



Building corresponding technical infrastructures to support sustainable development and trade

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Information about JCDCMAS can be obtained at www.bipm.fr/en/committees/jc/jcdcmas.

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1. Introduction

Technical regulations, metrology, standards and conformity assessment procedures (including accreditation) are used by societies to address issues of optimization of production, health, consumer protection, environment, security and quality, as well as to manage risk and areas of market failure. Their sound development and effective implementation enable sustainable development, build welfare and facilitate trade. Technical infrastructures directly contribute to achievement of the United Nations Millennium Development Goals and the action plan that resulted from the World Summit on Sustainable Development (WSSD) held in 2002 in Johannesburg.

However such activities may also act as impediments to economic efficiency; innovation and learning; the competitiveness of countries, or their ability to work collaboratively; and market access for goods and services for both developed and developing countries.

As a result, there is an increasing awareness of the need to discuss, compare and improve countries' abilities to determine, maintain and improve their infrastructure, practices, as well as international compatibility and recognition in these areas. This need extends to ensuring that the institutional frameworks (i.e. the technical infrastructure) to support these activities are effective, efficient and credible in the eyes of domestic constituencies and international partners.

Metrology, standards, and conformity assessment (including accreditation) are thus essential elements of technical infrastructures.

The World Trade Organization (WTO) Technical Barriers to Trade (TBT) Agreement recognizes the contribution that international standardization can make to the transfer of technology from developed to developing countries, and the role that international standards and conformity assessment systems have in improving the efficiency of production and facilitating the conduct of international trade.

Both the WTO TBT and Sanitary and Phytosanitary (SPS) Agreements rely upon the efficient functioning of the underlying technical infrastructure to support the system and the exchange of products worldwide. Many developing economies lack the institutional frameworks and the technical infrastructure and practices necessary to meet obligations of the Agreements. Discrepancy between the technical infrastructures of developed and developing economies present significant obstacles for the implementation of the Agreements.

The WTO Doha Development Agenda recognizes technical cooperation and capacity building as integral elements of the development dimension of the multilateral trading system. Efforts to support the development of trade related capacity are key to ensuring that developing countries have the ability to implement obligations and exercise the rights of membership.

Developing countries recognize the creation of the underlying technical infrastructure as a key priority area for assistance and trade related capacity building¹. Recent initiatives such as the New Partnership for Africa's Development (NEPAD²) highlight market access as a key priority for developing countries. In particular, they cite standards, technical regulatory frameworks, metrology, and accreditation as key areas for capacity development.

2. JCDCMAS

The Joint Committee on Co-ordination of Assistance to Developing Countries in Metrology, Accreditation and Standardization (JCDCMAS) was established by the principal international organizations that have mandates to strengthen technical infrastructures and deliver capacity building in metrology, standardization and conformity assessment (including accreditation).

The members of the JCDCMAS are:

- Bureau International des Poids et Mesures (BIPM)
- International Accreditation Forum (IAF)
- International Electrotechnical Commission (IEC)
- International Laboratory Accreditation Co-operation (ILAC)
- International Organization for Standardization (ISO)
- International Trade Centre UNCTAD/WTO (ITC)
- Telecommunication Standardization Bureau of ITU (ITU-T)
- International Organization of Legal Metrology (OIML)
- United Nations Industrial Development Organization (UNIDO)

The members exchange information and share their experiences in provision of technical assistance to developing countries. They coordinate, where possible, the members' individual technical assistance work programs, and identify synergies amongst themselves and with other organizations, such as the WTO and UN agencies.

3. Technical infrastructure

In order to achieve sustainable development and to fully participate in international trade developing countries require the necessary technical infrastructure and capacity to meet their obligations and to satisfy the technical requirements of the multilateral trading system (MTS). Normally, access to the following elements of a technical infrastructure is necessary:

- metrology services to ensure internationally recognized traceability of measurements and calibration of measuring instruments;

¹ See: 'Survey to Assist Developing Country Members to Identify and Prioritise their Specific Needs in the TBT Field' (G/TBT/W/178).

² New Partnership for Africa's Development (NEPAD), www.nepad.org

- the ability to formulate and promote national positions into the international standards development process, to access international standards once published and to assist in their implementation by economic players;
- conformity assessment systems to undertake assessments of goods and services against mandatory and voluntary requirements that result in claims of conformity (assessment activities may include testing, certification, inspection);
- peer assessment and accreditation systems to ensure that claims of conformity are credible and internationally recognised.

