

Guide for National Metrology Institutes

How to Develop Services Assuring Orientation to Users

On behalf of the German federal government, the Physikalisch-Technische Bundesanstalt (PTB) promotes the improvement of framework conditions for economic activity, thereby supporting the establishment of metrology.



| | | |
|-----|--|----|
| | Context | 3 |
| | National Metrology Institutes (NMI) | |
| | The Importance of NMIs | |
| | NMI Users | |
| | NMI Services | |
| | The Project: “NMI-Metrology User Relations” | |
| | What is in this Guide? | 5 |
| | How to use this Guide | 6 |
| | Strategic Options for the Development of NMI Services | 8 |
| | Key Stages for the Development of NMI Services | 11 |
| | Needs Assessment – Tools | 13 |
| 1.1 | Analysis to Identify Stakeholders | 13 |
| 1.2 | SWOT Analysis | 16 |
| 1.3 | Identifying Demand | 20 |
| 1.4 | Awareness Raising Seminar | 25 |
| 1.5 | Identifying the Offer | 31 |
| 1.6 | Analysis of Opportunities (<i>gaps</i>) | 33 |
| | Service Planning – Tools | 35 |
| 2.1 | Selection and Design of Service or Project | 35 |
| 2.2 | Strategic Planning | 37 |
| 2.3 | Operational Planning | 39 |
| 2.4 | Budget Preparation | 42 |
| 2.5 | Cooperation between Institutes | 45 |
| 2.6 | Preparation of a Pilot Consulting Project | 47 |
| 2.7 | Design of an Annual Training Program | 49 |
| 2.8 | Preparation of Training Workshops | 51 |
| 2.9 | Training of Trainers/Instructors | 53 |

| | | |
|------|---|----|
| 2.10 | Organisation of Group Calibration | 55 |
| 2.11 | Standardisation of Protocols for Proficiency Tests | 57 |
| | Implementation – Tools | 60 |
| 3.1 | Integration of External Counterparts | 60 |
| 3.2 | Implementation of Pilot Consulting Projects | 63 |
| 3.3 | Implementation of Training Workshops | 64 |
| 3.4 | Implementation of Group Calibrations | 66 |
| 3.5 | Building Networks of Secondary Laboratories | 68 |
| 3.6 | Implementation of Regulations | 70 |
| 3.7 | Metrology Training for Teachers of Formal Education | 73 |
| 3.8 | Entrepreneurs Show | 76 |
| | Evaluation – Tools | 78 |
| 4.1 | Evaluation of Chains of Impacts | 78 |
| 4.2 | Periodic Evaluation of Service | 80 |
| 4.3 | Evaluation of the Service “Proficiency Tests” | 82 |
| | Support Processes – Tools | 84 |
| 5.1 | Coaching | 84 |
| 5.2 | Monitoring | 87 |
| 5.3 | Ongoing Awareness Raising | 88 |
| 5.4 | Soft Skills | 90 |
| 5.5 | Visibility of Results | 91 |
| | Acknowledgements | 92 |
| | Guide Preparation | 93 |
| | Documents Associated to Each of the Tools. Reference Table | 94 |

Context

National Metrology Institutes (NMI)

NMIs are the institutes that develop, maintain and safeguard the standards of measurement in each country. They are one of the pillars of National Quality Infrastructure.

An NMI is typically a public organisation involved with several stakeholders, among them: the Government, science and technology organisations, as well as trade, industry and economy organisations. In the international arena, it is involved with International Metrology Organisations such as the CGPM¹, CIPM², BIPM³ and RMOs⁴ (EUROMET⁵, SIM⁶, APMP⁷, etc.).

The Importance of NMIs

Governments allocate resources for the operation of an NMI because they render important services to their citizens, covering many of the responsibilities inherent to the State; for instance:

- Quality of life: health, safety, protection of the environment, consumer protection.
- Development of industry and of service companies: quality of production/service, productivity, efficiency, competitiveness.
- Economy and trade: fair trade, free trade, non-technical barriers.
- Innovation and technological development: assessment of efficiency and effectiveness, comparability of and confidence in results, new measurement methods and technologies.

NMI Users

From a political and socio-economic standpoint, all NMI activities have the practical purpose of serving the citizens of the country and self-sustainable economies.

The following may be found among the main direct users of NMI capabilities:

- Metrology Laboratories: calibration, testing, analysis, etc.
- Quality infrastructure: standardisation, accreditation, conformity assessment.
- Sector-specific laboratories: health, safety, construction, environment, services (water, energy, oil, etc.).
- Industry: manufacturing (plastics, metal-mechanic, appliances, automotive, aerospace), processes (chemical, petrochemical, food, pharmaceutical, etc.).
- Regulating Entities.
- Specific companies and other companies.
- Universities and Institutions of Higher and Upper Secondary Education.
- Research institutions and innovation systems.

1 General Conference on Weights and Measures

2 International Committee for Weights and Measures

3 International Bureau of Weights and Measures

4 Regional Metrology Organisations

5 European Collaboration in Measurement Standards

6 Inter-American Metrology System

7 Asia and Pacific Metrology Program

NMI Services

Effective bonds with users are necessary for NMIs to fulfil their roles. These bonds are mainly created by means of:

a) Services:

- Calibration.
- Testing.
- Training.
- Consulting.
- Inter-laboratory comparisons.
- Proficiency Testing.

b) Projects:

- Research.
- Technological development/Technology Transfer.
- Innovation.

c) Raising awareness and education:

- Conferences.
- Forums.
- Training in Metrology.
- Meetings.

d) Collaboration of technical experts on various topics:

- Standardisation Committees.
- Legal Metrology.
- Accreditation.
- Sectorial panels.

The Project: “NMI-Metrology User Relations”

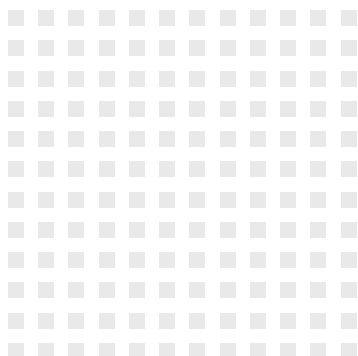
Between March 2009 and March 2014, the Professional Development Committee of the SIM (Inter-American Metrology System) and the International Technical Cooperation of the PTB (*Physikalisch Technische Bundesanstalt*) promoted and supported a project with the following objectives:

- Raise awareness about the importance of the NMI among Metrology users (for example, industry, regulators, trade and services).
- Strengthen the relationship between NMIs and the users of Metrology services by developing specific Metrology services.

This project, called “NMI-Metrology User Relations”, was implemented in two phases. During the first phase (2009-2011) the following services were created and consolidated: consulting, training and group calibration. During the second phase (2012-2014), actions were taken to bring closer the relationship between NMIs and regulating bodies, secondary laboratories and educational institutions.

During the course of the project, Working Groups were created for each one of the aforementioned areas, consisting of representatives of the NMIs of the SIM. During the first phase, 11 NMIs participated with 12 completed projects, and during the second phase, 15 NMIs participated with 24 projects. They shared their experiences, promoting collaborative work at each one of the phases.

The project was also supported by the Organization of American States (OAS), the National Institute of Metrology, Quality and Technology of Brazil (INMETRO), the National Metrology Centre of Mexico (CENAM) and, as of the second phase, also by the National Institute of Industrial Technology of Argentina (INTI) and the Technological Laboratory of Uruguay (LATU).



What is in this Guide?

This Guide presents different tools to facilitate the implementation of new services that an NMI could offer to its users or consolidation of existing services. Furthermore, this Guide can bring support to projects with entities that are or should be related to Metrology. The tools are a compilation of recommendations based on the experiences of NMIs that participated in both phases of the project “*NMI-Metrology Users Relations*”.

Services/projects that were developed or consolidated are related to:

- **Metrology consulting.**
- **Programs for Metrology training.**
- **Calibration (group calibration).**
- **Metrology regulations.**
- **Development or strengthening of capabilities of secondary laboratories.**
- **Educational institutions (basic, secondary and higher levels).**

The presentation of these tools allows readers to easily pick and choose those that apply to their particular NMI, depending on its current conditions. For each tool, a reference to various documents is presented, showing how participants applied that particular tool during the project. In order to navigate this Guide and to be able to review the tools and documents describing specific examples from the NMIs, please follow the ‘navigation path’ described in the topic ‘How to use this Guide’.

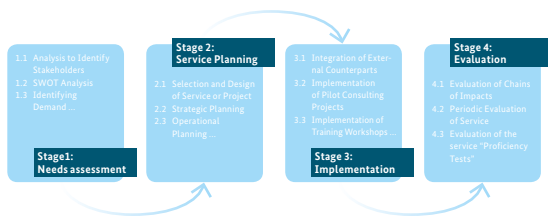
This Guide is addressed to Directors of National Metrology Institutes and heads of department and laboratory in charge of providing NMI services.

How to use this Guide

To facilitate reading, it is advisable to use the Guide as described below:

1 Please first read the topic ‘**Strategic options for the development of NMI services.**’ This topic will allow you to identify the starting point and the scope of the subsequent activities.

2 Please continue with the topic ‘**Key stages for the development of NMI services.**’ This topic offers an overview of the processes for the development of NMI services or projects. It helps to identify initial steps and to select specific tools that will aid in the development and implementation of the service.



Identify the „Tool“ you wish to review.

