

INTERNATIONAL DEVELOPMENT IN PRACTICE

Pakistan

QI Toolkit Case Studies

Martin Kellermann

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Abbreviations

BIPM	International Bureau of Weights and Measures
CE	Conformité Européenne
CEO	chief executive officer
CMC	calibration and measurement capabilities
EC	European Community
EU	European Union
FAO	Food and Agriculture Organization
G.A.P.	Good Agricultural Practice
HACCP	hazard analysis and critical control points
IAF	International Accreditation Forum
IEC	International Electrotechnical Commission
ILAC	International Laboratory Accreditation Cooperation
IP	intellectual property
ISO	International Organization for Standardization
KCDB	Key Comparison Database (BIPM)
MFD	Marine Fisheries Department
MoC	Ministry of Commerce
MoST	Ministry of Science and Technology
NA	Norwegian Accreditation
NAPHIS	National Animal and Plant Health Inspection Service
NMI	national metrology institute
Norad	Norwegian Agency for Development Cooperation
NPSL	National Physical and Standards Laboratory
NQP	national quality policy
NSB	national standards body
PakGAP	Pakistan Good Agricultural Practice
PCSIR	Pakistan Council of Scientific and Industrial Research
PNAC	Pakistan National Accreditation Council
PSQCA	Pakistan Standards and Quality Control Authority
QI	quality infrastructure
SCC	System Certification Centre
SMEs	small and medium enterprises
SPS	sanitary and phytosanitary

TBT	technical barriers to trade
TRIPS	Trade-Related Aspects of Intellectual Property
TRTA	Trade Related Technical Assistance
UNIDO	United Nations Industrial Development Organization
USAID	U.S. Agency for International Development
WTO	World Trade Organization

Pakistan

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Abstract: Pakistan reengineered its quality infrastructure (QI), driven by the need to secure export markets for its products, especially after its fish exports to the European Union (EU) were curtailed in 2004 owing to quality and safety issues. The standards, metrology, and accreditation bodies existed, but they required extensive modernization and international recognition. Laboratories and certification bodies existed, but none was accredited. The development of the QI focused specifically on the demands of the export sector. At the same time, small and medium enterprises (SMEs) in selected export sectors were supported in implementing the relevant quality systems, testing, and certification. By the end of the reform project in 2014, the QI institutions had gained international recognition, fish exports to the EU could be resumed, and new export markets for other products were realized.

EXECUTIVE SUMMARY

The development of the quality infrastructure (QI) in any country is a continuing process, and hence the narrative in this case study must be limited to a specific period—largely reflecting the changes from 2005 to 2014. In 2005, Pakistan developed a national quality policy. It was not implemented, however, because of inherent flaws, including (a) industrial development, which should have been dealt with in an industrial development policy; (b) the premise that the Pakistan National Accreditation Council (PNAC) was going to “supervise” the other QI organizations; and (c) the national quality policy’s prohibitive implementation budget.

At that time, the Pakistan QI organizations did not enjoy any international recognition: no laboratory was accredited; PNAC was not a signatory of the International Laboratory Accreditation Cooperation (ILAC) and International Accreditation Forum (IAF) Mutual Recognition Arrangement and Multilateral Recognition Agreement, respectively; the National Physical and Standards Laboratory (NPSL) laboratories were run down; and no calibration and

measurement capabilities (CMCs) had been established. The Pakistan Standards and Quality Control Authority (PSQCA) was responsible for standards development, inspection, testing, certification, and the implementation of mandatory standards—the latter totally at odds with good international practices.

Pakistan's fish exports to the European Union (EU) were suspended in 2004 and later banned owing to major quality and safety concerns. Even though Pakistan had a huge agribusiness sector, little was being exported for lack of understanding and implementation of foreign market requirements. The Pakistan quality management certification schemes earned themselves a bad reputation in local and foreign markets because of major problems in implementing such systems and subsequently certifying them, exacerbated by a well-meaning but flawed government subsidy scheme. None of the certification bodies was accredited.

Major development projects dealing with the development of the QI, small and medium enterprises (SMEs), the fishing industry, and related issues were undertaken by a variety of development agencies, to the value of nearly €35 million over nearly a decade. The largest of the programs was the Trade Related Technical Assistance (TRTA) program, the two phases of which ran for nearly 10 years (2004–14). It was funded mainly by the EU, with smaller contributions from the Norwegian Agency for Development Cooperation (Norad) and the United Nations Industrial Development Organization (UNIDO). It was implemented by UNIDO, which established a project office in Islamabad that at its height had 14 permanent staff members. Various international experts frequented Pakistan over the 10 years. Other programs aligned with the TRTA were implemented by the International Trade Centre (ITC), the World Bank, and others.

Regarding the issues, the TRTA subcontracted Pakistani institutions at the beginning to conduct three major evaluations concerning the constraints and issues faced by Pakistani industry regarding (a) technical barriers to trade (TBT); (b) sanitary and phytosanitary (SPS) measures; and (c) industry cluster compliance issues. These in-depth evaluations provided much-needed information to design meaningful support programs for the QI and industry.

The PSQCA, NPSL, and PNAC were supported during all the program phases. For PNAC, a master plan was developed (after much discussion and involvement of the EU delegation) that provided the blueprint for all further development work. This plan included training for staff and assessors in the country and abroad, practical training for trainee assessors during the assessment of laboratories by Norwegian Accreditation (NA), and support in developing and implementing quality management documentation within PNAC. PNAC was supported in applying for international recognition through ILAC and the IAF, which it attained in 2011 and 2013, respectively. By 2013, PNAC had accredited more than 50 laboratories in Pakistan, and a further 20 were in process, with the cost of accreditation much lower than it would have been through foreign accreditation services.

The NPSL laboratories were modernized with government funding before more modern measurement equipment and environmental controls could be provided. The NPSL was supported in participating in interlaboratory comparisons as a precondition for the establishment of its CMCs. Once these had been peer-reviewed by International Bureau of Weights and Measures (BIPM) members, they were listed in the Key Comparison Database (KCDB) kept by the BIPM, thereby providing Pakistan with international recognition in metrology.

The PSQCA was supported in streamlining its standards development process; establishing a national Inquiry Point¹ in accordance with the World Trade Organization (WTO) Agreement on Technical Barriers to Trade (TBT Agreement);

and building its capacity for more effective electronic communications with the international standards community. The PSQCA was also supported in establishing a proper management system certification body to counter the bad practices of other certification bodies in the market. Unfortunately, this effort came to naught when the newly appointed chief executive officer (CEO) of the certification body failed to respond to the development plan in a timely manner.

Initially 19 laboratories were selected for support in accordance with the needs of potential export industries. They received training in ISO/IEC 17025 (“General Requirements for the Competence of Testing and Calibration Laboratories”),² management system documentation, and interlaboratory proficiency testing. Thereafter they were accompanied in their applications and assessments for NA accreditation. This was a combined effort by Norad and UNIDO’s TRTA program. The first laboratories were accredited by 2009. Subsequently more laboratories were identified for support, and by the end of the program, 30 had been successfully accredited in the meantime by PNAC, which had gained international recognition through ILAC. An evaluation of their performance regarding the number of tests conducted and revenue generated showed marked increases before and after accreditation, in one or two cases by as much as 150 percent. The revenue increases from 2009 to 2013 averaged 60 percent—not only because of the accreditation but also because of the increased demand from industry wishing to export (UNIDO 2008b).

One of the major successes of the TRTA interventions was the upgrading of the fisheries sector in Karachi through a broad-based program comprising four pillars (UNIDO 2008b):

- *Pillar 1:* The capacities and operations of the Marine Fisheries Department of the Ministry of Food, Livestock and Agriculture were strengthened, and the department was designated as the responsible authority for the EU.³
- *Pillar 2:* To facilitate the compliance of the handling of fisheries’ products with international standards, the Karachi Fish Harbour Authority was supported in refurbishing fish auction halls, training fish inspectors, and upgrading the management of harbor activities.
- *Pillar 3:* The boat owners were supported through the powerful Fishermen Cooperative Society to upgrade their boats and the handling of fish. This included the refurbishing of fishing boats with fiberglass—the first four as a pilot project, followed by 500 financed by the provincial government, and finally about 900 financed by the boat owners themselves.
- *Pillar 4:* Capacity was improved in fish processing plants to implement hazard analysis and critical control points (HACCP) and related hygiene requirements in compliance with EU Directives. At the end of the fisheries component program in 2013, the EU had lifted the embargo on fish exports from Pakistan, and the first exports were received without any rejections in Europe.

Another intervention that was less successful was the support provided to mango and kinnow producers (UNIDO Evaluation Group 2014). Pakistan is a major mango and kinnow grower but was exporting little. After prolonged negotiations between the relevant provincial authorities, the federal promotion organization, and the dedicated mango and kinnow research organizations, a Code of Practice was developed as a cooperative venture between the UNIDO TRTA program and the Australia-Pakistan Agriculture Sector Linkages Program.⁴ Pilot programs trained farmers through Farmer Field Schools on the proper handling of the fruits from field to market, and trade missions were taken to Europe in

TABLE 1 Snapshot of quality infrastructure (QI) reform in Pakistan

BEFORE REFORM	AFTER REFORM
Pakistan developed a National Quality Policy in 2005, but its implementation stalled because of inherent problems with its content and overambitious budget.	A new National Quality Policy based on international good practices was developed and agreed to by stakeholders in both the public and private sectors. By 2013, it still had to be approved by the cabinet for implementation.
The food safety regime of Pakistan was totally fragmented, with a variety of national ministries, national organizations, and provincial authorities claiming responsibility. In reality, little was implemented.	Draft national food safety legislation was developed, but it still required stakeholder approval before being submitted to parliament.
PNAC had been established and offered a wide variety of accreditation services, but it struggled to gain international recognition, and it had no customers.	PNAC became a signatory of the ILAC and IAF multilateral recognition arrangements, and it retained its status during the first follow-up peer evaluation.
No laboratories in Pakistan were accredited, either by PNAC or foreign accreditation bodies. The National Physical and Standards Laboratory's (NPSL) equipment was out of date, and laboratories were in a bad state. No CMCs had been determined.	More than 50 laboratories were accredited to ISO/IEC 17025, some initially by the Norwegian accreditation body and, by the end of the project, by PNAC once it achieved international recognition. The NPSL laboratories were renovated, and equipment had been upgraded. CMCs were being determined.
The European Union (EU) had banned fish exports from Pakistan because of quality and safety concerns.	Massive interventions to upgrade the whole value chain of the fishing industry led to the lifting of EU sanctions and the first consignments being accepted by the EU authorities.
Mango and kinnow produce and products could not be exported to the EU owing to a total lack of food safety controls.	All the food safety controls were implemented, satisfying the EU "farm to fork" concept for the whole value chain. The first mango exports to the EU were realized.

Note: CMCs = calibration and measurement capabilities. IAF = International Accreditation Forum. ILAC = International Laboratory Accreditation Cooperation. PNAC = Pakistan National Accreditation Council. ISO/IEC 17025 refers to the standard, "General Requirements for the Competence of Testing and Calibration Laboratories."

cooperation with the Centre for Development Innovation (CDI) from the Netherlands. The result has been the first exports of mangoes to the EU; kinnow exports were still to come by the end of 2013. This was a small step. The big one—namely to roll out the program to all farmers—was left in the hands of the provincial authorities as the only entities with the mandate and human resources to do so.

In conclusion, it can be said that the broad-based programs of a decade had made a major impact on the Pakistani QI, upgrading it to international standards and gaining international recognition (table 1). At the same time, it developed major industrial sectors (namely, fisheries and horticulture) to the point where small and medium producers met international standards and could export successfully to the major markets of the world.

COUNTRY CONTEXT

General background

Pakistan, officially the Islamic Republic of Pakistan, is a South Asian country with the world's sixth-largest population—exceeding 199 million people. It has a 1,046-kilometer coastline along the Arabian Sea and the Gulf of Oman in the south and is bordered by India to the east, Afghanistan to the west, the Islamic Republic of Iran to the southwest, and China to the far northeast. It is separated from Tajikistan by Afghanistan's narrow Wakhan Corridor in the north and also shares a maritime border with Oman.

Classified as a low-income country by the World Bank,⁵ Pakistan has a semi-industrialized economy with a well-integrated agriculture sector. Pakistan gained independence in 1947, and its postindependence history has been characterized by

periods of military rule, political instability, and conflicts with neighboring India. It waged a disastrous war against India in 1971, after which East Pakistan gained its independence as Bangladesh. The country continues to face challenging problems, including overpopulation, terrorism, poverty, illiteracy, and corruption. Despite these factors, it maintains strategic endowments and development potential while it has made substantial progress in reducing poverty, giving it the second-lowest headcount poverty rate (3.5 percent at the level of US\$1.90 per day) in South Asia.⁶

Economic situation

Pakistan's economic growth since it gained its independence from Britain in 1947 has been varied. In the 1970s the economy was largely nationalized, and development slowed because of mismanagement. In the 1980s and 1990s, the economy was privatized again, but it stagnated owing to multiple factors, including international sanctions after Pakistan's first nuclear tests.

Following a military coup in October 1999, Pervez Musharraf became the president of Pakistan in 2001 and worked to address the challenges of heavy external and domestic indebtedness; a high fiscal deficit and low revenue-generation capacity; rising poverty and unemployment; and a weak balance of payments with stagnant exports. Sound structural policies coupled with improved economic management accelerated growth between 2002 and 2007, which reduced poverty levels and increased gross domestic product (GDP). The rate of inflation fell, while the investment rate grew with billions of foreign private capital inflows that financed many sectors of the economy. The exchange rate also remained fairly stable throughout this period. Although these gains can be attributed to debt reduction and economic reforms, the billions of dollars' worth of U.S. aid to Pakistan in return for Pakistan's support in the U.S.-led war on terror in Afghanistan also played its part.

