its broader impact on foreign exchange, employment and overall economic growth—cannot be determined without more specific knowledge of the good and the elasticity of its demand.

C. COST-BENEFIT ANALYSIS

Recommendations aimed at safeguarding the environment do not necessarily imply a zero pollution level. Given the often prohibitive cost of total clean-up or total prevention, the positive relationship between economic growth and environmental degradation, and the capacity of the environment to absorb some level of pollution, an optimal level of pollution is often sought rather than a zero level. Cost-benefit analysis, a tool used to evaluate public goods and projects, can be used to determine whether a specific measure is appropriate. This tool can be applied to environmental projects to prioritize pollution-reduction schemes. It illustrates the trade-offs between the beneficial aspects of pollution reduction and the resources which society must give up in order to achieve this reduction.⁴ The underlying rationale of such analysis is that the policy or measure is considered desirable if the marginal or additional benefits accrued from the measure are greater than the marginal or additional costs associated with its undertaking. In fact, measures will be adopted until the marginal benefit is exactly equal to the marginal cost.⁵ The problem of cleaning up a hazardous dump site constitutes a good example for which cost-benefit analysis can be used to determine exactly how much should be cleaned up. Typically the initial efforts will be associated with a relatively low cost, but as the clean-up progresses, and after a certain point, the cost increases; further, the additional benefits associated with the clean-up will become progressively lower. The optimal level of clean-up will occur when these additional benefits are equal to the additional costs, as shown in figure II.

Figure II. The optimal level of clean-up



⁴ A.J. Krupnick, "Using cost-benefit analysis to prioritize environmental problems" in J. Darnstadter (ed.), *Global Development and the Environment—Perspectives on Sustainability* (Washington, D.C., Resources for the Future, 1992), pp. 35-47.

⁵ A measure or project should be undertaken if its additional or marginal costs are less than or equal to its marginal benefits. Thus, a project to eliminate or reduce environmental degradation should be undertaken only to the extent that the marginal benefits equal the marginal costs involved. Using this criterion, it is not recommended to effect a total elimination of pollution unless society's benefits are greater than, or at least equal to, the cost of the clean-up. See E.J. Mishan, *Cost-Benefit Analysis*, new and expanded edition (New York, Praeger, 1976).

This rationale can also be used as the basis for evaluating a more general measure which would affect the producing sector. Country A (of figure I), for instance, may face policy choices with which different amounts of pollution or degradation are associated. Choosing the policy which forces producers to adopt production processes that do not allow them to recover their costs will have adverse effects on foreign-exchange earnings, national employment levels and economic growth; in other words, the costs may be greater than the benefits for the country as a whole. The policy which results in the new supply curve, $S'a$, in figure I may well be associated with some acceptable levels of pollution.

Undertaking cost-benefit analysis entails an accurate measure of costs and benefits. Measuring costs is usually fairly straightforward, though some costs may be hidden. Measuring the benefits of an environmental policy or measure may be difficult, in terms not only of identification but also of quantification. Putting a quantitative value, a shadow price, on benefits not normally valued in the market is often necessary. In addition, as most projects and measures are undertaken and accrue benefits over a period of time, costs and benefits of the future must be discounted to the present for an accurate assessment. The rate used to discount is often controversial, and small changes can affect the feasibility of a project or measure. The controversy centres around the issue of whether market interest rates reflect the true time preference of society, especially in developing countries where interest rates have been kept artificially low in attempts to promote investment and, more recently, have been influenced by structural adjustment policies.

D. UNILATERAL POLICY

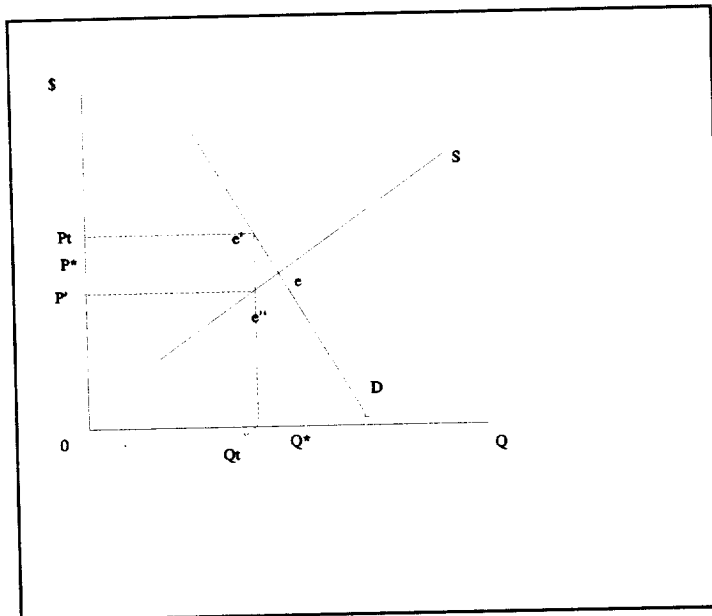
As illustrated above, environmental policies undertaken on a unilateral basis may place a country at a disadvantage in an increasingly globalized world economy. Country B's policies, which require the adoption of environment-friendly production processes, clearly place country A in a position of comparative advantage. Indeed, critics of international and regional trade agreements argue that comparative advantage can be gained by undervaluing natural resources, and, in an increasingly competitive world, poorer countries will be forced to adopt such a strategy. Unless all countries adopt environment-friendly techniques, any one country will be reluctant to do so. Therefore, many NGOs and environmentalists are calling for the inclusion of environment-related issues in trade agreements.

Policies can also be undertaken to limit the demand for a product or service which is considered harmful to the environment. The carbon-based tax proposed by many developed countries would fall more heavily on coal since it has the highest carbon content of the fossil fuels but would also affect the demand for oil, as shown in figure III.⁶ Such a tax would have the same effect as an excise tax, causing less to be consumed and consequently produced, as shown in figure III by a decline from $0Q^*$ to $0Qt$. After the imposition of a tax the revenues accruing to the producers decline from $0Q^*eP^*$ to $0Qte''P'$. After the imposition of the tax, an amount equal to $P'e''e''Pt$ will be collected by the Government. Though the total amount paid by the consumer is higher—especially in the case of a good facing a demand which is inelastic with respect to price, as is the case with oil—the total amount earned by the producer decreases.⁷

⁶ Countries of the ESCWA region are particularly sensitive to the effects of a carbon-based energy tax since the region's major export is oil.

⁷ The distribution of earnings depends on the elasticity of both demand and supply with respect to price. Oil is typically characterized by a relatively inelastic demand, especially in the short run, and this implies a larger share of revenues for the Government after the tax than would be the case if oil were characterized by elastic demand. The elasticity of supply with respect to price depends on the type of technology used and the physical characteristics of the oilfields, but is often inelastic with respect to price in the short run. Figure III is drawn with a relatively inelastic demand, but the supply is close to unity for illustrative purposes only.

Figure III. The effects of a carbon tax on the demand for and supply of oil



Energy-based taxes on final refined products in developed countries are already substantial, currently ranging from 31 per cent of total revenues from refined petroleum products in the United States to 65 per cent in France and Germany.⁸ Taxes have risen considerably during the past 10 years, reflecting, in part, concern for the environment in developed countries.⁹

E. STRUCTURAL ADJUSTMENT POLICIES

Structural adjustment policies have been undertaken by many developing countries, including some ESCWA member countries, as internal and external imbalances have become untenable. They have generally comprised contractionary policies aimed at stemming unacceptable inflation rates and attempts to decrease public-sector involvement in economic activity. Government expenditures

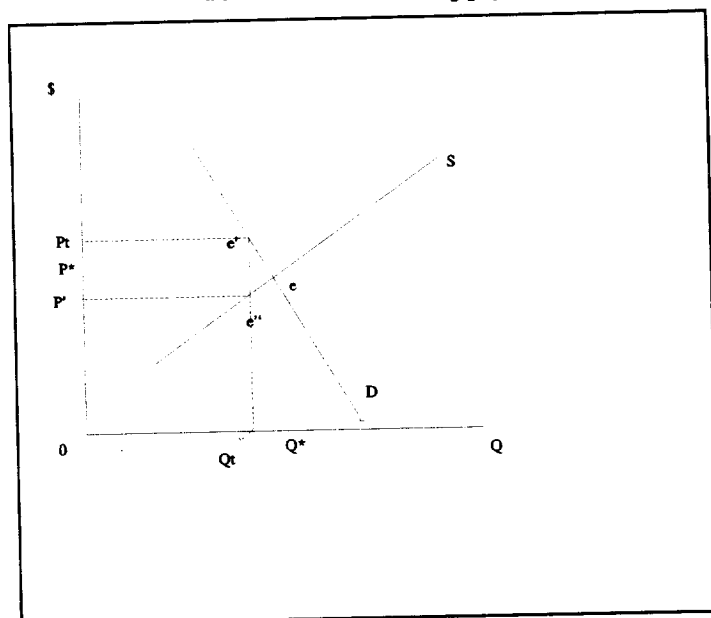
are curtailed, monetary expansion is slowed or halted, and domestic consumption, at least in the short run, declines. Subsidies provided by the Government on basic goods are reduced, and the private sector is encouraged to increase its role in economic development and growth. Partly owing to the decrease in domestic demand, a reorientation of economic activity to the production of export goods occurs.

In countries with exchange-rate controls in place, the devaluation of exchange rates is recommended. This policy is typically more encouraging to foreign private investment and makes exports more competitive in the world market. However, such a policy lowers the value of the inputs in the production process on the world market, so that the value of a country's labour and raw materials are actually worth less in terms of major world trading currencies; these inputs and raw materials include natural resources and the local environment. Capital goods, usually imported, become more expensive for domestic producers, and the goods produced will tend to be more labour- and resource-intensive. As a developing country strives to be more competitive, its export promotion policies may lead to the overuse of its natural resources and greater exploitation of the environment as a free good. These tendencies will become more pronounced as worldwide competition increases and developing countries have more incentive, or are under greater pressure, to gain comparative advantage by undervaluing their resources.