3 Review the table of **characteristics** of the selected tool.

| Tool 1.2 SWOT Analysis | |
|------------------------|---|
| Description | Analysis of strengths, weaknesses, opportunities and threats associated to the NMI and its environment. |
| Objectives | <ul style="list-style-type: none"> To evaluate the NMI. To evaluate stakeholders' perspectives and perceptions. To evaluate existing and potential services. To support the evaluation and selection of strategic options. |
| When it applies | <ul style="list-style-type: none"> During the initial stage of the project strategic definition. Preparation for the needs assessment. When external or internal changes take place. |
| Requirements | Interest of the NMI in making an inclusive analysis taking into consideration positive and negative aspects. |
| Resources | Low. |
| Tool Limitations | The strategic orientation of the NMI is a complex process requiring iterative cycles, which cannot be accomplished merely in a workshop. |
| Steps | 1.2.1 Bring together a multidisciplinary working group. 1.2.2 Define the scope of the analysis. 1.2.3 Promote brainstorming to identify 'STRENGTHS'. 1.2.4 Promote brainstorming to identify 'WEAKNESSES'. 1.2.5 Promote brainstorming to identify 'OPPORTUNITIES'. 1.2.6 Promote brainstorming to identify 'THREATS'. 1.2.7 Analyse results and conclusions. Please review the summary table for each step on the following page. |
| Templates/Forms | SWOT quadrants (Annex 1.2/F1). |
| Example | SWOT analysis made during the Seminar 'Strategic importance for innovation and development' at the LATU (Annex 1.2/E1). |

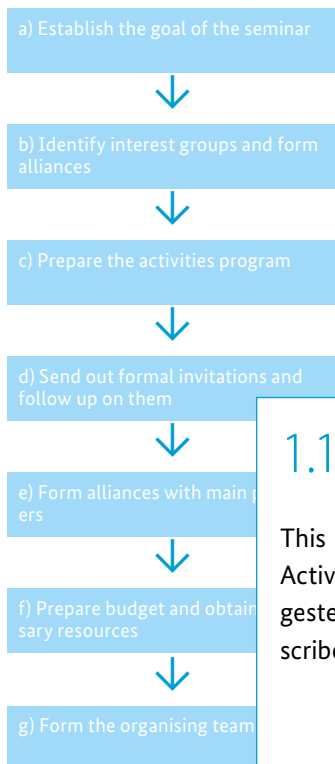
4 Read the support information linked to each tool, as indicated in the following diagram. The support information contains details of the activity, an example⁸ of its application by one or several NMIs and, in some cases, a suggested template or form.



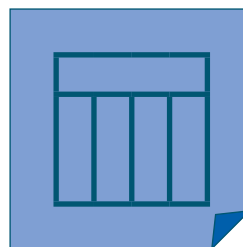
⁸ The examples of how the tools were used by the NMIs were described for the participants who wanted to share their experiences. There are some institutes that participated with many projects in both phases of the program, so you may observe that some institutes present more examples than other ones.

| Tool 1.2 SWOT Analysis | |
|------------------------|---|
| Description | Analysis of strengths, weaknesses, opportunities and threats associated to the NMI and its environment. |
| Objectives | <ul style="list-style-type: none"> To evaluate the NMI. To evaluate stakeholders' perspectives and perceptions. To evaluate existing and potential services. To support the evaluation and selection of strategic options. |
| When it applies | <ul style="list-style-type: none"> During the initial stage of the project strategic definition. Preparation for the needs assessment. When external or internal changes take place. |
| Requirements | Interest of the NMI in making an inclusive analysis taking into consideration positive and negative aspects. |
| Resources | Low. |
| Tool Limitations | The strategic orientation of the NMI is a complex process requiring iterative cycles, which cannot be accomplished merely in a workshop. |
| Steps | 1.2.1 Bring together a multidisciplinary working group. 1.2.2 Define the scope of the analysis. 1.2.3 Promote brainstorming to identify 'STRENGTHS'. 1.2.4 Promote brainstorming to identify 'WEAKNESSES'. 1.2.5 Promote brainstorming to identify 'OPPORTUNITIES'. 1.2.6 Promote brainstorming to identify 'THREATS'. 1.2.7 Analyse results and conclusions. Please review the summary table for each step on the following page. |
| Templates/Forms | SWOT quadrants (Annex 1.2/F1). |
| Example | SWOT analysis made during the Seminar 'Strategic importance for innovation and development' at the LATU (Annex 1.2/E1). |

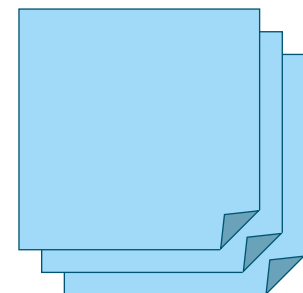
**Activities for each step
(Flow chart and/or
summary tables)**



Forms/Templates



**Example of how the Tool
is used by the NMI**



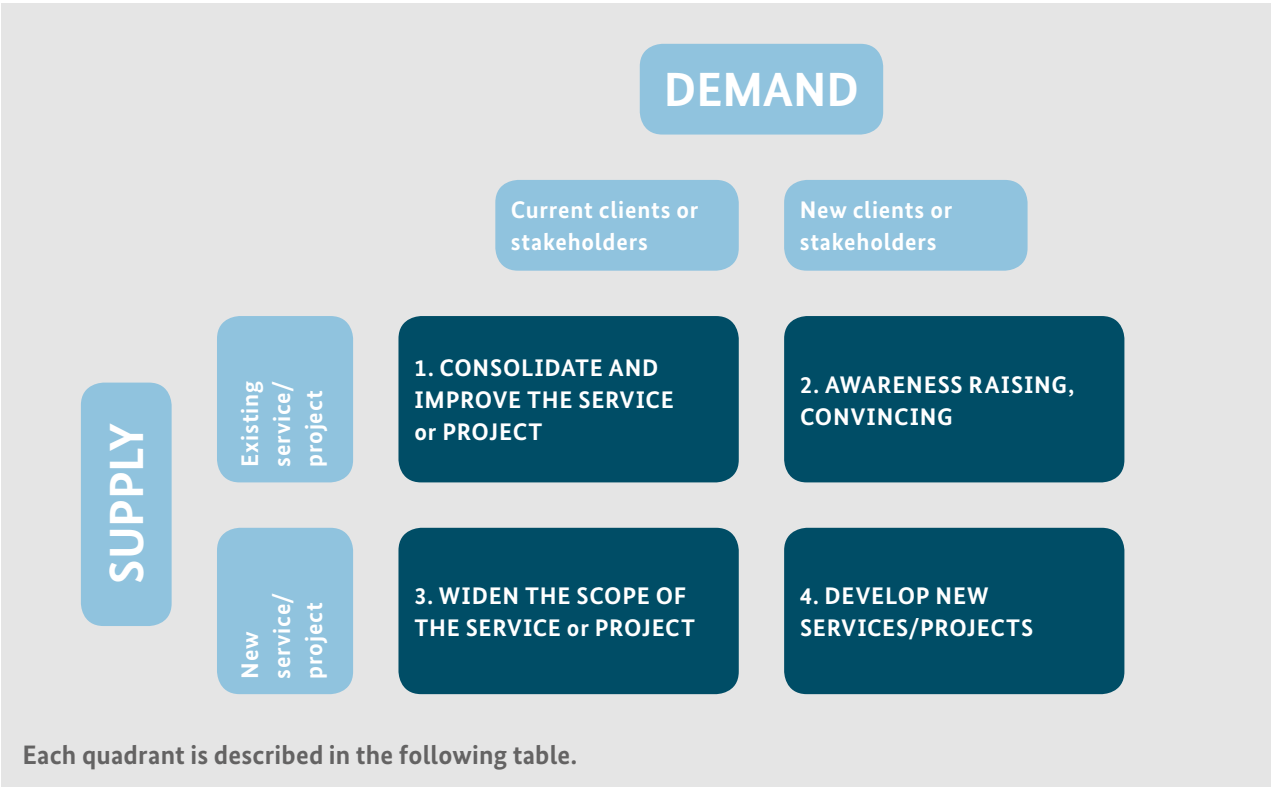
1.1.1 Title of summary table
 This is a summary table. Activities or steps suggested by the Tool are described here.

Strategic Options for the Development of NMI Services

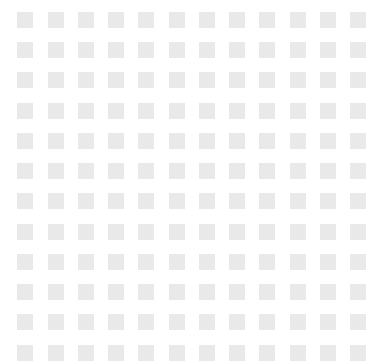
To define the best strategy to follow in your NMI, it is necessary to identify strategic options for the service or project you wish to develop. See in the diagram of the following page the four quadrants that characterise services based on supply and demand. Use the following questions as a guide for your choice:

- Do you wish to improve an existing service/project to offer it to current clients/stakeholders? (Quadrant 1),
- Do you wish to improve an existing service/project for new clients/stakeholders? (Quadrant 2),
- Do you wish to develop a new service/project for known clients/stakeholders? (Quadrant 3), or
- Do you wish to develop a new service or project to offer it to new clients/stakeholders? (Quadrant 4).

It is very important to be mindful of the context for the creation/consolidation of a service/project. Regardless of the quadrant you are in, it is advisable to identify, for example, the need to carry out awareness raising events and/or activities, the participation of the NMI as a player or promoter of public policies, the influence of the project on innovation, the impact of the service/project on the competitiveness or other aspects that may be characteristic of the NMI in that particular country.