After Musharraf's resignation in 2008, a civilian government once again resumed control of Pakistan. Subsequent civilian administrations experienced a dramatic rise in violence, corruption, and unsustainable economic policies that forced Pakistan to reenter an era of stagflation. The Pakistan economy slowed to around 5 percent annual growth, as opposed to the high of 9 percent during 2004–08, while the yearly growth rate fell from a two-decade average of 5 percent to around 2 percent.⁷ Inflation (average consumer price index) reached 19.6 percent in 2008, and Pakistan had to depend on a fiscal policy backed by the International Monetary Fund (IMF) to avoid possible bankruptcy. The inflation rate for the fiscal year 2010/11, for example, was 13.7 percent. Since 2013, as a beneficiary of an IMF program, Pakistan's economic growth has started picking up again.⁸

BACKGROUND OF QI ISSUES

Policy context

Pakistan developed and endeavored to implement many policies in the early 2000s that contained elements of standards, technical regulation, and quality assurance in some form: the National Science, Technology and Innovation Policy; National Environment Policy; National Trade Policy; national investment policy; and National Industrial Policy. These policies were developed over many years, their implementation varied, and some have been revised.

Although the policy directions regarding standards, technical regulations, and quality for each of these policies were laudable and sensible, they remained

disconnected from each other and provided little guidance on the coordination of the overall QI or a holistic technical regulation system. In addition, the 18th Amendment to the Constitution of Pakistan (2010)—enacted to curb presidential powers and reverse legislation of the military rulers not aligned with the Constitution—also devolved much of the policy and legislation implementation to the provinces while abolishing federal ministries such as the Ministry of Health. The system that followed can be described as chaotic because the rules were unclear: for example, some provinces were taking a lead in establishing a technical regulation system or food safety system all on their own; others did not really know what to do.

PNAC developed a National Quality Policy during 2004–05, which was approved by the government for implementation. This policy, however, had three main flaws:

- It included certain issues, such as industrial development, that should have been the domain of an industrial policy or similar policy.
- PNAC was, to some extent, elevated as an oversight organization among the QI institutions. This could not be, because these institutions are considered equal in the QI.
- Technical regulations were mentioned only in passing; no real policy objectives were listed that would coordinate the differences in approach among the regulators.

In addition, the finances required to implement this policy were quite substantial, and this—combined with the policy’s flaws—soon caused it to be quietly shelved.

National QI

This narrative describes the QI of Pakistan at the time the first National Quality Policy was developed, in 2004–05.⁹

Pakistan Standards and Quality Control Authority (PSQCA)

The PSQCA is the national standards body (NSB) of Pakistan. The PSQCA Act was promulgated in 1996, and the PSQCA became operational in 2001. But this act needed revision because many changes had occurred in the standards and quality domain worldwide, and the QI landscape in Pakistan had likewise seen many changes. Coordination issues had to be addressed, such as the relationship of food safety issues with mandatory standards that had to be aligned with internationally recognized approaches.

The PSQCA provided the whole range of services normally associated with an NSB in a low- or middle-income country: standards development, publication and information, inspection, testing, and product certification, as well as the administration of mandatory standards. The only conformity assessment service it did not offer was quality management system certification. As a full member of both the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC), the PSQCA participated in many international technical committees. It operated a standards information center that was also the designated national WTO TBT Inquiry Point but was not very effective. None of its laboratories was accredited.

The PSQCA administered 78 mandatory standards (approximately 50 percent of which dealt with food items) but would have liked to see this list extended

because it considered many products not covered by mandatory standards in the marketplace to be substandard. The notion of mandatory standards is in principle not a problem: every government has the responsibility to protect its peoples, fauna and flora, and environment from unsafe products, provided the standards' development and implementation meet the requirements of the WTO TBT Agreement. But the way in which mandatory standards are promulgated and the responsibility for their implementation frequently give rise to some real challenges.

Having NSBs responsible for the administration of such mandatory standards has been the norm in many low- and middle-income countries in the past, but it is becoming untenable in the modern era of more-open trade relations. Such a construct is considered a conflict of interest by the major trading blocs such as the EU and United States. Pakistan would therefore have to seriously reconsider this construct, also in light of the proposed establishment of a food authority as well as the devolution of implementation responsibilities to the provinces under the 18th Amendment to the Constitution.

The PSQCA had set up a national TBT Coordination Committee under the WTO TBT Inquiry Point, with approximately 25 ministries and agencies as members. The PSQCA considered its relations with the private sector to have been improving after hitting a low a few years earlier, but they were still far away from what the PSQCA would have liked them to be. That the PSQCA was a regulatory body certainly did not help; industry saw it mostly as an irritation rather than as a friend—another reason to reconsider its mandatory-standards activities.

Pakistan National Accreditation Council (PNAC)

PNAC was established in 1998 under the administrative control of the Ministry of Science and Technology (MoST) as the national apex agency to accredit conformity assessment bodies such as laboratories and certification bodies. Its accreditation services were launched in 2001, and PNAC soon provided a wide variety of accreditation services, including the following:

- Testing and Calibration Laboratories Accreditation (ISO/IEC 17025)
- Medical Laboratories Accreditation (ISO 15189)
- Certification Bodies Accreditation (ISO/IEC 17021)
- Halal Certification Bodies Accreditation (PS 4992)
- Inspection Bodies Accreditation (ISO/IEC 17020)
- Proficiency Testing Provider Accreditation (ISO/IEC 17043)
- Product Certification Bodies Accreditation (ISO/IEC 17065)
- Personnel Certification Bodies Accreditation (ISO/IEC 17024).

But PNAC struggled to attain international recognition through ILAC and the IAF, largely because of a lack of trained auditors and inadequate management practices. There was also no demand for accreditation in the country, and no laboratories or certification bodies had been accredited, not even by foreign accreditation bodies.

National Physics and Standards Laboratory (NPSL)

The NPSL is the national metrology institute (NMI) of Pakistan, administratively placed within the Pakistan Council of Scientific and Industrial Research (PCSIR). This is not an uncommon construct in low- and middle-income countries, and it has a number of advantages, especially in the formative years of the NMI.

However, as the NMI gains more metrology laboratories, national measurement standards, other measuring equipment, and personnel, there comes a time when it makes sense to establish it as an independent organization. Doing so will certainly enhance its stature in the international metrology community, even though there are no international agreements that demand it. As of 2010, none of the NPSL's CMCs had been accepted in the KCDB managed by the BIPM.

A formal national calibration service—a formal cooperation between the NPSL and private calibration laboratories—did not exist. Many laboratories were providing calibration services (driven by the ISO 9001, “Quality Management Systems—Requirements,” certification program),¹⁰ but none had been accredited by PNAC. This meant that some of the calibration services may have been of dubious quality. The NPSL estimated there were more than 50 such laboratories, but the UNIDO-managed TRTA Phase II Program identified only 10. This indicated the need for a new and in-depth review of the calibration capacity available in Pakistan and its state of competency to identify needs for technical support, including the establishment of a national calibration service and its modalities.

Legal metrology

Technically, legal metrology was in the hands of the provinces' labor and welfare departments. However, they employed few if any trained metrologists. It was also unclear whether appropriate legal metrology legislation was in place. On the other hand, the PSQCA was Pakistan's official representative to the International Organization of Legal Metrology (OIML), even though it did not conduct any legal-metrology activities.

The whole system could therefore be deemed dysfunctional. Legal metrology is an extremely important aspect of consumer protection, law enforcement, and health and environmental controls. It would therefore be absolutely necessary to establish a proper legal metrology system in Pakistan consisting of (a) appropriate legislation at the national level, (b) a national system of measuring equipment pattern approval and prepackaging requirements, (c) effective market surveillance at the provincial level, and (d) an oversight and coordination function at the national level.

Quality management system certification

After the 1987 publication of the ISO 9000 series of international standards, certification of quality management systems took off worldwide as purchasers tried to gain control over suppliers to deliver quality products. The same applied in Pakistan. Hence, the Pakistan government implemented a scheme to financially support the implementation of ISO 9001 in industry through subsidies managed by the Export Promotion Board (EPB). The subsidy was designed to cover the first round of certification costs. Approximately 800 companies benefited from this scheme before it was terminated around 2004. A follow-up scheme with slightly better controls was proposed but did not materialize.

Anecdotal evidence available to the EPB suggested that approximately 3,000 companies managed to be certified to ISO 9001 in the years before 2005 but that as many as 2,000 may not have maintained their certification because of financial constraints, a lack of tangible increases in market acceptance, or a failure to convert from the 1993 version of ISO 9001, ISO 9002, and ISO 9003 to the 2000 version of ISO 9001.

As many as 25 certification bodies were active in Pakistan, with five or six probably sharing the bulk of the business, but none was accredited. Furthermore,

there was evidence that many of these certification bodies, some of them even affiliates of multinationals, provided both consultancy services and certification of these same clients' management systems thereafter—a practice that is a serious conflict of interest. They basically responded more to the immediate concerns of enterprises for quick certification for marketing purposes than to the need to effect organizational improvements. At the same time, enterprises that established proper operational systems saw their reputation tainted by this low level of certification, and hence tended to lose interest. As a result, Pakistani quality management certification gained itself a bad reputation, both locally and abroad.

Food safety system

A systemic failure of food safety, plant health, and animal health controls existed in Pakistan. Fishery product exports to the EU were cut off for noncompliance with EC sanitary requirements. The EC's Rapid Alert System for Food and Feed (RASFF) continued to publish Rapid Alert notices regarding Pakistani food and horticultural products imported into the European Community (EC). There was ample evidence that a significant proportion of the agrifood products consigned to domestic and international markets other than the EU was not compliant with animal and plant health and food safety standards. For example, food items such as wheat, onions, mangoes, and honey had been refused entry even in less-sophisticated markets—such as India, the Islamic Republic of Iran, Iraq, the Philippines, and Sri Lanka—because they did not meet the required standards.

Pakistan had no policy on food safety. Most of the existing food laws dealt with production, distribution, and food supply, with some of these dating back to the 1960s. Apart from these basic food safety regulations, many law enforcement and regulatory bodies were working both directly and indirectly in the food safety sector. This situation was exacerbated by the lack of a single organizational focus of responsibility at the federal level for food safety.

These various bodies continued to undertake their food inspection activities—for example, fish inspection by the Marine Fisheries Department and meat inspection by the Animal Quarantine Department in relation to exports. The PSQCA, under the Ministry of Science and Technology (MoST), implemented mandatory standards dealing with food safety. On the other hand, there was only limited capacity to ensure food safety controls at places of production such as fishing vessels and landing sites, farms, and distributors. Food safety controls were poorly integrated throughout the supply chain; in other words, implementation of the “farm to fork” principle was nonexistent.

The widespread lack of understanding and awareness of modern SPS management systems in the SPS institutions hampered development of the control system. Controls were organized on the basis of commodity groups, reflecting functions of government departments rather than being arrangements concerning the risks to be controlled (regarding animal health, plant health, and food safety). The federal Animal Quarantine Department (under the Ministry of Livestock and Dairy Development) and the Department of Plant Protection (under the Ministry of Food and Agriculture) worked exclusively with import/export controls, with no focused effort to integrate activities or controls at the domestic level in Pakistan.

Furthermore, coordination between the different functions and departments with SPS responsibilities at the federal level had been significantly complicated by the 2010 division of the Ministry of Food and Agriculture and Livestock into two ministries: the Ministry of Food and Agriculture and the Ministry of Livestock and Dairy Development. Provincial governments were acting

unilaterally to fill the policy vacuum and had proceeded to develop food safety controls, but with no coordination or strategic direction from the federal government. For example, in Punjab alone, the Fisheries Department was developing new legislation for inspection and control of fishery products, the Livestock Department was developing a meat and dairy inspection agency, and the Department of Health proposed revisions of the Pure Food Rules and the formation of the Punjab Food Safety Agency.

These failures undermined export performance and also affected national consumers and the livelihoods of farmers supplying the domestic market.

Industry sector challenges

Business operators in a number of industrial sectors, especially in relation to fisheries and horticulture products, faced many constraints in export supply chains (UNIDO 2010b). Fishery products suffered from unsanitary conditions on fishing vessels and at landing sites and from a lack of ice and refrigeration. Mango export supply chains lacked rapid chilling facilities immediately after harvest. For kinnows and mangoes, there was poor quality management in plants packaging for export. Postharvest losses were high in all food sectors.

Common cross-sectoral constraints were the lack of compliance with international regulations, poor quality management by enterprises, poor handling of produce, and a lack of understanding of customer needs. These factors resulted in Pakistani exports being rejected by customers, achieving relatively low market prices, and subsequently losing market shares.

Although larger producers wished to move toward certification under the GLOBAL G.A.P. (Good Agricultural Practice) standard, this was out of reach for most of the small-scale growers in Pakistan. The Pakistan Horticulture Development and Export Company (PHDEC) had proposed a PakGAP standard as a more affordable complementary option. This approach was an important step in the right direction, but the standard lacked international recognition, without which it would remain ineffective.

Intellectual property rights system

Being a signatory to the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement under the WTO, Pakistan was required to upgrade its intellectual property (IP) infrastructure. Pakistan had already created the Intellectual Property Organization of Pakistan (IPO-Pakistan) in 2005 as a focal organization for integrated management of intellectual property and enforcement coordination. IPO-Pakistan operates under the Cabinet Division of the government of Pakistan.

Several IP measures had been implemented (UNIDO 2010b)—in particular, establishment of Anti-Piracy Cells by Pakistan Customs. To improve public awareness, IPO-Pakistan launched the Public Outreach Initiative for leveraging internal and external IP constituencies, including chambers of commerce and industry, business enterprises, research and development institutions, universities, academia, and the general public. The IPO-Pakistan Policy Board oversaw the drafting of a program for management of copyrights, patents, and trademarks, and in 2010 IPO-Pakistan established an application-receiving and -processing desk in Islamabad for patents, trademarks, copyrights, and industrial design. Initial work was also undertaken to automate the work of the IP registries.

