SOUTH ASIA
ENVIRONMENT AND WATER RESOURCES UNIT

THE WORLD BANK

The Bangladesh Responsible Sourcing Initiative

A NEW MODEL FOR GREEN GROWTH

The Bangladesh Responsible Sourcing Initiative

A NEW MODEL FOR GREEN GROWTH?

April 2014

THE WORLD BANK

World Bank
1818 H Street, N.W.
Washington DC 20433, USA
Tel: 1-202-4731000
Fax: 1-202-477-66391
www.worldbank.org

This is a report by the World Bank in collaboration with the International Finance Corporation (IFC) & the Natural Resources Defense Council (NRDC).

Sponsored by

The South Asia Water Initiative (SAWI), the Bank-Netherlands Partnership Program (BNPP) & the Water Partnership Program (WPP)

SAWI Donors consist of:

Photo credits

PHOTOGRAPHER: RAJIV ASHRAFI

Cover: Dirty Sunset: The sun sets over the dirty lake at Banani.

PHOTOGRAPHER: STEPHAN BACHENHEIMER

PHOTOGRAPHER: BO KAGE CARLSON

Page 29: Textile factory: Woman at work in a textile factory near Chattagam (Chittagong).
Page 44-45: Rice field in southern Bangladesh.

PHOTOGRAPHER: SIET MEIJER

Pages 16: Wastewater treatment plant in Bangladesh.
Pages 22-23: Spools in Bangladesh factory.
Page 34-35: Assembly line in a garment factory in Bangladesh.
Page 58-59: Men working in a textile factory in Bangladesh.
Page 75: Spools of thread in a textile factory in Bangladesh.

PHOTOGRAPHER: SHEHZAD NOORANI

Page 4: Woman block printing shirts and other materials for sale in local markets and for export to
Pages 8-9: Colored thread used for embroidery of cloth in a TMSS supported workshop.
Page 31: Woman spinning cotton thread using traditional spindle.
Page 43: Woman spinning cotton thread using traditional spindle
Page 65: Woman producing silk thread from cocoons of silk worms.
Page 57: Portrait of a woman with cocoons of silk worms which are used to make silk thread.

PHOTOGRAPHER: THOMAS SENNETT

Page: 19: People crossing river in boat. Bangladesh.

PHOTOGRAPHER: CATHERINE TOVEY

Pages: X-XI: Waterway in Bangladesh.
Page 14: Untreated effluent from a Dhaka textile mill flows into a waterway

PHOTOGRAPHER: SCOTT WALLACE

Page 66-67: Villagers bath in river in rural Bangladesh.

Contents

FIGURES

MAPS

BOXES

TABLES

ABBREVIATIONS

BGMEA	Bangladesh Garment Manufacturers and Exporters Association
BKMEA	Bangladesh Knitwear Manufacturers and Exporters Association
BTMA	Bangladesh Textile Mills Association
GIZ	German Agency for International Cooperation (Gesellschaft für Internationale Zusammenarbeit)
IFC	International Finance Corporation
ILO	International Labour Organization
IPE	Institute for Public and Environmental Affairs
NCPC	national cleaner production center
NGO	non-governmental organization
NLTA	Non-Lending Technical Assistance
NRDC	Natural Resources Defense Council
PaCT	Partnership for Cleaner Textiles
RSI	Responsible Sourcing Initiative
SEDF	South Asia Enterprise Development Facility
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
WDF	washing, dyeing, and finishing
ZDHC	Zero Discharge of Hazardous Chemicals

Currency Equivalents

2013 US$1 = 82 Bangladesh takas (Tk.)

FOREWORD

The last decade has witnessed a rapid increase in incomes in South Asia, but significant development challenges remain. Some challenges, such as industrial water pollution, have proved difficult to resolve. The case of Bangladesh is illustrative. Bangladesh's economy has benefited from the growth of its garment sector, but the country faces considerable challenges managing industrial standards. Despite donor and Government involvement, pollution remains a growing problem.

Tackling this issue necessitated the development of a large, strategic, multi-stakeholder program in collaboration with the private sector, drawing on the World Bank's expertise as a provider of knowledge and convener, as well as a financier. This was not easy. The team had to think carefully about how the private sector could be brought in. The importance of the global textiles sector to many of the Bank's client countries required identifying an appropriate entry point and bringing the right people to the table.

Three actors were instrumental in supporting this process: The Natural Resources Defense Council (NRDC), who pioneered work with textile mills in China. The International Finance Corporation (IFC)—particularly the Bangladesh team—, who provided knowledge of the local apparel sector and their cleaner production program. And, several global apparel brands, which possess enormous sourcing power and influence to improve the environmental performance of mills through their own supply-chain policies.

The result of these efforts—the Responsible Sourcing Initiative in Bangladesh—is an innovative approach to address these problems. It demonstrates how collaboration between the Government, the World Bank, IFC and the private sector (global apparel brands, and textile mills) can

improve the environment, people's health, and industry's bottom line—all at once. The potential to make a difference by greening the supply chain for textiles is enormous.

This work is timely and of prime importance. The industrial disaster at Rana Plaza factory in Bangladesh in April 2013, one of the deadliest in its history, demonstrates the need to improve industrial standards. The episode also serves to show the weight brands attach to reputation across their supply chain and difference multinational brands can make in improving standards in factories owned and managed by their suppliers. Since the disaster, over 100 multinational brands have joined a commitment to improve health and safety measures in the country's garment factories.

This report focuses on harnessing this potential, identifying a number of practical, achievable actions for multinational brands, and the Government of Bangladesh, so that textile firms are provided with the information, means, and incentives to comply with basic environmental regulations, adopt practices that make sense for their business, the environment and society.

Looking forward, the Responsible Sourcing Initiative has the potential to make a difference to textile industries in other countries, given the replicability of the model. The goal should be to ensure all textile mills adopt low-cost measures, which cut down waste and reduce production costs, and encourage brands to support better environmental performance through their supply chain guidelines.

John Henry Stein
Sector Director
Sustainable Development
South Asia

ACKNOWLEDGMENTS

The Responsible Sourcing Initiative (RSI) is a joint initiative between the World Bank, the Natural Resources Defense Council (NRDC), and the International Finance Corporation (IFC).

This report was produced under the guidance of Catherine Tovey (Task Team Leader). The lead authors of this report are Catherine Tovey and Siet Meijer from the World Bank. Extensive contributions were also made by Shahpar Selim from the World Bank and Avinash Kar, Susan Keane, and Linda Greer from the NRDC. The report draws from in-depth technical analysis carried out by the consortium led by Ecopsis. The report also benefited from additional inputs from the World Bank team consisting of Khawaja M. Minnatullah, Jane Nishida, Klas Sander, Vansa Chatikavanij, Pratibha Mistry, Panneer Selvam, Susan Palmer, Swarna Kazi, and Angie Harney. In addition, the team was also grateful for the overall guidance from Jack Stein and Herbert Acquay in the South Asia Department at the World Bank, and contributions from the IFC, especially Monika Weber-Fahr, Naureen Chowdhury, Syed Nayeem Emran, Mirnal Sircar, and Mohandas Seneviratne, as well as NRDC's representative in Dhaka, Syed Anwar Hossain. Excellent contributions were also received from the following peer reviewers: Sanjay Srivastava, Paul Martin, Jostein Nygard, and Kulsum Ahmed from the World Bank, and Mohandas Seneviratne from the IFC. Finally, the team would like to thank John Dawson for his superb editing.

Excellent collaboration was received from the brands and buyers that partnered with the RSI in Bangladesh: H&M, Levi's, Marks & Spencer, Wal-Mart, Li & Fung, Target, Nike and Gap. Appreciation also goes out to the senior and technical staff at all the factories who participated in the project, especially DBL, Delta, Epyllion, Libas, Niagara, Partex, and Sinha. Thanks to the the staff

and management of the textile trade associations who took time to meet with us and agreed to consider sharing the final results with their membership: Bangladesh Garment Manufacturers and Exporters Association, Bangladesh Knitwear Manufacturers and Exporters Association, and the Bangladesh Textile Mills Association. Lastly, extensive thanks is extended to the Government of Bangladesh, particularly senior officials in the Ministry of Environment and Forests, the Ministry of Local Government, Rural Development, and Cooperatives, and the Department of Environment.

This report was carried out as part of the South Asia Water Initiative, and would not have been possible without the generous support of the following donors::

- Department for International Development (DfID)
- Australian Government (AusAID)
- Norwegian Ministry of Foreign Affairs (through NORAD)
- Bank-Netherlands Partnership Program (BNPP)
- Water Partnership Program (WPP).

EXECUTIVE SUMMARY

The objective of this report is to document a new approach to tackle systemic industrial pollution in the textile industry. The Global Responsible Sourcing Initiative (RSI) was created in 2010 in response to this challenge. The initiative brings together the World Bank, the International Finance Corporation (IFC), the Natural Resources Defense Council (NRDC), and eight leading multinational brands. This platform allows non-traditional partners to explore a joint approach to address environmental concerns within the global apparel supply chain by collectively changing the "business as usual" mode of operation.

BANGLADESH CASE STUDY: A MAJOR EMERGING TEXTILE EXPORTER

Chapter 1 outlines why Bangladesh was selected as the first fully-fledged RSI pilot. There were a number of reasons. First, its ready-made garment industry is a major exporter, accounting for around 5 percent of the global ready-made garment sector, as well as being a major driver of Bangladesh's economy. Second, its market is dominated by a handful of leading multinational brands, which therefore exert considerable influence. Third, Bangladesh's rapidly growing textile industry is placing an increasing environmental footprint.

Chapter 2 further expands on the importance and characteristics of Bangladesh's dynamic and fast-evolving ready-made garment export sector.

TEXTILE INDUSTRY'S ENVIRONMENTAL FOOTPRINT

Chapter 3 explores the environmental footprint of Bangladesh's ready-made garment sector in more detail.

Most of the ready-made garment sector is manufacturing. Of the manufacturing processes, the washing, dyeing, and finishing (WDF) of textiles—which relies on large quantities of water, chemicals, and energy—is the primary driver of environmental issues. Environmental impacts are most felt around the capital city Dhaka, where much of the textile production is concentrated. Heavy water usage is contributing to groundwater over-exploitation, with yields falling and the water table declining by 3 meters a year. Initial estimates suggest the textile industry may be consuming almost as much groundwater as the capital city's 12 million inhabitants. Heavy chemical usage, combined with water, has resulted in large volumes of untreated effluent being discharged, affecting potable drinking water supplies, fisheries, and agricultural productivity, and citizen's health and well-being. The sector's heavy energy demands also negatively impact the availability and cost of scarce energy supplies.

LIMITATIONS OF EXISTING APPROACH TO ENVIRONMENTAL MANAGEMENT

Chapter 4 describes the Government's limitations to address these environmental issues. While Bangladesh's existing legislative and regulatory environment management framework is acceptable, it has been insufficient to address growing industrial pollution concerns. Balancing environmental needs with those of a valuable wealth-generating industry has so far proved problematic. Earlier efforts by development partners to tackle industrial water pollution have equally been mixed.

The Government and multinational brands are searching for more sustainable ways of nurturing local textile industries, which are good for growth and the environment. Global best practice has shown that building broad-based demand for change is best initiated by aligning incentives of multiple actors around incremental, achievable actions.

THE BANGLADESH RSI MODEL

Chapter 5 outlines in more detail the Bangladesh RSI approach to tackle these problems. This approach had a number of characteristics. First, it was based around a non-controversial entry point that all stakeholders would buy into—the identification of cleaner production best practices that simultaneously reduce waste and enhance productivity. Second, it focused on developing and nurturing multi-stakeholder dialogue between the government, the private sector from the full apparel supply chain (textile mills, trade associations, and multinational brands), and development partners (World Bank, IFC, and NRDC). Over the course of 2010–2011, these partners worked together in identifying cleaner production best practices and understanding constraints for factory uptake.

The use of cleaner production measures is a cornerstone of the RSI, since it provides a useful, neutral entry point to engage the textile mills. Factory audits in Bangladesh confirmed the large potential savings. The implementation of seven low-cost cleaner production best practices could help reduce water and energy consumption by 25 percent and chemicals by up to 10 percent. At the same time, it would save the industry up to $200 million a year on efficiency savings and up to $90 million in avoided wastewater treatment costs.

However, uptake of cleaner production measures by industry remains low. Tangible environmental benefits will only be achieved if a significant proportion of mills in Bangladesh adopt cleaner production best practices.

OVERCOMING BARRIERS TO CLEANER PRODUCTION

Chapter 6 explores the barriers to adopting cleaner production. Three complementary market failures are identified as inhibiting uptake of cleaner production best practices: (a) the failure to internalize externalities associated with water scarcity and pollution due to weaknesses in the broader enabling environment (including environmental regulation and enforcement); (b) information asymmetry (getting the right information to the right people at the right time); and (c) missing markets (including access to cleaner production products and finance).

RECOMMENDATIONS FOR SCALING UP CLEANER PRODUCTION

Chapter 7 outlines the proposed incremental, multi-stakeholder approach needed to promote cleaner production uptake amongst selected textile mills. The suggested approach is structured in three phases according to cost, implementation risk, and impact. Activities are intended to be implemented flexibly as stand-alone activities, simultaneously or in sequence over a number of years, depending on resource availability and emerging windows of opportunity for change.

Proposed actions include:

- Initial support and advice on cleaner production through the establishment of environmental assistance centers as a building block for future interventions;
- Complementary market-based actions to further strengthen incentives for uptake, including the harmonization of brand purchasing guidelines to promote cleaner production, the development of cleaner production products and services, and financial support for investments in clean technologies;
- Exploring the potential for *selective* reforms to environmental regulation and enforcement, including strengthened groundwater licensing, zero discharge, and enhanced enforcement targeting critical environmental hotspot areas, as such reforms—while challenging—have the potential to yield transformational change for both scaling up cleaner production and pollution abatement.

LESSONS FROM THE BANGLADESH RSI MODEL

Chapter 8 summarizes the key findings and reflects on the lessons from the RSI case study. The key lessons were that:

- At present, this model has principally been applied at the diagnostic stage, to help better understand the potential benefits and barriers of cleaner production;
- The advantages of nurturing and maintaining such a multi-stakeholder platform are likely to be even greater when discussing, formulating, and implementing specific interventions to scale up cleaner production measures. Indeed, all the recommended actions put forward in this report would greatly benefit, or even require, some form of consultative or collaborative work between public and private parties for successful implementation;
- The country-level findings of the Bangladesh RSI are also being fed into the global RSI platform, as these may be applicable in other major textile-exporting countries of interest to multinational brands, including China, India, and Vietnam;
- The incubator function of the RSI multi-stakeholder platform has already led to a number of spin-off activities including:

- Gap Inc. is now partnering with NRDC to pilot supply chain policies in its fabric mills and dyehouses in China;
- Modifications to existing environmental compliance databases produced by the Institute for Public and Environmental Affairs (IPE) in China to make these more brand user-friendly;
- Since 2013, NRDC started a city-track approach to scale up the RSI;

The non-traditional partnerships developed through the RSI at the global and country level also present a useful model for greening supply chains with similarly large, dislocated, environmental footprints, including sustainable organic cotton production, mining, timber, agri-business, and fisheries.

CHAPTER 1

Introduction

1.1 OBJECTIVES OF REPORT

The objective of this report is to reduce systemic industrial pollution in the textile industry in Bangladesh and other countries.

The purpose of this report is to document and share the Bangladesh RSI pilot as a new model[1] for green growth for governments, multinationals, and development partners interested in a more coordinated approach when tackling complex environmental issues. More specifically, it documents the innovative collaboration between the World Bank, IFC, Government of Bangladesh, civil society, and private sector to tackle industrial pollution in the textile industry, under the auspices of the RSI.

The report also provides a number of additional insights to support the Government of Bangladesh and its partners by: (a) showcasing the potential benefits of cleaner production for Bangladesh textile mills; and (b) providing a menu of options with recommendations for scaling up cleaner production uptake by leveraging non-traditional actors.[2]

1.2 GLOBAL RESPONSIBLE SOURCING INITIATIVE

The global RSI Non-Lending Technical Assistance (NLTA) was initiated in 2010 in response to the increasing problem of industrial pollution in the textile industry. The

1 Under this Initiative, Bangladesh was chosen as the pilot to carry out the RSI assessment. The RSI model refers to the results of the diagnostic/assessment.

2 Note that the purpose of this report is not to provide detailed or prescriptive recommendations.

objective of the NLTA was to promote environment compliance in the textile industry to reduce industrial water pollution in the Dhaka watershed. To achieve this, the NLTA sought to identify best-practice, energy-efficient, and less polluting cleaner production processes for the Bangladesh textile industry and encourage their adoption through market mechanisms and new partnerships between the suppliers of major multinational apparel retailers and brands, Bangladesh textile industry trade associations, the Government of Bangladesh, the IFC, and the World Bank.

The RSI brings together the World Bank, IFC, the Natural Resources Defense Council (NRDC), and eight leading multinational brands (Wal-Mart, Levi's, Gap, H&M, Nike, Li & Fung, Marks & Spencer, and Target). This platform allows non-traditional partners to explore a joint approach to address environmental concerns within the global apparel supply chain by collectively changing the business as usual mode of operation.

Complex international supply chains present particular challenges, which are difficult to address through traditional environmental management approaches implemented by national governments. Supply chains run across a wide range of countries. Multi-tiered[3] supply chains can profoundly impact local economies, environments, and communities—yet such impacts remain disconnected from global decision-making processes. Greening supply chains requires a holistic understanding of both supranational interconnections and a deep knowledge of multiple, specific local contexts.

The Global RSI brings together a set of actors who have the capacity to act both globally and locally and are united around a common vision of a greener, more sustainable, apparel supply chain. While each partner has slightly different incentives for promoting green growth, they also each have their own comparative advantage and leverage for effecting real change.

- The World Bank is an international organization whose mission is to fight poverty and enhance shared prosperity through financial and technical assistance and policy advice to governments in over 100 countries. Its long-standing engagement with national governments to promote growth and protect the environment, combined with its global best-practice knowledge, lends itself to a convening role as a facilitator for global and local, public and private interests;
- The IFC, the World Bank Group's private sector arm, has a long-standing role as an adviser and financier for the private sector under many guises. Its clients range from major multinationals to local small and medium enterprises, with many seeking support on green growth issues;
- The NRDC is a United States-based environmental non-governmental organization (NGO) with over 350 lawyers, scientists, and other professionals and over 1.3 million members. Priorities include protecting people's health by preventing pollution, ensuring safe and sufficient water, and creating a clean energy future. Through its Clean by Design initiative, it has established a network of relationships with several large multinational firms in the textile and apparel industry;
- There are eight multinational brands participating in the Bangladesh responsible sourcing round table, bringing together

3 In this report, first tier suppliers are defined as suppliers who have direct contractual engagements with exporters/retailers. Second and third tier suppliers are defined as providing inputs to suppliers further up the supply chain, and therefore generally do not have a direct relationship with exporters and retailers. Most textile mills tend to be second or third tier suppliers, except for large vertically integrated factories which include textile manufacturing as well as cutting and sewing of final garments.

senior executives from purchasing and corporate social responsibility departments, as well as local buyers with in-depth knowledge of supplier constraints. The strong concentration of buying power among just a handful of United States and European Union multinational brands makes this group highly influential. Wal-Mart and Target alone accounted for 45 percent or $384 billion of total retail sales in the United States in 2011 (Grannis 2012).

The RSI platform has been explicitly structured to simultaneously explore opportunities for change at the global and local level. Pilots undertaken by RSI partners at the national level provide incubators for testing out new ways of doing business, with the ultimate goal of influencing how multinational brands incorporate environmental concerns into their purchasing decisions and global purchasing guidelines.

