The First Metrology Planning Workshop

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PROPOSED BLUEPRINT FOR THE NATIONAL METROLOGY STRATEGY OF THE PHILIPPINES

I. Foreword

Imagine life without measurement. Imagine a world without accurate and reliable measurements.

There can be reliable measurement only when metrology is in place. It is not uncommon that in the Philippines many people remain unfamiliar with or unaware of metrology. Metrology? Do you mean meteorology or PAGASA? People are confused. Reason? Because the basic infrastructure of metrology is not in place, or people are not aware that there is such science of measurement, or it is not understood. This lack of understanding and appreciation, plus the absence of a well-established metrological infrastructure founded on a national metrology strategy are some of the reasons for the low competitiveness of Philippine products in world trade.

Recognizing the problems, the National Metrology Laboratory of the Philippines (NML) conducted the first metrology strategic planning workshop. It was sponsored by the national metrology institute of Germany (Physikalisch-Technische Bundesanstalt or PTB) and ably guided by its consultant, an internationally acknowledged adviser on metrology, Dr. Clemens Sanetra.

The workshop aimed to identify the needs and gaps in the current situation of metrology in the Philippines, to propose solutions on how to address the gaps, to define the relationship of NML with key players in metrology, to identify the key elements of a national metrology strategy for the Philippines, and to propose final targets and milestones in the process of implementation to achieve a metrology infrastructure fit for the needs of the country, and according to international best practices.

The importance of ensuring that measurements in the country are accurate and reliable cannot be overemphasized. From birth to death, measurement has always been part of man's life. At birth, his weight and length are measured. In his lifetime he needs measurement to enjoy a good quality of life. In death, man still resorts to measurement - to record his time of death or determine the size of his coffin.

Like ancient society, early Filipinos also had their own means of measurement to better manage their everyday life and be able to communicate with each other. They used terms to denote some form of measurement, such as "dangkal" (the point from the tip of the thumb to the tip of the middle finger) or "dipa" (the length of two extended arms) to measure length or distance, "dakot" (handful), "gatang" (a unit of measure for rice and other grains) to measure mass or weight, "saglit" (instant, moment), "sandali" (a moment, a short time) to measure time.

Today, new technology and innovation, development in industries worldwide, the growing practice of manufacturers jointly producing goods or providing services, the stiffer competition in trade, the greater expectations in public safety, consumer protection and healthcare, and the demand for higher quality of goods dictate an urgent need for greater accuracy, reliability and harmony in measurements within a country and among countries.

Metrology, together with the other components of a country's quality infrastructure (like standards, testing, certification, accreditation, quality assurance), ensures that one gets the right weight of rice or meat or the right volume of gasoline that he pays for. It ensures that spare parts of cars or airplanes made in one country accurately fit other parts produced in another country. It assures one that the radiation he gets from an x-ray machine is within safe limits. All these are possible with the right practice of metrology. All these are benefits from reliable and accurate measurements, whether they are related to the regulated areas (consumer protection & welfare) or the non-regulated areas (quality assurance, competitiveness and innovation).

This paper summarizes the output of the first workshop intended to provide the initial blueprint for a long-term national metrology strategy for the Philippines.

II. Introduction

Why is a national metrology strategy necessary?

There are many reasons why a national metrology strategy is necessary. It will provide a much deeper understanding of metrology, create greater awareness and enable the Philippines to establish a national metrology infrastructure that is best suited to the accurate measurement needs of all Filipino stakeholders. It will provide common goals for the private and public sectors working towards establishing a system that is in harmony with international metrology standards and best practices to achieve reliable, accurate measurements in the country.

Creating the right metrological set up requires big investment in equipment and infrastructure, and in the technical training of people. Developing competency needs time, and time is needed to change people's old or wrong practices and for them to adapt to international best practices. Time is needed for government to entrench best practices in national development policies. Long-term orientation is thus necessary. A national strategy is long term and can therefore serve as the constant reference through time regardless of changes of people in institutions, changes of institutions or political regime.

Why is the development of a national strategy in the Philippines timely now?