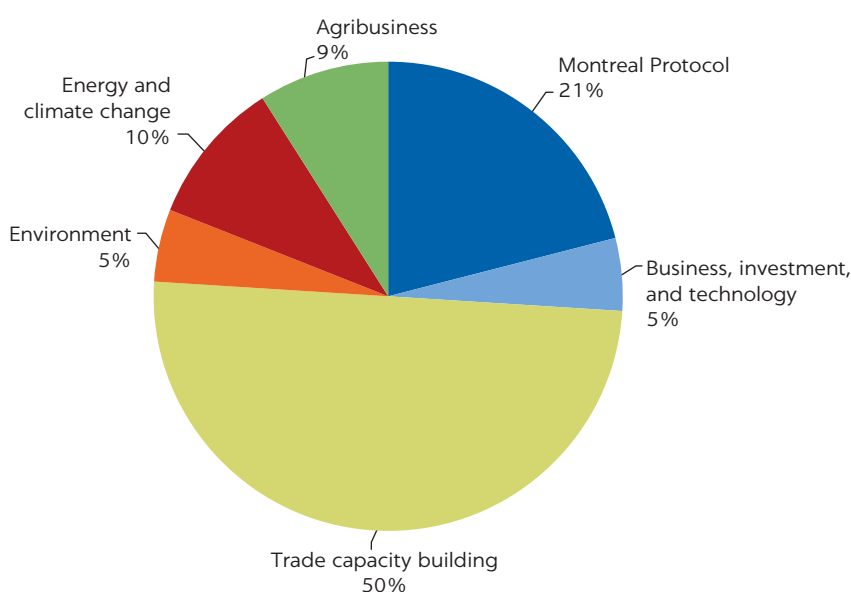
However, much remained to be done if the IP system was to make a meaningful contribution to the country's economic goals. IPO-Pakistan's ability to fully exercise its key role in leveraging the IP system for trade and economic development remained constrained by a lack of human resources and expertise and by the inefficient, paper-based nature of its work methods and procedures. There were still significant gaps in the IP legislative and institutional framework, including accession to certain international agreements and the development of laws to protect geographical indications and plant breeders' rights, which would add value to local potential export products.

PROJECT OBJECTIVES AND COMPONENTS

UNIDO has been involved in Pakistan since 1965. By the end of 2012, UNIDO had implemented more than 100 projects with a total expenditure of about US\$33 million (UNIDO Evaluation Group 2014). From 2000 to 2010, UNIDO implemented its Integrated Programme to support capacity building for sustainable industrial development in Pakistan, covering five components—one of which was the Trade Related Technical Assistance (TRTA) program targeting the QI and related matters. The Integrated Programme had a planned budget of US\$21.4 million, excluding project support costs. Since termination of the Integrated Programme in 2010, UNIDO's technical cooperation has been planned and implemented based on individual projects.

The successor to the TRTA I program was the TRTA II program. It was planned for 2010 to 2014 with a budget of US\$10.045 million and had three components, one of which addressed the QI issues. Figure 1 presents the overall budget and expenditures aggregated for all the UNIDO projects by main areas,

FIGURE 1
UNIDO projects' fund allocations in Pakistan, 2006–13



Source: UNIDO Evaluation Group 2014.

Note: The Montreal Protocol refers to the 1987 international environmental agreement to protect the stratospheric ozone layer by phasing out the use of substances responsible for ozone depletion.

for 2006–13. Trade capacity-building projects—projects related to the QI, technical regulation, and SPS measures—represented 50 percent of the portfolio in terms of financial resources, followed by Montreal Protocol-related projects with 21 percent. Energy and climate change as well as agribusiness-related projects accounted for around 10 percent each.

Trade Related Technical Assistance, Phase I (TRTA I)

From 2000 to 2010, the UNIDO Integrated Programme to support capacity building for sustainable industrial development in Pakistan was designed and implemented, covering five components:

- *Component 1:* Cleaner Production and Environmental Management
- *Component 2:* Institutional Capacity Building for SME Development
- *Component 3:* Metrology, Standardization, Testing, Quality Assurance, and Continuous Improvement
- *Component 4:* Regional Development
- *Component 5:* Industrial Investment Promotion and Technology Transfer.

The Integrated Programme’s objective was stated as “Provide the Pakistani authorities and private sector institutions with technical assistance to support their efforts to build national capacities for sustainable industrial development and enable them to meet their industrial objectives” (UNIDO Evaluation Group 2014, 4). In addition, Component 3’s immediate objective was stated as “Strengthen the metrology, standardization, testing and quality assurance capabilities of Pakistan and provide restructuring support to selected enterprises” (UNIDO Evaluation Group 2014, 5).

Only two components were implemented and closed during the Integrated Programme period (2000–10): Institutional Capacity-Building for SME Development (2007–09) and Trade Related Technical Assistance (TRTA I) (2004–08). Of the latter, two program results were relevant to the QI (UNIDO 2008b):

- *Program Result 4:* Completion of a full assessment of the constraints faced by Pakistan’s exporters in relation to TBT and SPS standards
- *Program Result 5:* Improved capacity of Pakistan’s export industry to comply with standards and certification requirements resulting from improved accreditation and conformity assessment practices and metrology and testing services.

To facilitate continuity in the development of the QI of Pakistan from 2008 to 2010, UNIDO and Norad provided bridging finances between the TRTA I and TRTA II programs funded by the EU.

From TRTA I to TRTA II

TRTA extended from 2004 to the end of TRTA II in 2014 (table 2). TRTA I, the three bridging phases, and TRTA II had a total duration of 9.25 years and an overall budget of €13.4 million. The EC provided the bulk of the funding, with a total contribution of €12.045 million. UNIDO financed the first and third Bridging Phases and contributed to TRTA II, with a total contribution of €892,000. Norad financed the second Bridging Phase with €456,000.

TABLE 2 TRTA phases, duration, budget, and donors in Pakistan, 2004–14

PHASE	YEAR(S)	DURATION	BUDGET (€, MILLIONS)	DONOR(S)
TRTA I	2004–07	36 months	2.50	EC
Bridging Phase 1	2007–08	6 months	0.34	UNIDO
Bridging Phase 2	2008–09	12 months	0.46	Norad
Bridging Phase 3	2009	3 months	0.06	UNIDO
TRTA II	2010–14	54 months	10.05	EC, UNIDO
Total	2004–14	9.25 years	13.40	EC, Norad, UNIDO

Source: UNIDO Evaluation Group 2014.

Note: Budget figures are rounded. EC = European Community; Norad = Norwegian Agency for Development Cooperation; TRTA = Trade Related Technical Assistance; UNIDO = United Nations Industrial Development Organization.

Trade Related Technical Assistance, Phase II (TRTA II)

Objectives

TRTA II, a follow-up to TRTA I, was funded by the EU. The financing agreement was signed by the EC in June 2009 and countersigned by the government of Pakistan in August 2009. Total program value was €10.045 million, made up of €9.545 million from the EC and €0.5 million from UNIDO, which managed overall program implementation. The program started in January 2010, with a planned implementation period of 54 months, until June 2014 (UNIDO 2010b).

The overall objective of TRTA II was to contribute to poverty reduction and sustainable development in Pakistan. The specific purpose was to support the economic integration of Pakistan into the global and regional economy and to stimulate decent work and employment creation by increasing exports and enhancing the enabling climate for international trade (UNIDO 2010b).

The principal stakeholders of the program were the Ministry of Commerce (MoC), MoST, Ministry of Food and Agriculture, Ministry of Livestock and Dairy Development, Ministry of Industries and Production, and IPO-Pakistan, as well as technological institutions and Competent Authorities operating under the aforementioned ministries.¹¹ Private sector associations concerned with the fisheries, horticulture, produce, and industrial clusters were also identified as beneficiaries of implementation activities.

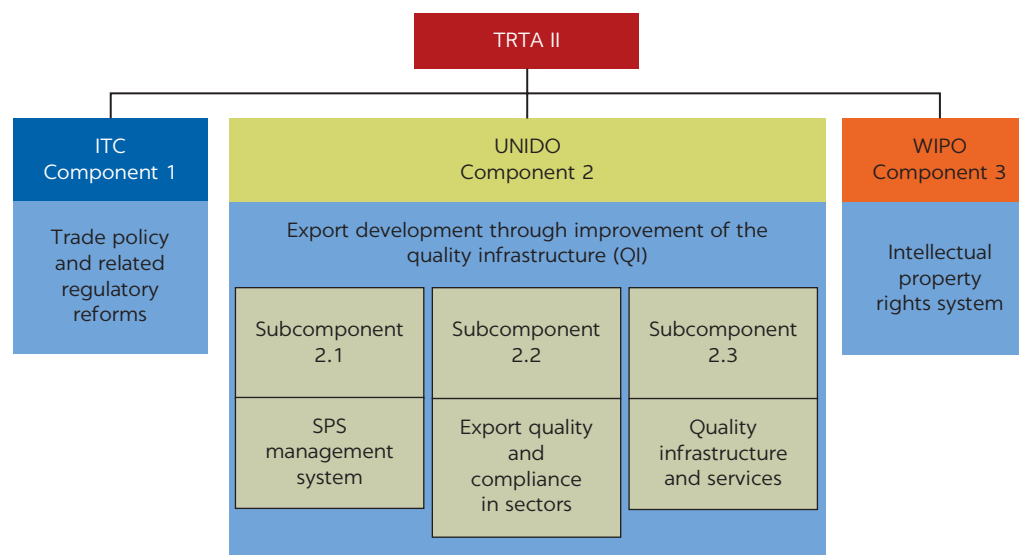
The program's overall objective and specific purpose were designed with relevant policy objectives of the parties in mind. Hence, the program was aligned with the Poverty Reduction Strategy Paper (2004) and the Strategic Trade Policy Framework (2009–12) of Pakistan, as well as with the Pakistan-European Community Country Strategy Paper for 2007–13 (EC 2007; IMF 2004; MoC 2009). The importance of international trade development for poverty reduction was further emphasized by the Second EU-Pakistan Summit held in Brussels in June 2010.

TRTA II components and management

The TRTA II program was a complex, wide-ranging project whose activities were implemented through three components. Its overall design is shown in figure 2, the budget allocations for the various components are shown in table 3, and the components are further described in table 4 (UNIDO Evaluation Group 2014).

UNIDO, as the program's lead implementing agency, established a field-based program management office headed by a chief technical adviser in Islamabad

FIGURE 2
Overall design of TRTA II program in Pakistan, 2010–14



Source: UNIDO Evaluation Group 2014.

Note: ITC = International Trade Centre; SPS = sanitary and phytosanitary; TRTA II = Trade Related Technical Assistance, Phase II; UNIDO = United Nations Industrial Development Organization; WIPO = World Intellectual Property Organization.

TABLE 3 TRTA II budget, by component and subcomponent, 2010–14

COMPONENT OR SUBCOMPONENT	BUDGET (EUROS)
Component 1 (ITC): Trade policy capacity building	1,040,000
Component 2 (UNIDO): Export development through the improvement of QI	7,108,400
Subcomponent 2.1: Support for SPS management capacity	1,107,460
Subcomponent 2.2: Support for improved quality and value added	1,495,820
Subcomponent 2.3: Improvement of conformity assessment infrastructure	3,530,490
Program coordination and management ^a	974,630
Component 3 (WIPO): Strengthening of the IPR system	1,163,000
Contingency	83,600
Total	9,395,000

Source: UNIDO 2010b.

Note: IPR = intellectual property rights; ITC = International Trade Centre; QI = quality infrastructure; SPS = sanitary and phytosanitary; TRTA II = Trade Related Technical Assistance, Phase II; UNIDO = United Nations Industrial Development Organization; WIPO = World Intellectual Property Organization.

a. The UNIDO coordination and management function budget is listed under Component 2 but pertains to all three components.

with 14 staff for TRTA II activities, guided by a program manager at UNIDO headquarters in Vienna. The Ministry of Commerce (MoC) would be the focal point on the Pakistan government's side, and it would have a role in the coordination, monitoring, and evaluation of TRTA II. The program's overall strategic policy and direction was to be guided by the Program Steering Committee (PSC), whose composition and terms of reference were developed during the inception phase. The PSC was cochaired by EC and MoC representatives.

As for the three TRTA II components (figure 2 and table 4), UNIDO managed Component 2 (QI development) in totality. For Component 1 (trade policy) and Component 3 (intellectual property), UNIDO negotiated two interagency

TABLE 4 TRTA II program components and key indicators, 2010–14

COMPONENT	EXPECTED RESULT	THEMATIC AREAS	KEY VERIFIABLE INDICATORS
<i>Component 1</i> Trade policy capacity building	A coherent trade policy and regulatory reform for export competitiveness	<ul style="list-style-type: none"> • Strengthening PITAD's institutional capacity • Strengthening PITAD's and other research institutes' expertise on trade policy • Strengthening government officers' capacity on specific trade policy and international trade negotiations • Contributing research studies to development of a national export strategy • Fostering public-private dialogue on a coherent national export strategy 	Institutionalization of a well-informed public-private dialogue on the design, implementation, and monitoring of trade policy and regulatory reform
<i>Component 2</i> Export development through improvement of quality infrastructure (QI)	Improved compliance of exported products with export market requirements	<ul style="list-style-type: none"> • Strengthening sanitary and phytosanitary (SPS) controls • Improving quality, value addition, and compliance with market requirements of supply chains of selected sectors (fisheries, horticulture, and industrial products) • Improving conformity assessment infrastructure and services 	Increase of 5 percent by 2014 in average unit export value in fishery and horticulture
<i>Component 3</i> Strengthening of the intellectual property (IP) rights system	A modernized IP system that facilitates increased investment and trade in IP-protected goods and services	<ul style="list-style-type: none"> • Strengthening IP institutions • Strengthening IP legislative and policy framework • Enforcing IP rights • Enhancing capacity of businesses and research institution to use the IP system 	Increase of 25–30 percent by 2014 in efficiency in registrations of IP titles (patents, trademarks, industrial designs, copyright, and so on)

Source: UNIDO Evaluation Group 2014.

