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Compliance with Global Quality Requirements in Pakistan's Export Sector

Salman Ehsan* **and Ayesha Khanum****

Abstract

This paper describes the level of compliance with quality standards in relation to Pakistan's top export product categories. With greater competition, innovations in technology, and stricter measures of quality being enforced, Pakistan needs to adopt a holistic, systematic approach to not just meeting, but also exceeding, international quality standards and certifications for its exports. Focusing on rice and textiles, we identify which compliance-related gaps need to be filled to ensure the sustainable growth of high-quality exports to major global markets. The study outlines the key dimensions of international quality standards as well as specific standards and requirements for textiles and rice, examines the quality assurance infrastructure in Pakistan, and presents policy recommendations.

Keywords: Global quality standards, exports, compliance, Pakistan.

JEL classification: L15, P45, Q18, Q27.

1. Introduction

Global trade has increased manifold in the last 15–20 years with countries such as China, India, and Bangladesh having increased their exports significantly since 2000. The overall economic contribution of a country's export sector should not be underestimated: Pakistan's exports, for instance, are a major source of foreign exchange earnings and a key source of employment (Table 1).

The opportunities arising from increased global trade are accompanied by numerous challenges both for manufacturers and exporters. One of these is meeting strict quality and compliance requirements, not only from a product-specific and technical perspective, but also from regulatory, social, environmental, performance, and customer-specific standpoints. This paper provides an overview of quality standards and certification with reference to Pakistan's principal export

* Assistant Professor, Faculty of Business Administration, Lahore School of Economics.
** Assistant Editor, Lahore Journal of Economics, Lahore School of Economics.

categories: textiles (specifically cotton cloth, knitwear, cotton yarn, readymade garments, and towels) and rice. It assesses their level of compliance with global requirements, identifies any gaps, and presents some policy recommendations for improving the situation. Chemicals and pharmaceuticals are seen as a potential category of export growth and thus included in our analysis in some cases.

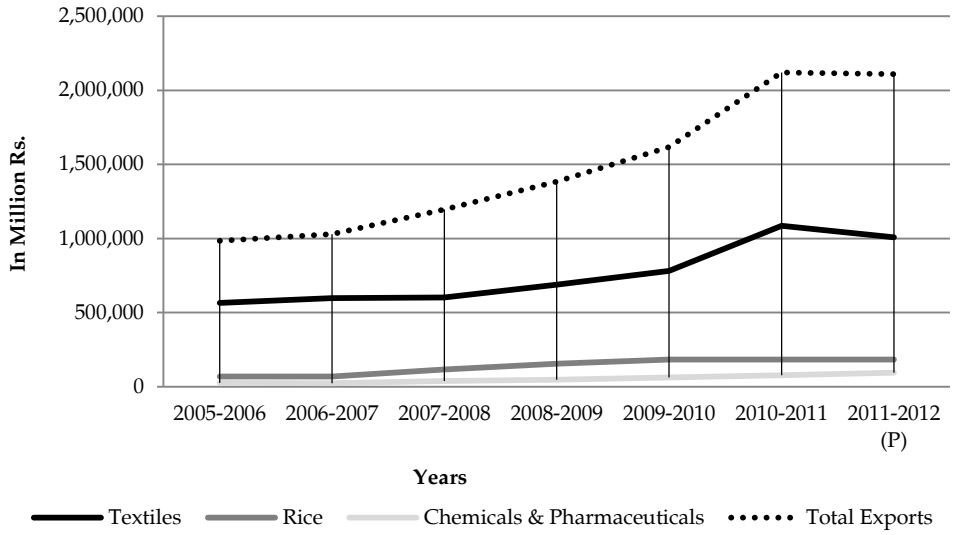
Table 1: The textile industry's economic contribution, 2011/12

Exports	52% of total exports (US$ 12.36 billion)
Manufacturing	46% of total manufacturing
Employment	40% of total labor force
GDP	8.5% of total GDP
Market capitalization (listed companies)	5.0% of total market capitalization

Source: http://www.aptma.org.pk/Pak_Textile_Statistics/repo.asp

Historically, the textiles sector has dominated Pakistan's exports with respect to value as well as volume (Table 2). Rice represents the country's important agriculture sector and has shown significant export growth in recent years, increasing almost threefold from 2005/06 to 2011/12 (Table 2 and Figure 1). Figure 1 shows growth trends for textiles, rice, chemicals and pharmaceuticals, and total exports.

Figure 1: Pakistan's major exports, 2005–12



Note: P = provisional.
Source: Pakistan Economic Survey for 2011/12 and 2012/13.

