



## International Technical Cooperation



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# Foreword by the Federal Minister for Economic Cooperation and Development, Mr. Dirk Niebel, for the 125<sup>th</sup> Anniversary of the Physikalisch-Technische Bundesanstalt

**Dirk Niebel**

Dear Readers,

In 2012, we will be celebrating the 125<sup>th</sup> anniversary of the Physikalisch-Technische Bundesanstalt – PTB. That means 125 years of progress and reliability in metrology, serving our society, the economy and science. PTB brings together scientific excellence and industrial practice, continually expanding the horizon of the technological possibilities for Germany's economic development.

A good 50 years ago, when development policy was still young, Walter Scheel, Germany's first development minister, got PTB involved in technical cooperation. His guiding principle for doing so was: "Good politics requires constant interaction with the latest findings from science and research." I am very pleased that we have been able to benefit from PTB's outstanding competence since the earliest days of German development policy. I am always being told – and have also seen for myself – how much PTB is appreciated by our partner countries.

In the field of development policy PTB has moved beyond its core competence of metrology, defining and shaping the concept of quality infrastructure. That concept encompasses institutions for metrology, standardization and testing, and for quality management and conformity assessment including certification and accreditation. These terms stand for services which we, as consumers or producers, are constantly making use of in our everyday lives without always being aware of them. In a globalized world, however, we place our trust in regulatory frameworks and technical prerequisites.

The aim of development policy is to give people the freedom to take ownership of their lives and to make their own decisions, without suffering material deprivation. Therefore, we are supporting efforts to establish an internationally recognized quality infrastructure in our partner countries. That is the basis for enabling the local private sector to be competitive, for establishing institutions with which to give shape to national framework conditions for promoting economic development and employment, and for environmental, consumer and health protection. A functioning



quality infrastructure is a prerequisite for removing technical barriers to trade and deepening the integration of the developing countries in the trade system at both the international and the regional levels.

This year, the Federal Ministry for Economic Cooperation and Development is celebrating its 50<sup>th</sup> anniversary. I am therefore pleased that PTB is dedicating this publication to development cooperation, reflecting upon the most important milestones from its perspective. There are many questions that occupy my thoughts. Was our aid sustainable? Why do some countries continue to be dependent on outside assistance? What makes development policy more effective? I took on the job of development minister so that I could modernize German development policy and make it fit to play its part in shaping the future with regard to the key global challenges of our time: climate, security and the permanent reduction of global inequalities.

Our work focuses on reducing poverty. However, in order to combat poverty effectively we need to tackle it at its roots. To do that we must first strengthen ownership and initiative. In the process, we can and must support people and countries in order that they can develop their own strengths so as to improve their situation. With that goal in mind we are putting greater emphasis on aspects such as education (particularly vocational education), health, rural development and sustainable economic development.

Civil society and private enterprise are central starting points when it comes to making progress

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Dirk Niebel,  
Federal Minister for  
Economic Cooperation  
and Development

on development. We want to reduce structural deficits by strengthening good governance and by fostering ownership and self-help capacities in the developing countries.

But we need to become more efficient in our own area, too. That is why we reorganized our technical cooperation last year, creating an effective and efficient structure with the Gesellschaft für internationale Zusammenarbeit (GIZ), and thereby giving a visible boost to the role that the government plays in shaping Germany's development policy.

In our German development policy we have, however, a well-proven special feature: the Physikalisch-Technische Bundesanstalt makes Germany the only bilateral donor with an internationally recognized specialist institution that provides technical and policy advice on quality infrastructure on its behalf. I would like to make even greater use of this comparative advantage in the future and I thank PTB for this successful cooperation.

Dirk Niebel  
Federal Minister for Economic Cooperation and  
Development

# 125<sup>th</sup> Anniversary of PTR/PTB and 50 Years of International Cooperation

**Ernst O. Göbel**

In 1887, the Physikalisch-Technische Reichsanstalt (*Imperial Physical Technical Institute* – PTR) was founded as the first institute of its kind world-wide, essentially at the initiative of Werner von Siemens and Werner von Helmholtz. In 1950, the Physikalisch-Technische Bundesanstalt (PTB), as the legal successor of the PTR, assumed the tasks of the national metrology institute for the newly established Bundesrepublik Deutschland (Federal Republic of Germany). The conclusion to be drawn from the history of the PTR and PTB is that only our own fundamental research – while applying the latest technologies – has, in the course of history, enabled us to safeguard and expand our competence in metrology which is recognized worldwide. A significant part of the success achieved so far can be attributed to the involvement in national and international networks. Nationally, we are integrated into the German research landscape through cooperations with universities, other research institutions, and industry and we use these to our mutual advantage. With the founding of the Metre Convention it was manifested already in 1875 at the highest state level that metrology is an international affair. Consequently, PTB is prominently involved in the international networks of metrology and is thus continually under critical assessment at the highest metrological level through international comparison with other national metrology institutes.

Due to the increasing globalization of economy and trade, the technical cooperation of PTB with developing and newly industrialized countries has increasingly gained in importance – a field of work that, in part, clearly exceeds the classic spectrum of tasks of a national metrology institute. Since the beginning of German development cooperation more than 50 years ago, PTB therefore supports its partner countries in the establishment of their quality infrastructures, i.e. the interaction of metrology and testing, accreditation and standardization. During this time, the staff members found themselves confronted with numerous challenges. Establishing a quality infrastructure is a long-term and complex task that requires substantial investments. To this end, the mutual effort of



state, economy and civil society is required in the respective country. PTB with its expertise has supported this process over decades. Thereby, the cooperation was continually adapted to the respective economic, political and social framework conditions and challenges of the countries and regions. This development is reflected in the individual articles of this anniversary edition. At the beginning of the technical cooperation, issues such as staff training, technology transfer and economic growth of the partner countries were rather more the focus of development objectives, but within the scope of international trade agreements, the focus has shifted to the reduction of technical barriers to trade. Whereas in the developing countries, the main focus continues to be placed on the establishment of the basic quality infrastructure, in newly industrialized countries individual sectors such as energy, environment, food safety and health are continually gaining in importance in view of pressing questions on environmental, climate and consumer protection. PTB's Department of Technical Cooperation has met these changes with the development of novel concepts and intensified its involvement in these areas. In addition to the technical advancement, the political discourse on development goals was also integrated into the

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Prof. Ernst O. Göbel  
– President of the  
Physikalisch-Techni-  
sche Bundesanstalt



work and appropriate instruments were developed. To be mentioned here are keywords such as impact orientation, ownership, participation and good governance.

This anniversary edition presents the diversity of the international cooperation of PTB. Thus I would like to thank the staff members of the Department of Technical Cooperation for their unflagging commitment throughout the years and also thank the authors of the following articles. I wish the reader an enjoyable reading experience.

## Editorial

### Dieter Schwohnke

50 years of Technical Cooperation in the Physikalisch-Technische Bundesanstalt which looks back on almost 125 years of history itself: That is a good moment to look back and learn from one's experiences and venture a glimpse into the future.

Development cooperation is viewed as a generation task, because the necessary transformation processes in the developing and newly industrialized countries are elapsing long term and the goal of "overcoming poverty and the catastrophic living conditions of a large part of humanity" can only be achieved by a constant and sustainably established development policy.

PTB, as part of the German research landscape, is used to thinking and acting in longer spaces of time. It has the long wind necessary for successfully concluding the projects of the Technical Cooperation (TC) which are implemented on behalf of the *Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung* (Federal Ministry for Economic Cooperation and Development). Often, TC continues to work with the partners past the end of the actual mandate in joint scientific-technological projects.

The articles in this issue provide a review of the last five decades of the Department of Technical Cooperation of PTB. PTB always met the requirements of the respective time and, embedded in the guidelines of the German development policy, accomplished successful work for the establishment and extension of the quality infrastructure (QI) in the partner countries.

The beginnings of PTB's Technical Cooperation were characterized by the euphoria of that time – to quickly overcome poverty through rapid growth. In addition, knowledge was to be transferred as fast as possible and the appropriate investments were to be made – but it was not possible to accomplish all of this quite so quickly.

Many recipients of TC in the initial years, such as Argentina, Brazil, China, India (see the article *India* in this brochure), Mexico, South Korea, later also Kenya and South Africa, are today partners in joint projects (see the article "*Anchor Countries*" and *Quality Infrastructure* in this brochure) or they pass their knowledge on to their less developed



neighbors within the scope of their own Development Cooperation (DC). Development Cooperation with the "old" partner organizations has been successfully concluded. Today they represent their interests as full members in the respective international professional organizations. Recipients of TC have become partners in a scientific-technological cooperation, bringing benefits to both sides.

Learning experiences regularly led to the adaptation and re-orientation of the implementation concept of PTB's Technical Cooperation. Essential changes took place in the 1990s. In addition to qualifying the partner experts as well as to the setting up and disassembly of the equipment, questions on the organizational development and the political consulting services came to the fore. At the same time, a more intensive orientation towards the use of the services of QI organizations occurred in the partner countries.

The experiences from the projects also showed that an isolated view and promotion of individual components of the QI is not sufficient. Not until there is a systemic approach – which promotes a QI network in compliance with the requirements of the national society – will self-supporting and sustainable structures be created in the partner countries.

With the founding of the WTO (World Trade Organization), the rules of world trade were re-

determined (see the article *Trade Policy and Trade Promotion in Development Cooperation – a Critical Review and Outlook* in this publication). Tariff-related barriers to trade decreased in importance and with the Agreement on Technical Barriers to Trade (TBT) as well as the sanitary and phytosanitary measures (SPS), QI edged ever closer into prominence, particularly when technical or sanitary requirements were not fulfilled by the exporting countries. Proof of the competence of the project partners of PTB became the international recognition of their working results, whether through an internationally recognized accreditation of testing and calibration laboratories, entries about the metrological competence in the database of the Metre Convention or the acceptance of the partner organizations in the regional and/or international technical organizations. Hence, at the end of the promotion there was a clearly verifiable indicator.

In order to devise the methods and results of the conformity assessment transparently and trustworthily in the partner countries of the development cooperation (DC), the promotion of QI coincided with the growing requirements of the WTO – TBT and SPS agreements in new trade agreements or the adaptation of existing agreements (see: *EPAs: Economic Partnership Agreements between the ACP states and the EU – Development due to the Removal of Technical Barriers to Trade*). The promotion of QI increasingly became an instrument of trade promotion.

During this time, the promotion tools were adapted to the project implementation. Until the end of the last millennium, PTB worked together classically with long-term advisors. Materials consignments thereby took up a large extent of the project volume (see: *Metrology as the Point of Departure for Development Cooperation*). The range of the consulting on-site changed due to the stronger orientation towards the use of the QI services and the increase in political consulting; thus the structure of the executing agencies became diversified. Nowadays PTB relies on professionally and development-politically competent short-term consultants (see the article *What on Earth are Zebras Doing at PTB?* in this brochure). Thus, the – often low – absorption capacity of the partner institutions is accommodated – the expert only comes when the partner is “ready”. The ownership of the partner grows and the regular evaluations show a strong partner proximity at a savings of costs.

Thanks to the “old” partners of the TC, also regional training and consulting resources are used increasingly today (see: *A Lusophone Triangle – the Trilateral Project Mozambique/Brazil/Germany*). The partner experts were previously still educated and trained mainly in Germany, but now this takes place in the partner institutes of the region. Only in seldom cases now (specialized advanced

training, study trips, etc.) do the partners come to Germany. Thus, the south-south transfer is strengthened and the regional cooperation is supported. For an accreditation body on the path to international recognition, the “best” consulting comes from an expert from an accreditation body who has just successfully completed this path (supported by PTB’s Technical Cooperation). It is PTB’s task to find the “right” consultant and, together with the partners, set up the framework conditions for a successful consulting service.

Today, PTB’s Technical Cooperation (TC) is integrated in the joint programs of the German Development Cooperation (DC) and contributes to the fight against poverty predominantly within the scope of the priority program “Sustainable Economic Development”. Furthermore, the TC takes part in the German priority programs “Drinking Water”, “Saving the Environment and Resources”, “Energy”, “Health” and “Good Governance”.

Successes of PTB’s Technical Cooperation have been achieved also in the various projects of the Development Cooperation (DC) of the European Union (EU). Within the neighboring countries in Europe, PTB is – within the Twinning projects (see: *TWINNING – More Than Just a Cooperation of Administrations*) – a valued partner for the cooperation, but also in other EU-financed projects, PTB’s know-how is often integrated into trade promotion. The World Bank relies on PTB’s expert competence, particularly in the countries of Southeastern Europe, the Caucasus and Central Asia.

The importance of QI in development policy is often not perceived. Not until – due to a deficient or an inadequate QI – there are problems, such as import bans, food scandals, payment of damages due to faulty products, etc., does the subject become apparent. Raising awareness for these problems in the partner countries with political decision makers and in society in general thus continues to be part of the promotional strategy. The holding of quality days, the forming of quality committees, targeted events for decision makers, etc., are actively supported. Investigations increasingly take place, together with the partners, into the benefits and the impact of QI on competitiveness, environmental, consumer and health protection (see: *Impact Studies*).

QI is and remains a cross-sectional subject. It is not possible to have an environmental and climate policy without scientifically based limiting values. A medical diagnosis and therapy are detrimental to a patient’s health without a well-founded and safe laboratory techniques. Competitiveness is essentially defined by price and quality. Small, goal-oriented investments in the QI have a large impact here. A needs-based QI creates the preconditions for the reduction of technical barriers to

trade and can give impulses to various sectors in the partner countries important for development.

In spite of many successes, the setting up and extension of the QI continues to be an issue in Development Cooperation. Many developing countries still have an inadequate basic infrastructure. Particularly in Africa, south of the Sahara, there are scarcely any functioning QI organizations in existence. Developing countries with the appropriate economic dynamics often fail to gain access to new markets – regional or international – since their products fail to fulfill the requisite technical and sanitary requirements of the importing countries. Due to insufficient quality, products from developing countries are often not competitive. In the countries in transition, often the old structures – originating from the Soviet era – still exist, which limit the competitiveness of the national economy. In the countries of Central Asia and the Caucasus, the QI institutions have to – in part – be re-established. (see: *Etalons, Standards, Control and Inspection – Specifics of Quality Infrastructure Development in Central Asia*)

PTB will, also in future, adapt the German DC to changing framework conditions in the partner countries and will transpose the guidelines of the development policy. Important preconditions for this are an adapted monitoring and evaluating system as well as the continuous dialogue with the partners on the “correct” strategy for the achievement of objectives.

At this point I would like to mention some challenges PTB’s Technical Cooperation will also be facing in future:

The impact and benefit of QI as cross-sectional task are to be worked out even more intensively in order to sharpen the awareness of the stakeholders. The subject should continue to be integrated into the development policy discussion.

- The users should be encouraged to make use of the existing QI services.
- The concepts for introducing the neighbors in Southern and Eastern Europe to the requirements of the technical rules of “joint ownership” are to be further developed.
- Strategies for an improved coordination and networking with other donors and executive agencies are to be further developed and implemented.
- The representation of the interests of the developing countries in the international professional organizations is to be intensified.
- Strategies of the regional development are to be developed further.
- Existing user-oriented instruments of PTB’s Technical Cooperation, such as CALIDENA (see: *Calidena – Quality Improvement and Value Chains*) and NMI – Metrology User Relations (see: *NMI – Metrology User Relations*) are to be integrated into the implementing concepts and further developed.

At this point, I would like to thank all authors of this issue for their articles. Special thanks go to Dr. Anna Cypionka for her very dedicated work in the preparation of this issue.

50 years of the successful Technical Cooperation of PTB have become possible only through the untiring commitment of the staff members of the Department of Technical Cooperation.



## Technology Transfer

**Jürgen Wiemann**

An economy based on the division of labor cannot function without an efficient quality infrastructure, and international trade would hardly be imaginable if weights and measures were not comparable. In the industrialized countries, a highly differentiated institutional infrastructure for standardization, metrology and testing has developed over the centuries. Its fundamental significance for the functioning of a modern economy and civil society is now taken for granted. It is only when there is a lack of these institutions

or when they are unreliable, as in developing countries, that one realizes how fundamentally important they actually are. Developing countries which have overcome their role as mere suppliers of raw materials, are developing their own industries and wish to diversify their exports towards processed industrial and agricultural goods, have to catch up with the establishment of a quality infrastructure and the associated legal and institutional pre-conditions in fast motion. In this process, technical Cooperation and technology transfer play a considerable role. Consolidating the institutions in the field of standardization, metrology and testing as well as the quality infrastructure all in all, is an essential pre-condition for successful industrialization and export-oriented production in the partner countries, but also for their integration in international agreements on environmental and climate protection and the protection of natural resources. It is therefore unbelievable how little attention has been paid to this topic in the international discussion on development to date.

The importance of metrology, standardization, testing and quality assurance (MSTQ) goes well beyond the industrial sector. Modern agriculture and healthcare systems, too, can no longer function without technical regulations<sup>1</sup>, standards<sup>2</sup> and



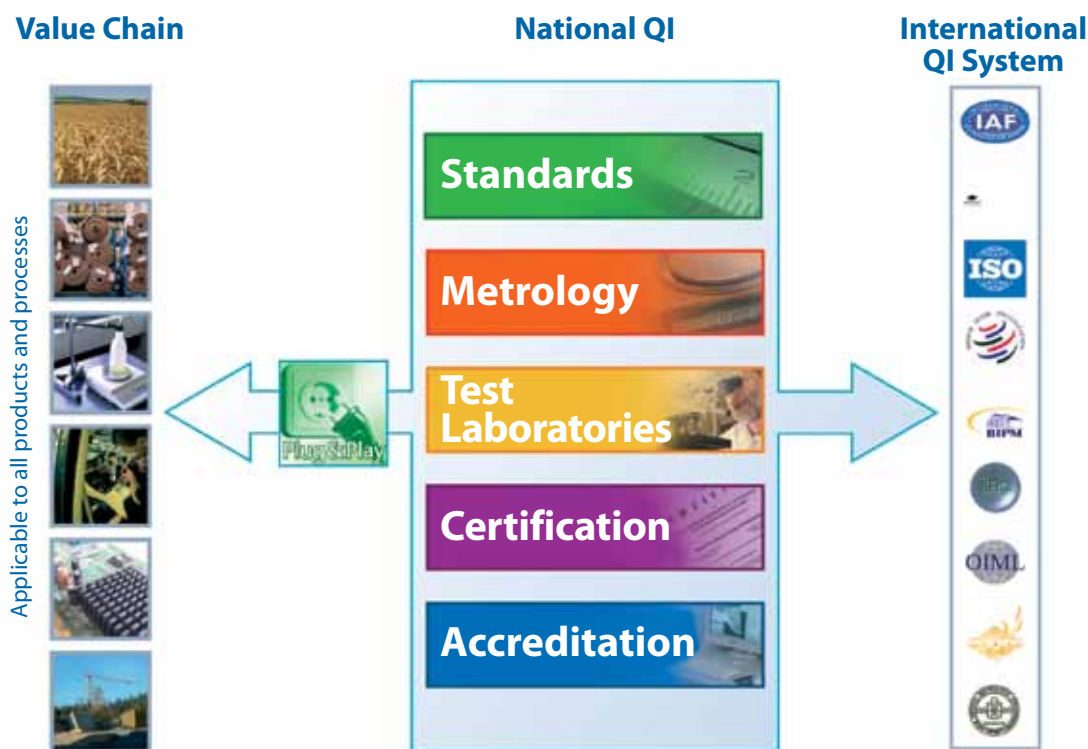
quality inspection. After experiencing several food scandals, the consumers have become more and more aware of the health risks but also of the environmental impacts caused by the growth-obsessed agroindustry and by a type of agriculture which is slightly too credulous when it comes to technological solutions. The consumers pay more attention to the quality of foodstuffs and also to careful and natural methods of production and processing. The maximum permitted limit values for the contents of harmful substances in foodstuffs established either by national laws and ordinances or within the scope of private quality labels are becoming lower and lower. Monitoring the compliance with such standards and technical regulations presupposes a well-developed testing system and accredited certification bodies. Developing countries which do not have such a quality infrastructure at their disposal cannot exploit their comparative advantages for agricultural export products due to the fact that consumers in Europe are not ready to take any chances when it comes to the quality of foodstuffs.

Standardization, metrology, testing and quality assurance also play an increasing role in environmental and climate protection, as well as in the healthcare system. Growing environmental

**Calibration of a force transducer in Chile**

- 1 Technical regulations are legally prescribed parameters of a product or of the production processes and methods as far as they have an impact on the product itself.
- 2 In contrast to a technical regulation, a standard is not legally binding. It is simply a set of specifications, compliance with which is not prescribed by the state.

Dr. Jürgen Wiemann, Economy and Employment, Gesellschaft für internationale Zusammenarbeit (GIZ)



damage and the anticipation of still larger ecological disasters (climate change, collapse of entire ecosystems) have contributed to the industrialized countries' technical regulations, standards and limit values being constantly adjusted and sharpened. If the developing countries are to be introduced to the protection of global public goods but also to the protection of their own health and environment according to European and international standards, then exhaustive technical cooperation with the authorities responsible for environmental protection and with the testing institutions of the partner countries is also the enlightened self-interest of the industrialized countries themselves. PTB's Technical Cooperation, thus, contributes to improving the pre-conditions for successful and cooperative *Global Governance* in the partner countries.

Similar to the material infrastructure, technical regulations and standards, as an immaterial

infrastructure, have a "public" function which is fulfilled by the state or by non-profit institutions which pursue standardization in the interest of the public. The basic weights and measures and the basic rules for safety, health, consumer and environmental protection are laid down by the state. The detailed definition of standards takes place within the limits laid down by the state by means of technical regulations and according to state-of-the-art scientific and technical knowledge and involving the business community and its committees or associations. Each industrial enterprise is free to decide whether it wishes to exploit the advantages provided by compliance with standards when exchanging goods with others or vis-à-vis the consumers. PTB's International Technical Cooperation furthers quality infrastructure as a whole and thereby cooperates with public and private institutions.

# Metrology as the Point of Departure for Development Cooperation

Dieter Kind, Eberhard Seiler

## The Beginnings

The very nature of metrology requires international cooperation. Uniform measures and reliable measurement results can only be achieved by means of international comparisons. This is not only a prerequisite for scientific progress, but also a necessity for global trade, for the safe handling of technology and for practically all fields of everyday life.

As national metrology institute, PTB represents the Federal Republic of Germany at the level of European and international organizations. Its technical expertise as well as its measurement and testing capabilities are the basis for technical regulations and international agreements [1].

Numerous countries have asked PTB for support when setting up their metrological structures.

## The First Projects

The first request came from the United Arab Republic (Syria and Egypt) in 1959. The resulting project that officially began in 1961 had to be stopped due to political disturbances.

Despite this setback, PTB, encouraged by the Federal Ministry of Economics, developed technical cooperation with developing countries and countries in transition as a new field of activity. The significance of the projects commissioned by the Federal Ministry for Economic Development and Cooperation (BMZ), which was created in 1961 in this regard, grew constantly over the years [2]. If the projects were first focused on setting up and developing metrology – PTB's core competence – the goals soon started diversifying. The main contribution to this development was the institutionalized exchange of information between PTB and BMZ concerning the importance of a functioning infrastructure including the following elements: *metrology, standardization, testing and quality assurance* (MSTQ). This helped to underline the significance of the topic and to ensure it was given the status it deserved [3]. Quality assurance was additionally ensured by means of international agreements on the certification and accreditation systems. Other German specialized

institutions, too, were involved in the dialogues and in the realization of the projects [4].