⁸ *Arab Oil and Gas*, vol. 23, No. 558 (16 December 1994), pp. 3 and 4.

⁹ See International Energy Agency, *Energy Efficiency and the Environment* (Paris, Organization for Economic Cooperation and Development, 1991) for the possible effects of a carbon-based tax on the environment. One scenario with a tax of \$65/ton of carbon, which is equivalent to a tax of \$8/barrel of oil, forecasts a total reduction in carbon dioxide (CO₂) emissions of 7.5 per cent.

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II. ENVIRONMENTAL CONCERNS IN INTERNATIONAL AND REGIONAL TRADE AGREEMENTS

Recently concluded regional and international trade agreements such as the North American Free Trade Agreement (NAFTA) and the General Agreement on Tariffs and Trade (GATT) 1994 have included some references to links between trade and the environment, mainly as a response to public pressure in some of the negotiating countries. This chapter reviews the trade and environment aspects of major international and regional trade agreements with a view to analysing their implications for the ESCWA region. It should be noted that the inclusion of references to the environmental effects of trade is a rather recent phenomenon, and initial references in the agreements are often vague. However, in regional trade negotiations currently under way in other parts of the world, ways and means of dealing with the problem of environmental degradation resulting from increased trade are being explicitly considered, and though these negotiations often do not deal directly with the ESCWA region, they provide some idea of the international regulations the region may face in the near future.

A. MEANS OF LINKING TRADE AND ENVIRONMENT IN TRADE AGREEMENTS

The goal of incorporating environmental measures in trade agreements is to avoid environmental dumping and the lowering of standards to the level of those of the least regulated country, as described in chapter I. In other words, they aim to force the producers to internalize costs associated with environmental degradation in the production process. Two ways of achieving this are suggested in the context of international trade agreements: countervailing measures and the harmonization of standards. Countervailing measures would enable the importing country to impose a duty on a good equal to the amount of producing the imported good under the same environmental standards as the importing country. Thus, the producers in the importing country would not be placed at an unfair disadvantage from the implementation of national environmental laws and regulations and would not need to relocate to other countries, as would be the case in the absence of such regulations. The consumer would pay the true costs of the product, including that of environmental degradation, and the problem of environmental dumping would be avoided. The second method is that of harmonizing standards, which entails establishing a mechanism for the specification of environmental standards within a treaty to prevent downward harmonization and encourage upward harmonization, that is, the adoption of the strictest environmental standards rather than the weakest.

Other, more specific means of internalizing the costs of using the environment in the production process include the recently proposed eco-labelling, where a traded product would carry a label certifying that the production process used to produce the good met certain environmental standards. This would allow the consumer to include environmental considerations in his or her decision to buy the good. Implementing this scheme requires a lot of preparatory work, however; the contents of the label must be decided upon, the required environmental standards must be determined, and a system of checking whether the firm has actually met these conditions must be established. Another proposal is to establish an international system of tradable permits; firms would be allowed to produce only a certain amount of pollutants and would be able to resell them if they are not needed. This approach would assign a price to the environment and is widely accepted among economists as a possible solution to the problem of the commons; however, problems may exist in implementing such programmes in developing countries.¹⁰

Such measures have not yet been incorporated in trade agreements and may be subject to criticism if differences in the ability of countries to absorb an acceptable level of pollution is not taken into account.

¹⁰ Kathleen L. Abdalla, "Energy policies for sustainable development in developing countries", *Energy Policy*, vol. 22, No. 1 (January 1994), pp. 29-36.

CHAPTER II. ENVIRONMENTAL CONCERNS IN TRADE AGREEMENTS

In fact, those promoting free trade often argue against such measures on the grounds that they could be used to create barriers to trade. Identifying differences in natural endowments, quantifying these endowments, determining a country's natural capacity to absorb an acceptable level of degradation (even simply defining the term "acceptable"), and negotiating an agreement are all difficult tasks.

B. INTERNATIONAL TRADE AGREEMENTS

The World Trade Organization (WTO) was established on 1 January 1995 as agreed upon by the 111 signatory countries at the conclusion of the Uruguay Round of multilateral trade negotiations, the eighth and last round of the General Agreement on Tariffs and Trade (GATT), to monitor and enforce the liberalized system of trade.¹¹ Although issues related to the environment were raised during the successive rounds of negotiations, GATT did not deal extensively with the issue. The Final Act Embodying the Results of the Uruguay Round of multilateral trade negotiations, however, provided for the establishment of the Committee on Trade and Environment to report on the relationship between trade and the environment including the issue of sustainable development. The Committee on Trade and Environment was established partly as a result of pressure from environmentalists and NGOs, which voiced their concern in various forums about the possible negative effects of liberalized world trade on the environment. Their concerns centre around the expected increase in world trade and the fact that free trade is expected to increase the scale of economic activity as economies grow; greater amounts of fossil fuel will be used for transportation and during the manufacturing process, and there will be increasing pressure on developing countries to exploit natural resources and the environment to gain comparative advantage in international trade.

The volume of world merchandise trade increased throughout the first half of the 1990s at rates ranging from 2.9 per cent in 1991 to 9.4 per cent in 1994.¹² The increase in 1995 is expected to be 8 per cent, as many economies recover from recessionary conditions, and by more than 6 per cent per year over the next 10 years as the effects of trade liberalization are realized.¹³ Increased trade necessitates the burning of more fossil fuel to transport goods, which will raise the levels of carbon emissions and other pollutants. Environmentalists note that the environmental costs of using fossil fuels are not accounted for in the prices of products and therefore constitute an implicit subsidy of trade. More goods are traded because the actual price of transportation is lower than its true cost. The internalization of the environmental costs of gasoline and other transport fuels would result in less trade worldwide.

The elimination of trade barriers under international and regional trade agreements interferes with the ability of countries to erect barriers against trade products produced using unacceptable processes as a means of forcing their standards on all goods consumed within their boundaries. Until recently, this was considered a "second best" method of protecting the environment. For example, European countries forced the producers of leather in India to meet their environmental standards in their production process before allowing Indian leather to be imported; this resulted in the modernization of the Indian leather industry and

¹¹ Of the 125 countries which participated in the Uruguay Round, 111 signed the Final Act and 104 signed the Agreement Establishing the World Trade Organization (the WTO Agreement). See UNCTAD, *Supporting Papers to the Trade and Development Report 1994, part three: The outcome of the Uruguay Round: An Initial Assessment* (New York, United Nations, 1994).

¹² IMF, *World Economic Outlook* (May 1995), table A22.

¹³ World Bank, *Global Economic Prospects and the Developing Countries*, 1995 (Washington, D.C., 1995), pp. 2-15.

TRADE POLICY ASPECTS OF ENVIRONMENTAL MEASURES

lower levels of pollution from production.¹⁴ Under GATT/WTO provisions, however, restrictions cannot be placed on the production processes of countries of origin, as illustrated by the tuna/dolphin dispute between the United States and Mexico in 1991. In this dispute, Mexico argued that the decision by the United States to limit its imports of tuna owing to the high incidence of dolphin casualties caused by Mexican fishing methods constituted an unfair barrier to trade. The GATT dispute panel decided in favour of Mexico, supporting the provisions of the General Agreement on Tariffs and Trade which prohibit the erection of barriers on the basis of production processes. While the elimination of trade barriers has raised concerns among environmentalists about the possibility of environmental dumping in developing countries with lax environmental standards, it has helped allay the fears of developing countries that barriers to trade would be erected on the basis of unfounded environmental concerns. This issue is of growing concern worldwide, and its treatment under GATT/WTO gives rise to uncertainties and, in effect, allows for decisions to be made by judicial panels rather than by the signatory countries.

The WTO Dispute Settlement Body (DSB), in its first decision on an international trading dispute, decided in favour of Brazil and Venezuela in an assertion by these countries that certain United States gasoline-refining regulations established to safeguard the environment constituted a barrier to trade.¹⁵ The fact that this was the first dispute brought before the newly created Organization and the public outcry against the decision indicate that this issue is likely to become more prominent in trade disputes and negotiations under the purview of the WTO.

Other international organizations have addressed the issue of environment and trade as well. The United Nations Conference on Trade and Development (UNCTAD) established an Ad Hoc Working Group on Trade, Environment and Development in 1994 to examine the linkages between trade, environment, development and related policies with a view to promoting sustainable development, with special attention to be given to problems faced by developing countries.¹⁶ The Working Group has investigated a number of issues in this regard including analyses of international environmental policies on competitiveness, eco-labelling, and the impact of environmental standards and regulations on trade. At the ninth session of UNCTAD, held in Midrand, South Africa, in April and May of 1996, it was decided that UNCTAD should continue its efforts in promoting the integration of trade, environment and development by examining trade and environment issues from a development perspective in close cooperation with the United Nations Environment Programme (UNEP), WTO and the Commission for Sustainable Development.¹⁷ The issues to be considered include competitiveness, market access, eco-labelling, multilateral environmental agreements, positive measures for trade liberalization, and trade and sustainable development.

The International Organization for Standardization (ISO) has addressed the environmental issue by undertaking the development of the ISO 14000 series of environmental management standards. ISO 14001,

¹⁴ General Agreement on Tariffs and Trade, *Trade and the Environment: Report on the GATT Symposium on Trade, Environment and Sustainable Development*. Session II: The internalization of environmental costs and the implications for the trading system (comments by J. Ferretti) (28 July 1994), p. 35 (TE 008).

¹⁵ *International Herald Tribune* (Paris), 20-21 January 1996, p. 3.

¹⁶ UNCTAD, "Report of the Trade and Development Board on the resumed second part of its fortieth session", report to the United Nations General Assembly, 17 June 1994 (TD/B/40(2)/26).

¹⁷ UNCTAD, "Draft final document of the ninth session of the United Nations Conference on Trade and Development", issued 10 May 1996 (TD/L.359).