Note: PITAD = Pakistan Institute of Trade and Development; TRTA II = Trade Related Technical Assistance, Phase II.

agreements, one with the International Trade Centre (ITC) and one with the World Intellectual Property Organization (WIPO) to take the lead, because they were recognized international institutions in these matters. The ITC had long-term field officers stationed in Islamabad, whereas WIPO managed its component from Geneva and fielded only short-term specialists in Pakistan.

The program envisaged regular consultations with other development partners and programs in areas relating to trade development to avoid overlap and foster complementary delivery of activities. These partners and programs included the following:

- *U.S. Agency for International Development (USAID)* “Empower Pakistan: Firms” project (US\$90 million, 2009–13), which supported enterprises in economic sectors important for Pakistan’s export performance
- *USAID* “Empower Pakistan: Trade” project (US\$22 million, 2009–13)
- *World Bank (International Development Association)* “Trade and Transport Facilities-II” project (US\$25 million, 2009–14), which supported implementation of the National Trade Corridor Improvement Program
- *Asian Development Bank (ADB)* “Sindh Coastal Community Development Project” (US\$40 million, 2007–13)
- *Food and Agriculture Organization (FAO)* “Capacity Enhancement Assistance to the Ministry of Food, Agriculture and Livestock” in WTO-related policy and strategy (US\$0.7 million, 2005–10)
- *International Fund for Agricultural Development (IFAD) and Pakistan-Italian Debt Swap Agreement* for Balochistan Coastal Area and Fisheries Development (US\$25 million and US\$5 million, respectively, planned for 2011–16).

PROJECT DESIGN AND IMPLEMENTATION

TRTA I program

Pakistan National Accreditation Council (PNAC)

A series of discussions between Norad, Norwegian Accreditation (NA), UNIDO, and PNAC in August–September 2005 identified the technical support to be provided and coordinated the UNIDO TRTA and Norad-NA interventions in accreditation support to PNAC and Pakistan (UNIDO 2008b). The joint UNIDO-NA intervention focused on capacity development of PNAC to meet the requirements of ISO/IEC 17011 (“Conformity Assessment—Requirements for Accreditation Bodies Accrediting Conformity Assessment Bodies”),¹² including the following:

- Assessment of PNAC’s organizational structure and operations
- Elaboration of master plan for PNAC
- Capacity building in laboratory accreditation through training of assessors (28) from various laboratories and PNAC in ISO/IEC 17025
- Development of a pool of external assessors (15) through attachments as observer trainees with NA assessors during the assessment of Pakistani laboratories
- Capacity building in accreditation of certification bodies through training of PNAC staff in ISO/IEC Guide 62 (“General Requirements for Bodies Operating Assessment and Certification/Registration of Quality Systems”)¹³
- Sponsorship of three PNAC staff for training abroad in ISO/IEC Guide 62 and cross-frontier accreditation¹⁴
- Training of PNAC staff abroad in inspection bodies accreditation in ISO/IEC 17020 (“Conformity Assessment—Requirements for the Operation of Various Types of Bodies Performing Inspection”)¹⁵
- Training of PNAC staff abroad in management of national proficiency testing scheme.

All of these activities were designed to eventually lead PNAC toward international recognition of its accreditation operations through the conclusion of a Mutual Recognition Arrangement with ILAC and a Multilateral Recognition Agreement with the IAF. In addition, UNIDO and NA coordinated their efforts to develop a pool of technical assessors and auditors in ISO 9000 (quality management), ISO 14000 (environmental management), and hazard analysis and critical control points (HACCP).¹⁶

National Physics and Standards Laboratory (NPSL)

Activities carried out to strengthen the national metrology infrastructure in Pakistan through support of the NPSL included the following (UNIDO 2008b):

- Renovation of the six NPSL metrology laboratories for mass, dimensional, volume, pressure, temperature, and electrical measurements in accordance with international criteria, with government funding and TRTA technical advice and support
- Installation and commissioning of an environmental conditioning system for the six NPSL metrology laboratories to enable the conduct of internationally traceable measurement and calibration services under internationally acceptable criteria of environmentally controlled conditions
- Supply of E1 class mass pieces (the national reference standard for mass for Pakistan) and state-of-the-art mass comparators for use by the NPSL’s renovated Mass Metrology Laboratory

- Improvement of skills of the management staff of NPSL through study tours to NMIs in high-income and low- and middle-income economies of relevance for application to Pakistan
- Review of the quality documentation of NPSL and presentations on quality management issues to NPSL technical staff.

The interventions were designed to enable NPSL to carry out and provide to Pakistan commerce and industry traceable measurement and calibration services under internationally acceptable criteria of environmentally controlled conditions and, hence, to enable the mass, dimensional, volume, pressure, temperature, and electrical measurement laboratories to achieve internationally recognized accreditation to ISO/IEC 17025.

Pakistan Standards and Quality Control Authority (PSQCA)

The TRTA I interventions to strengthen the PSQCA so that it would become a more effective NSB and to establish a national certification body included the following (UNIDO 2008b):

- Establishment and operation of a Consumer Liaison Office at the PSQCA for enhanced participation of consumer organizations in standards setting and comparative product testing
- Establishment and operation of the WTO TBT National Inquiry Point to enable the PSQCA to function effectively under the WTO TBT Agreement
- Improvement of standards development activities through provision of technical advice and elaboration of guides
- Improvement of product certification operations through provision of technical advice and elaboration guides and a business plan
- Alignment of PSQCA operations with international practice through provision of technical advice and development of corporate plans
- Improvement of skills of management and technical staff through local and foreign training of PSQCA staff members
- Enhancement of PSQCA capacity to participate expeditiously and effectively in international standardization work through online networking with the ISO activities and information system.

In addition to the general activities, the TRTA I program endeavored to establish a System Certification Centre at the PSQCA for ISO 9000, ISO 14000, ISO 22000 (food safety management),¹⁷ HACCP, and SA 8000 (social accountability)¹⁸ certification. These interventions included the following:

- After an evaluation of the Pakistani certification market, a concept paper was developed to establish a Pakistan system certification body as a public-private partnership but within the PSQCA.
- The System Certification Centre (SCC) was established at the PSQCA through TRTA technical advice and support.
- The chief executive of the SCC received training abroad in system certification.
- The government allocated resources for recruitment of technical staff to conduct the operations of the SCC, after which certification of selected enterprises to ISO 9000, ISO 14000, ISO 22000, HACCP, and SA 8000 would be carried out.

A new SCC chief executive was appointed in May 2007 upon transfer of the initial chief executive to assume other responsibilities at the PSQCA. The management documentation and operational procedures of the SCC activities were under preparation but stalled under the new chief executive. Hence, the recruitment of technical staff and launch of operations were put on hold as well. The conduct of an auditor training program and certification of selected pilot enterprises to ISO 9000, ISO 14000, HACCP, and SA 8000 envisaged in the project planning stage were not carried out because the SCC did not become operational before closure of the TRTA I program.

Laboratories

A group 19 testing laboratories (selected out of 29 reviewed) were prepared for accreditation to ISO/IEC 17025, covering the textile, leather, agroprocessing, fisheries, and electrical sectors, as follows (UNIDO 2008b):

- Microbiology testing (6 laboratories)
- Chemical testing (7 laboratories)
- Textile testing (3 laboratories)
- Leather testing (2 laboratories)
- Electrical testing (1 laboratories).

The support activities for the selected testing labs included

- Expert advice on laboratory layout, testing activities, and quality documentation;
- Formulation of an accreditation plan and close monitoring of planned activities;
- Provision of laboratory equipment, reference cultures, and technical literature;
- Local and foreign training of laboratory staff;
- Participation in international proficiency testing schemes;
- Initial assessment by an accreditation body; and
- Extraordinary assessment by an accreditation body.

The NA conducted initial assessment of the 18 testing laboratories in January–February 2007 and May–June 2007. The 19th testing laboratory was deferred for assessment to December 2007 to allow the method validation process for histamine testing to be finalized. The 18 testing laboratories assessed by NA achieved accreditation in September 2007 following closure of nonconformities raised during the assessments and subsequent verifications made through extraordinary visits by NA.

The NA-issued certificates of accreditation were presented to the 18 testing laboratories in an award ceremony held in November 2007 in Lahore, attended by senior government officials, EU and UNIDO representatives, and a large group of scientists and public and private sector participants.

Fisheries

UNIDO's TRTA I support to the fisheries sector was provided on request of the Ministry of Food, Livestock and Agriculture and agreed to by the EC delegation. This support was quite extensive and focused on four areas: the Marine Fisheries Department, the Karachi Fish Harbour Authority, the Fishermen Cooperative Society, and fish processing plants (UNIDO 2008b).

Marine Fisheries Department (MFD). The TRTA I support strengthened the MFD's capacity and operations by:

- Developing a comprehensive inspection manual in accordance with international practice for the MFD's purpose and use;
- Upgrading the MFD's microbiology testing laboratory and helping it achieve internationally recognized accreditation to ISO/IEC 17025;
- Preparing the MFD's chemical testing laboratory for internationally recognized accreditation to ISO/IEC 17025; and
- Improving the skills of the MFD's senior management and inspection staff through training abroad and local training in standard operating procedures as well as in HACCP and traceability methods.

These interventions were designed to enable the MFD to perform satisfactorily as the EU-designated Competent Authority for Pakistan.

Karachi Fish Harbour Authority (KFHA). Capacity improvement of the KFHA comprised:

- Renovation and operationalization of the two fish auction halls (K-1 and K-2), with the largest fish auction hall in Karachi handling more than 450 tons of fish daily;
- Skills development of KFHA inspectors in standard operating procedures and HACCP practices to apply good hygiene practices at landing sites and auction halls; and
- Capacity improvement in management of the fish harbor facilities.

These interventions were designed to facilitate compliance of the handling of fisheries' products with good international practices at landing sites and auction halls.

Fishermen Cooperative Society (FCS). The capacity development of the FCS included improvements in the operations of fishermen, boat owners, auction hall operators, and mole holders. The activities made in this regard consisted of:

- Upgrades to 175 Hilla boats and 50 trawlers in accordance with the recommendations of international experts;¹⁹ and
- Skills development of more than 500 fishermen, boat owners, auction hall operators, and mole holders in standard operating procedures to ensure good hygiene practices in the handling of fisheries' products.

These interventions were designed to facilitate compliance with requirements related to activities ranging from primary production to the auctioning of fisheries' products.

Fish processing plants. The activities in capacity improvement of the fish processing plants consisted of:

- Skills development of processors' staff in HACCP and traceability methods and practices;
- Implementation of HACCP practices by developing and applying HACCP plans specific to each fish processing plant;
- Employment of handheld, personal computer (PC)-compatible traceability instruments for recording the traceability of fisheries' products processed for export; and
- Application of paper-based traceability systems at processing plants covering all operations along the entire fisheries chain.

These interventions were designed to enable fish processing plants to meet international requirements of fisheries' exports destined to the EU countries.

TRTA II program

As noted earlier, the TRTA II Program was implemented in three components. Synergy between them was designed into the program from the start. It was envisaged that Component 1 institutions (Pakistan Institute of Trade and Development [PITAD] and other research entities) would develop capacity and undertake trade policy research and analytic studies relevant to the activities carried out through Components 2 and 3—export development and intellectual property (IP) rights, respectively—particularly in relation to sectors linked to high poverty rates (fisheries and horticulture). Component 2 would work with enterprises in these sectors and strengthen institutions dealing with mandatory and voluntary standards. Component 3 would strengthen the IP rights system, again with a focus on IP instruments such as geographical indications and plant breeder rights, which would contribute to the realization of trade and developmental goals (UNIDO 2010b).

The establishment of effective private-public dialogues was an important cross-cutting issue in all three components; hence common public-private dialogues for both horizontal trade-related issues and the specific targeted sectors were established to ensure coherence in program delivery across all components.

Component 1: Trade policy and related regulatory reforms

In 2008, the Pakistan Institute of Trade and Development (PITAD) (formerly the Foreign Trade Institute of Pakistan) was restructured to provide greater focus on strategic research on trade policy and to become Pakistan's premier body on trade capacity building and human capital development for commerce. PITAD had since strengthened its team of researchers, trainers, and support staff and became fully functional as an independent policy think tank and training center on international trade.

But although Pakistan had taken positive steps to establish the institutional framework for development of trade policy, more needed to be done to operationalize the organization. The specific purpose of TRTA II Component 1 was aimed at the government of Pakistan, but more specifically at the Ministry of Commerce (MoC), for developing a coherent trade policy and attendant regulations for export competitiveness, as envisioned in the MoC's Strategic Trade Policy Framework 2009–12 (MoC 2009). Hence, the activities of Component 1 constituted the following:

- Strengthening PITAD's institutional capacity by providing updated tools and publications based on actual needs as well as advice on their use
- Strengthening PITAD's and other research institutes' expertise on trade policy (after a needs assessment of ministries and implementing governmental agencies as well as key institutes) by enhancing specialized training programs to align with international best practices
- Strengthening government officers' capacity on specific trade policy and international trade negotiations through a series of six short (two- to three-day) training sessions on trade policy
- Conducting research studies to establish a coherent framework for trade policy and regulatory reform for a national export strategy
- Fostering a public-private dialogue for a coherent national export strategy.

Component 2: Improved compliance of exported products

Component 2 comprised three subcomponents designed to provide a holistic approach to improving the compliance of exported products with standards and technical regulations in export markets. They dealt with the SPS management system, export quality, and compliance in selected sectors, and with QI-related capacity building to support the other two subcomponents.