## South America

*One of the first projects was realized with the Instituto Nacional de Tecnologia Industrial, INTI, Argentina, from 1968 until 1976; it was funded with a financial volume amounting to EUR 2.6 million. A major part of these funds was spent on training activities for the Argentine partners in Germany. After having completed the language training, a 12-month professional training subsequently took place, mainly in the laboratories of PTB. In the course of the project, this pool of experts was repeatedly given the opportunity to refresh their knowledge at PTB and was finally able to work independently. Thanks to the equipment bought with project funds, and thanks to the support rendered by German short-term experts in Argentina as well as to the well-trained home staff, INTI became the most capable and efficient metrology institute at that time in South America. At about the same time, the neighboring country Brazil was given support by the implementation of two projects: one was aimed at supporting the standardization system, the other one at developing the verification system. Apart from three small countries in the north-east, PTB has been active in all South American countries [5]. Today, cooperation in South America is focused on supporting regional projects.*

## Training

The training of partner experts was – and still is – a great challenge and a decisive factor for the success of a project. PTB's laboratories, equipped with expensive instruments and operated by highly qualified experts, were not prepared for basic metrological training. Other specialized institutions which were involved in the project faced the same problem. The idea then occurred to create a special training site. The German Technical Academy (DTA) thus started, in 1985, with the

Prof. Dr.-Ing. Dieter Kind, President of PTB from 1975 until 1995

Dr. Eberhard Seiler, Head of PTB's Department "Technical Cooperation" from 1997 until 2005, previously Head of Section





The mass laboratory of the Kenya Bureau of Standards started its work in the 1970s and was accredited according to international standards by Deutscher Kalibrierdienst (German Calibration Service) in 1999.

“practical basic and advanced scientific training of experts and managers [...] especially from developing countries [...] in the field of metrology, standardization, testing and quality assurance” on the premises of the former Helmstedt University. The idea of a central training site for development cooperation could, however, not be implemented in a sustainable way. As a consequence, the partner institutions again had to assume these tasks.

### **Technology Transfer – Turkey**

Cooperation with Turkey started back in 1987; the last project was completed in 2005. In these nearly 20 years of cooperation, the development of an exhaustive quality infrastructure was supported with a financial contribution amounting to approx. EUR 18 million. Besides PTB, also experts from

- the verification authorities of the German federal states;
- the German Institute for Standardization (DIN);
- the Federal Institute for Materials Research and Testing (BAM);
- the German Calibration Service (formerly DKD, now known as DAkkS);
- the German Accreditation Council;
- the technical surveillance associations;
- the German Welding Society, and
- the German Society for Nondestructive Testing were active as partners in the different projects. The projects were realized in close coordination with other donors (EU and World Bank).

The most significant results:

- An efficient metrology system led by a national metrology institute which takes part in international comparisons with great success and complies with further international requirements.
- An accreditation organization which, as a member of the European Co-operation for Accreditation (EA), undergoes checks and operates according to international criteria.
- A modern institute for standardization which, among other things, makes foreign (international and regional) standards accessible to its users.
- A center specialized in welding techniques which offers training according to European directives, and a center for materials testing offering a wide spectrum of services [6].

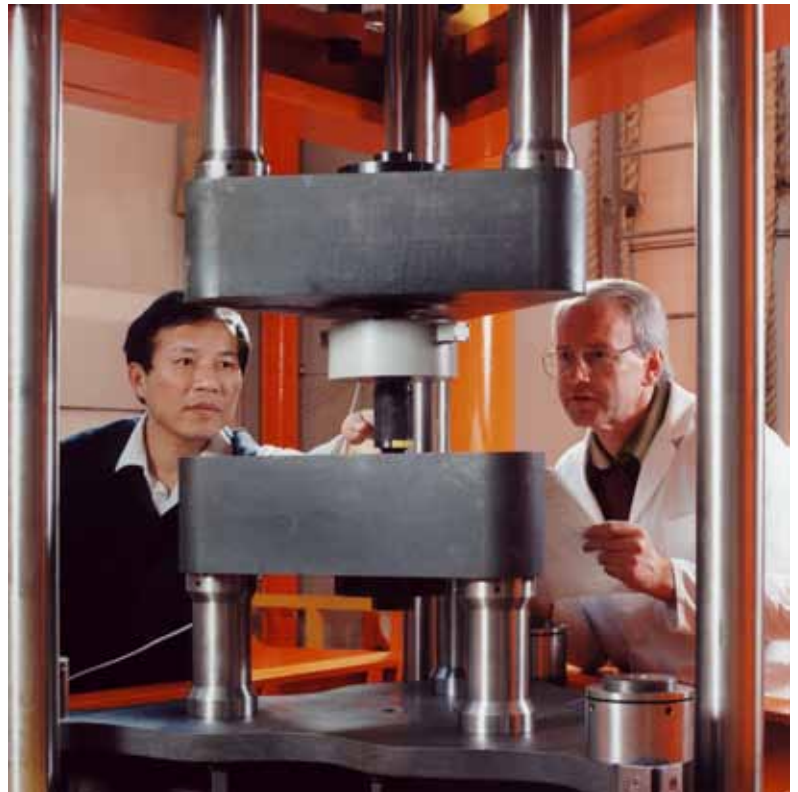
### **The International Environment**

The *Lima Declaration on Industrial Development and Co-operation* of the second UNIDO General Conference in 1975 spread the idea of industrialization as a driving force for economic development. Technology transfer as practiced by PTB was basically confirmed by this declaration.

As experience has shown, industrialization alone could not be the key to fast and sustainable development. Besides a lack of funds, of qualified personnel and of an appropriate infrastructure, also tariff barriers, quantity limitations and technical barriers to trade in the form of different national regulations often hindered commerce – reason enough to try and find a solution at the international level. The World Trade Organization (WTO) was created from the *General Agreement on Tariffs and Trade* (GATT) in 1995. Its aim is to lay down a codex for its members and to supervise its implementation, in order to enable global trade without arbitrary limitations. The *Technical Barriers to Trade* (TBT) Agreement of the WTO is intended to minimize technical obstacles to trade. This Agreement stipulates international standards to be laid down for technical regulations. Furthermore, it recommends the mutual recognition of tests by means of corresponding agreements in order to avoid redundant testing. If the test results are to be trustworthy, generally accepted testing procedures must be applied, calibrated measuring and testing instruments must be used, and minimum requirements must be placed on the testing laboratories involved. PTB projects support the setting-up of the required measuring and testing capacities and facilitate the international acceptance of the results obtained by partner institutions.

The organs of the Metre Convention adjusted their system to guarantee uniform measures and trustworthy measurement results by means of international comparisons, increased involvement of regional organizations and publication of the best possible measurement and calibration capabilities of national metrology institutes after a meticulous third-party checking. In addition, the possibility was offered to recognize the equivalence of the measurement and calibration capabilities of those institutes implementing a quality system in compliance with international standards and proving their competence through accreditation or peer review. This proof is labor-intensive and requires excellent knowledge in the field in question as well as close international and regional cooperation. With PTB's support, many young metrology institutes managed to override these obstacles.

To prove the competence of certifiers and to enhance and formalize confidence in certificates internationally, independent accreditation bodies were created and are now operated in many countries. Several international and regional organizations which also took part in monitoring were involved in setting up certification and accreditation systems. These systems can only function if close national, regional and international cooperation of all organizations involved is given. In 1998, PTB initiated a seminar entitled *The Role of Met-*



*rology in Economic and Social Development* which took place in Braunschweig, with the financial support of BMZ in order to emphasize this issue and to discuss possible solutions [7]. For the first time, representatives from all relevant international organizations and national institutions met to exchange ideas and information. This seminar was highly appreciated by all participants, providing non-metrologists with basic information on the significance of a well-functioning metrological system, whilst informing metrologists about the chances and risks globalization brings about; also, mutual understanding was enhanced and a closer cooperation launched.

Calibration of a force sensor as part of the training at PTB

## Regional Cooperation

With globalization, developing countries are facing a new challenge. They, too, have to provide quality proofs if they want to export their products. This is expensive and takes time. It is, however, more economical than redundant testing due to dubious certificates – or a total lack of such. With regard to the necessary investments in staff, equipment and facilities a regional cooperation seems appropriate in order to ensure proportionality between investments and efforts.

This is reflected by enhanced regional cooperation. To an increasing degree, PTB's project partners include regional association bodies at an economic and technical level. Regional development banks, which rely on the expertise of PTB and its ability to successfully implement a project, are involved in the projects as donors. A large

part of the knowledge and technology transfer is ensured by regional experts who have obtained the required qualifications through years of cooperation – a sign for sustainable project impacts.

### **Technology Transfer within Regions**

#### *Establishment of a regional Quality Infrastructure (QI) in the East African Community (EAC)*

*After the Customs Union and the Common Market came into being in 2010, two important goals of the agenda for an economic integration of the East African Community (EAC) have been reached formally. The EAC has a legal framework for a QI at hand which is WTO-compliant and is aimed at integration.*

*The project objective is to improve the shaping of the QI as an element of the regional integration process. The components of support will include consultancy also by short-term experts from the region, implementation of qualification measures and mutual evaluations and the setting up of regional and international cooperations in specialized fields of work.*

### **Final Remarks**

Several factors determine PTBS's success in the field of development cooperation: as a public specialized institution, PTB can fulfil its tasks for the project partner without being influenced by own interests; its experts remain contact persons for the partners, also after the project's term has ended; by cooperating in regional and international specialized organizations, PTB is informed about and can influence new developments, and it can also make the particular interests of developing countries heard at international level. This, in turn, makes PTB a valued and sought partner – especially since no other national metrology institute offers support to such an extent.

Although the funds flowing into the projects are comparatively low, the impacts achieved in the partner countries are considerable. The funds are used to set up basic structures which are indispensable for national economies to be competitive at international level and, thus, benefit from the advantages whilst avoiding the disadvantages of globalization. It is only by taking part in international trade that developing countries and countries in transition will achieve economic growth, which, in turn, contributes decisively to reducing poverty in these countries. PTB, thus, contributes to implementing the Millennium Goals formulated by the United Nations [8].

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## India

### Hans Bachmair

PTB's cooperation with the *National Physical Laboratory of India (NPLI)* started with the project *Development and Modernization of Metrology and Verification*. This project was implemented from 1974 to 1986 and had a budget of DM 3.8 million at its disposal. It encompassed the delivery of equipment, the rendering of consultancy and the training of Indian scientists at PTB. The main areas to be promoted were: electricity, length, force, acoustics, temperature, and optics. The project fitted in without any difficulties with the politico-economic objectives of the Indian Government of that time: Advancement of the industrial development, improvement of the international competitiveness and strengthening of the MSTQ sector, taking – in particular – industrial and legal metrology into account.

In 1985, another project was added which was aimed at promoting legal metrology. Within the scope of this project, the *India Government Mint, Bombay*, the verification school of the IILM in Ranchi as well as the *Regional Reference Standard Laboratories* of the *Department for Weights and Measures* – i.e. those laboratories which are important elements in the calibration hierarchy of India and which were to ensure the provision with metrological services all over the country – were, until the early 90s, promoted with a total volume of DM 3.6 million.

In 1988, a follow-up project was launched with the NPLI which was intended to consolidate the measurement capabilities so far available and to serve as a supplement in the fields already promoted in the first project phase. Liquid and gas metrology was added as another important field of tasks. The allowance covered a total amount of DM 8.07 million.

The superior objective of the second project phase was to raise the NPLI in some partial fields – which are of particular development-economic importance – to an international level and, thus, to support the whole economic strategy of the Indian Government which was aimed at increasing export activity and social and ecological growth processes. This is why electrical engineering and electronics, industrial metrology and the newly included



Employees of the NPL India in the High-Frequency Laboratory



Employees of the NPL India and of PTB during a DKD training of assessors

field “liquid and gas metrology” were focal points of the support, followed by thermometry and radiometry. Force, mass and density as well as workshop matters completed the picture.

At the same time, an accreditation body for calibration and testing laboratories was established at the NPLI: the *National Accreditation Board for Calibration and Testing Laboratories (NABL)*. NABL established an important link between the NPLI and the laboratories working in the field of industrial metrology and was promoted in the second project phase with an expert training program.

Today, the NPLI ranks among the leading metrology institutes in the Asian-Pacific region. NABL has meanwhile become an independent organization and is a member of ILAC and APLAC. Today, India has more than 600 accredited calibration laboratories and more than 1650 accredited testing laboratories at its disposal.

Prof. Dr. Hans Bachmair, Head of division 2, PTB, from 1991 to 2009

## “Anchor Countries” and Quality Infrastructure

Andreas Stamm

Towards the middle of last decade, a study of the German Development Institute<sup>1</sup> triggered a lively scientific and political debate about the role and the significance of the so-called “anchor countries”. Even though the notion of an “anchor country” and the definition – which first referred exclusively to the economic weight of a said country – was the object of criticism from various parties, the study, however, experienced good feedback. It demonstrated that it has always made sense to make a differentiation among developing countries in order to have a more systematic approach as to how to design cooperation with different groups of countries more judiciously. The term “anchor countries” designates those developing countries which, due to their sheer size, play a central role in the economic development of their region. With the exception of economies based on natural resources, such as Nigeria or Saudi Arabia, these countries have a diversified national economy and are intensely involved in regional and worldwide trade. Increasing trade integration raises the requirements placed on the national quality infrastructure, since the local producers have to be able to demonstrate that their products comply with the respective standards in force. Due to the progressive growth of a demanding middle class, this trend is emphasized, and the importance of quality standards increases – also on the national markets.

Cooperation with anchor countries in the field of quality infrastructure contributes to their – beneficial – integration into the global economy, which makes it easier for them to be competitive in demanding market segments instead of being competitive only due to particularly low-cost production. Strong competence in the field of standardization and metrology is also important for the environmental friendliness of growth and development processes. Since the anchor countries have a high and still growing share in the worldwide consumption of resources and in the „debiting“ of the sink capacities, this is an essential aspect of global sustainable development.

Cooperation with anchor countries in the field of QI can have a “halo effect” on the whole region. Anchor countries are represented and active in most international standardization and conformity assessment bodies. Many smaller developing



Brazil, India, Indonesia, Mexico and South Africa as global development partners

countries are not given this opportunity due to a lack of financial resources. Even if they do not wish to assume a representative role and have not been correspondingly mandated to do so by their neighbors, anchor countries can still have a positive trans-border effect if they can influence, for instance, decision-making processes within committees of the International Organization for Standardization (ISO) towards taking the specific conditions (ecology, factor endowment) of their home region into account.

Within the scope of international cooperation, PTB has made a positive contribution to QI development in a series of anchor countries. It has, for example, contributed to setting up the Brazilian metrological institute INMETRO and to creating an independent accreditation institution in Turkey. What is particularly worth mentioning is the setting-up of a regional QI in the area of the Southern African Development Community (SADC) which involved close cooperation with the regional anchor country South Africa.

The term „anchor country“ has meanwhile practically disappeared from the debate on development policy. Instead, the term „countries in transition“ has re-appeared. Whether this designation is better suited to describe the specific role of larger and upcoming developing countries is arguable. Regardless of this, no one can, today, deny the fact that the distribution of economic, and also political, weights throughout the world has changed for good. The international cooperation of the OECD countries has to take this fact into account and adapt its cooperation portfolio accordingly, e.g. by improving the coordination of development cooperation with scientific and environmental cooperation.

<sup>1</sup> Stamm, Andreas (2004) „Schwellen- und Ankerländer als Akteure einer globalen Partnerschaft – Überlegungen zu einer Positionsbestimmung aus deutscher entwicklungspolitischer Sicht“, DIE Discussion Paper 1/ 2004

## What on Earth are Zebras Doing at PTB?

**Martin Kaiser**

At the end of the 80s, PTB's main contracting authority, the BMZ, certified PTB in a cross-sectional analysis as doing excellent professional work but stated that this work should be geared still more strongly towards development policy. The consequence of this was a paradigm shift: whereas previously, long-term experts – as a



rule qualified PTB staff – had been dispatched over several years, these were now substituted by short-term experts. Apart from this, personnel not connected with the subject (i.e. qualified non-metrologists) were engaged as experts, and project coordinators with different scientific backgrounds were employed. Today this is all a matter of course but the route towards this was, however, not.

When, more than 20 years ago, I had my job interview at PTB for the post of a “development economist who was to act as a zebra”. At that time “zebra” was the name that development policy executive agencies gave to those short-term experts who provided advice to projects at regular intervals as accompanying experts over a complete project cycle (they were alternately present and absent: black and white, alternating like a zebra's stripes). PTB meanwhile keeps a small herd of these zebras, which mainly consists of independent consultants who cover various fields of quality infrastructure work. The term “zebra” has long since been replaced with the awkward, but resonant term: Intermittent Short-term Experts. This kind of expert works as a rule not only for PTB, but also for other development cooperation organizations, in a variety of countries and in different types of

projects. This does not only support networking but also the gaining of know-how is achieved.

Lateral thinking represents a guiding principle of the intermittent expert. They were therefore aptly named with the term “zebra”: well hidden within the herd, hard to domesticate, and hardly suitable for bearing loads or riding.

## Bilateral Projects

### Paul Date

PTB's bilateral projects are specifically targeted at supporting QI institutions specifically in the partner countries. Paul Date is the Head of the Scientific Metrology Department of the Ghana Standards Board. His short report referring to the project "Quality assurance of agricultural products through metrological and testing services in Ghana" describes some of the typical measures taken within the framework of bilateral projects.



Ghana Standards Board's temperature laboratory

By helping Ghana to establish and enhance the relevant quality infrastructure elements, PTB's project promotes the improvement of the quality and safety of food and agricultural products. Focusing on the delivery of adequate metrology and testing services, the project's achievements include the following:

- Three calibration laboratories in the field of mass, temperature and pressure accredited to ISO/IEC 17025 by DKD since 2008-05-15; expansion of their scope since then: mass laboratory (1 mg–20 kg) class F1 instead of (1 mg–10 kg) and temperature laboratory (–800 °C–10000 °C) instead of (–300 °C–2000 °C).
- Bilateral inter-comparisons with ZMK laboratory of Germany in mass, pressure and temperature, as well as regional inter-comparison in mass measurements at the level of Class F1, stainless steel.
- Ghana Standards Boards' Metallic Contaminants Laboratory and Food Research Institute's Laboratory for Mycotoxins scheduled for DAkkS accreditation in December 2011.
- A network of all major analytical testing laboratories with mandates in the field of agricultural products and food safety and quality firmly established by official network agreement on mutual cooperation and fully operational.
- Internal and external training of laboratory staff (calibration and testing) to develop the competence of staff in line with international performance expectations and standards.
- GSB in its function as National Metrology Institute successfully brought on the way to active participation in SOAMET and AFRIMETS metrology activities.
- Successfully supported Ghana's membership application as an associate member of the BIPM thus enabling Ghana to sign the CIPM – MRA effective 2010-02-24.

# TWINNING – More Than Just a Cooperation of Administrations

Martin Kaiser



In the beginnings of development cooperation it was assumed that everything that was already in existence in the industrialized countries simply had to be imitated in the development countries like an identical twin (in a mirror-inverted way) and that the institutional and economic framework built up in this way would then automatically entail industrialization and wealth for everyone. “Blueprint” – that’s what this procedure was called at that time. (For our younger readers: in former times, duplications of drawings or documents were called “blueprints”!). But it soon became clear – also to PTB’s International Technical Cooperation Department – that development depends on far more factors than simply on the provision of laboratory capacities, measuring instruments and trained staff. The success (i.e. the measurable

benefit and the sustainable impact of development projects) is based on a complex network which comprises – on the one hand - preliminary and follow-up fields and – on the other hand – the utilization of innovations as well as their benefit and their impacts. Although the former concept of identical twins most certainly led to a highly intuitive and emotional agreement between PTB and its partner institutions, the political impacts did not meet the expectations, especially not today’s.

Today, a new concept (called “*twinning*”) stands for an initiative of the European Commission for the establishment and development of public structures in candidate countries of the European Union (“*Institution Building*”). The program is aimed at adopting the *acquis communautaire* (Community acquis) of the European Union and at establishing modern, efficient administrations which are able to implement laws and ordinances to the same degree as the current member states.

PTB is involved in several *Twinning Arrangements*. Thereby, it uses the experience gained and the instruments tried and tested outside the EU and its candidate countries to generate more from administrative partnerships than just the implementation of laws and ordinances. PTB sees its partnership as a contribution to the development of economic and social structures and acts in a correspondingly comprehensive way. The identical twins of the past have become fraternal twins who regard differences in the establishment and organization as a basis for a meaningful – and necessary – adaptation to partnership-based framework conditions.



## Analogue International Cooperation

The staff of the Technical Cooperation Department get several hundred emails each day. Working without email and the Internet is hardly conceivable today.

Rita Walter was a secretary in the Technical Cooperation Department for many years and told us about her average working day without a computer in the middle of the eighties.

*Mrs. Walter, many thanks for giving an interview to the Technical Cooperation Department of PTB.*

My pleasure.

*You were the classical secretary in the classical outer office.*

Yes, but not right from the start.

*How did it all begin?*

My first boss, in 1985, was Dr. Walter Kaul. Then in 1987 I started working for Mr. Hartmut Apel.

*What was a typical working day like at the start of your career?*

There were no clocking in machines, work started at 7.30 am, you couldn't go home before 6.00 pm. Sometimes I even worked on Saturdays, when we had to get ready for a board meeting, for instance.

My office was a glorified storeroom in the Kohlrausch Building with furniture which had just been thrown together. The typewriter didn't even have a correction ribbon. So I had to type really accurately and well. I often had to take dictations and had to write in shorthand.

*How was it when a telex had to be sent?*

Mr. Kaul called me to take a dictation, I wrote the text in shorthand, then typed it up. Mrs. Schäfer in the Telex Centre had to re-type the text to make the paper tape. The telex was then sent out. Mrs. Schäfer was very nice. The way everyone worked together was always excellent, we complemented each other.

*How were things with Mrs. Jarzombeck, the new head of the working group?*



Mrs. Walter in the middle of the 1980s

The typical outer office no longer existed. I had lots of other jobs which I could do independently. I was happy to be able to work with the project coordinators, who could rely on me without having to ask. Being checked on is something I don't like that much at all.

*What was the biggest challenge in your time at PTB?*

Well, I think it was the computer!! I resisted having a computer at home, as I am a creature of habit. But I used one at work and, of course, didn't object to it.

Now I remember one incident: Mr. Wolff was still there at the time, there was meeting and I had offered to take the minutes. In no time I'd written up four pages – but then I forgot to save them – everything was gone, of course. That taught me a lesson! After that I never worked without saving a file. That really is an experience that I have in here. [*points to her heart*].

*When did the first emails arrive?*

I don't know any more when that was but it really was a milestone. Emails themselves weren't such a problem, unlike clicking on the attachments properly and sending them along, too.

Mr. Apel dictated the mails to me and I typed them straight into the computer. I was sitting down, he stood behind me.

Rita Walter, Secretary in the Technical Cooperation from 1985 to 2001

Sabine Thomas, Public Relations, Technical Cooperation, PTB

Having to write in Spanish or Portuguese for Mr. Apel was a big challenge, too, because I didn't know what I was writing. Mr. Apel wrote tons of things at home. I was quite confident in English, but in Spanish....