The establishment of technical infrastructure supports efforts to enhance trade and improve supply-side capacity and will enable countries to meet the export standards and technical requirements of export markets.

In addition active participation in international metrology, standardization, and accreditation organizations is an essential element of capacity development.

The following sections provide more specific details on each of the components that make up the technical infrastructure.

Metrology and physical standards

Metrology (measurement and physical standards) is an integral component of the technical infrastructure value chain. The national measurement standards of a country provide the basis for other conformity assessment activities like calibration services, trade metrology services, conformance testing with respect to technical regulations, testing, accreditation etc., in both the regulatory and the voluntary sectors.

Scientific and industrial metrology

The metrological activities undertaken by National Measurement Institutes (NMIs) are to develop, maintain and disseminate national measurement standards appropriate to national needs, and to develop and transfer to users new measurement technology. The national measurement standards of a country provide the basis for activities such as calibration services, trade metrology services, conformance testing, accreditation etc., in both the regulatory and the voluntary sectors.

The Metre Convention is an inter-governmental treaty that provides the international infrastructure to enable Member States to develop national measurement standards at whatever level is required by a country, thus facilitating their international recognition and acceptance. It is therefore relevant to countries at all stages of technical development.

The Metre Convention has 51 Member States and 18 Associates the General Conference on Weights and Measures (CGPM). It gives authority to the CGPM, the International Committee for Weights and Measures (CIPM) and the International Bureau of Weights and Measures (BIPM) to act in matters of world metrology, particularly concerning the demand for measurement standards of ever increasing accuracy, range and diversity, and the need to demonstrate equivalence between national measurement standards.

Mutual recognition in metrology – the CIPM MRA

The CIPM Mutual Recognition Arrangement (MRA), established in October 1999, provides for the international recognition and acceptance of national measurement standards and calibration and measurement certificates issued by signatory NMIs. The objectives of the CIPM MRA are to provide governments and other parties with a secure technical foundation for wider agreements related to international trade, commerce and regulatory affairs. Thus, it is intended to help eliminate technical barriers to trade and instil greater confidence in the measurement capabilities of NMIs, particularly for the regulatory and accreditation communities.

An economic analysis of the benefits of the MRA, commissioned by the BIPM and undertaken by KPMG Consulting, found that a conservative estimate of the impact of the CIPM MRA in reducing TBTs is likely to be very large; a sum of at least US\$4 billion was mentioned.

The CIPM MRA has been recognized in trade negotiations such as the “Joint US-EC Declaration on Cooperation in Metrology in Support of Trade” as providing evidence of the equivalence of national standards of measurement. The combination of the CIPM MRA and national traceability systems conforming to ISO/IEC 17025 or to ISO Guide 34 gives regulators, legislators and international bodies such as the WTO objective evidence of the equivalence of measurements.

The CIPM MRA provides international recognition of the measurements made by accredited testing and calibration laboratories. Taking advantage of this relationship, the ILAC and the CIPM signed a Memorandum of Understanding (MoU) in November 2001 to ensure a sound, linked, technical framework to underpin cross-border trade arrangements and work towards the ideal of having products that are “tested once and accepted everywhere”.

Legal metrology

International activities in legal metrology are coordinated by the International Organization of Legal Metrology (OIML), and apply when there are legal or legislative requirements to be fulfilled. The OIML has 60 Member States and 53 Corresponding Members and, like the Metre Convention, is operated under an inter-governmental treaty. Its activities are coordinated by the International Bureau of Legal Metrology (BIML) operating under the International Committee of Legal Metrology (CIML).

Legal metrology specifications are produced within the OIML framework and find widespread adoption in developing as well as developed countries. The OIML also provides other valuable services such as a model law on metrology, which sets out a number of considerations that should be assessed when setting up a national MAS infrastructure.

The OIML Certificate System for Measuring Instruments has been in operation since 1991. Its aim is to simplify the type (pattern) approval process for manufacturers and metrology authorities by eliminating costly duplication of application and test procedures. The Certificate System provides a manufacturer with the possibility of obtaining an OIML Certificate and Test Report indicating that a given measuring

instrument type (pattern) complies with the requirements of relevant OIML International Recommendations. Certificates are delivered by Issuing Authorities in OIML Member States and are accepted by national metrology services on a voluntary basis. The Certificate System currently covers 41 categories of measuring instrument, and over 1400 Certificates have been issued by December 2004.