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which specifies the core elements of an environmental management system, has been finalized for use as an international standard. Standards developed by the ISO are typically voluntary, but their use becomes widespread as consumers require compliance by suppliers. The ISO 14001 standard requires a firm to establish and maintain an environmental management system based on a self-determined environmental policy and goals; to periodically undertake audits of its environmental performance; and to undertake the continuous improvement of environmental standards, exceeding the minimum required by law in this regard.¹⁸

C. REGIONAL TRADE AGREEMENTS

Pressure also exists to address environmental issues in regional agreements, as illustrated recently when a side agreement on the environment was adopted along with the North American Free Trade Agreement (NAFTA).¹⁹ The agreements of other regions are of interest to the ESCWA region because they provide indications of environmental regulations which may have to be followed when trade is conducted with those countries. NAFTA is an example of one such regional agreement, important not only because the signatory countries are the destinations for more than 10 per cent of the ESCWA region's exports, but also because environmentalists and NGOs were influential in the negotiating process, and their concerns may be the basis for future regulations adopted by trading partners of the ESCWA member countries.

NAFTA contains several provisions aimed at making the Agreement environmentally sensitive, and these provisions are viewed as more rigorous than the equivalent provisions incorporated in the Agreement Establishing the World Trade Organization (the WTO Agreement). NAFTA provisions regarding sanitary and phytosanitary measures and standards-related measures ensure that countries will be able to maintain their own levels of environmental protection, and they also support the establishment of committees to enhance protection levels.²⁰ Downward harmonization, in which standards are lowered to the level of those in the least protective country, is prevented to some degree. The preamble to NAFTA contains a commitment by the member countries to increase trade in a manner consistent with environmental protection and conservation and the promotion of sustainable development. NAFTA was negotiated together with a side agreement, the North American Agreement on Environmental Cooperation (NAAEC), which provides for the establishment of the Commission for Environmental Cooperation. The adoption of the NAAEC contributed significantly to allaying the fears of environmentalists and NGOs about environmental dumping and ensuring the ultimate ratification of NAFTA in the United States. The relocation of polluting industries just south of the border between Mexico and the United States, encouraged by the former's provision of investment incentives, was the basis for concern. While significant progress has been made, the agreements still face criticism, including the assertion that, though certain standards are specified, there are too many caveats, that environmentally harmful trade is not prohibited, and that national environmental laws seem to be superseded.²¹

Other regional trade agreements recently negotiated or currently under negotiation will provide further indications of how strong the influence of environmentalists and NGOs is in the countries the ESCWA region

¹⁸ UNCTAD, "Newly emerging environmental policies with a possible trade impact: a preliminary discussion", Report to the Trade and Development Board at its third session, 6 November 1995; issued 28 August 1995 (TD/B/WG.6/9), pp. 18-22.

¹⁹ Concluded among Canada, Mexico and the United States in 1993 and implemented in 1994.

²⁰ D. Magraw, "NAFTA's repercussions: Is green trade possible?", *Environment*, vol. 36, No. 2 (March 1994), pp. 15-45.

²¹ S. Charnovitz, "NAFTA's environmental significance", *Environment*, vol. 36, No. 2 (March 1994), pp. 42-43.

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trades with and how environmental regulations pertaining to traded goods might affect the foreign trade of the ESCWA region in the future. The European Union, representing a region which purchases a significant portion of the ESCWA region's total exports (ranging between 16 and 31 per cent during the period 1980-1992), pursues regional environmental objectives and has signed a number of agreements with Eastern European countries which include provisions linking trade and environmental standards.²² The Euro-Mediterranean Conference was held in Barcelona on 27 and 28 November 1995, and brought together members of the European Union and Mediterranean countries/areas including Egypt, Jordan, Lebanon, Palestine and the Syrian Arab Republic. The Barcelona Declaration, issued at the end of the Conference, calls upon participants to establish a comprehensive Euro-Mediterranean partnership among themselves. Such a partnership should be achieved through the strengthening and regular exchange of political dialogue, the development of economic and financial cooperation, and the placing of greater emphasis on the social, cultural and human dimension. In the area of economic cooperation and concerted action, the participants emphasized their interdependence with regard to the environment, recognizing that a regional approach and increased cooperation are required along with the better coordination of existing multilateral programmes, while confirming their attachment to the Barcelona Convention and the Mediterranean Action Plan. They acknowledged the importance of reconciling economic development with environmental protection, of integrating environmental concerns with the relevant aspects of economic policy, and of mitigating the negative environmental consequences which might result. Finally, they committed themselves to establishing a short- and medium-term priority action programme, in connection with efforts to combat desertification, and agreed to appropriate sufficient technical and financial support for this programme.²³

Trade between the ESCWA member States and other countries in Asia has been growing, accounting for 18 per cent of exports in 1990 and increasing steadily to almost 24 per cent in 1994. The latter group has examined issues related to trade and the environment within the context of various regional agreements. The Association of South-East Asian Nations (ASEAN) has recognized the importance of regional cooperation in matters related to the environment since 1981. In 1992 its members agreed to work towards the harmonization of environmental quality standards and a free trade area, but they have not yet adopted specific standards, nor have they linked environmental standards with trade regulations. The Latin American Southern Cone market trade bloc (Mercosur) has attempted to deal with the issue of trans-border polluters, but efforts in trade and environment are not yet fully integrated.

Future regional trade agreements and those currently under negotiation are more likely to be influenced by environmental groups and NGOs as their influence in the public arena grows stronger. Two regional negotiating forums initiated in late 1994 are Asia-Pacific Economic Cooperation (APEC) and the Free Trade Area of the Americas (FTAA). Both groups are concerned with the issue of trade and environment linkages and are working towards harmonizing investment subsidy policies, exchange rates, technology policies, manufacturing standards and possibly antitrust regulations. Many environmentalists and NGOs view these negotiations as tests of the commitment of regions to the precepts of Agenda 21.

D. INTRAREGIONAL TRADE AGREEMENTS AMONG ESCWA MEMBER COUNTRIES

The ESCWA member countries do not constitute a recognized trade bloc, and there are no intraregional agreements exclusive to them. Existing intraregional agreements include other Arab and/or non-

²² S. Charnovitz, "Regional trade agreements and the environment", *Environment*, vol. 37, No. 6 (July/August 1995), pp. 16-45.

²³ European Commission, External Relations, *Euro-Mediterranean Partnership: Barcelona Declaration, Work Programme of the Euro-Mediterranean Conference*, held in Barcelona from 27-28 November 1995, p. 5.

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Arab countries. Some of these are trade agreements; in none, however, are there explicit links between trade and the environment. A number of subregional agreements exist, the most successful of which is the Gulf Cooperation Council (GCC), which was formed in 1981 and entered into effect in 1983. The GCC, which includes Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates, has been active in unifying tariffs, harmonizing standards and reducing non-tariff barriers to trade. While environmental standards, have not been a concern of the member countries in the negotiation of trade agreements, there have been efforts to harmonize standards; the GCC has taken steps to harmonize environmental impact assessment procedures, and a ban was imposed on industrial wastewater discharge into the marine environment by the Regional Organization for the Protection of the Marine Environment. Another regional economic subgroup is the Arab Common Market, established in 1964. The former Arab Cooperation Council, which was established in 1989 and included Egypt, Iraq, Jordan and the Republic of Yemen, was suspended shortly after the Gulf war, and Egypt officially quit in 1994. These arrangements have aimed to promote trade within the region, but again, environmental concerns have not been addressed.

The latest development in the area of regional cooperation has been the signing of peace agreements by the Palestinian Authority and Jordan with Israel. This has led to a number of proposed joint projects and foreign investment activities on multilateral and bilateral bases within the region. The easing of border restraints and trade regulations in the West Bank and Gaza Strip is expected to improve trade prospects with these Palestinian areas as well. The Amman Summit for the Middle East and North Africa (MENA), held in late 1995, was not intended to result in a regional trade agreement, but it was designed to promote trade and investment within the region. While a number of concrete results were achieved, such as the establishment of a regional development bank, the Summit did not deal with the linkage between environment and trade. In a more general sense, however, notice is being taken of the possible adverse environmental effects of increased water usage and tourism in the ESCWA member countries—another consequence of peace and stability in the region. Projects proposed for joint implementation by Egypt, Israel and Jordan in the Gulf of Aqaba area, for example, are being scrutinized to determine their potential impact on the fragile ecosystem there. Further, the ancient Nabataean city of Petra in Jordan has experienced a dramatic increase in tourism, and regulations have been imposed to prevent ecological damage to that area.

Although environmental issues are not yet a major focus of concern in the ESCWA region, they are expected to become more important as peace and stability prevail, as economic growth accelerates and as people become more aware of the disadvantages of environmental degradation. A small but growing number of NGOs concerned with the environment already exist in the region, and this movement may gain strength. Future trade arrangements in the region may come under pressure from such groups to adopt agreements that provide safeguards for environmental protection.

Other pressures may come from abroad as ESCWA member countries accede to WTO and as they become more active trading partners with countries already under pressure to adopt trading policies which protect the environment.

III. THE ENVIRONMENTAL IMPACT OF THE MANUFACTURE OF SOME PRODUCTS EXPORTED WIDELY BY DEVELOPING COUNTRIES

A. ENVIRONMENTAL DUMPING

The environmental regulations in developing countries are less stringent than those in developed countries, and this can lead to environmental dumping. Environmental dumping occurs when a pollution-intensive industry relocates from a country with strict environmental standards to one with relatively lax standards; since strictly enforced regulations involve added costs for the producer, the company has a strong incentive to relocate to an area with fewer or no regulations. This is one of the reasons many of the environmental NGOs and lobbying groups are against free-trade agreements such as NAFTA and WTO, as discussed earlier. Though environmental costs are not specifically identified as the reason for industry relocation, the fact remains that some areas such as Mexico and the Far East have been experiencing significant environmental degradation which can be linked to the rapid growth of export industries. Such arrangements offer transnational corporations significant benefits, since their industries tend to be larger in scale and more capital intensive (both of which imply higher pollution levels); further, because of their transnational status, they may have more location options than national firms. The issue of environmental dumping is important to ESCWA member countries, since many are opening their economies to foreign investors and encouraging export industries under structural reform policies and are also taking positive steps towards accession to the WTO.