*Were there many visitors?*

Constantly, and especially lots for Mr. Apel. There were also visitors from South America and Africa.

*Did you have a lot of contact with the partners, did you organize trips?*

Yes, and it often meant more work, with lots of cancellations and re-bookings.

What else I had to do: keep a register. Each in-coming and out-going letter was entered into a book: where it came from or where it was going to. I needed so much time for that, that it was hardly possible to get it done. Then I asked for it to be dropped, as the letters were also registered in the post room.

*How was life with a fax machine?*

It made life much easier! And it helped communication within our group, too. You stood there, waiting for the fax to go out and then someone else came along and you could talk to each other.

*Did you have a favorite partner country?*

Argentina, with charming Dr. Valdéz. He was a gentleman from head to toe.

The people in Turkey were also very nice!

*Did you also go on a trip yourself?*

No, that was unfortunately not possible. There were no assistants at that time. Mr. Apel always wanted me to travel, but there was no chance because of the invoicing. Mr. Apel thought it would have been good if I had gone along on a trip. At one time there was an invitation to the Turkish Ulusal Metroloji Enstitüsü UME, but I didn't press the issue. I preferred to be in the background.

*Can you think of anything else that you'd like to say?*

Only that I liked working at PTB very much!

*Mrs. Walter, many thanks for your time and your memories.*

Sabine Thomas carried out the interview for the PTB-Mitteilungen.

## Twinning with Malta

Joseph A. Bartolo



Maltese Prime Minister Dr Lawrence Gonzi during the inauguration of the second phase of development of the Maltese national metrology labs

In the year 2000 Malta as an applicant country to the European Union faced the challenges of necessary institutional changes and restructuring.

EU law includes requirements for a legal metrology system. Legal metrology had been institutionalized in Malta centuries ago during the British period, however, to fulfil the EU legislation we had to restart from a zero standpoint. Besides, new manufacturing industries were growing in various sectors. The improvement of the quality of products and services entailed control and measurement, but services were absent at a local level at that time.

A technical visit in October 2000, headed by Dr. Hans-Dieter Velfe, former Head of Working Group *Technical Cooperation in Europe, Caucasus and Central Asia*, helped to formulate a first concept for a legal metrology system based on EU requirements. At that time the Metrology Directorate of which I am responsible today did not even exist and it was through the assistance from PTB that capacity building in the area of metrology commenced.

We understood that legal metrology could not just exist as an isolated entity. It had to be part of a scientifically sound traceability system, developed in line with the resources and technology available and a sense of appropriateness for economic size and strength.



PTB Technical Cooperation Department helped to build bridges within PTB, with manufacturers and with the European metrology system. PTB helped to design a strategy for the development of metrology in Malta allowing for a solid build-up of competencies through the appropriate selection of technologies and importantly the establishment of measurement competencies in certain sectors.

Thank you PTB Technical Cooperation Department.

Ing. Joseph A. Bartolo, Head of National Metrology Services, Malta

## Trade

### Jürgen Wiemann

The diversification of exports and integration into the international division of labor are efficient motors for a country's economic and social development. More than any theory, China's "Great Leap Forward" has – since the economic reforms and trade liberalization which started in 1978 – demonstrated how fast an opening to the world economy can turn a developing country into a country in transition which, in many fields, will probably soon outrun the old industrialized countries. For such an economic catching-up process, many factors must, however, interact. One of these factors is the existence of a differentiated and well-functioning quality infrastructure. PTB's Technical Cooperation, which supports countries in transition in establishing a quality infrastructure system, makes a contribution to the economic success of these countries which should not be underestimated. In contrast to this, the less developed countries – in which this basic infrastructure is missing or is underdeveloped – are poorly prepared for the tasks of a modern economy within a globalized world economy that is based on the international division of labor, and they run the risk of becoming increasingly marginalized.

Differences in the standards and technical regulations between exporting and importing countries act like absolute barriers to trade. In the theories of international trade, this problem is not sufficiently dealt with. These theories underestimate the importance of "technical barriers to trade" which are erected by an importing country in the form of highly demanding standards and stringent quality requirements which the exporting countries have to meet with their products. Whereas it is possible to predict very precisely – by means of economic models – which impact a change in tariffs will have on trade, these models fail ruefully when it comes to estimating which impact technical barriers to trade have on trade itself. Economic models are based on the assumption that goods are homogeneous – i.e. these models assume that the goods have identical properties and are of uniform quality. In reality, however, differences in quality as well as technical improvements which may have been achieved in one product out of a whole category of such products are an important aspect of competition and are more important than price differences. If developing countries do not comply with the technical regulations or health and environmental requirements of the importing



countries, their access to international markets can be completely blocked. Thus, technical barriers to trade have a much more drastic effect on trade than moderate tariff rates which certainly increase the price of imported goods, but do not block their import altogether.

Development practitioners, too, often overestimate the role tariffs play as a barrier to imports as well as the role tariff preferences play as an instrument for promoting the exports of developing countries. The EU tariff preferences for imports from developing countries and the complete exemption of the imports from the least developed countries from customs duties (i.e. the so-called "Everything But Arms Initiative" of the EU) were, for example, celebrated as a great success of development policy in the field of trade policy until, after a while, it became evident that exports from these countries had not increased to the expected degree. An important reason for this was that the preference-favored countries and their export firms were unable to comply with the constantly increasing standards and the increasingly demanding technical regulations of the EU. Without comprehensive technical cooperation in the field of quality infrastructure, all well-intentioned offers for opening the market will remain ineffective.

In our globalized economy, trade with semi-finished products or with intermediate products which are part of international value chains is constantly gaining in importance. Today's worldwide networks encompassing sub-contractors, processors and end users as well as trade chains would not be possible without uniform technical standards and binding quality regulations. If a country lacks the preconditions for an efficient quality infrastructure, it is not considered as a sub-contractor for the international value chains and for the networks of enterprises operating these chains.

The technical regulations are, however, not the only barrier for export products from develo-

Globalized commodity flows require international interaction

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Dr. Jürgen Wiemann,  
Economy and  
Employment, Gesell-  
schaft für internati-  
onale Zusammenarbeit (GIZ)

ping countries. In the interest of the consumers, the importers are placing increasingly higher demands on quality, and these must be met by the exporters. When it comes to quality, consumers are not ready to make concessions just because the producers in a developing country still have difficulties in reaching the standards that are usual in Germany or in other parts of Europe. This also explains the constantly increasing number of private quality labels which do not only guarantee defined product properties, but also a defined method of production – i.e. whether the good has been produced in accordance with specific criteria (e.g.: prohibition of child labor, organic agriculture, sustainable forestry and lumber industry). The private quality labels, environmental protection or health labels usually place higher demands on the import products than the national standards of a country. This makes it additionally difficult for the producers and exporters in the developing countries to keep up with the diverse requirements of their export markets (which even differ from each other).

The task of the World Trade Organization (WTO) is to facilitate world trade by removing barriers to trade. It assumes this task, for example, by laying down precise rules for the application of standards and technical regulations in international trade. By making the procedure for the determination of technical regulations more transparent and by promoting the international harmonization of standards, it is aimed to prevent standards and regulations from becoming technical barriers to trade. If the quality infrastructures of the exporting countries are well functioning and are comparable to those of the importing countries, another and more convenient procedure becomes possible as long as complete harmonization has not been achieved: the *mutual recognition of the conformity assessment results*.

The WTO makes a distinction between “*product standards*” and the so-called “*process standards*” (*production and process measures* – PPM) – a distinction which is of utmost importance: “*Product standards*” may be applied by the importing country also to imported products – inasmuch as these standards also are to be applied to national products of the same type. Imported products must not be discriminated against. Furthermore, product standards which are, for example, intended to guard against substances in food or clothing which are harmful to health, must not be arbitrarily tightened, but in case of disputes, scientific evidence of the necessity of such tightening must be provided. In contrast to this, “*process standards*” (these are technical regulations for the production processes but also requirements placed on the

impact they may have on the environment and on the work conditions in factories) must not be applied to imported products. Because from the viewpoint of the WTO – and under the aspect of trade – this would mean that the importing country interferes with the internal affairs of the exporting country and with its production methods, and this would excessively jeopardize world trade. This WTO verdict does not, however, refer to the private quality labels. Consumers must not be hindered from using such labels as a means of orientation to find out whether they will get the quality they are used to also when they buy imported goods. Their freedom to search for products which were manufactured according to the principles of “fair trade” or organic agriculture, for example, must not be restricted by the general freedom of trade.

In the course of the constantly increasing environmental, health and, in particular, food requirements, the dividing line between “*product standards*” and “*process standards*” is becoming increasingly blurred. If the quality of a product depends on its production conditions, it is possible for the importing countries to stipulate that the imported good complies with their own technical regulations: This means that the EU is authorized to check, for example, the hygiene regulations in the butcheries of the exporting countries. In future, conflicts are to be expected also when it comes to the climate compatibility of production processes. The importing countries fear that the high requirements they have to fulfill in their countries will be undermined by imported products. This would have a harmful effect on the climate. In any case, the setting up and the constant improvement of a quality infrastructure are decisive prerequisites for export-oriented developing countries to be able to meet the manifold requirements placed on quality by the global market. Some countries had to learn this lesson after their export products had been rejected by German or other European test centers.

After it became evident that especially the less developed countries have benefited by far less from the general trade liberalization of the former GATT rounds than the countries in transition and the industrialized countries and that also the current Development Round in the WTO will probably not overcome this asymmetry, the developed WTO member countries have agreed to promote the trade capacities of the poorer countries – and of the least developed countries (LDCs) in particular – by a comprehensive programme. An essential element of the Aid-for-Trade Package is technical cooperation – with the focus on improving the quality infrastructure – and it is here that PTB’s expert knowledge is sought after.

# Trade Policy and Trade Promotion in Development Cooperation – a Critical Review and Outlook

Regine Qualmann

## 1. Changed framework conditions of the world economy

During the global financial and economic crisis of 2008/09, the worldwide intertwinement of the trade and cash flows – as well as their mutual dependence – became apparent as if under a magnifying glass. The nose-diving demand and the temporal failure of credit financing have also affected those development countries whose banks had no discernible links with the North-American and European crisis centers. Thanks to the active stimulation of the economic activities in some OECD countries and a support of the national demand in the large countries in transition – in particular China – world trade has recovered surprisingly fast and has, on its part, contributed to improved trade data in most countries – among them, also in Germany. Trade was an important transmission belt for both the faster propagation and the speedy recovery as, within the global production chains, parts of a product frequently cross borders several times. This system is extremely fast, but it has also become very accident-sensitive.

In addition, the crisis has contributed to a further displacement of the global economic dynamics – from the industrialized countries to the emerging countries in transition – in particular towards Asia. For several years, China has experienced a rapid growth of its trade and cash flows, and the South-South trade – into which, above all, the Asian countries are integrated – meanwhile makes up one third of world trade. For this year's "Asian Development Outlook" of the Asian Development Bank, the crisis even signals the turning point for a general change of direction of the trade flows towards an intensified South-South trade. But even if this tendency bears a great potential for development, it does not necessarily mean that this trade will really contribute to sustainable development.

To get a better share in world trade, the developing countries have to fulfill a large number of prerequisites. Therefore, many countries find it difficult to get past the role of a mere supplier of raw materials. As soon as they assume more



Handling of cargo in the fruit terminal of the Port of Hamburg

demanding tasks – such as the further processing of their raw materials – the requirements placed on the technical quality of their products increase. Standards and technical regulations thereby often act as barriers to trade, even if such barriers have not been intended. The quality requirements placed by the customers and the conditions which the different countries lay down in order to protect their citizens often become hurdles for the developing countries which they cannot overcome by themselves.

Trade-focused development cooperation takes these global tendencies and shiftings into account. Hereby, it must also take German interests into account – as far as these are affected by these tendencies and shiftings. Open and well-functioning markets surely are part of this, but the superior objectives are poverty reduction and sustainable development in accordance with the millennium development goals. This article will highlight the development-political importance trade has for a development under the changed framework conditions of the world economy and it will show the challenges which result from these changed conditions for the developing countries and for trade-focused development cooperation.

## 2. The development-political importance of trade

Today, many of the previous discussions on comparative advantages in world trade and the free trade paradigm based on them seem out of date. Although open markets still lead to gains in

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Globalized commodity flows require international interaction



efficiency and an increase in welfare, the cause-effect relation is much more complex in a globalized economy than is described in the economic schoolbooks. In addition, newer theories turn their attention more to the fact that the gains in efficiency are often not distributed uniformly between countries, sectors and the single groups of the population which may emerge in the case of a market opening.<sup>1</sup>

For the short-term distribution effects – which occur, for example, after a tariff reduction or after an improvement of market access in third countries – but also for a long-term effect with a broad impact, it is important to know how strongly the production and consumption in one's own country are affected, which population groups are working in the relevant branches, which qualification they have and how flexible they could possibly react to new potentials and employment opportunities. For conceiving and supporting a trade opening, there is much leeway – e.g. incentives to invest in specific branches, extending the infrastructure for consultancy services for enterprises which penetrate into more significant market segments or which want to achieve a greater processing depth, or qualifying especially women or disadvantaged groups of the population for new job profiles. Here, external trade is an incentive and a catalyst for the development of economic dynamics, especially in small countries.

In many developing countries, the national strategies for a development are not systematically linked to trade policy and in the past, the development cooperation, too, did not draw enough attention to this point. In particular the first generation of the strategies for poverty reduction in Africa (*Poverty Reduction Strategies*, PRS) has largely ignored the question of the sources for economic growth and its sustainable financing. Also, for a long time, good empirical analyses of the impact

channels of trade-political measures were missing and trade economists fell short of providing proof of poverty-reducing effects for individual economies. Meanwhile, the transmission channels of trade measures are, however, very well documented and political consequences can be better assessed, e.g. with the aid of the *Poverty Impact Assessments* (PIA) developed by the OECD.

As has been shown at the beginning of this article, world trade today is increasingly characterized by the outsourcing of partial processes of the production and of services to various countries – especially to a group of advanced development countries in Asia. The term “Factory Asia” is therefore a good expression for this new type of industrial division of labor. Today, trade (including the commodity flows between the Asian countries) has developed into *intra*-industrial trade, i.e. trade which takes place within the same sectors and product groups. Within this type of trade, a specialization in certain process steps takes place which takes advantage of the wage level and the technical skills of a country and which changes in the course of time. It can be assumed that this kind of so-called “specialization” (which is called “vertical specialization”) will increase even further in world trade in the future.

Some developing countries have been able to benefit from this development and have attained high economic growth and an increase in productivity, although poverty has not yet been overcome. Also, questions as to how broad the impact of this will be and in which way ecological sustainability of this growth model can be ensured, will have to be posed time and again. Many other developing countries, however – among them most of the less developed countries in the world and, in particular, the African developing countries – do not have a share in these dynamic processes. Obviously, trade preferences have hardly contributed to the

<sup>1</sup> Cf. Winters (2000).

objective of these countries overcoming the dependence on just a few – mostly unprocessed – agrarian exports and mineral exports. Many further prerequisites for developing dynamic competitive advantages are lacking. The international Development Cooperation can make some important contributions to this field, however, using trade much more than before as a motor of development.

An important element for this is, for example, the setting up of a national quality infrastructure system (composed of metrology, standardization and testing as well as accreditation, quality management and conformity assessment) which is internationally recognized at every level. Here, there is a need for tailor-made solutions which will enable also the small countries to finance these systems in the long run. What is also important is to develop the capabilities of the technical institutions and of the corporate economy, in order to make it possible for the developing countries to participate in the international dialogue. It is, for example, important for them to be represented in standardization committees – in order to be able to raise a voice for the developing countries when it comes to drawing up technical standards for trade, or to impede measures that might distort trade. PTB is one of the worldwide leading institutions in the field of metrology and is explicitly commissioned by the German Government to support the setting up of quality infrastructures in developing countries. This gives it a special status worldwide.

In view of the importance of trade for reaching the 8 Millennium Development Goals (MDGs) of the United Nations, it makes sense to concentrate on MDG 8 – i.e. the establishment of a global development partnership – in the first place, although the targets specified originally by MDG 8 remain very indistinct. Among other things, they stipulated to “develop further an open, rule-based, predictable, non-discriminatory trading and financial system”.<sup>2</sup> The Millennium Declaration was, however, clearly focused on achieving a reduction in poverty by an increased promotion of the social sectors – and not of the productive ones. The importance of economic growth at a broad level as a prerequisite for reducing absolute poverty (MDG 1) and for dividing gains more equally between the genders (MDG 3) was, however, not highlighted in the first place.

The Monterrey Consensus of 2002 has made the MDG 8 more precise and emphasized the role of trade and investments as the motor for development. In addition to duty-free and rate-free market access, the less developed countries were also promised – by the G7 countries – a considerable increase in public development funds used for trade promotion (ODA). The second generation of PRSPs turned its attention more strongly again to the aspects of economic growth and its framework

conditions. An initiative of multilateral organizations tried – by means of the so-called *Integrated Framework* – to achieve a better coordination of the donor contributions in the field of trade-related measures and to embed the subject of trade more strongly in the national development strategies. The implementation of this, however, took place very hesitantly<sup>3</sup>.

### 3. The untermiated Doha Round and the Aid for Trade Initiative of the WTO

The task of the World Trade Organization (WTO) – which was founded in 1995 – is to monitor the compliance with the agreements and with the rules of world trade, whose further development is being negotiated by the Member States within the scope of multilateral trade rounds. In multilateral negotiation rounds, specific subjects for negotiation – such as agricultural trade subventions, technical barriers to trade, and health standards – are dealt with. In contrast to its predecessor – the *General Agreement on Tariffs and Trade* (GATT – which was less institutionalized) – the WTO has also included such political matters into the negotiations which – in addition to market access – strongly affect national regulation, for example, when it comes to the trading with services or to the protection of intellectual property rights (*Trade-Related Intellectual Property Rights*, TRIPS). In the course of the current trade round, the Doha Round<sup>4</sup>, the industrialized countries have tabled additional subjects for negotiation – e.g. public purchasing management as well as trade facilitations in view of customs clearance and logistics. This concerns a number of “*behind-the-border*” matters of market opening – a thorn in the flesh of many developing countries which consider this as a strong restriction of their leeway in setting up their own national development strategies.

Multilateral trade rounds in GATT – and now in the WTO – have become more tenacious and difficult, which has also something to do with the increased number of Member States and an overloading of the agenda. But another reason for this is, in particular, the lacking willingness of the USA and the EU – on the one side – to reach agreements, and of a number of countries in transition on the other side. When it comes to the issues of “market access” and “cutting back on subventions”, they block. Many experts now fear that – after ten years – the Doha Round will definitely fail. In any case, a conclusion of the round is still not in sight. This is especially disastrous as the negotiations have been conceived as a “package solution”, i.e. as a so-called *single undertaking*, which means: “Nothing has been agreed upon until everything has been agreed upon”. This means that a number of the intermediate results that have already been

<sup>2</sup> But at least, it was stipulated – with regard to the disputed „Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)“ – to „make indispensable medicaments available at affordable costs in developing countries in cooperation with the pharmaceutical enterprises“. The situation was mitigated only by the exceptional rules which were negotiated for developing countries at a later stage. See: BMZ (2010).

<sup>3</sup> Cf. Kaushik (2010).

<sup>4</sup> The trade round is named after the capital of the emirate Qatar, where the round started against the background of the events of September 11 in the year 2001. It was raised to the status of a „development round“ and was to take into account, in particular, the interests of the developing countries, among others by cutting back on agricultural subventions in the industrialized countries.



achieved do not become binding, or that they will not be implemented at all – or only incompletely – by the respective governments. At least though, important exceptional rules have been approved for developing countries within the scope of the TRIPS Agreement to ensure the provision with cost-favorable essential medicaments by compulsory licenses for generic imports or for local manufacturers, even if the originals are still protected by patent law.

Parallel to the increasing disillusionment about the course of the multilateral negotiations, the interest in concluding regional agreements and free trade agreements between the different blocks increased worldwide<sup>5</sup>, particularly on the part of the non-LDCs among the developing countries which hope to get an improved market access this way. A risk is, however, that the WTO conformity decreasingly serves as a frame of reference and that a proliferation of specific agreements and standards could ultimately rather impede world trade than promote it. Especially those developing countries which are weak in negotiations are partly not able to make a sufficient analysis of their own interests and to strike a balance between the advantages and the disadvantages of obligations they assume individually within the scope of such bilateral or regional agreements.

A prominent protectionist of such interregional trade agreements is the EU – despite its declared support of multilateralism. While the EU conceded – already in 2001, by means of the *Everything But Arms* (EBA) initiative – unilateral tariff-free and rate-free market access to the (at that time) 49 LDCs, it is negotiating further bilateral trade agreements with several development regions (especially known among these agreements are the *Economic Partnership Agreements* (EPA)) with the seven regional negotiation groups of the ACP states<sup>6</sup>). But these negotiations, too, have turned out to be very tedious and just as complex as the WTO negotiations. Besides, there is the problem that they additionally incriminate the negotiation capacities of the EU which are strongly stressed anyway. Up to now, only one regional agreement has been signed, i.e. with the group of the Caribbean states; in the case of all others, the result is still pending, although some interim agreements have been concluded with individual countries.

In 2006, a Task Force commissioned by the WTO Ministerial Conference came to the conclusion that if “fair” participation of the developing countries in global trade is to be achieved, much more has to be done – both in respect of quality and in respect of quantity – and that this has to be done in addition to a successful conclusion of the WTO negotiations, not as a complement to these. For the operationalization of the Aid for Trade (AfT) initiative which had been founded in

this way, the Task Force recommended that the industrialized countries should provide more aid for trade and that this aid should be more predictable. Furthermore, this aid should be better coordinated, and it should also be used to overcome bottlenecks in the supply of products in the developing countries. The aid should be geared to specific needs, and priorities should be set. In its Aid for Trade Strategy of 2007<sup>7</sup>, the EU commits itself to spending at least 2 billion euros every year on AfT (one billion from the Commission and one from the Member States) starting in 2010.

Thus, an important step has been taken for the recognition of trade as a central factor for growth and development. In view of stagnating ODA numbers it is, however, doubtful that additional resources have been mobilized.<sup>8</sup> What is clear is that Aid for Trade cannot replace good national trade strategies and policies.

#### 4. Trade-related Development Cooperation of Germany

Today, Germany is one of the most important donors in trade-related development cooperation. Due to its own economic success, it has – for many countries – the function of a role model in the field of trade. In addition, the German government is an important stakeholder in international trade policy and contributes significantly to its conception – be it within the EU or via the common trade policy of the EU. As a country which has only few raw materials of its own, and due to the fact that it depends highly on exports, Germany has a great interest in the existence of well-functioning and growing global markets. In individual cases, this can bring about conflicting interests between trade and the pursuit of development policy, but in general, the commitment to open the market for developing countries and to support them, at the same time, in developing the ability to participate in trade, is high.

This is why the promotion of trade has, for many years, been an inherent part of the German Development Cooperation, in particular of the Technical Cooperation (TC). The consultancy approaches at the intermediate (or the so-called “meso”) level usually began with the chambers and other institutions that promote the private economy, and they were aimed at strengthening the competitiveness of the economy in general. Often, however, they had no specific relation to trade.<sup>9</sup> An exception to this was PTB’s supporting of the developing countries by the setting up of a quality infrastructure in order to reduce or prevent technical barriers to trade.

