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The Costs and Benefits of Compliance with International Environmental Standards

Pakistan Case Study

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The Costs and Benefits of Compliance with International Environmental Standards: Pakistan Case Study

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- Governance
- Environment
- Human Development
- Economy

Executive Summary

Section A: Overview

The trade-environment nexus continues to generate heated debate. From the benign setting of Rio, to open confrontation at Seattle, to the "behind closed doors" diplomacy at Doha, at times it appears impossible that the various stakeholders will trade in their differences for consensus. Perhaps environmental regulations define this split best. Its advocates in the North feel that such regulations will promote sustainable development and growth eventually. Inverting this argument, Southern countries claim environmental regulations are trade-restricting devices, engineered by coalitions to protect domestic industries and block exports from the South.

Following upon the premise of the Pakistan TKN I study (Khan et al., 1999), this paper, too, avoids the histrionics such debates can give rise to and focuses on the practical implications. It begins with the stance that the reality is somewhere in between, and that environmental regulations can cut both ways: they can be trade restricting but they also offer new market niches and can lead to cleaner production practices in the exporting countries. The institutional challenge is to address the concerns and maximize the benefits. Also, in the final analysis, developing countries are left with little choice other than to comply with the increasingly stringent environmental regulations in order to maintain their export shares.

The North, too, has a responsibility to facilitate this process by displaying sensitivity for environmental and social realities in the South. With regard to process standards (effluents, emissions) tolerances vary, given the initial pollution and emission baselines. This is as true intra-North, as across the North-South divide. In fact, the WTO Agreement on Technical Barriers to Trade (TBT) and the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS), to which Pakistan is signatory, offer concrete ways to bridge such differences. Both agreements are designed to minimize trade restrictive impacts and maximize environmental and social benefits associated with the imposition of international environmental and social standards—whether of a voluntary or legal nature. By the same token, the agreements are prone to developing a pro-North bias as the South is unable to respond to their technical and institutional imperatives. This needs to be rectified through technical assistance for capacity building for—among other things—improving access to information on standards, setting good national standards and regulations and ensuring compliance audits (conformity assessment).

Study objectives and methodology

This study attempts to quantify and assess the firm-level impacts of complying with international standards. Three outcomes are envisaged with regard to the economic and social costs and benefits: win-win; net-win; net-loss.

Win-win refers to a situation where cost savings realized more than offset the costs of mitigation or compliance. This can occur through increased energy efficiency and recycling inputs and wastes. A net-win refers to the environmental and social benefits accruing from reduced pollution and health risks. Net-wins occur where the mitigation costs outweigh the savings in

costs but, combined with the environmental and health benefits, there is still a net gain. In the case of net-loss, the costs of mitigation outweigh economic, environmental and health benefits.

The three possible outcomes define a policy spectrum. The first outcome can be seen as a useful entry point for a national and/or international environmental agenda. The second outcome presents a social rationale for compliance. The third outcome justifies incentives/subsidies to industry. As in the TKN I study, health and environmental benefits are enumerated (environmental gains are quantified selectively), reflecting the methodological difficulties of quantification.

The assessment is based on a micro-level analysis. Textile firms and leather tanneries were selected purposively, as opposed to randomly, from larger clusters. Questionnaires were distributed and cost and environmental data was collected. The cost data covered the various clean production measures undertaken (machinery upgrades, recycling, waste recovery, other process changes, raw material substitution, end-of-pipe treatment and ancillary activities such as captive energy generation).

A pragmatic approach to standards

From the North's point of view, environmental standards are a necessary means to achieving environmental objectives. There is resistance to lowering these standards for economic gain. In particular, environmental groups in these countries oppose a "race to the bottom" on the grounds that present environmental standards are an outcome of a long and arduous struggle. Compliance undoubtedly raises complex issues. Whereas, product standards imposed by Northern governments cannot be termed protectionist, one cannot say this with any certainty for the standards based on processing and production methods (PPMs). However, as Khan (2002) notes,

> "Southern countries such as Pakistan must distinguish between restrictions imposed by Northern governments and those imposed by Northern businesses. If Northern governments impose import restrictions because Southern countries are not doing enough about child labour or cleaning up production technologies, this constitutes a non-tariff barrier. However, this is not the big danger that faces Southern exporters. Increasingly, businesses in the North are being required by their boards/shareholders to do businesses with firms that meet certain "voluntary" environmental and quality standards… This is a very important distinction. The only option Southern exporters have is to conform or lose markets."

