



Cleaner production in Pakistan's leather and textile sectors



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ABSTRACT

This study evaluates the dissemination of cleaner production in Pakistan's industrial sector by assessing the performance of two of Pakistan's three cleaner production (CP) centers. The study examines the adoption of CP measures by firms, as well as firms' compliance with Pakistan's National Environmental Quality Standards and certification to ISO 14001. A survey of 80 leather tanneries and textiles processing firms served by a CP center is the primary data source. Surveyed firms adopted the majority of CP measures proposed by the centers, even though firms had little understanding of CP concepts. Many of the commonly reported factors motivating CP adoption were present, but one was conspicuously absent: the need to meet ambient environmental quality standards. Survey results also indicate that firm size and engagement with foreign business customers are correlated with: the adoption of CP, the establishment of environmental management systems and certification to ISO 14001.

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1. Introduction

For more than 15 years several initiatives have been launched to advance cleaner production (CP) practices in Pakistan. Among the key actors in moving CP forward, those that stand out involve Pakistan's cleaner production centers, which have been funded by trade associations, domestic and foreign government organizations, and international aid institutions. Examples of donors include: the Government of Pakistan, the United Nations Environment Program, the Norwegian Agency for Development, and the Royal Netherlands Embassy.

This paper examines CP at leather tanneries and textile processing firms served by two of Pakistan's three CP centers.² The Cleaner Production Institute (CPI) has the broader scope of the two

and provides services (primarily in Lahore, Karachi and Faisalabad) to firms engaged in leather tanning and textile processing, and to a lesser extent in the sugar and pulp and paper sub-sectors. The second center examined herein, the Cleaner Production Center (CPC), is headquartered in Sialkot, a city north-west of Lahore near the Indian border, and works with leather tanneries in and around Sialkot. These firms are almost all small and medium sized enterprises (SME), defined herein as firms with at most 250 employees. More than 250 employees is a commonly used basis for distinguishing SMEs from large firms in Pakistan. Over 95% of manufacturing SMEs in Pakistan have fewer than 10 employees (Kureshi et al., 2009).

There is general agreement in the literature that barriers and drivers for adopting CP measures can be usefully divided into three broad categories³

- Government actions, including promulgation and enforcement of environmental standards as well as market-based instruments, such as effluent charges and tradable pollution permits.

³ For examples of recent literature reviews, see [Murino-Luna et al. \(2011\)](#) and [Montalvo \(2008\)](#).

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² The third center, the National Cleaner Production Centre-Foundation is a for-profit organization that provides services (primarily to the oil and gas sector) that include: compliance monitoring of industrial effluent and emissions, incineration and bioremediation to dispose hazardous waste, environmental impact assessments and energy audits. It is omitted here because we were unable to collect sufficient high-quality data from the firms served by NCCP-F.

- Market-based pressures, including green supply chain demands from business customers and high production costs.
- Community demands, reflected in environmentally-related pressures exerted by NGOs and the media as well as the public at large.

Few generalizations about barriers and drivers can be made because high variations in CP adoptions exist across countries, industrial sectors and firm sizes (Luken and Van Rompaey, 2008). Moreover, variations exist even for a particular country, sector and firm size: for example, some leather-sector SMEs in Pakistan have embraced CP whereas others have not.⁴ However, there is agreement in the literature that SMEs have particular challenges in implementing CP measures.

This study uses survey results to evaluate the overarching motivations and obstacles in adopting CP measures in Pakistan's industrial sector. The study also presents results concerning firms' certification to ISO 14001 and compliance with Pakistan's National Environmental Quality Standards (NEQS). It is based primarily on a random sample of firms served by CPC and CPI, with an emphasis on leather tanneries and textiles processing firms; leather and textiles are Pakistan's leading export products. In addition to the survey, interviews were conducted with officials in environmental protection agencies (EPAs) and representatives of trade associations. Arguably, CPC and CPI together have undertaken the most ambitious efforts to diffuse CP among firms in Pakistan.

The remainder of the paper is organized as follows. Following a description of data gathering methods, the paper examines the extent to which surveyed firms are aware of and in compliance with environmental regulations. The next two sections analyze the impacts of the cleaner production centers on CP adoption at surveyed firms and the firms' evaluation of the centers' work, respectively. Then we examine the extent to which surveyed firms were aware of environmental management systems (EMS) and compliant with ISO 14001. The penultimate section considers the results in the broader context of the literature on factors affecting CP adoption; the final section summarizes key conclusions.