The Framework for a Mutual Acceptance Arrangement on OIML Type Evaluations (MAA) was approved by the CIML in 2003, and is currently being put into operation. The MAA establishes the rules for a voluntary framework for the acceptance and use of test reports, validated by OIML Certificates, for type approval or recognition in relevant national or regional metrological control systems, and/or for issuing subsequent OIML Certificates. The MAA is implemented through separate "Declarations of Mutual Confidence" for each category of instruments. The first two categories will be load cells (OIML R 60) and non-automatic weighing instruments (OIML R 76).

The OIML's work for developing countries is now directed by a Permanent Working Group on Developing Countries. This is a small group to enable the efficient development of practical actions for developing countries. The production of a number of "Expert Reports" has begun, which will be of practical use in developing, as well as in industrialized countries.

International documentary standards

Voluntary international standards, and their use in technical regulations on products, production methods and services play an important role in sustainable development and trade facilitation through the promotion of safety, quality and technical compatibility. The benefits that are derived are significant³. Standardization contributes to the basic infrastructure that underpins society including health and environment while promoting sustainability and good regulatory practice.

The international organizations that produce International Standards and that are members of the JCDCMAS are IEC, ISO and ITU-T. IEC covers electrotechnology and related conformity assessment, ITU-T covers telecommunications and ISO covers nearly all other technical fields, a number of service sectors, management systems and conformity assessment.

International Standards, or national or regional adoptions of International Standards, assist in the operation of domestic markets, and also increase competitiveness and provide an excellent source of technology transfer to developing countries. They play an integral role in the protection of consumers and the environment.

Developing countries face many trade-related standardization challenges. They require access to standardization infrastructures to engage in the global trading system. With the increasing globalization of markets, international standards (as opposed to regional or national standards) have become critical to the trading process,

³ See "The economics of standardization" (Manchester Business School, 2000), "Economic benefits of standardization" (DIN Deutsches Institut für Normung, 2000) and "Assessing the Presence and Impact of Non-Tariff Barriers on Exporters" (Standards New Zealand, 2002).

ensuring a level playing field for exports, and ensuring imports meet internationally recognized levels of performance and safety.

Standards can be broadly sub-divided into three categories, namely product, process and management system standards. The former refers to characteristics, related to quality, safety, etc, that a good should possess. Process standards refer to the conditions under which products and services are to be produced, packaged or refined. Management system standards⁴ assist organizations to manage their operations. They are often used to help create a framework that then allows the organization to consistently achieve the requirements that are set out in product and process standards.

The TBT Agreement encourages the use of international standards, where appropriate. In fact, members are obligated to reference international standards in existing and new regulations. The Agreement also encourages members “wherever possible” to move towards the development of mutual recognition agreements and the harmonization of conformity assessment procedures and to accept the conformity assessment procedures of other members.

The Second Triennial Review⁵ of the TBT Agreement emphasized the importance of WTO Members' participation in international standardization activities, with a view to good regulatory practice, conformity assessment procedures and standards on as wide a basis as possible. The inability of some developing countries to participate in the work of international standards bodies due to resource limitations and, in some cases, the cost of memberships, shortage of qualified personnel, and the location of meetings was cited as significant capacity constraints facing many countries. The Review underscored the importance of participation in the elaboration and adoption of international standards to ensure their global effectiveness and relevance and assistance in the prevention of unnecessary obstacles to trade.

Conformity assessment

Conformity assessment plays a critical role in sustainable development and trade. In developing countries conformity assessment activities are generally less developed than their industrialized counterparts.

ISO/IEC 17000 describes conformity assessment as, “demonstration that specified requirements relating to a product, process, system, person or body are fulfilled”. Conformity assessment procedures, such as testing, inspection and certification, offer assurance that products fulfil the requirements specified in regulations and standards.

There are many forms of conformity assessment that are specific/particular to the object being assessed (e.g. a product, or a service or a management system), and to the body undertaking the assessment (e.g. it may be the 'first party', such as the manufacturer of a product who is making a supplier's declaration of conformity (SDoC) using their own internal testing system, or a 'third-party' certification or

⁴ Well known examples of management system standards include the ISO 9000 series focused on quality management and the ISO 14000 series of standards focused on environmental management.

⁵ See: Report of the WTO TBT 2nd Triennial Review, Annex 3, Paragraph G (G/TBT/9).

inspection that is undertaken by an independent service provider (that could be a part of a government or a private company)).