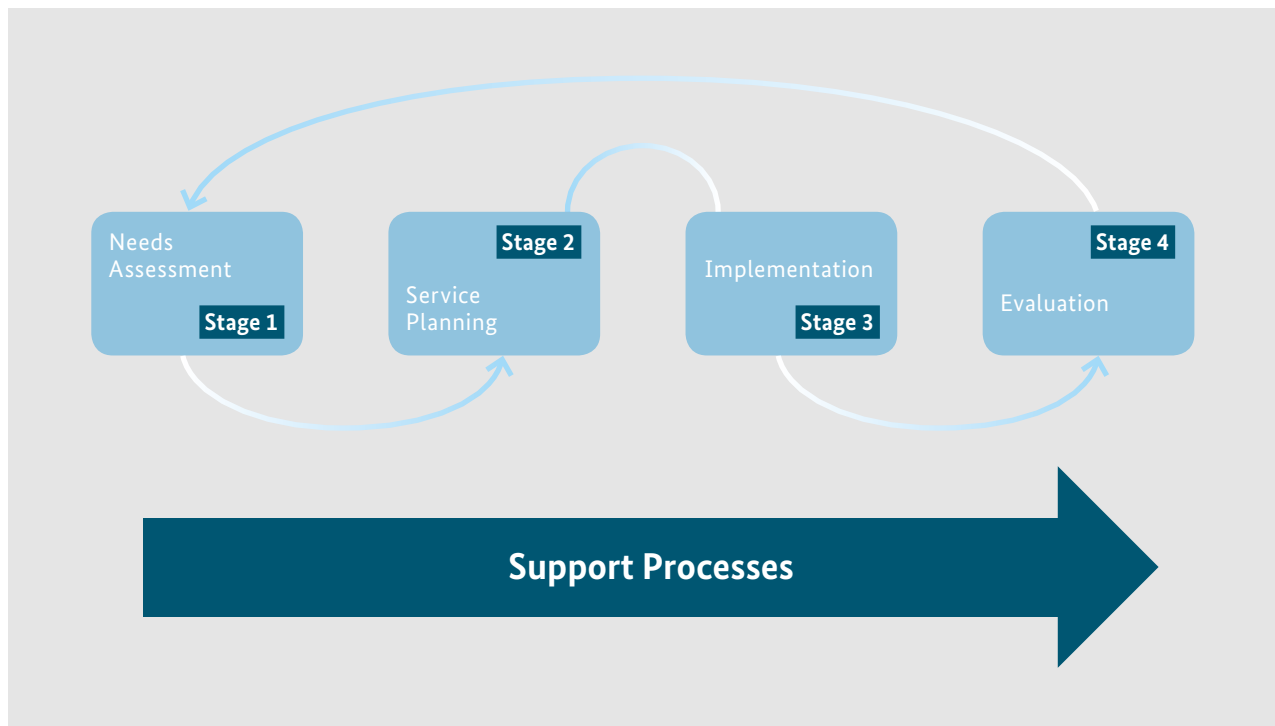
| | Strategy 1 Existing services/projects and known clients/stakeholders | Strategy 2 Existing services/projects and new clients/stakeholders |
|------------------------|---|--|
| Description | Consolidate and improve existing services/projects for known or existing clients/stakeholders. | Offer existing services/projects (improved) to new clients/stakeholders. |
| Objectives | <ul style="list-style-type: none"> ■ Increase user satisfaction with the services that are being offered. ■ Increase the recognition of the NMI. ■ Increase revenue. ■ Increase efficiency of NMI processes. | <ul style="list-style-type: none"> ■ Increase the number of clients. ■ Meet existing needs. ■ Use an economy of scale. ■ Increase revenue. |
| When it applies | <ul style="list-style-type: none"> ■ Existing services/projects not recognised. ■ When there are complaints from clients/stakeholders. ■ Existence of inefficient NMI processes. ■ Before applying Strategies 2, 3 and 4. | <ul style="list-style-type: none"> ■ High demand by new clients. ■ Importance for the economy and social development. ■ Political priority. |
| Requirements | Institutional planning and desire to improve the service/project. | <ul style="list-style-type: none"> ■ Recognition of services/projects. ■ Awareness raising, Marketing. |
| Resources | Low. | Low. |



| | Strategy 3 New services/projects for known clients/ stakeholders | Strategy 4 New services/projects for new clients/ stakeholders |
|------------------------|--|--|
| Description | Widen the scope of services/projects for known clients/stakeholders. | Develop new services/projects for new clients/stakeholders. |
| Objectives | <ul style="list-style-type: none"> ■ Meet the demand of existing clients. ■ Improve client satisfaction. | <ul style="list-style-type: none"> ■ Invest in new markets with high potential. |
| When it applies | <ul style="list-style-type: none"> ■ High demand for new services for known or existing clients. ■ Political priority. ■ Importance for the economy and social development. | <ul style="list-style-type: none"> ■ Importance for the economy and social development. ■ Long term investment. |
| Requirements | <ul style="list-style-type: none"> ■ Sufficient demand from existing clients (critical mass). ■ Awareness raising, Marketing. | <ul style="list-style-type: none"> ■ Sufficient resources. ■ Sufficient demand in the long term for new services and new clients. ■ Political support. ■ Awareness raising, Marketing. |
| Resources | Medium. | High. |

Key Stages for the Development of NMI Services

Key stages for the development/implementation of a service/project are shown in the following diagram:



Needs Assessment: Prior to planning, it is necessary to clearly identify the supply and demand, as well as the characteristics of the clients or users (current and potential). “**WHAT?**” is the question to be answered.

Service Planning: Based on the needs assessment, the characteristics of the service/project should be chosen and determined. Once the characteristics of the users/stakeholders and of the service have been identified, work programs are drawn up for the development and implementation of the service. “**HOW?**” is the question to be answered.

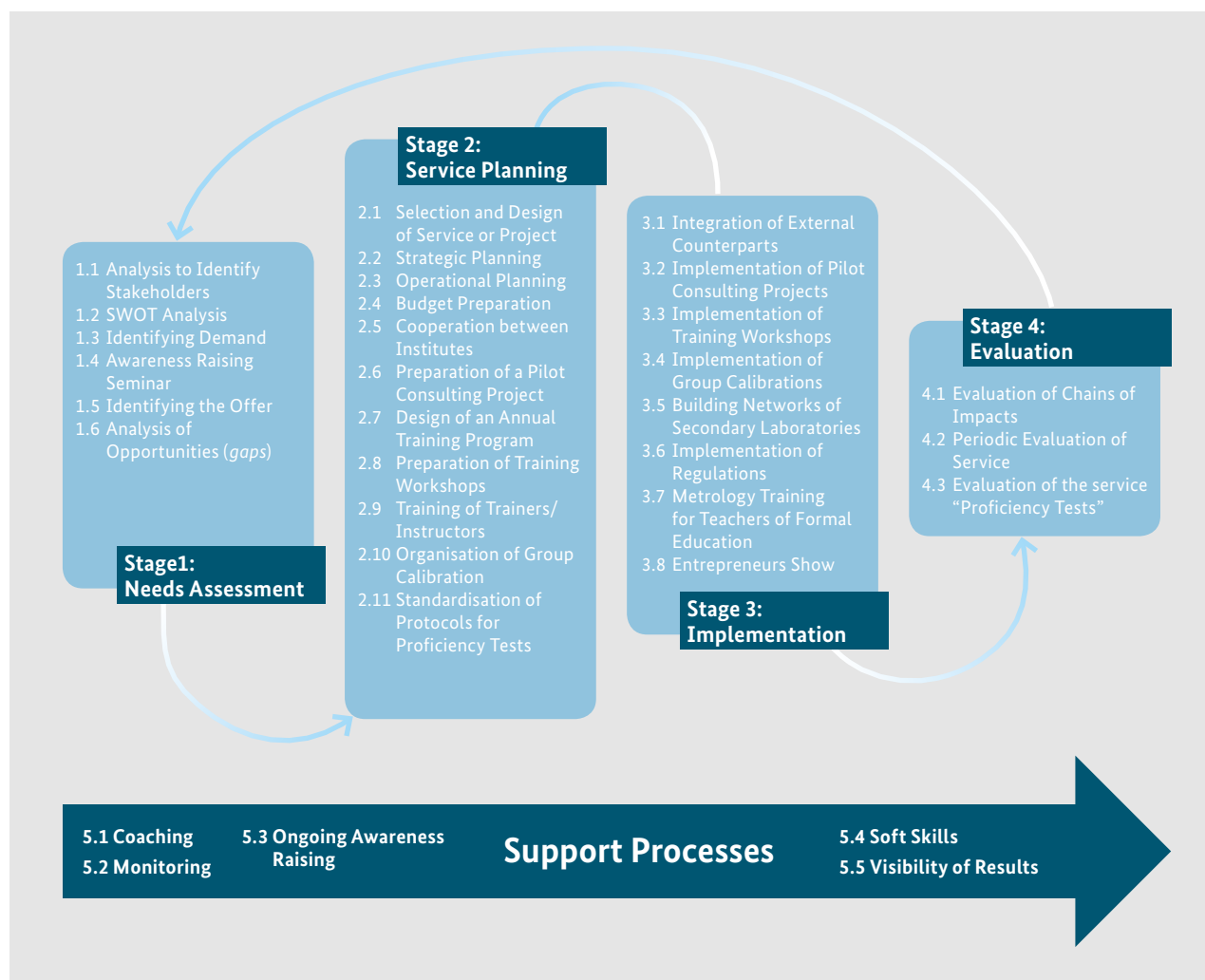
Implementation: The following stage is the implementation of work programs, as well as the adjustments required to adapt the service/project to the actual needs of NMI users, taking into consideration the availability of NMI resources. Specific tools to support the implementation of specific services/projects are described in this section.

Evaluation: The last stage evaluates whether the designed service/project is achieving its expected impact. Identify the outputs (tangible results, new or improved technical capabilities), outcomes (achievements, benefits achieved as a consequence of the output) and impacts (significant changes in the political, social or economic aspects), as well as the benefits for the country, the NMI and the users.