Given their inevitability, product and process standards could be viewed more proactively as a driver for achieving efficiency gains (improved technology, energy efficiency, recycling inputs) and competitiveness in world markets. Ultimately, the South risks losing export markets if it does not comply. The RISNODEC (2000) regional study referred to such risks, especially with regard to South Asian exports of cotton, textiles, leather, fish and fruits and vegetables.

Success stories

On a positive note, standards offer opportunities for tapping into emerging market niches for "green" products. Also, environmental endorsements, like good quality, can ensure sustained market demand. As consumers and producers all over the world are becoming sensitized to environmental concerns, the global market for environmentally friendly products is increasing at a rapid rate. There is growing potential for environmentally friendly products to be rewarded

through price premiums and increased market access. Several success stories can be cited where the South has benefited as a result of conforming to environmental standards.

- Century Textiles of Bombay, the largest textile company in India, gained Öko-Tex certification for its products. As a result of the certification, it was able to raise prices by 8-10 per cent and increase market access by 10 per cent. (SIDA: 1998)

- The Hungarian automobile battery manufacturer, Perion, which produces and exports chemical batteries to the EU, reduced pollution loads by 50 per cent through the introduction of environmental management measures.

- The Colombian leather tannery, Curtigran Ltd. faced increasing environmental legislation, decreasing productivity and product quality. The company saw eco-efficiency as a strategy which could ensure its survival. Working in cooperation with the local San Benito Leather Tanners' Association (ASOCUR), the company reduced its operating costs by 11 per cent and pollution by 50 per cent.

- The agricultural residue-based pulp and paper mill, in Raval Paper Mills, India participated as a demonstration unit, in the UNIDO-sponsored cleaner production program DESIRE (Demonstration in Small Industries for Reducing Emissions). Execution of the cleaner production techniques created numerous benefits for the firm. The investment of US$80,000 made in implementing the first 30 measures generated savings of US$88,000 per year.

Section B: Costs and Benefits of Compliance – The Scope for Win-Wins

THE LEATHER SECTOR

Economic costs and benefits

A survey of the tanneries in Kasur and Sialkot revealed that though the techniques adopted for pollution mitigation in the two areas are different substantial efficiency gains and social benefits have accrued in both places. The thrust of the Sialkot project is on in-plant modifications to minimize waste generation, and reduce the use of raw materials and energy. The Kasur project concentrates on combined end-of-pipe treatment, with some in-plant treatment at the firm level.

In-plant measures

The Cleaner Production Centre (Sialkot) advised the firms to focus on those areas where pollution mitigation was critical and cost savings could be achieved concurrently. Even though financial and environmental outcomes have not been evaluated completely, initial results show that the 16 firms have collectively generated net savings amounting to almost Rs. 9 million, which is about 7.5 per cent of their total capital cost. The program has led to the identification of fourteen cleaner technology options through a detailed survey of leather tanneries.

Net savings refer to revenue minus the cost of equipment in the first year, whereas, yearly savings are the projected savings for the years ahead. It is evident that the measures with a pay-back period of less than one year have high savings. Of the Rs. 17 million in yearly savings generated by all the projects in the sixteen tanneries, almost Rs. 16 million were due to the projects with a pay-back period of less than one year. Since the focus of the CP program is on introducing house keeping measures and better in-house treatments, a majority of the investments have a short pay-back period. By making these one-time investments, firms can potentially cut their costs substantially, without compromising product quality.

A point to note is that the tanners are using environmentally friendly dyes which, in most cases, are four to five times more expensive than the hazardous ones. However, this has not had a significant impact on profitability, as these additional costs are low as a proportion of total operating costs, and can also be partly absorbed by price increases negotiated with the clients.

End-of-pipe treatment

Of the 700 tanneries in Pakistan, 237 are located in Kasur. The three tannery clusters discharge about 13,000 m^3 per day of heavily polluted tannery wastewater, which drains into the river Rohi Nullah. The estimated annual effluents consist of 4,000 tonnes of BOD_5 11,000 tons of COD, 10,000 tonnes of suspended solids, 160 tonnes of chromium and 400 tonnes of sulphide. Needless to say, the environmental and health consequences were extremely serious until the Kasur Tanneries Pollution Control Project (KTCP) intervened. The KTCP was launched in 1998, and is a collaborative venture, which includes the federal government, provincial departments, international donors and the tanneries. The project components include both in-plant and end-of-pipe measures.