Thanks to the international AfT initiative, the subject of “trade” also got new impetus in the German Development Cooperation<sup>10</sup>. The central

5 Cf. Hoekman/Vines (2007)

6 ACP stands for Africa, Caribbean and Pacific and comprises a group of 78 countries – former colonies of European countries – with which the EU has maintained preferential trade relations since they became independent. The unilateral preferences for non-LDCs in this group are regarded as not being in compliance with the WTO because they discriminate against other developing countries. See also the article of B. Hofmann in this brochure.

7 Cf. Council of the European Union (2007).

8 Cf. OECD (2009).

9 Cf. Bähr (2004).

10 Cf. BMZ (2009).

reference frame for the implementation is the joint EU AfT, in which the EU and its Member States commit themselves to a series of qualitative and quantitative objectives. Germany will spend a share of at least € 220 million a year for AfT. This amount will not comprise any measures of infrastructure or any general budget aids, but it will be spent especially on establishing expert knowledge in the fields of trade and commerce, in particular in public and intermediate organizations and institutions. The measures are – within the scope of “Financial Cooperation – implemented via the KfW and the DEG and – within the scope of “Technical Cooperation” – by the GIZ and PTB as these are the executive agencies in this field. Supporting developing countries in the setting up of a systemic quality assurance system is a special feature of the German trade-related Development Cooperation. Thanks to its special status and mandate and to its core competence, PTB is in a position to offer the rendering of direct technical consultancy, to act as a direct mediator for the integration of a country into international structures, and to guarantee the transfer of knowledge.

In order to ensure that the liberalization of trade and the development of trade capacities will have a positive impact on the fight against poverty – and that this will guarantee sustainable development – the BMZ gears its AfT approach to the target idea of ecological, social and economic sustainability. By means of the projects, the partners are assisted in taking on responsibility of their own. Besides this, the stakeholders get involved in a broad field of issues, including gender matters. This can be achieved, for example, by intensifying the public-private dialogue on national and regional trade and on development strategies. Another possibility is to enter into “strategic alliances” with the economy – with the aim of achieving *Corporate Social Responsibility* (CSR) – and to launch initiatives for the application of voluntary standards.

Special experience has been gained in the field of Capacity Development. Capacity Development is aimed at creating an environment which is favorable to exports and at developing suitable enterprise services. When it comes to setting up a quality infrastructure, PTB and GIZ often complement each other (example: Ethiopia), and also when it comes to supporting important institutions and multipliers along value chains.

Also at the regional (intergovernmental) level, there are an increasing number of BMZ programs for promoting economic integration and cooperation. These achieve excellent results, for example when it comes to removing non-tariff barriers to trade and giving the private sector and civil society a share in drawing up specific policies. In the growing South-South trade, barriers to trade often take the form of insufficiently defined or



Retail trade in South America

insufficiently harmonized standards, rules and regulations. On the whole, the question arises as to how the environmental and social standards that are essential for sustainable development can be better incorporated into the South-South trade. Here, rendering advice to regional trade organizations on how to reduce barriers to trade and how to develop efficient single markets is an important starting point of the German Development Cooperation. Here, too, PTB renders consultancy on how to set up QI institutions and structures and how to introduce harmonized standards (example: SADC in Southern Africa, East African Community (EAC), Caribbean Development Association (CARICOM)).

## 5. Conclusions and Outlook

In the debate on development policy, trade policy and the promotion of trade have strongly gained in importance again lately. For a better incorporation of the German Development Cooperation, the international Aid for Trade initiative has given the decisive impetus. As a successful exporting nation, Germany is a trustworthy and much-demanded donor within the scope of trade-related Development Cooperation without having to neglect its own interests. On the contrary: The German commitment in trade-related Development Cooperation assists its trading partners in becoming more strongly and better involved in global trade. It is only in this way that markets can be kept open and remain functioning long-term. The aim of the WTO's Doha Round was to create an improved framework for this; so far, this has – unfortunately – not been the case yet.

Today, trade is increasingly effected via production chains around the globe. This is a new challenge the developing countries have to cope with. In the industrialized countries, the consumers'

demand for high-quality products having been produced according to standards of social sustainability is constantly increasing. The high requirements being placed on the safety and quality of products and the high hygiene regulations can easily become barriers to trade for developing countries and they need support to be able to comply with these. Already now, an increasing part of trade evolves in regional trade blocks; the share of the South-South trade is constantly increasing. The economic relations are becoming increasingly complex and intertwined and the necessity of advantageous framework conditions and an adequate business environment are growing. Thereby, the requirements placed on QI are particularly high: In the fields of resource management, product safety, food safety and health, it contributes directly to sustainable development.

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# Capacity Building and Entrepreneurship Made in Latin America

**Leopoldo Colombo**

Latin America is a geographical area experiencing significant changes in the last years. Various countries of the region are managing to keep medium and high stable economic growth, including control of the inflation and strong tendency to become integrated into the international trade.

In this context Quara was founded in 2005 to provide consulting and conformity assessment services. We started with offices in Argentina and expanded towards the Central American region by setting up offices in the Republic of Honduras to address the needs of this region.

The Latin American region is showing a significant rate of growth for services in the sector of conformity assessment. The national quality infrastructure of several countries of the region evolved significantly in the last decade. PTB played an important role in this achievement creating the conditions for and the availability of domestic or regional technical services necessary for SME to improve their access to certification, accreditation and inspection at competitive prices. Our company could successfully take a position in this value chain.

The market of most of the developed economies, like Argentina, Brazil, Chile, Colombia and Mexico is very competitive and the demand for services is diversified. In less developed economies, the demand is strongly focused on products aimed to improve competitiveness and the implementation of quality management systems according to the ISO 9001 standard.

This phenomenon is particularly true in thousands of SMEs, created and developed in recent years as a consequence of the mentioned growth. These enterprises are looking for a long-term sustainability and show an increasing demand for consultancy services, certification, accreditation and training.

International projects with external funding have helped SMEs; facilitators as intermediate NGOs and conformity assessment bodies are strengthening their quality systems, increasing the awareness on the importance of conformity assessment matters for developing sustainable growth. Quara has participated in several interna-



tional projects together with other organizations. Especially our partnership with DGQ in several projects gave us the chance to train almost 300 Latin-American professionals in quality management and to contribute to the improvement of the national QI of those countries.

Consultancy and training in quality management and conformity assessment matters for instance in projects managed by PTB in Latin American and Caribbean countries increase the awareness of intermediary organizations responsible for standardization and conformity assessment issues. However, a critical point in the region remains that SMEs and intermediary organizations sometimes consider standards as a threat – a barrier to trade – and not as a competitive advantage that is worth to invest in. International and national organizations should work together in this field to change this perspective. As we could experience in our relationship with projects and activities of PTB in Paraguay and Colombia and others, the task to reduce technical barriers to trade and the improvement of the national quality infrastructure is essential.

The guidance and coaching that a cooperation agency as PTB can provide may lead to a more effective collaboration between the public and the private sector, it can stimulate the scope as well as the demand of quality services. Of course, the benefit for all participating parties, local companies as well as a consulting firm like Quara, will be measured by some kind of added value that results

**Quality Assurance in the Peanut Production of an Agricultural Cooperative in Paraguay**

Leopoldo Colombo,  
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Consulting and  
Training

from strengthening the local capacity to respond better to the market demands.

However, besides the mainstreaming of quality management that accompanies the growing dynamics of Latin America, a consulting company like ours, faces significant challenges with the introduction of new communication and IT tools, new technologies and products that determine future markets. Fields like food safety, biomedical devices, climate change, social responsibility and risk management will surely be significant trends.

Those organizations that are already integrated into the global market or belong to highly regulated industries, or those who are emerging in the Latin American context as “Multi-Latinas”, require more sophisticated products in order to improve their competitiveness and compliance with environmental, health and safety regulations. They rely more on the proved image of social responsibility, they try to show transparency about their impact on climate change, their efficient use of energy. They run business continuity plans and manage innovation as a key process in the company, both

understood as common market requirements. However, these are requirements still difficult to handle for the SMEs and/or even restricting them because of the related investments and changes.

Hence, the governmental support, the alliance between private and public sectors and the international donor organizations can create and contribute with important incentives to put the huge SME sectors in conditions to compete better on the regional and global platforms of commerce. Of course, this would include those who are locally based and familiar with the idiosyncrasy and play an intermediate role as facilitators of knowledge and quality services. That is where our own consulting agency belongs to and where we feel part of the growing tendencies of the markets of the Latin American continent.

We would like to express our gratefulness to be part of initiatives that are aimed to support the development and cooperate with PTB who is an overall competent, innovative and transparent partner.

All the best for its 125<sup>th</sup> birthday.

Figure taken from  
"The answer to the  
global quality  
challenge: A national  
quality infrastructure"  
Dr. Clemens Sanetra,  
Rocío M. Marbán



# Calidena – Quality Improvement and Value Chains

Ulrich Harnes-Liedtke, Helmuth Bublatzky, Beatriz Paniagua Valverde

## Initial Situation

In how far is a quality infrastructure (QI) really efficient? This can be assessed when we look at the benefits it brings about for the local enterprises and consumers. The challenge of promoting the setting-up of a QI system in developing countries is to identify and live up to the needs of the – only poorly formalized – sector of the small- and medium-sized enterprises (SMEs). The quality systems of large, export-oriented enterprises often stand out as isolated solutions which, in individual cases, may grant access to a market. On the other hand large parts of marginal economies are not involved in the development of a quality system. The setting-up and development of QI services therefore require collective forms of addressing the SMEs and compliance with their needs.

One form of addressing customers collectively is to work with so-called “value chains (VCs)”. A value chain analysis involves following a product through its different conversion steps. It sees the transformation process as a chain of different phases, with each phase involving different actors, regulations and customer demands. For the development of a QI system, this approach offers the advantage that a relevant number of enterprises of different sizes are involved and addressed. The analysis of the VC covers both the regulatory

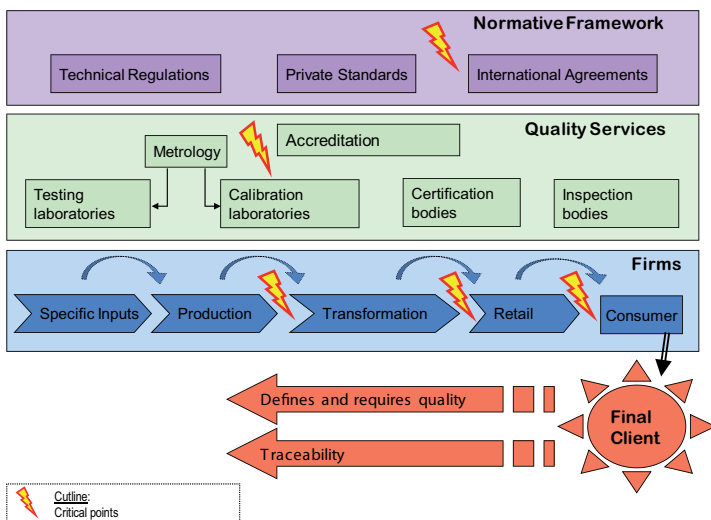


Toys certified by the Brazilian INMETRO in a German supermarket

framework (by which the conditions for an added value are laid down) and the interfaces between the different enterprises. For an efficient functioning of these interfaces, it is important that quality standards are being complied with. In turn, the enterprises involved benefit from improved access to and the availability of quality services which allow them to improve their competitiveness.

## The Didactic VC Approach of PTB: Calidena

In development cooperation, the number of programs working with the VC approach (e.g. ValueLinks of the GIZ) is constantly increasing.



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Consultant, Partner of the consultancy firm Mesopartner

Dr. Helmuth Bublatzky  
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Beatrice Paniagua Valverde  
Consultant, former Director of LACOMET, Mesopartner associate, Costa Rica

This is because value chains offers increased scale, and interventions can be designed to be more systemic. With Calidena<sup>1</sup>, PTB has a method of its own which concentrates on questions of product and process quality within a value chain. Calidena makes it possible to use the technical excellence of PTB, and it also complements other approaches dealing with the analysis and promotion of VC.

By bringing the parties involved in a selected value chain as well as the representatives of the supporting institutions or processes together, Calidena promotes the development of a QI system which is tailored to the needs of the developing countries. After an awareness-raising phase, the QI institutions formulate their objectives in the respective sector, the participants draw up (in a workshop of 2 ½ days) a mapping of their VC, they analyze quality requirements – in particular those of customers and of potential target markets – as well as the required service offer of the QI, and they identify the concrete need for action. This will be reflected in a common working plan which will be updated and continued by a follow-up committee which is composed of representatives of the VC and the QI.

A necessary prerequisite for improving the interaction between supply and demand is to raise the awareness of the representatives of the enterprises for the possibilities which open up when using quality services. In various cases, the participants pointed out measures to improve the demand for QI services or to adapt the supply to the concrete

needs (in particular of the SMEs involved) already in the first workshop.

The implementation of the action plans raises their motivation of the parties involved. Their further cooperation depends on the benefit all parties involved get from such a cooperation. Often the process which has been launched by Calidena gains positive dynamics of its own and the results and impacts achieved by this exceed by far the small focus that – initially – had been concentrated on QI only.

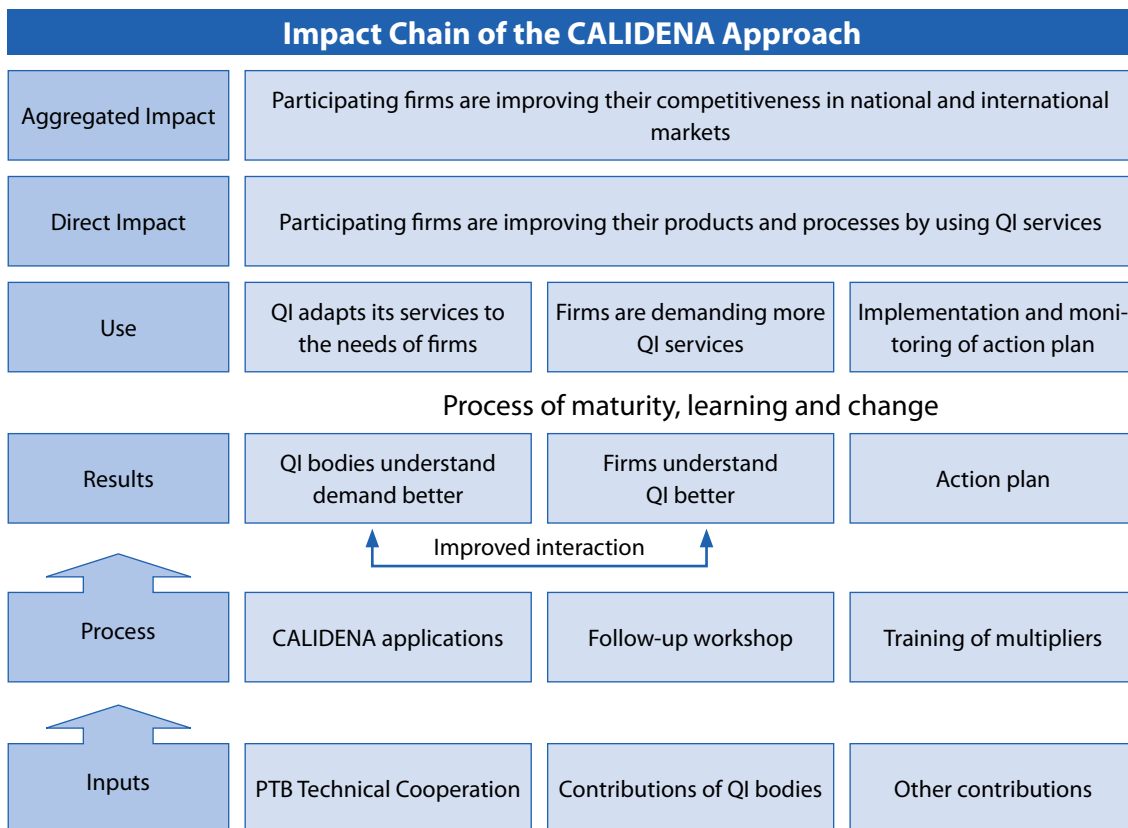
The activities which have been agreed upon in the action plan are intended, in the first place, to make fast progress in the field of QI visible. The participants are encouraged by these results to remain involved in the process and to tackle increasingly ambitious projects. The improvement of products and processes is a result of the continuous interaction between the enterprises involved and the supporting services of the technical institutions. Calidena turns this interaction into a systemic approach which – ultimately – contributes to an increase in competitiveness.

A study originating from the end of 2010 and dealing with the systematization of the experience gained describes the Calidena impact chain as follows:

The Calidena method has been applied since 2007 in Central America and since 2010 also in the Andes region (see survey).

PTB used the year 2009 for drawing up the Calidena Guide which is now available in Spanish and

<sup>1</sup> Calidena is an artificial word and is composed of the Spanish terms for quality (in Spanish: *calidad*) and value chain (in Spanish: *cadena de valor*)



Year	Country	Value chain
2007	Nicaragua	Organic cocoa
2008	Costa Rica	Fruit processing, mould construction
	Nicaragua	Wood and furniture
	Guatemala	Fruit processing
2009	Drawing-up of the Calidena Guide	
2010	Colombia	Cocoa and chocolate
	Nicaragua	Milk products in the Siuna region
	Ecuador	Organic coffee
	Peru	Cocoa and chocolate
	Bolivia	Hearts of palm
2011	Honduras	Beef

Survey: Application of Calidena in Latin America 2007–2010

English. On the basis of this guide, fifteen multipliers have been trained.

Up to now, the Calidena activities have been significantly supported by PTB. Additional contributions have been made by the QI institutions, the associations and enterprises of the VC involved as well as by national ministries and programs for the promotion of VC. Supranational, regional institutions such as the Andean Community CAN and the Central-American Economic Community SIECA are supporting corresponding initiatives.

## Outlook

The VC approach is recommended as an instrument to raise the customers' awareness for QI services. The initial experience gained with Calidena shows new ways of how national and regional quality systems can be further developed in a form based on the principle of participation. The experience gained from PTB projects in Latin America can also be interesting for projects on other continents and/or of other donors.

By raising the awareness for the possibilities of using QI services – in particular for SMEs – new

markets open up to enterprises. The QI institutions also benefit from this, as they can gear their services even better to the specific needs of the SMEs and of other enterprises involved in a VC.

However, the assessment of this initial experience also makes clear that the mere execution of a Calidena workshop does not automatically lead to an improvement in the QI services. An important criterion for success is the intensive preparation and suitable selection of value chains. When selecting a certain value chain, important parties involved in this chain should already have shown that they are interested in a stronger orientation towards quality and that they are willing to open up new market opportunities.

Of equal importance are the follow-up measures which are carried out after the analyzing workshop has taken place and due to which PTB's projects as well as the special promotion approaches of the technical QI institutions and the international recognition capability of their services are to have a lasting effect. For these follow-up measures, continuity must be given and the respective resources must be made available. These things will also be contributed by the Technical Cooperation of PTB.



## Organic Certification Strengthens Armenia's Compliance with Quality Criteria of Foreign Markets

Nune Darbinyan



Armenian honey, certified organic

In current socio-economic conditions the organic production and bio-labeled products from Armenia have promising opportunities locally and internationally. One of the important elements of organic markets is conformity assessment of organic production throughout the value chain from “farm to fork”. To respond to this requirement and to promote organic production in Armenia, the organic certification body ECOGLOBE LLC has been established in 2002.

The company is the current market leader in organic certification in Armenia and in broad regions of Eastern Europe, Caucasus and Central Asia (EECCA). The availability of professional organic conformity assessment became one of the central arguments for the development of the organic sector in Armenia. In order to facilitate the access to the “organic” and “bio” markets, ECOGLOBE applied for accreditation by former DAP and is accredited since 2009 by the German accreditation body DAkkS and since 2009 by the USDA National Organic Program (NOP).

It was significant that the company has been established under the transitional socio-economic conditions in Armenia, when the authorities gave no importance to internationally competitive conformity assessment and quality infrastructures in place. Although national systems had been existing, the know-how and qualification remained relatively poor, limited and non-competitive in the markets.

Nowadays, the national policy is moving towards reformation of the quality infrastructure in Armenia and targets integration in the global markets. The WTO membership of Armenia obligates the country as well to invest in internationally harmonized systems. The national legislation, accreditation arrangements, certification and testing schemes were studied with the donor support within the framework of international cooperation: the German PTB, the EU advisory group and others. Development of professional skills and capacities for all components of quality infrastructure was considered one of the overall requirements for reform processes. In 2009, it was significant for ECOGLOBE to cooperate with PTB and World Bank in a study that focused on the identification of existing capacities and needs, strengths and weaknesses.

Giving importance to education and know-how, ECOGLOBE conducts a regular training program for its own staff and creates a potential of professionals who may serve to the growing organic sector as well as to provide trainings to others upon their request and needs. Considering the dynamic developments of international markets, ECOGLOBE responds to changes and in order to promote growth and stability, seeks for collaboration with agencies that are ready to support the “young” certification system that promotes the “Green Caucasus” trademark and attends the capacity building needs in the different value chains. Recent collaborators of ECOGLOBE were USAID, UMCOR, WB, FAO, GIZ, UNEP, GROLINK and others, who support market and agriculture oriented projects in Armenia and elsewhere. They all share the goal to increase the competitiveness in conformity assessment matters that are based on a working quality infrastructure.

From a market perspective all operators benefit from organic services and may get access to the EU, USA, Canada and other markets. A certification scheme has not only the mission to facilitate trade integration, but also enables the articulation of the national regional identity. To fulfill this task, producers and traders are allowed to use the certifier’s registered trade mark “Green Caucasus”,

which is recognized by the accreditation body DAKKS.

ECOGLOBE LLC as a regional player allied with the Georgian partner Caucascert LLC. To harmonize the rules and to promote the region as a whole, both companies apply the same quality system and certification scheme, as well as the common regional standard and trade mark "Green Caucasus". This successful initiative in Caucasus has been supported by several agencies that recognize the importance of regional cooperation – the two Swiss organizations Development and Cooperation/SDC and HEKS-EPER, the German GIZ, the US Department of Agriculture/USDA and the Avalon Foundation of the Netherlands. Regional partners share liabilities, link the private sectors of both countries and are active players in the process of quality infrastructure reforms in Armenia and Georgia.

Further on, it is expected to touch the whole quality infrastructure, including calibrated measuring tools, testing labs, certification bodies and the qualified accreditation capacities – all to establish professional, affordable and trustable structures. ECOGLOBE understands the success of reformation as directly related to the existing parts of educated and demanding consumers, represented by influential and strong civil society organizations with a strong advocacy, with consistent national strategies and sufficient financial and technical resources. Broad capacity building programs are considered a transversal task all over the quality infrastructure.

However, the whole process requires up to 10 years. To facilitate the access to the markets for its clients, ECOGLOBE plans to continue its development. The company takes the lead and works with stakeholders to make the organic sector a part of the national agenda. The EU organic legislation and Codex Alimentarius (FAO/WHO) formed the

baseline for a law on Organic Agriculture, which entered into force in 2009. By-laws of the law are in process of discussion and approval by the Government.