Table 2: Export categories

	Top exports	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12*
1	Rice	68,786	68,286	117,088	154,762	183,371	183,557	184,405
2	Fish and fish preparations	11,578	11,419	13,329	18,465	19,051	25,319	28,598
3	Fruits	7,331	6,892	9,086	12,313	20,086	23,138	32,069
4	Wheat		5,863	446	3,064	61	49,746	11,179
5	Sugar	1,591		5,739	640	2		2,576
6	Meat and meat preparations	1,126	2,515	3,069	5,546	8,327	13,027	15,518
7	Raw cotton	4,038	3,048	4,425	6,827	16,367	30,734	41,392
8	Cotton yarn	83,490	86,588	81,321	87,354	120,069	186,601	162,003
9	Cotton cloth	126,674	122,864	126,172	153,039	150,937	219,065	218,160
10	Knitwear	103,876	115,865	114,481	135,998	147,866	196,110	176,681
11	Bed linen	120,750	121,005	119,030	136,105	146,195	178,290	155,109
12	Towels	35,699	36,546	38,453	50,387	56,012	64,978	61,326
13	Readymade garments	79,131	86,965	93,703	96,483	106,446	152,858	144,268
14	Made-up articles (art, silk, and synthetic textiles)	11,847	25,464	25,494	21,740	37,422	57,103	48,816
15	Carpets, carpeting, rugs, mats	15,367	14,147	13,528	11,392	11,473	11,285	10,758
16	Sports goods excl. toys	20,569	17,481	19,012	21,393	25,021	27,839	30,242
17	Leather excl. reptile leather (tanned)	17,293	20,237	26,026	23,394	28,699	39,569	39,841
18	Leather manufactures	42,870	33,592	43,765	43,473	38,413	46,178	46,535
19	Footwear	8,709	6,944	7,778	9,875	7,763	9,296	8,861
20	Medical/surgical instruments	9,739	11,571	16,368	19,870	19,203	21,995	27,126
21	Chemicals and pharmaceuticals	25,799	23,744	38,913	47,289	62,251	77,816	96,009
22	Engineering goods	13,105	14,397	13,356	20,752	19,294	21,650	24,727
23	Jewelry	966	2,550	13,477	22,444	53,456	34,588	82,774
24	Cement/cement products	6,143	8,844	26,390	45,574	40,261	38,191	44,618
25	All other items	168,362	182,485	226,189	235,539	299,412	411,914	417,015
	Total exports	984,839	1,029,312	1,196,638	1,383,718	1,617,458	2,120,847	2,110,606

* Provisional exports.

Source: Pakistan Economic Survey for 2012/13.

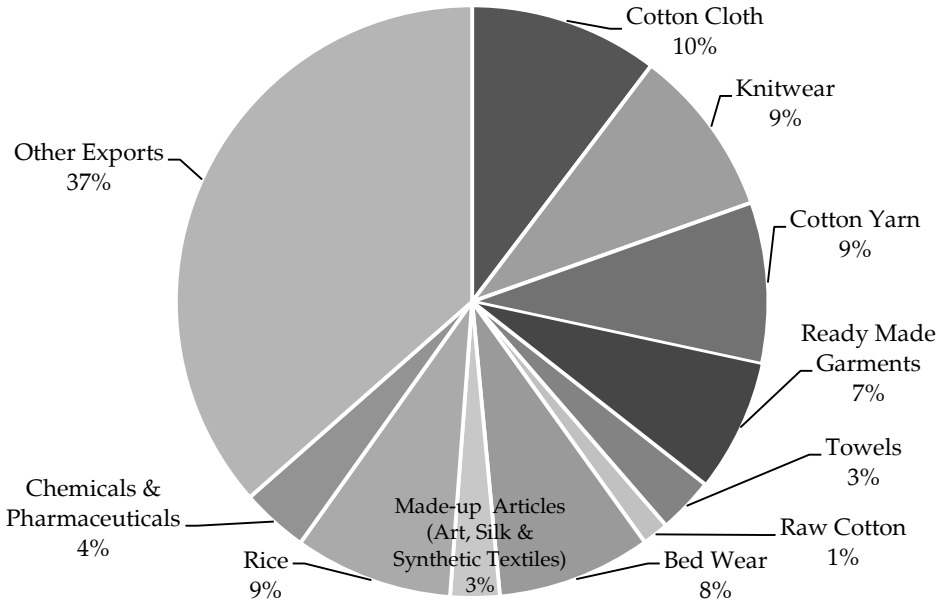
Table 3 shows the structure of major exports from 2005 to 2012. Figure 2 shows that the textiles sector still leads among export categories, followed by rice.

Table 3: Pakistan's major exports (PRs million)

	Textiles										
Year	Cotton cloth	Knitwear	Cotton yarn	Readymade garments	Towels	Raw cotton	Bed linen	Made-up articles*	Rice	Chemicals + pharmaceuticals	Total
2005/06	126,674	103,876	83,490	79,131	35,699	4,038	120,750	11,847	68,786	25,799	984,839
2006/07	122,864	115,865	86,588	86,965	36,546	3,048	121,005	25,464	68,286	23,744	1,029,312
2007/08	126,172	114,481	81,321	93,703	38,453	4,425	119,030	25,494	117,088	38,913	1,196,638
2008/09	153,039	135,998	87,354	96,483	50,387	6,827	136,105	21,740	154,762	47,289	1,383,718
2009/10	150,937	147,866	120,069	106,446	56,012	16,367	146,195	37,422	183,371	62,251	1,617,458
2010/11	219,065	196,110	186,601	152,858	64,978	30,734	178,290	57,103	183,557	77,816	2,120,847
2011/12 (P)	218,160	176,681	162,003	144,268	61,326	41,392	155,109	48,816	184,405	96,009	2,110,606

Note: * = art, silk, and synthetic textiles; P = provisional.
***Source*:** Pakistan Bureau of Statistics.