As noted earlier, in a world of free trade such as that envisioned by the WTO, countries will be under pressure to reduce costs in order to compete. Degrading the environment may become a necessity for small, low-income countries struggling to compete with well-established industries already taking advantage of significant economies of scale. Indeed, the race to grow large enough to accrue significant economies of scale before competitors establish themselves may be joined in earnest (and the accompanying environmental degradation viewed as acceptable) in developing countries as the pressures of competing in a free-trade environment become clear.²⁴

While the cost incentive as a basis for the relocation of "dirty industries" is difficult to refute, other factors may also be involved in location decisions by firms. One strong incentive for relocation may be labour costs, which are usually lower in developing countries.²⁵ In fact, since labour-intensive industries are usually associated with less pollution, lower labour costs may be an incentive for industries with lower pollution levels to relocate to developing countries. Polluting industries already situated abroad may have based their decisions to relocate on labour and other production cost considerations rather than on the (potential) existence or lack of environmental regulations. This view is supported by recent data showing very low pollution-abatement costs in the United States;²⁶ if abatement costs are low, regulations have not yet resulted in higher costs and cannot be the cause of industry relocation. Other reasons for relocating may include land, costs, government regulations pertaining to other matters, and tax differences.

²⁴ The presence of significant levels of economies of scale as an underlying cause of international trade are detailed in P. Krugman, *Rethinking International Trade*, Cambridge, Massachusetts, MIT Press, 1994.

²⁵ In fact, labour unions in developed countries have traditionally been opposed to free trade with low-wage countries.

²⁶ P. Low, "Trade measures and environmental quality: the implications for Mexico's exports" in P. Low (ed.), *International Trade and the Environment*, World Bank Discussion Papers, 159 (Washington, D.C., World Bank, 1992), pp. 105-120.

Although it may be too early to tell, empirical evidence does not provide much support for the environmental dumping argument. In fact, it is difficult to isolate environmental degradation caused by relocation from that caused by economic development in general. Most investigations use toxic emissions as an indication of environmental degradation. One study finds that polluting industries are dispersing internationally and that this dispersion is greatest in the direction of developing countries.²⁷ Others, however, contend that polluting industries thrive only in highly protected economies.²⁸ Protected trade environments may have provided incentives for the growth of polluting industries in some developing countries. In developing countries that have adopted free-trade policies, industries have had to invest in new technologies to remain competitive, and these new technologies tend to be associated with lower emissions and to have more positive environmental implications. Birdsall and Wheeler, using data from Latin America, corroborate these findings by showing that the more open economies have a cleaner set of industries, which suggests that capital- and material-intensive industries (those that tend to be more polluting) have found havens in highly protectionist countries.²⁹

Identifying industries associated with environmental degradation may be rather complicated, given the multitude of processes and technologies available to producers. For example, the same product may be produced with obsolete, pollution-causing equipment or with equipment specially designed to function without contributing to environmental degradation. In addition, the producer may have an array of production available which are associated with varying degrees of pollution. The costs associated with different technologies and different processes may also vary widely. This makes it difficult to assign an absolute or even a relative value for pollution in a given industry or set of industries, though generally the more capital-intensive industries are associated with higher levels of pollution. An alternative method may be to compare pollution abatement costs among industries. Table 1 shows the pollution abatement costs associated with various industries relative to total investment and to total operating costs in the United States, a developed country with environmental regulations in force.

B. ENVIRONMENTAL DEGRADATION ASSOCIATED WITH THE PRODUCTION OF TEXTILES

Although the rise in textile production does not appear to represent a case of environmental dumping, care must be taken to prevent the degradation of water, land and air often associated with these industries. The pollution associated with the production process in the textile industry has been identified; the types and levels of pollutant discharge and of water and energy consumption are well documented. Though the industry is characterized by large and small producers, the production process is highly standardized, and pollution control measures specific to this industry have been analysed for the industry in general in both developed and developing countries.³⁰ Discharges typically occur throughout the production cycle as the raw materials

²⁷ P. Low and A. Yeats, "Do 'dirty' industries migrate?", in P. Low (ed.), *International Trade and the Environment*, World Bank Discussion Papers, 159 (Washington, D.C., World Bank, 1992), pp. 89-103.

²⁸ R.E.B. Lucas, D. Wheeler, and H. Hettige, "Economic development, environmental regulation and the international migration of toxic industrial pollution: 1960-88"; and N. Birdsall and D. Wheeler, "Trade policy and industrial pollution in Latin America: where are the pollution havens?", both articles in P. Low (ed.), *International Trade and the Environment*, World Bank Discussion Papers, 159 (Washington, D.C., World Bank, 1992).

²⁹ Birdsall and Wheeler, *Ibid.*

³⁰ For a detailed analysis of the sources of pollution in the textile industry and a description of the techniques and processes that might prevent or minimize such pollution, see United Nations Environment Programme, *The Textile Industry and the Environment*, Technical Report No. 16, 1993 (Paris, UNEP, 1993) (United Nations publication, Sales No. E93-III-D5).

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are treated by chemical and mechanical means to produce the final product; these discharges include grease, dirt, and waste chemicals ranging from highly toxic substances to those presenting chronic health risks to highly visible (and thus unsightly) but less harmful colourants.

TABLE 1. POLLUTION ABATEMENT COSTS* IN SELECTED INDUSTRIES,
UNITED STATES OF AMERICA, 1989

Industry	Total investment in new plant and equipment		Annual cost of pollution abatement	
	Millions of US dollars	Share for pollution abatement	Millions of US dollars	As share of total value of output
		Percentage		Percentage
Textiles	2 280	1	136	0.3
Chemicals	13 480	9	3 509	1.3
Petroleum	3 330	13	2 170	1.5
Primary metals	5 660	7	1 931	1.3
Paper	10 070	8	1 449	1.1
All manufacturing	97 190	4	15 626	0.5

Source: World Bank, *World Development Report 1992: Development and the Environment* (Washington, D.C., World Bank, 1992), table 6-2.

* For both air and water pollution.

Water pollution is associated with the textile production process, varying according to the variety of the fibre blend produced. Effluents released during the production of wool typically have a high biochemical oxygen demand³¹ (BOD); their impact on the waters into which they are discharged is therefore quite serious. Wool scouring, a single step in the process and undertaken with alkali, trisodium phosphate and sometimes solvents, is associated with the most severe effluent problem in the wool production process (cotton and synthetic fibre production does not require scouring). Suspended solids dumped into the water during the production process are another source of water pollution, as are chromium (and other metals used in the dyeing process), phenols, sulphide and trace constituents washed into effluents. The trace constituents are of increasing concern; though low in concentration, they may pose health risks because of their toxicity and because the water may be used for drinking in downstream areas. Chemical oxygen demand³² (COD) is measured against BOD to determine the biodegradability of the wastes. BOD-COD ratios of 1 to 2 and 1 to 3 imply good biodegradability, and most textile effluents lie within this range.³³ Wool scouring, however, is associated with a ratio of 1 to 5, indicating that the biological treatment of its effluents might prove difficult.

³¹ Biochemical oxygen demand measures the rate of oxygen usage from biochemical oxidation, or in other words, how much oxygen a given quantity of liquid is capable of consuming in a given time period.

³² Chemical oxygen demand measures the amount of oxygen needed to chemically oxidize organics in a liquid.

³³ United Nations Environment Programme, *The Textile Industry and the Environment* (Paris, UNEP, 1993), pp. 38-40. (United Nations publication, Sales No. E93-III-D5)

Air pollution from the textile industry is caused mainly by oil mists, dust and lint, acid mists, solvent vapours and odours. Two components typically found in these emissions are acetic acid and formaldehyde. Some chemicals used in the production process may end up in the fibre and evaporate during the drying stage.³⁴ Dust and lint, produced mainly prior to and during the spinning process, napping and carpet shearing, do not cause serious pollution problems but may interfere with other processes designed to minimize pollution.

Water conservation is often recommended as a solution to the effluent pollution problem, since it is associated with a significant reduction in water effluents. Water is often wasted during washing operations in textile production because much of the equipment is inefficient, washing cycles are long, and fresh water is used at all stages. Washing is typically done in the preparation of fibre and in dyeing operations, and there are various points in the washing cycle where water can be conserved through reuse. One method, called counter-current washing, uses the least contaminated water from the final wash in the next-to-the-last wash, and so on, until it reaches the first wash and is then discarded.³⁵ The lack of proper maintenance (resulting in broken or missing valves and leaks in pipes and hoses) and carelessness (water taps left on after production has ceased) may also result in increased water use, though such problems can often be corrected inexpensively.

Energy conservation is also recommended as a means of lowering emissions from boilers and generating plants. Textile mills usually consume large quantities of energy, and minimizing heat losses caused by inefficient piping can also serve to reduce operating expenses. Recommendations made following energy audits at individual plants often result in savings which exceed the cost of the energy audit itself.

Reducing or optimizing the use of chemicals can also play a significant role in lowering water and air effluent levels. Many of the chemicals traditionally used in textile production can now be substituted with safer chemicals, especially in the dyeing process. For example, there are many chemicals with low BOD which can be used in place of those with high BOD. Chemicals considered safer and less harmful to the environment are often more expensive, however, and their use may increase operating costs and lower the competitiveness of the product with regard to final price. Further, some chemicals with low BOD may seem advantageous in the short term, but little is known about their long-term degradability. Large textile plants have the option of using automated chemical dispensing, which reduces chemical use and effluents. This is considered a major innovation in the industry and is being adopted with increasing frequency.