Support Processes: Some activities are key factors for the continuity of the whole process; hence, support tools were implemented during the project and they are described in the corresponding section.

The process may be cyclical, which is why there is an arrow in the diagram linking the final stage with the starting stage.

During the “NMI-Metrology User Relations” project different tools were used to support different stages for the development or consolidation of NMI services/projects. Tools may be applied at different levels depending on the strategy selected. Please review the following diagram for an overview of tools at all stages.

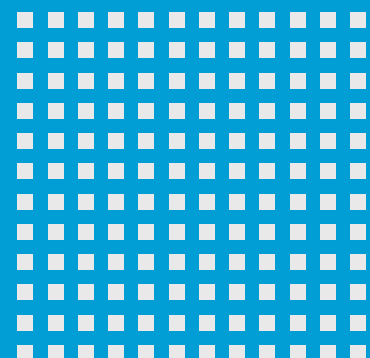


Stage 1

Needs Assessment

Tools

The following tools may help to evaluate needs effectively, regardless of the service or project to be developed.



1.1 Analysis to Identify Stakeholders

| Tool 1.1 Analysis to Identify Stakeholders | |
|--|---|
| Description | Identification of significant stakeholders and their relationship. |
| Objectives | <ul style="list-style-type: none"> ■ To identify users, stakeholders and potential partners. ■ To evaluate the perspectives and perceptions of the players. ■ To monitor their relationships. |
| When it applies | <ul style="list-style-type: none"> ■ During the initial stages of the project strategic definition. Key starting point for other steps in the development of an NMI service/project. ■ Preparation for the needs assessment. |
| Requirements | Clear definition of the strategic goal of the analysis. |
| Resources | Low. |
| Tool Limitations | Stakeholder analysis is a subjective tool. Stakeholders and their relationship may change over time. |
| Steps | <p>1.1.1 Define the goal of the analysis.</p> <p>1.1.2 Identify, classify and prioritise users, stakeholders and potential partners.</p> <p>1.1.3 Analyse the value chain.</p> <p>1.1.4 Compile information about the most important players and their interest in participating.</p> <p>1.1.5 Analyse results.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | None. |
| Example 1 | Identification of stakeholders for calibration services (Dominica BOS): Annex 1.1/E1 . |

Steps for Tool

1.1.1 Define the goal of the analysis.

This analysis is important since it focuses on those users with a higher likelihood of being interested in the service/project. For this reason, it is advisable to be careful when defining stakeholders' analysis goal.

1.1.2 Identify, classify and prioritise users, stakeholders and potential partners.

Identify users:

- Identify the economic or social sector in your country (food industry, tourism, agro-processing).
- Identify key players in each one of the economic sectors.
- Identify suppliers of goods and services for the economic sectors.

Criteria to classify and prioritise the target groups:

- Sector (primary, secondary, tertiary).
- Type of user at group level (agricultural, industrial, testing laboratories).
- Type of user in its group (e.g.: in Industry: SMEs, international company).
- Existing and potential clients.

1.1.3 Analyse the value chain.

In the prior step, some recommendations were mentioned to identify users and stakeholders at a national level. For a more accurate analysis it is advisable to select a process and draw up a value chain analysis, which will make possible to identify the stakeholders who add the most value to the process.

The process of value chain analysis is a topic that may nowadays be reviewed in any source of information. It is for this reason that it is not the purpose of this tool to explain how to make a value chain analysis but to recommend it as a part of the stakeholder analysis.

PTB has developed a successful methodology to analyse value chains. For more information, refer to the 'Calidena Methodology Handbook, Participative Analysis of Quality and Value Chains' (Guide No. 5/2009).



1.1.4 Compile information about the most important players and their interest in participating.

Do desk research to gain information on the companies, institutions or organisations selected.

Basic information you need to have is the following:

- Products and services manufactured by company/organisation.
- Key processes for manufacturing goods or for developing the service.
- Certification (e.g.: ISO 9001, ISO/IEC 17025, ISO 22000 or equivalent, etc.).
- Regulations for the product or service.
- Industrial chambers of which it is a member.
- Relationship with Research Centres, Higher Education Institutions, etc.
- Main national and international clients.
- Size of the company, laboratory, etc.
- Key company contacts (e.g.: personnel involved in measurements, quality manager, etc.).

On the basis of this information, formulate a hypothesis about potential metrological challenges. After the documented research, organise meetings to interview potential stakeholders and go on to find out about their interests.

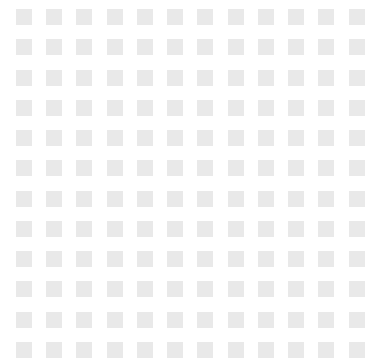
1.1.5 Analyse results.

Bring together a team of experts in various disciplines (Quality, Metrology, Industrial processes) and analyse the results of steps 1.1.2 to 1.1.4. Discuss with them:

- What is the relationship among the players?
- What is the relationship between the NMI and the players?

Potential results of the analysis:

- Identification of potential partners.
- Identification of government stakeholders.
- Identification of industry stakeholders.
- Identification of regulating entities' stakeholders.
- Identification of stakeholders from the educational sector.



1.2 SWOT Analysis

| Tool 1.2 SWOT Analysis | |
|-------------------------|--|
| Description | Analysis of strengths, weaknesses, opportunities and threats associated to the NMI and its environment. |
| Objectives | <ul style="list-style-type: none"> ■ To evaluate the NMI. ■ To evaluate stakeholders' perspectives and perceptions. ■ To evaluate existing and potential services. ■ To support the evaluation and selection of strategic options. |
| When it applies | <ul style="list-style-type: none"> ■ During the initial stage of the project strategic definition. ■ Preparation for the needs assessment. ■ When external or internal changes take place. |
| Requirements | Interest of the NMI in making an inclusive analysis taking into consideration positive and negative aspects. |
| Resources | Low. |
| Tool Limitations | The strategic orientation of the NMI is a complex process requiring iterative cycles, which cannot be accomplished merely in a workshop. |
| Steps | <p>1.2.1 Bring together a multidisciplinary working group.</p> <p>1.2.2 Define the scope of the analysis.</p> <p>1.2.3 Promote brainstorming to identify 'STRENGTHS'.</p> <p>1.2.4 Promote brainstorming to identify 'WEAKNESSES'.</p> <p>1.2.5 Promote brainstorming to identify 'OPPORTUNITIES'.</p> <p>1.2.6 Promote brainstorming to identify 'THREATS'.</p> <p>1.2.7 Analyse results and conclusions.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | SWOT quadrants (Annex 1.2/F1). |
| Example | SWOT analysis made during the Seminar 'Strategic importance for innovation and development' at the LATU (Annex 1.2/E1). |

Steps for Tool

1.2.1 **Bring together a multidisciplinary working group.**

It is important that analysis participants have different viewpoints and that they belong to different technical and strategic disciplines, or to different sectors.

If this tool is used in an NMI, an attempt should be made to invite technical and administrative personnel, as well as metrologists of different areas.

If this tool is used at a seminar:

- Bring together representatives from different sectors: government, education, secondary laboratories, chambers, exporters and importers, and industry.
- Make small groups for analysis. It is not advisable to have groups larger than 10 persons. If the participants have been divided into several groups, make sure there are representatives of most sectors in each group.
- Appoint a coordinator to organise the discussion by means of questions and also a secretary to take notes and record agreements.

1.2.2 **Define the scope of the analysis.**

Define and explain to the team the scope of the analysis. Does the scope encompass the whole NMI or a specific area of the NMI or a specific service of the NMI?

1.2.3 **Promote brainstorming to identify 'STRENGTHS'.**

Explain to participants that strengths are INTERNAL aspects that have placed the industry/organisation/service where it is now.

Highlight strengths related to Metrology.

Ask participants to write their ideas on cards and to place them on a board/flipchart.

Examples of strengths:

- Proven quality, based on international standards.
- Certified quality systems.
- Implemented quality practices.
- Implemented quality assurance practices.
- High contribution to the GDP.

1.2.4 Promote brainstorming to identify 'WEAKNESSES'.

Explain to participants that weaknesses are INTERNAL aspects that weaken the industry/organisation/service.

Highlight the weaknesses related to Metrology.

Ask participants to write their ideas on cards and to place them on a board/flipchart.

Examples of weaknesses:

- Absence of metrological assurance practices.
- No acknowledgement of the importance of Metrology.
- Measurements with no identified traceability.
- No use of reference materials.
- Main players in the country know little or nothing about metrological topics.
- The company has not standardised its process and works manually.
- Weakness to compete in international markets.
- No technical standards are applied.
- Non certified quality systems.
- Lack of infrastructure to offer all the services in demand.

1.2.5 Promote brainstorming to identify 'OPPORTUNITIES'.

Explain to participants that opportunities are EXTERNAL aspects that favour the industry/organisation/service but are not under their control.

Ask participants to write their ideas on cards and to place them on a board/flipchart.

Examples of opportunities:

- Government measures benefiting the industry/organisation/service.
- Penetration in international markets.
- Opening of markets.
- Elimination of tariff barriers.
- New standards to be achieved.
- Existence of financing programs, etc.

1.2.6 Promote brainstorming to identify 'THREATS'.

Explain to participants that threats are EXTERNAL aspects that affect the industry/organisation/service, to such a degree as to impact on its market presence.

Highlight the threats related to Metrology.

Ask participants to write their ideas on cards and to place them on a board/flipchart.