Bangladesh was selected as the first fully fledged RSI incubator, given its rapidly growing importance as a textile producer among several of the participating brands; strong interest from the Government of Bangladesh in identifying new ways to tackle industrial pollution; and long-standing engagement by the World Bank and IFC on industrial water pollution issues in Bangladesh.

CHAPTER 2

Importance of the Garment Industry for Bangladesh's Economy

The ready-made garment sector in Bangladesh is an important driver in the economy, with annual growth rates of around 12 percent a year. The sector currently accounts for around a sixth of Bangladesh's economy and employs 4 million workers, around 80 percent of whom are women. It remains a key export sector for Bangladesh, representing around three quarters of export earnings.[4] Globally, Bangladesh accounts for 5 percent of the $376 billion ready-made garment market (Gereffi and Frederick 2010).

The ready-made garment sector in Bangladesh is predominantly locally owned (Montfort and Yang 2004).[5] Cutting and sewing of garments ready for export currently dominates the sector, with over 5,000 factories. Moreover, the ready-made garment value chain is increasingly expanding its domestic back linkages into textile production, with 1,700 wet processing units now dedicated

4 Bangladesh Garment Manufacturers and Exporters Association (BGMEA) website: www.bgmea.com.bd.

5 Over 95 percent of factories were locally owned in 2004. However, this proportion may have reduced somewhat since.

to the washing, dyeing, and finishing (WDF) of textiles.[6] The ready-made garment industry in Bangladesh was estimated to be worth $19 billion in 2010/11, accounting for almost 80 percent of total Bangladesh exports.[7] Figure 2.1 shows the increasing share of Bangladesh exports taken up by garments.

The ready-made garment export market has been undergoing some profound changes: In just three years, the value of Bangladesh's ready-made garment exports to the United States and Europe has increased from close to $10 billion in 2008/09 to $15.5 billion in 2010/11.[8] This trend is set to continue (Berg et al. 2011).[9]

Bangladesh firms are increasingly doing business with a small number of leading multinational brands (for example H&M, Levi's, Gap, C&A). The higher value-added mid-market sector (with a greater emphasis on brand quality and reliability) is predicted to outstrip the currently dominant value sector (Berg et al. 2011).

This is an era of great opportunity for the growth of the Bangladesh ready-made garment sector, but also of change, as multinational brands look set to extend their influence and demands—and consolidate their supply chains.

The rapid collective response of the world's largest retail brands to improve health and safety standards in garment factories in Bangladesh in the aftermath of the 2013 Rana Plaza disaster both highlights the strategic importance Bangladesh now holds in the global RMG sector, as well as the challenges and risks of operating in weak regulatory environments.

6 Washing involves cleaning textiles or apparel with water and chemicals; dyeing involves coloring or printing substrates; finishing involves the superficial treatment of textiles or apparel at the wet or dry stage. WDF is more popularly known in Bangladesh as dyeing, printing, and finishing. These are the final steps in the textile industry. Here textile materials undergo both mechanical and chemical treatment. Perfection in WDF operation determines the appearance and use of the fabric and thus its marketability.

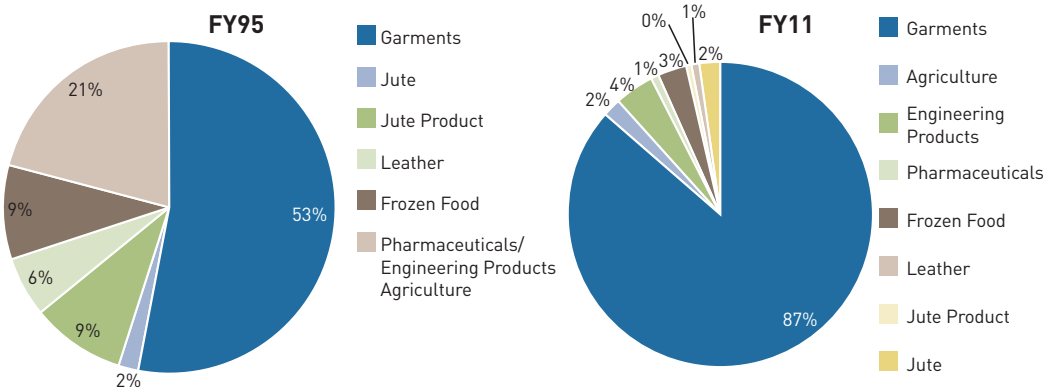
7 Bangladesh Board of Investment data: http://www.boi.gov.bd/index.php/potential-sector/garments-and-textitles.

8 BGMEA trade data: http://www.bgmea.com.bd/home/pages/TradeInformation#.UVn0AGE2WAg.

9 Bangladesh Board of Investment data: http://www.boi.gov.bd/index.php/potential-sector/garments-and-textitles.

FIGURE 2.1

BANGLADESH MERCHANDISE EXPORTS (% SHARE OF TOTAL EXPORTS), 1995 AND 2011



Source: Export Promotion Bureau, as cited in World Bank 2012.

CHAPTER 3

Environmental Challenges of Bangladesh Ready-Made Garment Industry

3.1 ENVIRONMENTAL FOOTPRINT OF READY-MADE GARMENT SECTOR IN BANGLADESH

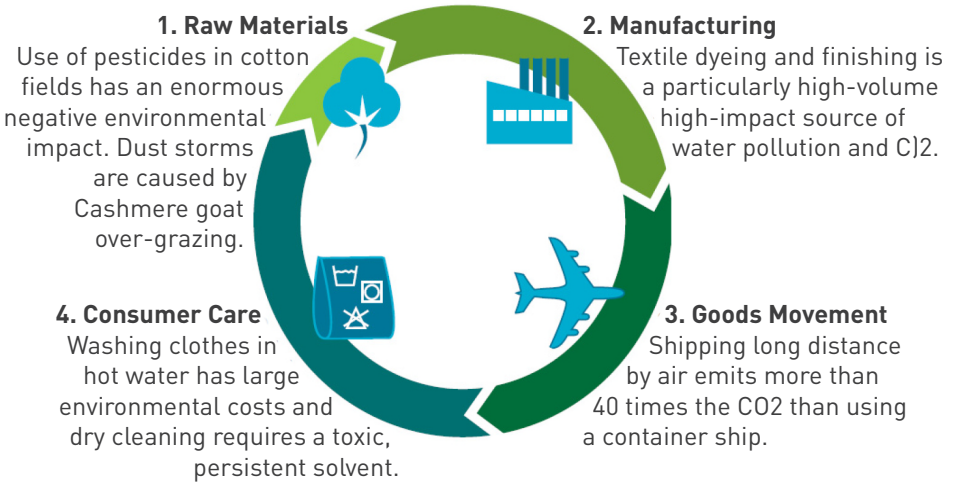
The global ready-made garment supply chain can be categorized into four distinct phases: (a) the production of raw materials (such as cotton); (b) manufacturing; (c) transport; and (d) end-point consumer care. Each has its own distinct environmental impact, as presented in figure 3.1.

Most of Bangladesh's ready-made garment sector involves manufacturing. Typical manufacturing processes include yarn production, fabric production, wet processing, and garment production. As shown in figure 3.2, the degree of environmental externalities generated by each of these processes varies markedly. The WDF textile-processing units have the greatest environmental footprint, due to:

- The intensive use of clean freshwater to wash, dye, and finish textiles;
- The associated generation of large volumes of wastewater;
- To a lesser extent, the use of energy to heat water and generate steam and associated emissions.

FIGURE 3.1

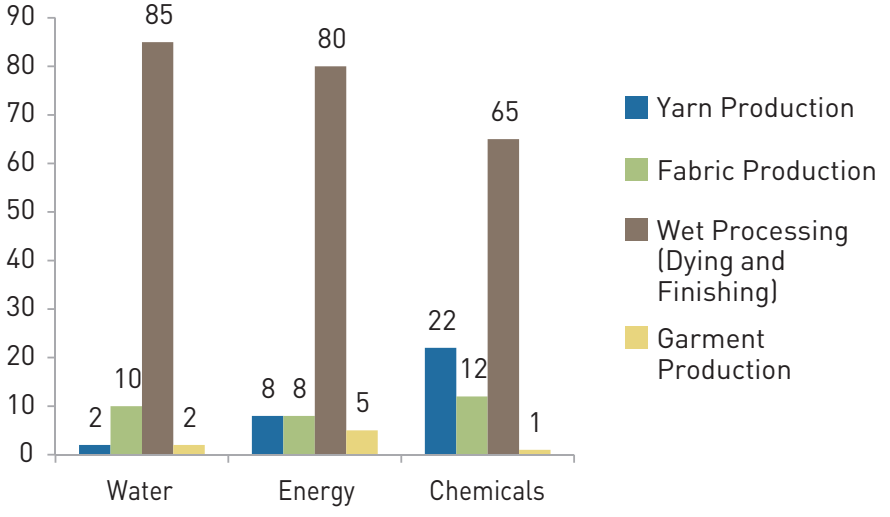
WATER, ENERGY, AND CHEMICAL USE IN TEXTILE PROCESSING (% OF TOTAL USE)



Source: NRDC.

FIGURE 3.2

ENVIRONMENTAL IMPACTS OF READ-MADE GARMENT SUPPLY CHAIN



Source: adapted from Cotton Incorporated 2010.

This policy note will therefore exclusively focus on the environmental footprint of the 1,700 WDF textile-processing units in Bangladesh, particularly those located in and around Dhaka.[10]

Over 95 percent of WDF units in Bangladesh are concentrated near rivers, canals, and water bodies in Bangladesh's two major cities, Dhaka and Chittagong, primarily for good access to services, infrastructure, and markets, and to dispose of large volumes of wastewater daily (ADSL 2009). Aside from a few dozen WDF units in the six export-processing zones, most mills tend to be concentrated in informal, heterogeneous, under-serviced industrial clusters. These clusters comprise a mix of small and medium factory units from a range of industries in addition to WDF textile-processing units, often interspersed with some residential dwellings. The most severe environmental impacts generated by the WDF textile sector tend to be highly localized. These impacts include the over-exploitation of freshwater resources and the pollution of water bodies, and, to a lesser extent, pressures on energy supplies and associated emissions.

The following sections will review the impact of the WDF textile sector on each of these in turn. Much of the discussion will relate specifically to the impacts on the Greater Dhaka area, where the most severe environmental pollution is concentrated.

3.2 OVER-EXPLOITATION OF FRESHWATER RESOURCES

3.2.1 Water Footprint of WDF Industry

The washing, dyeing, and finishing of textiles requires large amounts of clean freshwater, ranging from under 100 cubic meters to well over 300 cubic meters of water per tonne[11] of textiles, depending on the nature and efficiency levels of the manufacturing processes.

The impact on water resources is significant. It is estimated that the annual global production of textiles is between 60 and 70 million tonnes, requiring 9 billion cubic meters of water (enough to fill 3.6 million Olympic-sized swimming pools). Water usage by the textile industry in Bangladesh is estimated to be 1,500 million cubic meters, principally of groundwater. [12]

3.2.2 Impact of Water Over-exploitation

The rapidly expanding textile industry's demand for freshwater supplies is exacerbating pressures on scarce water supplies in large urban areas with growing demand.

The groundwater situation in Dhaka is particularly critical (figure 3.3). Although reliable data is hard to obtain (as most groundwater abstraction is carried out through unmetered self-supply), initial calculations[13] suggest that the textile mills in and around Dhaka may consume as much groundwater as is supplied to the entire megacity of over 12 million inhabitants. Worse, at current growth rates, demand for water from textile mills is expected to double within the next seven years if no efficiency

10 The ADSL (2009) baseline survey found 35 clusters with significant WDF presence, of which 24 were located in Greater Dhaka (roughly 70 percent).

11 Reports and data are often unclear what type of ton they are referring to: metric, American, British, or other weight measurement. It should be noted that there may be up to 10 percent variance in weight depending on which unit of measurement is being used. This report refers to the metric ton (tonne).

12 This figure is based on the assumptions of average factory water consumption of 300 liters per day and annual textile production of 5 million tonnes (ADSL 2009).

13 It is estimated that annual groundwater consumption by WDF units in Dhaka is currently around 880 million cubic meters a year, based on the following assumptions: total annual fabric production of 5 million tonnes, average water efficiency of 250 cubic meters per tonne (conservative estimate), and around 70 percent of WDF units located in Greater Dhaka area (ADSL 2009). In comparison, the Dhaka Water Supply and Sewerage Authority currently obtains around 16,500 million liters per day from groundwater, or 610 million cubic meters a year (Akther, Ahmed, and Rasheed 2009).

improvements are made. At present, over 80 percent of the city is reliant on groundwater for domestic consumption and industrial uses. Groundwater over-abstraction has dropped the water level more than 70 meters from the surface in some locations (IWM 2007). Moreover, the productivity of new boreholes declined by almost a third between 1970 and 2000 (UNEP 2003).[14] Falling water tables and reduced yields have potentially serious economic implications:

- **Costs of developing alternative water sources.** First, the economic cost of reduced water availability has a direct cost on the economy (including the livelihoods of the poor) by pushing up the price of water (due to increased pumping costs or the need to develop alternative, more expensive sources) and reducing access to good-quality water. Second, falling water tables can also lead to further environmental degradation by putting the aquifer at greater risk from contamination by surface water pollution. Once contaminated, aquifers become prohibitively expensive to decontaminate, which could compromise the entire resource base;
- **Costs to manufacturing sector, including the WDF sector.** Water-intensive industries such as textile mills that mostly rely on the private self-supply of groundwater as

14 The productivity of new boreholes as measured by specific capacity (yield per unit drawdown) has fallen from 6.3 liters per second per meter in 1970 to 4.5 liters per second per meter in 2000 (UNEP and DFID 2003).

FIGURE 3.3

GROUNDWATER IN DHAKA CITY

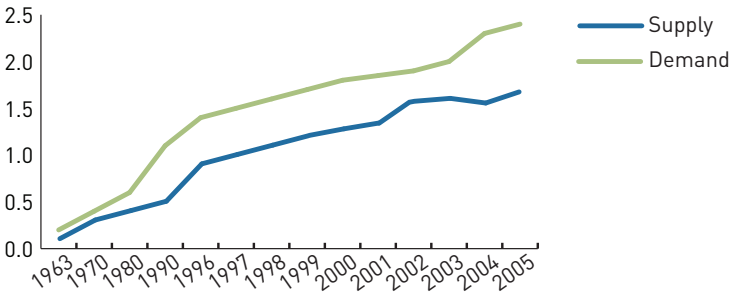


Fig A: Groundwater demand and supply in Dhaka City from 1963 to 2005

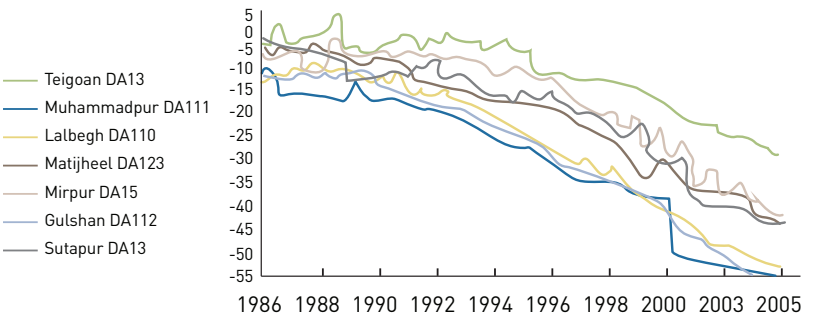


Fig B: Groundwater hydrograph of seven observation wells of Dhaka City from 1986 to 2005

Source: Akther, Ahmed, and Rasheed 2009.

a virtually free input into their production costs are also at risk. Not only are textile mills significantly, and increasingly, contributing to groundwater over-exploitation, but the industry as a whole may be vulnerable to its impact. Falling water tables can directly affect the mills' bottom line due to increased pumping costs or well failure, and, in extreme cases, threaten the mills' entire production systems if no affordable alternative sources of freshwater can be found.

3.3 WATER POLLUTION

3.3.1 Chemical Footprint

The WDF processes result in a range of chemicals being added to the water or steam used in these wet processes, and large volumes of starch being washed out. The leftover combined organic materials, chemicals, and water are then discharged from mills as wastewater. In many textile-producing countries, a wide range of substances from WDF mills are routinely discharged directly into the adjoining water bodies due to weak environmental standards and enforcement. Some studies suggest that the treatment and dyeing of textiles is responsible for up to one fifth of industrial water pollution globally, including through the emission of some 72 toxic chemicals reaching the water supply from textile dyeing (table 3.1).[15]

3.3.2 Impact of Water Pollution

Major urban and industrial areas over the past few years have shown increased evidence of the

15 "Water Pollution." ECO 360 Trust, Institute for Sustainable Communication: http://www.sustainablecommunication.org/eco360/what-is-eco360s-causes/water-pollution.

TABLE 3.1

WDF SECTOR'S CONTRIBUTION TO WATER POLLUTION

Process	Wastewater
Singeing	Little or no wastewater is generated
Desizing (removal of starch materials from fiber)	Organic waste (BOD)
Scouring (removal of fatty/oily and waxy substances)	Hydrogen peroxide, sodium silicate or organic stabilizer; high pH
Bleaching (whitening)	Hydrogen peroxide, sodium silicate or organic stabilizer; high pH
Dyeing and washing	Cationic materials; color; BOD; sulfide; acid
Printing	Suspended solids; urea; solvents; color; metals; heat; BOD; foam
Finishing	BOD; COD; suspended solids; spent solvents
Mercerizing (enhancing luster by treating with NaOH)	High pH; NaOH
Heat setting	Little or no wastewater
Dry finishing	Little or no wastewater

Source: Ramesh Babu et al. 2007.

BOD = biological oxygen demand; COD = chemical oxygen demand; NaOH = sodium hydroxide.

degradation of both groundwater and surface water quality. A pollution assessment carried out by IWM (2007) found that industrial sources, notably the textile industry, tanneries, and the pharmaceutical industry, were the largest contributors to pollution in the Dhaka watershed. Over 1.3 million cubic meters of heavily polluted industrial wastewater entered the drainage and river system without treatment on a daily basis in Dhaka alone. There is also evidence of heavy metals and dissolved solids in shallow aquifers, while surface water bodies (such as rivers, canals, and ponds) have low oxygen levels due to domestic sewage and chemical residues from industry. Most surface water is unfit for human use and is likely to be dangerous for livestock.

The environmental, health, and economic costs associated with pollution from untreated industrial effluent are significant. Although evaluation of costs is difficult, some studies have estimated the costs of unmitigated industrial wastewater for the Greater Dhaka area to be around $150 million to $170 million annually (Ullah et al. 2006; Alam and Marinova 2006; Alam 2008).[16]

The most significant costs stemming from industrial water pollution include:

- **Costs to environment and livelihoods of the poor.** In the Greater Dhaka area, a quarter of households, which are highly dependent on agriculture and fisheries, have had their livelihoods affected by increased water pollution, leading to reduced productivity;
- **Costs to citizens' health and wellbeing.** Water pollution from industrial sources also has a significant bearing on living standards (particularly health) and the economy. A recent household survey found that the incidence of disease (jaundice, skin disease, and diarrhea) was around twice as high for villagers located close to industrial areas (Ullah et al. 2006);
- **Cost of safe urban drinking water supplies.** The Dhaka Water Supply and Sewerage Authority relies on the treatment of surface water sources to complement groundwater supplies. However, during the dry season, river water can become so polluted that it cannot be effectively treated to drinking water standards. If the situation worsens, the Dhaka Water Supply and Sewerage Authority may have to obtain water from the Padma and Meghna Rivers, with estimated investment costs of $430 million and $285 million, respectively (IWM 2007);
- **Costs to manufacturing sector, including WDF establishments.** Key industries, including the ready-made garment sector, are highly dependent on large quantities of good-quality water. Surface water pollution can affect competitiveness by compromising the mills' groundwater resource base both directly (contamination risk through infiltration) and indirectly (increased over-exploitation of groundwater in the absence of alternative sources).