The organic production in Armenia has proven its potential for growth in particular sectors and may contribute to the country's sustainability. In the meantime the reformation of quality infrastructure is important for the removal of barriers and for the creation of a culture of transparency and trust among the countries. Without doubt there is a strong need of trained and dynamic professionals, in official institutions as well as in the private sector, who are prepared and ready for sustainable development. Taking into account the current economic situation of Armenia, the distance to the markets, the still existing gaps of experience and the lack of investments, there is a strong belief that all the ambitious goals and reforms will come true with the support of the international community and their donor agencies, combined with the strong political will of the government of Armenia and related national investment. ECOGLOBE considers itself as a facilitator of reforms, as a practitioner who works in risky environment of competition and strictly demanding markets. To save this young but qualified business branch from counterproductive struggles, ECOGLOBE continuously raises resources for its sustainability and cooperates with donors.

The products currently certified by ECOGLOBE are crossing already borders of EU, USA, Canada and other countries. They find their unique place on the food store shelves and tell the story of their origin to the "bio" food consumers. The organic products, standing for the implementation of a specified quality system, also tend to bring up a new generation of consumers in Armenia who are more conscious about the sense of quality.

## Good Food – Worldwide

**Jochen Neuendorff**

Standards for food safety and sustainability increasingly gain in importance. In how far does a well-functioning, effective quality infrastructure contribute to effective consumer protection?

Sanayh Kraokaw is a producer who exports to Europe. On three hectares of his farm in the Northern region of Thailand, he grows green asparagus which is exported to England – a special delicacy which gets onto the shelves of the supermarket in springtime. In the past few years, Sanayh Kraokaw had to learn that it is getting increasingly hard for him to sell his asparagus to Europe. His Thai wholesaler told him that because of the harmful effects flights have on the climate, there is a tendency among the European consumers to buy less fruit and vegetables that have been transported by airplane. Furthermore, there are consumer protection organizations in Europe which give the supermarkets a hard time because now and then, residues of pesticides which have long been forbidden in Europe are found in Thai asparagus. The English supermarkets therefore stipulate that the new standards for food safety – such as GLOBALG.A.P. and BRC – have to be implemented also in Thailand.

### Food safety: GLOBALG.A.P.\*, BRC\* and Co.

With the increasing awareness of the consumers for safe, non-contaminated food, the necessity grew for the large trade chains in Europe to ensure that compliance with the food safety standards is already given at an early production stage. Food surveillance by the state was no longer considered effective enough since the results of samples of the food surveillance authorities are often not available until many months after contaminated fruit and vegetables have been sold. For this reason, the voluntary certification program GLOBALG.A.P. has been developed. Its aim is to guarantee compliance with good agricultural practices and with the food safety requirements at the farm level. Environmental and social standards are also taken into account. Compliance with this Business-to-Business standard (B2B) is checked by product certification bodies. These, on their part, are

monitored by technically competent accreditation bodies which have signed the corresponding IAF-MLA\*. Similar standards exist for food processing (e.g. BRC, IFS, ISO 22000).

Now, what does this all mean for Sanayh Kraokaw? To continue selling his asparagus, he needs a GLOBALG.A.P. certification. Otherwise, European importers will no longer buy his goods, and almost the same applies to the USA. Until 2009, the GLOBALG.A.P. standards were not available in the Thai language, and national interpretations and adaptations did not exist. This problem was solved by the Thai “National Technical Working Group” which was founded with the support of PTB. Today, specifications and “National Interpretation Guidelines” are available in Thai. In the neighboring country Vietnam, a local GLOBALG.A.P. certification body exists whose establishment had also been supported within the scope of the German technical cooperation. PTB also trained the regional organization Pacific Accreditation Council (PAC) – which also covers Thai accreditation bodies – for the qualification for the GLOBALG.A.P. standards.

### Specific quality attributes of foodstuff: Organic, Fair Trade, climate friendly

However, an ever increasing number of today’s consumers in the industrialized countries want not only “safe” food, but prefer sustainably produced



Farmer harvesting organic rice in Thailand

\* Global Good Agricultural Practise, private body organization and related standards

\* British Retail Consortium, leading trade association

\* Multilateral Recognition Agreement with the International Accreditation Forum

food which exhibits specific quality attributes that go beyond the legal standards, for example “organic”, “Fair Trade” or “climate friendly”. These consumers are prepared to pay higher prices for organic food and “fair trade” products. They are, however, very sensitive as far as the trustworthiness of such products is concerned.

For farmers in developing countries, the change to organic agriculture often opens up new possibilities as they use only few chemical-synthetic substances anyway and it is, therefore, not too difficult for them to do completely without them. Nevertheless, much effort has to be taken by them until sustainable organic farming has been established: The fertility of the soil must be built up, documents have to be drawn up and systems for group certification have to be created. To be able to sell the organic products on the European market, a certification is needed which must be in accordance with the legal regulations of the EU on organic farming.

In Thailand, organic rice has been very successfully cultivated in farmers cooperatives for many years. It is sold on the national market, but also exported to Europe. The certification is carried out by a local Thai certification body which guarantees that for small Thai producers, the costs for organic certification remain at reasonable limits.

With a new system for imports of organic products from third countries, the European Union

now wants to improve the market opportunities for such products in Europe. The organic certification bodies working in third countries are to be supervised by sufficiently qualified accreditation bodies. To ensure efficient consumer protection, PTB supports accreditation bodies in third countries in the establishment of the respective technical competence. For PAC, for example, a multi-stage training program has been conceived for assessors of accreditation bodies whose testing phase will be launched in 2011 and 2012. In future, interesting cultivation alternatives might arise from this for farmers like Sanayh Kraokaw.

## Outlook

Due to the globalization of the markets for agricultural products and foods, a well-functioning and internationally coordinated quality infrastructure will become increasingly important in the future. This means that PTB's Technical Cooperation, too, will have to face new challenges as the certification of food products will increasingly gain in importance. As the economies of developing countries are usually strongly based on agriculture, PTB will be able to contribute significantly – and with a broad impact – to an improvement of the living conditions of different classes of the population and guarantee – in addition – high-quality food to the consumers in Europe.

## “Blended Learning” – A Cooperation Between Institutions

Siglinde Kaiser



QuISP – this is the name of a blended learning course which has been designed jointly by PTB and DIN and which is implemented in cooperation with Inwent (since January 2011 one of the integrated parts of GIZ). From the all in all six modules which make up the E-learning part, DIN elaborated the modules “Fundamentals of Standardization”, “Benefits of Standardization” and “Conformity Assessment” and PTB contributed the modules “Technical Regulation”, “Quality Infrastructure” and “Trade”. The task was not only to compile the contents of the course, but also to bring it, in cooperation with specialists from the fields of methodology and didactics, into a form which is suitable for E-learning and to present it interactively. In addition, DIN ensures together with the other main parties involved that the participants will be supported during the whole learning process and that any impediments arising from the participants’ different levels of knowledge will be smoothed and reduced.

The course is, among others, targeted at those experts and executives in the trade ministries of the ACP countries who are actively involved in preparing and negotiating regional and international trade agreements and who for the successful execution of their activities should have knowledge

of the field of quality infrastructure – and especially of the significance of standards and technical regulations.

Especially within the scope of the still continuing process of negotiating the trade agreements (EPAs) between the EU and the ACP states, the developing countries are facing the challenge of having to put through symmetrical and compatible regulations also in the field of technical barriers to trade. To be able to take an active part in shaping the negotiations, it is indispensable for the negotiating partners to understand the interaction of standardization, market access, conformity assessment and deregulation.

The three modules prepared by DIN deal with the fundamental mechanisms of a well-functioning standardization and with its preconditions as a part of the quality infrastructure. Not only is it important for the standards to be applied properly and meaningfully, but the principles of their elaboration process must also be made transparent and public, as producers, associations and consumers will accept and apply the standards (as well as the specifications contained therein) in the first place if they have been involved in their elaboration and have had a share in this process.

One special module of the course was dedicated to the topic “Benefits of Standardization”. Although many of the participants had some basic knowledge of this subject, it turned out that this module – which dealt with the determination, classification and representation of these benefits – provided new information to them. In this regard, the participants of the course will be important multipliers in their home countries as it is of utmost importance that this knowledge be imparted when it comes to involving broad circles of the society and when standards are to be applied.

### Execution of the course

The blended learning course was conceived in the following way: It always starts with a one-week introductory to the training course where all the participants gather. On that occasion, they meet the technical experts from PTB and DIN involved

in the course and get to know each other. Furthermore, they are introduced to computer-based learning.

After this, a learning phase of approximately six months follows, in which the participants acquire their knowledge online. During that time they stay, however, in contact with each other via discussion fora and by means of "chats". Thanks to such "virtual meetings", an active exchange of experience becomes possible and allows the participants to stay in contact with each other during the whole E-learning phase. In addition to this, a close cooperation within the region is promoted. This is confirmed by Serge Richard Petit-Frère, who is an executive employee at a finance development company from Haiti and took part in the QuISP Caribbean course. Petit-Frère reports on the intention of the participants to keep up "a continuous network for exchanging information with each other, for example about the results of conferences or about new laws that will have an effect on our trade or standardization. We now have the possibility to harmonize our standardization approach within our region."

After the final online test has been successfully passed, the participants will be invited to a second training in Germany. In Braunschweig and Berlin, they will get to know PTB and DIN as well as other institutions working in the field of quality infrastructure. This insight into practice in Germany

as well as technical discussions with German colleagues will complete the blended learning experience.

Shanta Williams Cox, an employee at the Ministry of Trade of the Caribbean island of Grenada, explains why knowledge of the German or European practice is important for her work: "I have to know the import rules for the German market as well as for the whole European market. I have to know the European standardization process in order to be able to bring our products up to this standard. The E-learning workshop helped me to understand the standards and the standardization process much better. Before this course, we did not really know in detail how our products could be brought up to this standard."

Particularly pleasing is the fact that many participants want to pass their experience on to others: "It is important for us to impart our new knowledge to all the relevant institutions and SMEs in our countries. To help the SMEs, we must share our knowledge [...]. We have to act proactively. I think that developing our capacities in standardization will be a key to success." (S. R. Petit-Frère; all quotations to be found in: DIN-Mitteilungen, August 2010, pp. 116–118)

Up to now, QuISP has been performed successfully with participants from the Caribbean and from Africa. Further courses in cooperation with DIN are planned.

# EPAs: Economic Partnership Agreements between the ACP states and the EU – Development due to the Removal of Technical Barriers to Trade

**Birgit Hofmann, Alexis Valqui**

Since the end of the last Lomé Agreement at the end of the 90s, much effort has been made to find out how a trade regime between the ACP (= African, Caribbean, Pacific) states and the European Union should be set up if it really was to contribute to a sustainable development in these countries.

The solution lay in the negotiation of Economic Partnership Agreements (EPAs). EPAs are – by nature – free trade agreements according to article XXIV, GATT<sup>1</sup>. In contrast to the – hitherto existing – unilateral preferences of the EU vis-à-vis the ACP states, they envisage a reciprocal liberalization of the markets. Nevertheless, EPAs are not free trade agreements in the classical sense but instruments which are intended to contribute to a sustainable development and to fight poverty.

The decisive feature of the EPAs is the idea of coherence between trade policy and development policy. Whereas hitherto, both fields of policy have rather been treated separately, they are now, in the EPAs, to be combined. But what does this mean?

First of all, a regional approach – based on already existing integration initiatives of the ACP states – is chosen for the EPA negotiations. The intention of this is to launch economic dynamics in these regions which will facilitate the integra-

tion into the global market by means of goods of higher quality.

Secondly, the scope of possibilities offered by the WTO's rules is to be used to the maximum in order to be able to adapt the opening of the market on the part of the ACP countries to their needs. Whereas the EU opens its market completely and immediately, the ACP states will be in a position to exclude sensitive products from the market opening and to use, for all other products, long transition periods.

Thirdly, besides the classical trade with goods, also the trade with services is intended to be included, as well as trade-related issues such as laws on investments and competition. With these subjects, the framework conditions can be improved especially with a view to regional integration.

Fourthly, the implementation of the completed agreements is to be monitored and checked at regular intervals within the scope of a monitoring and review mechanism. This will allow the objectives of the EPAs and their impacts to be followed up.

Last but not least, the rendering of support within the scope of development policy is a central column of the entire EPA process because the mere opening of the market misses its purpose if the

production-, delivery- and trade capacities in the ACP states are not strengthened at the same time and if these countries are not supported in their reform efforts.

In which way this last-mentioned aspect is to be implemented concretely in the EPAs and in which way the idea of coherence can be considered

<sup>1</sup> General Agreement on Tariffs and Trade



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at the same time will be illustrated here in more detail, taking the technical barriers to trade as an example.

By the liberalization of trade within the scope of EPAs, it is intended to increase, in particular, the exports of products from ACP states, i.e. new products will find their way into the European markets but also into the ACP markets. Thereby, trade policy has often reacted – and still has to react – with the issuing of technical regulations. In this, it is legitimated – for example, when consumer protection is at stake. When doing so, trade policy should orient itself on international standards and keep track of complying with the WTO requirements – in particular with those of the *Agreement on Technical Barriers to Trade* (TBT Agreement). In this way, no additional technical barriers to trade will be established and existing, unnecessary technical barriers to trade will be removed.

The EPA monitoring and review mechanism mentioned above should also monitor and evaluate the existence and the development of technical barriers to trade within the respective ACP region itself as well as within the EU and also between the ACP region and the EU. This would certainly ensure that the impact which trade policies that are pursued by the EU or by the ACP states have on technical barriers to trade will be monitored and that corresponding adaptations can be made.

Besides the creation of a trade-political framework for the removal of technical barriers to trade it is also regarded as indispensable for the ACP countries to build up technical competence in the fields of quality infrastructure (QI) and conformity assessment. Only in this way will products from ACP states meet the quality requirements of the target markets and be able to furnish the respective proof. Therefore, funds for the establishment of the quality infrastructure in the ACP regions have been provided in the European Development Fund (EDF). In addition, and making use of the comparative advantage of PTB as an officially commissioned Development Cooperation Executing Agency, Germany has launched several PTB projects for the establishment or strengthening of the QI in Africa and in the Caribbean. These projects, which promote the regional cooperation and integration in the QI range, support the EDF programs in a complementary way.

In this way, the EPAs guarantee the ACP states not only complete access to the markets of the EU, but they can enable these countries also to overcome technical barriers to trade, to protect their own consumers and, thus, to make use - in an effective and sustainable way – of development opportunities from an increased intraregional and interregional trade.





# Climate, Energy and the Environment

Jürgen Wiemann

Only the worst environmental damage can be detected with the naked eye or with an untrained nose. Environmental pollution which can hardly be detected with the human sensory organs can be determined only by means of more or less sophisticated technical measuring instruments and chemical analyses. Radioactivity, for example, is not perceptible at all. It can only be measured using a Geiger counter. Prognoses of future environmental risks – such as climate change – are based on scientific models. These are fed with data from the global network of measuring stations which collect weather data and data about sea temperatures and sea currents. From the climate models, limiting values for the maximum permissible emissions of greenhouse gases are derived whose observance, again, requires highly developed measurement procedures and techniques. The trustworthiness of scientific recommendations given to governments, industry or every individual citizen in order to parry future dangers and disasters depends – not least – on the precision of the measurements.

Global environmental challenges – such as climate change – can only be coped with if the newly industrializing countries and the developing countries assume responsibility (within the scope of global environmental agreements and environmental policy) for their share in causing environmental damage. A prerequisite for their active cooperation is an efficient quality infrastructure. In this respect, technical cooperation for the establishment and improvement of the capabilities of the partner countries in the field of metrology is also in the own interest of the industrialized countries. In today's world, only the least environmental damage can be limited to one region or one country. Usually, it is global public goods that are at stake. When it comes to setting up environmental standards which take account of the particularities of whole geographical regions, close cooperation is required. Also, close cooperation is required when enabling the partner countries to monitor the observation of such environmental standards and technical regulations by manufacturing companies and each individual citizen. The degradation of the environmental quality in

# 計量与環境測量

國際計量日：2007年5月20日

舒適的環境對我們的生活至關重要。環境的變化與我們息息相關，影響我們的生活。人們逐漸認識到人類現在的活動可能對環境起負面作用。正因為如此，環境測量變得越來越重要。它幫助我們：監測環境的變化並確定這些變化對未來生態系統的影響。計量 - 測量的科學 - 使得我們擁有可信的數據用以有效地監測環境質量。

**水**  
水是地球生命之源。海洋、河流、冰川、湖泊里的水質條件和供水系統對我們都很重要。我們必須有規律地對水源進行測量以便：  
• 監測溫度、酸鹼度、鹽度和重金屬含量。  
• 監測工業廢棄物中的硝酸鹽和磷含量。

**空氣**  
大氣層形成氣候，提供我們呼吸的新鮮空氣。保護大地防止有害的太陽輻射並且幫助調節環境溫度。我們必須有規律地測量空氣以便：  
• 監測溫室氣體以及汽車和工業廢棄物的排放量。  
• 監測大氣防護太陽輻射能力的變化。

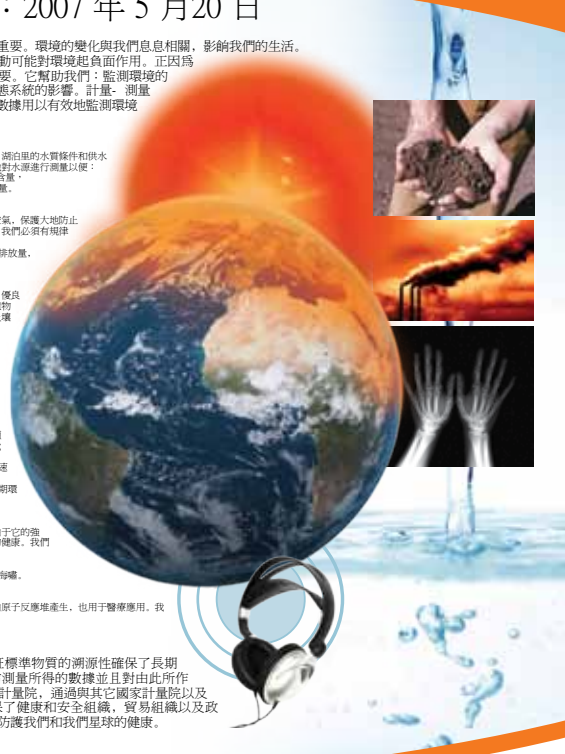
**土壤**  
土壤是食品生產的基礎，是生命的搖籃。優良的土壤能為作物的質量數量並且為植物和動物的多樣性。我們必須持續地檢測土壤以便：  
• 監測保護農作物種植生長所需的土壤結構、濕度、酸鹼度和肥力。  
• 監測農藥、化肥和工業廢棄物的污染。

**氣候變化**  
氣候是每年在某個時間我們所期望的平均天氣。人們越來越普遍地承認有些人類活動可能對地球的氣候產生影響並且可能導致海平面上升、融化和海冰崩解等現象的自然災害等現象的嚴重原因。所以我們必須不得地監測氣候以便：  
• 監測大氣、海洋溫度和極地冰川融化速度的長期變化。  
• 給政府提供精確的數據用以制定長期環境保護政策並測它們的效果。

**聲音**  
聲音是日常生活的一部分，但某些聲音由于它的強度和持續度可能會損害環境，危害我們的健康。我們必須有規律地監測聲污染以便：  
• 預防我們的聽力損傷。  
• 記錄聲波用來監測可能發生的地震和海嘯。

**輻射**  
放射性是有些元素的自然特性。人爲地由原子反應堆產生，也用于醫療應用。我們必須按常規地監測輻射以便：  
• 監測人員的輻射污染。  
• 保證醫療器械的安全性和有效性。

國際認可的測量標準和/或有證標準物質的溯源性確保了長期測量的準確度。這使我們相信測量所得的數據並且對由此所作的決定充滿信心。各國的國家計量院，通過與其他國家計量院以及國際計量組織共同合作，確保了健康和安組織。貿易組織以及政府機關擁有所需的科學數據來防護我們和我們星球的健康。



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developing countries has direct economic effects if the quality of exported food or the tourism sector are affected.

Agriculture – the most important branch of economic activity in most of the developing countries – depends to a particularly high degree on the quality of the soil, of the water and of the other environmental conditions. A highly developed quality infrastructure which is broadly distributed over an entire area is, therefore, also of considerable importance for agriculture. In future, this importance will even significantly increase to the degree to which modern and ecologically adapted production procedures (keyword: precision agriculture) will gain in importance to safeguard the feeding of the world while relieving, at the same time, the environment and the climate.

In 2007, the World Metrology Day's theme was "ENVIRONMENT"

Dr. Jürgen Wiemann, Economy and Employment, Gesellschaft für internationale Zusammenarbeit (GIZ)

# Sustainable Development and Environmental Management

Edith Kürzinger, Thomas Votsmeier

## International Framework: Sustainable Development

At least since the Conference on Environment and Development (UNCED) in Rio in 1992, it has been widely recognized that environmental depletion has global impacts, and will clearly become worse in the next decades unless decisive measures are taken. For this reason, the UNCED decisions and the environmental conventions promoted over the past 20 years have called on all relevant stakeholders to combat these problems according to the principle of “common – but differentiated – responsibility”, and to realign development strategies, policies and measures towards an environmentally, economically and socially sustainable development.

The global framework for measures of development, social and economic policy at the national and international level has since then been the “Agenda 21” – the “Action Plan for the 21st century”. The concrete recommendations of the 40 chapters are also the overall orientation for the financial and technological cooperation between the industrialized and the developing countries; and they address all social groups in the 170-odd signatory states.

In 2012, it will be assessed by the participants of the Rio+20 process how far – and with what impacts – the decisions have been implemented which were taken at UNCED-92, at the follow-up conference in Johannesburg in 2002 (especially with regard to sustainable production and consumption patterns), as well as the Millennium Development Goals (MDGs), agreed upon by a Special Session of the UN General Assembly in 2000. In addition, new impulses to the world community are envisaged, e.g. by agreeing upon measures to implement a sustainable “Green Economy”. This will also be the occasion to look over the different concepts which have been developed by numerous institutions and donors – mostly with the same goal, but using different methods, unfortunately even competing with each other.

## The Role of the Economy: Implementing Proven Methods and Resource-Saving Innovation

Business and industry are significant social stakeholders when it comes to implementing sustainable development as explicitly described in Chapter 30 of Agenda 21, “*Strengthening the Role of Business and Industry*”. During the past 20 years, the environmental framework conditions have been tightened worldwide, and a large variety of concepts and instruments for implementing more sustainable production patterns and for developing less resource-intensive products and production processes have been developed and put to the test.

The following aspects, goals and measures have been considered as particularly relevant for business and industry:

- Governments and the private sector should make an effort to increase resource efficiency and reuse of residues, to reduce the quantity of waste per unit of production.
- As a key determinant for sustainable production and consumption patterns, environmental management (or “integrated management”) should be given high priority within the enterprise: environmentally friendly production concepts have to be integrated into operational processes and investment decisions, but also into supply chains and client relations.
- The private sector should inform consumers about environmentally relevant activities, energy and resource consumption, as well as the implementation of codes of conduct for outstanding environmental and social behavior.
- The private sector should, in cooperation with scientific and technical institutions, enhance research and development on environmentally safe and sound technologies, taking local knowledge fully into account.