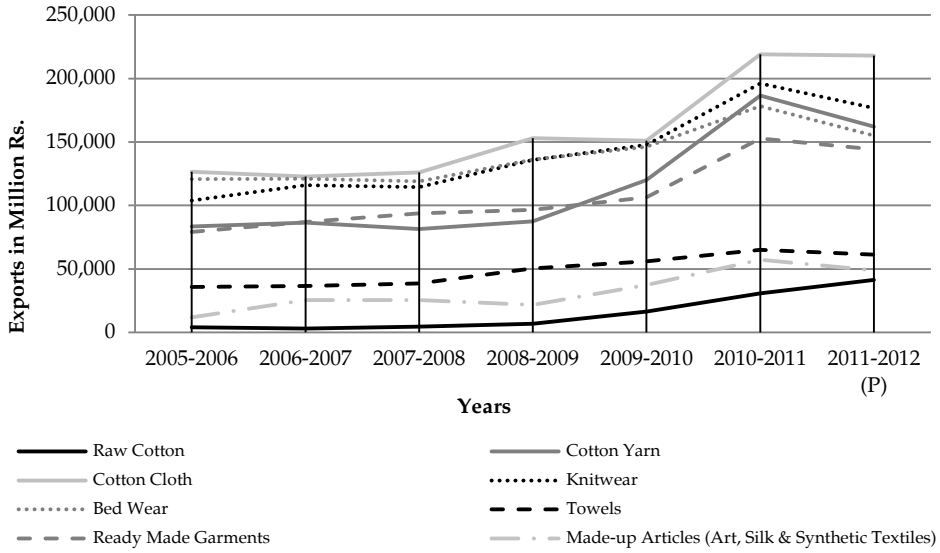
Figure 2: Overall exports of textiles, rice, and other products, 2010/11



Note: Data includes provisional exports.
Source: Pakistan Economic Survey for 2012/13.

Figure 3 shows the overall growth trends for all textile categories; of these, cotton cloth has consistently trended upward.

Figure 3: Growth trends for textile export categories, 2005–12*



Note: * = provisional.
***Source*:** Pakistan Bureau of Statistics.

2. Key Dimensions of International Quality Requirements

This section examines the main international quality standards that apply to textile and rice exports.

2.1. Textiles

The requirements and standards that apply to textile exports can be categorized broadly as (i) regulatory (safety, labeling, origin, or other); (ii) product-specific (durability, performance, appearance); (iii) customer-specific (physical, chemical, or other); (iv) social (labor, facility, and work environment); and (v) environmental.

2.1.1. Key International Quality Standards Applicable

The main international quality standards for textile exports include the following (see Small and Medium Enterprise Development Authority, n.d.):

- *ISO 9001/2000* (gaining competitive advantage through quality)
- *ISO 14001* (proving the producer's environmental responsibility)

- *OHSAS 18001* (demonstrating the ability to manage risk)
- *SA 8000* (enhancing a company's reputation through social responsibility)
- *ISO 17799/BS 7799/BS 15000* (improving the security of a business)
- *WRAP* (certification of lawful, human, and ethical manufacturing)
- *Eco-labels* (eco-labels differ in many respects. Based on the product's scope and familiarity with the textiles sector, two labels are selected that could add value to the Pakistani industry.)
- *Oeko-Tex 100* (a label that focuses on minimizing the presence of dangerous chemicals in textile products)
- *EU Eco-Label for Textiles* (sometimes referred to as the "European flower," it takes into account the complete lifecycle of a textile product)
- *Customer-specific requirements* related to facility, product, labor, and environment.

Compliance with these standards is likely to boost textile exports. They cover a range of dimensions, including technical, product-specific, safety/regulatory, performance-related, and social and environmental standards. Larger firms, particularly those conscious of their corporate image, identify their own codes of conduct, employ their own auditors, and do not rely solely on international certifications such as ISO. Such firms include, among others, Disney, Ikea, Gap, Wal-Mart, Levi Strauss & Co., and Nike. Their own codes of conduct relate mainly to capacity, capability, safety, environment, child labor, discrimination, applicable laws, and working conditions.

Nike, for instance, follows a Restricted Substance List program and does not allow the use of heavy metals such as cadmium, azo dyes, and other chemical compounds deemed harmful for humans and/or the environment. Other global brands may insist on using organically grown cotton for their products given consumer demand and willingness to pay a premium for such products. In the case of Disney, the company employs a focused code of conduct including environmental protection and labor standards.