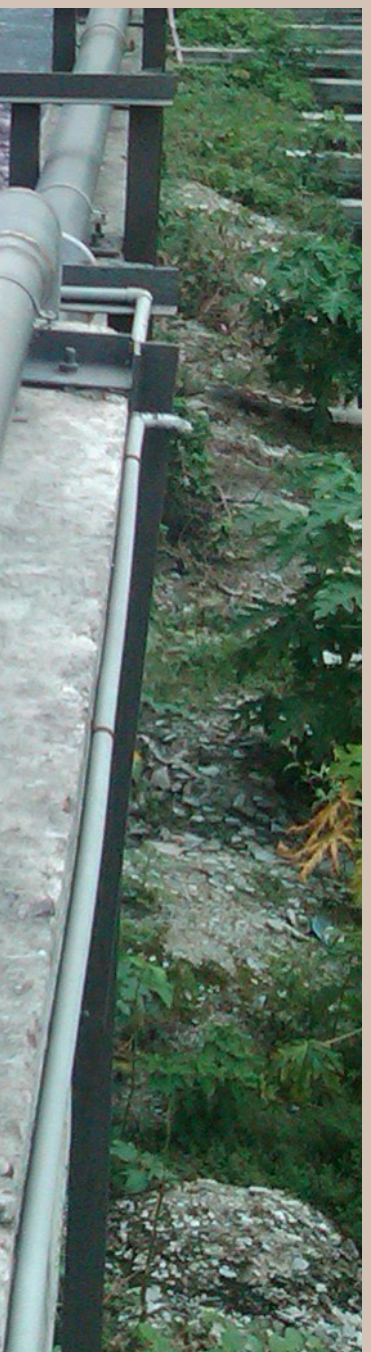
16 The studies cited document the hypothetical restoration of just one of the watersheds of the many rivers and khals (the Buriganga River) and assessed total annual costs at $18 million. See also World Bank 2008.

3.4 ENERGY USE AND ENERGY FOOTPRINT

The textile sector is also relatively energy intensive. In particular, the dyeing and finishing processes require extensive generation of hot water and steam (Rupp 2008). As a result, the WDF sector's energy demands negatively impact the availability and cost of scarce energy supplies. Moreover, the sector causes greenhouse gas emissions and local air pollution (though impact on air quality is fairly negligible compared to emissions from vehicular transport and brick kilns).

However, as this report is chiefly concerned with addressing the water-related impacts of the textile industry, an extensive discussion on the impact of energy use on the sector and the environment is beyond its scope.

CHAPTER 4



Addressing Environmental Impacts: Limits of Traditional Approach

4.1 GOVERNMENT INTERVENTIONS

4.1.1 Existing Regulatory and Institutional Framework

The Government of Bangladesh has developed a set of environmental policies and legislation that provide an acceptable regulatory framework for environmental management and industrial pollution control. The environmental standards for the textile industry in Bangladesh are regulated by the Environmental Conservation Act, 1995; the Environmental Conservation Rule, 1997; and the Forest Act, 1927. Specific effluent concentration-based standards exist for the discharge of treated wastewater directly into the natural environment (table 4.1).[17] The Bangladesh Environmental Conservation Act (1995, amended in 2002) also places a strong emphasis on prevention of industrial pollution.

The Department of Environment under the Ministry of Environment and Forests is the main environmental regulation and enforcement agency. It is responsible for

17 These standards do not apply to effluent discharged into the sewerage system.

TABLE 4.1

CONCENTRATION-BASED EFFLUENT STANDARDS FOR THE TEXTILE SECTOR (MAXIMUM CONCENTRATION)

Parameter	Standards/limit (mg/l)
Total suspended solid	100
BOD 20C	150
Oil and grease	10
Total dissolved solid	2,100
Wastewater flow	100 l/kg of fabric processing
pH	6.5–9
Special parameters based on classification of dyes used:	
Total chromium	2
Sulfide	2
Phenolic compounds	5

Source: Schedule 12(B), Environmental Conservation Rules, 1997, Bangladesh.

Note: BOD of 150 mg/l will be applicable only for physicochemical processing method.

awarding factories with environmental clearance certificates, undertaking factory inspections, and monitoring compliance and enforcement of environmental standards (through fines and factory closures).

4.1.2 Limitations

While the existing legislative and regulatory environmental management framework is acceptable, it has not been sufficient to address growing industrial pollution concerns, in part due to institutional inefficiencies and limited enforcement capacity.

Institutional Inefficiencies

Achieving environmental sustainability of the textile mills requires careful long-term planning, including land zoning, the provision of appropriate infrastructure and services, and environmental clearances, monitoring, and enforcement. However, the presence of multiple institutions, with overlapping roles and responsibilities, severely curtails coordination and effective long-term planning. As a result, there is a systemic lack of oversight and inadequate prioritization of actions required to improve the environment.

In fact, no single institution is responsible for ensuring the overall sustainable development of cities. Within Greater Dhaka, for instance, where most of the textile mills are concentrated, the Dhaka City Corporation, local pourashavas (municipalities), the Dhaka Water Supply and Sewerage Authority, and Dhaka's Capital Development Authority all have a major role in addition to the Department of Environment.

Weak Enforcement

The Government's enforcement of environmental compliance remains inadequate. The main mandate for environmental compliance rests with the Department of Environment, which faces significant internal limitations. Its monitoring and enforcement functions are constrained by the absence of clear implementation guidelines and monitoring systems to effectively enforce environmental compliance. The

Department of Environment's factory inspection program remains chronically under-resourced to fulfill this challenging role. Moreover, its personnel lack capacity and incentives and remain vulnerable to powerful vested interests. The juxtaposition of distinct functions (notably certification and enforcement) within the institution further blurs lines of accountability and reduces operational efficiency.

Limits of Command and Control Approach

Finally, there is a growing recognition that traditional sanctions-based approaches alone do not necessarily help develop incentives to reduce waste generation in the first place. Although the Department of Environment has made substantial efforts in recent years to staff up and strengthen its enforcement practices, the focus on ad hoc fines and closures alone remains a rather blunt instrument. Many WDF establishments that have installed the mandated chemical and biological effluent treatment plants fail to run them due to their significant operating costs—combined with a relatively low probability of getting caught. Other WDF establishments remain unable to install effluent treatment plants due to lack of space, finance, and know-how, and the lack of alternatives to in situ treatment.[18] In sum, while adequate monitoring and enforcement remain critical, efforts to develop a more positive and collaborative engagement with industry, by providing support and advice to non-compliant firms, can help develop a more pragmatic roadmap to better support sustainable environmental practices while enhancing the robustness of an economically important industry.

18 For instance, ability for mills to pay a third party to convey and treat wastewater off site through a common effluent treatment plant.

4.2 DEVELOPMENT PARTNERS AND PREVIOUS INTERVENTIONS

Over the past decade, the pollution of water bodies, especially around Dhaka, has been raised as a priority environmental issue for development partner assistance by the Government, stakeholders, citizens, and the media.

On the domestic pollution side, the World Bank has had a long-term program of engagement with the Dhaka Water Supply and Sewerage Authority to expand its sewerage network and treatment (currently servicing less than a third of the city), including the development of a long-term sewerage and drainage master plan.

On the industrial water pollution side, earlier efforts have been somewhat more fragmented. At the time of the launch of the Bangladesh RSI NLTA in 2010, challenges remained:

- While the capacity of the Department of Environment has been successfully strengthened, it still requires further support, including addressing systemic issues (better inter-institutional coordination and long-term planning, separation of clearances and enforcement functions, civil service reform);
- New communal industrial wastewater treatment facilities have been successfully financed within selected export-processing zones. However, such facilities are significantly more challenging to locate, finance, and operate within the large, informal, heterogeneous industrial clusters around Greater Dhaka, where most of the textile mills are located;[19]
- Promising early technical assistance activities carried out between 2000 and 2010 remain limited to two or three factories, and lack a suitable framework for sustaining and scaling up these gains. The IFC cleaner production pilot project and their forthcoming Partnership for Cleaner Textiles (PaCT) technical assistance program, to be launched in 2013, have since been filling an important gap (see appendix B for details).

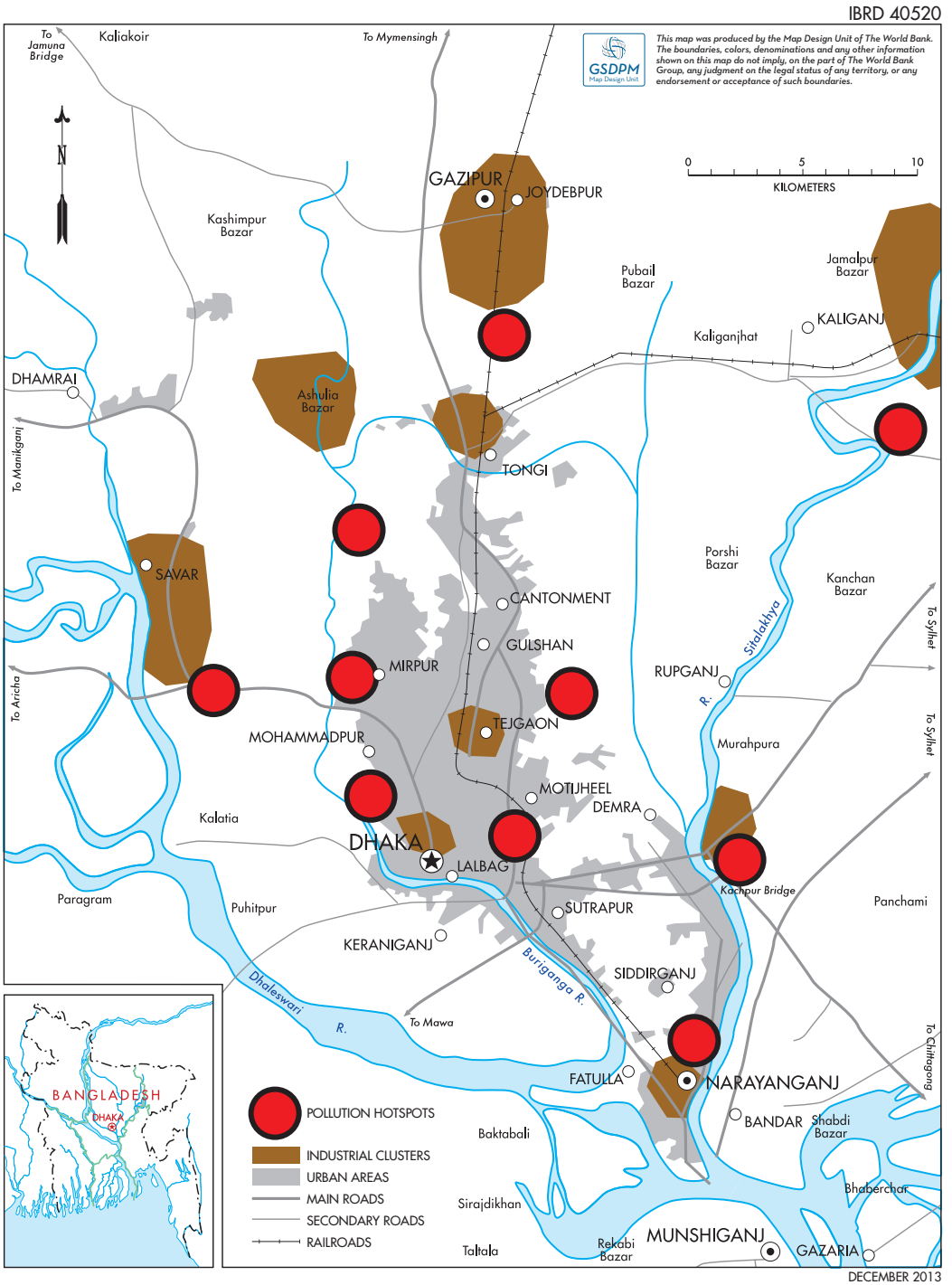
4.3 TOWARD A NEW APPROACH

The Government of Bangladesh remains highly committed to addressing industrial pollution. However, despite significant efforts to tackle the problem, the pollution of water bodies—including by textile mills—continues unabated. Addressing industrial pollution remains a long-term, complex agenda, requiring extensive cross-sectoral commitment and significant financing, including from the polluters themselves.

Balancing environmental needs with those of a valuable wealth-generating industry is never easy. Nevertheless, global best practice has shown that building this broad-based demand for sustainable change is essential. Such support can often be best initiated by aligning incentives of multiple actors around incremental, doable actions. As emphasized in the World Bank's new sourcebook on pollution management *Getting to Green* (World Bank 2012), different stakeholders can have very different incentives for managing pollution. These incentives range from maximizing public welfare from a government standpoint, to improving competitiveness and securing markets for a private sector enterprise, to minimizing environmental risks in a portfolio for a financial intermediary or an investor. When different incentives for different stakeholders are aligned in applying several tools toward a common pollution management goal, these are often termed "win-win" options. This was the approach piloted by the Bangladesh RSI.

19 In fact, early attempts by the World Bank to finance common effluent treatment plants for textile mills in Gazirpur were suspended due to a lack of appropriate available land to build the plants and institutional complexities.

WATER POLLUTION HOTSPOTS IN GREATER DHAKA



CHAPTER 5

A New Approach: The Bangladesh Responsible Sourcing Initiative

5.1 BACKGROUND TO THE BANGLADESH RESPONSIBLE SOURCING INITIATIVE

The Bangladesh Responsible Sourcing Initiative (RSI) was established in 2010 as part of the broader RSI multi-stakeholder platform (see chapter 1). The purpose of this country-level incubator activity is to test how multiple non-traditional actors can be brought together to help the Government of Bangladesh achieve relatively simple quick wins as an additional, innovative way to shift the industrial pollution debate from a traditional command and control approach to one centered around green growth.

The Bangladesh RSI is an incubator that seeks to test a new approach for greening supply chains at the country level. The initiative was built on two simple pillars:

- Selection of a non-controversial entry point—the identification of cleaner production best practices for textile mills—that most stakeholders would buy into;
- Development and nurturing of multi-stakeholder partnerships to work together in identifying cleaner production best practices and exploring options for their implementation.

The rationale, process, and main findings of this initiative are described below.

5.2 CLEANER PRODUCTION

5.2.1 What Is Cleaner Production?

According to the United Nations Environment Programme (UNEP),[20] resource-efficient and cleaner production "continuously applies integrated and preventive strategies to processes, products and services. This increases efficiency and reduces risks to humans and the environment." Cleaner production specifically works to advance:

- **Production efficiency** through optimization of productive use of natural resources (materials, energy, water) at all stages of the production cycle;
- **Environmental management** through minimization of the adverse impacts of industrial production systems on nature and the environment;
- **Human development** through minimization of risks to people and communities, and support to their development.

5.2.2 Why Focus on Cleaner Production?

Encouraging industry to adopt cleaner production practices, and thereby reduce water, chemical, and energy use, does not remove the need to treat the pollution generated by industrial processes. Indeed, the Ministry of Environment and Forests and the Department of Environment remain committed to gradually encouraging polluters to pay for the pollution they have generated, as part of their overall vision for tackling polluted water bodies.

Nevertheless, cleaner production provides an attractive initial entry point for addressing complex pollution problems involving multiple stakeholders as part of the government's overall environmental sustainability and green growth agenda, as outlined below:

- Cleaner production can simultaneously benefit both the environment and the industry bottom line, unlike most other interventions that are designed to protect the environment and usually impose a net cost on the industry. Cleaner production that builds upon the "three R's"—reduce, reuse, recycle—can provide attractive financial win-win incentives for industry by considerably reducing energy, materials, and water inputs, encouraging recycling and reuse, and thereby reducing costs, as well as reducing waste and pollution loads. As a result, cleaner production can also significantly reduce the costs associated with (mandatory) pollution abatement;
- Cleaner production interventions can be adapted to suit business and production needs. These can range from basic interventions, with no investment costs ("good housekeeping") to major investments in new processes and high-technology machinery. Both small and large manufacturing units, of differing degrees of sophistication, can potentially benefit, according to their needs. In particular, opportunities for extensive resource savings at little cost to mills are expected to be significant in Bangladesh, given the relatively low levels of production efficiency on average when compared with global best practice;
- The benefits derived from cleaner production can be reaped throughout the apparel supply chain (including reduced unit costs and enhanced quality control). They also provide an incentive and mechanism for the multinational corporations and buyers to better acquaint themselves with their supply chain;

20 "Resource Efficient and Cleaner Production." UNEP: http://www.unep.fr/scp/cp/.

- Cleaner production provides an opportunity to align incentives from multiple diverse actors. Cleaner production's widespread benefits, and absence of obvious drawbacks, can thus encourage the establishment of a broad-based platform around a clear, common objective. This is particularly important when seeking to bring together a heterogeneous group of stakeholders in the textile supply chain, representing both environmental and industrial interests at the local, national, and international levels, to help jointly address a complex, multi-dimensional issue.

5.3 ESTABLISHING THE RIGHT PARTNERSHIPS

Establishing the right partnerships is a critical part of maximizing the potential for cleaner production in Bangladesh. A range of actors have a vested interest in helping mills become more efficient and reduce the amount of pollution generated, including the Government of Bangladesh, private sector actors across the apparel supply chain, local communities and civil society, and development partners. Many of these actors possess a specific comparative advantage in helping mills achieve this goal.

This section will look at the key national and international players that need to be engaged with in identifying and promoting cleaner production best practices at the country level.

5.3.1 Government of Bangladesh

The Government of Bangladesh remains the main driver for promoting sustained and enhanced environmental management practices by the textile industry across the country. Many departments within the Government have a strong vested interest in this agenda, including the Ministry of Commerce, the Board of Investment, the Ministry of Environment and Forests, and the Department of Environment, as well as the city corporations, pourashavas, and national utility service providers.

The Ministry of Environment and Forests and the Department of Environment play a particularly important role. The Ministry helps set the rules of the game, through environmental legislation, which the Department of Environment is then responsible for enforcing. In addition, both institutions are interested in exploring new complementary ways of encouraging better environmental management that go beyond traditional sanctions-driven command and control tools. Encouraging the adoption of cleaner production practices can become an important entry point for establishing new modes of engagement between the government and polluters as part of this more holistic approach.

5.3.2 Private Sector Actors from the Full Supply Chain

There are a number of different actors within the apparel supply chain that will play an important role in identifying, advocating, and promoting cleaner production and are able to incentivize behavioral change. Within Bangladesh, these include the textile mills and the major trade associations.[21] In addition, the apparel supply chain includes a strong international dimension brought by the buyers, including major multinational corporations.

Textile Mills

Individual mills have the strongest vested interests of all actors, as the operational decisions made on the factory processing floor, including the extent to which cleaner production processes are adopted, have a direct impact on their bottom line, environmental performance, and ultimate viability, and in the scenario of the power constraints, there is a drive from the mills to explore opportunities to improve resource management. The textile mills operating in

21 "Resource Efficient and Cleaner Production." UNEP: http://www.unep.fr/scp/cp/.

Bangladesh are however very heterogeneous, ranging from large, sophisticated, technologically advanced and export-oriented concerns to small, highly inefficient mills supplying the domestic market. Therefore the awareness, market drivers, and capacity to implement cleaner production measures and the incentives for positioning themselves as market leaders vary greatly.