Examples of threats:

To the national economy:

- The local industry lacks of the necessary competence to show compliance with international technical standards and regulations.

To the company/organisation:

- Unlike other companies/organisations, the analysed company/organisation has not implemented metrological assurance practices.
- Unlike other companies/organisations, the quality system has not been certified, etc.
- International requirements are not met.

To the NMI:

- Unlike other NMIs, its offer of services has not been broadened (threat to the NMI).
- The Government does not consider Metrology important for the competitiveness of the industry and the country.

1.2.7 Analyse results and conclusions.

Involving the appropriate personnel:

1. Review the ideas placed on the board/flipchart.
2. Divide the ideas into 4 groups (Strengths, Weaknesses, Opportunities and Threats).
3. Choose the most important elements from each group.
4. Suggest strategies based on the previous item.
For instance, how to take advantage of external opportunities to overcome internal weaknesses; how to prepare to avoid threats from the environment; how to take advantage of strengths to avoid or decrease the impact of threats.
5. Make a summary of some recommendations.
6. Prepare an action plan to follow based on the results obtained.

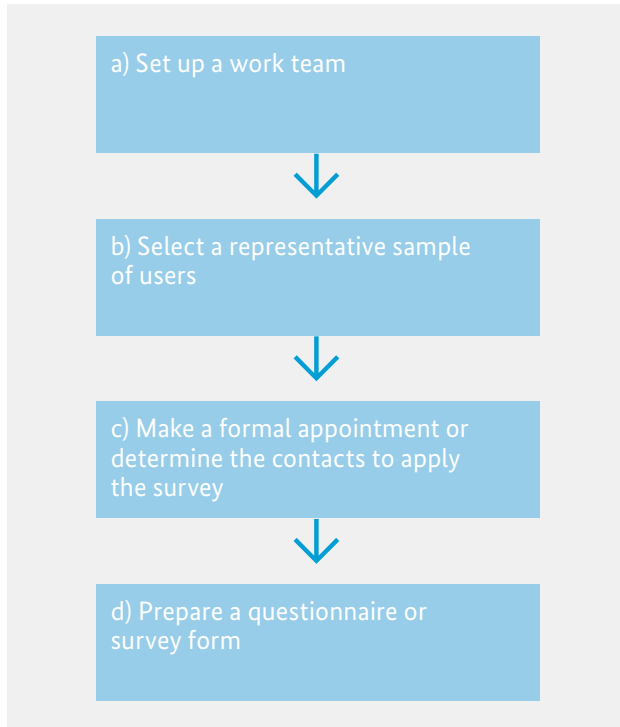
1.3 Identifying Demand

| Tool 1.3 Identifying Demand | |
|-----------------------------|--|
| Description | Identify and evaluate demand by means of interviews and surveys. |
| Objectives | <ul style="list-style-type: none"> ■ To identify, evaluate and prioritise the needs of existing and potential users/ stakeholders for NMI services. ■ To facilitate the decision for or against the development of new services/ projects or the consolidation of existing services/projects. ■ To facilitate the decision with regard to the scope of the service to be developed. ■ To raise user awareness regarding the importance of Metrology. |
| When it applies | Starting point to decide on the development of new services or consolidation of existing services; as well as the scope of the service/project to be defined. |
| Requirements | Clearly identified and prioritised users (see Tool 1.1 Analysis to Identify Stakeholders). The survey must include tools to evaluate the demand of existing and potential clients. |
| Resources | Medium to high (in the case of visits to users). |
| Tool Limitations | Identification of demand is a complex process requiring iterative cycles. Depending on the economic, social or political development, users' demand may vary. That is why, the identification of demand must be an ongoing process and regularly analysed. |
| Steps | <p>1.3.1 Planning the survey. 1.3.2 Apply the survey. 1.3.3 Inform the results.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | <p>Invitation letter (Annex 1.3/F1).</p> <p>Form 'Survey of demand for consulting services' (Annex 1.3/F2).</p> <p>Form 'Survey of demand for calibration services' (Annex 1.3/F3).</p> <p>Form 'Survey of demand for training services' (Annex 1.3/F4).</p> |
| Example 1 | Results of Survey of Demand for calibration services, performed by the Dominica Bureau of Standards (Annex 1.3/E1). |
| Example 2 | Results of Survey of Demand for training services, conducted by LATU (Annex 1.3/E2). |

Steps for Tool

1.3.1 Planning the survey

Activities



In the following summary tables you will find recommendations for each activity.

a) Set up a work team.

Choose the associates that may help you understand the stakeholders' needs.

The associates may be:

- Partners related to Metrology with experience in the sector to be interviewed (one person for each critical variable measured in the company to be interviewed).
- Quality experts with knowledge of Metrology.
- Partners from related fields (service to clients or others associated to stakeholders).

Ensure that there is a person in the group with general knowledge of the company/organisation to be interviewed and knowledge of Quality, as well as metrologists specialised in the critical magnitudes that are measured to manufacture their products or develop their service.

b) Select a representative sample of users.

Select a representative sample of users to be interviewed. Apply the following criteria for the selection:
Representation: Selected users must represent and reflect various characteristics of the sector.

Relation with the NMI: Select users that have or have had a relationship with the NMI. It will be easier to have them provide information if there is a prior relationship.

Relevance: Select users according to their relevance for the country's economic or social development (refer to official data bases, economy statistics and company listings).

c) Make a formal appointment or determine the contacts to apply the survey.

The best response to the survey is obtained during a visit to the company/organisation to be interviewed.

Use official or formal channels to request the interview (for example, a letter signed by the Director of the NMI).

The letter should contain:

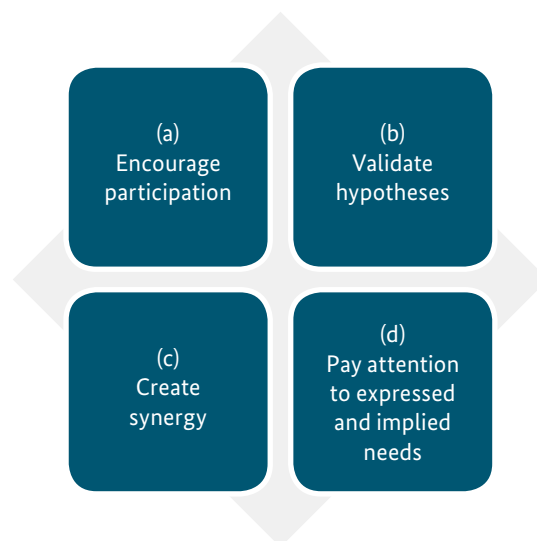
- A description of the project for identifying demand.
- The importance of having the information from that particular company/organisation.
- A confidentiality clause about the information shared during the interview.

An example of this letter is included in [Annex 1.3/F1](#) of this Guide.

If it is not possible to visit the interviewee, attempt to contact him/her electronically.

1.3.2 Apply the survey

During the interview, it is advisable to take into consideration the points shown in the following diagram:



d) Prepare a questionnaire or survey form.

On the basis of the information collected during planning, prepare a survey or questionnaire that will help you to conduct the interview. If possible, record the interview with the consent of the interviewee.

For each question, make a hypothesis about the possible answers. It is not necessary to write the hypothesis; it is enough to have a notion in order to present interesting arguments to the interviewee.

The survey should have the following characteristics:

- Short: People do not have the time to answer more than 10 questions.
- Focused on key aspects: Choose exclusively key aspects related to the purpose of the survey.
- Friendly: Use simple vocabulary and friendly options for answers.
- Provide information about priorities: Formulate some questions in such a manner that the interviewee will voice his/her priorities.

The Annexes contain examples of forms used to analyse the demand for consulting, training or calibration services.

In the following summary tables, information may be found about each one of these points.

Encourage participation.

a) Encourage participation.

During the interview:

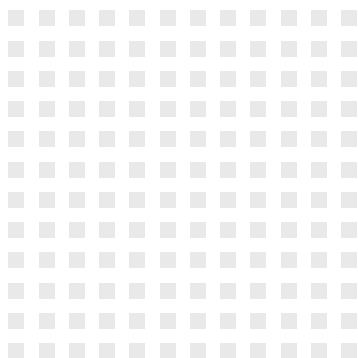
- Create an atmosphere of trust.
- Once you notice that an interviewee is comfortable, begin the interview.
- Encourage the interviewee to participate as much as possible.
- Avoid assuming a dominating attitude. It is said that the listener is in control of the conversation.

b) Validate hypotheses.

Validate your hypotheses regarding the interviewee's Metrology problems.

During the interview:

- Adapt questions to the speaker's vocabulary depending on his/her role (strategic, tactical or technical/operational).
- Continue asking in different ways until you get a response to your question.
- Do not be limited by the questions included in the form or questionnaire; if you consider more should be raised, do so.



c) Create synergy.

Assume the role of moderator in order to create synergy.

An amazing synergy may be created upon integrating the interviewees' knowledge and experience.

We talk about synergy when the knowledge of two or more interviewees is integrated and new knowledge is generated which could not have been obtained by adding individual contributions. That is to say $1+1 > 2$.

d) Pay attention to expressed and implied needs.

Be an active listener and keep your ears open to detect any possible opportunity that comes up during the conversation.

Identify any expressed and implied needs.

Active listening involves the ability to detect needs and problems even though they have not been mentioned (implied).

An expressed need is that which the interviewee states clearly and expressly.