Subcomponent 2.1: SPS management system

As noted earlier, the food safety system of Pakistan was totally fragmented and, for all intents and purposes, ineffective. Therefore, the TRTA II approach was to

- Strengthen the coordination of SPS issues by the government of Pakistan;
- Implement new and better-coordinated controls, particularly in relation to food safety and plant health to respond to mandatory and voluntary quality standards;
- Improve productivity and value added at the enterprise level (subcomponent 2.2); and
- Establish the necessary QI support services (subcomponent 2.3).

To address the need for a holistic integration of SPS controls, the government of Pakistan, through the Ministry of Food and Agriculture, established the National Animal and Plant Health Inspection Service (NAPHIS) with its own premises and professional staff complement. Although it had established a number of activities, NAPHIS had not been able to develop any coherent policy proposal for the development of an SPS management system.

These developments increased the need for interventions to improve SPS coordination. NAPHIS had a clear opportunity to lead and coordinate important developments in the SPS area, but it needed to establish its credibility by taking the policy lead for strengthening the SPS management system in Pakistan, with a focus on food safety. Hence, the activities to achieve the goals of Subcomponent 2.1 constituted the following:

- *Strengthening the SPS management system*, starting with SPS policy development and followed by the development of new food safety and phytosanitary laws and model technical regulations
- *Enhancing application of food safety controls* by developing inspection guidelines, manuals, and checklists; providing inspection equipment; and building the technical capacity of the food safety inspection staff.

Subcomponent 2.2: Export quality and compliance in selected sectors

Industrial sectors suffered from (a) lack of awareness of market requirements, and (b) use of outdated management and productivity tools. Strategic direction for meso-level interventions to support the improvement of quality and productivity was only weakly defined. The TRTA II program results in this component were therefore designed to support exporters by building the capacity of private and public organizations that were in a position to provide support services (such as technical advice, training, public infrastructure investment, and incentive schemes).

In the fisheries and horticulture sectors, the program would help strengthen public and private investment planning in supply chain infrastructure (such as fish landing sites) and would support the development of business arrangements along the global supply chain to identify key bottlenecks in the establishment of business links between international buyers and Pakistani exporters.

Hence, this subcomponent focused on the following activities:

- *Strengthening the competitiveness of meso-level agencies and service providers through technical advice and training*
- *Improving competitiveness in selected pro-poor manufacturing sectors through recommendations and technical advice on value-added production, leading to certification to recognized standards*
- *Improving competitiveness in the fishery sector with proposals to improve branding, marketing, and supply chain performance as well as business planning*
- *Improving competitiveness in the horticulture sector with development and dissemination of codes of practice and their pilot implementation in the kinnow and mango sectors and in the provision of associated training*
- *Improving consultancy services and the certification of enterprises through (a) the training and qualification of trainers and consultants in management systems, in collaboration with the National Productivity Organization; (b) the certification of 40 enterprises; and (c) support to 10 selected enterprises to achieve Conformité Européenne (CE) marking of products²⁰*
- *Developing business arrangements along the international supply chain by establishing links between local producers and international buyers in markets for fisheries, horticulture, and selected industrial products as well as promoting cost-effective freight forwarding and export logistics, including cold chain.*

Subcomponent 2.3: QI-related development

During the TRTA I program, some progress had been achieved in developing internationally recognized QI services in Pakistan. The TRTA II program built on this progress to develop the QI services to a level where they could be internationally recognized, with the intention that they would be able to provide the conformity assessment services required by the export sectors envisaged for TRTA II support. Hence, the activities to achieve the result of this subcomponent constituted the following:

- *Support for the development of technical regulations and voluntary standardization* (including enhancement of the participation of the private sector and consumers) as well as technical advice to fully operationalize the PSQCA as the national WTO TBT Inquiry Point and hence as the national notification body
- *Technical advice to national metrology services* in the development of measurement and calibration capabilities in the areas of mass, length, volume, temperature, pressure, and electrical quantities (accreditation of six metrology labs); establishment of a proficiency testing (PT) scheme for chemical and microbiological testing; provision of metrology equipment; and achievement of internationally recognized accreditation of the NPSL's metrology laboratories
- *Support for the national accreditation service* through training and certification of personnel to strengthen the pool of external assessors, helping PNAC to achieve Multilateral Recognition Agreement signatory status with the IAF, and providing technical advice in the accreditation of PT schemes
- *Support for the testing laboratories* in the form of technical advice and provision of subcontract services to (a) achieve internationally recognized accreditation of 24 testing laboratories; (b) facilitate PT participation and provision of certified reference materials or reference cultures to the testing laboratories targeted for accreditation; and (c) develop business plans to commercialize the testing services of the laboratories to ensure sustainability.

Component 3: Intellectual property rights system

Although Pakistan had established its Intellectual Property Organization (IPO-Pakistan) in response to its obligations under the WTO TRIPS Agreement, IPO-Pakistan's effectiveness was constrained by a lack of human resources and expertise as well as the inefficient, paper-based nature of its work methods and procedures. In addition, Pakistan had not acceded to certain international agreements and had failed to develop laws to protect geographical indications and plant breeders' rights, which could add value to local export products.

Enforcement mechanisms needed to be strengthened, especially by enhancing the capacity of enforcement agencies to train their IP-related officials on their own in a sustained manner. Most importantly, measures needed to be taken to enable businesses to leverage IP for increased innovation and competitiveness. These measures included promoting the commercialization of the outputs of Pakistan's research and higher-education infrastructure. Furthermore, the business sector's and other stakeholders' involvement in IP policy exercises needed to be strengthened.

Hence, the activities to achieve the goals of this subcomponent entailed

- Strengthening the IP institutions;
- Strengthening the IP legislative and policy framework;
- Improving the enforcement of IP rights; and
- Increasing the use of IP systems by businesses and research institutions.

Stakeholders and their roles

Many stakeholders were involved in the development of the Pakistani QI and the development of selected industrial sectors. The principal stakeholders were the MoC, MoST, Ministry of Food and Agriculture, Ministry of Livestock and Dairy Development, Ministry of Industries and Production, and IPO-Pakistan, as well as the technological institutions and Competent Authorities operating under the aforementioned ministries. The MoC was the main counterpart because of the trade focus of the interventions, but other ministries also played important roles; for example, MoST was the line ministry of the three pinnacle QI organizations (the PSQCA, the NPSL, and PNAC).

At the institutional level, the three pinnacle QI institutions received much of the development support, but others, such as the PCSIR, benefited as much if not more regarding laboratory development, and it was the home of the NPSL. All of these QI organizations played meaningful roles in the development of the National Quality Policy under the leadership of MoST, especially in developing the draft implementation plan. As for the draft food safety legislation, NAPHS was one of the main stakeholders involved in the process; and for the fisheries-related projects, the Marine Fisheries Department and the Karachi Fish Harbour Authority were the main regulatory authorities involved.

Private sector associations concerned with fisheries, horticulture, produce, and industrial clusters were also identified as beneficiaries of implementation activities. Of specific note was the involvement of the Fishermen Cooperative Society, which cooperated in getting the fishermen, boat owners, auction hall operators, and mole holders involved and motivated.

The MoC initiated a trade-related donor coordination that was largely facilitated by UNIDO as one of the major development agencies in this sector. Information was collected and analyzed on the 21 major donors in trade, and the first donor coordination meeting was held in February 2013, chaired by the secretary of the MoC and the EC delegation. Donors decided to establish

regular coordination meetings and specific focus groups. Direct collaborations were also organized through the TRTA II program with the Australia–Pakistan Agriculture Sector Linkages Program in the horticulture sector, the Centre for the Promotion of Imports (Netherlands) in the surgical industry, and the FAO in animal health legislation (UNIDO 2013a).

RESULTS ACHIEVED

The results and outcomes of the two programs—TRTA I and TRTA II—are not presented individually (for each of the programs) but in totality because many interventions of the one flowed into the other.

Identifying TBT and SPS constraints faced by exporters

Three surveys relating to TBT and SPS constraints faced by Pakistani exporters were conducted during the TRTA I program. All of these reports were used by UNIDO and other development agencies as input to development project planning. The TRTA II program in particular benefited from the QI-related needs quantified in these reports.

Technical barriers to trade (TBT). A survey identified compliance challenges that 157 Pakistani exporting firms faced in complying with TBT and SPS requirements. The sectors covered in this survey included textiles, leather, agroprocessing, and fisheries. The survey report—“Trade Related Challenges Facing Exporters in Pakistan”—was published and widely disseminated to government departments, exporters, industry, and public and private sector institutions, including the donor and international community in Pakistan (PIDE 2007).

Sanitary and phytosanitary (SPS) compliance. A study of SPS compliance was conducted jointly by the World Bank and UNIDO, covering the horticulture, livestock, meat, and fisheries sectors. The survey findings were reported in “Pakistan’s Agro-Based Exports and Sanitary and Phytosanitary (SPS) Compliance” (World Bank and UNIDO 2006). The report included a detailed action matrix for enhancing trade-related SPS management capacity in Pakistan to address the SPS constraints and shortcomings identified by the study. The report was published and widely disseminated to federal and provincial government departments, industry, and public and private sector institutions in Pakistan.

Compliance issues affecting enterprise clusters. A survey covering 195 Pakistani enterprises was conducted on compliance issues affecting the enterprise clusters in Punjab province, namely textiles and textile garments, sporting goods, cutlery, fans, and tangerine and mango clusters. The survey results were reported in “Compliance Issues Affecting Enterprise Clusters in Punjab Province of Pakistan” and were widely distributed to federal and provincial government departments, industry, exporters, and public and private sector institutions in Pakistan (UNIDO 2010a).

Developing a national QI

A national QI consists of institutions engaged in standardization, metrology, testing, inspection, certification, and accreditation. If such infrastructures and services are not available in the country, or are not internationally recognized for

their accuracy, companies are obliged to source such services (product testing, equipment calibration, and certification against ISO or other standards) abroad. This process is usually expensive, time-consuming, and complicated, and hence often excludes SMEs from the use of such services.

On the other hand, having such infrastructures and services locally established—provided they are internationally recognized for their accuracy and considered equal to such services as provided abroad—allows a broad base of companies (but also local governments, consumer protection actors, and so on) to quickly access cheaper, more reliable services. The development of the Pakistani national QI made great strides in the years 2005–13, but there were also failures and persistent challenges, as detailed below.

Pakistan Standards and Quality Control Authority (PSQCA)

During the initial TRTA I program, the PSQCA received a fair amount of technical support to streamline its standardization activities, including better online networking with the ISO's activities and information system. The establishment of a Consumer Liaison Office and the national WTO TBT Inquiry Point are specifically noteworthy.

The establishment of a System Certification Centre (SCC) under PSQCA auspices started well, with agreement and financial support from government based on a sound business plan developed with technical support from TRTA experts. Unfortunately, personnel movements within the PSQCA and the lack of interest of the newly appointed CEO of the SCC led to major hold-ups in the development of procedures and the appointment of personnel. Consequently, the planned training of auditors, development of quality documentation, implementation of sound procedures, and preparation for accreditation during TRTA I did not take place (UNIDO 2008b). The SCC did not recover from these setbacks and was dissolved before the end of TRTA II.

The PSQCA was not really the focus of the TRTA II program, even though some further training of the WTO TBT Inquiry Point personnel took place. The PSQCA's organizational structure was evaluated in the context of the development of the national quality policy (NQP), but no further action was taken to address its shortcomings because the NQP had not been approved by the end of TRTA II.

Pakistan National Accreditation Centre (PNAC)

One of the main achievements of providing support to PNAC was the development of a master plan early during the program for PNAC's international recognition. This was based on in-depth evaluations of its organizational structures, practices, and future business opportunities. All other interventions were based on this master plan and included the training of 35 assessors and 28 lead assessors from both PNAC and various laboratories, providing practical training to 16 of these assessors through attachments as observer assessors with Norwegian Accreditation (NA) assessors during the assessment of Pakistani laboratories as well as training of PNAC staff in ISO/IEC 17020 and ISO/IEC Guide 43 (“Conformity Assessment—General Requirements for Proficiency Testing”)²¹ (UNIDO 2014a).

PNAC finally achieved Mutual Recognition Arrangement signatory status with the Asia Pacific Laboratory Accreditation Cooperation (APLAC) and ILAC for testing and calibration laboratories (ISO/IEC 17025) in May 2009 and was also successfully reevaluated in 2013 for continued recognition in this regard.

In the same year, it achieved signatory status with the IAF Multilateral Recognition Agreement for its ISO 9001 and ISO 14001 (“Environmental Management Systems—Requirements with Guidance for Use”) accreditation systems.²²

After obtaining its international accreditation in 2009, PNAC started accrediting laboratories on its own. By the end of 2013, it had successfully accredited 56 laboratories in Pakistan at a considerably lower cost to the laboratories compared with accreditation from abroad. Another 20 were in process. The number of laboratories in Pakistan that could be accredited was estimated at about 400 (UNIDO 2008a, 2010c, 2011, 2013a, 2014b, 2015).

National Physical and Standards Laboratory (NPSL)

In 2004, no national accredited on-site calibration capacity was available to calibrate laboratory equipment (balances, incubators, autoclaves, furnaces, and so on) in the approximately 400 laboratories of the country. The main TRTA partner to develop the metrology system has been the third pillar of the federal QI, the NPSL. TRTA I first provided support to the NPSL for the necessary hardware and upgrading of civil works and started developing the human resources through exposure trips and specialized training.

After successfully mastering all conformities, six NPSL labs were accredited by PNAC in 2012 with the support of the TRTA II program. By the end of 2013, the NPSL offered 55 internationally recognized on-site calibrations to laboratories and had calibrated more than 120 different types of equipment, and the cost to industry for these services had decreased by around 80 percent (UNIDO 2008a, 2010c, 2011, 2013a, 2014b, 2015).

The NPSL has participated in the International Committee for Weights and Measures (CIPM) Mutual Recognition Arrangement since July 2011, but no CMCs had been listed on the KCDB of the BIPM. The NPSL had recorded several supplementary comparisons in the KCDB, and a few KCDB entries have been approved for equivalence, but they have not yet been published as CMCs.²³

Organizationally, the NPSL is still under the PCSIR. However, to become a fully-fledged NMI, as in other countries, the NPSL should become organizationally independent.