To maximize the impact of work on cleaner production, initial outreach will therefore focus on concerns in the higher-performing segment, given their interest in and ability to implement a wide range of cleaner production improvements, and strong export focus with large multinational corporations. These higher-performing mills can also serve as a model that smaller factories can learn from. One of the key components will be to identify market leaders in key clusters, and use them as a conduit for outreach to the smaller, less enlightened firms. [22]

Trade Associations

Several dedicated manufacturing and trade associations, notably the Bangladesh Garment Manufacturers and Exporters Association (BGMEA), the Bangladesh Knitwear Manufacturers and Exporters Association (BKMEA), and the Bangladesh Textile Mills Association (BTMA), have become influential advocacy and capacity-building institutions with an extensive network of members from the textile and apparel manufacturing and export sector. These associations seek to enhance the competitiveness of their members through training, activities, and programs, including establishing and nurturing relationships with government, foreign buyers, businesses, and other trade and research organizations, and to help facilitate global trade negotiations on behalf of Bangladesh industry interests.

The potential for cleaner production to enhance the productivity and sustainability practices of their members, and hence market positioning with foreign buyers, is of clear interest to these associations in a dynamic and competitive sector.

Auditors and Other Service Providers

A range of service providers (including auditors, consulting firms, effluent treatment plant providers, dye and chemical suppliers, manufacturing equipment indenters, and laboratory designers) also significantly contribute to value addition in the WDF sector and the promotion of cleaner production measures. However, the concept of cleaner production is at a very nascent stage in the market, and until recently there were hardly any quality service providers offering cleaner production services in a commercial manner. There is still a high degree of reliance on international or regional service providers.

Third-party auditing companies (including Bureau Veritas, SGS, Moody International, Intertek Labtest Bangladesh, and Certification International Bangladesh) are used by buyers throughout the manufacturing process to provide quality assurance and enforce supply chain regulations in areas such as workplace safety, social accountability, and environmental compliance. While these third-party auditors are accredited internationally for the standards they certify, there are no government-based auditing authorities. Domestic technical audit capacity remains weak, due in part to a chronic shortage of technically skilled human resources.[23] Moreover, few auditors have established business lines in cleaner production and environmental compliance. Most services are limited to apparel and chemical testing services, inspection services, and quality checks.

22 This is also one of the key features of the recently initiated IFC PaCT program.

23 The German Agency for International Cooperation (Gesellschaft für Internationale Zusammenarbeit, GIZ) has been building auditor capacity as part of its Promotion of Social and Environmental Standards in the Industry (PSES) initiative, targeting compliance inspectors at BGMEA, BKMEA, and the Ministry of Labor and Employment, and compliance officials in selected factories.

Multinational Corporations and Retail Brands
Multinational corporations have considerable influence over the Bangladesh apparel supply chain and hence over the decisions and operations of individual textile mills. While most factories are locally owned, a large proportion of the textile production is destined for the export market. A highly concentrated buyer-driven value chain is made up of a handful of large retailers or branded manufacturers that dominate the market (UNIDO 2008).[24]

In recent years there has been significant public pressure on multinational corporations to improve their environmental and social corporate responsibility throughout their supply chains. As described in box 5.1, while multinational corporations have clear incentives to improve the environmental performance of their supply chain, it requires a new model of engagement. In response, multinational corporations have shown a keen interest in collaborating with other multinational corporations, governments, and other parties to pilot new ways of doing business (including the multinational corporation-led ZDHC initiative, see chapter 7).

5.3.3 Development Partners

Development partners can play an important role in nurturing a broad-based multi-stakeholder platform to address complex pollution patterns, especially as each institution brings its particular comparative advantage to the table.

World Bank
The World Bank has been working closely with the Government of Bangladesh to explore options for addressing industrial pollution since the mid-2000s. The impact of pollution from Dhaka's surface water bodies initially emerged as a priority issue during consultations around the Bangladesh Water Resources Country Assistance Strategy. Subsequent analytical work found that industry, and textile factories in particular, were major contributors to the overall surface water pollution, and recommended an incremental, targeted approach to address this issue in conjunction with multiple actors, including the private sector. As part of a broader engagement with the Ministry of Environment and Forests and the Department of Environment, it was agreed to look at alternative market-based approaches through the Bangladesh RSI NLTA.[25]

In this context, the World Bank has a crucial role to play in the short term by providing knowledge to the Government of Bangladesh and acting as a convener bringing multiple stakeholders to the table on behalf of the Government.

Natural Resources Defense Council
The Natural Resources Defense Council NRDC is a United States-based environmental NGO with a long-standing national reputation within the United States' government, private sector, and civil society as a highly respected and independent leader in environmental protection. Through its Clean by Design initiative, it has established a network of relationships with several large United States multinational firms in the textile and apparel industry, including several that actively source in Bangladesh, for example Gap, H&M, Levi's, Wal-Mart, and Li & Fung. NRDC was instrumental in identifying cleaner production as a useful entry point for greening the apparel supply chain, and had already successfully developed and tested the cleaner production best-practice methodology in China (box 5.2).

24 In 2011, Wal-Mart and Target alone accounted for 45 percent of United States retail sales (Grannis 2012). In the United Kingdom, the top five retailers represent 35 percent of all clothing sales (UNIDO 2008).

25 The Better Work program is the product of a partnership between the International Labour Organization (ILO) and IFC. It unites the expertise of ILO in labor standards with that of IFC in private sector development.

BOX 5.1

THE RACE TO THE BOTTOM—AND BACK TO THE TOP?

The demands from consumers coupled with globalization have led multinational corporations to source production from the lowest-cost locations in the world: the so-called "race to the bottom." These multinational corporations control global production networks and stipulate supply specifications. Multinational corporations have, however, recently become increasingly concerned with non-production factors in their supply chain, such as social compliance (see for example the Better Work program[26]) and—even more recently—environmental standards. The relatively new focus of multinational corporations on environmental standards in their supply chain, and their impact on water resources in particular, can be ascribed to four factors:

- Reputational risk. Pressure is increasing from more demanding consumers;
- Physical risk. Textile production is highly dependent on large volumes of clean freshwater. With areas of production often in highly water-stressed areas, degradation and over-exploitation of water resources is a major threat to production processes;
- Regulatory risk. Sudden changes in legislation or enforcement may also pose threats to production if large numbers of suppliers are non-compliant;
- Financial risk. All of the above risks represent significant potential financial losses to the bottom line of multinational corporations.

There have been significant advancements made on so-called sweatshops (any working environment considered to be unacceptably difficult or dangerous) and child labor issues in the garment industry, largely due to public pressure and media involvement. Following the 2013 Rana Plaza disaster, over 100 global retailers have signed up to the Accord on Fire and Building Safety in Bangladesh, including agreeing on joint standards, monitoring, training and remedial programs to ensure worker safety in over 1500 of their direct suppliers.

However, to date, efforts of multinational corporations to improve the environmental performance of textile mills remain far more mixed.

This is partly because environmental impact is often more complex, harder to define and less controversial than the social dimension, since most pollution occurs further down the supply chain, where the less direct relationship and large number of mills make it difficult to apportion responsibility. In a highly competitive market, there is less incentive to push for pollution treatment, as this results in higher production costs, particularly where the playing field is uneven. In spite of various initiatives, multinational corporations are still grappling with defining new ways to meaningfully engage on the environmental front.

Cleaner production thus offers multinational corporations a very attractive entry point, because:

- It enhances efficiency and competitiveness;
- It is a positive way to get to know and develop fruitful relationships with second- and third-tier suppliers;
- It is a first step toward reducing four key risks (reputational, physical, regulatory, and financial risks).

26 The Bangladesh RSI NLTA was carried out from 2010 to 2012, and includes the present report.

BOX 5.2

SUMMARY OF KEY FINDINGS FROM NRDC'S CLEANER PRODUCTION BEST-PRACTICE METHODOLOGY IN CHINA

NRDC first collaborated with international brands on an RSI in China, the world's largest center of manufacturing. Following a review of more than a dozen textile mills, NRDC identified 10 cleaner production best practices involving simple, cost-saving opportunities to reduce water, energy, and chemical use via improvements in manufacturing efficiency. The China pilot demonstrated significant savings: the practices identified could save approximately 25 percent of water and 30 percent of fuel use through initiatives that pay for themselves in less than eight months. A showcase mill, Redbud Textile Company in Changshu, China, adopted just three of these practices with a one-time cost of $72,000. The result was a 23 percent reduction in water use and an 11 percent reduction in coal consumption, with savings of nearly $840,000 per year accruing for Redbud (NRDC 2010). The 10 recommended best practices for China are illustrated below.

	COST	PAYBACK
1. Leak detection, maintenance, housekeeping	**SMALL**	**1 MONTH OR LESS**
2. Reuse cooling water	**SMALL**	**1 MONTH OR LESS**
3. Reuse condensate	MODERATE	5 MONTHS
4. Reuse process water	**SMALL TO MODERATE**	**1 MONTH OR LESS**
5. Recover heat from hot water rinses	MODERATE – HIGHEST	2-4 MONTHS
6. Pre-screen coal	MODERATE	5 MONTHS
7. Fix/maintain steam traps	**SMALL**	**1 MONTH OR LESS**
8. Recover heat from smokestacks	MODERATE	8 MONTHS
9. Insulate pipes/ valves/flanges	**SMALL**	**1 MONTH OR LESS**
10. Optimize compressed air system	**SMALL**	**1 MONTH OR LESS**

International Finance Corporation (IFC)
The Dhaka-based IFC South Asia Enterprise Development Facility (SEDF) has extensive experience of working closely with the ready-made garment sector in Bangladesh. The IFC Dhaka office has strong established links with a range of local private sector enterprises in Bangladesh, including textile mills, trade associations, service providers, and national buyers from global multinational brands.

IFC's extensive network with a broad range of local private sector actors within the textile industry thereby provided a highly complementary entry point to the Government of Bangladesh and global multinational linkages brought by the World Bank and NRDC.

By adopting a collaborative approach, the World Bank, IFC, and NRDC were able to build a strong public-private sector platform for knowledge sharing and policy deliberation between the Government of Bangladesh, Bangladesh private sector interests, and global multinational brands (figure 5.1).

5.4 PROCESS AND METHODOLOGY

NRDC was originally invited to showcase its cleaner production best-practice work in China, along with senior executives from Gap, Wal-Mart, and Li & Fung, to the Government of Bangladesh at a workshop held in Dhaka in October 2009. Following these initial discussions, the Ministry of Environment and Forests expressed an interest in carrying out a similar assessment in Bangladesh.

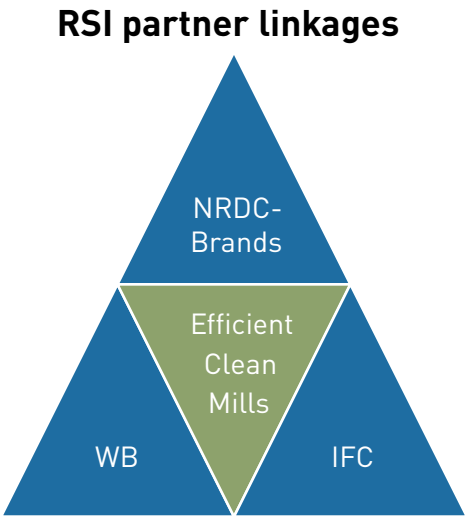
In 2010, the Bangladesh RSI NLTA Program was established by the World Bank to help the Government of Bangladesh and its partners (a) to determine the potential benefits of cleaner production for Bangladesh textile mills; and (b) to provide recommendations for scaling up cleaner production uptake by leveraging non-traditional actors.

During initial discussions under the Bangladesh RSI, it emerged that the IFC-SEDF was also in the process of designing a one-year project in partnership with the Dutch NGO Solidaridad entitled "Promoting cleaner production in the textile washing/dyeing/finishing sector in Bangladesh," which piloted the implementation of selected cleaner production measures in 12 WDF factory units.[27] The high degree of complementarity between the

27 See appendix B for more details.

FIGURE 5.1

RSI PARTNER LINKAGES



Bangladesh RSI and the IFC pilot, both in terms of substance (focus on identification of cleaner production best practices and institutional constraints, and in-factory implementation) and ability to leverage different partnerships (government, global and local private sector), led to close collaboration and synergies throughout the process.

The first series of textile mill audits was carried out under the Bangladesh RSI in early 2010 following preliminary consultations with the Ministry of Environment and Forests, Department of Environment, IFC, and multinational brands. The purpose of these factory audits was to assess existing cleaner production measures under implementation and the potential scope and benefits for scaling up. The methodology for the factory assessments and formulation of the best-practice measures was based on NRDC's earlier China experience. After close consultation with leading global brands, 25 textile mills were nominated from the brands' Bangladesh supply chain segment. Following an initial audit of these 25 factories, three top-performing factories and five medium-performing factories were then selected for in-depth assessments.

The audit findings from the Bangladesh RSI and the IFC cleaner production pilot were then presented at a series of consultation events throughout 2011, including a high-level round table co-chaired by the Ministries of Environment and Forests and Local Government, the World Bank, and IFC in May 2011. NRDC and senior executives from multinational brands also participated in these events, including round tables with participating mills, trade associations, and development partners.

Finally, the results from the Bangladesh RSI were showcased at a senior round table event in Washington co-chaired by World Bank and IFC directors as part of the Global RSI, which included senior executives from eight participating multinational brands.

5.5 POTENTIAL FOR CLEANER PRODUCTION: SUMMARY OF KEY FINDINGS

The initial audits of textile mills demonstrated tremendous potential for cleaner production measures in improving performance and reducing environmental waste. Details of the study findings and individual cleaner production practices are summarized in appendix A. In particular, the audits highlighted the following results:

- Comparative evidence from Bangladesh and China suggests that most cleaner production best practices are highly replicable across the textile manufacturing industry in developing countries;[28]
- In Bangladesh, the audits highlighted seven low-cost cleaner production best practices based upon the following criteria: low up-front investments (usually less than $15,000) and rapid payback time (less than 15 months), resulting in significant reductions in both water and energy or chemical use.[29]

  These seven low-cost best practices are:

  - water leakage elimination;
  - cooling water reuse;
  - process water reuse;
  - steam management;
  - pipe insulation;
  - heat recovery;
  - first-time right dyeing/improved dye recipes.[30]
- By implementing the top seven low-cost best practices together, factories would reduce their consumption of water and energy by up to 25 percent and chemicals by up to 10 percent;
- Rolling out these seven low-cost cleaner production best practices to Bangladesh textile mills could result in overall resource savings of up to 300 million cubic meters of water per year and a reduction of up to 350,000 tonnes of chemicals per year being discharged into the environment;[31]
- Implementing these seven low-cost cleaner production best practices could lead to savings for the industry as a whole of around $70 million to $200 million a year. In addition, by reducing the overall volume of wastewater to be treated, this would also reduce the cost of effluent treatment by up to $90 million per year (SWECO 2010; Ecopsis 2011);[32]

28 There are some differences between the China and Bangladesh best practices with regard to energy-related cleaner production measures owing to the different sources of energy used by mills in both countries (coal in China, natural gas in Bangladesh). A more detailed technical comparison is included in appendix C.

29 Due to the underpricing of water (which limits mill incentives for adopting such a measure), best practices were only selected if they simultaneously had significant reductions in energy or chemical use

30 The range of potential cleaner production investments for first-time right dyeing, including improved dye recipes and dispensing equipment, is broad, making it both a low-cost and a more advanced cleaner production best practice.

31 Estimates are based on the following assumptions: annual textile production of 5 million tonnes; for water, 20 percent reduction in usage, average (low-end) consumption 250 cubic meters per tonne; for chemicals, 10 percent reduction in overall chemical usage, assuming 650 kilograms of chemicals per tonne of textiles (Ecopsis 2011).

32 This estimate is based on the following data and assumptions: cost of chemical treatment by effluent treatment plant at around $0.34 per cubic meter and 250 million cubic meters of water saved (based on 20 percent savings out of a total of 12.5 billion cubic meters of water used annually by the textile industry, assuming a conservative 250 cubic meters per tonne average water use and a total of 5 million tonnes textile production). Biological treatment is somewhat cheaper at $0.21 per cubic meter, but is much less widespread. Sources: SWECO 2010; Ecopsis 2011.

- For those factories interested in doing more, and able to invest in equipment, improved dye recipes, low liquor ratio dyeing machines, the reuse of caustic soda in mercerizing operations, and salt recovery through membrane filtration can achieve even greater savings;
- While all of the cleaner production best practices mentioned above have already been adopted by some of the top-performing factories in Bangladesh, uptake has been uneven and remains generally low among mills;
- In particular, metering of water and energy consumption (whether overall, at the workshop level, or by particular machinery), which is essential for monitoring and benchmarking cleaner production performance, was very low.

The cleaner production best practices mentioned above can only help achieve tangible environmental benefits if they are adopted by a significant proportion of mills within certain hotspot areas. The next chapter will consider the current barriers to uptake and recommend a new incremental and more coordinated approach for tackling these.

CHAPTER 6

Overcoming Barriers to Cleaner Production

6.1 CONSTRAINTS ON CLEANER PRODUCTION UPTAKE

Although the cleaner production best practices identified in chapter 5 (and detailed in appendix A) can yield significant savings in terms of water, energy, and chemical use and production costs, current uptake is low, even among top-performing factories. Tangible environmental benefits will therefore only be achieved if a significant proportion of mills in Bangladesh start to adopt these cleaner production best practices.

The factory audits highlighted the complementary market failures that are inhibiting uptake of cleaner production best practices, namely: externalities, which mean that cleaner production uptake is lower where firms do not have to internalize their costs imposed on society and the environment; and information asymmetry and missing markets, which raise the costs for firms to adopt cleaner production.

- **Externalities.** The relative benefits of, and incentives for, implementing cleaner production measures can be considerably lower when environmental externalities

are not consistently factored into mill production costs;

- **Information asymmetries and missing markets.** Even when it makes business sense for mills to enhance their production efficiency and adopt cleaner production measures, they may not find it economically viable to do so, due to insufficient access to information, and missing markets in finance and cleaner production products and services.

6.1.1 Environmental Externalities

Failure to incorporate the societal costs from externalities into production costs has a systemic dampening effect on overall rates of cleaner production uptake across the Bangladesh textile sector and beyond. The benefit-cost ratio of implementing water-related cleaner production measures can be considerably lower when the social costs of water scarcity and pollution are not factored into mill production costs. This results in smaller relative efficiency savings for mills implementing cleaner production measures, which can therefore act as a significant disincentive to overall cleaner production uptake.

Environmental policy recommendations generally encourage the incorporation of environmental externalities into the costs of production as a first best solution. Indeed, incorporating environmental externalities into production costs matters not only for getting polluters to pay for pollution treatment costs (the "polluter pays principle"), but also for minimizing resource use and pollution generation via cleaner production.

Identification of the main legislative and regulatory constraints responsible for the failure to internalize externalities associated with water scarcity and pollution is relatively straightforward and is discussed below. The three main constraints are:

- Weaknesses and inconsistencies around groundwater licensing;
- Discharge standards and lack of clear monitoring guidelines;
- Low capacity of the regulator to enforce compliance with the existing legislation.

However, as discussed in chapter 4, reforming the broader enabling environment often remains challenging due to the large number of stakeholders involved (with sometimes entrenched vested interests), complex implementation challenges, and the high costs associated with effective monitoring and enforcement.

Groundwater Licensing and Metering

Most textile mills depend on private tubewells for their water supply. In Dhaka and Chittagong, where most of the mills are located, the respective water utility is responsible for managing these commercial wells. In Dhaka, the utility currently licenses 1,640 private wells.[33] However, this figure greatly underestimates the number of wells in existence and does not account for the large proportion of textile mills, which are located outside the administrative city limits. Even where commercial fees are levied, consumption from private tubewells is generally not metered and flat rates do not account for increased water scarcity (Global Water Intelligence 2011).[34] As a result, the absence of an effective groundwater licensing regime means that most factories are de facto neither measuring nor paying for freshwater they use. [35]

33 Dhaka Water Supply and Sewerage Authority 2012, personal communication.

34 Unmetered rates in 2012 were less than $2 per month, and rates per cubic meter around $0.20, or 10 times less than the average 2011 global water tariff ($2.03) (see Global Water Intelligence 2011; and International Benchmarking Network for Water and Sanitation Utilities http://www.ib-net.org/).