2.1.2. Constraints to Meeting Quality Standards

Our findings are based primarily on interviews with the Sapphire Group of Companies, the Chakwal Group, Matrix Sourcing, Trans-Atlantic

Business Solutions, and Intertex.[1] The key constraints identified by the business operators we interviewed are listed below:

- The lack of quality orientation and commitment to labor on the part of entrepreneurs
- Poor in-process handling, which can result in product contamination and poor appearance, and an emphasis on fixing defects downstream instead
- Inconsistent product quality
- Very few facilities that are engaged in high-quality pattern making and stitching
- The near absence of approaches to labor and human resource development
- The country's poor law and order situation, which discourages customers from visiting the industry regularly
- The high cost of energy, which, in some cases, compels producers to cut corners in process and product quality
- The dearth of high-quality raw materials and inputs needed to produce high-value consumer products
- Issues related to packaging material quality and labeling (barcodes, radio frequency identification, etc.)
- The lack of IT infrastructure, such as enterprise resource planning and electronic data interchange at the supplier level, which are critical to becoming part of high-performance global supply chains.

2.2. Rice

According to the Codex standards (198-1995) for rice,

> Rice is whole and broken kernels obtained from the species *Oryza sativa L.* Paddy rice is rice which has retained its husk after threshing. Husked rice (brown or cargo rice) is paddy rice from which the husk only has been removed. The process of husking and handling may result in some loss of bran. Milled rice (white rice) is husked rice from

[1] These firms were represented, respectively, by: Shayan Abdullah (owner and operator), Khawaja Shehzad (owner and operator), Azfar Hassan (chief executive officer), Mohammad Azhar (chief executive officer), and Shahid Chaudhry (chief executive officer).

> which all or part of the bran and germ have been removed by milling. Parboiled rice may be husked or milled rice processed from paddy or husked rice that has been soaked in water and subjected to a heat treatment so that the starch is fully gelatinized, followed by a drying process. Glutinous rice (waxy rice) [comprises] kernels of special varieties of rice, which have a white and opaque appearance. The starch of glutinous rice consists almost entirely of amylopectin. It has a tendency to stick together after cooking (Codex Alimentarius Commission, 1996).

Rice quality factors thus include general as well as specific standards, and relate to contaminants, hygiene, packaging, and labeling. According to the Rice Exporters Association of Pakistan (REAP) (2012), "for consumers, quality encompasses a complete range of visual, sensory and palatability criteria that include impressive appearance of raw as well as cooked rice texture in terms of stickiness/flakiness and appealing aroma."[2] Rice is generally classified by grain length or by the ratio of length to width. For simplicity's sake, Pakistan's rice exports can be divided into basmati and non-basmati varieties. Basmati generally fetches a much higher price than non-basmati varieties.[3]

2.2.1. Constraints to Meeting Quality Standards

Our main findings are based on interviews with leading rice exporters, including Guard Rice, Reem Rice Mills, and Ideal Rice.[4] The key constraints identified by the business operators we interviewed are listed below:

- The dearth of effective research on grain development and new varieties
- The poor handling of pre-harvest and post-harvest paddy, which results in high moisture content, leading to numerous quality issues such as the development of aflatoxins
- The lack of accredited local testing facilities for critical tests related to DNA, aflatoxin, heavy metals, genetically modified organisms (GMOs), pesticide residue, and others

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[2] See http://reap.com.pk/links/about_rice.asp

[3] Interview with Abdul Basit, Head of Exports, Guard Rice, Lahore.

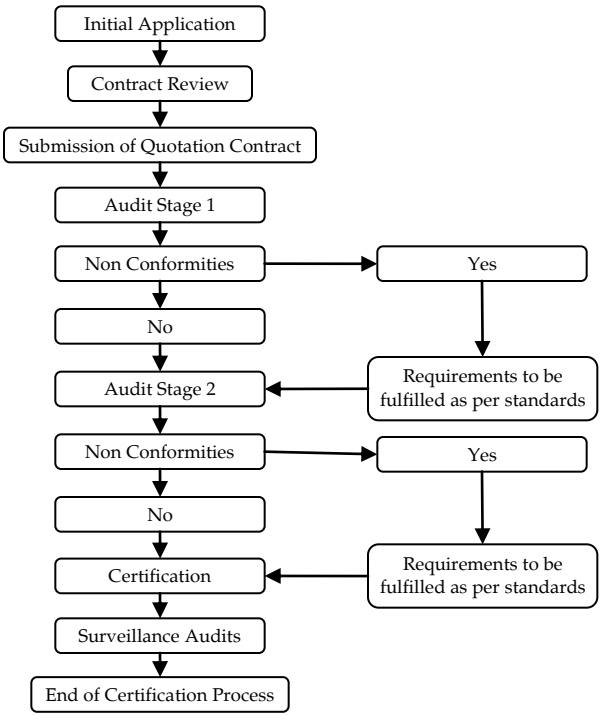
[4] These firms were represented, respectively, by Abdul Basit (head of exports), Javed Islam Agha (firm owner and cofounder of REAP), and Ahsan Saeed Sheikh (owner and operator).