Formulating a national quality policy

During the TRTA I program as well as the subsequent TRTA bridging phases, it became increasingly clear that Pakistan lacked overall coordination of QI-related matters. The TRTA II Program Steering Committee (PSC) consequently initiated the development of a NQP to replace the discredited 2005 version, even though an NQP had not been included in the TRTA II program document (UNIDO 2014b).

The broad objectives of the new NQP were

- To provide a clear demarcation of the responsibilities for metrology, standards, and accreditation and the consequent government commitments;
- To ensure that conformity assessment can be provided by both public and private organizations in a market-related environment as long as they are shown to be technically competent;
- To provide for the development of a technical regulation framework to ensure a common, effective, and efficient approach to their development and implementation across all relevant ministries and their agencies; and
- To apply measures supportive of the preceding objectives.

To develop the NQP, a road map with four main steps was designed and followed under the leadership of MoST and with the support of international experts:

- *Step 1: An appraisal and stock-taking exercise* identified major shortcomings of the current situation.
- *Step 2: Options were developed and presented*, based on a benchmarking exercise with the QIs of Malaysia, Turkey, and Vietnam (UNIDO 2013b), as well as in-depth discussions at workshops involving both the public and private sectors in Lahore, Karachi, and Islamabad. The workshops with the private sector were held without public sector participation to gain an understanding of the private sector's needs without the proceedings being overshadowed with public-private sector sensitivities.
- *Step 3: A working draft of the NQP was formulated* in technical workshops and circulated for comment.
- *Step 4: A National Quality Forum was established* with all relevant stakeholders, including the private sector, to discuss the draft and provide recommendations for further improvement.

The final draft of the NQP was to be submitted to MoST for consideration at the political level and, finally, promulgation, which was planned for 2014. Preparatory work was also undertaken with a working group selected by the National Quality Forum on a detailed implementation plan, including budget requirements. The implementation of the NQP would be a key element of Pakistan's national QI and technical regulation system and would represent a contribution to its sustainability (UNIDO 2016).

Working toward an SPS management system

During TRTA I, the program produced the basic analyses that identified the TBT- and SPS-related conformity problems and deficits then existing in the country. Subsequently, a SPS compliance study was undertaken in collaboration with the World Bank. The study identified serious deficits in food safety, plant health, and animal health control systems and led to the plan to develop an integrated SPS management system with effective food safety control measures (World Bank and UNIDO 2006). The main result of these efforts was that the government of Pakistan formulated, with technical assistance from TRTA II, the National Food Safety Bill. By the end of 2013, the bill had still not been approved at the political level and by parliament.

As a consequence, the National Animal and Plant Health Inspection Service (NAPHIS) continued to operate as a government of Pakistan project, which ended in June 2014. As such, NAPHIS had no regulatory powers, which it would only gain once the National Food Safety Bill was passed in the parliament. Accordingly, the (provincial) Punjab Food Authority, for example, did not formally recognize NAPHIS and had not been interested in collaborating. Because of the delay in establishing NAPHIS as a federal authority, important issues remained pending, and sadly cooperation between the Punjab Food Authority and NAPHIS, but also with TRTA II, stalled despite earlier good collaboration in trainings for SPS management and food safety officers.

Taking a commendable medium- and long-term perspective for building up the SPS regime, TRTA II had successfully initiated and supported postgraduate diploma courses in food safety and control at three universities. A total of

85 students participated in the initial intake, with the first 32 students graduating from the University of Veterinary and Animal Sciences in Lahore (UNIDO 2014b). The university planned to upgrade its course to the MPhil level and to have it accredited by the Royal Environmental Health Institute of Scotland.

Upgrading and accrediting laboratories

Since 2004, 49 laboratories (19 under TRTA I and 30 under TRTA II) had been assisted to obtain ISO 17025 accreditation. The laboratories were initially accredited by the NA and subsequently by PNAC. The upgraded laboratories were in the areas of chemical and microbiological testing, calibration, electrical testing, mechanical and materials testing, and sector-specific textile and leather testing. The performance of the laboratories was evaluated by looking at the volume of tests conducted, their income generated, and the satisfaction of customers in the export sector (UNIDO 2014a).

Data were collected from a total of 30 laboratories in nine institutions that were supported by the TRTA initiative. The institutions and the number of laboratories, and their scopes, were as follows:

- Grain Quality Testing Laboratory, Pakistan Agricultural Research Council (1 laboratory)
- Grain Quality Testing Laboratory, National Agricultural Research Centre (2 laboratories)
- Leather Research Centre (2 laboratories)
- Marine Fisheries Department (2 laboratories)
- National Physical and Standards Laboratory (NPSL) (1 laboratory)
- National Reference Laboratory for Poultry Disease (1 laboratory)
- Pakistan Council of Scientific and Industrial Research (PCSIR), Lahore (10 laboratories)
- Pakistan Council of Scientific and Industrial Research (PCSIR), Karachi (10 laboratories)
- Pakistan Council of Research in Water Resources (1 laboratory).

The performance of the laboratories supported by the TRTA I program before and after their accreditation was recorded—performance being measured by the number of tests performed and revenue generated in 2006 and 2008. The performance of the laboratories supported during TRTA II underwent a more detailed analysis. The number of tests carried out and the revenue generated from such tests within the scope of TRTA II during 2009, 2011, and 2013 were obtained from the laboratories. In addition, the gains to the export sector were determined via a survey or questionnaire to regular customers of the laboratories. A direct comparison of the performance of laboratories under the TRTA I and TRTA II projects would therefore be a bit questionable, but general trends can be observed, as described below.

Performance of laboratories under TRTA I

A survey of 19 accredited laboratories was conducted for 2006 (one year before accreditation) and 2008 (one year after accreditation) within the TRTA I project. The results reflected an increase in number of tests as well as revenue following accreditation. Overall, the number of tests conducted more than doubled during the two years under observation, while revenues from accredited labs in totality tripled by 2008 (UNIDO 2014a).

Performance under TRTA II: testing volumes

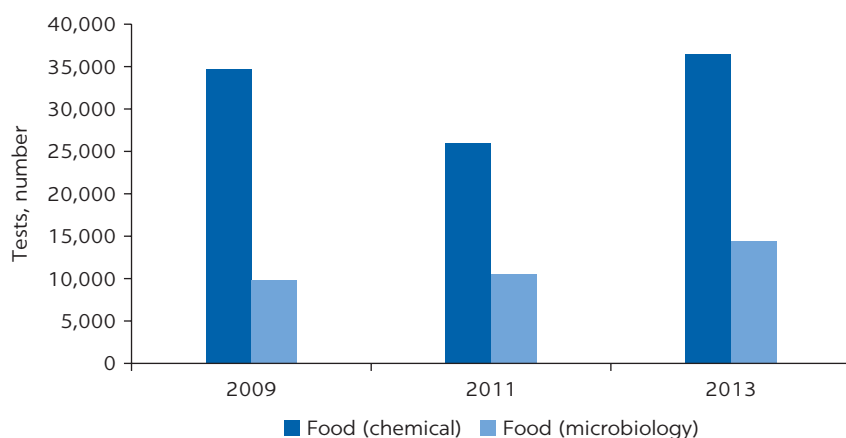
The total number of tests carried out increased by 20 percent during 2009–13 (UNIDO 2014a). The largest volumes of laboratory services were in the food processing sector, with test volumes increasing by 46 percent for microbiology testing by and 5 percent for chemical testing during 2009–13 (figure 3).

Over the same period the number of services provided for electrical testing recorded a 72 percent increase; and for calibration, a 150 percent increase (figure 4). This is a significant reward for laboratory accreditation, where the need for precision measurements has been recognized by the export sector.

The leather-testing services increased by 40 percent (for physical testing) and by 33 percent (for chemical testing), indicating that a substantial number of exporters or producers have used the locally available, accredited testing services (figure 5).

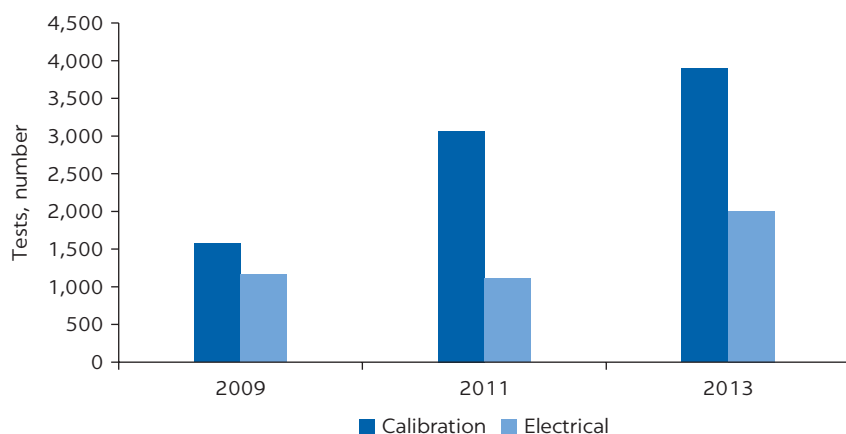
The textile test count, on the other hand, was just short of a 20 percent increase (figure 5). This increase could be attributed to the increase in demand

FIGURE 3
Tests in food laboratories, Pakistan, 2009–13



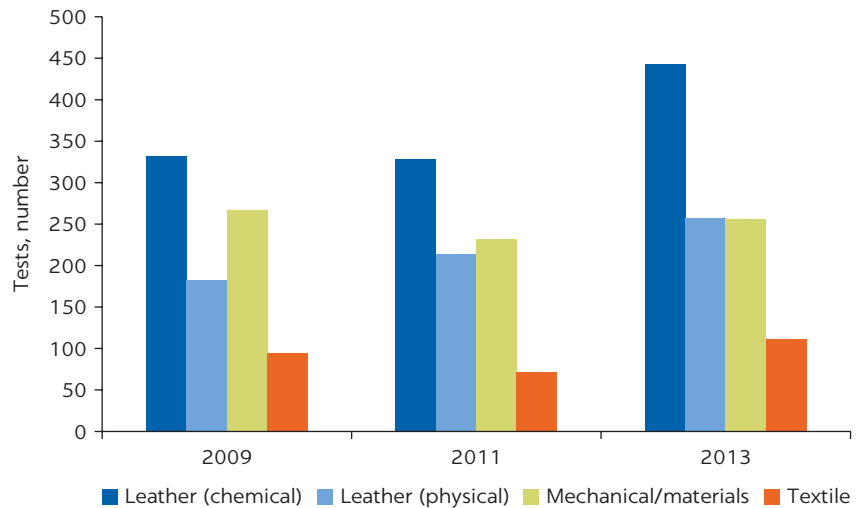
Source: UNIDO 2014a.

FIGURE 4
Calibration services and electrical tests, Pakistan, 2009–13



Source: UNIDO 2014a.

FIGURE 5
Laboratory tests in selected export sectors, Pakistan, 2009–13



Source: UNIDO 2014a.

for textile testing to meet export market requirements. However, private sector competition emerged from laboratories offering accredited textile-testing services, such as TTI (Textile Testing International). These laboratories are linked with international buyers and textile associations, have a strong marketing strategy, and are serious competitors of the public sector laboratories. The leather and textile sectors are two of the five leading export sectors of Pakistan.

The mechanical and materials testing services recorded an increase of 10 percent from 2011 to 2013, with accreditation achieved in 2013 (figure 5). This was an improvement, given the 13 percent decrease that the laboratory had experienced in 2011 before accreditation.

Performance under TRTA II: revenue generated

The revenue generated from the tests carried out recorded a 60 percent increase from 2009 to 2013 (UNIDO 2014a).

In the food sector, the demand for microbiology testing services rose significantly and recorded more than a 50 percent increase in revenue from 2009 to 2013, while chemical testing displayed a 33 percent increase (figure 6). In fiscal year 2012/13, food exports increased by 4.82 percent, and accredited testing services may have played a role in this increase.

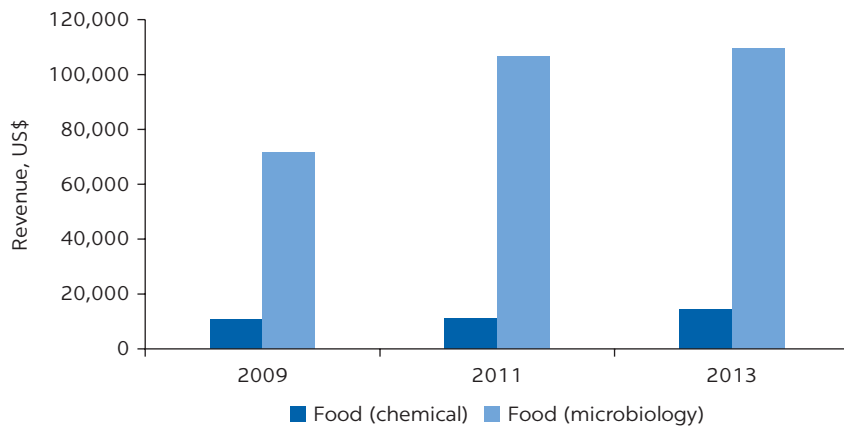
The income from calibration services more than doubled for all three providers, which affirms the benefit to local producers and laboratories and promises future lucrative returns (figure 7). Detailed analysis shows that the laboratories may need to scale up their services to match increasing demands in the sector. Revenue from electrical testing services also more than doubled in 2013, after witnessing only a marginal rise in 2011 (figure 7).

Physical testing of leather products recorded a revenue increase of 55 percent, while chemical testing recorded a 35 percent increase (figure 8). Mechanical and materials testing revenue increased by almost 10 times from 2009 to 2011, and another 8 percent increase was recorded in 2013 after accreditation.