35 This was confirmed by the factory audits, where none of the mills reported either metering or paying the utility for their groundwater.

Failure to internalize the costs of groundwater over-exploitation remains closely linked to the water pollution agenda. First, it reduces incentives to implement water-related cleaner production measures, as: (a) most of the participating textile mills deemed their water inputs to be "free";[36] and, (b) lack of investment in water meters severely constrains a mill's ability to even measure its consumption, losses, and costs. Second, the volume of water used throughout the production process is the main driver of a mill's wastewater treatment costs. Third, falling water tables can make aquifers more vulnerable to infiltration of surface water pollution (and once aquifers are contaminated, such contamination is prohibitively expensive to reverse). And finally, a mill's water footprint is a powerful marketing tool, and is arguably the foremost environmental concern among multinational brands within their textile supply chain.

Environmental Standards

Environmental legislation and regulation in Bangladesh is adequate. Environmental standards for effluents are based around maximum concentration of specific pollutants in wastewater (see table 4.1). While such standards are widely used, they do have drawbacks for water systems that are particularly water stressed or degraded. Indeed, rather than encouraging water reuse and minimization, concentration-based standards incentivize the consumption of even more groundwater to dilute wastewater to acceptable standards.

On the other hand, load-based standards (which measure the concentration of a pollutant along with the average volume of discharge over a fixed period) encourage the reuse and minimization of chemicals and other pollutants, while promoting the reuse and minimization of water, as more concentrated wastewater is cheaper to treat. [37]In their most extreme form, "zero discharge" standards prohibit the discharge into water bodies of specific pollutants or liquid effluent.

Weak Enforcement of Effluent Treatment

Weak enforcement of existing environmental standards is the most significant issue, with most mills treating their wastewater at best inconsistently, if at all. As a result, mills rarely incorporate the true costs of treating their wastewater—around $350,000 a year for a typical 20 tonnes of wastewater a day—within their operations. The ability of many textile mills to routinely pass the high costs of treating wastewater onto society and the environment is the single greatest factor driving water-related inefficiencies within the mills, as overall treatment costs are actually mostly driven by the volume of (waste) water to be treated rather than the actual pollutant load. Although in recent years the number of mills installing a treatment plant has significantly increased in response to Department of Environment and buyer pressure, few mills have an incentive to consistently operate their treatment plant on a daily basis, given the high running costs and the challenges for external parties (even buyers) to monitor correct usage on a daily basis.

In sum, there are clear distortions within the broader enabling environment due to failure to internalize externalities associated with water scarcity and water pollution. While addressing these externalities may be the first best solution to encourage greater cleaner production uptake (and pollution treatment) in terms of transformative impact, it also poses a number of implementation challenges. Reforms to the groundwater licensing regime, environmental

36 This notion of "free water" is actually incorrect, as energy (pumping) and water purification (softening) result in water input costs for textile mills of around $12–40 per tonne (still below the full costs of the groundwater) (Ecopsis 2011).

37 Measuring the total amount of waste generated can also provide textile mills with a baseline and tracking tool, which in turn supports the effective implementation of cleaner production processes.

standards, and enforcement remain costly and complex, and carry an implementation risk.

6.1.2 Addressing Information Asymmetry and Missing Market Failures

Even under present conditions, there are incentives for the private sector in Bangladesh to adopt cleaner production measures, even though the externalities associated with water scarcity and pollution are not fully factored into the mills' production costs. While mills currently may have limited incentives to improve water efficiency and water treatment practices, water is also a "carrier" for other hidden inputs, such as energy (pumping water, steam production) and chemicals. Once these hidden costs are made explicit to mills, they can significantly alter the benefit-cost ratio so that the apparent costs of not adopting cleaner production become much clearer. This is why great care was taken when selecting low-cost and advanced water-related cleaner production best practices to make sure they simultaneously generated savings not only in terms of water consumption, but also in terms of the more costly energy and chemical inputs.

However, this strong business case for textile mills to adopt water-related cleaner production best practices today is hampered by two key market failures:

- Information asymmetry;
- Missing markets for cleaner production products and ancillary services and access to finance.

These serve to push up the price to the private sector of adopting cleaner production practices.

INFORMATION ASYMMETRY

Access to information emerged as a major barrier for textile mills in adopting cleaner production measures. The factory audits revealed that making optimal, informed, cleaner production choices at the factory level requires getting the right information and support to the right people and at the right time.

The "right" information. Factory owners and senior management were mostly unaware of the full merits of adopting cleaner production practices within their business operations—and the real impact on their bottom line. This was particularly significant when looking at water-related inputs. Indeed, the true cost of water as an input tends to be systematically underestimated by factory owners and managers because of its low nominal cost. Lack of metering further distorts the picture as there is no baseline and it is difficult to measure performance and identify losses. Factory-specific audits are therefore often necessary to measure and identify the true costs of water as a "carrier" of production inputs and outputs (including energy-intensive water pumping, heating, cooling, and chemical recovery) (Henderson, Somers, and Stuchtey 2013).[38]

The "right" people. Even mill owners convinced of the merits of cleaner production can struggle to ensure appropriate measures are implemented in practice. Weak factory management, coupled with lack of information, often means that factory floor managers have insufficient support, incentives, understanding, tools, means, and specific technical know-how to effectively identify and implement individual cleaner production practices.

The "right" time. Even the low-cost cleaner production measures that do not require significant financial investments often require management and staff to dedicate valuable resources (including staff time) in order to set up the right systems and processes. Such opportunity costs can be a deterrent in rapidly expanding sectors such as the textile industry in Bangladesh, where profits may be more readily generated by focusing on expanding operations rather than

38 For water-intensive sectors, studies have shown that the true costs of water can be 100 times more than the nominal value.

achieving (relatively) marginal efficiency gains within existing operations. Rapid expansion also, however, presents a window of opportunity to ensure that cleaner production best practices are rolled out from the inception within the new units, as this is both easier and more cost-effective than making changes retroactively in older, existing units.

Missing Markets: Access to Finance

Access to finance was generally not a major barrier for the implementation of the low-cost cleaner production measures highlighted in this report. Indeed, significant environmental benefits can be accrued even through the implementation of these seven low-cost best practices. Nevertheless, factories interested in "doing more" (by moving from low-cost to more advanced cleaner production measures) may face difficulties in accessing affordable credit options. Although there are around 15 private and public banks that do lend to WDF factories for purchasing machinery and financial working capital, credit is often not available to small and medium enterprises. Where credit is available, interest rates are prohibitive. In particular, access to concessional finance for green investments does not currently extend to most cleaner production equipment.

It should however be noted that where access to finance is not a limiting issue, factories often prefer to opt for the advanced rather than low-cost cleaner production options. Indeed, investments in high-performing machinery not only tend to provide greater financial gains per transaction, but also provide extra "cachet" in terms of market positioning with buyers and brands.

Missing Markets: Cleaner Production Products and Services

Access to competitively priced and reliable ancillary cleaner production services and goods in Bangladesh (including cleaner production audits, and agents importing higher-performing "greener" manufacturing equipment) is generally difficult. This is partly because the local market for add-on cleaner production services remains limited due to weak domestic demand and lack of competitiveness. High import duties and lax standards further encourage the use of low-quality dyes and chemicals and inefficient, out-of-date, secondhand machinery (generally imported from China and assembled in Bangladesh). Half of WDF machinery is over eight years old, and there are limited incentives and advisory support for upgrading (ADSL 2009). Even energy and water meters (which are essential for measuring performance of any cleaner production measure) were found to cost up to twice as much in Bangladesh than in China.[39]

6.2 PROPOSED APPROACH FOR SCALING UP CLEANER PRODUCTION

A concerted approach for scaling up cleaner production among textile mills in Bangladesh is required in order to effectively overcome existing externalities and market failures. The proposed approach has been formulated based on the following considerations:

- Interventions need to be carefully prioritized (based on cost, implementation risk, and impact), sequenced, and targeted;
- The overall approach is designed to help the Government of Bangladesh leverage the complementarities of different stakeholders, including the private sector and development partners;
- Recommendations are pragmatic, and based around an incremental menu of options that allow for flexibility, opportunism, and potential synergies.

39 See NRDC 2012a& b and Ecopsis 2011 for details.

6.2.1 Prioritizing Interventions

Scaling up cleaner production can be achieved, in broad terms, either by increasing the costs to mills of not adopting cleaner production (by incorporating externalities into production costs) or by reducing the costs of adopting cleaner production (by removing critical barriers to entry) (table 6.1).[40] Interventions will need to be carefully prioritized based on:

- The costs of tackling each barrier;
- Implementation risk (complexity or ease of implementation and number of stakeholders involved);
- Environmental impact on water resources (water scarcity and pollution).

The comparative assessment of proposed interventions based on cost, implementation risk, and impact shows that interventions seeking to address immediate barriers to cleaner production should be considered in the first instance, as these are cheaper and easier to implement, even though impacts will not be as transformational as in the case of changes to the broader enabling environment.

In the context of limited resources and support, actions to overcome information asymmetries should be clearly prioritized. Access to information is important, both in and of itself, and also because it is a critical building block

40 The assessment in table 6.1 is qualitative; data are currently too limited to carry out a more quantitative analysis.

TABLE 6.1

COMPARISON OF DIFFERENT APPROACHES TO PROMOTING CLEANER PRODUCTION UPTAKE

	Increase costs of not adopting cleaner production (incorporate externalities)			Reduce costs of adopting cleaner production (remove barriers to entry)		
Proposed intervention	Groundwater licensing	Targeted load-based standards for critical hotspots	Enforced wastewater treatment	Addressing information asymmetry	Addressing missing market finance	Missing market cleaner production products
Costs	High (1)	High (1)	High (1)	Low (2)	Medium (3)	Medium (4)
Implementation risk	High	High	High	Low	Medium	Medium
Impact on water scarcity Pollution	High Medium	Medium	High	Medium	Low (unless information provided, n/a for low-cost ones)	Low (unless information also provided)

Notes: (1) Refers to the high costs of monitoring and enforcement for effective implementation.

(2) Costs of information dissemination are low. Setting up an environmental assistance center can be achieved at modest costs.

(3) This refers to the implementation of advanced cleaner production measures (as low-cost measures require very little capital investment). Offering interest-free credit to all 1,700 WDF units toward the implementation of one single cleaner production measure averaging $200,000 would require a subsidy[41] of $68 million—assuming standard 20 percent interest rates for non-premium borrowers.

(4) This may include the provision of incentives for firms to provide cleaner production services and develop *networks*.

41 Subsidies are listed here as a possible option, while acknowledging that many oppose their use.

TABLE 6.2

POTENTIAL ROLE OF STAKEHOLDERS IN OVERCOMING BARRIERS TO CLEANER PRODUCTION

	Externalities			Market failures		
Actors	**No groundwater licensing**	**Concentration-based standards**	**Weak enforcement of wastewater treatment**	**Lack of information**	**Missing market for cleaner production products**	**Missing market for finance**
Government	✔	✔	✔	✔	✔	✔
Trade associations				✔	✔	
Local banking institutions					✔	✔
Local civil society, NGOs			✔	✔		
Multinational brands	✔	✔	✔	✔		

for overcoming poor access to finance and market linkages (and indeed for raising awareness about any policy or regulatory changes).

Nevertheless, while more challenging, the potential for reforms to the broader regulatory environment should not be dismissed. The scope for a more coordinated, multi-stakeholder approach, including government, trade associations, and multinational brands, could help shift entrenched vested interests and open up new windows of opportunity—provided there is sustained, broad-based commitment.

6.2.2 Leveraging Complementarities

As discussed in chapter 5, implementing selected interventions through a multi-stakeholder approach can enhance environmental outcomes. Different stakeholders often have their own comparative advantages when it comes to promoting the uptake of cleaner production measures. Recommended strategies for encouraging mills to adopt cleaner production practices are therefore likely to be more effective if carried out by a broad-based multi-stakeholder approach, bringing together government, national trade associations, multinational brands, and interested development partners. As highlighted in table 6.2, the effectiveness of individual areas of intervention can be greatly enhanced if the proposed recommendations take into account the differing roles, incentives, and leverage of different actors.[42]

6.2.3 Targeted Approach

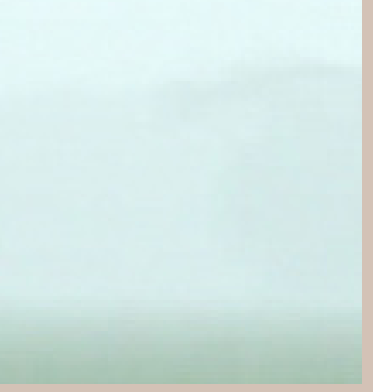
Targeting priority environmental hotspot areas, particularly around Greater Dhaka, where textile factories are highly concentrated and stresses on the environment and water resources are greatest, will enhance overall environmental benefits.

42 Note that factories are not included in table 6.2 as they are not actors that should influence, but rather should be influenced by, the actors addressing the barriers listed.

While some actions are broad based, [43] cleaner production uptake is also likely to be maximized if efforts initially focus on the top-performing textile factories, due to the following factors:

- There is still significant scope to improve production processes, even among better-performing factories in Bangladesh;
- The better-performing factories are mostly large, export-oriented, and vertically integrated. They have stronger incentives to improve their production efficiency and environmental footprint, as they need to produce high-quality goods directly for major brands in the demanding and competitive European Union and United States markets;
- These larger, export-oriented mills also have a stronger culture of results-based decision making, and have greater managerial capacity to ensure desired changes at the top are actually implemented on the factory floor;
- These mills can then act as champions or role models for less advanced mills.

43 Broad-based interventions include changes to the regulatory environment, while actions relating to access to finance (in particular) tend to be highly targeted. Actions seeking to overcome information barriers tend to be mixed, depending on dissemination channels and whether the provision of technical assistance is involved.



CHAPTER 7

Recommendations for Scaling Up Cleaner Production: Menu of Options

The following actions are recommended as part of a holistic, incremental, multi-stakeholder approach to promote cleaner production uptake among selected textile mills. Activities can be implemented as stand-alone activities, simultaneously or sequenced over a number of years, depending on resource availability and emerging windows of opportunity for change. The proposed plan of action is in three parts:

- **Part I.** Immediate efforts should focus on enhancing access to cleaner production information and advisory support;
- **Part II.** A number of complementary market-based actions should also be considered to further strengthen incentives for uptake;
- **Part III.** Proposed changes to the regulatory framework for water use and disposal could yield transformational change, provided there are sufficient resources, demand for change, and broad-based multi-stakeholder support.

Part I: Cleaner Production Information and Awareness

The sharing of cleaner production best practices identified during the RSI, and included in the World Bank and NRDC cleaner production technical guides (NRDC 2012a, 2012b), is an important first step in helping raise awareness among factory owners and managers, notably via trade associations and local buyers for multinational brands. However, to maximize impact, this knowledge needs to be institutionalized, so that the relevant information and support reaches the right people at the right time. One way of institutionalizing cleaner production knowledge is through the establishment of an environmental assistance center.

ENVIRONMENTAL ASSISTANCE CENTER

Recommendation

- Establish an environmental assistance center[44] to provide the industry with appropriate technological, legal, and administrative information and advisory support services on environmental management issues, including cleaner production, through a one-stop shop;

Background

Environmental assistance centers are a relatively straightforward and cost-effective way of offering information and services regarding a wide range of environmental issues. In addition to cleaner production best practices, these include environmental standards and regulation, permit clearances, and options for voluntary environmental compliance. Such a holistic approach enhances the viability and appeal of environmental assistance centers, and ensures that cross-linkages and synergies are maximized.[45] International best practice suggests that semi-autonomous centers, which are not directly administered by national or state governments, and have strong business linkages, have been found to provide a more up-to-date, high-quality service (Box 7.1).

The long-term viability of environmental assistance centers needs to be given careful consideration. In addition to remaining financially sustainable, such centers will need to continue to stimulate genuine demand for their services. First, the services provided by the center will need to be continuously adapted and updated to meet relevant and fast-changing business needs (through proactive engagement by the center with users, trade associations, and buyers). Second, demand for cleaner production and compliance assistance may be further stimulated in response to new regulatory and policy incentives.

Additional functions that may be carried out by environmental assistance centers include capacity building of engineering firms (through workshops and trainings) and the conduct of cleaner production assessments and

44 UNEP has produced a series of reports on government strategies and policies for cleaner production, as well as case studies on cleaner production worldwide, while the United Nations Industrial Development Organization (UNIDO) has also established a network of national cleaner production centers. See for example http://www.assistancecenters.net/about.cfm and http://www.cleanproduction.org/Steps.Process.UN.php.

45 For instance, incentives to reduce the amount of water used through cleaner production are greatly enhanced for mills running a fully operational—that is, expensive – effluent treatment plant in compliance with environmental regulations.

BOX 7.1

NATIONAL CLEANER PRODUCTION CENTERS

The international community has supported cleaner production initiatives in countries with developing and transitional economies since the early 1990s. UNIDO and UNEP have adopted a multi-pronged approach combining advocacy, training, industry demonstrations, policy advice, and facilitation of technology transfer and investment with institutional development through over 45 national cleaner production centers (NCPCs). NCPCs contribute to improved environmental performance and resource efficiency of enterprises and other organizations, which also increases productivity and competitiveness. Key services include:

- Technical assistance and in-plant assessments;
- Training;
- Information dissemination and awareness creation;
- Policy advice;
- Cleaner production technology and investment promotion.

A 2007 evaluation found that the program had been especially successful in: (a) putting cleaner production on the agenda of businesses and government; (b) training of professional cleaner production auditors; (c) implementation of, in particular, low- and intermediate-cost technology options in assisted companies; and (d) policy change and technology transfer in several countries.

Key lessons learned included:

- Cleaner production is of continued and rising relevance as a result of several trends, including worsening industrial pollution and high industrial resource use; multilateral environmental agreements entering into force; globalization and trade liberalization; and buyer pressure.
- NCPCs are appropriate for cleaner production capacity building, but institutional development and positioning of NCPCs amid other business service providers in their home countries deserve greater attention.
- There was a trade-off between the financial independence of NCPCs and the sustained impact of the program. The priority assigned to financial sustainability (independence) of the NCPC as a national institution (largely through income from services) can become counterproductive to achieving sustained effects and impacts as measured by the program's objectives.
- The NCPC program has great potential. The predominantly country-based funding strategy has, however, not been conducive to networking, knowledge management, and learning between NCPCs operating in different countries and regions. Moreover, the potential for cooperation and leverage with other initiatives was not fully exploited (UNIDO and UNEP 2008, 2010).

demonstration projects covering key processes and product lines at different scales (thus specifically targeting different users, including high-end as well as small and medium enterprises). IFC's PaCT program is proposing to establish a textile technology business center (see appendix B for details) that could provide a complementary (textile-specific) platform for greener technologies and operations.

Actors' Roles

- The Government, particularly the Ministry of Environment and Forests and the Department of Environment, would have a key role to play in setting up the environmental assistance center's legal statute, oversight, roles and responsibilities, and financing mechanisms. Centers may be an integral part of the Department of Environment, or more usually, a semi-autonomous entity;[46]
- Trade associations (such as BGMEA, BKMEA, and BTMA) should be closely involved in the establishment and operation of such a center, and form part of the center's governing body. Such close partnerships will ensure that the center adequately responds to the often rapidly changing business needs or any members' concerns, and raise awareness of the center's services among the associations' members;
- Multinational brands can play a useful advisory role to ensure the center responds to long-term business needs and anticipates future market demands.

46 For instance, the environmental assistance center could be set up as a semi-autonomous institute such as the Bangladesh Institute for Water Modelling or the Center for Environment and GIS, which are able to hire staff outside civil service rules and raise their own funds.