- The change in pre-shipment inspection (currently handled by the Quality Review Committee (QRC) under the government-controlled Trade Development Authority of Pakistan; since control shifted from REAP to TDAP, exporters' confidence in the QRC has been compromised significantly)
- Inadequate quality and compliance orientation at the grower level, leading to numerous issues for exporters
- The absence of an effective body representing the interests of the supply chain as a whole.

2.2.2. Obtaining International Certification

Figure 4 illustrates the procedure for obtaining major international certification such as from the International Organization for Standardization (ISO) and hazard analysis critical control point (HACCP) systems.[5]

Figure 4: Procedure for obtaining major international certification

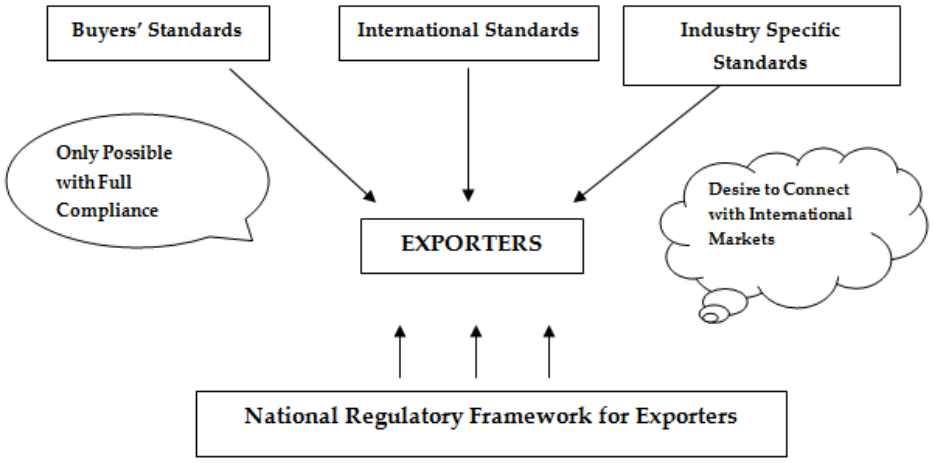


Source: Small and Medium Enterprise Development Authority (n.d.).

[5] For further details, see http://www.fao.org/docrep/meeting/008/y5871e/y5871e0m.htm

Figure 5 provides a general idea of the regulatory framework followed by exporters, who need to comply with buyers' standards, international standards and, in some cases, industry-specific standards (e.g., Nike and Ikea in the case of textiles). Rice exporters may need to comply with country-specific standards such as those laid down by the Saudi Standards, Metrology and Quality Organization (SASO) (for exporting rice in to Saudi Arabia).

Figure 5: Regulatory framework for exporters



3. Standards and Requirements for Textiles and Rice

Some of the main international testing standards for textiles are laid down by the American Society for Testing and Materials, the American Association of Textile Chemists and Colorists, the British Standards Institute, the ISO, the European Committee for Standardization, the Electrotechnical Commission, and the Technological Association of the Pulp and Paper Industry (see Appendix).

Rice testing requirements can vary from market to market. Some of the more common testing requirements for Europe include tests related to:

- Aflatoxin
- DNA
- Heavy metals
- GMOs
- Pesticide residue

The inspection criteria include product specifications and physical characteristics such as:

- Moisture percentage
- Average grain length
- Broken grains
- Purity
- Shriveled percentage (immature grain)
- Damaged grains (discolored, field damage, heat damage, fungus)
- Foreign content (e.g., insects, stones, etc.)
- Tip breakage
- Whiteness

4. Quality Assurance Infrastructure in Pakistan

Tables 4 and 5 provide a generic capability matrix for the textiles and rice sectors. It is evident that international quality service providers are generally considered more reliable and are often a nominated source for testing, inspection, and certification requirements because they are globally recognized and have the requisite capacity and networks.

Table 4: Major players in textile quality assurance in Pakistan

	Capability			
Organization	**Testing**	**Inspection**	**Certification**	**Origin**
SGS Consumer Testing Services	√	√	√	International
Intertek Pakistan	√	√	√	International
Bureau Veritas Consumer Products Services	√	√	√	International
Textile Testing International	√	√	×	National
Pakistan Textile Testing Foundation	√	√	√	National
Pakistan Council of Scientific and Industrial Research	√	√	×	National
In-house laboratories	√	×	×	National

Source: Pakistan Standards and Quality Control Authority.