Despite the considerable number of national and international programs, especially the generalised application of instruments of environmental management in enterprises is still lacking. Large part of the potentials for a more efficient use of

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resources (measured by the specific resource and energy consumption per product or per production unit) are mostly untapped by approximately 50 % of the enterprises in the industrialized countries, Micro, Small and Medium-Sized companies, and enterprises at any level of development in developing countries. This is all the more incomprehensible as case studies have proven the considerable potentials for net reduction of production costs by the implementation of voluntary (environmental) management instruments and systems, e.g. certifiable ISO standards, or non-certifiable Cleaner Production, Ecoprofit, Profitable Environmental Management, Product Integrated Management, etc.) – by and are subsidized by the state even in the industrialized countries. In addition, public incentives do subsidise consultancy costs, even in industrialized countries.

A new challenge is also the necessity to clearly reduce the consumption of – especially – non-renewable resources, which is still increasing in absolute terms, and to slow down the growing negative impacts on climate and the environment. This can be achieved by all societies: On the one hand, by de-linking economic growth from resources consumption, and, on the other hand, by changing current production and consumption patterns towards a more extensive use of renewable resources, e.g. by using renewable energy sources, waiving energy-intensive technologies, reducing resource consumption by modified consumer behavior, reducing material intensity when using raw materials at all steps of the production and consumption chain (including disposal), implementing closed cycles of material use and developing and producing durable products which are adapted to the needs of customers and the functions needed.

This implies that the producers and the consumers in the industrialized countries must show exemplary behavior – for instance, by designing sustainable products, enhancing sustainable mobility, housing and leisure activities, supporting the efforts made by developing countries to combat poverty, by improving access to resources which have to be used sustainably, and enhancing the quality of life for all strata of the population. To achieve this, the private sector has to mobilize a Schumpeterian<sup>1</sup> readiness for innovations and for taking risks, as well as conducive political incentives and framework conditions are required. Due to the latest natural disasters (e.g. tsunamis) and the failure of technologies we deemed to have under control (e.g. the nuclear meltdown in Fukushima, Japan), a new aspect which could increasingly gain in importance could be how to avoid and master risks and enhance safety.



### PTB and Sustainable Development within the scope of the International Cooperation

PTB has taken due note of the results of the Rio Conference (Agenda 21 and Rio Declaration, Climate Convention) and of the follow-up events and has increased its activities as regards the supporting of environmental management and climate protection – as well as of a more efficient use of energy, water and other resources. All this will be achieved, in the first place, by including environmental aspects and environmental management into the consultancy measures for the development of national and regional quality infrastructure (QI) – especially into the components *accreditation, certification, human resources and management systems, products, basic and advanced training, consultancy, and laboratories*. Furthermore, this will be achieved by enhancing the customer perspective of enterprises within consultancy processes, and by stimulating the companies' demand for new services (against payment) provided by qualified consultants, certification bodies, accreditation institutions and reference laboratories at the institutional level.

At the **political** level, PTB has been actively involved in the Environmental Managers' Working Group of the German Development Cooperation institutions. Together with the BMZ, this group has established the Environmental Impact Assessment as an important basis for the introduction of environmental management in development cooperation projects and has organized a successful exchange of experience. As a member of the advisory board, it supported the GTZ<sup>2</sup> pilot project for the Promotion of Environmental Management in the Private Sector of Developing Countries (P3U) which developed the wide variety of training and consultancy modules labelled within the concept *Profitable Environmental Management PREMA*<sup>®</sup>.

1 According to Joseph Schumpeter, efficient capitalism depends on the ability of entrepreneurs to promote constantly innovation and technical and scientific progress.

2 As the statements refer to the past, the former name „GTZ“ is used (not the new one „GIZ“).



PTB established a link between this institutional level and the **consultancy level**. Here, PTB promoted the effective implementation of cost-saving and environmentally friendly measures of “Good Housekeeping” by means of PREMA® training, especially in Central America and Venezuela. This served as a basis for the subsequent certification processes of its customers (i.e. enterprises and institutions) – mostly according to ISO 9001 and 14001. PTB encouraged the cooperation between GTZ’s P3U and DGQ in order to generate synergies – between directly increasing the basic performance of the enterprises in the short term by PREMA® training and starting bottom up the introducing of an environmental or quality management system certifiable according to ISO. Due to the cash flow crisis and the termination of crucial projects, this innovative approach could unfortunately not be developed into a coherent concept for replication.

PREMA® modules were successfully implemented within the scope of PTB programs in Venezuela (Sencamer) and in cooperation with Costa Rica (CEGESTI and CCAD) in all Central American countries, where Good Housekeeping was focused on the “resource ‘water’”. An effort was made to entice the local institutions in charge to apply methods of Good Housekeeping, so to speak “at home” and achieve cost reductions by modifications in their (environmental) management (see below).

### **Certifiable Environmental Management Systems as Part of a Corporate Philosophy Geared to Sustainability: Experience from the Cooperation between PTB and DGQ**

An essential instrument for enterprises towards sustainability is the certifiable environmental corporate management according to ISO 14001.

By establishing an environmental management system, enterprises can considerably increase environmental performance.

Advantages of ISO 14001:

It

- reduces the consumption of resources and related negative environmental impacts by mitigating weak points;
- reduces production, energy and disposal costs;
- enhances the identification of employees with the company;
- increases competitiveness/compliance with demands of major customers;
- provides a new orientation for product development/innovation;
- improves the enterprise’s reputation by becoming a role model with regard to environmental responsibility and respective Public Relations;
- boosts the financial standing by systematically reducing environmental risks;
- increases the enterprise’s legal security and the possibility of reducing insurance premium.

The adoption of standards for environmental management systems has increased the need to train competent and dedicated experts who are to be entrusted with specific new activity and task profiles in order to establish, maintain and perform both internal and external audits and to further develop environmental management systems. Specific, modular concepts for basic and advanced training were elaborated, th the national and international levels, for environmental managers and officers, consultants and persons interested in qualifying as environmental experts and auditors. This know-how was made available to customers and partners such as PTB. Training measures and the certification of persons related to environmental management were provided from the end of the 1990s as part of QI projects, e.g. in Russia, Brazil, Argentina, Columbia, Venezuela, China, Vietnam and Romania. The most important partner organizations involved in programs organized by PTB-DGQ were INTI (Argentina), ICONTEC (Columbia), FUNSEIN (Venezuela), and FUNCEFET (Brazil).

PTB’s programs also benefited from the harmonized scheme for the registration of qualified personnel for environmental tasks (environmental managers and environmental auditors) adopted by the European Organization for Quality in 1999 (EOQ: the umbrella organization of the European quality associations) that takes both national and international legislation and concepts into account and whose implementation was clearly supported by DGQ.

The increasing application worldwide is a success story for the implementation of precautionary corporate environmental management instruments.

What is decisive for the efficiency of the training is the selection of the staff provided by local organizations. It would be an interesting innovative approach to avoid disappointments by binding the organization whose staff is trained to implement the program on its own afterwards.

Experience or feed-back concerning the efficiency of the application and the implementation of the environmental management systems and with regard to the environmental improvements achieved are not systematically collected.

The following aspects summaries 10 years' experience with environmental management systems and should be taken into account when implementing projects in order to ensure success and sustainability of training measures in the context of international programs:

- establishing a network of organizations and persons from the target region and abroad which plan and implement educational programs with defined competences, coordinated strategies and concrete goals;
- determining in detail the different interests and potentials of the partners involved as well as the logic of the respective approaches;
- carrying out market and target group analyses with local partners (especially a correct estimation of the demand and acquisition of the participants according to previously agreed criteria);
- establishing a realistic calculation of the costs and efforts prior to signing cooperation agreements;
- taking into account in the project planning eventual differences in mindsets and culture as well as the coordination effort required;
- clarifying legal and organizational ancillary conditions in the target country;

implementing appropriate marketing instruments such as, e.g.:

- participating in local trade fairs;
- holding presentations at congresses;
- mentoring delegations in order to exchange experience;
- compiling country-specific product information;
- Internet presence: providing links to training databases;
- ensuring an adequate supply of resources (in coordination with partner organizations), among others with regard to translation of documents, provision of interpreters as well as qualified experts in the concerned field and national/international technical and legal experts.

Obstacles to the implementation can occur mainly due to two aspects: firstly, due to insufficient environmental legislation which results in little incentives for improving environmental performance; on the contrary, they are even purposefully

exploited by some international enterprises from the leather industry/tanneries and paper industry; secondly, due to a lack of awareness in parts of the industry of the environmental management certificate according to ISO 14001 as a competitive advantage. This, however, could possibly be avoided by setting up sector-specific programs which integrate environmental and energy issues.

The trend toward implementing environmental management systems may be constant. Taking a closer look, however, it becomes obvious that mainly large and internationally active enterprises are pushing the implementation of environmental management systems. Small and medium-sized enterprises, in contrast, have only a very limited share in this trend since the costs and the time required to set up a formalized environmental management system are rather high for them and since they often want to obtain the certificate only to satisfy their customers' requirements.

This is where PREMA®'s Profitable Environmental Management (see below) strikes – by means of short modules which aim at iterative learning processes that lead to a direct implementation of resource-saving and cost-cutting measures and, thus, to increasing the base line of environmental performance and productivity and to motivating enterprises for continuous improvement.

### **Profitable Environmental Management (PREMA®) – Increased Resource Efficiency by Experiential Learning Processes in the SME “System” – Experience also from PTB Programs**

PREMA® is a training and consultancy concept which was originally developed for the management of micro, small and medium-sized enterprises (MSMEs) in (more than 30) developing countries and emerging economies. In the meantime, the modules have been successfully applied also in Germany and Europe, have been adapted to the needs of service providers (hotels), institutions (offices, administrations, schools, training centers) and larger-scale enterprises, value chains and industrial areas and completed with modules such as “Profitable and climate-friendly management” (ProClima). Since June 2006, PREMA® has disseminated, in particular, thanks to the international trainer network PREMAnet e.V.<sup>3</sup>

All PREMA® programs or modules aim to trigger and accompany processes of corporate learning and of organizational development of a group of MSMEs. According to the statement “The company has only *one* management system”;

- there is **no unilateral focus on environmental aspects**,

<sup>3</sup> cf. www.PREMAnet.net

- but the attempt is made to convey an **integrated view** of the whole **system** of an “enterprise” instead;
- during (short) interactive training modules (which are based on experiential learning and on in-house and process-oriented consultancy and network meetings),
- and to identify, as many “**blind spots**” of **inefficient resource use** as possible in the enterprises involved
- by going through the PREMA® **change cycle** in a structured manner and **mobilizing** the available know-how and energy for change in the company;
- to develop **fast-to-implement measures** which allow a triple win (see below);
- to support and document the **effective implementation** of these measures by means of coaching and modern collegial consultancy within the company network, and
- to **anchor** – finally – the improved practices, processes, technologies, products, information flows, problem-solving competences, etc. in a **management system** that is focused on continuous improvement and which may also aim at bridging the gap toward a certification according to ISO standards (cost-effective bottom-up approach to certification).

The analysis of approx. 300 case studies from 22 countries and 53 sectors has shown<sup>4</sup> that two thirds of the implemented PREMA® measures result from the improvement of existing facilities and processes. The **triple win** realized with very low or even without any investment at all, at an average payback period of under 12 months – mostly less than 6 months – has the following positive impacts:

- It reduces the **production costs** (depending on the size of the business and the measure: between EUR 100 and 100,000) by using resources more efficiently (this is the main incentive for carrying out optimizations in an enterprise).
- It improves **environmental performance** by reducing consumption of raw material, energy, and chemicals, as well as unqualified product, trade returns, waste, waste water, emissions, machine downtimes, etc.
- It increases the problem-solving capability, motivation and **organizational efficiency**. This encompasses optimized processes, improved risk management and occupational health, as well as social aspects of management. A cost-reduction via a more efficient use of resources and transparency of the (relatively low) labor costs can mitigate to some extent the pressure in developing countries to rationalize jobs.

The PREMA® results<sup>5</sup> are achieved via two **conceptual PREMA® core elements**:

- Identifying quickly the “blind spots” in the

workflow by obtaining a new view on the enterprise with the aid of the **Non-Product Output (NPO) concept** and by identifying the NPO-related *total* costs (input, process, disposal and opportunity costs) as well as any other effects (environmental, organizational, social) of an inefficient utilization of resources; this has also proven to be useful for enterprises in developing countries which had already obtained a certification in ISO 14001, since the ISO standards require neither the immediate implementation of “Good Housekeeping” measures in order to immediately increase the basic performance, nor do they necessarily apply the NPO view when searching for improvement potentials;

- Going through the six steps of the **PREMA® cycle of change** (identifying problems/opportunities, effects of the status quo and its causes, developing and implementing measures, as well as assessing and integrating their results) in a structured manner; these steps are indispensable for the successful implementation of a change process.

Among the central lessons learned from the diverse PREMA® projects – also in cooperation with PTB<sup>6</sup> – count the following:

- The assumption that the question as to “what” has to be done should be the focus of the consultancy service – by supplying technical and expert knowledge – has proved wrong since – at least at the beginning of a process of change – the questions of “whether” and “how” are in the foreground, and a lot of technical know-how, energy and creativity are already available within the enterprise, but are often not exploited.
- Crucial is the provision of a **new and systemic view on the enterprise** – by means of a new analytical structure and a different perspective from outside.
- The components “*External Support to the learning process of the company’s representatives along the cycle of change*” and “*Coaching of the implementation process of the measures*” as well as “*Situation – specif consultancy*” and “*Peer consultancy provided by the company network*” have to be **systematically combined**; in case of doubt, the quality of the support of the “how” (= implementing process) is more important success factor than the know-how, abilities and skills provided during the training.
- Conveying **bottom-of-the-line working instruments** which are **based on common-sense** and which are not necessarily self-evident in developing countries (but are often used unconsciously as “tacit or implicit knowledge” in industrialized countries) – such as visualization, communication, creativity, planning and

4 cf. GTZ/PREMA-net e.V., PREMA® Impact Report, Eschborn/Bonn, 2009

5 For the following statements, cf. Kürzinger, E., Capacity building for profitable environmental management, Journal of Cleaner Production, Vol. 22, 2004, pp. 237–248

6 For a more detailed explanation, cf. Kürzinger, E. / Miller, J., Profitable environmental management: a best-practice approach from consultancy in international cooperation, in: Galea, C. (Editor), Consulting for Business Sustainability, Sheffield 2009, pp. 105–127

documentation skills as well as the focus on results and impacts.

- Using an **action plan** which is regularly updated (with clearly defined objectives, indicators, activities, responsibilities, resources, cost-benefit assessments and deadlines) as a basis for a systematic mentoring and for the routine – but simple – documentation of the process of implementation of measures and the gradually more complex learning processes and measures.
- The key element for a successful implementation of improvement measures is the component “**organizational development**”. It consists of: supporting the clients in the implementation of organizational improvements, achieving more effective communication and cooperation between the relevant stakeholders (in order to achieve a common vision), focusing on objectives (i.e. reducing Non-Product Output, overcoming resistance to change), and assessment of benefits (e.g. reward system, reputation, customer satisfaction, compliance with legal requirements), improving social competence, and the ability of problem-solving and working in networks.
- Complying with the rule according to which the **problem lies with the customer** and that consultancy/training and coaching can only contribute to finding a solution if “ownership” is given and energy for change can be generated.
- The **analysis of the causes for a problem** and of the potentials for improvement plays a central role as a basis for involving relevant stakeholders and developing realistic measures whose implementation will be confronted with a minimum of resistance to change.
- Applying the **Pareto principle** according to the motto “better be roughly right than exactly wrong” and initially focusing on the aim of achieving 80 % of the possible results with just 20 % of the effort.
- Mobilizing “energy for change” by applying methods of experiential learning which avoids imparting theoretical knowledge and advice (at least at the beginning) and enhances, instead, systematically the problem-solving and creativity potentials within the enterprise by means of structured learning/training exercises according to the motto “Yes we can ...!”
- PREMA® requires considerable **efforts on the part of the trainers and of the consultants** to work with “living specimens”, and the mastering of a wide variety of technical, social and process-relevant competences. They have to work with the results of the customers, have to elaborate and adapt the materials depending on the process requirements. This is considered as attractive rather by individual innovative consultants than by consultancy firms as the



latter prefer approaches that are based on standardised and ex-cathedra methods that allow to exploit economies of scale.

- PREMA® as a **market-oriented consultancy method** (usually, **one** substantial implemented measure can be profitable enough to cover the total costs of training/consultation) has difficulties when it comes to marketing. This is due to the fact that the highly subsidizing donor programs often compete with each other, and also the continued attractiveness of ISO certificates: they are relatively easy to obtain in some developing countries without improving (documented) environmental performance immediately.

### Future Challenges to (Environmental) Management for a Sustainable Development

Since “(nearly) everything has already been developed, however not by everyone”, the worldwide, large-scale implementation of the proven and tested cost-cutting management systems and technologies is the main challenge for the years to come – and this should take place, as far as possible, without subsidies which are unjustified in times where tax money is becoming increasingly scarce. In order to achieve this aim, it makes sense to break with this spirit of competition among the different “systems” and to look for synergies instead, i.e. by combining down-to-earth methods – such as PREMA® – which immediately enhance the performance of enterprises in terms of their operative resource efficiency – with management systems geared at continuous improvement and certifiable according to ISO standards.

It has meanwhile also become widely known that integrated approaches (e.g. management systems for the environment, occupational health and safety, quality, and socially sustainable management) can be absolutely affordable and efficient. The great challenge for certified manage-



ment systems in developing countries is to assure the quality of the certifications by selecting and monitoring of trustworthy certification bodies and by the competent implementation of the systems. Due to the fact that numerous enterprises are only interested in obtaining the mere “certificate” – and not necessarily in optimizing their results – quite a number of local consultants consider consultancy and audits as an easy source of revenue – by economies of scale – and neglect sufficient depth and implementation-orientation.

It would be possibly more important – especially in developing countries and emerging economies – to pay more attention to quality assurance when implementing and certifying management systems in order to concretely improve environmental performance, rather than differentiating and elaborating even more ambitious standards.

In addition, it would, under certain circumstances, make sense to envisage introducing – within the scope of development cooperation projects

– minimum requirements for performance of enterprises to obtain certification in order to speed up the implementation and documentation of improvement measures. For this purpose, additional instruments – such as Good Housekeeping or unannounced third-party audits – could be used to evaluate the “standard performance” of an enterprise more realistically and to improve also in the short term its environmental performance level.

The above-mentioned improvement potentials could become innovative components of future consultancy programs of PTB in the field of QI, alongside de with the reactivation of the idea of a combined approach of PREMA® and DGQ to achieve ISO 14001 in SME. By this, impulses could be anticipated which are to be expected from the international donor community for the “Green Economy” in 2012 for both developing and industrialized countries.

## PTB's Technical Cooperation in the Drinking Water Sector in Peru

Jose Dajes

The enormous importance of a drinking water supply for a population is well known – even more so if one bears in mind that water is a scarce resource which is directly associated with the quality of life and a reduction in poverty and that its development to connect every single household requires, in addition, considerable investments. Although the supply of drinking water is among the most important tasks of many governments, it is often not clear where to begin to ensure it in an efficient way. It is not only important to offer drinking water, but it must also be guaranteed to the population that the water is of adequate quality and this quality is guaranteed via reliable measurements – and this relates to both the quantity (volume) and the quality (compliance with defined parameters).

The INDECOPI-PTB project “Improvement and Safeguarding of the Quality and Consumption Measurements in the Drinking Water Sector – Peru”, was developed with due regard to the actors (involved partners) who play a part in the Quality Infrastructure in the water sector of Peru. Over a period of more than 6 years, the project has been executed in particular by the Peruvian metrology institute and the accreditation body. The project works in two target dimensions: firstly, it contributes – via the improvement of the consumption measurement of drinking water – to a more efficient supply and use of the resource; secondly, it allows better and more reliable monitoring of the drinking water quality through the implementation of national references and the promotion of quality management in drinking water analyses.

Cooperation in this project has allowed us – in addition to many other things – to approach the technicians of the laboratories, in particular the technicians of the water supply companies, which – as far as economic aspects are concerned – have proved to be the “most forgotten” enterprises; in this connection, we have not limited ourselves to one single city or one single laboratory, but we have rather tried to “approach” the water suppliers in the interior of the country.

Thanks to this cooperation project, we also have an improved infrastructure at our disposal

which allows us to meet the need for measurements for the drinking water sector – and that relates to both flow-rate measurement and the measurement of some chemical parameters. The staff of INDECOPI was trained and received technical support from experts of PTB, CENAM (Mexico) and other national metrology institutes of the region. Furthermore, the project has served to demonstrate to the Technical Cooperation Department of PTB our commitment and our interest to further develop these subjects for which staff has been made available, laboratories have been established and equipment has been bought.

At present, we can, therefore, present an improved capacity for calibration services of water consumption meters and offer metrological traceability – which had not been the case before in that country.

In addition, we now have an electro-chemical laboratory in the field of chemical metrology at our disposal which deals with the certification of secondary reference materials for pH-value and electrolytic conductivity.

We have established the best contact to the testing laboratories of the water sector (this relates to both public and private holders) via the organization of proficiency tests which allowed us to detect deficiencies in the measurements performed by the laboratories and to suggest corrections and/or measures for improvement.

Our technical employees who were involved in this project have been trained in the subject fields “metrology”, “testing” and “quality management”. The last-mentioned field has proved to be of particular importance, as it can be used as a tool to



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(SIM), the regional  
metrology organization  
of America

raise the awareness of superiors and to receive the required financial support from them.

We are aware that this project is an impulse which has allowed us to start with an improvement of metrology for the water sector. But we also know that in future it will be our responsibility to continue this development for the benefit of our population.



(translation from the Spanish language)

Drinking water plant in Arequipa, Peru

# The APMP-PTB Guide to Creating or Improving a National Infrastructure for Chemical Measurement

**Laurie Besley**

The national metrology institutes of the world have been traditionally based around physical measurement activities. Only in relatively recent times have they been asked to address the issues associated with providing a similar national metrological infrastructure for chemical measurement.

In recent years the Asia-Pacific Metrology Programme (APMP), one of the world's regional metrology organisations, has been continually asked for advice on how to establish such an infrastructure for chemistry as its economies became increasingly aware that some of their key priority areas such as food safety, secondary industry and agriculture were highly dependent upon reliable and demonstrably accurate chemical measurements.

The APMP therefore decided to develop a written guide that would enunciate some of the principles involved and would suggest approaches that could be used by metrology institutes that were extending their activities into this vital area. APMP approached PTB for support for the concept and PTB agreed to become intimately involved with its development, seeing that the Guide was a key element in capacity building in this field. An international workshop was held in Malaysia in 2006 to begin the process and with the cooperation of many people and with financial and strategic support from PTB the Guide was developed over a period of two years.

The structure of the Guide is relatively simple. It covers the following key topics:

- Awareness raising with national stakeholders
- Identification of needs
- Capability assessment
- Gap analysis
- Prioritisation of needs
- Selection of an appropriate model or strategy
- Obtaining government commitment
- Capability building
- Dissemination of services

The Guide stresses from the outset that there is not a single "correct" way of establishing appropriate infrastructure. Different nations have vastly different needs and resources and the approach chosen and the areas to which it is applied may depend



markedly on those factors. However, the Guide aims to present a methodology for deciding which of those approaches is the most suitable for a given set of national circumstances.

The Guide has now been used for several years as one of the key tools in a series of workshops in the Asia-Pacific region on metrology in chemistry aimed at supporting the developing economies in their efforts to provide an appropriate standards and conformance infrastructure for their countries. Some of the case studies to which it has been applied include controlling the quality of the products of aquaculture, or fish farming, detection of pesticides in fruit and vegetables, and controlling urban air pollution. It is believed to have been very useful to a number of developing economies as they plan their strategies for the future and for this reason it has been translated into Spanish for use in South and Central America.

