



## Ensuring quality, protecting the environment

A well-functioning Quality Infrastructure (QI) is the basis for effective environmental protection. Environmental standards and technical regulations specify limiting values and procedures, as well as properties of products and goods; these elements provide the basis for working carefully with and sustainably managing natural resources. Every country must possess the necessary technical expertise in order to implement these standards in practice, enable its companies and citizens to comply with technical regulations, and monitor compliance. In addition, global environmental challenges can be met only if

emerging and developing economies (alongside industrial countries) are able to assume their responsibility within the scope of global environmental agreements and global environmental policy. Joint responsibility also means that joint regulations and environmental standards are developed within the scope of close cooperation on an international, regional and national level. PTB supports its partner countries in establishing this expertise by means of its Technical Cooperation Department.

Environmental protection and sustainable development are closely interconnected, as it is the poorest segments of the population who are especially affected by contaminated water, degraded farmland, lost biodiversity and extreme climate changes.

Working carefully in nature and improving the management of natural resources contribute considerably to ensuring a sustainable means of existence, to broad-impact economic growth and to reducing poverty, and can thus be found in a number of Sustainable Development Goals (SDGs). Delinking consumption of resources from economic growth is essential for sustainable development. In addition, continuous monitoring of environmental parameters in the air, ground, water and in products is a fundamental element of national environmental and consumer protection policies. In German development cooperation, sustainable development and environmental protection play a central role. This is reflected in measures for preventing natural disasters and improving the supply of drinking water and wastewater treatment, and is also reflected in international protective efforts for forests and soil, and in global climate negotiations.



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Effective environmental protection takes place on different levels: environmental risks have to be identified, regulated and monitored (macro level); different substances have to be analysed with respect to their environmental impact, and production processes, products and services have to be inspected for compliance with environmental directives and standards (meso level); finally, public-sector and private-sector companies have to change their conduct where it is relevant to the environment and integrate these changes into their procedures (micro level).

This can only be achieved if a functioning Quality Infrastructure is available which supports these tasks at all levels: at the regulatory level, at the technical level and at the operational level. Therefore, an efficient QI is one of the fundamental prerequisites for having emerging and developing economies actively participate in meeting environmental challenges in both national and global contexts.

### **Our contribution.**

By means of its international Technical Cooperation Department, PTB supports its partner countries in establishing expertise on the macro, meso and micro levels:

In our partner countries, the macro level encompasses the environmental ministries and authorities. In its individual projects, PTB's activities are primarily characterised by awareness-raising for the significance of Quality Infrastructure and by strategic consulting.

The focal point of PTB's project activities is on the meso level, which encompasses all QI institutions in their entirety: national metrology institutes, inspection and testing authorities, calibration laboratories, standardisation institutes, regulatory authorities, certification bodies and accreditation bodies.

Taken individually, these activities comprise consultation and training for environmental inspection and testing authorities, strengthening and international integration of national metrology institutes and calibration laboratories, and consultation for national standardisation institutes and regulatory authorities. Additional activities include establishing and enhancing national and regional certification bodies which certify environmental management systems and national and regional accreditation bodies which provide accreditation to environmental testing and calibration laboratories; activities also include promoting regional cooperation and coordination.

On the micro level, which encompasses small and medium-sized enterprises (SMEs) as well as consumers, PTB contributes to raising the awareness of these groups within the scope of its projects. In addition, it advises SMEs concerning implementation of environmental management systems (e.g. ISO 14001).

In the following section, important activity areas are described:

## **1. ENVIRONMENTAL ANALYSIS**

Decisions and action strategies on environmental policy on both a national and a global level require a reliable basis of data which is primarily based on results from the field of environmental analysis. Reliable environmental analyses, in turn, cannot be obtained without a national Quality Infrastructure that guarantees the comparability of the measurement results. In most countries, the technical backbone of this infrastructure is a network of national reference and metrological laboratories which is indispensable for two essential elements of

quality assurance in environmental analysis: interlaboratory comparisons and certified reference materials.

In many emerging and developing economies, only rudiments of this metrological verification exist in environmental analysis, which in some cases has not been integrated into the international system.

## 2. ENVIRONMENTAL MANAGEMENT

Companies are important stakeholders within society for implementing sustainable development. Efforts towards a sustainable usage of resources (raw materials, water, energy) within companies allow important innovations to take place for processes and products; these innovations contribute to increased resource productivity.