In terms of sustainable development, developing countries must decide what types of conformity assessment are necessary for what purposes. One of the crucial decisions is whether to make conformity assessment mandatory through government regulations in specific sectors, or whether to rely on the market to determine in a voluntary manner the conformity assessment requirements within the normal transactions between buyers and sellers.

This decision should be based on an assessment of the risks involved with a particular product or process, and on an understanding of the impact the associated costs and benefits will have on achieving sustainable development.

Barriers to trade may occur when conformity assessment requirements in countries differ, making products subject to duplicate testing, different types of testing, or multiple inspections. Products may be denied market access because the testing procedures or results are not recognized, or because those who performed the tests do not belong to a peer assessment scheme or are not accredited. If additional certification is required, this imposes further costs upon exporters in cases where mandatory product specifications differ from country to country. Duplication of effort associated with additional or separate conformity assessment procedures is costly, and effectively keeps some producers out of certain markets. According to an OECD study (1996)⁶, standards and technical regulations, combined with the cost of testing and compliance certification, constitute between approximately 2 and 10 percent of overall production costs.

Conformity assessment was addressed during the WTO TBT Second and Third Triennial Reviews with agreement on a list of different approaches to the acceptance of conformity assessment results. Regardless of the type of conformity assessment (e.g. first-party, second-party, third-party, product, service, and management system), the importance of using international standards and guides, that are developed by the ISO Committee on Conformity Assessment (CASCO) was underscored, as was the active participation of Members in the work of this body.

Accreditation

Accreditation is the “third-party attestation related to a conformity assessment body conveying formal demonstration of its competence to carry out specific conformity assessment tasks” (ISO/IEC 17000). The achievement of results through accreditation is dependent on the peer evaluation of technically competent facilities that consistently apply the appropriate technical as well as underpinning management principles contained within international standards and guides (i.e. international standards and guides developed by ISO/CASCO). This increasingly helps provide the necessary confidence among users of conformity assessment services, including business and government, and accounts for the growth of mutually recognized conformity assessment services throughout the world.

⁶ See "Trade and Competition: Frictions after the Uruguay Round" (OECD, 1996).

Lack of acceptance of laboratory test data and certification results across national borders has been identified as a significant barrier to trade⁷. Establishing accreditation systems based on international standards and guides and linked with membership of the ILAC and / or IAF mutual recognition arrangements can help provide assurance to trading partners that suppliers of tests and certificates are competent. At the same time it helps in overcoming trade barriers and in complying with the requirements of the WTO/TBT Agreement.

The use of an internationally recognized accreditation regime by a country signatory to the WTO/TBT Agreement allows a country to rely on the terms of the agreement to establish the competence of their conformity assessment system. Section 6.1.1 of the TBT Agreement states that, "...verified compliance, for instance through accreditation, with relevant guides or recommendations issued by international standardizing bodies shall be taken into account as an indication of adequate technical competence." In other words, the use of an accreditation system in this situation reduces the possibility of goods being denied access on the basis of inadequate conformity assessment.

The lack of access to accreditation programmes in developing countries is a key factor preventing their full integration into the established world trading system. The absence of an accreditation service has thus been recognized by many developing countries as a key development priority to be addressed.

Developing an accreditation infrastructure can be a daunting task for a national government that does not perceive itself as possessing the knowledge, experience or financial resources to do so. The task is not however impossible as the success of various regional initiatives illustrates, for example the Pacific Accreditation Cooperation (PAC) and the Southern African Development Community in Accreditation (SADCA).⁸

⁷ "The Role of Testing and Laboratory Accreditation in International Trade" (ILAC-13:1996).

⁸ A large portion of the signatories to the Pacific Accreditation Cooperation (PAC) Quality Management System Multilateral Recognition Arrangement (MLA) are considered to be developing countries. PAC members operate within the framework of the International Accreditation Forum (IAF) and in cooperation with other regional groups of accreditation bodies around the world.

In a communiqué (IAF-AM-02-023) following the 16th Annual Meeting of the International Accreditation Forum (IAF) on 21 and 26 September 2002 it was announced that: The IAF "... was able to welcome the admission to membership of ... SADCA (Southern African Development Co-operation in Accreditation) as a Special Recognition Regional Group ..."

4. A composite approach to development assistance for technical infrastructures

In terms of assisting developing countries to create and maintain appropriate technical infrastructures a composite approach is called for. By this it is meant that a holistic consideration of a country's needs is required, and a plan of action be agreed. If this can be achieved by the developing country, then assistance efforts can be coordinated and synergies between the various parts of the technical infrastructure established. Once established these synergies provide the technical infrastructure with its identity and strength, and enable it to contribute the country's sustainable development and trade potential.