An improved version of the Guide is being planned that will include a number of examples of applications.

The Guide is available free of charge from PTB and can also be downloaded from the APMP website at [www.apmpweb.org/dec/mic\\_guide\\_druck\\_260110\\_web.pdf](http://www.apmpweb.org/dec/mic_guide_druck_260110_web.pdf)

Analytical chemistry laboratory in Australia

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## Metrology in Chemistry – Essential for Developing Countries

Robert Kaarls

Having the opportunity to oversee what is going on globally with respect to the need and development of metrology in chemistry, and being able to visit several countries and to study the situation in many countries, it is clear that reliable, internationally recognized chemical measurement results are essential. And this not only in industrialized countries, but certainly also in developing economies. In most of the developing countries the economy is highly depending on the export of food, marine and agricultural products, as well as raw materials (metals, etc.) and energy (natural gas, oil, coal). A flourishing touristic economy also requires food safety, adequate health care and a clean environment. Unfortunately, in many developing countries the national metrology and quality infrastructure is not well developed nor is the importance sufficiently recognized by the responsible authorities. Assistance by experienced and established institutes in creating awareness and investigation of needs is needed and very much welcomed. Assistance in formulating and implementing a national fit-for-purpose metrology and quality infrastructure can accelerate economic developments and improvements of the quality of life in the country. Better food and medical products and a cleaner environment, potable water and clean surface waters all contribute to a higher life expectancy, a better economy and less unemployment. Getting a fair price for high quality raw and enriched materials and energy can be fostered by reliable and sufficiently accurate measurement results which cannot be questioned. Over the years I have joined in a several projects, all over the world, carried out by the PTB Technical Cooperation unit. It is great to see that now in many countries authorities have taken up the tasks to realize and improve the metrology in chemistry capabilities by better equipped laboratories, trained staff and participation in regional and global comparisons, potentially leading to international recognition under the CIPM (International Committee for Weights and Measure) Mutual Recognition Arrangement. The global cooperation in metrology led by the BIPM (International Bureau of Weights and Measures) makes it also possible to contribute to the activities

carried out by the World Meteorological Organization – WMO, in particular with respect to climate change, by underpinning measurement results by unquestionable, long-term stable, traceable measurement standards and methods/procedures, including certified reference materials.

The experience shows that in order to create a sustainable infrastructure it is essential to agree on a long term program which covers the whole chain of necessary steps, starting with sufficient awareness, needs assessment, creating the right legislative conditions, gap analysis versus what may be already available in the country, training of competent staff (also abroad at experienced institutes), creating fit-for-use laboratories, including fit-for-purpose conditions and equipment and continuous active international participation in regional and global metrology (BIPM) and accreditation (ILAC, International Laboratory Accreditation Cooperation) organizations. A successful and sustainable situation requires clear government commitment and sustainable government financial support and within the country a good connection with all stakeholders. If the basic cornerstones of the “house of quality” are all systematically put in place, it is my experience that a successful physical and chemical metrology infrastructure can be realized and maintained being an essential element in any quality infrastructure in support of an improved economy and quality of life.



Dr. Robert Kaarls, Secretary, International Committee for Weights and Measures, CIPM, President, Consultative Committee for Metrology in Chemistry, CCQM

# A Lusophone Triangle – the Trilateral Project Mozambique • Brazil • Germany

**Günter Wipplinger**

This trilateral project is a reaction to the urgent need for a national quality infrastructure (QI) in Mozambique. During the implementation phase of the project, the national metrological institute of Brazil, Inmetro – a partner of PTB for many years – has advised INNOQ of Mozambique and trained Mozambican metrologists. The project is aimed at improving the service capacities of INNOQ in order to support Mozambique's socio-economic development. GIZ and PTB are involved in the project planning and realization and are ensuring that the impacts achieved are sustainable. This instrument of international technical cooperation – a cooperation between a traditional donor, a country in transition and a developing country – is called “triangular cooperation”. Brazil's support to Mozambique is particularly facilitated by the common language, Portuguese.

The cooperation with INNOQ within the scope of this project started back in 2008 with a 1.5 year pilot phase. This pilot phase was focused on re-establishing of the legal metrology system in Mozambique by means of technical training, using the basic equipment supplied within the scope of an EU/UNIDO project; this equipment started being used via INNOQ by the competent communal associations for the fields of mass, weight and volume (for petrol stations) by the end of 2010. In that phase, an effective cooperation was established between the Brazilian institutions involved (Agência Brasileira de Cooperação – ABC, Inmetro, and GIZ, Brasília) as well as PTB in Germany, positively complemented by the EU/UNIDO project which was being carried out in parallel.

Already during the pilot phase, the framework conditions were modified to comply with the needs of a national QI, and essential fundamental conditions for the consolidation of INNOQ were created: the Mozambican government became increasingly aware of the significance of metrology, standardization and quality systems for the economic development of the country and approved the construction of a special building for INNOQ (whose structural work has progressed very well in the mean time), enabled a personnel increase at



INNOQ – to almost 50 employees now – and took the necessary legal steps for INNOQ's activities. Simultaneously, the interest in INNOQ's services has increased significantly on the part of the country's private sector – on which global competition exerts considerable pressure.

In the second half of 2010, the positive results achieved during the pilot phase brought about the conception, planning and adoption of a triennial project which started in November 2010. This project prescribes increased efforts not only to develop legal and industrial metrology, but also to support INNOQ in specifically developing the existing field of standardization and in opening up the new field of system and product certification. In the long run, this will therefore imply an intensive involvement of the Brazilian standardization institute Associação Brasileira de Normas Técnicas, ABNT, and further specialized institutions in the project implementation, for which also the support of the corresponding German experts (DIN, PTB, etc.) could be drawn upon.

In the draft of a quality law for Mozambique, which is presently being elaborated, it is envisaged that INNOQ will play the role of the Secretariat having the responsibility for conceiving the national QI system in the country. With this broad spectrum of activities, the trilateral project is helping INNOQ to live up to this role.

Besides the consolidation of INNOQ in the technical fields, the constitution of institutional structures (internal organization, internal and external

**Calibration of weights in Mozambique**

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communication, strategy development and medium-term business planning) is playing an increasing role. Besides GIZ, especially PTB is solicited as a consultancy unit furthering the efficient development of a national metrological institution and labor division within the scope of the whole QI.

Developing a national QI and consolidating the Mozambican national metrology institute correspondingly have to be considered as greater goals requiring a long-term and constant work process. Given the limited budget available and along with the complexity of the process, the need for further cooperation with INNOQ will remain even after the current triennial project has been completed.



Delivery for a mass laboratory in Mozambique

# Triangular Cooperation for Metrology in Natural Gas – An OAS Perspective

Oscar Harasic

The Organization of American States (OAS) is committed to boost triangular cooperation, but it also recognizes that the Latin American and the Caribbean (LAC) region is still in its initial stages, since only a few countries have leveraged cooperation by partnering in concrete international programs<sup>1</sup>. In this respect, the triangular Cooperation for Metrology in Natural Gas, within the OAS-PTB cooperation framework, stands out as a triangular project model for the region due to several reasons. First, the project was crafted to fit the different partners' interests, a key factor for the development of a successful cooperation project. The OAS, through its Office of Science, Technology and Innovation and based on its political mandates, and many years of technical expertise, helped identifying the specific need in the region and used its convening power to become the partnership liaison. PTB's technical expertise fostered its cooperation activities to strengthening quality infrastructure and standardization in LAC, while Brazil and Mexico consolidated their regional leadership in metrology services, and the small economies of Peru and Bolivia benefited directly by boosting their infrastructure and technical capacities required by export markets. Second, as a result of the interaction, all countries involved have benefited from lessons learned to improve their own processes and services through an in-depth analysis of the complex issues related to natural gas markets and tested a new model of triangular cooperation. Third, the project investment demonstrated immediate results for Peru and Bolivia locally and internationally since the infrastructures help producers, regulators and consumers as well. The harmonization of natural gas markets, an important objective of the major goal of this project, promotes markets transparency, consumer protection, security and energy efficiency, and increases countries' competitiveness to export by eliminating technical barriers to trade (TBT) and fostering their participation in international trade. Finally, the model will probably be replicated in other countries of the region.

This project was of the utmost interest for the OAS, which is clearly reflected in the many events



Flow measuring post for natural gas in Bolivia

and activities in which the model was disseminated. For example, this project was one of the only five cases submitted by OAS to the Task Team on South-South Cooperation (TT-SSC) for its High-level Meeting<sup>2</sup>. Other relevant meetings were the III Meeting of Higher Authorities and Councils of Competitiveness of the Americas, the VI Meeting of the Inter-American Committee on Science and Technology (COMCYT), and the Permanent Executive Committee of the Inter-American Council for Integral Development (CEPCIDI).

1 The Effectiveness of Hemispheric Cooperation: A perspective from the Americas, 2010, Inter-American Cooperation network, Canadian International Development Agency (CIDA) and OAS ([www.Cooperanet.org](http://www.Cooperanet.org))

2 Case study is presented in Spanish at: [http://www.impactalliance.org/ev\\_en.php?ID=48706\\_201&ID2=DO\\_COMMUNITY](http://www.impactalliance.org/ev_en.php?ID=48706_201&ID2=DO_COMMUNITY)

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Organization of  
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(OAS)



## Desertec – A Tunisian Point of View

Fekria Romdhani, Lea Zeppenfeld



Solar-thermal power plant in Morocco

Fekria Romdhani is an engineer specializing in metrology. She is currently Deputy Head of the Department for Quality and Standardization with the Tunisian Ministry of Industry. She also works as a short-term expert for PTB.

Here is an interview conducted by Lea Zeppenfeld, a project coordinator at PTB, with Fekria Romdhani concerning the Desertec initiative:

*The issue of renewable energy sources in northern Africa and in the Middle East is very popular at the moment – which is partly due to a great interest in the Desertec project. Why?*

The fact that the region has decided to turn towards renewable energy sources is in line with the global trend of avoiding climate change by a sustainable energy production. Due to its geographical situation, the region, with its deserts and coasts, is predestinated for producing energy from renewable energy sources.

*What is the Desertec project about?*

The Desertec project consists of a non-profit and an industrial initiatives and is aimed at developing a network by means of which the power generated in northern Africa could be transported to Europe. Thereby, the constantly growing demand for energy in the Northern African countries has to be satisfied while pursuing Europe's ambitious goal

of covering 20 % of its energy demand with power generated by means of renewable energy sources by 2020. Desertec is based on the hypothesis that the incident solar irradiation on each square kilometer of desert corresponds to 1.5 million barrels of oil. Accordingly, all the deserts of the world taken together could, thus, cover by far the total demand for energy worldwide.

*What is the technology used?*

The technology planned (to date) for the generation of power in the desert is solar-thermal power plants. These plants use mirrors to focus solar radiation and to generate heat in the form of steam which is used to drive the turbines of a power plant. Heat accumulators can store the heat gained in this way to drive the turbines during the night or during peak periods. In order to ensure continuous energy generation, other energy sources such as gas, oil or biofuels can be used in addition to solar radiation. Furthermore, the heat gained can also be used for desalinization plants or for cooling purposes – both applications being of paramount importance in the desert areas of northern Africa.

*Does a large-scale project such as Desertec fit in with the plans of the northern African states or with their national strategy plans with regard to renewable energy production?*

At the international level, the Union for the Mediterranean – in which all countries bordering the Mediterranean Sea are represented, i.e. also the northern African states – furthers the implementation of a solar plan. Furthermore, countries such as Morocco and Tunisia have national solar plans which clearly aim to generate power using renewable energy sources and are – in part – already being implemented. In Morocco, 6 power plants with a total output of 2,000 MW are to be built within the next few years.

*What are the advantages of such a project and what are the possible disadvantages?*

First of all, generating power with renewable energy sources contributes to protecting the environment and to reducing CO<sub>2</sub> emissions – and,

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thus, to preventing climate change. In this way, energy security is ensured, and countries without fossil fuel deposits can still be independent of oil and gas imports. Desalinization of sea water for the production of drinking water is facilitated. But due to the opening of the European market as well as due to private investors, local production and technology transfer towards the region, it also means overall economic growth. It must, however, be pointed out that the Desertec project was planned and adopted without the presence of the main national stakeholders – i.e. the power-producing countries. None of the countries concerned was officially involved in the process, for example, by signing a binding contract under international law. It must be clearly stated that the electricity produced in northern Africa should benefit the producing countries in the first place.

*Will the upheavals which the Arabic world has been experiencing since 14 January 2011 change anything in this project?*

In my opinion, the revolutions in Egypt and Tunisia will bring about more transparency and democracy as well as an opening-up of the markets in northern Africa and the Middle East, which will facilitate cooperation with Europe – and, thus, also concretely promote international direct investments. Furthermore, regional cooperation will be improved, too, so that the conflicts which still divide countries today will perhaps soon be history.

*Why is PTB committed to renewable energy sources? Where can PTB bring in a special contribution?*

PTB has broad knowledge recognized worldwide in all fields involved (optics, temperature, electricity...). It can support the partners in the corresponding countries by means of technical consultancy; in addition, it can rely on both a national and an international network. Furthermore, the Technical Cooperation Department has valuable experience in the field of regional cooperation.



## Good Governance

### Jürgen Wiemann

A modern quality infrastructure is unimaginable without good governance; yet the quality infrastructure can, in turn, contribute to an improvement of governance. Incorruptible verification offices and testing laboratories cannot gain a foothold in a country where political decision-making processes are autocratic and lack transparency and where arbitrariness and corruption reign at all levels of public administration. Under such circumstances, the population and the business community of the country cannot trust the actions and decisions of the national institutions – nor can their international business partners. The economic disadvantages implied are considerable and should prompt the government to undertake reforms combining economic liberalization and improved governance. This is, at any rate, what the transformation countries in Eastern Europe and East Asia have experienced.

Developing a modern quality infrastructure itself can, in turn, contribute to improving governance. This already takes place at the level of the businesses which experience quality as a factor of competitiveness by complying with generally accepted standards. By ensuring constant high quality in the production, they deserve the confidence of their customers who, alone, would not be able to detect and compare the concealed quality properties of complex products. For economic and technological development, the quality infrastructure plays a role that can hardly be overestimated as part of the institutional setting of a country. Beyond this, it also plays an educational role: it represses fraudulent business practices by accustoming the enterprises to complying with rules – in the form of standards and technical regulations – which are valid in exactly the same way for each enterprise as well as for each citizen.



By getting accustomed to complying with standards and technical regulations, enterprises are also prepared for having their work processes and management systems measured against the corresponding international ISO standards in force and having them certified. Whereas from a German point of view, “good governance”, is essentially related to government and public administration, the English meaning also includes the management of businesses – which is known as “corporate governance”. It is then only a small step to take from corporate governance and its criteria of transparency and efficiency to good governance in the public sector and government to which these criteria can be applied in the same way. For instance, a few years ago, the British government charged an independent commission with elaborating a “Good Governance Standard for Public Services”. And recently, the International Organization for Standardization (ISO) elaborated – after the standards package for quality management systems (ISO 9000) and the one for environmental management (ISO 14000) – a further standard, this time for social responsibility (ISO 26000), which can also be applied to public administration.

This shows that the quality infrastructure can have both an indirect and a direct impact on the governance quality of a country. When it comes to establishing and improving the quality infrastruc-

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ture in developing countries, technical cooperation may contribute in a very subtle way to improved governance. By focusing on allegedly technical aspects and on seemingly unpolitical institutions (verification offices and testing institutes), technical cooperation seems to abstain from getting involved in the domestic politics and affairs of the host country – such interfering would be considered as undesirable by the host country's government. In the field of quality infrastructure, technical cooperation, however, operates as a grassroots movement – by getting the partner institution accustomed to applying transparent and harmonized legal rules and procedures in their activities. Within the scope of international training programs and thanks to the participation in international standardization processes, the representatives of national quality institutions progressively gain confidence in the corresponding institutions of other countries.

One example of an efficient grassroots integration policy which has started from tackling technical barriers and considering the economic interests involved to progressively clearing the way for free trade, closer political rapprochement and, finally, total integration, is the European unification process. This experience could well be repeated with the progressive integration of the developing countries to global trade and their participation in the international economic institutions – with the support of Aid for Trade – if however at a smaller scale and over a longer period of time. In this context, technical cooperation with the developing countries in the field of quality infrastructure plays a discreet yet significant role in the civilization of international economic relations and in the reduction of the North/South economic divide.

# Quality Infrastructure – A Contribution to Good Governance

Ulrike Grote

## Quality Infrastructure and Good Governance

Good governance implies that the state protects its citizens and that the traded goods and services fulfil the respective safety requirements and values. Laws and technical regulations (such as, e.g., the Verification Act or rules and regulations for occupational safety or environmental protection) are in the interest of the consumers and producers – hence in the interest of all citizens of a country equally. Legal framework conditions (and the support and surveillance systems associated with these) make government action transparent and predictable.

In addition, conformity assessment and market surveillance must be designed in such a way that corruption is prevented.

In many of its projects and programs, PTB's international technical cooperation renders consultancy to the partner government when it comes to designing such systems. Even the stakeholders themselves are often not aware of the fact that it is not only with regard to the Millennium Declaration that their expert consultancy is considered as a contribution to good governance.

Good governance is considered as a significant prerequisite for poverty reduction and economic development in developing countries. At least since the Millennium Declaration in 2000 with the Millennium Development Goal (MDG) No. 8 (*“Develop a global partnership for development”*), good governance has moved even stronger into the focus of the donor countries.

It is often overlooked that the setting-up of a quality infrastructure (QI) – and hence, one of PTB's tasks within the scope of international cooperation – contributes significantly to good governance. Technical barriers to trade are mostly the expression of a lacking QI or of a QI that is not internationally recognized. Non-compliance with technical regulations and testing and measurement results that are not proven lead to mistrust – and that not only in international trade – and eventually become barriers to trade. This especially hits



export firms, traders and – ultimately – producers from developing countries particularly hard. But also corruption, the lack of efficiency of the public administration or a lack of transparency and an absent rule of law prevent the QI from functioning duly. Combating these problems therefore is an essential precondition for good governance.

## Good governance in development policy

But what exactly is “good governance”? Good governance plays an important role especially in development policy. A prerequisite for the donor countries' rendering of financial or technical support is the existence of specified good governance conditions such as, e.g., combating corruption, the responsible exploitation of resources and handling of the political power on the part of the government, or participation and rule of law. Good governance is, however, not only considered as a precondition for the rendering of support by the donor countries, but also as an aim of development cooperation.

For the German development cooperation, “good governance” comprises the following five criteria (1):

- Politics must be focused on the reduction of poverty and on sustainability (MDG orientation, economic and ecological sustainability);
- All human rights must be respected, protected and safeguarded;
- Democracy and rule of law must be guaranteed (among others: democratic participation of the population, legal and legislative limitation of the state's powers);
- State efficiency must be given (no corruption, transparency of politics, etc.);

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- Cooperative behavior within the community of states (constructive participation in international processes and bodies, etc.).

The contribution of the German development cooperation to good governance consists, on the one hand, of direct measures of support (e.g. improving the legal and administrative framework conditions, including reforming the judiciary sector) and, on the other hand, of indirect measures such as efficiently supporting public institutions as well as civil society and the private sector.

Furthermore, combating corruption within the scope of development policy has turned out to be one of the focuses on the agenda when it comes to good governance. It is assumed that corruption hampers the sustainable economic and social development of a country and, thus, impedes poverty reduction. One of the development cooperation's goals therefore is to contribute to combating corruption by elaborating behavior codices. Civil society can be supported by strengthening the media and by creating transparency in order to make corruption public.

But good governance is said to be important also in an international context – namely for maintaining peace and worldwide security. Thus, the UN, but also multilateral development banks and the EU, are aiming at strengthening important international institutions and development cooperation support programs. This includes, for example, global legislation against corruption.

### **What does PTB do? – Elements of a QI promotion**

QI designates the entirety of the following elements: metrology, standardization and testing systems, quality management and conformity

assessment, including certification and accreditation. These single elements are closely linked with each other and represent a functioning system only when complete. PTB's work contributes to developing institutional and organizational structures and to designing national framework conditions for this system.

Standards and technical regulations are a central element of QI. They can be of national, regional or international origin. They facilitate the exchangeability of goods and services and make it possible for market actors to assess product quality in a uniform way and to identify it as such. In order to be able to participate in the international exchange of goods and services, the national or regional QI network must be operated according to international guidelines.

In developing countries, some of the QI elements mentioned above are neglected. They are, however, essential preconditions for improved regional integration and for the integration of the partner countries into the world economy. But how strong actually is PTB's contribution to good governance?

### **Contribution to good governance**

In development cooperation, one feature of good governance is to achieve sustainability in politics. As a matter of fact, PTB furthers ecological, social and economic sustainability with its work. A systemic QI contributes, for example, to protecting the consumers from qualitatively substandard – or even harmful – products. If all producers comply with the technical regulations, the buyer no longer has to check all the properties of a product before buying it – a task for which he lacks the necessary expert knowledge anyway. QI is therefore a necessary precondition for the comparability of quality and, thus, for competition in trade and, ultimately, for the establishment of social equality. The value chain becomes more transparent, and it becomes easier to check the quality of a product or its quantity.

It is evident that especially in the field of healthcare, knowing about measurement uncertainties is of the utmost importance as diseases are diagnosed by means of the most diverse measurements. If a false diagnosis is made due to a measurement error, this not only leads to increased costs but can, in extreme cases, entail the harming of a patient's health or even his/her death.

In the field of environmental protection, QI takes on regulatory functions – for example by monitoring that specified contingents for fishing or felling timber are being complied with, in order to protect natural resources from excessive exploitation. Certain fish or timber products are increasingly becoming certified by means of labels such

as “Marine Stewardship Council (MSC)” or “Forest Stewardship Council (FSC)” if it is guaranteed that these products come from a sustainable source of production. In addition, metrology ensures that water and energy consumption are measured appropriately. Environmental protection and resource conservation are also enhanced thanks to the increased efficiency and effectivity of the institutions and structures. QI also ensures framework conditions for the field of occupational safety.

QI is also a component of competition policy as quality management improves the competitiveness of a country’s economy. First of all, it furthers technological innovations. In addition, it contributes - thanks to the harmonization of standards and technical rules and thanks to the mutual recognition of testing and measurement procedures - to eliminating technical barriers to trade and to reducing transaction costs. The reason why transaction costs are high is usually because the information available to the two trading partners - both national and international - diverges. The costs arising from the introduction of certification and accreditation are usually compensated by the reduction in the transaction costs. The safer a transaction, the more efficient a market becomes, and the fewer disputes occur (2). Also savings (so-called “economies of scale”<sup>1</sup>) can be achieved by harmonizing standards and regulations at the regional level, i.e. by harmonizing different types of regulations for a group of countries in a region.

### Fields of action and special measures for the promotion of a QI

It is possible to point out special measures which contribute to good governance. The establishment of efficient QI institutions in the public sector depends, for example, on:

- (i) capacity building;
- (ii) the introduction of monitoring and surveillance mechanisms;
- (iii) transparency; and
- (iiii) fighting corruption.

These factors contribute directly to the good governance criteria “democracy and rule of law” as well as “performance and transparency of the state” which have been laid down by the BMZ.