For companies, one important instrument for promoting industrial environmental protection is the implementation of an environmental management system in accordance with international standards (ISO 14001). This provides the basis for an improvement of the quality and environmental compatibility of industrial products and manufacturing procedures, as well as for improved usage of resources; it also provides the conditions for the improvement of market transparency for suppliers and consumers. By implementing an environmental management system, companies can improve not only their productivity, but also their image and competitiveness.

To prove that environmental management systems comply with international standards, environmentally relevant testing and certification services are required. Proof of the competence of these testing centres and certification bodies is furnished by internationally recognised accreditation bodies. For many years, PTB has supported its partner countries in establishing local capacities in the fields of environmental management and environmentally relevant testing, certification and accreditation services, from which SMEs benefit in particular.

## 3. WATER AVAILABILITY AND WATER QUALITY

For all people, drinking water is both an essential resource and a source of nutrition. In many regions, its availability is limited due to the hydrologic conditions; in other regions, availability is in continuous decline due to changing climatic conditions. Improving the water supply, the sanitation system and resource management is one of the greatest challenges for global development. The World Health Organization (WHO) attributes 80 % of all diseases in developing countries to poor water supply and poor basic sanitation, as well as to a lack of hygiene education.

In many of the world's supply systems, up to 50 % of the extracted water is lost on its way to the consumer.

Without a precise and comprehensive measurement of flow rates, consumption and water pressure, this deficiency cannot be corrected effectively.



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For all of these reasons, it is of essential importance for emerging and developing economies to handle this scarce resource responsibly and to ensure its quality. To this end, a functional Quality Infrastructure is a valuable contribution.

## 4. ENERGY

Sustainable supply and use of energy creates the basis for sustainable development. PTB's projects contribute to the implementation and enhancement of quality-assurance services for the energy sector. These services are necessary to exploit renewable energies competitively, to optimise conversion technologies, to reduce transmission and distribution losses and to increase energy efficiency and environmental compatibility.

For additional information on this topic, please refer to the brochure entitled "Quality Infrastructure for Support of Sustainable Energy".

## 5. BIODIVERSITY AND CLIMATE PROTECTION

In the field of biodiversity and climate protection as well, quality-assurance services are of fundamental importance, for which reason they are supported by PTB's Technical Cooperation Department. Here, activities are primarily concentrated on promoting regional cooperation for developing harmonisation of ISO standards, strengthening metrological competencies, and establishing and performing accreditation programmes as well as validation, verification and certification programmes.

For additional information, please refer to the brochures entitled "Quality Infrastructure and Biodiversity" and "Quality Infrastructure and Climate Protection".



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### The impact of our work.

Establishing metrological expertise as part of an effective system of environmental monitoring and environmental control helps preserve natural resources, improve the competitiveness of export companies and reduce the costs of environmental damages. An efficient system of environmental analysis increases the acceptance and credibility of measurement results – thereby making compliance with environmental standards possible – and provides authorities with the necessary basis to make environmentally responsible decisions, as well as companies with fundamental information on environmentally damaging production technology. Furthermore, environmental analysis makes a significant contribution to enhancing environmental awareness among the general populace and in companies.

By expanding and enhancing QI services for the water sector, suppliers can conduct reliable analyses and measurements which are the prerequisites for effective quality monitoring and efficient water supply. Here, the general population benefits from improved access to hygienically safe drinking water, while resource protection is ensured by means of quality monitoring and corresponding wastewater treatment.

Improvement of consumption measurements contributes to a more efficient use of water as a resource; its impact is also economic, noticeable in the costs and economic viability of the water supply. The established know-how on analysis of drinking water and wastewater can also be applied for other measurements relevant to the environment, such as surface waters or sea water; in this way, the environmental monitoring of drinking water and wastewater is ensured.

By making available competent quality-assurance services in the field of energy, manufacturers can produce and market systems and energy-efficient devices locally. Businesses can identify energy-saving potentials, reduce their manufacturing costs and increase their competitiveness. New technologies are disseminated and accepted more quickly and efficiently. Electricity grids are made more intelligent, more efficient and more robust, and the energy supply is made more reliable. Consumers gain trust in the functionality and operating life of photovoltaic and wind power plants, as well as solar water heaters, their consumption measurements are calculated correctly, and they can rely on the available consumer information when choosing electronic and household devices.

By promoting Quality Infrastructure in the field of biodiversity and climate protection, partner countries have access to reliable technical data for political decisions; this allows them to implement the obligations they have agreed to in international conventions (Convention on Biological Diversity, United Nations Framework Convention on Climate Change etc). Companies benefit from reliable and recognised conformity assessment services, which are required for sustainable management and for innovative products and services (export of biodiverse products, climate labels). Consumers are protected from fraudulent labelling and “greenwashing”.