Part II: Market-Based Initiatives

A number of useful market-based activities can build on the new cleaner production information platform, including leveraging the power of the brands and the local private sector to help fill in the missing markets.

BRAND PURCHASING GUIDELINES

Recommendation

- Multinational brands incorporate cleaner production incentives into a harmonized set of purchasing guidelines.[47]

Background

Multinational brands have considerable "soft power" in influencing the Bangladesh factories via their prequalification inspection routines and ongoing supplier-buyer relationships. The development of purchasing guidelines offers an alternative, innovative way to enhance awareness and incentivize adoption among textile mills keen to position themselves with brands in a competitive market (for example, through the achievement of "preferred supplier status"). As part of the Global RSI, brands have been actively discussing how to incorporate cleaner production incentives into their procurement guidelines, including encouraging mills to systematically meter their water and energy consumption as a first step for benchmarking performance.

47 Since chemical recipes (particularly dyes and chemicals) are frequently provided or prescribed by the multinational brands, the implementation of these measures will therefore require collaboration with the multinationals through their purchasing guidelines.

It is important to note that factory owners' drive to improve their bottom line is not always sufficient to adopt cleaner production practices. However, since top performers are indeed also keen to position themselves with brands, investing in cleaner production is a good way for them to cement a stronger relationship with brands and enhance their bottom line in the longer term. This is why getting brands to encourage the adoption of cleaner production through their supply chain guidelines (and make cleaner production an explicit value proposition) is a hugely important entry point.

Actors' Roles

- Multinational brands to engage to the extent possible with interested partners (e.g. NRDC) to support the development of harmonized purchasing guidelines.

ZERO DISCHARGE OF HAZARDOUS CHEMICALS (PREFERRED SUPPLIER SCHEME)

Recommendation

- Explore potential for Bangladesh to become a pilot of the brands' Zero Discharge of Hazardous Chemicals (ZDHC) initiative.

Background

The concept of zero discharge has clear brand appeal. Brands have already shown strong leadership with regard to hazardous chemicals (box 7.2), and the promotion of zero discharge standards would help drive the implementation of cleaner production measures across the entire production cycle. Efforts are however still in their infancy. While the early adoption of such standards could present some advantages in terms of enhanced competitiveness, associated risks and costs should also be carefully assessed. In any case, the successful implementation of zero discharge standards will need

BOX 7.2

THE APPAREL INDUSTRY'S ZERO DISCHARGE OF HAZARDOUS CHEMICALS ROADMAP

The Zero Discharge of Hazardous Chemicals (ZDHC) initiative was established by the apparel industry in 2011, largely as a response to the publication of a Greenpeace report Dirty Laundry, which highlighted the widespread discharge of untreated chemicals by textile companies into waterways in China. The objective of the ZDHC is to provide the industry with a roadmap for zero discharge of hazardous chemicals within their supply chain by 2020.

Current members include Adidas Group, C&A, Esprit, G-Star Raw, H&M, Inditex, Jack Wolfskin, Levi Strauss & Co., Li Ning, NIKE, Inc., PUMA SE, and key influencers in the chemical industry. The founding group of brands developed a roadmap to detail specific projects and actions that can be taken collectively with other brands to drive the apparel and footwear industry toward the goal of ZDHC.

Challenges ZDHC is trying to tackle include:

- The contract manufacturing model;
- The complexity of the supply chain (with thousands of direct contract partners and tens of thousands of material suppliers, in multiple tiers);
- Hundreds of individual chemicals are used at each material supplier;
- Limited visibility into the formulation of preparations (mixtures of chemicals) used by suppliers, in particular incomplete information on hazardous ingredients in material safety data sheets;
- Chemical preparations of lower quality (often containing unwanted ingredients) are in direct competition with better alternatives;
- Directly controlling chemical formulations deep into the supply chain (suppliers of suppliers to factories) has not previously been attempted by brands;
- Large volumes of water used in dyeing/finishing and other processes;
- Facility by facility wastewater treatment (rather than centralized wastewater treatment);
- Import/export barriers for chemicals and technologies.

The joint roadmap is highly ambitious, and it is a plan that sets a new standard of environmental performance for the global apparel and footwear industry. It includes specific commitments and timelines to realize this shared goal.

Source: ZDHC: http://www.roadmaptozero.com/joint-roadmap.php.

to be either strongly incentivized by brands through enhanced market positioning or stringently enforced (by government or brands).

Actors' Roles

- Multinational brands to raise awareness among their suppliers and national trade associations of current initiatives, including the ZDHC rationale, and the advantages and necessary changes associated with these standards.

CLEANER PRODUCTION PRODUCTS AND SERVICES

Recommendations

- Focus on quick wins and opportunistic interventions by:
  - Removing duties on select green equipment, eco-dyes and meters;
  - Stimulating local technological innovation through dedicated grants;
  - Exploring the potential for independent certification of environmental management systems.

Background

Some countries (such as China, see box 7.3) have sought to use cleaner production legislation to ensure minimum efficiency standards for manufacturing equipment, and stimulate the market for cleaner production products and services from the supply side. However, there are rarely sufficient resources and support systems in place to ensure these standards are adequately applied and enforced. Rather, interventions should be opportunistic, identifying quick wins or taking advantage of existing or proposed structures.

An example of dedicated grants is IFC's proposed $500,000 Innovation Fund under its PaCT program, which has been designed to help finance the development of new technologies with significant water savings, treatment, or other resource efficiency gains.

An environmental management system, certified by an independent accrediting agency, creates a set of independent monitors and sets out a path for progressively improving environmental performance among those who need consistent support.

Actors' Roles

- The Government of Bangladesh's Ministry of Finance and National Revenue Bureau could consider waiving import duties on water and energy meters, dyes and chemicals, and selected "green equipment;"
- The proposed environmental assistance center and IFC's proposed textile technology business center could include cleaner production training specifically targeted to local environmental engineering firms (training of trainers) to help expand their service base;
- The Ministry of Environment and Forests and the Ministry of Industries, in consultation with a range of stakeholders, could explore the scope for setting up cleaner production standards to encourage the use of meters and more efficient manufacturing equipment.

CLEANER PRODUCTION FINANCING

Recommendation

- Expand and strengthen existing green credit lines to cover specific water- and energy-efficient manufacturing equipment.

Background

Most of the cleaner production best practices featured in this report have focused on lower-cost options with rapid payback times. Nevertheless, many mills are also keen to invest in more advanced cleaner production measures,

BOX 7.3

CHINA'S CLEANER PRODUCTION LAW

On January 1, 2003, the Cleaner Production Promotion Law came into effect in China. The law seeks to reduce pollution and promote resource recycling by regulating all stages of the production chain, including design, choice of energy resources and raw materials, type of technology, equipment maintenance, and waste recycling. It gives each local administration responsibility to initiate appropriate regulations on the basis of the level of economic development of the locality and the nature of its pollution problems. This is because the huge size and diverse ecological conditions of China's different regions make it extremely difficult to develop a general and standardized policy applicable to all regional environmental problems (Geng et al. 2010).

This new law is the most significant of a number of initiatives the Chinese government has taken to establish cleaner production nationwide as one of China's key strategies for sustainable development. The law seeks to raise the profile of cleaner production and raise awareness of its benefits, contributing to a change from downstream management to a more holistic supply chain approach.

However, no comprehensive independent evaluations have yet been carried out to assess its full impact. Certainly, the results from NRDC's RSI factory audits suggest there is still room for improvement, even among low-cost cleaner production measures. Clean production still remains mainly targeted toward particular manufacturing processes and business strategies within individual companies. In order to further enhance its success, governmental agencies should play a leading role by coordinating different initiatives, enacting appropriate regulations, stipulating feasible guidelines and standards, providing substantial financial support, and carrying out international collaboration.

Source: "Cleaner Production in China." http://www.chinacp.com/EN/PolicyDetail.aspx?id=38.

with significant up-front capital investments, but are unable to access credit facilities at affordable interest rates.[48] Bangladesh Bank has recently put in place credit lines for green investments, including a $25 million refinancing line at 5 percent interest earmarked for specific items, including effluent treatment plants, solar energy, and biogas, although uptake remains limited. Another example is IFC's proposed Bangladesh PaCT program, which will facilitate investments in technologies with significant water benefits for 100 textile mills.

Actors' Roles

- Bangladesh Bank could extend credit lines for green investments to cover manufacturing equipment yielding significant water and chemical savings, and work more closely with commercial banks to stimulate uptake.[49]

48 Commercial bank prime lending rate was 13.3 percent in December 2012 for Bangladesh (Central Intelligence Agency World Factbook: https://www.cia.gov/library/publications/the-world-factbook/fields/2208.html).

49 Note that the Central Bank should in principle not be providing directed credit. Such types of subsidy—if any—should come from the budget in a fiscally transparent fashion.

Part III: Strengthening Environmental Regulation and Enforcement

Strengthening environmental regulations and their enforcement remains necessary both to fully incentivize cleaner production uptake and to address the underlying need for polluters to pay for the costs of treating pollution. Reforms have however proved difficult to successfully implement, due to the considerable complexities, costs, and implementation risks involved. Nevertheless, the multi-stakeholder approach adopted throughout the RSIs hints at a new more collaborative model for supporting green growth reforms to:

- Ensure the proposed changes support growth without compromising environmental sustainability;
- Identify the reforms that have the greatest buy-in and catalytic effect;
- Leverage the particular complementarities of each stakeholder to catalyze incentives for change and successful on-the-ground implementation.

STRENGTHENING COMMERCIAL GROUNDWATER LICENSING

Recommendation

- Review potential for strengthening licensing arrangements for tubewells privately installed by major industrial water users.

Background

The effective implementation, monitoring, and enforcement of commercial groundwater licensing regimes is notoriously challenging, but these are being considered by certain urban municipalities facing acute water stress (such as Aurangabad Municipal Corporation in Maharashtra, India) (Garduño et al. 2011). Given that WDF textile mills appear to be using a disproportionate share of rapidly depleting groundwater resources in Dhaka, a targeted approach focused on the monitoring of groundwater use by large commercial and industrial users such as WDF factories might be worth considering. There is also scope for potential synergies if implemented in conjunction with more targeted environmental standards (see next recommendation).

The water footprint of factories is of particular interest to the multinational brands' environmental corporate social responsibility. Any proposed interventions should be accompanied by a careful communications campaign, supported by a range of partners (including trade associations and brands), to raise awareness among industries of the economic costs of groundwater over-exploitation and the potential threats to their business.

Metering of water usage, particularly groundwater, is an important basic step in attempting to track water consumption. Currently, metering is almost nonexistent, since it is not mandatory and metering equipment is expensive.

Actors' Roles

- The Ministry of Water Resources may wish to consider provisions for groundwater monitoring, licensing, and charging as part of the forthcoming Bangladesh Water Act;
- Municipal water utilities (Dhaka Water Supply and Sewerage Authority, Chittagong Water Supply and Sewerage Authority)

could review licensing arrangements for large commercial and industrial customers, including scope for redrawing jurisdictional boundaries to include major industrial clusters outside Dhaka city limits; revising volumetric tariffs to reflect environmental externalities; rolling out metering; and developing effective bill collection systems;

- Trade associations and multinational brands could then be consulted on any proposals and asked to support awareness campaigns among industry members and suppliers.

BOX 7.4

LOAD-BASED STANDARDS

Load-based environmental standards are based on the total amount of a substance that passes through a particular point within a given amount of time. The standard is calculated by the concentration times the total volume of water, and therefore requires both variables to be measured.

Load-based standards have been increasingly used in Canada, Germany, India, and the United States to target critically impaired water bodies under situations of serious water stress or to promote a more integrated catchment-wide planning.

TOTAL MAXIMUM DAILY LOAD

In the United States, for example, total maximum daily load (TMDL) standards have been used extensively since the 1990s by the United States Environmental Protection Agency (EPA) and state environmental agencies under the United States Clean Water Act. A TMDL establishes the maximum amount of a pollutant that a water body can assimilate and still meet water quality standards. These load-based standards have been particularly useful in establishing maximum pollution limits for industrial wastewater dischargers around specific water bodies that are classified as impaired or threatened for beneficial uses. This process incorporates both point sources and nonpoint source pollutants, and has been increasingly applied at the watershed level.[50]

ZERO LIQUID DISCHARGE

Zero liquid discharge legislation was enacted by the Indian state of Tamil Nadu in response to severe pollution of local freshwater sources from wastewater by textile mills in Tirupur, India's leading knitwear hub. The renewed threat of permanent closure in 2011 led to radical changes in the way mills' wastewater was treated, with Tirupur's common effluent treatment plants becoming the first to implement zero liquid discharge technology in India, by recovering water and salts. However, it remains to be seen how the enforcement of zero liquid discharge standards will affect long-term competitiveness (Vishnu et al. 2008; Yew et al. 2012).

50 "TMDL." Maryland Department of the Environment: http://www.mde.state.md.us/programs/Water/TMDL/Pages/Programs/WaterPrograms/TMDL/index.aspx.

ENVIRONMENTAL LOAD-BASED STANDARDS

Recommendation

- Assess potential for targeted load-based or zero discharge standards in critical environmental hotspots.

Background

Load-based standards, including the more extreme form of zero discharge standards, have been most successfully applied in critical environmental hotspots where freshwater resources are severely depleted or degraded (box 7.4).

Actors' Roles

- Ministry of Environment and Forests and Department of Environment to review the scope for implementing load-based standards (including zero discharge) in selected critical areas, in close consultation with key stakeholders and brands;
- Department of Environment and Dhaka Water Supply and Sewerage Authority to explore synergies between reforms on groundwater licensing and environmental standards, particularly if a targeted watershed, cluster-based approach is adopted.

PUBLIC DISCLOSURE FOR ENVIRONMENTAL COMPLIANCE

Recommendation

- Develop public database to strengthen monitoring of environmental compliance, including data obtained through third-party monitoring;
- Encourage the sharing and triangulating of information obtained by different parties through the stakeholder platform. In particular, explore opportunities to leverage the (1500 strong) publicly available factory data base—which includes some textile mills)—and inspection protocol under the Accord on Fire and Building Safety.

Background

Improving environmental outcomes, and getting mills to treat their wastewater, is ultimately less about the nature of the environmental standards per se and more about developing effective monitoring and enforcement systems on the ground. Given the huge transaction costs associated with monitoring, particularly in relation to the regulator's staffing and resource capacity, efforts over the past decade have increasingly turned to third-party monitoring and public disclosure programs (box 7.5).

A multi-stakeholder platform can play a pivotal role in promoting greater public disclosure by encouraging the sharing and triangulating of information obtained by different parties. Multinational brands could help in two ways. In the first instance, brands can seek to better monitor environmental performance of suppliers by systematically mapping out their supply chain, and through their prequalification inspection routines and ongoing supplier-buyer relationships (including monitoring requirements under the proposed supply chain guidelines). In the medium term, they can encourage mills to carry out peer-to-peer benchmarking of cleaner production performance measures (such as being part of a "preferred suppliers" scheme).

Brands can also incentivize compliance with standards, such as the Accord Initiative. At present, brands themselves face constraints in monitoring the full extent of their supply chain in-country, particularly with second- or third-tier suppliers with whom they have no direct contact. By making even basic information on mill compliance available publicly, and encouraging brands to map out their supply chain, the Department of Environment could help the brands exert additional pressure more readily on

their extended supply chain. The online publication of basic data for over 1500 factories as part of the Accord on Fire and Building Safety is a major foundation to build on.

The Beijing-based NGO the Institute for Public and Environmental Affairs (IPE) has been particularly effective in bringing the environmental violations of global firms and Chinese suppliers into public view. IPE has a publicly accessible database of tens of thousands of outstanding pollution infractions, which it collects from government environmental agencies and other public sources. IPE, in coalition with NGO partners, may contact multinationals whose Chinese suppliers are in the database and ask them to work with those suppliers on remediation. Motorola, Philips, Pepsi, and Cargill are among the thousands so far exposed, in addition to Timberland. The latter worked with IPE to resolve problems and terminated its relationship with one of the suppliers (Lee, Plambeck, and Yatsko 2013).

Actors' Roles

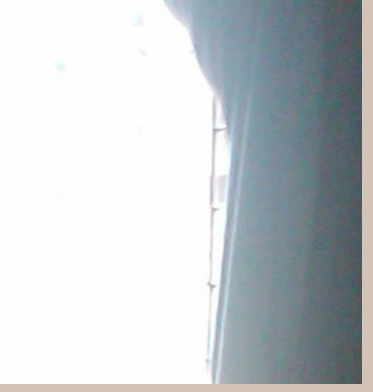
- The Department of Environment can help set up a public database on industry environmental compliance, which could draw information in from third parties, including from civil society, industry peers (such as voluntary benchmarking schemes), and multinational brands;
- Multinational brands can build on a number of key systems already put in place through the recent Accord Initiative (including factory mapping, factory inspection protocols) as well as leveraging the 100 strong brand and retailer platform;
- Multinational brands can continue to jointly take action on key issues such as the recent Accord Initiative that is addressing the fire and building safety problems in Bangladesh.

BOX 7.5

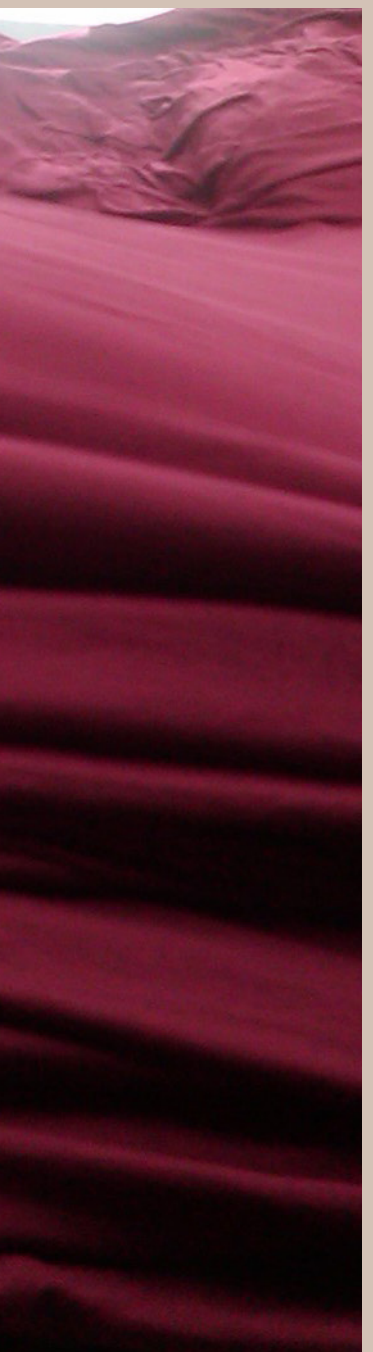
PUBLIC DISCLOSURE PROGRAMS: INTERNATIONAL BEST PRACTICE

Community-based instruments (including public disclosure programs) have been used for over two decades as a complementary tool in reducing pollution emissions. In 1995, Indonesia put in place a voluntary, pilot public disclosure scheme that encouraged firms to clean up their water pollution. The Program for Pollution Control, Evaluation and Rating (PROPER) required firms to self-report their water pollution levels, which were subsequently checked by the government's environmental agency, and then assigned a color-coded rating (from black for the factories that made no effort at control, to gold for those that demonstrated adherence to international standards). The detailed findings were first shared with the companies, and, after a suitable period of time to allow for retesting, were made available to the public, thus bestowing either honor or shame on the rated factories and encouraging offenders to clean up their act. China followed suit with a similar program, Green Watch, in 2000, when two Chinese municipalities established pilot programs covering 150 factories. In 2005, 20 municipalities adopted similar programs covering 8,500 factories. Research shows that the Green Watch program has significantly reduced pollution emissions in China. Today similar systems are also in place in several countries, including Ghana, India, Republic of Korea, Philippines, and Vietnam.