1.3.3 Inform the results

After completing the surveys, draw up a final report with the following information:

| Suggested content | Expected information |
|-------------------|--|
| Introduction | Background information of the project/interview. |
| Implementation | Dates, stakeholders, place, and names of participants. |
| Results | <p>Prepare an executive summary with survey results.</p> <p>Add documentary references supporting the information obtained to confirm the hypotheses formulated during the planning stage.</p> <p>Suggested content for the report:</p> <ul style="list-style-type: none"> ■ Characteristics of stakeholders surveyed. ■ Status of quality systems implemented. ■ Role of Metrology in the companies/organisations interviewed. ■ Impact or consequences of inadequate measurements or lack of metrological assurance practices. ■ Main variables involved in the quality of the product or service. ■ Needs identified and prioritised. |
| Proposals | Suggest proposals on how the NMI can help the target user or sector. |

1.4 Awareness Raising Seminar

| Tool 1.4 Awareness Raising Seminar | |
|------------------------------------|---|
| Description | Carry out an awareness raising seminar and take advantage of the event to identify users/stakeholders needs. |
| Objectives | To make users/stakeholders aware of the importance of Metrology and to identify demand. |
| When it applies | Stage 'Needs assessment'. |
| Requirements | <ul style="list-style-type: none"> ■ Tool 1.1 Analysis to Identify Stakeholders (preferably). ■ Access data/contacts base of potential clients/stakeholders. ■ Tool 1.3 Identifying Demand (supplementary). |
| Resources | Low to medium (if conference rooms are rented). |
| Tool Limitations | Planning the seminar may require several weeks. |
| Steps | <p>1.4.1 Plan the seminar. 1.4.2 Prepare activities to identify needs. 1.4.3 Carry out the seminar. 1.4.4 Submit a seminar report.</p> <p>For more detailed information on each step, please review the following pages.</p> |
| Templates/Forms | 'Seminar Evaluation' Form (Annex 1.4/F1). |
| Example | Seminar 'Strategic importance of Metrology for the innovation and development' at the LATU (Uruguay) (Annex 1.4/E1). |

Steps for Tool

1.4.1 Plan the seminar

Planning Activities



Please review the summary tables below for further information.

a) Establish the goal of the seminar.

Establish the goal of the seminar and how achievement of the goal will be measured.

Example:

Identification of needs and their scope.

Formulate hypotheses that may be confirmed or rejected.

b) Identify interest groups and form alliances.

It is important to identify interest groups and their degree of representation.

Consider inviting:

- **Government entities:** Government attendance is important since they could provide support in the case of regulations, financing, etc.
- **Quality Infrastructure:** Organisations related to Accreditation, Standardisation, Certification, Testing and Calibration Laboratories or Inspection and Verification Bodies.
- **Company and NMI directors:** It is important that they participate since they are decision makers. It is important that they be the first to know about the importance of Metrology for the competitiveness of companies and the country.
- **Representative companies, with impact in their sector:** Companies invited must be representative of the sector they belong to. That is to say, they should have characteristics similar to other companies in their sector. Selected sectors must have social and economic impact in the country. Look for national and international statistics and references.
- **Entities offering financing programs:** In the event that companies are interested in adopting metrological practices requiring considerable investment, it is advisable that information about financing programs be at hand.

c) Prepare the activities program.

To design the program, it is advisable to:

- Plan conferences and round tables that will be of interest to all groups.
- Formulate hypotheses about industry needs and include activities to validate them.
- Consider sessions where special guests and participants have discussion opportunities and encourage communication between them.
- Customise conferences based on the context and characteristics of the NMI and attending companies. Share successful experiences.

f) Prepare budget and obtain necessary resources.

Prepare a budget (see Tool 2.4). If funding is limited, consider sponsors as a way of obtaining the funding you need.

Offer sponsors some benefits, such as to set up a 'stand' to participate in the advertising of the event as a sponsor, or any other mechanism that will promote win-win relations.

Sell spaces to sponsors in a place close to the meeting rooms where the seminar will be held.

d) Send out formal invitations and follow up on them.

Send out invitations in a professional manner.

Examples of professional ways to issue the invitations:

- Send a letter signed by the Director of the NMI or by decision-making authority.
- Maintain or foster an image, for example, place a poster of the event at the information desks.
- Make phone calls personally.
- Deliver customised invitations.

Regardless of the type of invitation you have chosen, it is important to request confirmation, for example, by means of a phone call.

e) Form alliances with main promoters.

It is hard for you alone to take on the promotion work of the seminar. Rely on other areas of the NMI or on promotion institutions.

You may ask for support from client service areas, industries, universities, financial promoters, associations, etc.

g) Form the organising team.

Form a small team to help you organise the seminar. It is difficult for one person to assume responsibility for following up in furtherance of what is planned.

Define who will be the supervisor(s)/coordinator(s) who will conduct the seminar or the sessions of the seminar.

Below are some activities for which you may want to appoint a person. This person should prepare them during the planning stage and direct them during the actual seminar:

- Preparing session rooms, computers, audio, audio-visual equipment, etc.
- Collecting speakers' presentations.
- Registering and assisting all participants.
- Recording agreements and identifying needs in each session.
- Monitoring compliance with the timeframe and the efficient use of time.

h) Prepare an evaluation form.

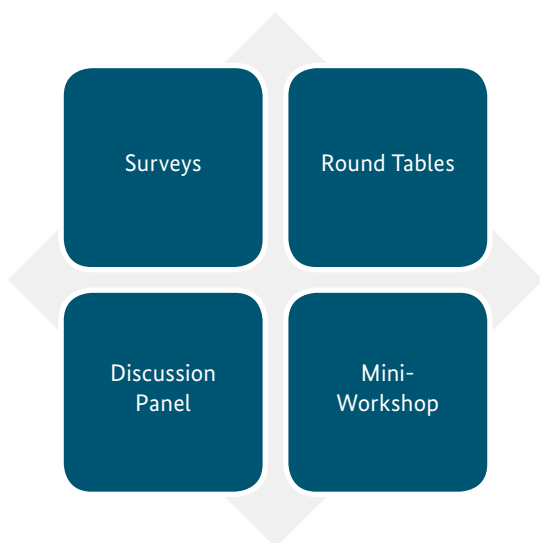
Prepare a list of multiple choice questions so that participants may evaluate the seminar.

Include questions about:

- General Assessment (achievement of goals, logistics, the seminar, etc.).
- Content (quality of the information, effectiveness of the sessions and dynamics or exercises, etc.).
- Benefits (new ideas, solutions, etc.).

1.4.2 Prepare activities to identify needs

Below are some activities that provide support for identifying needs during the Seminar:



A description of these activities is included in the following summary tables:

Surveys.

Please review Tools 1.3, Identifying Demand and 1.5, Identifying Offer.

Round Tables.

Round tables are an excellent way to obtain information from participants.

A round table consists of a group of people with a common interest. A moderator is assigned to ask a series of questions encouraging the participants to express opinions.

It would be ideal for the representatives of the various departments related to Metrology to participate (government, laboratories, universities, industry and users in general).

Examples that illustrate this tool also specify the execution and results of round tables.

1.4.3 Carry out the seminar

Activities

Discussion panel.

In the discussion panel, a group of experts is invited to answer a series of questions and discuss answers among themselves. The discussion is witnessed by seminar participants, who have the chance to ask the experts questions.

It would be ideal for the panel to be made up of representatives of the 3 elements of the system, Metrology, Standardisation and Accreditation; as well as representatives of the industry and its consumers.

At the start of the panel, the moderator presents the experts' curriculum and asks the questions to kick off the discussion. The final goal of the panel is for experts to reach agreements and raise awareness about the importance of Metrology, standardisation and accreditation.

Mini-Workshop.

The mini-workshop is aimed at participants who have prior experience in Metrology and who wish to develop new knowledge. A parallel result is that it raises awareness of Metrology.

Topics that may be of interest for a Workshop are:

- Reviewing requirements based on the ISO/IEC 17025.
- How to apply the ISO/IEC 17025 to specific cases.
- Recommendations for the estimation of measurement uncertainty.



a) Register participants.

Considering that registration is the first contact participants will have with the seminar, make sure to create an atmosphere of trust and professionalism. Prepare a special reception.

Further, it is advisable that the special guests be accompanied by a representative from the NMI.

With regard to the participants who have not arrived, assign somebody to call them by phone to learn the reason for their absence and to ask them to attend at least part of the seminar.

b) Monitor compliance with the goal and work program.

Monitor compliance with the goal and the program on an ongoing basis.

Stay in communication with session supervisors/coordinators and remind them about the importance of stimulating guest participation, as well as of aligning the activities with the goals of the seminar.

d) Confirm your hypotheses.

Make good use of the information discussed in order to confirm or reject the hypotheses you made while planning the seminar.

Make your hypotheses known to supervisors/coordinators and ask for their assistance in exploring said hypotheses during the course of the sessions they arrange.

c) Encourage participation.

The role of the supervisors/coordinators is very important towards achieving the goals of the seminar.

Supervisors/coordinators must stimulate the participants to speak about everything that is useful to achieving the goal of the seminar. They must provide assistance in identifying needs and recording the agreements and follow-up activities.

It is advisable that supervisors/coordinators have knowledge about the NMI potential and the needs of industry and users. They must also have the ability to detect any expressed and implied needs.

e) Seminar evaluation.

Deliver previously prepared evaluation forms to all participants and ask them to evaluate the seminar (an example for reference is included in [Annex 1.4/F1](#)).

If time allows, ask participants to share their comments about the seminar at the plenary.