Table 5: Major players in rice quality assurance in Pakistan

Organization	Capability			Origin
	Testing	Inspection	Certification	
SGS	√	√	√	International
Intertek Pakistan	√	√	√	International
Bureau Veritas	√	√	√	International
Eurofins	√	√	×	International
Agriculture – Industry – Marine Survey and Inspection Group	√	√	√	International
e-Rice Lab	√	√	√	National
National Institute for Biotechnology and Genetic Engineering	√	√	×	National
Pakistan Council of Scientific and Industrial Research	√	√	√	National
Nuclear Institute for Agriculture and Biology	√	×	×	National
In-house laboratories	√	×	×	National

Source: Pakistan Standards and Quality Control Authority.

5. Policy Recommendations

Based on our findings, the following measures would help the textiles sector improve its compliance with international certification standards:

- Investing in research and development (R&D) in cotton crop production to improve yield and quality.
- Investing in human resource development at all levels, including leadership and management training for entrepreneurs.
- Seeking joint ventures with technically advanced and mature players such as China, Sri Lanka, and Turkey.
- Encouraging textile firms to hire and train women workers for garments and knitwear production—a step the government should, in turn, facilitate.
- Facilitating travel by foreign buyers.
- Promoting cluster development for sub-sectors within textiles.

- Encouraging big players across different sectors of the industry to form strategic partnerships (holding companies) capable of reaching a size/scale of operations comparable with that of regional competitors.
- Promoting effective public-private partnerships to improve Pakistan's image as a high-quality supplier of textiles and apparel.
- Introducing a national quality award in Pakistan along the lines of the Malcolm Baldrige National Quality Award in the US; the government could support this with financial and nonfinancial rewards.

The following measures would help the rice sector improve its compliance with international certification standards:

- The sector should focus on result-oriented R&D in grain development and new varieties of rice.
- The government should enact laws that deal with the proper pre- and post-harvest handling of paddy and launch awareness campaigns at the grower level to highlight the benefits of doing so.
- The government could also offer soft loans for the establishment and improvement of storage facilities for paddy.
- National and local testing and inspection facilities should seek globally recognized accreditation.
- The QRC should function independently of the TDAP.
- For pre-shipment inspections, recognized third parties such as SGS should be added to the list of approved service providers (in addition to the QRC).
- The government should encourage the export of branded rice by offering soft loans and other incentives.
- The sector should establish an effective body that represents the interests of the whole sector and has global outreach. This would facilitate R&D and help register new varieties. The proposed body should work in coordination with the public sector to improve awareness at the farmer level and help formulate a comprehensive code of conduct and/or regulations for the entire rice supply chain.

References

All Pakistan Textile Mills Association. (2014). *Pakistan textile statistics*. Retrieved from http://www.aptma.org.pk/Pak_Textile_Statistics/repo.asp

ASTM International. (2014). *ASTM International: Standards worldwide*. Available from http://www.astm.org/

British Standards Institute. (2014). *Standards, training, testing, assessment, and certification*. Available from http://www.bsigroup.com

Codex Alimentarius Commission. (1996). *Codex Alimentarius: Cereals, pulses, legumes and derived products and vegetable proteins* (vol. 7, pp. 53–60). Rome: Food and Agriculture Organization and World Health Organization.

European Committee for Standardization. (2014). *European Committee for Standardization*. Available from http://www.cen.eu

Food and Agriculture Organization and World Health Organization. (2004, October). *Second FAO/WHO global forum of food safety regulators: Building effective food safety systems*. Retrieved from ftp://ftp.fao.org/docrep/fao/meeting/008/y5871e/y5871e00.pdf

International Electrotechnical Commission. (2014). *Welcome to the IEC*. Available from http://www.iec.ch

International Organization for Standardization. (n.d.). *ISO – International Organization for Standardization*. Available from http://www.iso.org

Pakistan, Ministry of Finance. (2012). *Pakistan economic survey 2011–2012*. Islamabad: Author.

Pakistan, Ministry of Finance. (2013). *Pakistan economic survey 2012–2013*. Islamabad: Author.

Pakistan Standards and Quality Control Authority. (n.d.). *Pakistan Standards and Quality Control Authority*. Retrieved from http://www.psqca.com.pk/NEP/%5B10%5D%20Laboratories%20in%20Pakistan%20i.htm

Small and Medium Enterprise Development Authority. (n.d.). *Compliance with international standards (Guidelines for textile industry)*. Lahore: Author.