Changing the production process itself is another possible way of reducing wastes and pollutants. Many innovations have been introduced in the industry and can be adopted, including those associated with washing operations, sizing (starch application) and desizing systems, dyeing solvent processing, and transfer printing. Again, the adoption of such innovations typically involves additional costs and may adversely affect the competitiveness of the final product, especially in the increasingly competitive world markets.

³⁴ These chemicals include chlorine, ethylene oxide, hydrochloric acid, methylene chloride, perchloroethylene, toluene, xylene, ammonia, tetrachloroethane, and trichloroethylene.

³⁵ For diagrammatic versions of this recycling method in various textile production processes, see the United Nations Environment Programme, *The Textile Industry and the Environment* (Paris, UNEP, 1993), pp. 44-46. (United Nations publication, Sales No. E93-III-D5)

Another strategy for reducing the environmental degradation associated with the production of textiles is to undertake efforts to clean up the pollution after it has occurred. There is some flexibility with regard to this strategy, and the ultimate decision should be taken in line with least-cost criteria, which will vary depending on the factory and the type of processes used. An initial procedure is the screening, identification and separation of effluents into separate streams, which must be undertaken before the appropriate treatment can be applied. Different treatment methods are available, but for some the cost is prohibitively high. It is often more cost-effective in the long run to adopt a preventive rather than a curative (treatment-centred) approach.

C. ENVIRONMENTAL DEGRADATION ASSOCIATED WITH THE PRODUCTION OF LEATHER

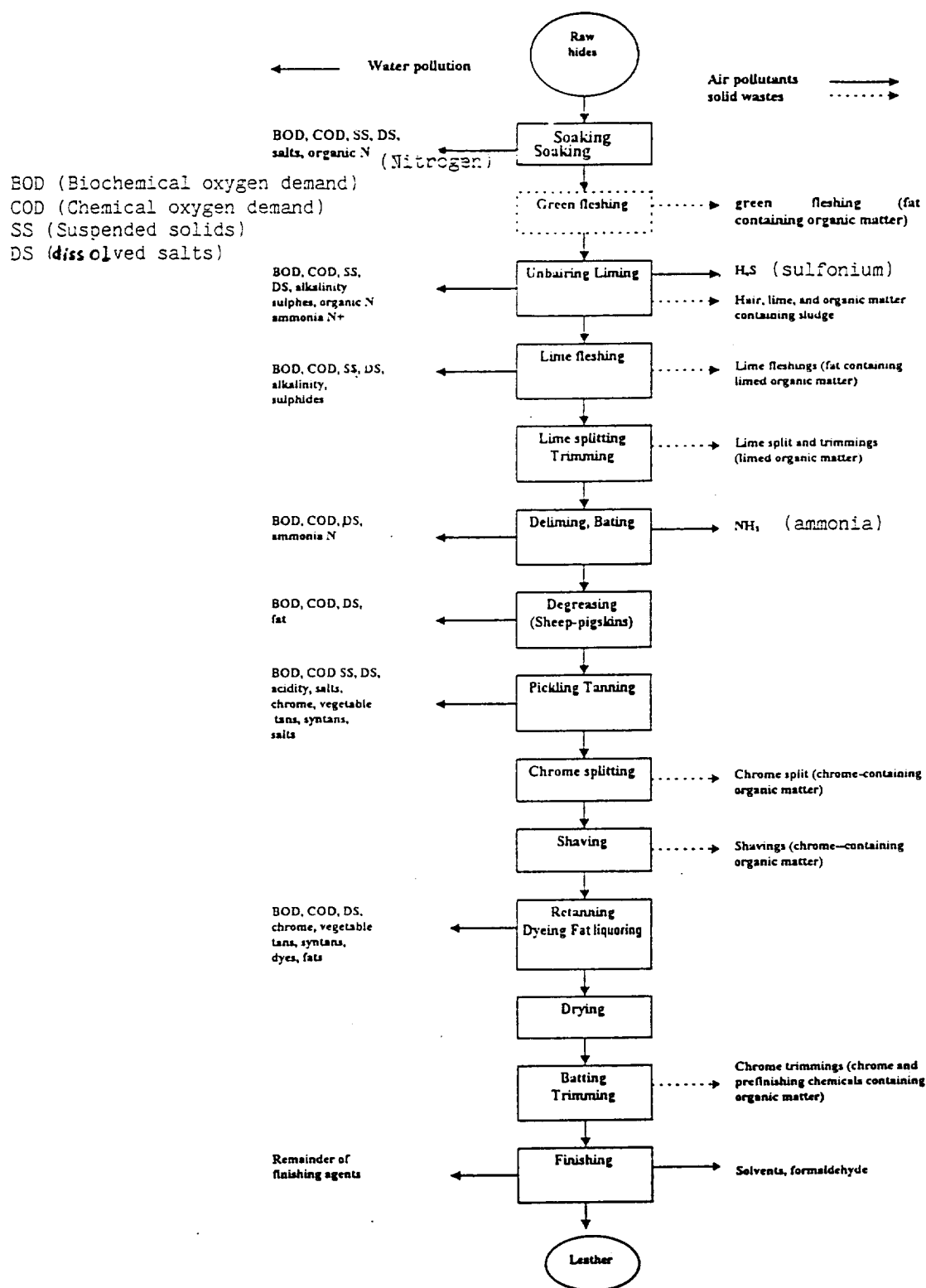
The leather industry is also characterized by a variety of processes, some simple and others highly sophisticated, which enable small-scale producers to exist along with large producers taking advantage of economies of scale. The product itself is versatile and widely used as an input for a number of different final products including handbags, footwear and clothing. In an age where new and durable products made of plastics, metals and various synthetic materials are readily available as substitutes, leather has maintained its market. It is widely demanded and is generally considered superior in comparison with imitations and substitutes. Trade in leather and leather products is increasing worldwide and is becoming increasingly important to developing countries. Total world exports of leather rose from \$9.3 billion in 1990 to \$12.8 billion in 1994, an increase of 38 per cent.³⁶ Leather exports from developing countries grew as well. Africa, for example, witnessed an increase from \$134.5 million in 1990 to \$395.3 million in 1994; leather exports grew by 194 per cent, and revenues almost tripled during the four-year period. Asia, another region comprising mainly developing countries, saw its leather exports almost double, increasing from \$2.2 billion in 1990 to \$4.3 billion in 1994. In the Middle East, which includes the ESCWA region, leather exports increased almost fourfold, from \$29 million to \$107 million, during the same period. The much larger increase in exports for developing regions than for the world as a whole may imply a shift in the geographical location of the export industry.

The conversion of animal hides into leather, or tanning, involves many stages (as illustrated in figure IV), and most of these are associated with environmental degradation of some kind.³⁷ The exact level and type of pollution resulting from the production of leather depend on the tanning process utilized. After the hides are cleansed of fat and flesh residuals they are treated, or cured, with chemicals to ensure durability. These chemicals can be derived from vegetable products or purchased from major chemical suppliers. Insecticides are also used to prevent beetles and other insects from destroying the hides during storage and transport. In the past, strong chemicals such as dichlorodiphenyltrichloroethane (DDT) were used for this purpose, but a large number of these substances have been banned in many countries. Arsenic and mercury insecticides were also used routinely at one time, until they were found to have highly toxic effects on workers in the industry. Milder chemicals such as pyrethrum, permethrin and borax are now recommended.

³⁶ United Nations, *1994 International Trade Statistics Yearbook* (New York, United Nations, 1995) (ST/ESA/STAT/SER.G/43), p. 109.

³⁷ A more detailed account of the tanning process and potential effects on the environment can be found in the United Nations Environment Programme, *Tanneries and the Environment, A Technical Guide*, Technical Report Series, No. 4 (Paris, 1991) (United Nations publication, Sales No. E.91.III.D.1).

Figure IV. The tanning process and potential associated environmental degradation



Source: United Nations Environment Programme, *Tanneries and the Environment: A Technical Guide*, Technical Report Series, No. 4 (Paris, 1991). (United Nations publication, Sales No. E.91.III.D.1)

The next stage in the process is the cleaning and conditioning of the hide to prepare it for tanning. The hides are soaked, limed and dehaired, delimed, bated, and degreased. These steps require the use of a variety of chemicals, solvents, wetting agents and enzyme preparations. The actual tanning involves stabilizing the collagen structure of the hide.³⁸ In this stage no solid wastes are created, but effluents from chemical use and subsequent washings are generated. Though a variety of tanning techniques are used, most of the leather produced is tanned in drums over a period of 4 to 24 hours and typically involves the use of chrome tanning salts, sodium bicarbonate, sodium formate and fungicides. Other tanning methods include vegetable tanning and the use of synthetic materials.

Waste chemicals are generally discharged at various stages of production and may be toxic to water supplies, air and soil. BOD measurements can be used to assess the impact of effluents discharged in water bodies. Sulphides, often toxic, produce the unpleasant odour usually associated with leather factories. Other vapours released may have adverse effects on health as well, especially for those exposed over long periods of time. Solid wastes are generated during the trimming and buffing stages of production. Though techniques are available to minimize the negative environmental impact of leather production, air and water pollution remain a problem in areas in which tanneries are located. While pollution-minimizing techniques and procedures are available, the increasing use of synthetic materials in the process has increased the potential adverse environmental impact associated with the industry. The pesticides, solvents, dyes, finishing agents and processing chemicals now widely used in place of traditional solutions and methods may be toxic to workers as well as those living in nearby areas or downstream from factories.

Efforts to control pollution can be effective if various methods aimed at water conservation are employed, but this necessitates the reduced use of chemicals, the use of more efficient floating and soaking devices, and the reuse of water. Dehairing and liming can be made less environmentally harmful through the use of substitutes for sulphide and the recycling of lime and sulphides. New technologies exist for the chrome tanning process which are more environment-friendly and in some cases are less expensive to implement than those widely used now.³⁹ Effluent treatment is another option; a number of methods can be utilized to treat the toxic effluents discharged during the tanning process, but these usually prove more expensive than preventive measures.