1.4.4 Submit a seminar report

Suggested contents for the report

| Suggested Content | Expected information |
|-----------------------------|---|
| Introduction | Describe the context and the manner in which the seminar was carried out. State seminar goals. |
| Implementation | Date, place, attending companies and institutions. |
| Achievement of the goal | State whether the goal of the seminar was achieved. Include evidence (documentary source) if possible, for example, results of surveys or participants' comments during the sessions. |
| Compliance with the program | Describe how each session progressed and the participation of the groups of interest. Request this information from the supervisors/coordinators. Include information referring to the confirmation of your hypotheses. |
| Results and agreements | Include here a specific section for each one of the activities carried out with the purpose of identifying needs (surveys, round tables, discussion panels, mini-workshops, and questions about the presentations). The use of tables is recommended to present identified needs. Refer to Tool 1.3 for the presentation of survey results. To present round tables or discussion panels results, write the information discussed during sessions and interpret it from the standpoint of the participants' interest in receiving the services you wish to develop/consolidate. To present mini-workshops results, you may include a list of those items the participants were most interested in. Include feedback information from participants (collected in the evaluation forms). |
| Subsequent activities | Based on the results, suggest activities that could be carried out after the seminar. |

1.5 Identifying the Offer

| Tool 1.5 Identifying the Offer | |
|--------------------------------|--|
| Description | Survey services offered by the NMI or actions implemented in the country in the field of Metrology, as well as their scope. |
| Objectives | <ul style="list-style-type: none"> ■ To survey the services offered by the NMI or actions implemented by the country in the field of Metrology. ■ To facilitate decisions for or against the development/consolidation of new services. ■ To facilitate decisions regarding the scope of services to be developed/consolidated. |
| When it is applied | Starting point for decisions about the development of new services as well as to decide about the scope of an already defined service. |
| Requirements | The analysis must be carried out jointly with Identifying Demand (Tool 1.3) to ensure representative results in the Analysis of Opportunities (<i>gaps</i>) (Tool 1.6). |
| Resources | Low. |
| Tool Limitations | Data that may be obtained is the reflection of a specific moment in time. Since conditions change, the information of the surveys (on supply and demand) must be updated periodically, and parameters must be defined to evaluate and validate the elements incorporated into the strategy. |
| Steps | <p>1.5.1 Appoint the team to conduct the survey. 1.5.2 Define and develop a methodology for the survey form. 1.5.3 Conduct the survey. 1.5.4 Analyse the survey. 1.5.5 Present, share and publish results.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | Questionnaire to survey the training offered by the NMI (Annex 1.5/F1). |
| Example 1 | Identifying offer carried out at the LACOMET 2009-2010. (Annex 1.5/E1). |
| Example 2 | Survey about NMI Training offer, carried out by LATU (Annex 1.5/E2). |

Steps for Tool

1.5.1 Appoint the team to conduct the survey.

The personnel conducting the survey should have the following characteristics:

1. Knowledge of design and application of surveys/ interviews.
2. General overview of NMI capabilities and the country's quality infrastructure.
3. Knowledge about services that comprise the offer and preferably about general Metrology.
4. Availability to complete the survey in the expected time.

1.5.2 Define and develop a methodology for the survey form.

Designing the form for the survey.

The survey should have the following characteristics:

- Short: People do not have the time to answer more than 10 questions.
- Focused on key aspects: Choose exclusively key aspects related to the purpose of the survey.
- Friendly: Use simple vocabulary and friendly options for answers.

Selecting the sample to be interviewed.

Interviewees should have the following characteristics:

- Have prior experience/relationship with the NMI and Metrology, or in the areas of regulation or education, when the survey applies to these fields.
- Be interested in improving their quality system.
- Be representative of the type of clients served by the NMI.

1.5.3 Conduct the survey.

Conduct surveys and organise the data.

1.5.4 Analyse the survey.

Extract data from the survey in the form of a table.

Use computer tools to process data or run queries.

1.5.5 Present, share and publish results.

Report preparation:

Prepare an executive report with processed data and any additional information you may have obtained.

Present the information using charts.

Present the report:

Schedule a meeting to present the report.

Analyse with the Director the performance of the country's offer of metrological services.

Analyse the feasibility of offering, improving or suspending the service considering the survey about the offer.

Identify options to improve the existing services.

Distribute or publish the results:

Depending on the project it may be necessary to share the results with specific people.

1.6 Analysis of Opportunities (*Gaps*)

| Tool 1.6 Analysis of Opportunities (<i>gaps</i>) | |
|--|---|
| Description | Analyse NMI opportunities or deficiencies when offering services. |
| Objectives | <ul style="list-style-type: none"> ■ To identify and prioritise opportunities/deficiencies of services and scope of the services offered. ■ To find grounds for deciding for or against developing new services or consolidating existing services. ■ To find grounds for deciding on the scope of the service to be developed. |
| When it is applied | During the needs assessment about the development of new services or consolidation of existing services, as well as for determining the scope of defined services. |
| Requirements | Analysis must be carried out jointly with the demand analysis (Tools 1.3 and 1.4) and Identifying the Offer (Tool 1.5) to ensure representative results in this Analysis of Opportunities (<i>gaps</i>) (Tool 1.6). |
| Resources | Low. |
| Limitations of the tool | <p>Subjectivity in defining and prioritising the opportunities/deficiencies.</p> <p>Data that may be obtained is the reflection of a specific moment in time. Since conditions change, the information of the surveys (on supply and demand) must be updated periodically, and parameters must be defined to evaluate and validate the elements published in the strategy.</p> |
| Steps | <p>1.6.1 Identify opportunities/deficiencies between supply and demand.</p> <p>1.6.2 Define criteria and an evaluation system to prioritise the opportunities/deficiencies.</p> <p>1.6.3 Draw up a proposal based on opportunities/deficiencies detected.</p> <p>1.6.4 Prepare a strategy to implement changes based on the analysis of opportunities/deficiencies.</p> <p>Please review the summary table for each step on the following page.</p> |
| | None. |
| Example | Analysis of opportunities of training and calibration services offered by LACOMET (Annex 1.6/E1). |

Steps for Tool

1.6.1 Identify opportunities/deficiencies between supply and demand.

Prepare information obtained during the process of identifying supply and demand.

Make a cross reference between:

- Services offered and services demanded.
- Services offered vs. demanded in furtherance of NMI role.
- Actions implemented vs. those required in the country, in the field of Metrology, by Quality Infrastructure players.

1.6.2 Define criteria and an evaluation system to prioritise opportunities/deficiencies.

Discussion of main parameters to evaluate and prioritise new services and develop areas.

The parameters are:

- a. Financial resources.
- b. Time.
- c. Personnel available to render the service.
- d. Revenue expected from the services.
- e. Political priorities.
- f. Importance for economic and social development.

1.6.3 Draw up a proposal based on opportunities/deficiencies detected.

Together with the Management draw up a proposal based on:

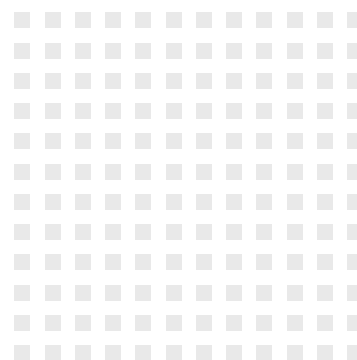
- Opportunities/deficiencies (*gaps*).
- Strategic planning of the NMI.
- Duties of the NMI according to law.

1.6.4 Prepare a strategy to implement changes based on the analysis of opportunities/deficiencies.

Prepare a strategy to:

1. Submit a proposal to the areas related to Metrology.
2. Publish information in internal leaflets or material for distribution.
3. Inform personnel about changes (in the office of 'client services' and laboratories).
4. Define internal procedures to manage new services.

These activities that have now been planned may be carried out in the 'Implementation' stage.



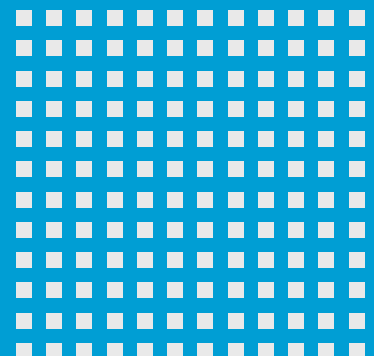
Stage 2

Service Planning

Tools

Planning is essential once the service or project to be developed/consolidated has been identified. Remember that effective planning ensures the success of the project. It is said that effective planning should take more than 50% of the time invested in the project.

The first 5 tools presented in this section may be applied to any service or project. The following tools are specific for services related to consulting, training, group calibration and proficiency tests, respectively. The title of the tool specifies which service it refers to.



2.1 Selection and Design of Service or Project

| Tool 2.1 Selection and Design of Service or Project | |
|---|--|
| Description | Selecting and designing the service required by users, or the project to implement with interested organisations, based on the analysis of the implementation of the 'Needs Assessment' stage tools. |
| Objectives | To prioritise and define the characteristics of NMI services or projects to be addressed. |
| When it applies | After applying Tool 1.6 Analysis of Opportunities (<i>gaps</i>). |
| Requirements | <ul style="list-style-type: none"> ■ Identifying Demand (Tool 1.3), Identifying the Offer (Tool 1.5) and Analysis of Opportunities (<i>gaps</i>) (Tool 1.6) ■ Strategic thinking. |
| Resources | Low. |
| Tool Limitations | Identification of demand and supply are time consuming activities and needs change. It is therefore necessary to start designing the service as soon as the results of supply and demand are ready. |
| Steps | <p>2.1.1 Select 3 services or projects with the highest demand and evaluate their impact, feasibility and the resources required.</p> <p>2.1.2 Identify services or projects of most interest to users.</p> <p>2.1.3 Select service based on defined criteria, impact, feasibility, resources, priorities and interest of stakeholders.</p> <p>2.1.4 Identify characteristics of selected services/projects.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | None. |
| Example | Program of services established to respond to the needs of industry, carried out by the GDBS (Annex 2.1/E1). |

Steps for Tool

2.1.1 **Select 3 services or projects with the highest demand and evaluate their impact, feasibility and the resources required.**

Review the results of the Analysis of Opportunities (*gaps*) and select the 3 most recurring needs.