Building capacities in the field of QI, or improving them, involves the national accreditation body (or an equivalent point of contact), the national metrology institute and the certification body, as well as the support which the state renders to standardization organizations and to calibration and testing services. Besides this, capacity building also encompasses the public promotion of educational and training components in the

field of QI. The education and training of staff and the realization of exchange and training programs strengthen the capacities of public enterprises. In this context, quality-oriented consulting firms acting as training providers as well as chambers of industry and industrial associations acting as multipliers for awareness-raising measures, play a considerable role.

In a country, the government often becomes aware of its own role as a monitoring and surveillance organ only if an import embargo is placed on the exports from its own country. It is therefore necessary to raise the awareness of the politicians to enable *pro-active* - rather than *reactive* - action. By avoiding export failures, considerable costs can be saved.

Another control task of the state is related to the implementation of technical regulations via conformity assessment and/or market surveillance. Whereas conformity assessment takes place prior to placing products on the market, market surveillance starts once products have been placed on the market. Market surveillance fulfills the purpose of consumer protection but is also of great interest for other stakeholders such as traders or producers, since it makes it possible to sue infringers of fair competition. To ensure effective surveillance (e.g. by means of visits to industrial, trading, storing and production sites on a regular basis, by sampling and on-site controls, etc.), the required resources and authorizations must be made available. Cooperation with consumer protection associations can bring about positive effects since, e.g., potentially harmful products can be detected early enough (3).

Also in the case of credence goods - i.e. goods and services whose quality can be determined neither before, nor during or after the use or consumption of a product - the consumers generally rely on state control. Where services are concerned, the state requires minimum professional qualifications from service providers. To ensure the quality of goods, voluntary or binding regulations are developed (4).

Transparency can be achieved especially by increasing the exchange of information. The government bodies which deal directly or indirectly with QI have the responsibility or sometimes even the duty of supplying information for various stakeholders. Among these are especially the public information and notification bodies which have been set up within the scope of the WTO obligations, but also national standardization and metrology institutes or state-financed information centers. Providing information successfully can often be attained by furthering the introduction of information and communication technologies.

Accreditation is a means of increasing confidence in the activities and results of testing and

<sup>1</sup> The term “economies of scale” originates from the theory of production and says that an increase in production leads to a reduction in piece costs.



calibration laboratories as well as of inspection and certification bodies. Accreditation facilitates the mutual recognition of proofs of conformity and promotes international trade.

QI basically aims at correcting market failures by means of state intervention. If the state is not able to erect a quality infrastructure system, this will lead to a lack of transparency, to distrust, to disputes or even to corruption. It must be ensured that infringements of technical regulations will be punished. Only in this way is it possible to establish confidence in the rule of law. QI thereby contributes to increasing transparency in production and processing in a country and to reducing or to ruling out corruption.

Especially by creating transparency, and by giving civil society a share in decision-making, but also by introducing surveillance systems and improving control functions, a significant contribution is made to combating corruption in a country.

### **Globalization, decentralization and good governance**

Globalization, technological progress and an increased consumer awareness of quality and environmental protection permanently lead to new tasks and requirements. Especially changes in the legally regulated area make adaptations necessary. New tasks in the area of environmental, health and consumer protection, medical metrology, energy, traffic and information technologies are becoming increasingly important (5). The international demand for test results and other technical information is growing, especially where the consumers' health is at stake. Examples of this are the toxicity of medicines, the safety of food additives or indications concerning the environmental innocuity of products (6).

In numerous developing countries, globalization has triggered off a series of different reform processes: on the one hand, it has furthered decentralization and privatization at the national level in many countries. On the other hand, growing regional integration is visible at the regional level. These reform processes have to be consolidated without the countries in question losing their individual responsibility. Important elements of these reforms are (i) to allocate tasks and resources efficiently as well as to shift them from the central to the decentralized level, and (ii) to promote the participation of the various stakeholders and of civil society.

In most developing countries, diverse QI tasks are offered by the state. A centralized system is, however, often considered to be extremely bureaucratic, inflexible and corrupt. Individual efforts towards decentralization further a more efficient

division of labor between the different institutions of a society. This process implies that the central government cedes competencies, resources and tasks to subordinate administrative structures at the decentralized level. With regard to the QI system, it must be thoroughly considered which tasks are to be dealt with at the central or at the local level, and whether certain tasks may even be privatized. Besides privatizing diverse services of the public metrological institutes – especially in the field of verification – and certification bodies, some tasks may have to be outsourced to foreign countries in some cases. This is particularly true of testing and calibration laboratories, but also of the tasks of maintaining and disseminating the legal measurands (SI units).

Stakeholders from the private sector, from civil society and from NGOs are involved in diverse tasks relating to QI. It is, for instance, important that the private sector be involved in the elaboration of technical regulations. Involvement in standardization can also contribute to the increasing of participation. Thanks to the metrological system, the consumers can control transactions more easily and, eventually, attempts at fraud can be revealed. The purchase of most products by determining their quantities and weights is easy to check. Beyond this, consumers and producers, for example, can be involved by furthering the creation of consumer and industrial associations. Also awareness-raising campaigns for consumers and producers are carried out to highlight the relations between quality and health or quality and price.

In summary, PTB significantly contributes to good governance with its work. It is only by means of an efficient QI that developing countries are able to participate in globalization and to open up access to new markets. Beyond the promotion of good governance, QI contributes to creating development-friendly international framework conditions in the developing countries, especially with regard to trade. In this way, QI also contributes to achieving Millennium Goal No. 8 (“Develop a global partnership for development”); in addition, it supports the developing countries in combating poverty.

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## AFRIMETS

**Kathrin Wunderlich**

AFRIMETS (Intra-Africa Metrology System) was founded in 2007; it is the youngest regional metrological organization (RMO) for legal and industrial/scientific metrology. AFRIMETS was recognized by the BIPM and registered with the OIML as an African RMO in 2008. Thus, Africa was linked up with the international world of metrology.

Within the scope of its pan-African support measures, PTB's Technical Cooperation was considerably involved in the creation of AFRIMETS – not only as a pathfinder but also and especially as a consultant to the organization. AFRIMETS implemented the “best practices” and “lessons learnt” from other regional metrological organizations for its creation, paying particular attention to the special African conditions. Due to the state of development of metrology in Africa, it made sense to establish a joint organization for legal and industrial/scientific metrology.

Furthermore, it was taken into account that the political and economic development of Africa should be oriented towards a future common market (United States of Africa) and build on the existing economic communities. This is what the “S” (for “system”) stands for in the acronym: only sub-regional metrological organizations (SADCMET/SADCMEL, EAMET, SOAMET, MAGMET, etc.) can become full members; they obtain double voting rights. This entices national metrological institutions to join a sub-regional metrological association. This concept is exceptionally successful. Today, apart from a few small countries, all African states are involved with the work of AFRIMETS via the sub-regional metrological networks.

The level of the sub-regional structures is mostly in charge of the technical work. This includes carrying out intercomparisons which are – via AFRIMETS – then linked up with the international system of the BIPM. At the pan-African level, AFRIMETS has the task of coordinating or harmonizing the different strategies in the field of QI with other QI institutions in order to ensure a common approach for Africa.



AFRIMETS is a cooperation model with a rotating secretariat which is, apart from funds from development cooperation, mainly supported by voluntary donations of the more developed countries in Africa. The annual general assemblies and meetings of the Technical Committees of AFRIMETS are important junction points in the regional network and are enjoying great popularity with increasing numbers of participants – whereas the support from external donors is decreasing. A clear indicator for the increasing interest is the difficulty of positioning each participant optimally to take a group photograph – a task which is growing more and more complex every year!

There is, however, still a need for action with regard to the conception of AFRIMETS: it has not yet been possible to fit the heterogeneous African metrological landscape to a harmonious whole. There is a clash between countries due to the different level of development of their metrological systems, the boundaries between the verification system and industrial metrology still have to be surmounted, and linguistic problems are a hindrance. Furthermore, a varied appraisal of Africa's role as well as reservations towards “economically hegemonic states” represent a political challenge.

PTB is continuing to accompany AFRIMETS technically and organizationally. Awareness-raising measures, among others at the level of political decision-makers, are a further focus of cooperation. This also includes obtaining the recognition of AFRIMETS by the Commission of the African Union, a milestone for African metrology and a good example of global governance.

# Impact Studies – QI Impact of the Quality Infrastructure in Latin America: Institutions, Practices and Challenges for Public Policies

Karl-Christian Göthner, Jan Peuckert, Sebastián Rovira

In the last years, the term of “Quality Infrastructure (QI)” has evolved which comprehends the institutions and services designed to assure the conformity and the security of products and production processes in a more and more globalized and interdependent world.

Especially in many of the emerging and developing countries without sufficiently developed quality services, the high and increasing costs of developing and maintaining a QI has caused a permanent debate on whether it is necessary or not to make such high investments in this structure. In view of scarce public budgets, in many cases governments are not disposed to give the necessary inputs: sufficiently paid and qualified personal, technical equipment, adequate premises. In particular, micro, small and medium enterprises are considering the expenditures for measurements, standards, tests, etc. as costs and not as investments in the future.

Hence BIPM (International Bureau of Weights and Measures) and other international QI organizations, but also national institutions like NIST (National Institute of Standards and Technology) or DIN (German Institute for Standardization) are promoting and executing impact assessment studies. The studies define the cost-benefit relation of investments in QI and the economic, social and environmental impacts of services.[1] PTB in cooperation with ECLAC (Economic Commission for Latin America and the Caribbean) promoted a first study about social and economic impacts of the QI in some Latin American countries. Funding was provided by the German Federal Ministry of Economic Cooperation and Development within the GIZ/ECLAC cooperation agreement. The participants in the project were INTI (Argentina), INMETRO (Brazil), CENAMEP (Panama) and LATU (Uruguay). Methodologically, the work was supported by a team of the Berlin Institute of Technology (TU Berlin) and an expert of GRADE (Peru). The participating NMIs (National Metrology Institutes) self-financed their studies, but the workshops which were held to develop a mutual understanding between the participating metrologists and economists were supported by



INMETRO and German funds under the auspices of ECLAC.

The resulting publication “Impacto de la infraestructura de la calidad en América Latina: instituciones, prácticas y desafíos para las políticas públicas”[2] has to be seen as a first approach to an impact assessment of QI in the Latin American and Caribbean region. The most important results are:

- a compilation of several methods to measure the impact of QI activities stressing out the pros and cons and the complexity of the subject;
- the proof of positive effects of the re-introduction of legal metrology in Argentina on different levels: the macroeconomic level, the level of small and medium enterprises and producers, the social level;
- a study about possible positive effects of metrological controls of big balances in enterprises in

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- Panama;
- the importance of the development of standards in the case of biofuels and the determination of the acceptance of certified reference materials by the potential clients and the expected positive effects (Brazil);
- a first attempt to analyze the effects of a long-term and comprehensive sector policy for quality assurance in combination with other instruments of economic policy in the case of dairy production in Uruguay.

The study shows first advances with some measurable results as in the cases of Argentina and Uruguay, but also the existing difficulties and gaps in finding a mutual understanding between metrologists and economists, to develop a baseline and to identify and implement adequate methods for the different subjects. The findings allowed developing improved principles for political recommendations as:

- to develop the quality services along the value chains for improving the competitiveness of the sector;
- to take the transversal character of QI into consideration, with its importance not only for economy and trade, but also for health, consumer protection, environmental protection, energy efficiency, technological innovation and so on;
- the necessity of cooperation between the private and the public sector;
- to provide the necessary means for the development of QI according to the prior needs of the country.

A stimulating result consists in the increasing interest of some of the National Metrology Institutes in Latin America – partially already supported by their governments – to deepen this work in the next years. This is not only the case for Argentina, Brazil, Uruguay and Panama. Chile, Colombia and Ecuador have signaled interest in conducting impact studies. The successful outcomes convinced the Federal Ministry for Economic Cooperation and Development to extend the financing of the methodological expertise at TU Berlin, thus facilitating a theoretical support and the systematization of some of the projects to be realized by the Latin American QI institutions in the near future.

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## APMP Developing Economies' Committee

**Angela Samuel**

The Asia-Pacific Metrology Programme (APMP) began in 1977 as a Commonwealth Science Council (CSC) initiative with the primary objective of assisting national measurement laboratories in Commonwealth Asia Pacific nations to develop their capabilities and international recognition of these capabilities. The early years of APMP involved a significant focus on expert consultancy visits and workshops aimed at providing guidance to developing economies in setting up their national measurement infrastructures and training their staff. Support in the early years came largely from the CSC, the United Nations ESCAP program as well as the predecessors of the Australian Agency for International Development (AusAID) and through the resources of member institutes and governments where possible.

While its history has emphasised the importance of capacity building as a primary overall goal of the Regional Metrology Organization, it was in the year 2000 that APMP member NMIs decided to strengthen these activities through the establishment of APMP's Developing Economies' Committee (DEC).

Having been directly involved in the development of the DEC and in its operations and activities since its creation, I am delighted to have the opportunity provided by this publication to highlight the development of the DEC's work since that first meeting in late 2002. In the interests of brevity, I have provided short descriptions of three tools that have strengthened the DEC's impact on APMP's developing economies over the past almost 9 years:

- The first DEC Strategic Planning Workshop was designed and conducted in cooperation with PTB Technical Cooperation in May 2005 in Bangkok. This Planning Workshop was a watershed event in the activities of the DEC by – for the first time in that forum – directly empowering developing economy participants to actively participate in the identification of their top 10 issues/needs. Not only have these 10 issues remained core to the work plans of the DEC since this Workshop, the Workshop process has become a model for subsequent strategic planning workshops.



- DEC and PTB developed a successful model aimed at increasing the effectiveness of measurement comparison programs involving developing economy NMIs. APMP and the DEC already recognised the importance of comparison programs in demonstrating uptake from regional training activities. The approach adds on two Workshop components, one before the commencement of the comparison and one after the comparison had been completed and, in addition, identifies a developing economy NMI as the comparison pilot with a developed NMI providing a mentor role to support the pilot laboratory. The preparatory workshop is then run by the pilot with the support of the mentor to help guide comparison participants through the requirements of the comparison and provide some initial training; the concluding workshop brings participants

Visit in a pressure laboratory during an APMP workshop

Dr. Angela Samuel,  
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together to work with both pilot and mentor to discuss results and mechanisms to improve performance.

- Beginning in February 2006 with a Workshop in Malaysia, the DEC has been working with the APMP Technical Committee for Metrology in Chemistry (TCQM) to deliver a series of highly successful Metrology in Chemistry (MiC) Workshops, in which a different subset of APMP's developing economies works with experts to develop action plans to address priority issues within their economies. In themselves the Workshops are viewed as highly useful by the developing economy participants. As a by-product of these activities, Dr Laurie Besley (CEO of NMI, Australia), with input from other global experts, drafted the APMP-PTB publication, the "APMP Guide to creating

or improving a national infrastructure for chemical measurement". This publication is now used as a key reference source by a number of developing economies both within and outside the Asia Pacific as well as by other regional metrology organizations.

The DEC – working together with APMP's Technical Committees and with the significant support of PTB – can now look back on almost a decade of substantial support to APMP's developing economy NMIs.

I thank PTB "Technical Cooperation" – the management as well as the individuals with whom I have worked closely for close to a decade – whole-heartedly for the years of expert advice and support they have given me and APMP.

Happy 125<sup>th</sup> Birthday PTB!!!

# Etalons, Standards, Control and Inspection – Specifics of QI Development in Central Asia

**Jonathon Hornbrook**

Since 2008, the regional PTB project “Support to the development of Quality Infrastructures in Central Asia with special reference to metrology and accreditation” is active in the independent republics of Kazakhstan, Kyrgyzstan, Uzbekistan and Tajikistan. The political and economic background of the former Soviet Union is still perceptible in these countries today, even after 20 years of independence. In development cooperation, these republics are referred to as transformation countries. But for how long can a transition phase last and what should be the objective?

The development of economic relations in the Central Asian region is mainly complicated by a number of existing trade barriers. The Soviet heritage offers an uncoordinated system of foreign trade procedures and the involvement of the private sector in the strategy definition and policy development of foreign trade is inadequate. Also, the existing quality infrastructure services are not focused on market demands and do not correspond to international requirements. Mostly, the Central Asian countries are internally dealing with other priorities. Therefore, the level of attention paid to the highly technical field of quality infrastructure as an integral part of the economic development in these countries is rather low. So, unlike in “classic” development countries, Central Asian republics have to be motivated to transform their existing systems towards more international compatible ones.

PTB is not the only German player in the field, since 2005, one of the GIZ programmes “Support to Regional Economic Cooperation in Central Asia” began to provide technical assistance to Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan as well. This assistance is in close collaboration with ministries, state agencies and organizations responsible for technical regulation, standardization, metrology, accreditation and testing. One of the main objectives of the programme is to remove technical barriers to trade (TBTs) and to bring the countries forward to joining international agreements and best practices. Naturally, a cooperation with PTB and the Central Asian metrology institutes followed.



It should be noted that the level of services of quality infrastructure institutions and the understanding of the importance of QI by the government differ from country to country. Accordingly, cooperation approaches are determined by the needs of each country. Therefore, successful implementation of this cooperation and understanding of the specifics are the key for good results. While in one country, support for drafting national QI related laws is needed, in the other one it might be important to provide technical trainings for labs. For these tasks, the projects of PTB and GIZ involve both local and international experts.

Another important factor is to stimulate private sector demand for services of quality infrastructure organizations. For instance, up to now, there is almost no demand in Central Asia for calibration services, since measurement equipment is usually verified by legal order. As a result, no innovation processes are taking place. By raising awareness of entrepreneurs and technical capacity of metrological labs, demand and offer can be developed and matched.

Further, as a practical application the projects, together with other donors, introduce advanced methods of production control such as “lean manufacturing” and implementation of quality management systems in accordance with international standards.

Exchanging experience: GIZ and PTB experts in Kyrgyzstan

Jonathon Hornbrook, Program Director “Support of Regional Economic Cooperation in Central Asia”, Gesellschaft für internationale Zusammenarbeit (GIZ), Kyrgyzstan



PTB and GIZ provided several study tours and seminars for key experts from ministries, departments and organizations of the national quality infrastructure to developed countries with market economies (Germany, Austria, France, Norway) and countries with experience in transition from a planned economy to a market model (the Czech Republic, Slovakia). Assistance is also provided in establishing direct contacts with German institutions of quality infrastructure (DAkkS, DIN, BAM, TÜV) and institutions with best practices. In order to ensure international recognition of the QI organizations in Central Asia, both GIZ and PTB, support active involvement of key experts in inter-

national and regional organizations for standardization, metrology and accreditation, and promote the regional exchange of experiences.

As a next step of further cooperation of PTB and GIZ, the development of a joint regional programme for economic development is planned. The second phase of the PTB project plans to provide support to Central Asia until 2014, the commitment of GIZ also follows a long term approach. In the future, quality infrastructure in Central Asia will not longer mean control and inspection, but motivation and innovation, not forced verification, but demanded calibration.

## NMI – Metrology User Relations

**Salvador Echeverría-Villagómez, Taynah Lopes de Souza, Clemens Sanetra**

National Metrology Institutes (NMIs) are keystones of the quality infrastructure of their countries and economies. They establish and maintain national measurement standards, develop metrological knowledge, provide traceability and other types of services. Their main role is to deliver the full benefits of metrology to industry, government and society. The channels and ways in which relations develop among NMIs and metrology users are the key for the effectiveness of their interaction. In reality, especially smaller NMIs are still in the process to establish relations to their user community through identification and development of adequate user-oriented services.

To take actions and to address this fact and considering the experiences of other NMIs in the region of SIM, the regional metrology organization of the Americas, PTB proposed the “NMI – Metrology User Relations” idea to the SIM Council in Autumn 2008. The initiative was accepted, the concept was developed jointly and the SIM – PTB cooperation was implemented through regional workshops, followed by homework in the participating countries supported by coaches and regular audio conferences for updates and consultations among the groups. The experiences and lessons learnt led to guidance documents which are used by other NMIs now that did not participate in the program.

In March 2009 the initial four-day workshop took place in CENAM/Mexico, with the attendance of 21 participants from 20 NMIs from the SIM region, apart from the organizers (SIM, PTB, OAS) and coordinators (SIM, CENAM-MESURA, INMETRO). Several types of metrological services usually provided by NMIs were presented and analyzed by the group: group calibration, verification services, intercomparisons, proficiency tests, training programs, awareness raising, metrological evaluation, demand inventory and consultancy. Three priorities were chosen by the plenum and working groups for these topics were established: group calibration, training programs and consultancy. Individual work plans were prepared, first experiences were collected and presented in the second workshop in October 2009 in Lima/



Peru. The third gathering, a three-day workshop in Santo Domingo/Dominican Republic in June 2010, produced first results from the groups, exchange of experiences and good practices as well as new inputs from the experts and coaches. The project is due to terminate in May 2011 with a conclusion meeting at INMETRO/Brasil to finalize the guidelines, extract lessons learnt and elaborate new ideas to be worked on in future. It can already be stated that the biggest impacts came from the networking among the groups, the experience exchange and the implementations guided by coaches.

**Metrologists from Latin America and the Caribbean during a “Speed Matching” session.**

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**Dr.-Ing. Clemens Sanetra,** Consultant, Technical Cooperation, PTB

Group Calibration	Training Programs	Consultancy
<p>Group: DBOS (Dominica), DIGENOR (Dominican Republic), GNBS (Guyana).</p>	<p>Group: CENAMEP (Panama), LATU (Uruguay), SKNBS (St. Kitts and Nevis), SIC (Colombia), LACOMET (Costa Rica).</p>	<p>Group: LATU (Uruguay), INTNM (Paraguay), INDECOPI (Peru), RNM-INN (Chile), MCI (Haiti), GBS (Grenada) and BNSI (Barbados).</p>
<p>Coach: PTB (Germany).</p>	<p>Coach: INMETRO (Brazil).</p>	<p>Coach: CENAM (México).</p>
<p>The concept of “group calibration” is to offer a specific calibration in a country where the NMI has not yet established this service. The example in this group was:</p> <p>GNBS identified and grouped the requested calibrations (multimeters in Guyana) and sought support through an experienced NMI (INDECOPI/ Peru). Although the original idea was to send the Peruvian technician together with his calibrator over to provide the service in Guyana, in this case an existing calibrator from GNBS got new traceability from INDECOPI and the expert from Peru only needed to come to perform the calibrations on site in Guyana. The program was combined with training of GNBS staff and awareness events for the local industry and decision makers.</p>	<p>CENAMEP leads the work of the group and each participant was responsible for elaborating an action plan in order to improve training services provided by NMIs to industry and metrology users. NMIs were then capable of either initiating the offer of training activities in the country or of developing better annual training programs. SKNBS was coached by INMETRO and able to launch its first training course for their users focusing on the importance of metrology.</p> <p>A joint project SIM-PTB-INMETRO is under way in order to adapt long-distance training modules about basic metrology – developed by the Brazilian NMI – to the reality of other countries in the SIM region.</p>	<p>INTNM leads the work of the group. Regular online meetings were conducted and each participant developed a semiannual action plan for the preparation and implementation of the service consultancy to be established or improved.</p> <p>LATU received coaching support by CENAM and performed meetings with industrial associations, as well as pilot consultancy studies in depth in three companies of different sectors.</p> <p>The consultancy program is under negotiation to be launched with the support of the Industry Chamber of Uruguay.</p>