According to a techno-economic study completed under the UNDP/UNIDO Preparatory Assistance Project, the estimates of the annual recurrent costs of the plant are as follows:

Operating and management costs:	Rs. 13.96 million
Depreciation:	Rs. 7.94 million

Total:	Rs. 21.90 million

The following benefits have been identified, and while some of these are quantified, data on the others is still to be collected:

- chrome recovery;
- reduced use of water (indirect benefits such as savings in electricity, dyes);
- waste recycling for energy;
- land reclamation.

The following table compiles the information on capital and recurring costs and benefits.

Consolidated Costs and Benefits

	Total Costs (million rupees)	**Total Benefits (million rupees)**
Capital		
Total Capital Costs (water treatment plant, chrome recovery plant, in-plant initiatives)	379.00	
Land Reclamation		462.00
Recurring (annual)		
Water treatment Plant operation Depreciation	21.90 (13.96) (7.94)	
Chrome recovery (unit costs) Plant operation	1.87	2.53

Capital costs and the reclamation/appreciation of agricultural land have a one-off character. Only recurring costs are relevant from a project sustainability perspective. The transfer of the water treatment facility to tanneries is reviewed in more detail in Section 3, Institutional Analysis. Chrome recovery is clearly profitable, and while still a pilot project, it shows potential for being replicated by the tanners themselves.

Environmental and Health Benefits

Quantifying environmental and health benefsits entails using complicated methodologies, so in this case it is limited to enumerating such gains. The only exception is the land reclamation and appreciation which is quantified in the preceding section.

The presumptive environmental benefits of the CP project (Sialkot)—measured in terms of pollution reduction per year)—are summarized below:

Environmental Benefits of the CP Project

Substance	Chromium (kg)	Salt (kg)	Water use (m^3)	Effluent (m^3)	Solid waste (kg)	VOC (kg)	Chemicals[1] (kg)
Reduction/yr.	28,000	138,000	55,500	4,500	9,000	10,000	50,000

1 Chemicals include sulphates, fat liquors, dyes and other tannery substances
Source: EPB (2001)

These figures illustrate the effectiveness of the CPC measures in reducing effluent and emission levels. The Export Promotion Bureau (2001) reported that the companies had achieved a 10–20 per cent reduction in water consumption, 50 per cent reduction in salt use and an average 25 per cent reduction in the use of chrome. The spray booths and roller coaters had achieved VOC reductions of, respectively 90 per cent and 25 per cent. In addition, the ambient environment within the tanneries had improved considerably as a result of the dust collectors installed to control toxic dust emissions during buffing operations. The key achievement of the project is in demonstrating that relatively simple housekeeping measures, which yield economic benefits, have the potential to reduce pollution by over 25 per cent.

More substantively, the water treatment plant (Kasur) has reduced pollutant loads considerably, as can be seen in the following table.

Pollution Reduction

Pollutants	Reduction		
	%	tonnes/day	tonnes/annum
Suspended solids	99	40	14,000
COD	60	30	11,000
BOD	75	23	8,300
Cr	98	0.311	110
Sulphide	70	1	350

Source: Malik, S. (2002)

There is little doubt that environmental conditions in Kasur were detrimental to the health and well being of the inhabitants, the tannery workers, and the farmers. The treatment plant has proved to be a primary step in dealing with the problem and is a successful example that can be replicated for other tannery clusters in Pakistan.