Strategies to promote environmentally sound production techniques in developing countries may be challenged by the existence of many small producers utilizing traditional, labour-intensive factory production processes and by the fact that many people gain their livelihood from employment in this industry. Moreover, even in establishments that have adopted more modern techniques and enjoy gains from economies of scale, the adoption of new technologies is often expensive. Since the benefits of adopting such technologies often accrue to society as a whole, managers and entrepreneurs may not be convinced of the need to incur these expenses; incentives must be provided in such cases. Further, new technologies deemed cost-effective to the factories may be untried and may therefore be labelled "experimental" by factory managers and entrepreneurs.

³⁸ Ibid, p. 18.

³⁹ Ibid., chapter 5.

IV. THE STATE OF THE ENVIRONMENT AND THE IMPACT OF SELECTED EXPORT INDUSTRIES IN THE ESCWA REGION

A. THE STATE OF THE ENVIRONMENT IN THE ESCWA REGION

The ESCWA region, like other developing regions, faces a basic dilemma between economic growth and environmental deterioration. Increased industrialization and energy use, if unchecked, result in increased emissions and wastes from the production process which have adverse effects on water and air. Further, developing regions are generally characterized by growing urbanization, high poverty levels and inadequate infrastructures, all of which exacerbate environmental problems.

The ESCWA region is beset by a number of specific environmental problems ranging from the increasing salinity of agricultural land to the deterioration of air and water quality in its major cities. These problems are the result of economic development, increasing urbanization and the development of coastal areas, the relative scarcity of water and arable land, the increased use of pesticides and fertilizers, persistent poverty, and generally high population growth. Industrial pollution is caused by emissions from electric power generation facilities, cement factories, and other industries such as steelworks and ironworks, refineries, and textile, brick and chemical factories. Problems also arise in urban areas from traffic congestion and over-reliance on the automobile to meet urban transportation needs.⁴⁰

The most publicized environmental problem in the region is the air pollution in Cairo (described in the box below). Other ESCWA member countries such as Lebanon face similar (though less extreme) problems with urban air pollution caused, in part, by overcrowded conditions and traffic congestion. Jordan's urgent water scarcity and the deterioration of its supply have become more pronounced as population levels have surged in the 1990s.⁴¹ Wastewater from industrial concerns and pesticide run-off has also adversely affected the water quality in Jordan. Water scarcity and degradation problems are severe in Yemen and in the West Bank and Gaza Strip as well. Air pollution problems caused by industrial emissions, vehicle emissions and natural dust are present in Baghdad, Damascus, Beirut, Sana'a and of course, Cairo.⁴² The World Bank recently estimated that in the Middle East and North Africa (MENA) area, which includes the ESCWA region, the overall costs associated with land degradation and sickness caused by air and water pollution amount to almost \$12 billion per year, or about 13 per cent of gross domestic product (GDP).⁴³

The countries of the ESCWA region have begun to address these problems in a variety of ways. Specific ministries and agencies have been established in Bahrain, Egypt, Jordan, Oman, Saudi Arabia, the Syrian Arab Republic, and the United Arab Emirates to deal with national environmental problems. Other ESCWA member countries address their environmental concerns through existing mechanisms and agencies. Environmental issues are often handled by agricultural or water agencies and ministries, since water deterioration is a concern in many countries.

⁴⁰ ESCWA, *Survey of Economic and Social Developments in the ESCWA Region, 1995*, chapter VI (New York, United Nations, 1996) (United Nations publication, Sales No. E.96.II.L.18).

⁴¹ Nader Marayyan, "Economic development and environment in Jordan", unpublished paper, no date.

⁴² See note 40.

⁴³ World Bank, *Issues in Development: The Middle East and North Africa* (Washington, D.C., 1995), p. 9.

Box. Environmental problems in Cairo

The environmental situation in Cairo is usually considered the most serious in the ESCWA region, especially with regard to air quality. Levels of particulate matter far exceed the limits established by World Health Organization (WHO) guidelines, and in 1991 nitrogen oxide levels were measured at 0.218 parts per million.¹ In 1990 smoke emissions were measured at 1,200 tons, or seven times the figure recorded in 1970.² Cairo's pollution problems are the result of a myriad of factors including rapid urbanization, overcrowding, traffic congestion, the incineration of garbage, and natural dust. Nearby industrial centres have also contributed significantly to pollution in Cairo. Helwan, located 24 kilometres south-west of Cairo, boasts three large cement factories, ironworks and steelworks, fertilizer factories, automobile plants, and textile, ceramic and brick factories. Another industrial area, Shoubra El-Khayma, located 30 kilometres north-west of Cairo, has 450 factories including metallurgical works and textile, ceramic, brick and glass factories. The electric power generation plants which provide electricity to these areas run on heavy fuel oil and natural gas and also contribute to air pollution. Traffic to and from these areas adds to the problem, as many workers commute to and from Cairo on a daily basis.

As Egypt continues its industrialization process and its programme of economic reform and structural adjustment, adopts free trade measures in line with WTO guidelines, and generally encourages growth in export-oriented industries, such pollution problems are expected to increase unless appropriate measures to encourage the internalization of pollution costs in the production process are adopted.

¹ United Nations Environment Programme and World Health Organization, "Cairo: unbridled dust", *Environment*, vol. 36, No. 2, p. 30.

² M.S. Neamatalla, "Urbanization and the environment, case study of Egypt", a paper presented at the Arab Ministerial Conference on Environment and Development, held in Cairo from 10-12 September 1991 (E/ESCWA/ENVHS/1991/CRP/3).

ESCWA member countries have been signatories to a number of international treaties and agreements that address environmental problems, including the Convention on Biological Diversity, the Montreal Protocol, the United Nations Framework Convention on Climate Change, and the International Convention to Combat Desertification. In addition, Arab countries (including all ESCWA member countries) have adopted the Arab Plan of Action for the Environment.

Specific laws regarding the environment vary from country to country in terms of scope and sophistication. Generally, the primary focus of such laws has been the regulation of the region's natural resources including water and land. Environmental impact assessments for projects and investments are required in only some ESCWA member countries.

As long as economic development continues and export-oriented industrial growth is encouraged either explicitly or implicitly through macroeconomic reforms, environmental degradation is likely to remain a problem. Legislation and specific regulations should be combined with other efforts to reduce

environmental degradation; some of these might include educating the public about environment problems, encouraging the education of the girl child (who will make crucial household resource-use decisions as an adult), promoting economic development and opportunities in rural areas, adopting pollution-reducing mass transportation policies especially in urban areas, and promoting the rational use of water in the agricultural sector. The widespread adoption of such policies would contribute to overall sustainable development in the ESCWA region.

Most of the ESCWA member countries are undertaking policies aimed at liberalizing their economies, encouraging export industries and promoting free trade practices in line with WTO requirements; however, the potential for environmental dumping in the region is not clear. There are certainly no "hot spots" that can be readily identified as problem areas, such as Mexico's border area with the United States. While the existence and magnitude of environmental dumping are difficult to confirm, as shown in the previous chapter, this issue remains a potential problem considering that the full costs associated with the regulations currently being applied in the developed industrialized countries are not yet known. There may be a time lag before quantitative tests can identify problem areas. In the light of such uncertainty, it may be advisable for ESCWA member countries to be wary of polluting industries relocating within their borders and of those experiencing rapid growth in terms of output and/or number of firms. Once environmental standards are set, ESCWA member countries may wish to pay special attention to industries associated with a high degree of environmental degradation to ensure that standards are uniformly met within each industry and across industries.

Existing industries in the region contribute to environmental degradation to varying degrees. The textile and leather industries are examined below owing to their growing importance as export industries in some ESCWA member countries. There are a number of other industries in the region that may be suitable candidates for environmental costs-benefit evaluations as well. The petroleum, refining and petrochemical industries are the major export-oriented industries of the region, accounting for a significant portion of the region's total exports and hard-currency earnings, but they are also characterized by capital-intensive production processes and are generally considered to be polluters.

B. THE TEXTILE AND LEATHER INDUSTRIES OF EGYPT, JORDAN AND THE SYRIAN ARAB REPUBLIC

The textile and leather industries in selected countries of the ESCWA region—namely Egypt, Jordan and the Syrian Arab Republic—are considered here owing to the potential adverse environmental impact of these industries in general and to their growing importance as these countries turn to export industries as a means of promoting economic growth.⁴⁴

1. *The textile industry*

(a) *Egypt*

Egypt has an important cotton crop, and its textile industry is relatively well established, forming part of the country's diversified industrial base. Table 2 shows the growth in Egypt's textile industry between 1985 and 1992, the last year for which data are available. The number of textile establishments grew by

⁴⁴ The initial orientation of this study was revised in the light of the constraints imposed by the United Nations financial crisis on missions and consultancy, making it impossible to investigate whether these industries used environment-friendly or -unfriendly techniques; however, a forthcoming study will give this matter the attention it deserves.

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more than 28 per cent from 1985 to 1990, decreasing 2.7 per cent in 1991 then increasing only slightly, by 0.4 per cent, in 1992. The number of workers employed increased by only 3.7 per cent during the 1985-1990 period, a much smaller amount in relative terms, and 1991 saw a sharp decline of 13.4 per cent; however, an increase of 11.4 per cent was recorded in 1992. Gross output increased by 210.5 per cent during the period 1985-1990, decreased by 6.6 per cent in 1991, and increased the following year by 18.9 per cent. The value added increased by 153.6 per cent during the initial five-year period described in table 2, decreased by 13.3 per cent in 1991, and increased by 20.8 per cent in 1992. Notwithstanding the rather short time period for which data are available, this may indicate a significant improvement in labour productivity and a more intensive use of capital goods. However, unofficial figures show that the number of labourers has increased substantially since 1992.⁴⁵ Egypt's textile industry is dominated by the public sector, which has hampered recent efforts to liberalize supply and trade policy relating to textiles. Egypt's cotton crop is used both for export and as input in the domestic textile industry, and recent shortages have occurred in the latter as exports of raw cotton have increased.