Revenue from textile testing plunged in 2011 by 50 percent owing to a marked decrease in demand for costlier tests such as colorfastness, determination of

FIGURE 6

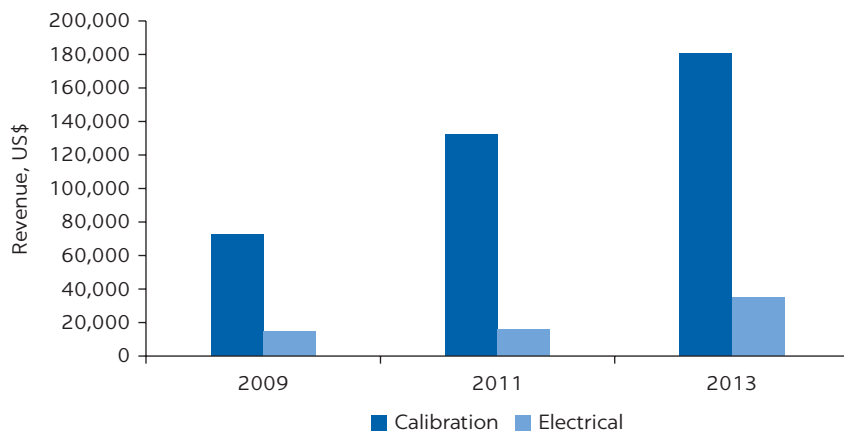
Revenue for food laboratories, Pakistan, 2009–13



Source: UNIDO 2014a.

FIGURE 7

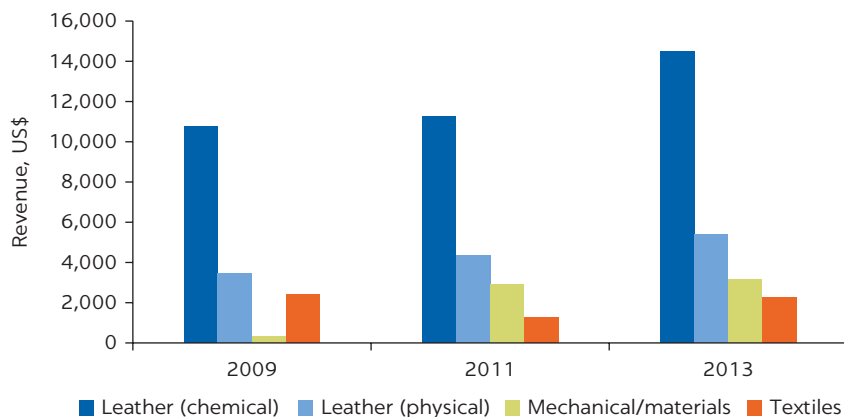
Revenue for calibration and electrical laboratories, Pakistan, 2009–13



Source: UNIDO 2014a.

FIGURE 8

Revenue for physical testing in selected export sectors, Pakistan, 2009–13



Source: UNIDO 2014a.

fabric propensity, and determination of linear density of yarn by the skein method. By 2013, revenues were back up, boasting a 75 percent increase in income generation since 2011 (figure 8). China, one of Pakistan's largest trading partners, increased imports of textiles, textile articles, and leather goods from Pakistan, and if the same trend is maintained, the reliability and quality of these products will remain of utmost priority.

Promoting exports in three sectors

During TRTA I and the subsequent bridging phases, the program had only been active in the fisheries sector. During TRTA II, given its overall pro-poor orientation, horticulture and manufacturing industries were also included as labor-intensive sectors with good export potential.

Within the horticulture sector, the mango and kinnow value chains were selected, based on pragmatic feasibility considerations and export potential, while apricots and dates, for instance, were excluded as being too challenging. In the industrial sector, electric fans, protective gear, and cutlery were selected as nontraditional products with good export potential; however, textiles were ruled out for already receiving sufficient support. During the inception phase in 2010, the program then conducted extensive sector and value chain analyses, which served as sound bases for designing interventions in each value chain (UNIDO 2010b).

The following brief analysis deliberately separates the different sectors—treating fisheries, horticulture, and industry individually. Challenges and activities in the three sectors were quite different, as were issues of sustainability and impact.

Fisheries

Fisheries is the only sector where activities had already started during TRTA I in 2004, when Pakistan imposed a self-ban to avoid the imminent threat of an EU ban on Pakistan fish exports. Nevertheless, the EU ban remained in effect in 2007 after a check by the Food Veterinary Office of the EC Directorate-General Health and Food Safety identified continued quality deficits, including poor inspection practices and poor hygienic conditions and control practices of fish packers and exporters. In total, 13 critical points were identified that had to be addressed before exports could be resumed (UNIDO Evaluation Group 2014).

The three main players in the Karachi fisheries sector included, first, the Marine Fisheries Department (MFD) under the Federal Ministry of Ports and Shipping. The other two were the Karachi Fish Harbour Authority (KFHA) under the provincial government and the Fishermen Cooperative Society (FCS), a powerful lobbying organization with some 11,000 fishermen members that was founded in 1945, representing nearly all fishermen along Pakistan's 1,200-kilometer coastline.

Collaboration between the three main actors was not particularly smooth, especially between the KFHA (as provincial body and owner of the Karachi port infrastructure) and the FCS (as operator and contractor of the fishing harbor). There were long-standing issues between the KFHA and the FCS related to harbor ownership and lease agreements, which were financed by a 3.5 percent excise tax on each fish catch brought into the harbor. On the other hand, the KFHA also saw itself, as a consequence of the devolution of powers to the

provinces, as owner of the facilities and insisted that the MFD, as a central government body, should pay rent for the premises it occupied in the harbor.

During TRTA I, the MFD was strengthened as Competent Authority and converted into the technical champion of the sector. Its microbiology and chemical laboratories were accredited to ISO/IEC 17025. Two fish auction halls were renovated. The staffs of 17 processing plants were trained, along with the KFHA and MFD staffs, in hazard analysis and critical control points (HACCP). Information technology (IT)-based traceability instruments were also installed. The HACCP trainings were certified by the Royal Institute of Public Health of the United Kingdom. In all, 1,500 fishermen were trained in standard operating procedures (UNIDO Evaluation Group 2014).

Overall, the TRTA I and TRTA II programs leveraged around €2 million of government contributions and investments, particularly for the PCSIR and MFD labs, fishing boat upgrading, and the renovations of the two fish auction halls. A prominent success story was the equipping of 1,400 fishing boats with fiberglass hulls. TRTA I paid for the first five boat renovations as demonstrations. Later the provincial government financed the rehabilitation of 500 units, and by the end of 2013 around 900 boat owners had self-financed the renovation of their vessels out of a total 1,800 boats in the Karachi harbor. Government funding of approximately €24,000 was mobilized to establish testing facilities for dioxins, PCBs, and PAHs in fish and fish products at the PCSIR Karachi laboratories.²⁴ At the end of 2013, foreign third-party laboratories were performing these tests, but the PCSIR laboratories would take over as soon as they were accredited (UNIDO Evaluation Group 2014).

After the EU had lifted the ban on fish exports in March 2013, exports were resumed on a pilot basis. Two processor/exporters had been cleared for exporting to the EU. One of these, however, preferred to continue catering to the less demanding markets in China and the Middle East. By the end of 2013, 10 trial seafood shipments from the second cleared exporter had reached European markets without rejection.

Overall, the TRTA programs since 2004 had a major impact on the fisheries sector in the main production site in Karachi. By the end of 2013, the preconditions in terms of infrastructure and know-how were in place for the sector to increase its volumes and exports to the EU and other markets. The next challenges would be (a) to expand the improved Karachi “system” to other major fishing sites like Korangi, (b) to increase value addition by exporting processed products, and (c) to ensure that the carrying capacity of the Pakistani seas are respected. For the latter challenge, the FAO was conducting a thorough investigation.

The UNIDO evaluation mission in 2014 suggested that after some 10 years of intensive support, the time had come to let the sector take care of itself; more hand-holding would hardly lead to proactive private sector development, which ultimately would be the only sustainable growth path for the fisheries sector (UNIDO Evaluation Group 2014).

Horticulture: Mango and kinnow

Mango and kinnow are two of the major horticulture crops in Pakistan. An in-depth analysis of the sector in 2010 highlighted a number of challenges, including a disconnect between the research institutes specifically created for the improvement of these crops (the Mango Research Station in Multan and the Citrus Research Institute in Sargodha) and the Extension Wing of the Provincial Agriculture Department responsible for these sectors; for example, research

results were not being effectively communicated to farmers (UNIDO Evaluation Group 2014).

Although agriculture was a provincial responsibility, the Pakistan Horticulture Development and Export Company, a federal corporate body under the MoC, was mandated with improving the horticultural supply chains and increasing exports. It planned the establishment of a Pakistan certification system (PakGAP) to be benchmarked against the Global G.A.P. certification process for exports. But it saw its role as more of a coordinator to whom others reported than as the implementer of activities.

In selecting the mango and kinnow sectors for further support, the TRTA program linked up with two other programs: the Australia-Pakistan Agriculture Sector Linkages Program and the USAID projects. Even so, the implementation of the kinnow and mango support program was delayed; contracts with the research institutions were only signed in February and March 2012—a delay owing to lengthy bureaucratic procedures for concluding an agreement with the government of Punjab as well as with the research institutes that were delivering the support to the growers.

Forms of support

The support program was provided in a several steps (UNIDO Evaluation group 2014):

Step 1: Instituting a Code of Practice and Farmer Field Schools. The disconnect between the research institutes and the farmers was addressed by developing the Code of Practice for the farmers and training them through the influential Farmer Field Schools. The Code of Practice—a joint effort between TRTA II and the Australia-Pakistan Sector Linkages Program—dealt with the critical points on the supply chain (from farm to market). A further result from the joint effort was the identification of markets for Pakistani produce.

Experts from the research institutions thereafter managed an instruction program through Farmer Field Schools with pilot trials for 10 (rather large) participating mango farmers (in clusters of 4 to 5 smaller farms each) and 10 kinnow farmers (again in clusters of 4 to 5 smaller farms), involving in total around 100 producers. Participants in the Farmer Field Schools were selected based on their resources, capacities, and in particular their willingness to apply what they learned in the pilot trials to their own production.

The direct impact of the program on the poor was expected to become visible once better working conditions and more work became available for laborers involved in applying inputs (water, fertilizer, and pesticides) as well as in the harvest, transport, and storage tasks. The longer-term plan was for the Provincial Agriculture Department to play the dissemination role across the whole sector once the trials had been completed, because it had the necessary staff and mandate to do so.

Step 2: Training the trainers. The second step in establishing a permanent and effective extension system was still under development by the end of 2013. The concept foresaw the scientists of the research institutions as master trainers who were to train the agriculture officers and field assistants of the Extension Wing as trainers, who in turn were to train farmers and other actors of the supply chain, following the Farmer Field School concept and using the Code of Practice.

Step 3: Building trade links. To establish market links with international buyers, several activities were undertaken. First, two focus group meetings were held in Multan and Sargodha for the mango and kinnow sectors, respectively, on how to best link Pakistani exporters with buyers, resulting in a road map to develop trade corridor links. Second, training workshops were conducted on marketing and trade links for kinnow and mango exporters and processors in Sargodha. Experts from the Centre for Promotion of Imports (CBI, Netherlands) were sourced to support this training.

In collaboration with the Trade Development Authority of Pakistan, which had the mandate of promoting all export products including horticulture, seven mango and kinnow growers embarked on a study tour of the EU and the United Kingdom to establish trade links. Support was also sought from commercial counselors in Pakistani embassies to promote exports to their respective countries.

Program outcomes and challenges

As a result of these activities, 65 tons of mangoes (worth €150,000) had been shipped to Asda, a Walmart subsidiary in the United Kingdom, by the end of 2013; other shipments went to a Malaysian supermarket chain. One early shipment to Asda in the United Kingdom had to be sourced in Sindh province (and thus not from Farmer Field School participants) because the Multan crop ripened too late for the early-season export market. Unfortunately, the Sindh shipment had a fruit fly infestation; however, the issue could be resolved, and the prospects for the next season exports were said to remain good but would need to be monitored. No kinnow exports could be organized by the end of 2013. The necessary testing was conducted by the accredited laboratories in Pakistan.

Several challenges remained. On the production side, a functioning extension system still needed to be built up with the Provincial Agriculture Department (a task where many projects have failed over the years in Pakistan). Upscaling and mainstreaming of the Farmer Field Schools and Code of Practice are only possible through the Extension Wing of this department because only this organization has the mandate and necessary “field army” to increase coverage. This would continue to require intensive efforts of the master trainers-cum-scientists, particularly after the TRTA program financial support would end. For postharvest handling and export, grading has to be mainstreamed, and the specific SPS requirements for different countries have to be disseminated and followed.

On the institutional side, government structures will need to play their envisaged roles more proactively and effectively than they were doing at the time. Also, PakGAP had failed to progress any further than the planning stage by the end of 2013.

Industries: Electric fans, protective gear, and cutlery

Ten companies were identified in the fan and protective gear sectors and were supported on a cost-sharing basis to enable them to affix the CE marking to their products.

The TRTA strategy was based on preparing pilot companies for compliance and then allowing for scaling-up or replication to have a tangible impact on the entire spatial clusters and sectors. In addition, local consultants were trained (twinned with supporting international experts) for the development

of local expertise in these areas (CE marking and so on). However, it remained to be seen whether these consultants—who were supposed to introduce lean manufacturing and to support the CE marking application process—would be able to make a business out of it and thus achieve the envisaged scaling-up.

Guidelines were developed for the manufacturers on how to obtain the CE marking for electric fans and protective gear, and a simplified list of steps for CE marking was prepared. The technical files were completed, and the products had been sent to EU notified bodies for testing by the end of 2013. The companies were not overly enthusiastic regarding their chances of entering the EU markets, however, because they claimed that Chinese companies could supply fans at about half the cost. Their main export markets remained Africa, the Middle East, and South Asia.