THE TEXTILES SECTOR

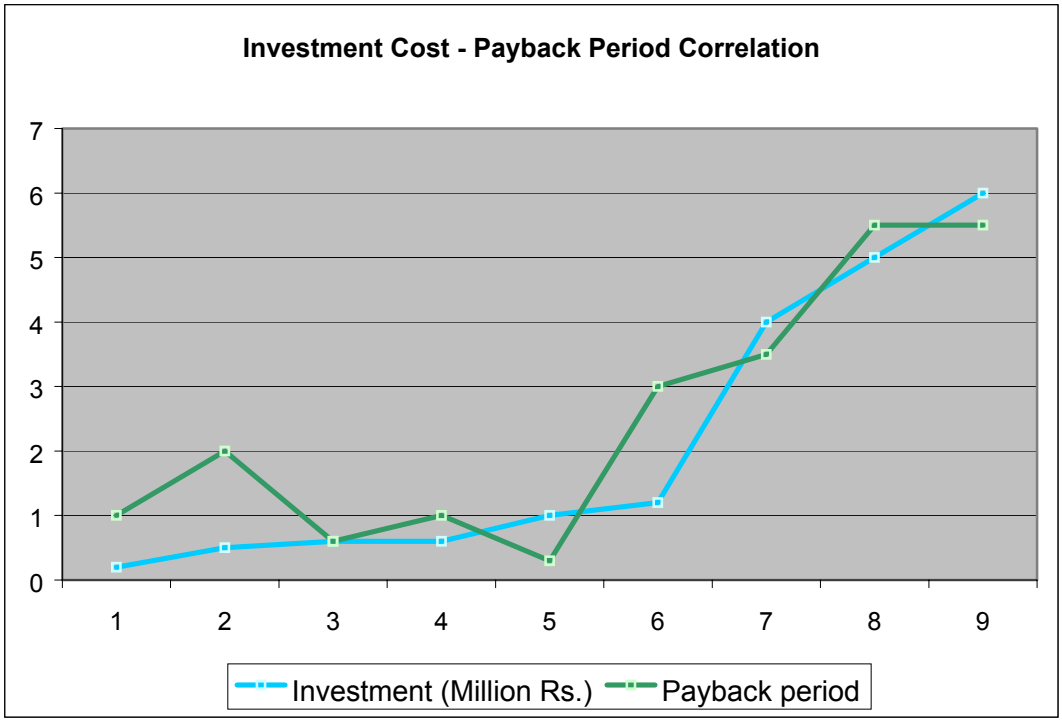
Economic costs and benefits

Pakistan's textile industry is concentrated in the Faisalabad, Lahore, Gujranwala and Karachi regions. Textile processing utilizes a variety of chemicals, which include detergents, dyes, acids, sodas, salts and enzymes. Currently, the textile mills are discharging the wastewater into the municipal drains and rivers without any treatment, which has serious impacts on natural water bodies and land in the surrounding areas. Other less hazardous environmental impacts are solid wastes, air emissions, and noise pollution within the firms and health risks to workers from over exposure to chemicals.

In-plant treatment: Environment Technology Program for Industries

The Environment Technology Program for Industries (ETPI) carried out a survey of textile firms, identified a number of CP and end-of-pipe treatment options and presented rough cost estimates and payback periods for them. The CP (in-plant) options have the potential to reduce effluent loads, which in turn reduce the end-of-pipe treatment costs.

There is a direct correlation between cost of investment and payback period, as can be seen in the following figure. However, firm financial constraints suggest the need for prioritizing mitigation investments. An obvious criterion for prioritizing such investments is their cost but an additional efficiency parameter can be imposed on this, namely, the payback period in relation to investment cost (preferred options are those where the payback period converges to, or is less than, the investment cost).



End of pipe treatment: ETPI

The ETPI firm level survey identified the following end-of-pipe treatment options. Their potential for mitigation and relative capital and recurring costs are presented in the table below:

End-of-Pipe Treatment for Textile Wastewater

Recommended Measures	Environmental benefits	Capital cost estimates	Recurring cost estimates (annual)	Remarks
Integrated Macrosorb treatment	Removal of some 60 % of COD and some 95 % of overall dyestuff effluents	Rs. 11,000 - Rs.14,000/m^3	Rs. 11,000 - Rs.14,000/m^3	A large volume of effluent can be treated through this method, although it is relatively more expensive than the others.
Macrosorb treatment of concentrated dye bath/wash water	Removal of some 6% of COD, 10 % of Nkj and 80% of dyestuffs	Rs. 4,000/m^3	Rs. 5,600/m^3	This method is economical as only a small stream, highly polluted with dyes, can be treated.
Separate removal of size from de-sizing wastewater and COD from scouring wastewater by ultra filtration	Removal of 50 % COD and 5 % BOD	Rs. 8,000/m^3	Rs. 4,800/m^3	Effluent may require further biological treatment to reduce BOD level.
Combined removal of size from de-sizing and scouring wastewater by ultra filtration	Removal of 65 % COD and 20 % BOD	Rs. 7,000/m^3	Rs. 4,900/m^3	Effluent may require further biological treatment to reduce BOD level.
On-site colour removal of heavily coloured effluents with the help of ozone	Removal of some 7 % of COD, 5 % of BOD and 80% of dyestuffs	Rs. 16,000/ m^3	Rs. 4,800/m^3	

End-of-pipe initiatives are the most effective because of the large volume of water treated, and important from the viewpoint of the national environmental quality standards (NEQS). However, high costs preclude firm level investments. Firms' intentions are limited to planning designs and stated intentions to construct water treatment plants. Also, textile plants are dispersed, unlike the tannery clusters which attract project funding for remediation.