A national metrology strategy is a prerequisite to developing a strong national metrological infrastructure that, in turn, will help strengthen the position of the Philippines in its international commitments, such as the World Trade Organization (WTO-TBT Agreement) or the upcoming ASEAN 2015 economic community. It will also help establish the Philippines as an acceptable major production base in the Asian region for international markets and would lay a base for its commitment to better consumer welfare, public safety, or environmental change. A national metrology strategy shall increase the country's chance of success through time in the complete implementation of an operating national quality infrastructure.

The positive economic forecast for the Philippines made by independent and reputable financial institutions like Citi Private Bank and HSBC makes it even timely to develop a national metrology strategy if the country wants to achieve the economic prospects.

The ASEAN neighbors invested heavily in their metrological infrastructure and legal framework over the last years. In Vietnam just recently a very modern metrology law came into force. Thailand and other countries have an autonomous National Metrology Institute with its own budget. Notably impressive is the increase of measurement capabilities in these countries as well as in Indonesia and Malaysia. Therefore it is now urgent for the Philippines to catch up in building a national quality infrastructure in which metrology is a key component.

Why is The National Metrology Laboratory of the Philippines (NML) the lead agency in the development of a national metrology strategy?

NML is logically the lead agency because (1) it has been mandated by law (Metrology Act of 2003 or R.A. 9236) "to carry out the technical, calibration and laboratory functions to effectively implement provisions of the Act", "to provide international traceability of measurements" and "undertake metrological controls in the Philippines." In effect, NML is the national metrology institute (NMI) of the Philippines. (2) NML has signed as the NMI for the Philippines the International Mutual Recognition Agreement (CIPM-MRA) stating the equivalence of national measurement capabilities. Therefore it is the country's official representative in international metrological organizations and technical cooperation projects and has easy access to international experts who can provide support to metrology strategy and infrastructure in the country. (3) The NML plays a central role in the Philippine metrology system. NML is the most competent metrological institution in the Philippines. It is ISO/IEC 17025:2005 accredited by the prestigious German Accreditation Body (DAkkS) in various measurement fields and scope. This means that calibration certificates issued by NML (in the accredited fields and scopes) are acceptable in member economies worldwide, thereby benefiting the local industry through lower calibration costs and faster turn around time. NML's metrologists have also been undergoing and continue to undergo extensive technical training abroad thus improving the agency's technical competency.

In the Philippines, it is only the NML that has the metrological competence.

How shall the process be?

The metrology planning workshop, the first made since the passage of the 2003 Metrology Act of the Philippines, was initiated by NML and involved national and international experts. Participants were the Director of the Industrial Technology Development Institute (ITDI), the NML Chief and NML laboratory managers, representatives from the Department of Science and Technology (DOST), the National Economic Development Agency (NEDA) and the Philippine Metrology, Standards, Testing, and Quality, Inc. (PhilMSTQ), a private advocacy group working for the establishment of a national quality infrastructure in the country.

The workshop was sponsored and technically accompanied by Physikalisch-Technische Bundesanstalt (PTB), the national metrology institute of Germany. Metrology as its core competence, it provides scientific and technical assistance to developing countries. It provides the Philippines with assistance in setting up a national quality infrastructure and supports the NML in developing its technical competence.

Under the guidance of Dr. Clemens Sanetra, an expert in setting up national quality infrastructure system with main focus on metrology, the workshop discussed international metrology rules, standards and best practices, and the current Philippine metrology situation. It identified gaps and brainstormed to formulate this initial national metrology strategy for the Philippines which will be subject to further consultation with other concerned stakeholders.

III. The International System of Units

The International System of Units (or the "SI") is more popularly known in the Philippines as the Metric System. It is the only international measurement system underpinned by a multilateral diplomatic treaty which is the Metre Convention. The Metre Convention founded the International Bureau of Weights and Measures (BIPM) as intergovernmental organization to provide technical reference in the worldwide measurement system. The national counterparts of the BIPM are the National Metrology Institutes (NMI's), which are the unique national authorities for everything in the country related to correct measurements and implementation of the metric system. Equivalence of measurements between countries is assured by a strict system of inter-NMI comparisons and peer evaluations supervised by the BIPM. The BIPM also manages the international database in the internet where the evaluation results of equivalence are published as "Calibration and Measurement Capabilities" (CMC). The CMCs reflect each country's metrological capabilities. They are a basis for the recognition of the technical competence of the country in Conformity Assessment under Free Trade Agreements. They create confidence among economies and in case of disputes related to measurements (rejection of goods in export, non-compliance of international commitments, etc.). Their non-existence can be critical.