2. Data gathering approach

A survey was conducted during 2009 and 2010 of a random sample of tanneries and textile firms served by CPC and CPI. In addition, interviews were conducted with: (i) staffs at CPC and CPI; (ii) officials with Pakistani EPAs; and (iii) staffs of relevant business chambers, trade associations, and NGOs.

Our survey involved structured interviews that lasted 3 to 5 h each. Typically, individuals interviewed included a firm's CEO and/or its top managers. The survey documents 42 of the 222 leather tanneries using the services of CPC, and 8 of the 45 tanneries served by CPI in Lahore and Karachi. The survey also presents data for 30 of the 117 textile processing firms served by CPI. In the survey results presented herein, sample sizes are slightly lower because of missing responses to some survey questions.

The survey concentrated on leather and textiles because they are key sectors in Pakistan's manufacturing economy, and because textile production and leather tanning are the most polluting processes in these sectors, which are known to contain major pollution sources. While leather is not as important as textiles in contributing to Pakistan's economy, the pollution from leather elevates its significance from an environmental perspective. In presenting results below, "n" represents the size of the sample that contained usable responses for the variables presented.

A survey questionnaire was used to structure interviews at each firm in the study and the main parts of the questionnaire are summarized here. The initial section was used to document the understanding of the concept of cleaner production on the part of the interviewee representing the firm; it also included questions about the extent to which the firm had conducted environmental and/or energy audits. The next section, which was the most extensive, included questions concerning several issues, including: the CP measures implemented by the firm and why those measures were selected, the firm's benefits and costs from implementing CP, and obstacles to CP implementation. This section also included questions about the firm's compliance with environmental regulations and whether it had an environmental management system. Another section of the questionnaire covered general environmental policy issues, including the identification of policies that hindered CP implementation. Still another section asked questions about how the firm interacted with the CP center that provided it with assistance.

3. Awareness of and compliance with NEQS

Figs. 1 and 2 present data from surveyed firms that responded fully to questions on NEQS awareness, NEQS compliance, firm size and whether or not they exported outputs. Fig. 1 shows the distribution by firm size of the 65 firms providing usable responses: 89% of the SMEs are tanneries, whereas 68% of the large firms are engaged in textile processing. The awareness of NEQS among surveyed firms varied significantly by firm size. Larger firms were more aware of NEQS than SMEs: all but one of the surveyed large firms were aware that NEQS existed, while only one-third of the SMEs were aware that Pakistan had such standards.

The data within the bars in Fig. 2 show that only 16 of 46 SMEs were aware of the NEQS, and of those 16 firms, 9 exported at least part of their output. (The term "engagement in exports" in the caption for Fig. 2 indicates that a firm either sold all of its output in international markets or sold part of its output domestically and part internationally.) In contrast, nearly all of the large firms knew about the existence of NEQS, regardless of whether they were engaged in exporting. As Fig. 2 also reveals, firm size and engagement in exports are correlated, and a far higher share of large firms sell all or part of their output overseas. (See Table A1 for correlation coefficients.) Whether a firm was aware of NEQS was significantly correlated with each of the following variables: firm size, industrial sector, and engagement in exports (Table A1). It is difficult to distinguish the individual influences of firm size, industrial sector and engagement in exports on NEQS awareness because firm size is strongly correlated with both industrial sector and engagement in exports (Table A2).

Survey results included information on NEQS compliance for the same 65 firms in Figs. 1 and 2, and the extent of noncompliance is striking: only 10% of the surveyed firms satisfied the NEQS, and none of the 46 SMEs met the standards. While the compliance

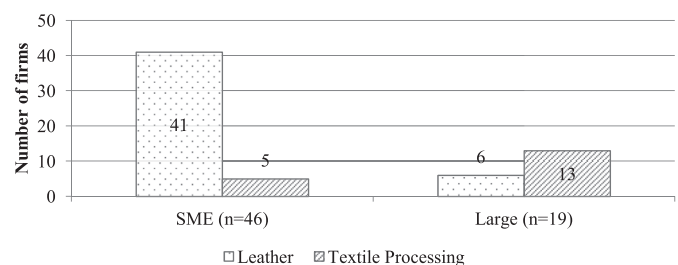


Fig. 1. Industry distribution in terms of firm size and sector ($n = 65$).

⁴ On this point more generally, see Darnall (2001).

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