Environmental and Health Benefits

Environment Technology Program for Industries (ETPI)

The presumptive environmental benefits enumerated under the ETPI project are presented in the table below:

Adoption of cleaner production options in textile mills

Recommended measures	Environmental benefits
Caustic recovery from mercerising	50% savings in caustic consumption
Direct reuse of waste caustic from mercerising in scouring	Savings in caustic consumption
Counter current washing and replacement of nozzles at printer table blankets	50 -70% reduction in water use in washing
Pigging of dye paste from printing equipment (lance, tubes)	Reduction of dye paste emissions to water
Installation of a tray at the printers to avoid spilling	Reduction of dye paste emissions to water
Installation of shorter tubes between paste drums and printer	Reduction of dye paste emissions to water
Addition of displacement bio-dies in dye/finish equipment	Reduction of water and chemicals consumption
Introduction of pad batch dyeing system	Saving of chemicals and water Prevention of chemicals emission
Application of reactive dyes with higher fixation degrees	Prevention of dyestuff emission
Reduction of dye paste losses by in-line dye paste dosing	Reduction of dye paste losses and emissions to water
On-line conductivity measurement in washing process	Reduction of wash water Better utilization of equipment
Installation of automatic water shut down valves	5-10 % savings in water consumption and discharge
Reuse of Boiler off-gas	Savings in energy consumption
Reuse of off-gas in the drying sections of the rotary printers	Savings in energy consumption
Reuse of energy from blow down with flash tanks	Energy conservation
Countercurrent regeneration of ion exchangers	Energy conservation Reduction in the use of regeneration salt
Treatment of boiler feed water by R O	Energy conservation Reduction in blowdown
Heat recovery from wastewater by heat exchange	Savings in energy
Excess water removal after washing with the help of vacuum suction boxes	Reduction of water and chemical use and chemicals discharge water, chemicals
Anti-corrosion measures	Reduction of water and chemical consumption Prevention of related safety problems

Note: 1. In all cases, energy conservation will reduce CO_2-emissions as well.

Section C: Institutional Analysis

Pressure for mitigation, status and problems in compliance

Tanneries and textile mills face various kinds of pressure to adopt environmental mitigation strategies. Importer specifications constitute pressure from outside the country, which is directed at exporting industries. National laws and regulations embrace production for domestic as well as international markets. While their focus is not on the export sector *per se*, synergies in the form of concessions, technical assistance and institutional capacity building can be achieved by interfacing national laws and regulations with international requirements. Community pressure tends to be exerted when environmental degradation and pollution, and the health problems they pose, become intolerable.

Importer specifications

Pakistan's major trading partners, the U.S., EU and Japan, have stringent environmental regulations which Pakistani exporters were generally unfamiliar with in the past. In recent years, these are being overtaken by voluntary standards, reflecting consumer purchasing preferences. Exporting firms are becoming aware of importer specified "codes of conduct" pertaining to environmental and social-standards. Our interactions with large textile and leather exporters pointed to responses in the shape of relatively low-cost, in-plant mitigation measures, particularly those which reduce production costs as well. There was much less evidence of more expensive end-of-pipe treatment. Often compliance is facilitated by donor interventions. In the case of the Sialkot tanneries, the donor initiative was pitched as much at cleaning the export sector, as it was with promoting the national environmental agenda.

Many grey areas exists that need policy attention. While the ISO 14,000 certification requires documented proof of compliance with national environmental quality standards (NEQS), some firms have secured such certification even though they do not appear to be in full compliance. Also, a number of firms are being granted ISO 14,000 and/or bilateral certification ahead of full compliance, by demonstrating partial compliance or intent to comply. This provides an opportunity for dilatory tactics at best and spurious compliance at worst. There is, however, strict compliance with product standards banning the use of carcinogenic dyes and other substances harmful to human health.

National laws, regulations and their implementation

The first draft of the Pakistan Environmental Protection Ordinance (PEPO, 1983) was prepared in 1976 and promulgated in 1983. This created a legal basis for environmental policies, national standards and environmental impact assessments. A concerted effort to implement the NEQS for industrial effluents and emissions was made at the first meeting of the Pakistan Environmental Protection Council (PEPC) in 1993. The NEQS set limits to air emissions, effluents and noise pollution.

An innovative response to the weak enforcement capabilities of the EPAs was the move to rationalize existing environmental standards (which were too stringent) and implement them through a self-monitoring and compliance program, which includes a combination of self-assessed pollution charges and random external audits.