Through the SI, measurements are equivalent and easily accepted in global trade and other undertakings. More information can be found in www.bipm.org/en/home.

In the Philippines, the SI is so far the only allowed measurement system.

IV. The National Metrology Infrastructure

The objective of the national metrology strategy is to put in place a strong national metrology infrastructure. This is an arrangement or set up in which various groups, organizations or agencies involved in ensuring accurate and reliable measurements in the country work jointly and harmoniously

according to agreed working procedures, systems, rules or guidelines governing their own or joint areas of operation or activities to achieve the goals of the national strategy.

While the National Metrology Laboratory of the Philippines does not yet have the legal, financial, autonomous and prestigious status like other countries' NMI's, it has been mandated by law (Metrology Act of 2003 or R.A. 9236) "to undertake metrological controls in the Philippines" and it functions as the country's National Metrology Institute (NMI). It will thus operate at the center of the national metrology infrastructure to lead and interface with the other bodies, organizations or government agencies.

As the NMI, duties and functions of NML include the following: to develop and maintain measurement standards, to work on the recognition and acceptance of measurements done in the Philippines by the international community, to ensure the use of the SI in the country, to disseminate knowledge and information regarding metrology, to provide advice to government policy makers and public or private institutions and industries on international measurement developments, to serve as the Philippine representative to regional and international metrological organizations, and to work with the other components of the metrology infrastructure to ensure compliance to international metrological best practices, supporting in the process the realization of the country's development plans.

But how do we put order into the national metrological infrastructure considering that there are many tasks and responsibilities to do?

Putting in place Philippine metrological infrastructure would necessitate addressing key strategic elements of the national metrology strategy:

1. **Development of a National Metrology Policy**

It is important that a National Metrology Policy is developed, promulgated and implemented to ensure efficiency, and to avoid overlapping or contradictions in operations, specially across different government institutions.

2. **Collaboration with Regional and International Metrological Organizations**

Being the official metrological reference for the country and the Philippine representative to international metrological events, NML has to actively participate in the activities of these organizations and collaborate with the NMIs of other countries.

3. **Delivery of Top Level Metrological Services to Industry**

In order for Philippine industries to become more globally competitive in the production of high quality products and services, NML should be able to deliver top-level metrological services, specially those needed by key local industries.

4. **Service Measurement Needs Through a Network of Designated Institutes (DIs)**

To ensure that NML's metrological network of Designated Institute (DI) is expanded so that relevant measurement needs are serviced according to NMI's best practices, necessary policies and guidelines for the selection of DIs have to be established and funding provided.

5. **Development and Maintenance of Philippine Measurement Standards**

For NML to effectively perform its functions, it has to be equipped with the needed infrastructure and develop its metrological capabilities so that NML and the DIs can achieve and maintain Calibration and Measurement Capabilities (CMC) in all relevant areas for the Philippines. NML also has to develop capabilities and good relations to the Philippine industries to satisfy their high level metrological requirements. This requires development, custody and maintenance of the Philippine physical and chemical national standards.

6. **Strengthening the Link to Secondary Laboratories**

Relation of NML with secondary metrology calibration laboratories and Metrology in Chemistry laboratories (the national reference being NML) need to be strengthened to provide support to enable these laboratories to perform satisfactorily routine calibration to the industry. The traceability should come from a competent NML. (Metrological traceability means that there is an unbroken chain of measurements from the industry through calibration laboratories and the national reference standards of the NMI to the international standards and the SI units.)

7. **Establishment of Strong Links with Regulators**

To deliver greater consumer protection, higher level of public safety and environmental protection, NML must establish strong working relations with regulators to assure that measurements performed in regulatory enforcement are accurate, reliable, according to international best practices and with traceability to the national measurement standards in NML.