Technological Association of the Pulp and Paper Industry. (2014). *TAPPI*. Available from http:// www.tappi.org

World Bank. (2014). *World development indicators* [Database]. Available from http://data.worldbank.org/data-catalog/world-development-indicators

Appendix

Table A1: Testing standards for textiles and fabrics

Standard	Description
ASTM D1388	Measures the stiffness of fabrics, bending length, and flexural rigidity.
ASTM D1683	Measures the sewn seam strength in woven fabrics by applying a force perpendicular to the sewn seams.
ASTM D2061	Determines the strength of zippers and zipper parts.
ASTM D2136	Fabrics coated with rubber or rubber-like material display increased stiffening when exposed to decreasing ambient temperatures. This test employs a simple pass/fail procedure to determine material flexibility at a specified low temperature. Failure indicates the unacceptability of the coated fabric for use at that temperature.
ASTM D2208	Determines the breaking strength of leather by the grab method. Intended for use on light, soft leathers; boarded, sueded, or embossed leathers tested on a specimen in the form of a rectangle; narrow strap, welt, lace, and round belt leathers; or other leathers that cannot be accurately tested using method D2209. Does not apply to wet blue.
ASTM D2209	Determines the load required to rupture a leather test specimen of 1/2″ (12.7 mm) width. The load to rupture divided by the original unstretched cross-sectional area gives the tensile strength. Can be used for all types of leather that are smooth and firm enough to permit accurate thickness measurements.
ASTM D2211	Measures the elongation or stretch characteristics of leather produced by a tensile load.
ASTM D2212	Determines the slit tear resistance of light leathers such as shoe uppers, gloves, and upholstery.
ASTM D2213	Determines the compressibility of sole leather.
ASTM D2261	Measures the tearing strength of textile fabrics by the tongue (single-rip) procedure using a recording CRE-type tensile testing machine.
ASTM D2594	Measures fabric stretch and growth of knitted fabrics intended for applications requiring low-power stretch properties.
ASTM D3107	Determines the amount of fabric stretch, fabric growth, and fabric recovery of fabrics woven in whole or in part from stretch yarns after a specified tension and extension.
ASTM D4393	Determines peel adhesion of reinforcing fabrics that are bonded to rubber compounds. Applicable to either woven or parallel cord textile structures from both natural and manmade fibers and to parallel steel cord structures.
ASTM D4704	Determines the tearing strength of leather by measuring the force required to tear a specimen cut perpendicular to the surface.
ASTM D4705	Determines the stitch tearing resistance of leather, using a double-hole tear. Particularly applicable to lightweight leathers.
ASTM D4786	Determines the stitch-tearing strength of leather with a tear originating from one hole. Particularly applicable to heavy leather.

Standard	Description
ASTM D4831	Intended for use on all types of leather to determine the load required to tear a leather strap fastened in a buckle.
ASTM D5034	Grab and modified grab test procedures to determine the breaking strength and elongation of most textile fabrics. Provision is made for wet testing.
ASTM D5035	Raveled-strip and cut-strip test procedures to determine the breaking force and elongation of most textile fabrics. Provision is made for wet testing.
ASTM D5170	Measures the peel strength of hook-and-loop touch fasteners using a recording CRE tensile testing machine.
ASTM D5587	Measures the tearing strength of textile fabrics by the trapezoid procedure using a recording CRE-type tensile testing machine.
ASTM D5733	Measures the tearing strength of nonwoven fabrics by the trapezoid procedure using a recording CRE tensile testing machine.
ASTM D5735	Measures the tearing strength of nonwoven fabrics by the tongue (single-rip) procedure using a recording CRE tensile testing machine.
ASTM D6077	Measures the tearing load of nonwoven fabrics by the trapezoid method for leather.
ASTM D6571	Measures compression resistance and recovery properties of any type of high-loft nonwoven fabric using a simple, economical applied static weight-loading technique.
ASTM D6614	Determines the amount of fabric stretch and fabric growth after a specified extension and held for a specified time.
ASTM D6644	Measures the resistance of the bridge of a sew-through button to a steadily increasing strain.
ASTM D6775	Determines the breaking strength and elongation of textile webbing, tape, and braided materials using a split-drum type specimen clamp.
ASTM D6797	Measures the bursting strength of woven and knitted textiles taken from rolls of fabric or fabric taken from garments.
BS 3356:1990	Determines the bending length and flexural rigidity of fabrics.
BS 3424-5:1982	For coated fabrics. Methods 7A, 7B, and 7C. Determines tear strength.
BS 4098:1975	Determines thickness, compression, and recovery characteristics of textile floor coverings.
BS 6906-8:1991	Geotextiles: determines sand-geotextile frictional behavior by direct shear.
BS EN 12242:2000	Touch-and-close fasteners: determines peel strength.
BS EN 13542:2001	Manufactured articles filled with feather and down: determines the compressibility index of clothing.
BS EN 13895:2003	Textiles and monofilaments: determines tensile properties.
BS EN 1875-3:1998	Rubber- and plastic-coated fabrics: determines tear strength using trapezoidal method.
BS EN 1876-1:1998	Rubber- or plastic-coated fabrics: low temperature tests, bending test.