Source: World Bank 2012.



CHAPTER 8



Conclusions

Complex global supply chains present particular challenges for promoting green growth. Textile manufacturing has become a major contributor to gross domestic product for many developing countries, including Bangladesh, but also has a significant environmental footprint due to overstretched environmental regulation and enforcement capabilities.

Both national governments and major multinational brands are searching for more sustainable ways of nurturing local textile industries that are good for growth and for the environment.

8.1 POTENTIAL FOR CLEANER PRODUCTION: KEY FINDINGS

Encouraging mills to adopt cleaner production measures offers a useful, non-controversial entry point. Factory audits in Bangladesh confirmed the large potential savings. The implementation of seven low-cost cleaner production best practices alone could help reduce water and energy consumption by 25 percent and chemical use by up to 10 percent. At the same time, it would save the industry up to $200 million a year in efficiency savings and up to $90 million in avoided wastewater treatment costs.

However, uptake of cleaner production measures by industry remains low. Tangible environmental benefits will therefore only be achieved if a significant proportion of mills in Bangladesh start to adopt these cleaner production best practices.

The factory audits highlighted three complementary market failures that are inhibiting uptake of cleaner production best practices: (a) the failure to internalize externalities associated with water scarcity and pollution due to weaknesses in the broader enabling environment

(including environmental regulation and enforcement); (b) information asymmetry (getting the right information to the right people at the right time); and (c) missing markets (including access to cleaner production products and finance).

8.2 RECOMMENDATIONS FOR SCALING UP CLEANER PRODUCTION

In order to tackle these barriers, a holistic, incremental, multi-stakeholder approach is proposed to promote cleaner production uptake among selected textile mills. It is structured in three phases according to cost, implementation risk, and impact. Activities can be implemented flexibly as stand-alone activities, simultaneously or sequenced over a number of years, depending on resource availability and emerging windows of opportunity for change. Proposed actions include:

- Initial support for information and cleaner production advice through the establishment of environmental assistance centers as a building block for future interventions;
- Complementary market-based actions to further strengthen incentives for uptake, including the harmonization of brand purchasing guidelines to promote cleaner production, the development of cleaner production products and services, and financial support for investments in clean technologies and zero discharge;
- Exploration of the potential for selective reforms to environmental regulation and enforcement, including strengthened groundwater licensing and enhanced enforcement targeting critical environmental hotspot areas, as such reforms, while challenging, have the potential to yield transformational change for both scaling up cleaner production and pollution abatement;
- Public disclosure of environmental performance through a multi-stakeholder platform by encouraging the sharing and triangulating of information obtained by different parties. In particular, opportunities for leveraging the 1500 strong publicly available factory data base (which includes some textile mills) and inspection protocol under the Accord on Fire and Building Safety should be actively explored.

Table 8.1 shows the potential roles for various actors in implementing the recommendations to overcome the barriers to clean production.

TABLE 8.1

RECOMMENDATIONS AND ACTOR'S ROLES IN OVERCOMING BARRIERS TO CLEANER PRODUCTION

	CLEANER PRODUCTION INFORMATION & AWARENESS	MARKET-BASED INCENTIVES				ENVIRONMENTAL REGULATION & ENFORCEMENT		
Actor	**Establish environmental assistance center (EAC)**	**Multinational corporation purchasing guidelines**	**Zero discharge of hazardous chemicals**	**Cleaner production products & services**	**Cleaner production financing**	**Groundwater licensing**	**Load-based standards**	**Public disclosure**
Government	Play key role in setting up center (institutional arrangements, financial contributions)	Provide inputs, in line with environmental legislative framework	May engage in discussion with brands (monitoring impact of intervention, provision of TA and support via EAC)	Remove duties on cleaner production-related imports Training on cleaner production, including environmental assistance center Cleaner production standards (metering)	Raise awareness (eg via EAC)	Groundwater licensing, monitoring, volumetric pricing Provision of technical support to industry via EAC	Implement load-based standards Provision of technical support to industry via EAC	Set up public database on environmental compliance
Trade associations	Closely involved in setting up and operation (including potential financial contributions)	Provide inputs	Raise awareness, technical assistance to members	Cleaner production training, including business technology center	Raise awareness	Raise awareness		
Local banking institutions					Expand green credit lines			
Local civil society, NGOs		Provide inputs	Raise awareness					
Multinational brands	Play advisory role	Develop guidelines and liaise with partners to implement	Raise awareness & solutions on ZDHC			Raise awareness, include incentives in guidelines	Raise awareness, include incentives in guidelines	Map out supply chain (leverage Health and Safety Accord factory database) Monitor performance of supplier (third party)

8.3 STRENGTHENING BANGLADESH RSI MULTI-STAKEHOLDER PLATFORM

Most importantly, each of the above recommended interventions provides an opportunity for the Government of Bangladesh to work more closely with national and international private sector actors from across the textile supply chain in the development of strategies to promote enhanced cleaner production uptake and better environmental management practices in general. Coordinated action will be particularly important for achieving long-term transformative change through reforms to the enabling environment, where substantial resources and long-term commitment, demand for change, and active support from a range of stakeholders are critical.

Development partners, including the World Bank, IFC, and NRDC, have started to facilitate the development of a multi-stakeholder platform as part of the Bangladesh RSI. This platform was instrumental in bringing the Government of Bangladesh together with national and multinational private sector actors (including trade associations, major mills, local buyers, and senior executives of multinational apparel brands) to discuss the potential for cleaner production in Bangladesh and potential barriers to scaling up.

Moving forward, the Bangladesh RSI multi-stakeholder platform can continue to play a key role in supporting the Government of Bangladesh to implement the proposed recommendations to scale up cleaner production by identifying areas of common interest and potential synergies around specific actions in order to leverage complementarities from government and across the private sector (including linkages to the broader Accord on Fire and Building Safety Coalition). Such a forum may also be used to debate and formulate more complex, long-term interventions to address underlying systemic issues, including groundwater over-exploitation and pollution abatement and lead to spin-off activities (box 8.1).

8.4 LESSONS FOR GLOBAL RESPONSIBLE SOURCING INITIATIVE

The experience of the Bangladesh RSI will also inform the Global RSI dialogue in two ways:

First, a comparative assessment of the findings from the cleaner production audits in China and Bangladesh has highlighted considerable similarities (and some local differences) in terms of the specific nature of the cleaner production best practices, the range of expected benefits (including productivity efficiency and resource savings), and challenges of scaling up cleaner production, even among high-performing mills. This strengthens the case for multinational brands to develop harmonized supply chain guidelines promoting cleaner production for their entire global supply chain.

Second, this case study has highlighted the benefits of closer engagement and dialogue between the private sector and government, as carried out through the Bangladesh RSI (compared to the original China RSI, which exclusively focused on the role of the private sector). Recommendations for scaling up cleaner production in Bangladesh have highlighted the advantages of a more coordinated, holistic approach, where some actions are best led by the Government (strengthening the enabling environment, import duties, and green credit), others best led by the private sector (harmonization of supply chain guidelines), and others best carried out through close consultation by all parties (monitoring and information sharing, promotion of zero discharge standards). Some of the proposed recommendations for scaling up cleaner production in Bangladesh may also be applicable in other major textile-exporting countries of interest to multinational brands participating in the RSI, including China, India, and Vietnam.

BOX 8.1

SPIN-OFF ACTIVITIES FROM RSI

Gap Inc. is now partnering with NRDC to pilot supply chain policies in its fabric mills and dyehouses in China. The objective is to establish a set of policies that lay out clear expectations of suppliers' environmental performance, and that integrate this performance into business decision-making. The pilot will have several phases: understanding mills' current social and environmental compliance with the law; creating social and environmental performance standards aligned with local law; communicating Gap Inc.'s expectations to mills; and integrating social and environmental performance metrics into business assessment considerations. The pilot, which will be carried out with selected mills in China, is now in its initial phases, focusing first on establishing compliance status and collecting baseline information on the mills' performance.

The Institute for Public and Environmental Affairs (IPE), a Chinese NGO, has developed the China Pollution Map Database, which compiles publically available records of environmental violations by industrial polluters across China. The database is an invaluable resource to multinational companies who want information about the environmental compliance status of their suppliers, a first step in establishing supply chain policies. During the RSI World Bank led round tables, multinational apparel retailers and brands identified a number of improvements that would allow them to use the database more effectively. The NRDC RSI team is now working with IPE to implement a number of these recommended changes, including modifications that will improve methods to search the database and make it easier for brands and retailers to identify new entries and other changes.

City-track The RSI World Bank led round tables discussed the challenge of scaling up the positive results of the RSI pilot projects to a larger number of suppliers, and suggested concentrating on key geographies as one possible strategy. Starting in 2013, the NRDC RSI program plans to use a "city track" approach to scale up the Responsible Sourcing Initiative. Under this geographically based plan, the program will select cities that have a large concentration of textile mills as well as relatively progressive officials who are under pressure to reduce energy use, improve water quality, and showcase international partnership in their localities. Those cities with mills in the supply chains of the RSI partner retailers and brands will be of special focus to enable these partners to influence suppliers to take part in the program. Factories involved in the program will receive technical assistance and training in exchange for implementing environmental improvements in their facilities.

8.5 LESSONS FOR WORK ON GREEN GROWTH

The creation of a multi-stakeholder platform also provides an incubator of innovative ideas and approaches. The non-traditional partnerships developed through the RSI, at the global and country level, present a useful model for promoting green growth, particularly when tackling complex supply chains with large, often

dislocated, environmental footprints.[51] Where there is a strong interest from multinationals to engage on certification issues, supply chains can range from organic cotton production for textile manufacturing to sustainable mining, timber, agri-business, and fisheries.

There are plenty of opportunities for the World Bank and IFC to work closely together to green these supply chains. As the experience with the RSI has shown, the two sister institutions are in a unique position to jointly leverage their role as neutral brokers and conveners, working in tandem at both the global and country level, bringing together multinationals, international civil society players, governments, and local private sector interests.

51 Note that there is already a group called the Sustainable Apparel Coalition, which is an industry-wide group of over 80 leading apparel and footwear brands, retailers, suppliers, civil society, and NGOs working to reduce the environmental and social impacts of apparel and footwear products around the world. The focus of the Sustainable Apparel Coalition is the Higg Index, which measures the environmental performance of apparel products. Future versions will include footwear products and measure social performance.

APPENDICES

Appendix A: Bangladesh RSI Cleaner Production Factory Audits

The Bangladesh RSI factory audits were carried out in Dhaka in 2010–2011, as part of the World Bank Bangladesh Responsible Sourcing Initiative Non-Lending Technical Assistance.

The main results from the Bangladesh cleaner production factory audits are summarized here. Detailed overviews of the more promising cleaner production measures, of interest to textile mills, trade associations, and brands, are found in NRDC 2012a, and further information will be provided in a World Bank best practices technical guide (to be published). The complete findings of the audits are detailed in Ecopsis 2011 as part of their production efficiency and pollution prevention factory assessments for fabric mills and dye houses in Bangladesh (consultancy report), including Task A report: *Showcase of three top-performing factories*, and Task B report: *Assessment of five medium-performing factories*.

The factory cleaner production audits focused on practical factory improvements that would improve the production of steam and water heating, recycle process water, and recover heat. The emphasis was on low-cost, or even no-cost, measures, although more advanced high-cost interventions were also identified.

Methodology

The methodology for the factory assessments and formulation of the best-practice measures were based on NRDC's

earlier China experience. Over 25 Bangladesh factories were first long-listed. This initial selection was done in close consultation with the brands, who nominated their supplying firms from their Bangladesh supply chain segment. After an initial audit assessment was carried out, a final selection was made. The short-listed factories included three top-performing factories and five medium-performing factories.

Selection criteria included the implementation status of the best practices in each factory (as defined in the China context), and status of other or new cleaner production opportunities. In addition, factory-level considerations were taken into account. These included factory motivation, closeness of their relationships with brands, the attractiveness of savings to the factory, the relevance of savings in the factory's marketing strategy and future growth focus, existing compliance with buyer environmental standards, management capacity and commitment to environmental quality, willingness to share with peers, financial capacity to undertake the exercise, factory size, value as a peer leader for other similar factories, and factory size in relation to resource savings.

Following consultations with individual factories to make sure all the above criteria were met, a final shortlist of four medium-performing factories was drawn up. It is important to note that these were all improvement-minded factories, with much to demonstrate both in terms of resource savings and as peer leaders for the rest of the market and their brand buyers.

The selection methodology was shared during regular workshops and communication platforms with various stakeholders (including the brand buyers and the government) for refinement and improvements. In particular, the IFC's parallel initiative (see appendix B) was extremely useful, as it provided valuable input into the RSI selection criteria and calibrated the RSI findings in resource savings.

RSI's focus was on practical, low-cost (or even no-cost) factory infrastructure improvements that would improve the production of steam and water heating, recycle process water, and recover heat. Each potential improvement was assessed and ranked based on capital and operational costs (under $15,000 per initial investment for low-cost measures), payback time, and resource savings. Interventions with multiple resource savings (for example water and energy or water and chemicals) were prioritized, particularly water-related interventions, given the initiative's overall focus on water pollution.

Low-Cost Cleaner Production Best Practices

The factory audits identified seven low-cost cleaner production best practices for textile mills in Bangladesh. Three of the seven best practices cost less than Tk 410,400 ($5,000) each; two of these cost almost nothing (table A.1). The cost ranges for three other practices start at less than Tk 410,400 ($5,000). None requires more than 15 months to recoup costs. Note that the range of potential cleaner production investments for first-time right dyeing (including improved dye recipes and dispensing equipment) is broad, making it both a low-cost and a more advanced cleaner production best practice.

In total, if implemented together at the same mill, these improvements could reduce consumption of water and energy by up to 25 percent, and also reduce chemical use significantly. Most practices actually have a potential impact on several inputs (water, energy, chemicals) simultaneously.

It is interesting to note that although many factories do have housekeeping or maintenance programs that incorporate some of the best practices identified in this report, they tend not to systematically take advantage of the full range of low-cost cleaner production measures available to them. As a result, factories with

similar production systems had each adopted their own piecemeal selection of measures, and many owners and managers simply did not recognize or appreciate the existing inefficiencies associated with certain practices, and tended to value more expensive and sophisticated cleaner production measures over the cheaper ones.

Advanced Cleaner Production Best Practices

The Bangladesh textile mills audits also identified a range of more advanced cleaner production measures that could generate even more significant reductions in water, chemicals, and energy usage and yield greater financial savings. Initial up-front investments are higher than for low-cost measures, but payback remains attractive, at two years or less.

These higher-end practices were based on audits in three factories that are top-performing in energy, water, and chemical efficiency, namely the DBL Group (Hamza and Mymun factories), the Epyllion Group, and Partex Denim. All three are leading garment manufacturers in Bangladesh who have found that reducing pollution means significant savings to their bottom line, and are proof that textile factories in Bangladesh can achieve a high level of resource efficiency (NRDC 2012b).

Advanced cleaner production best practices included improving dye recipes; improving liquor ratio; minimizing washing and rinsing; using cogeneration plants; recovering heat from the power generation vent; and reusing caustic soda in the denim mercerizing operation. Table A.2 highlights some of the potential savings.

These practices may be especially suitable for new factories being established and for factories that are expanding or replacing equipment, and are thus especially relevant to Bangladesh's expanding textile sector. Measures may need to be adjusted to meet individual factory requirements.

TABLE A.1

RECOMMENDED BEST PRACTICES (ASSESSMENT OF FOUR BANGLADESH FACTORIES)

	% resource savings		Savings (Tk/tonne fabric)		Cost (Tk/tonne fabric)		Investment cost (Tk)		Payback period (months)	
Practice	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**
Water										
Eliminate water leaks, reduce hosepipe use	0.3	0.7	6.8	31.3	0.7	1.1	3,000	3,000	0.4	1.4
Reuse cooling water from dyeing machine	8.2	14.8	392	714	75	204	280,000	800,000	2.1	3.3
Reuse process water from rinsing	9.0	11.9	91	426	134	196	380,000	1,000,000	3.9	25.9
Energy										
Steam management	1.1	5.3	81	349	—	—	—	—	now	now
Insulate pipes, valves, flanges	0.4		23		22		60,000		11.2	
Recover heat from drying operations	20	20	527	1,769	267	368	1 million	1,5 million	2.5	8.4
Chemicals (dyes)										
Improved dye recipe	3	10	19	49			836, 000	3,4 million		15

Note: The costs and savings here are in Bangladesh taka (Tk). Conversions between taka and US dollars throughout the report reflect conversion rates in effect on May 9, 2012 at Tk 82 per US$1.

TABLE A.2

POTENTIAL SAVINGS FROM CLEANER PRODUCTION PRACTICES

Practice	% resource savings	Savings (Tk / tonne fabric)	Investment cost (Tk)	Payback period (months)
Water and chemical				
Improved dye recipe	20–35%	21,000/year water and energy	16-30 million	15
Improved liquor ratio	< 25%		16-41 million	
Reusing caustic soda	4–6%	790–1,188/year	30, 000-40, 000	now
Minimizing washing & rinsing	25–33%	10 l/kg	1,3 million	< 12
Energy				
Use cogeneration plants	30%		50–60million	> 24

Appendix B: IFC Cleaner Production Initiative, Bangladesh

IFC's Bangladesh Pilot: Promoting Cleaner Production in Textile WDF Sector

Between 2010 and 2012, IFC implemented a resource efficiency technical assistance pilot project. The objective of this pilot was to identify and implement potential cost-saving measures for energy, chemical, and water usage in 12 selected wet processing factories around Dhaka. IFC partnered with Solidaridad, a Dutch organization, and 10 buyers (H&M, Kappahl, Lindex, Mothercare, Levi's, WE Fashions, New Look, Bestseller, Primark, Tesco) to implement the project. Results from cleaner production measures in 12 wet processing factories demonstrated the potential for significant environmental benefits.

By implementing low-cost measures, the 12 participating factories saved on aggregate 880 million liters of water, 9 million cubic meters of gas, and 4.45 gigawatt-hours of electricity, and avoided 19,000 tonnes of greenhouse gas emissions annually. By implementing 150 recommendations out of a total of 185, the pilot factories saved $1 million in a year. While factories were expected to implement five to seven of the audit recommendations, an evolving program has inspired the realization of almost 85 percent of all recommendations at their own cost.

Estimates shows that if 50 percent of the factories in the wet processing industry adopted similar measures the savings would include $75 million; 63 billion liters of water; 650 million cubic meters of gas; and 300 gigawatt-hours of electricity per year. Given this remarkable potential, IFC is currently envisaging scaling up its technical assistance to an additional 200 wet processing factories, while promoting broader industry-wide uptake, ensuring continued competitiveness of the sector by reducing its environmental footprint and accelerating a "green" agenda.

IFC's Bangladesh Partnership for Cleaner Textiles (PaCT)

IFC has initiated a technical assistance program—the Bangladesh Partnership for Cleaner Textiles (PaCT), which is due to start implementation mid-2013. The goals of the program are to reduce water usage, reduce wastewater use, improve water quality, reduce energy consumption and greenhouse gas emissions, and improve occupational health and safety, including through improvements in water, sanitation, and hygiene. PaCT will try to achieve these goals through three components: buyer capacity building, factory support, and multi-stakeholder engagement.

Appendix C: Comparison of Low-Cost Cleaner Production Best Practices: China and Bangladesh

This appendix compares the results of NRDC's earlier cleaner production audits carried out in textile mills in China with the results for the low-cost options in Bangladesh. Overall, in spite of the differences in country context, there is a very high degree of transferability of best-practice measures across both textile-producing countries. As shown in table C.1, most cleaner production practices are highly relevant:

- Only two practices identified in China were not at all applicable in Bangladesh (the prescreening of coal, and the recovery of heat from smokestacks). This is due to the fact that textile mills in China and Bangladesh depend on very different energy sources, the former on coal and the latter on natural gas;
- Other practices, including the reuse of condensate, the optimization of air compression systems, and improved dye recipes, were all highly relevant in both contexts, but differed slightly in terms of their rankings as top or medium best practices, due largely to differences in the magnitude of anticipated savings.