8. **Contribute to and Promote the Philippine Quality Infrastructure**

For a national quality infrastructure (NQI) to be effectively working, all the NQI components of standards, metrology, testing, certification, and accreditation, etc. have to work in a coordinated and systemic approach. There are multiple interactions within the NQI (Bureau of Product Standards - BPS, Philippine Accreditation Office – PAO) and with the stakeholders in the private and public sector. NML has to contribute to the NQI and promote its use in the country.

9. **Strengthen NML as an Organization**

NML has to strengthen itself as an organization in various areas like quality management, planning, corporate imaging, and administrative procedures in order to provide efficient and customer oriented services and operating according to international best practices in metrology.

10. **Awareness Creation for Metrology and NML's Role**

Considering that there is low awareness and understanding about metrology, NML needs to be recognized by all relevant sectors, specially by the government as the national knowledge center for metrology through a strategic information, educational and marketing campaign funded and sustained at least in its initial phase.

V. Situation in the Philippines

The situation of metrology in the Philippines still leaves much to be desired if it were to be compared with some of its neighbors like Thailand, Singapore and Indonesia. There is still no well-functioning metrology system in the country.

The Metrology Act of 2003 which was supposed to put in place a measurement infrastructure in the country has not been implemented. Thus, there is no clear and official designation of NML as the national metrology institute of the Philippines, though in practice it functions as the Philippine NMI. The legal framework for the metrological infrastructure comprising the regulated and non-regulated fields is not in place too, and already outdated according to international guidelines and best practices.

The NML, which has to fulfill a national task and by designation is on top of the measurement hierarchy in the Philippines, is only a small division among many others in ITDI. Without its own resources and autonomy, it will be unable to develop its physical laboratory infrastructure requisite to act proactively as the national metrology agency.

Considering its big responsibilities, the NML is inadequately supported to establish the right infrastructure, hire the needed personnel complement and advance the competency of its people. Its capabilities are still limited and it cannot provide all services needed by the local industry. It is only able to offer a few calibration services that are of a higher order than those offered by PAO accredited calibration laboratories. With the limited services of NML, industries and the calibration laboratories in some cases seek recalibration of their equipment abroad making the process longer and more costly.

While small-scale advancements at NML are constantly being made, these are not embedded into a national approach.

There is also limited awareness and full understanding of metrology and its best practices among stakeholders and consumers in general. The lack of this understanding is true even among some people in this field.

The metric system or the SI, which the Philippines formally subscribed to, is not popularly known nor consistently used. The internationally harmonized SI abbreviations for the meter, kilogram or other units are mixed up with all forms of confusing terms. (Who knows what is the difference between kg, Kg, kgs, KGS, gms, gr or g? Are they all the same?). Some people are still comfortably using the US measurement system such as psi for tire gauge pressure, yards for textiles in Divisoria, inches for undergarments sizes. Construction materials such as wood is more commonly measured as dos por dos (which is actually 2 x 2 inches thick), and tarpaulin prints or poster prints are ordered in feet. There

remains a need to more aggressively inform, educate and remind the people, companies and even government decision makers the need to put the SI into practice.

Much is needed to be done in Philippine metrology.

VI. Strategic Development in Philippine Metrology Over the Next 15-20 Years

Following the key elements of the national metrology strategy, the first metrology planning workshop proposed the following strategic directions:

Objective 1: Develop a long term National Metrology Policy

1. Final Target

The national metrology policy is developed, implemented and regularly updated to support the national development plan.

2. Goals

a. Establish a competent advisory board for the national metrology institute (NMI)

b. Pass a new legislation for a modern metrology law, harmonizing other laws affecting the development of a national quality infrastructure for the country, like in the areas of standardization, testing, quality management (certification and accreditation).

c. Implement the metric system, which is the International System of Units (SI).

d. Generate government budget for NML to enable it to perform its duties and functions as the national metrology institute and to implement the national metrology strategy.

Objective 2: Strengthen NML's relations with regional and international metrology organizations

1. Final Target

NML and its Designated Institutes (DIs) become members of regional and international metrology organizations and actively participate in relevant activities.