The EPAs have called in large producers, indicated they are in violation and threatened them with closure. By and large, exporters obtain stay orders or ignore such warnings. Compounding this problem is the fact that the warnings are frequently issued without on-site checks. While voluntary compliance is seen as a way of addressing the weak technical and enforcement capabilities of the EPAs, the process has not reached operational maturity. There still appears to be a clear lack of understanding of the NEQS process among exporting firms. Conversely, the EPAs seem unaware of international environmental standards. Neither entity seems aware of the potential interface between the two. In principle, international standards can inform and refine the NEQS process, while the NEQS standards can be viewed as a useful benchmark for phasing in international standards.

Community pressure

Another source of pressure for environmental action is civil society groups, which exert pressure on the government to impose standards to protect the environment and public health from dirty processes. The Kasur tanneries are an important example where communities residing adjacent to the tanneries and various public welfare organizations lobbied successfully to get the KTCP initiative launched.

However, concern exists regarding the collective effort required to operate the combined water treatment plant once the donors phase out. Despite the obvious cost advantages associated with collective action (economies of scale) it may not actually be observed. For instance, Olsen (1971) was sceptical of collective action because of the free-rider problem. This is very much in evidence in the case of the Kasur tanneries with widespread delinquency in mandatory contributions by the tanneries.

The Way Ahead: Tapping into the WTO

As tariff restrictions are being phased out under various trade accords, non-tariff barriers to trade represented by quality, environmental and social standards are phasing in. Further, legally binding technical regulations are being overtaken by a bewildering array of voluntary standards. As these fall outside the government remit—not being governed by international trade rules—they have the potential to become instruments of protection. By the same token, because they reflect a combination of consumer sovereignty and social pressure, exporting countries like Pakistan can ill-afford to ignore them. We have attempted to show that in the best case scenario, exporting firms can comply with such standards and reap economic benefits from doing so. However, this is premised upon a support infrastructure that, presently, does not exist. Specifically, Pakistan does not have the institutional and technical capacity to help its industries respond to the plethora of voluntary standard requirements, or tap into the export prospects that they offer.

In this context, the WTO Agreements on Technical Barriers to Trade (TBT) and on the Application of Sanitary and Phytosanitary Measures (SPS) agreements—to which Pakistan is signatory—present both an opportunity and a constraint. The two agreements seek to increase market access for the exports of its member countries. As constituted, the agreements require that those *importing* governments that formulate standards do so according to rules related to transparency, fairness and sound science. However, developing countries like Pakistan come up short in two respects: first, they generally lack the technical and institutional capacity to test for, and certify compliance with, such standards, and have to rely on costly foreign testing bodies; second, they

lack the resources to participate meaningfully in the development of standards, whether in the context of developing standards in international standards-setting bodies, or in responding to proposed national-level standards in the countries to which they export.

The WTO offers technical assistance to developing countries to develop these capabilities. Such assistance should be preceded by a capacity and needs assessment under the following broad categories:

- risk assessment and sound science, namely, how technically empowered is the country in question to justify its environmental standards and technical regulations?;
- access to information, is there an effective domestic network in place that ensures that relevant national government agencies and industry groups are aware of impending standards and have the opportunity to comment on them?;
- does the country have a competent standards body that has relevant legal and economic expertise, that complies with the standards code and that can enter into agreements with competent authorities on technical equivalence issues?; and
- does the country have a robust conformity mechanism in place, which includes testing and metrology equipment, experimental techniques and procedural rigour?

Acronyms

BOD	Biological Oxygen Demand
CETP	Common Effluent Treatment Plant
COD	Chemical Oxygen Demand
CP	Cleaner Production
CPC	Cleaner Production Centre
Cr	Chromium
EMS	Environmental Management System
EPA	Environment Protection Agency
EPB	Export Promotion Bureau
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GOP	Government of Pakistan
KTPCP	Kasur Tannery Pollution Control Project
MEA	Multi-lateral Environmental Agreements
NEQS	National Environmental Quality Standards
NGO	Non-governmental Organization
SEBCON	Socio-Economic Business Consultants
SME	Small and Medium Enterprise
TBT	Technical Barriers to Trade
TDS	Total Dissolved Solids
TKN	Trade Knowledge Network
TSS	Technologically Suspended Solids
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNIDO	United Nations Industrial Development Organization
VOC	Volatile Organic Compounds
WTO	World Trade Organization