Standard	Description
BS EN 1897:2001	Geotextiles and geotextile-related products: determines compressive creep properties.
BS EN 29073-3:1992, ISO 9073-3:1992	Nonwovens: determines tensile strength and elongation.
BS EN ISO 10319:1996, ISO 10319:1993	Geotextiles: wide-width tensile test.
BS EN ISO 10321:1996, ISO 10321:1992	Geotextiles: tensile test for joints/seams by wide-width method.
BS EN ISO 10618:2004	Carbon fiber: determines tensile properties of resin-impregnated yarn.
BS EN ISO 12957-2:2005	Geosynthetics: determines friction characteristics; inclined plane test.
BS EN ISO 13431:1999	Geotextiles and geotextile-related products: determines tensile creep and creep-rupture behavior.
BS EN ISO 13934-1:1999	Textiles: tensile properties of fabrics; determines maximum force and elongation at maximum force using the strip method.
BS EN ISO 13934-2:1999	Textiles: tensile properties of fabrics; determines maximum force using the grab method.
BS EN ISO 13935-1:1999	Textiles: seam tensile properties of fabrics and made-up textile articles; determines maximum force to seam rupture using the strip method.
BS EN ISO 13935-2:1999	Textiles: seam tensile properties of fabrics and made-up textile articles; determines maximum force to seam rupture using the grab method.
BS EN ISO 13937-2:2000	Textiles: tear properties of fabrics; determines tear force of trouser-shaped test specimens (single-tear method).
BS EN ISO 13937-3:2000	Textiles: tear properties of fabrics; determines tear force of wing-shaped test specimens (single-tear method).
BS EN ISO 13937-4:2000	Textiles: tear properties of fabrics; determines tear force of tongue-shaped test specimens (double-tear test).
BS EN ISO 14125:1998	Fiber-reinforced plastic composites: determines flexural properties.
BS EN ISO 1421:1998	Rubber- or plastic-coated fabrics: determines tensile strength and elongation at break.
BS EN ISO 2062:1995	Textiles: yarns from packages; determines single-end breaking force and elongation at break.
BS EN ISO 252-1:1999	Textile conveyor belts: adhesive strength between constitutive elements; methods of test.
BS EN ISO 283-1:2000	Textile conveyor belts: full thickness tensile testing; determines tensile strength, elongation at break, and elongation at the reference load.
BS EN ISO 3376:2002	Leather: physical and mechanical tests; determines tensile strength and percentage extension.
BS EN ISO 3377-1:2002	Leather: physical and mechanical tests; determines tear load (single-edge tear).

Standard	Description
BS EN ISO 3377-2:2002	Leather: physical and mechanical tests; determines tear load (double-edge tear).
BS EN ISO 4674-1:2003	Rubber- or plastic-coated fabrics: determines tear resistance (constant rate of tear methods).
BS EN ISO 505:2000	Textile conveyor belts: determines tear propagation resistance.
BS EN ISO 5079:1996	Textiles: determines breaking force and elongation at break of individual fibers.
BS EN ISO 9073-4:1997	Textiles: nonwovens; determines tear resistance.
BS EN ISO 9073-7:1998	Textiles: nonwovens; determines bending length.
BS ISO 3341:2000	Textile glass: yarns; determines breaking force and breaking elongation.
BS ISO 3342:1995	Textile glass: mats; determines tensile breaking force.
BS ISO 3597-2:2003	Textile glass-reinforced plastics: determines mechanical properties on rods made of roving-reinforced resin (flexural strength).
BS ISO 3597-3:2003	Textile glass-reinforced plastics: determines mechanical properties on rods made of roving-reinforced resin (compressive strength).
BS ISO 4606:1995	Textile glass: woven fabrics; determines tensile breaking force and elongation at break by the strip method.
EN 14689	Leather: physical and mechanical tests; determines bagginess, creep, and relaxation.

Note: CRE = constant rate of extension.
Source: ASTM International (2014).

Table A2: Different testing and international inspection standards

International testing standards
Textiles
• ASTM International (www.astm.org) • British Standards Institute (www.bsigroup.com) • International Organization for Standardization (www.iso.org) • European Committee for Standardization (www.cen.eu) • International Electrotechnical Commission (www.iec.ch) • Technological Association of the Pulp and Paper Industry (www.tappi.org) • AATCC is the world's leading not-for-profit association serving textile professionals. It provides test method development, quality control materials, and professional networking for thousands of members in 60 countries throughout the world. • Azo dyes (banned in Europe) • Customer-specific
Rice
• Codex Alimentarius Commission (Codex 198-1995)
International inspection standards
Textiles
• As the leading US standards and conformity assessment system, the American National Standards Institute empowers its members and constituents to strengthen the US marketplace position in the global economy while helping to assure the safety and health of consumers and the protection of the environment. • ASTM International (formerly known as the American Society for Testing and Materials) is a globally recognized leader in the development and delivery of international voluntary consensus standards. Today, some 12,000 ASTM standards are used around the world to improve product quality, enhance safety, facilitate market access and trade, and build consumer confidence. • Intertek provides comprehensive services for all textile and apparel inspection, testing, and certification needs to help deliver the highest-quality products. • 4-point American system for acceptable quality limit (AQL) • Saudi Standards, Metrology and Quality Organization • Customer-apecific (e.g. Levis, Nike, Wal-Mart)
Rice
• Food and Agriculture Organization, World Health Organization