2. Goals

a. Regularly collaborate with national metrology institutes in other countries.

b. Participate actively in Asia-Pacific Metrology Program and the International Bureau of Weights and Measures (BIPM).

c. Source funds for membership in organizations.

Objective 3: Support industries to become more competitive in world trade

1. Final Target

Industries are fully serviced in their measurement-related needs.

2. Goals

a. Conduct demand survey and match with equivalent NML services.

b. Create greater industry awareness about NML and initiate closer relationship with industries.

c. Provide consultancy services to advanced industries.

Objective 4: Establish Designated Institutes (DIs) to expand NML's network of national reference standards.

1. Final Target

DIs are available in all relevant areas working according to NMI best practices.

2. Goals

a. Create designation criteria and policy.

b. Provide funding for DIs.

c. Ensure well-coordinated implementation of plans.

Objective 5: Development of NML's (and DI's) technical competence.

1. Final Targets

Achieve and maintain CMCs in all relevant areas, satisfy high-level metrological demand, and establish and maintain physical and chemical national standards.

2. Goals

a. Set up a highly competent technical team.

b. Establish appropriate laboratories, equipment, installations and build office and laboratory structures.

c. Improve standards and traceability procedures, inter-comparisons and peer reviews.

d. Increase number and scope of metrological services provided.

Objective 6: Streamline and strengthen relations with calibration and MiC laboratories and provide them the necessary support.

1. Final Target

PAO accredited laboratories can satisfy needs for routine calibration and chemical analysis traceable to the NML and DIs.

2. Goals

a. Establish national inter-comparisons.

b. Organize metrology clubs.

c. Implement a promotions program to generate awareness and interest.

Objective 7: Develop closer relations with regulators to support accurate and reliable measurements in law enforcement.

1. Final Target

Metrological traceability is implemented in the enforcement.

2. Goals

a. Generate higher awareness on traceability and traceability requirements.

b. Maintain regular monitoring of lab facilities and practices.

Objective 8: Provide strong technical support to the national quality infrastructure.

1. Final Target

Metrology is integrated as part of the operating system of the National Quality Infrastructure.

2. Goals

a. Sign Memorandum of Agreement (MOA) with the national standards, accreditation and other regulatory bodies, LGUs and advocacy groups. Implement and monitor agreed areas of cooperation. Self-regulate.

b. Provide total support in the value chain process.

Objective 9: Strengthen NML in its institution building activities.

1. Final Target

NML (and DIs) operate according to international best practices in metrology, delivering greater customer satisfaction and creating a corporate image of authority, reliability, accuracy.

2. Goals

a. Ensure availability of sufficient budget for its operating plan.

b. Conduct annual planning.

c. Institutionalize quality management systems, administrative and operational procedures, and skills enhancement program.

d. Create stronger corporate image.

Objective 10: Implement a marketing campaign for better awareness and understanding about metrology and NML.

1. Final Target

NML is recognized by all sectors as the national knowledge center for metrology.

2. Goals

a. Implement a national information-education campaign.

b. Conduct training programs such as train-the-trainer to cascade expertise and knowledge to other groups and educational institutions.

c. Disseminate metrology information materials.

VII. Conclusions and Next Steps

The first metrology planning workshop provided the initial framework where the crafting of a full national metrology strategy for the Philippines shall evolve from.

A national metrology strategy is necessary to serve as the basis for putting up an effective metrology infrastructure that will strengthen the position of the Philippines in world trade, enable it to produce better quality products competitive with other countries, and identify and promulgate the necessary legislative support.

By virtue of its mandate and being the only metrologically competent agency in the country, the NML shall serve as the lead agency in the development of a national metrology strategy and infrastructure. This requires addressing key strategic issues to achieve long-term objectives and goals identified in the workshop and proposed in this paper. The strategy will help the government deliver its medium and long-term development plans and reinforce consumer welfare and protection.

Further sectoral consultations in each key strategic element shall be conducted after the first workshop; round table discussions with stakeholders and experts will be done; awareness, information dissemination and educational campaign shall be implemented; and finally, discussions with and presentation of recommendations to decision-makers in government will be done to provide the necessary legal basis and support for the implementation of an agreed long term Philippine Metrology Strategy.