TABLE C.1

COMPARISON OF CLEANER PRODUCTION BEST PRACTICES: CHINA AND BANGLADESH

No.	Practice	China	Bangladesh
1	Leak detection, maintenance, housekeeping	√	√
2	Reuse cooling water	√	√
3	Reuse condensate	√	o
4	Reuse process water	√	√
5	Recover heat from hot water rinses	√	√
6	Prescreen coal	√	X
7	Steam management	√	√
8	Recover heat from smokestacks	√	X
9	Insulate pipes, valves, flanges	√	√
10	Optimize compression air system	√	o
11	Improved dye recipes	o	√

X Not applicable.

√ Low-cost cleaner production best practice.

o Useful cleaner production measure, but not classified as a low-cost best practice.

The principal factors driving these differences in returns for individual cleaner production measures are as follows:

Source of water. China uses river water (which can include resource charges) and public supply (less common), while Bangladesh mostly uses borewells (so costs are not explicit).

Fuel type. China uses coal to generate power, and Bangladesh uses natural gas. Reliability of energy supply is a major issue for Bangladesh mills and inefficient handling of this energy crisis may affect the whole value chain of the ready-made garment export business, causing negative export growth, unemployment, social unrest, and frustration in the whole economy (ADSL 2009).

Metering. In China there is factory-level water, steam, and electricity metering, and water meters are relatively inexpensive. Process-level metering is officially required but there is low compliance. In Bangladesh, there is very limited metering, it is not required, and meters are expensive (they need to be imported).

Cost of water treatment. In China the cost of both water and wastewater treatment is significantly higher compared to Bangladesh (5–10 times higher for water costs and 2–3 times higher for wastewater treatment).

Chinese government policies. China has energy reduction targets and cleaner production goals in place as part of their Cleaner Production Law. As a result, some mills have been forced to close older plants and move to industrial parks. This also means the Chinese manufacturing equipment in use may be more recent and efficient (although there are no clear data to support this).

Huge Chinese domestic market for apparel. In China there is a significant number of mills that only serve the domestic market, which means they are not sensitive to export-related and international measures.

Labor costs. Bangladesh still has significantly lower labor costs: In Bangladesh the hourly rate is $0.22–0.32, while in China it is $0.55–1.08.

Appendix D: Bangladesh World Bank Responsible Sourcing Initiative (RSI) Non-Lending Technical Assistance (NLTA)

OBJECTIVES AND OUTPUTS

RSI NLTA Objective

As a process-based NLTA, this activity has been based around (a) the identification and nurturing of new collaborations with non-traditional partners; and (b) the development and dissemination of specific outputs each tailored to target specific stakeholders, including Bangladesh factories, trade associations, regional buyers (based in-country or at regional level), senior executives of multinational brands, and the Bangladesh Department of Environment. The PCN review meeting was held in May 2011.

The higher-level objective of this activity was to promote environmental compliance in the textile industry in order to reduce industrial water pollution in the Dhaka watershed.

The objective of this activity was to identify best-practice, energy-efficient, and less polluting cleaner production processes for the Bangladesh textile industry and to encourage their adoption through market mechanisms and new partnerships between the suppliers of major multinational apparel retailers and brands, Bangladesh textile industry trade associations, the Government of Bangladesh, and IFC.

This objective was to be achieved through the following outcomes:

- The most promising clean production options for Bangladesh textile factories (which are simultaneously low cost and waste reducing) are identified through factory audits and piloting of best practices;
- Awareness is raised within industries, business associations, and the Government of Bangladesh on global environmental best practices through demonstration pilots, South-South exchange of lessons learned (mostly with other Asian counterparts), and information sharing and knowledge building (through a series of dissemination events and workshops);
- Leading multinationals are encouraged to feed the lessons learned from the RSI into the development of their supply chain policies and guidelines.

Overview of Key Outputs and Workshops from the RSI NLTA

Detailed audits were carried out for four medium-performing factories and three top-performing factories. Implementation of a few measures was carried out in one of the factories. In addition, results were compared and contrasted with IFC's parallel initiative, which had a greater implementation focus.

Ecopsis Reports

Ecopsis. 2011. *Production Efficiency/Pollution Prevention Factory Assessments for Fabric Mills and Dye Houses in Bangladesh*.

Task A: Showcase of three top-performing factories.

Task B: Assessment of five medium-performing factories.

Task B: Water, energy, chemicals, and transversals savings calculations spreadsheet of the five medium-performing factories.

Task C: Implementation of the best practices at one of the five medium-performing factories, Libas.

Task D: Consolidation for scaling up.

NRDC Reports

NRDC (Natural Resources Defense Council). 2012a. Best Practices for Textile Mills to Save Money and Reduce Pollution, Bangladesh.

NRDC (Natural Resources Defense Council). 2012b. Standout Practices at High-Performing Bangladeshi Textile Mills: How Top Resource-Efficient Factories in Bangladesh Save Money and Curb Pollution. http://www.nrdc.org/international/cleanbydesign/files/cbd-textile-mills-standout-practices-bangladesh.pdf.

Workshops and Consultations

- **Round table** co-chaired by World Bank, IFC, Ministry of Environment and Forests, and Ministry of Local Government, May 8, 2011: Consultations with the local stakeholders—factories and trade associations—to share and to seek input on the draft best practice and case study reports;
- **Workshop** co-chaired by World Bank, IFC, Ministry of Environment and Forests, and Ministry of Local Government, May 9, 2011: These national multi-stakeholder workshops purposefully included a broad range of stakeholders, including government, trade associations, local buyers, and donors;
- **India Water Week Paper**, March 2012: India Water Week—shared lessons with broad range of Indian and international government officials, academics, donors;
- **RSI round table** with multinational corporations, March 1, 2012: The round table was held with senior executives from eight leading brands, chaired by World Bank SASSD Director and co-chaired by IFC and NRDC, to discuss implementation of supply chain guidelines and next steps;
- **RSI round table** with multinational corporations, July 19, 2012: The objectives of this meeting were to (a) get consensus around the RSI Phase II as a whole (overall conceptual framework, relationship of the country/regional/global initiatives); (b) agree on specific roles and responsibility of partners (country activities and global actions); and (c) better leverage each partner's unique comparative advantage.

Reference List

ADSL. 2009. *SEDF Baseline Surveys and Sector Studies in Agribusiness, Light Engineering and Textiles and Apparel Sectors in Bangladesh.* Final Report. Dhaka: International Finance Corporation, South Asia Enterprise Development Fund.

Akther, H., M.S. Ahmed, and K.B.S. Rasheed. 2009. "Spatial and Temporal Analysis of Groundwater Level Fluctuation in Dhaka City, Bangladesh." *Asian Journal of Earth Sciences 2:* 49–57.

Alam, K. 2008. "Cost-Benefit Analysis of Restoring Buriganga River, Bangladesh." *International Journal of Water Resources Development* 24 (4): 593–607.

Alam, K., and D. Marinova 2006. *Sustainability and River Restoration.* Proceedings of the 35th Australian Conference of Economists (ACE), 25–27 September 2006, Curtin University of Technology, Perth, Western Australia.

Berg, A., S. Hedrich, S. Kempf, and T. Tochtermann. 2011. *Bangladesh's Ready-Made Garment Landscape: The Challenge of Growth.* McKinsey & Company.

Cotton Incorporated. 2010. *Sustainable Dyeing Solutions.* Cotton Incorporated Supply Chain Insights. http://www.cottoninc.com/corporate/Market-Data/SupplyChainInsights/sustainable-dyeing-solutions/Sustainable-Dyeing-Solutions-02-10.pdf.

Ecopsis. 2011. *Production Efficiency/Pollution Prevention Factory Assessments for Fabric Mills and Dye Houses in Bangladesh.*

Garduño, H., S. Romani, B. Sengupta, A. Tuinhof, and R. Davis. 2011. *India Groundwater Governance: Case Study.* Water Partnership Program. http://www.groundwatergovernance.org/fileadmin/user_upload/groundwatergovernance/docs/Country_studies/GWGovernanceIndia.pdf.

Geng, Y., W. Xinbei, Z. Qinghua, and Z. Hengxin. 2010. "Regional Initiatives on Promoting Cleaner Production in China: A Case of Liaoning." *Journal of Cleaner Production* 18: 1502–08. http://www.iae.cas.cn/kycg/lw/jqfbzylw/201009/W020100928354779427586.pdf.

Gereffi, G., and S. Frederick. 2010. *The Global Apparel Value Chain, Trade and the Crisis: Challenges and Opportunities for Developing Countries.* Policy Research Working Paper No. 5281. Washington, DC: World Bank Development Research Group, Trade and Integration Team. http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2010/04/27/000158349_20100427111841/Rendered/PDF/WPS5281.pdf.

Global Water Intelligence. 2011. *"Global Water Tariffs Continue Upward Trend." Global Water Intelligence* 12: (9). http://www.globalwaterintel.com/archive/12/9/market-profile/global-water-tariffs-continue-upward-trend.html.

Grannis, K. 2012. STORES *Top 100 Retailers Report Finds Growth in Grocery Segment.* National Retail Federation. http://www.nrf.com/modules.php?name=News&op=viewlive&sp_id=1397.

Henderson, K., K. Somers, and M. Stuchtey. 2013. "Measuring the Real Cost of Water." *McKinsey Quarterly* March 2013.

IWM (Institute of Water Modelling). 2007. *Industrial Environmental Compliance and Pollution Control in Greater Dhaka—Phase 1.*

Lee, H., E. Plambeck, and P. Yatsko. 2013. "Incentivizing Sustainability in Your Chinese Supply Chain." *European Business Review.* http://www.europeanbusinessreview.com/?p=6453.

Montfort, M., and M. Yang. 2004. *The End of Textile Quotas: A Case Study of the Impact on Bangladesh.* International Monetary Fund Working Paper.

NRDC (Natural Resources Defense Council). 2012a. *Best Practices for Textile Mills to Save Money and Reduce Pollution, Bangladesh.*

NRDC (Natural Resources Defense Council). 2012b. *Standout Practices at High-Performing Bangladeshi Textile Mills: How Top Resource-Efficient Factories in Bangladesh Save Money and Curb Pollution.* http://www.nrdc.org/international/cleanbydesign/files/cbd-textile-mills-stand-out-practices-bangladesh.pdf.

NRDC (Natural Resources Defense Council). 2010. NRDC's Best Practices for Textile Mills: How Redbud Company Saved Money, Curbed Pollution—and Gained Favor from a Major Buyer. http://www.nrdc.org/international/files/redbud.pdf

Ramesh Babu, B., A.K. Parande, S. Raghu, and T. Prem Kumar. 2007. "Cotton Textile Processing: Waste Generation and Effluent Treatment." *Journal of Cotton Science* 11: 141–53.

Rupp, J. 2008. *Ecology And Economy In Textile Finishing.* Textile World. http://www.textileworld.com/Articles/2008/December_2008/Features/Ecology_And_Economy_In_Textile_Finishing.html.

SWECO. 2010. *Consultancy Service for Water Quality and Industrial Pollution Monitoring System: Program Design and Feasibility Studies for CETPs in Bangladesh.*

Ullah, A.N.Z., A. Clemett, N. Chowdhury, M. Chadwick, T. Huq, and R. Sultana. 2006. *Human Health and Industrial Pollution in Bangladesh.* Stockholm Environment Institute at York, Bangladesh Centre for Advanced Studies, University of Leeds, and Department for International Development.

UNEP (United Nations Environment Programme). 2013. *Resource Efficient and Cleaner Production.* http://www.unep.fr/scp/cp/.

UNEP (United Nations Environment Programma). 2003. *Groundwater and its Susceptibility to Degradation: A Global Assessment of the Problem and Options for Management.* Early Warning and Assessment Report Series, RS. 03-3. Nairobi, Kenya.

UNIDO (United Nations Industrial Development Organization). 2008. *Globalization, the Changed Global Dynamics of the Clothing and Textile Value Chains and the Impacts on Sub-Saharan Africa.* Geneva: UNIDO.

UNIDO and UNEP (United Nations Industrial Development Organization and United Nations Environment Programme). 2008. *Independent Evaluation: UNIDO-UNEP Cleaner Production Programme*. http://www.unido.org/fileadmin/user_media/About_UNIDO/Evaluation/Thematic_reports/CP%20Progr%20eval%20report_ebook.pdf.

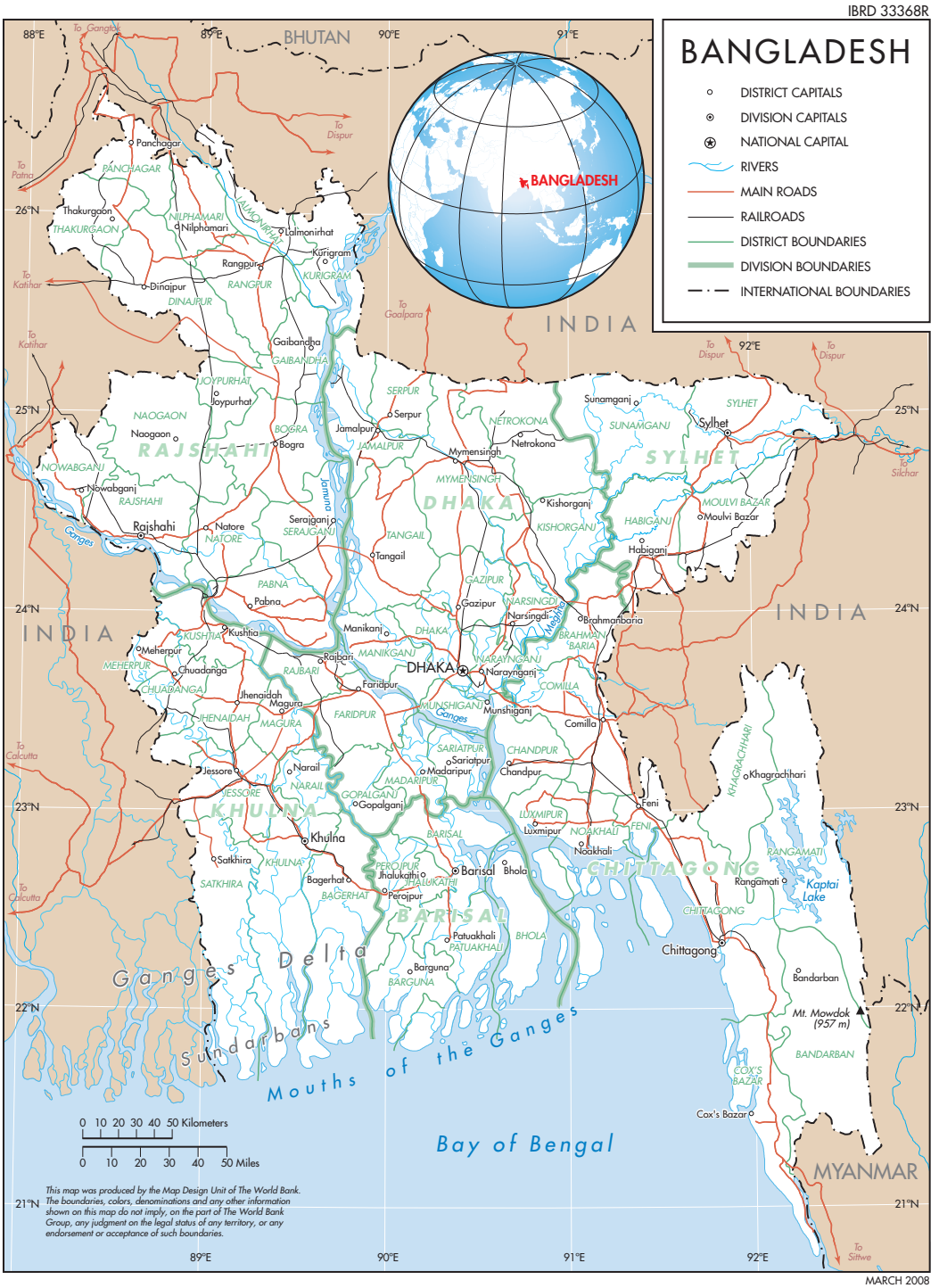
UNIDO and UNEP (United Nations Industrial Development Organization and United Nations Environment Programme). 2010. *Taking Stock and Moving Forward: The UNIDO-UNEP National Cleaner Production Centres.* http://www.unep.org/resourceefficiency/Portals/24147/scp/cp/pdf/Taking%20Stock%20of%20NCPC%20Programme.pdf.

Vishnu, G., et al. 2008. "Assessment of Fieldscale Zero Liquid Discharge Treatment Systems for Recovery of Water and Salt from Textile Effluents." *Journal of Cleaner Production* 16 (10): 1081–89.

World Bank. 2008. *Bangladesh Institutional and Economic Analysis of Industrial Effluent Pollution and Management in the Greater Dhaka Watershed.* Washington, DC: World Bank (unpublished).

World Bank. 2012. Getting to Green: *A Sourcebook of Pollution Management Policy Tools for Growth and Competitiveness.* Washington, DC: World Bank. http://siteresources.worldbank.org/ENVIRONMENT/Resources/Getting_to_Green_web.pdf.

Yew, L., et al. 2012. *Urban Water Sector Reforms in India: Financing Infrastructure Development through Market-Based Financing and PPP.* Working Paper Series. University of Singapore.


IBRD 33368R
BANGLADESH
DISTRICT CAPITALS
DIVISION CAPITALS
NATIONAL CAPITAL
RIVERS
MAIN ROADS
RAILROADS
DISTRICT BOUNDARIES
DIVISION BOUNDARIES
INTERNATIONAL BOUNDARIES
BHUTAN
INDIA
MYANMAR
BANGLADESH
DHAKA
RAJSHAHI
KHULNA
BARISAL
CHITTAGONG
SYLHET
RANGPUR
Ganges Delta
Sundarbans
Mouths of the Ganges
Bay of Bengal
Kaptai Lake
Mt. Mowdok (957 m)
Panchagar
Thakurgaon
Nilphamari
Lalmonirhat
Kurigram
Rangpur
Dinajpur
Gaibandha
Joypurhat
Naogaon
Bogra
Serpur
Jamalpur
Mymensingh
Netrokona
Sunamganj
Sylhet
Nowabganj
Rajshahi
Natore
Serajganj
Tangail
Kishorganj
Moulvi Bazar
Habiganj
Pabna
Gazipur
Narsingdi
Brahmanbaria
Kushtia
Manikanj
Meherpur
Chuadanga
Raibari
Narayanganj
Faridpur
Jhenaidah
Magura
Munshiganj
Comilla
Jessore
Narail
Madaripur
Chandpur
Sariatpur
Gopalganj
Khulna
Feni
Satkhira
Bagerhat
Jhalukathi
Barisal
Bhola
Noakhali
Luxmipur
Khagrachhari
Rangamati
Patuakhali
Barguna
Chittagong
Bandarban
Cox's Bazar
0 10 20 30 40 50 Kilometers
0 10 20 30 40 50 Miles
This map was produced by the Map Design Unit of The World Bank. The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of The World Bank Group, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries.
MARCH 2008

SAWI SOUTH ASIA WATER INITIATIVE

IFC

BANK-NETHERLANDS BNPP PARTNERSHIP PROGRAM

WATER PARTNERSHIP PROGRAM

NRDC
THE EARTH'S BEST DEFENSE

DFID Department for International Development

Australian Government
AusAID

NORWEGIAN MINISTRY OF FOREIGN AFFAIRS