The effectiveness of these interventions was therefore a bit debatable, especially because manufacturers considered the Electric Fan Manufacturers Association to be politicized and ineffective, and the competitors were said to be generally disinterested in changes, particularly when investments would be required.

PROBLEMS ENCOUNTERED

Federal versus provincial responsibilities

The Pakistani government started a process to deal with excessive presidential power, culminating in the passage of the 18th Amendment to the Constitution in April 2010. Among other important legislative changes, the hallmark of the constitutional amendment was devolution of powers to the provinces, involving transfer of a number of federal-level ministries and functions to the provinces. Overall, around 17 federal-level ministries were targeted for devolution and have been transferred to the provinces. The transition process was complex, unclear, and slow. Hence, it negatively affected the work of development agencies.

Most of these bilateral and multilateral agencies had dealt with the federal ministries and institutions as their national partners or counterparts in the past. With devolution of many of these ministries or functions to the provinces, however, the planning and implementation practices of international agencies became further complicated and cumbersome, because they then needed to deal with various departments of six provincial administrations separately to work in the respective provinces. If such a transition is known from the start, it is one challenge, but if it happens halfway through the programs—as in the case of TRTA and others—it became in some instances an unsolvable headache.

Sustainability

The sustainability of the efforts made in the horticulture value chains is uncertain. Realistic strategies are needed on issues like the further promulgation by the involved government organizations of the Farmer Field School concept and the Code of Practice, without any third-party budget support. The same applies, for instance, to the fan sector, where a scaling-up and mainstreaming strategy is required to disseminate the innovations beyond the 10 currently participating companies.

Federal and provincial government cooperation on food safety

With the messy implementation of the 18th Amendment to the Constitution and the devolution of responsibilities, coordination between the provincial governments and the federal government became an issue. The food safety legislation was a prime example, where the Punjab government refused to accept any directives from the federal level and unilaterally started establishing its own food safety system. This had negative consequences for the development of the federal food safety legislation supported by the development agencies, whose final progress, after five years of work, was still stalled by the end of 2013. UNIDO, for example, was also caught in between: it provided the Punjab provincial authorities with technical support, and it also supported the development of the federal food safety legislation.

A similar dynamic was experienced during the upgrading of the fishing industry. The mistrust and lack of cooperation between the federal ministry (that is, the Marine Fisheries Department), the provincial authorities, and the industry nearly ended the development project on more than one occasion, and a lot of energy, persuasion, and sensitivity regarding the political power play was required to smooth out an otherwise bumpy environment.

The PSQCA and mandatory standards

The PSQCA, like similar agencies in many low- and middle-income countries, was a body responsible for standards development, inspection, testing, and certification as well as the implementation of mandatory standards. About 50 percent of the mandatory standards were related to food safety. Over the years, the mandatory standards scheme inevitably became the main income generator for the PSQCA by far. Hence, separating the implementation of mandatory standards from the PSQCA—as good international practice would require—was not welcomed at all.

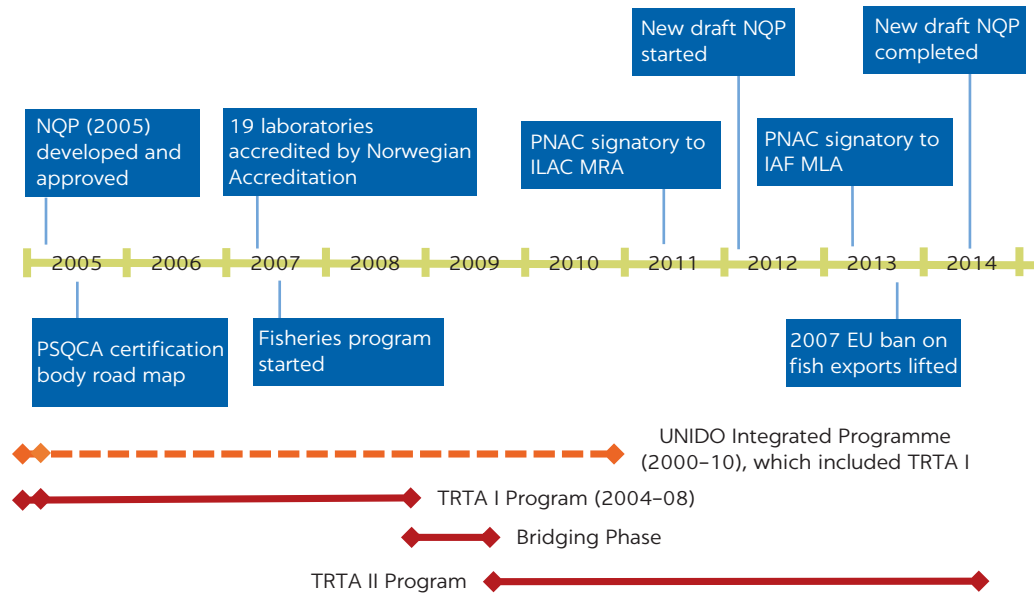
Neither was the notion that the food safety–related mandatory standards should be transferred to NAPHS as the designated federal agency for food safety. The PSQCA therefore did everything possible to maintain the status quo, even slowing down the passage of the food safety legislation at the federal level by raising issues against it through its parent ministry (MoST).

KEY SUCCESS FACTORS AND LESSONS LEARNED

Several key success factors and lessons learned can be derived from the 10 years of QI-related development in Pakistan (figure 9):

- *An in-depth needs assessment of industrial and government sectors*, before major projects are initiated, provides important information on designing meaningful interventions. These were especially important to highlight the QI service needs of the industries destined for technical support for the export markets.
- *Ownership of the development program in QI institutions* is of paramount importance. Where this was experienced (in PNAC and, to a lesser extent, the NPSL), positive results were evident. Where it was not as pronounced (for example, in the PSQCA), the results were less positive. The continuous movement of senior personnel in such organizations is a danger sign that should be heeded.
- *A strong alliance between the government, the private sector, and development agencies*, working together toward common and clear objectives, yields

FIGURE 9
Timeline of main QI reengineering events in Pakistan, 2005–14



Source: World Bank analysis.

Note: EU = European Union; IAF = International Accreditation Forum; ILAC = International Laboratory Accreditation Cooperation; MLA = Multilateral Recognition Agreement (IAF); MRA = Mutual Recognition Agreement (ILAC); NQP = national quality policy; PNAC = Pakistan National Accreditation Council; PSQCA = Pakistan Standards and Quality Control Authority; TRTA = Trade Related Technical Assistance (UNIDO); UNIDO = United Nations Industrial Development Organization.

positive results. Private sector and beneficiary ownership and commitment were particularly evident in projects working with the leather sector in Sialkot and Kasur.

- *A holistic approach to sector development* (including environmental sustainability, skills development, export promotion, and technology upgrading) was seen as a most successful approach.
- *Collaboration with universities* (for example, three universities approved curricula for a postgraduate diploma in food safety and control) adds value to interventions using sustainable local partners and for access to additional funding and resources. The same applies for working with technical vocational training centers operated within clusters. They provide customized solutions and training services and have a good prospect for sustainability.
- *A high level of ownership regarding the new quality regime* among different government organizations and bodies produced evident commitment to further develop and strengthen what was started when the government of Pakistan began to allocate regular budgets instead of project-based budgets. A particular benefit was that two-thirds of the increasing incomes from testing, calibrations, and so on could remain with the laboratories.
- *The ongoing process to develop an overall national quality policy* (originally not foreseen in the program design) was a good investment to ensure the sustainability of what was introduced by QI development programs.
- *Directly approaching, and expanding the involvement of, private sector laboratories* could further safeguard the sustainability of the quality regime. Commercializing the testing beyond government laboratories introduces more competition and expands coverage by further bringing down costs for exporters.

CONCLUSION

The broad-based programs of a decade had a major impact on the Pakistani QI, upgrading it to international standards, gaining international recognition for its accreditation and metrology services, and establishing recognized testing services required by exporters. At the same time, major industrial sectors were developed, namely fisheries and horticulture, to the point where small and medium producers met international standards and could export successfully to the major markets of the world.

The programs showed how important it is to take a longer view when establishing a QI that complies with international standards and needs to be formally recognized. In the case of Pakistan, the pinnacle QI organizations had been established, but it still took about eight years to gain international recognition.

The programs also highlighted once again how difficult it is to separate work on mandatory standards from the NSB when this is the NSB's main income source. In this program, no gains could be reported even though the concept was included in the National Quality Policy.

NOTES

1. The World Trade Organization (WTO) Technical Barriers to Trade (TBT) Inquiry Point is an official or office in a member government designated to deal with inquiries from other WTO members and the public on technical barriers to trade.
2. ISO/IEC 17025:2005 has been superseded by ISO/IEC 17025:2017, "General Requirements for the Competence of Calibration and Testing Laboratories": <https://www.iso.org/standard/66912.html>.
3. The Ministry of Food, Livestock and Agriculture is now the Ministry of National Food Security & Research.
4. The Australia-Pakistan Agriculture Sector Linkages Program was an 2007–15 initiative funded by the Australian Centre for International Agricultural Research (ACIAR) and the Australian Agency for International Development (AusAID).
5. For the current 2019 fiscal year, low-income economies are defined as those with a gross national income (GNI) per capita of US\$995 or less (converted from local currency using the World Bank Atlas method).
6. Poverty headcount data from the World Bank's PovcalNet database: <https://data.worldbank.org/indicator/SI.POV.DDAY>.
7. Growth, inflation, and IMF program data from the IMF's "Pakistan: Country Data" web page: <https://www.imf.org/en/Countries/PAK>.
8. See "Pakistan: Financial Position in the Fund as of April 30, 2019" from the IMF's "Pakistan: Country Data" resources: <https://www.imf.org/external/np/fin/tad/exfin2.aspx?memberKey1=760&date1key=2099-12-31>.
9. Much of the data for the "National QI" subsection come from UNIDO 2013.
10. ISO 9001:2015, "Quality Management Systems—Requirements": <https://www.iso.org/standard/62085.html>.
11. A Competent Authority generally is an organization that has the legally delegated or invested authority, capacity, or power to perform a designated function. In this specific case, the Competent Authorities were the entities designated to ensure that the requirements for the safety and quality of specific products to be exported to the EU were implemented and maintained by suppliers and producers.
12. ISO/IEC 17011:2004 has since been revised as ISO/IEC 17011:2017, "Conformity Assessment—Requirements for Accreditation Bodies Accrediting Conformity Assessment Bodies": <https://www.iso.org/standard/67198.html>.
13. ISO/IEC Guide 62:1996, "General Requirements for Bodies Operating Assessment and Certification/Registration of Quality Systems," has been superseded by ISO/IEC 17021:2006, "Conformity Assessment—Requirements for Bodies Providing Audit and Certification of Management Systems": <https://www.iso.org/standard/29343.html>.

14. The cross-frontier policies of ILAC and the IAF endeavor to limit competition between accreditation bodies that could be detrimental to the quality of accreditation (IAF 2016; ILAC 2012).
15. ISO/IEC 17020:2012, “Conformity Assessment—Requirements for the Operation of Various Types of Bodies Performing Inspection”: <https://www.iso.org/standard/52994.html>.
16. See ISO 9001:2015, “Quality Management Systems—Requirements”: <https://www.iso.org/standard/62085.html>; and ISO 14001:2015, “Environmental Management Systems—Requirements with Guidance for Use”: <https://www.iso.org/standard/60857.html>.
17. ISO 22000:2005 has been superseded by ISO 22000:2018, “Food Safety Management Systems—Requirements for Any Organization in the Food Chain”: <https://www.iso.org/standard/65464.html>.
18. SA 8000:2014, “Social Accountability: International Standard”: http://sa-intl.org/_data/n_0001/resources/live/SA8000%20Standard%202014.pdf.
19. Hilla boats are a type of wooden fishing boat. The upgrades were to line them with fiberglass in order to enable proper cleaning for hygiene reasons.
20. The CE marking is a regulatory product mark that demonstrates compliance of a product with the relevant EU Directive in terms of standards and conformity assessment procedures. In principle, it denotes the manufacturer’s acceptance of responsibility for the integrity of the product. It is not a product certification mark licensed by a certification body.
21. ISO/IEC 17020:2012, “Conformity Assessment—Requirements for the Operation of Various Types of Bodies Performing Inspection”: <https://www.iso.org/standard/52994.html>. ISO/IEC Guide 43-1:1997 and Guide 43-2:1997 have been superseded by ISO/IEC 17043:2010, “Conformity Assessment—General Requirements for Proficiency Testing”: <https://www.iso.org/standard/29366.html>.
22. ISO 9001:2015, “Quality Management Systems—Requirements”: <https://www.iso.org/standard/62085.html>. ISO 14001:2015, “Environmental Management Systems—Requirements with Guidance for Use”: <https://www.iso.org/standard/60857.html>.
23. The CIPM Mutual Recognition Arrangement (CIPM MRA) is the framework through which NMIs demonstrate the international equivalence of their measurement standards and the calibration and measurement certificates they issue. The outcomes of the CIPM MRA are the internationally recognized (peer-reviewed and approved) CMCs of the participating institutes. Approved CMCs and supporting technical data are publicly available from the CIPM MRA Key Comparison Database (KCDB), managed by the BIPM. For more information about the KCDB, including information on CIPM key and supplementary comparisons, see the KCDB website: <https://kcdb.bipm.org/>.
24. Polychlorinated biphenyl (PCB) is an organic chlorine compound once widely deployed as dielectric and coolant fluids in electrical apparatus, carbonless copy paper, and heat transfer fluids. The International Research Agency on Cancer (IRAC) rendered PCBs as definite carcinogens in humans. Polycyclic aromatic hydrocarbons (PAHs) are organic compounds containing only carbon and hydrogen. They have been linked to skin, lung, bladder, liver, and stomach cancers in well-established animal model studies.

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