Each of the above parts of the technical infrastructure is interdependent on the others. Metrology and physical standards provide the basis for accurate measurements, the accepted performance of which can then be written in international documentary standards, which can in turn then be used as the basis for conformity assessment activities, and those activities can then be accredited, peer assessed or both.

While these parts are interdependent, it is recognized that for many countries the cost of providing for all of these activities at their most advanced level is prohibitive. Even in the case of developed countries there are variations on how sophisticated each part of the technical infrastructure is, and there are many cases where some parts of the infrastructure may be jointly owned or shared between one or more countries, or that the services of another country are relied upon altogether.

What is important for sustainable development and trade purposes is to ensure the societies and industries in developing countries have access to a technical infrastructure that reflects their specific needs.

To provide for a composite approach to developing technical infrastructures, the JCDCMAS members recommend that assistance be based on:

- a thorough needs assessment for all parts of the economy, including sectors that are domestically, societal or import focused, and those that are more trade and export focused;
- the understanding that there is no ready-made model for technical infrastructures, either in terms of the components that are required, the degree of sophistication they should have, or the way that technical infrastructure services can be delivered, and as such developing countries themselves must make these policy decisions and provide their ongoing political commitment to those decisions;
- careful consideration of the assessed needs and based on the type and appropriate sequencing of assistance to ensure technical infrastructures are built in a sustainable and planned manner;
- a clear articulation of the resource and finance that will be required to sustain the necessary technical infrastructure on an ongoing basis; and
- that the development of national technical infrastructures not preclude consideration of bilateral or regional service delivery options that may achieve

better economies of scale. These latter approaches need to be cognizant of the historical, political and cultural sensitivities that exist between countries.

Achievement of a composite approach also requires cooperation and coordination with international partners and organizations responsible for the delivery of technical assistance and capacity building. The Joint Committee on Co-ordination of Assistance to Developing Countries in Metrology, Accreditation and Standardization (JCDCMAS) was established to improve the coordination of assistance to developing countries in the areas of metrology, accreditation and standardization. International specialist organizations with technical expertise and funding agencies must work together to strengthen and improve the effectiveness of technical infrastructure capacity building. Collaboration with partners is key to efficient utilization of resources and to long term, sustainable development. Effective development assistance needs a coordinated approach, that is both bottom-up demand-driven and a country-owned process undertaken in partnership with aid agencies.

5. Conclusion

The provision of development assistance aimed at strengthening the technical infrastructures of developing countries is necessary for everyone's sustainable development, and to enable developing countries to effectively participate in global trading activities, including becoming signatories to international agreements.

Annex

Glossary of acronyms

BIPM	Bureau International des Poids et Mesures
CIPM	International Committee of Weights and Measures
IAF	International Accreditation Forum
IEC	International Electrotechnical Commission
ILAC	International Laboratory Accreditation Co-operation
ISO	International Organization for Standardization
ISO/CASCO	ISO Committee on conformity assessment
ITC	International Trade Centre – UNCTAD/WTO
ITU-T	Telecommunication Standardization Bureau of the ITU
JCDCMAS	Joint Committee on Co-ordination of Assistance to Developing Countries in Metrology, Accreditation and Standardization
MoU	Memorandum of understanding
MRA	Mutual recognition agreement/arrangement
MTS	Multilateral Trading System
NMI	National Metrology Institute
OECD	Organization for Economic Cooperation and Development
OIML	International Organization of Legal Metrology
PAC	Pacific Accreditation Cooperation
SPS	Sanitary and Phytosanitary (WTO)
SADCA	Southern African Development Community in Accreditation
TBT	Technical Barriers to Trade (WTO)
UNIDO	United Nations Industrial Development Organization
WTO	World Trade Organization

ITC: Your Partner in Trade Development

The International Trade Centre (ITC) is the technical cooperation agency of the United Nations Conference on Trade and Development (UNCTAD) and the World Trade Organization (WTO) for operational, enterprise-oriented aspects of trade development.

ITC supports developing and transition economies, and particularly their business sectors, in their efforts to realize their full potential for developing exports and improving import operations.

ITC works in six areas:

- ▶ Product and market development
- ▶ Development of trade support services
- ▶ Trade information
- ▶ Human resource development
- ▶ International purchasing and supply management
- ▶ Needs assessment, programme design for trade promotion



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