The export figures shown in table 2 indicate that exported textiles constitute only a small portion of total output; this proportion increased from 2.1 to 3.8 per cent during the period 1985-1991, increased more sharply to 6.4 per cent in 1991, then dropped to 3.7 per cent in 1992.

Egypt has been active in recent WTO consultations on matters related to trade and the environment that could have an impact on the textile industry, such as charges and taxes imposed for environmental purposes, multilateral environmental agreements and technical barriers to trade.⁴⁶ Egypt has noted that developing countries are price takers in certain industries, so environmental regulations may harm its competitiveness in a number of products, especially textiles and clothing, footwear and leather products.

(b) *Jordan*

Jordan's textile industry is much smaller than Egypt's, as measured by the indicators shown in table 3, and is comprised mainly of smaller firms with fewer employees. The number of textile establishments in Jordan grew at varying rates during the period 1986 to 1994: increases amounted to 23.5 per cent between 1986 and 1990, then 5.9 per cent in 1993, and 43.9 per cent in 1994, with the actual number of textile firms rising from 119 to 308 between 1986 and 1994. The number of workers also increased throughout this period. In 1994 there were 3,289 workers in Jordan's textile industry, an increase of 36.4 per cent over the previous year. The value of Jordan's gross output of these goods increased by 158.1 per cent during the period 1986-1990, and an increase of 21.8 per cent in 1991 was followed by a lower increase of 12.2 per cent the following year. Output decreased by 7.1 per cent in 1993 but rebounded and grew by 32 per cent in 1994. Value added increased by 195.5 per cent during the period 1986-1990 and by 10.6 per cent in 1991. In 1992, value added decreased by 21 per cent, recovered with a 5.4 per cent hike in 1993, then increased significantly in 1994 by 60.4 per cent, possibly indicating the resumption of growth in this industry.

Exports of textiles from Jordan accounted for 49 per cent of total output in this industry in 1990, but this figure dropped to 31 per cent in 1991 and again to 27 per cent in 1993, increasing only slightly, to 28 per cent, in 1994.

⁴⁵ One source estimates that the number of labourers in the textile industry alone is now 600,000. See Economist Intelligence Unit, *Country Report, Egypt*; first quarter 1996 (London, EIU Limited, 1996), p. 27.

⁴⁶ World Trade Organization, *Trade and the Environment* (Geneva), various issues: 11 October 1994 (TE/010); 8 December 1995 (Press/TE/006); 1 May 1996 (Press/TE/009); and 25 January 1996 (Press/TE/007).

TABLE 2. EGYPT'S TEXTILE INDUSTRY, 1985-1992

Year	Number of establishments	Rate of change	Number of workers	Rate of change	Gross output (thousands of Egyptian pounds)	Rate of change	Value added (thousands of Egyptian pounds)	Rate of change	Percentage of exported output	Rate of change
1985	742		267 924		2 021 704		667 868		2.1	
1990	950	28.0	277 716	3.7	6 277 415	210.5	1 694 031	153.6	3.8	81.0
1991	924	-2.7	240 399	-13.4	5 861 282	-6.6	1 468 290	-13.3	6.4	68.4
1992	928	0.4	267 690	11.4	6 967 717	18.9	1 774 251	20.8	3.7	-42.2

Source: Egypt, Central Agency for Public Mobilization and Statistics, unpublished data, August 1996.

TABLE 3. JORDAN'S TEXTILE INDUSTRY, 1986-1994

Year	Number of establishments	Rate of change	Number of workers	Rate of change	Gross output (millions of Jordanian dinars)	Rate of change	Value added (millions of Jordanian dinars)	Rate of change	Percentage of exported output	Rate of change
1986	119		1 109		11 783		4 385		..	
1990	147	23.5	1 530	38.0	30 413	158.1	12 959	195.5	49	
1991	149	1.4	1 838	20.1	37 057	21.8	14 327	10.6	31	-36.7
1992	202	35.6	2 224	21.0	41 592	12.2	11 318	-21.0	30	-3.2
1993	214	5.9	2 411	8.4	38 647	-7.1	11 926	5.4	27	-10.0
1994	308	43.9	3 289	36.4	51 031	32.0	19 131	60.4	28	3.7

Source: Jordan, unpublished data provided by the Department of Statistics, August 1996.

Note: Two dots (..) indicate that the data are not available.

(c) *Syrian Arab Republic*

Table 4 indicates that the Syrian Arab Republic's textile industry remained unchanged between 1985 and 1994 in terms of the number of establishments.⁴⁷ The number of workers changed slightly throughout the same period, with variations ranging from -4 per cent to 2.2 per cent; the actual number of workers fell slightly between 1985 and 1994, from 24,201 to 23,196. Gross output, however, rose during most of this period. The period 1985-1990 saw a significant increase of 218.2 per cent, but much lower increases in output were recorded for subsequent years, when production rose by 22.2 and 2.5 per cent in 1991 and 1992 respectively. Output declined by 7.2 per cent in 1993 but rebounded in 1994, increasing by 10.7 per cent. The increase in 1995 was more sizeable, amounting to 20.2 per cent. Consequently, the value added increased during most of this period, with the exception of declines noted in 1992 and 1993 of 6.8 and 7.6 per cent respectively. Value added increased by 195 per cent between 1985 and 1990, but the rate of increase dropped to only 4.1 per cent in 1991. Further increases of 12.9 and 16.7 per cent were reported in 1994 and 1995 respectively. Overall trends point to efficiency gains in this industry, with higher productivity indicating a greater reliance on capital goods in the production process.

Exports accounted for a significant portion of total textile output during most of the period 1985-1995. The figure remained above 40 per cent in 1985 and 1990 but dropped to 10.8 and 4.5 per cent in 1991 and 1992 respectively. The following years showed considerable improvement, as exports increased to 25.2 and 48.9 per cent of total textile production in 1994 and 1995 respectively. Taking the significant increases in value added, these figures indicate that textiles are becoming increasingly important as a commodity export in the Syrian Arab Republic.

2. *The leather industries of Egypt, Jordan and the Syrian Arab Republic*

(a) *Egypt*

The number of establishments in Egypt's leather industry increased from 35 to 58, or by 65.7 per cent, between 1985 and 1990 (see table 5). An increase of 19 per cent was reported in 1991, when the number of firms peaked at 69; this figure dropped to 60 in 1992, a decline of 13 per cent. The number of workers employed in the leather industry almost doubled between 1985 and 1995, rising from 3,350 to 6,691, but there was a sharp drop of 43.4 per cent in 1991. This was followed by a decrease of 16.8 per cent in 1992, with the actual number of workers employed in the industry falling to 3,153—fewer than in 1985. Gross output, however, increased substantially between 1985 and 1992. Output was valued at 36,768 Egyptian pounds (LE) in 1985; it increased by 155.2 per cent over the next five years, then by another 19.8 per cent in 1991, reaching a value of LE 112.4 million. Despite a decline of 17.5 per cent in 1992, the overall increase in gross output coupled with the decline in the number of workers implies an industry turning to capital-intensive methods of production. It is interesting to compare these figures with the value added, which increased significantly each year for which data is available at rates hovering around 50 per cent.

Exports of leather as a proportion of total production in Egypt also increased consistently during the 1990s. From 1990 to 1991 the ratio rose slightly, from 2.3 to 3.2 per cent, but then improved significantly in 1992, reaching 17.6 per cent. If this figure remains steady, the leather industry will be identified as increasingly export-oriented—a shift from the mainly "local market" focus of most of the period under review.

⁴⁷ Separate data for the private-sector component of the textile industry in the Syrian Arab Republic are unavailable; thus, the analysis focuses on the public sector only.

TABLE 4. THE SYRIAN ARAB REPUBLIC'S TEXTILE INDUSTRY, 1985-1995*

Year	Number of establishments	Rate of change	Number of workers	Rate of change	Gross output (thousands of Syrian pounds)	Rate of change	Value added (thousands of Syrian pounds)	Rate of change	Percentage of exported output	Rate of change
1985	22		24 201		2 130 244		867 519		46.0	
1990	22	--	23 924	-1.1	6 777 870	218.2	2 559 010	195.0	41.5	-9.7
1991	22	--	24 461	2.2	8 284 084	22.2	2 662 768	4.1	10.8	-74.0
1992	22	--	24 207	-1.0	8 486 649	2.5	2 480 787	-6.8	4.5	-95.9
1993	22	--	23 247	-4.0	7 873 389	-7.2	2 292 518	-7.6	25.2	464.4
1994	22	--	23 763	2.2	8 713 910	10.7	2 588 933	12.9	48.9	93.8
1995	22	--	23 196	-2.4	10 469 082	20.2	3 020 222	16.7

Source: Syrian Arab Republic, unpublished data provided by the Central Bureau of Statistics, September 1996.

Notes: Two dots (..) indicate that the data are not available.

A dash (--) indicates that the amount is nil or negligible.

* Data are for publicly owned establishments only.

TABLE 5. EGYPT'S LEATHER INDUSTRY, 1985-1992

Year	Number of establishments	Rate of change	Number of workers	Rate of change	Gross output (thousands of Egyptian pounds)	Rate of change	Value added (thousands of Egyptian pounds)	Rate of change	Percentage of exported output	Rate of change
1985	35		3 350		36 768		8 959		..	
1990	58	65.7	6 691	99.7	93 827	155.2	13 316	48.6	2.3	..
1991	69	19.0	3 790	-43.4	112 400	19.8	21 259	59.7	3.2	39.1
1992	60	-13.0	3 153	-16.8	92 688	-17.5	31 204	46.8	17.6	450.0

Source: Egypt, unpublished data provided by the Central Agency for Public Mobilization and Statistics, August 1996.

Notes: Footwear is not included. Two dots (..) indicate that the data are not available.

(b) Jordan

The number of establishments in Jordan's leather industry almost doubled between 1986 and 1990, increasing from 31 to 59 (see table 6). The number dropped to 50 the following year but increased again, to 67, in 1992 then to 68 in 1993. The number fell to 33 in 1994, however—a significant drop of 51.5 per cent. After growing by 176.6 per cent during the period 1986-1990, the number of workers employed by the industry fell each year from 1991 to 1993; the largest decline (26 per cent) occurred in 1992. A turnaround was reported in 1994, when the number of workers increased by 39.7 per cent. Gross output increased throughout the period 1985-1994, except in 1993, when a drop of 17.2 per cent occurred. The overall increase from JD 1,717 million in 1986 to JD 11,452 million in 1994 indicates significant growth in the leather industry. The value added declined by 10.9 per cent between 1986 and 1990 but increased significantly during the next year, rising by 224.5 per cent. Increases were also noted in 1992 and 1994 of 22.4 and 7.2 per cent respectively, though a decline of 13.1 per cent occurred in 1994.

The share of exports in the total output of leather in Jordan ranged between 18 and 24 per cent during the period 1986-1993 but increased to 36 per cent during 1994. This indicates that leather is already an important export commodity in Jordan and is likely to become more significant in this respect in the future.

(c) Syrian Arab Republic

Data on the Syrian Arab Republic's leather industry show that only two establishments exist, indicating that the industry is highly concentrated (see table 7). In 1985, 618 people were employed in the Syrian leather industry. After increasing by only 12.3 per cent during the five-year period 1985-1990, the number of workers decreased by 2.8 per cent in 1991 and thereafter by 1.5 and 8 per cent in 1992 and 1993 respectively. The number of workers continued to decline in 1994, falling 4.3 per cent to 575. Gross output increased by 337.8 per cent over the period 1985-1990, but double-digit decreases during the 1990s outweighed the small increases of 1.2 and 6.4 per cent recorded in 1992 and 1994 respectively. Gross output amounted to 435 million Syrian pounds (LS), but by 1990 this figure had dropped to LS 314 million. Value added followed a similar pattern, showing a significant increase of 221.7 per cent over the first five years but showing a net decline during the first half of the 1990s. More specifically, value added increased by 16.8 per cent in 1992, declined by 16 per cent in 1993, and increased by 11.3 per cent in 1994. In absolute terms, value added was considerably lower in 1994 than it had been in 1990, falling from LS 120 million to LS 81.2 million during this particular period.

The share of leather exports in total leather produced also varied during the period 1985-1994 from a low of 4.9 per cent in 1990 to a high of 30.7 per cent in 1992. In 1993 the proportion dropped to 10.7 per cent, but rebounded to 23.9 per cent the following year. Given the variance in this indicator during the period under review, it is difficult to conclude whether leather exports will continue to represent a significant share of total production.

The public sector plays a significant role in the textile, clothing and leather industries, accounting for more than half (53.2 per cent) of the total output and 50 per cent of the total labour in 1992.⁴⁸ Public-sector investment in the textile, clothing and leather industries continued to grow: accumulated investment totalled

⁴⁸ Calculated from data in the Syrian Arab Republic, Central Bureau of Statistics, *Statistical Abstract 1994*, chapter 5. Note that data for clothing are included in the statistics.

TABLE 6. JORDAN'S LEATHER INDUSTRY, 1986-1994

Year	Number of establishments	Rate of change	Number of workers	Rate of change	Gross output (millions of Jordanian dinars)	Rate of change	Value added (millions of Jordanian dinars)	Rate of change	Percentage of exported output	Rate of change
1986	31		192		1 717		837		..	
1990	59	90.3	531	176.6	5 270	206.9	746	-10.9	22	..
1991	50	-15.3	530	-0.2	9 784	85.7	2 421	224.5	18	-18.2
1992	67	13.6	392	-26.0	11 876	21.4	2 963	22.4	24	33.3
1993	68	1.5	353	-9.9	9 828	-17.2	2 576	-13.1	19	-20.8
1994	33	-51.5	493	39.7	11 452	16.5	2 761	7.2	36	89.5

Source: Jordan, unpublished data from the Department of Statistics, August 1996.

Notes: Footwear is not included. Two dots (..) indicate that the data are not available.

TABLE 7. THE SYRIAN ARAB REPUBLIC'S LEATHER INDUSTRY, * 1985-1994

Year	Number of establishments	Rate of change	Number of workers	Rate of change	Gross output (thousands of Syrian pounds)	Rate of change	Value added (thousands of Syrian pounds)	Rate of change	Percentage of exported output	Rate of change
1985	2		618		99 437		37 291		11.8	
1990	2	--	694	12.3	435 376	337.8	119 959	221.7	4.9	-58.3
1991	2	--	674	-2.8	338 783	-22.2	74 295	-38.1	8.7	76.6
1992	2	--	664	-1.5	342 928	1.2	86 808	16.8	30.7	254.3
1993	2	--	611	-8.0	295 284	-14.0	72 956	-16.0	10.7	-65.1
1994	2	--	575	-4.3	314 076	6.4	81 198	11.3	23.9	122.8

Source: Syrian Arab Republic, unpublished data provided by the Central Bureau of Statistics, September 1996.

Note: A dash (--) indicates that the item is nil or negligible.

* Data for publicly owned establishments only.

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LS 5.4 billion in 1993, compared with LS 3.7 billion in 1989.⁴⁹ However, although disaggregated private-sector data are unavailable for the Syrian Arab Republic, regulations have been liberalized in recent years to encourage private-sector growth in general, so growth in these industries may be larger than that which is indicated in the present.

⁴⁹ Ibid., p. 174.

V. CONCLUSIONS AND RECOMMENDATIONS

The potential impact of environmental regulations on the ESCWA member countries' foreign trade is two-tiered. First, the environmental measures undertaken by the trading partners of ESCWA member countries, as well as those likely to be incorporated in international trade agreements, may have an adverse effect on the ESCWA region's exports. Second, environmental measures undertaken by the ESCWA member countries to protect their environments may adversely affect the competitiveness of their products in international markets, particularly when the burden of prevention falls on the producers, who will be forced to internalize the costs of environmental degradation.

Many ESCWA member countries have undertaken macroeconomic structural reforms as part of their efforts to promote more efficient use of resources in the development process. Since such reforms favour the production of export goods, these countries are now in a better position to benefit from the liberalization of trade agreed upon during the Uruguay Round, and many of them have undertaken efforts to join the WTO. However, such an orientation necessitates cutting costs and inefficiencies to remain competitive; in developing countries, this often means using the environment as a free or relatively inexpensive input. Under the new economic order, the trade-off between environment and development affects developing countries most acutely, including those in the ESCWA region, as they strive to achieve competitiveness in an increasingly competitive global economic environment. The reality is that such competitiveness can be short-lived if environmentalists and concerned NGOs succeed in persuading the international community to adopt more stringent regulations to protect the environment.

This study emphasizes the growing importance of the linkages between trade and environment. While these linkages have been explored here from a theoretical perspective, the issue deserves more practical attention. The interaction between trade and environment policies will have an effect on the competitive position of the ESCWA region in what is increasingly a global economy. The environmental constraints imposed through international agreements, standards and conventions and through national regulations may serve to increase the costs of production and could adversely affect the trade and growth prospects of the region. Careful consideration of the linkages between trade and environment is therefore a necessary step in the formulation of appropriate trade and environment policies in the ESCWA member countries, especially as environmental concerns are becoming more urgent at the regional and global levels.

The region may be affected by environmental protection measures already in place in developed countries which are applied when the latter import certain (especially capital) goods; such a situation could have a far-reaching impact on production costs and overall efficiency, which may, in turn, affect the region's competitive position in the world market.

Another area that may deserve further consideration is the provision of environmental services; as trade in services grows on a global level, trade in environmental services may become an increasingly important component of the trend, and the participation of the ESCWA region in this activity may have an impact on trade and environment in the future.

This study has examined a number of theoretical and practical elements relating to the interaction between environmental measures and trade policy as well as some of the environment-friendly technologies available for the textile and leather industries of the region. In the light of what has been discussed, the ESCWA member countries may wish to consider the following recommendations:

1. ESCWA member countries may wish to actively participate in ongoing and future international and regional negotiations leading to agreements which relate to trade and the environment. Egypt's recent

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interventions in the WTO negotiations on matters relating to textile production is an example of the type of involvement needed to safeguard the region's interests.

2. Environmental regulations applied by the trading partners of ESCWA member countries to the region's major export goods should be carefully examined with regard to their potential effects on export prospects and their conformity with international trade agreements. Oil, refined petroleum products and petrochemicals, which constitute the region's major exports, are particularly vulnerable to taxes and regulations imposed by developed countries for environmental reasons.

3. Industrial areas in the region currently associated with environmental problems should be carefully examined and evaluated to determine the best ways and means to encourage the private sector to internalize environmental costs in the production process while at the same time maintaining and/or improving their competitiveness in domestic and international markets.

4. Potential environmental effects should constitute one criterion in decisions to promote export-oriented industries and encourage foreign investment in ESCWA member countries. Countries of the ESCWA region may wish to avoid the potential pollution problems associated with environmental dumping by applying local environmental standards uniformly and ensuring that the environmental costs of newly established export-oriented industries are not imposed on society in general but are borne by the producers of the products to be exported.

5. Environmental audits of problem industries should be undertaken with a view to helping industries in the ESCWA region solve environmental problems in a cost-effective manner. Member countries may wish to conduct a close examination and analysis of the production processes currently used in the textile and leather industries to determine both their environmental impact and their potential for adaptation to the newer, cleaner technologies currently available for these industries.

6. Given the fact that the consideration of environmental issues in the trade policy arena is a fairly recent phenomenon, the ESCWA member countries may wish to undertake special efforts to ensure that the importance of this issue is fully understood by trade officials involved in international negotiations and by those involved in determining domestic policies aimed at export-oriented industries. Specific training for officials in trade and industry ministries on the environmental impact of various policies may be appropriate for some ESCWA member countries.

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