For each one of them evaluate:

- **Impact of service on the NMI** (economic impact, market presence, development of the industry). For reference, see in <https://www.ptb.de/lac> the impact studies done by the PTB for various projects.
- **The feasibility to develop the service:**
 - Is the NMI prepared to offer the service?
 - Is the NMI's infrastructure suitable?
 - If the answers are no:
 - Is it possible to forge an alliance with other NMIs or organisations?
 - Is the time required to prepare the service to be offered reasonable?
- **Resources:**
 - Are there sufficient human and material resources to implement a quality service?

2.1.2 **Identify services or projects of most interest to users.**

Organise a meeting with representative users of each one of the potential services to be developed.

During the meeting, research the company/organisation's interest in the new service.

2.1.3 **Select service based on defined criteria, impact, feasibility, resources, priorities and interest of stakeholders.**

Compare analysis results with regard to the impact, feasibility and interest of stakeholders on the service to be developed.

2.1.4 **Identify characteristics of selected services/projects.**

Invite an expert to determine and design the new service's key elements.

Define with an expert any required activities and the timeframe for the design and implementation of the service.

2.2 Strategic Planning

| Tool 2.2 Strategic Planning | |
|-----------------------------|---|
| Description | Consider elements of strategic planning for the service to be developed/ consolidated. |
| Objectives | <ul style="list-style-type: none"> ■ To align the service with NMI strategic planning. ■ To develop strategic indicators to evaluate results progress towards obtaining the expected impact. ■ To create mechanisms to give visibility to project results. |
| When it applies | At the beginning of the 'Service planning' stage. |
| Requirements | <ul style="list-style-type: none"> ■ Needs assessment. ■ Management must be a part of this task. |
| Resources | Low. |
| Tool Limitations | – |
| Steps | <p>2.2.1 Integrate the project into institutional strategic planning.</p> <p>2.2.2 Identify project indicators.</p> <p>2.2.3 Identify means to give visibility to the project.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | None. |
| Example | Development of Proficiency Tests supported by a Quality Management System established in LACOMET's strategic plan (Annex 2.2/E1). |

Steps for Tool

2.2.1 Integrate the project into institutional strategic planning.

If you are a part of the NMI Management, define the project within the activities of strategic planning. If otherwise, suggest to Management that the project be considered as part of this plan.

Consider the following questions at the time of including the project in the strategic planning actions that the NMI is implementing:

- What is it for? What is the expected impact?
- Who is interested in the impact the project may have?
- How to measure the impact?
- Who do we want to see us or to see our results?
- How can we measure what we want to make visible?

2.2.2 Identify project indicators.

Indicators are parameters to measure the ACHIEVEMENT of activities and of the expected impact.

Remember that an indicator must be specific (unequivocal), measurable, accurate (clearly reflecting the change), and it must be measured regularly in realistic time frames.

One or two indicators may be assigned to each expected impact result or achieved outcomes.

2.2.3 Identify means to give visibility to the project.

Through VISIBILITY, we share RESULTS with stakeholders.

Define, preferably with the NMI Management, the most feasible mechanism to make the results known internally within the institute and externally to all the stakeholders.

Please refer to Tool 5.5 for more information.



2.3 Operational Planning

| Tool 2.3 Operational Planning | |
|-------------------------------|---|
| Description | Develop work plans (biennial and semi-annual) to implement the project. |
| Objectives | <p>On the basis of strategic planning:</p> <ul style="list-style-type: none"> ■ To define clearly the activities, resources, timeframes and responsibilities to organise strategy implementation. ■ To design a chain of expected results/impacts to supervise/evaluate periodic work plans. |
| When it applies | This tool may be applied during 'Preparation' (prior to the start of the project) and during the 'Service planning' stage. |
| Requirements | <ul style="list-style-type: none"> ■ Clearly defined objectives of the project. ■ Approval and support of the Director. |
| Resources | Low. |
| Tool Limitations | Implementation of activities depends in some cases on external factors and on players that are beyond our control, hence the implementation of the work plan may, sometimes, be affected. |
| Steps | <p>2.3.1 Specify characteristics of project or service.</p> <p>2.3.2 Identify the resources needed for the project (time, human and material resources).</p> <p>2.3.3 Identify key events for project development.</p> <p>2.3.4 Develop a biennial work plan.</p> <p>2.3.5 Develop semi-annual work plans.</p> <p>2.3.6 Appoint a person in charge of monitoring the implementation of the plan (Tool 5.2).</p> <p>For more detailed information of each step, please review the following pages.</p> |
| Templates/Forms | Work plan form (Annex 2.3/F1). |
| Example | Operational planning of WG Consulting – specific case of the Grenada Bureau of Standards (Annex 2.3/E1). |

Steps for Tool

2.3.1 Specify characteristics of the project or service.

Specify the characteristics of the project or service to be developed according to the results of the needs assessment and strategic planning.

The characteristics of the project or service to be defined are:

- Name of the project or service.
- Users at whom the service is targeted.
- Goal of the project:
This must be feasible with the available resources.
- Justification.
- Scope:
Depending on the project, the scope could be the level or areas of consulting or training; the calibration interval and uncertainty; the areas or fields of regulation; the involvement with secondary laboratories; the educational level or areas of education.
- Expected impacts or results.
- Potential obstacles.

Preferably, define these points with the Director or request his/her approval.

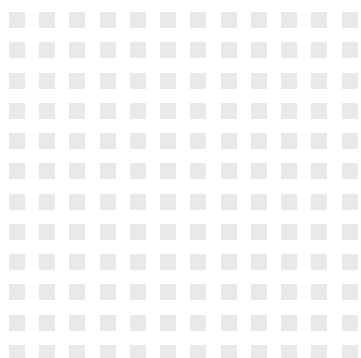
2.3.2 Identify the resources needed for the project (time, human and material resources).

During operational planning, it is important to identify the most adequate personnel to cooperate with the project. Your work team must include:

- People committed to the NMI and passionate about Metrology to such a degree that they may act as „advocates“ of the project to push it and achieve good results when raising awareness among stakeholders.
- Participation or involvement of Management or other authorities such as the Minister.
- Key players that participate from the beginning of the project.

The material resources required must also be identified, for this purpose review all recommendations in Tool 2.4 below.

Time is a resource that must also be considered. Allocate sufficient time for the activities included in the program and also for those not included but requiring time that must be added.



2.3.3 Identify key events for project development.

Depending on the users you are targeting, identify together with your Director and colleagues the main decisive events for the success of the project.

Examples of key actions or events:

- Awareness raising events.
- Strengthening the laboratory infrastructure to provide calibration services.
- Obtaining support from external organisations (chambers, agencies, etc.).
- Finding a partner NMI to carry out the objectives.
- Coaching.
- Training in specific topics for secondary laboratories.

After determining the key actions or events, develop a plan to carry them out.

2.3.4 Develop a biennial work plan.

Define a biennial work plan including the following stages:

- Needs assessment.
- Planning.
- Implementation.
- Evaluation.

Include partial goals (milestones) at the end of each one of these stages, which could be evaluated every six months.

The biennial plan must include at least:

- Time frame: start and finish dates.
- Results/products.
- Timeframe.
- People in charge.
- Resources.

Review the Example in [Annex 2.3/E1](#).

2.3.5 Develop semi-annual work plans.

Every 6 months define a work plan consistent with the biennial work plan and adapt it to the current situation (which may often change) during implementation.

The semi-annual plan must include:

- Time frame (start-finish).
- Activities.
- Outputs/Products.
- Responsibility.
- Budget.
- Comments.

Review the Example in [Annex 2.3/E1](#).

2.3.6 Appoint a person in charge of monitoring the implementation of the plan.

It is very helpful to appoint a person in charge of overseeing the implementation of the plan. Some recommendations to this end are offered in Tool 5.2.

2.4 Budget Preparation

| Tool 2.4 Budget Preparation | |
|------------------------------|--|
| Description | Recommendations for preparing a budget for events. In order to estimate the project budget; add up the budgets of each individual event. |
| Objectives | To estimate the cost of an event considering direct and indirect costs. |
| When is it applicable | During 'Service planning' stage. |
| Requirements | Awareness of expected event results. Experience with similar events (preferably). Knowledge of NMI needs. |
| Resources | Medium to high. |
| Tool Limitations | Consistency with NMI procedures for budget estimation. |
| Steps | <p>2.4.1 Identify financial resources. 2.4.2 Estimate direct costs. 2.4.3 Estimate indirect costs. 2.4.4 Estimate final cost.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | Template for budget preparation for training events (Annex 2.4/F1). |
| Example | Preparation of budget for LATU courses (Annex 2.4/E1). |

Steps for Tool

2.4.1 Identify financial resources.

Identify different options to obtain financial resources. If a high budget is required, prepare a strategy to get additional funding from other sources.

2.4.2 Estimate direct costs.

Make a list of event related costs. Please see examples for various types of events in Table A (Cells A through F).



2.4.3 Estimate indirect costs.

Estimate NMI indirect costs (electricity, cleaning services, parking, etc.).

In some cases, there is a standard fee established by the NMI (for example 5%).

2.4.4 Estimate final cost.

- Add direct and indirect costs.
- Multiply this by profit margin established by the NMI (if applicable).

Table A. Examples of Direct Costs

| A. Consulting Services | B. Training Services (Courses, workshops, seminars) | C. Group Calibration |
|---|--|--|
| <ul style="list-style-type: none"> ■ Experts (Number of experts, fees per expert-day, number of days required by expert). ■ Travel expenses. ■ Coordination. | <p>General costs</p> <ul style="list-style-type: none"> ■ Instructors (Number of instructors, fees per instructor-day, course duration). ■ Travel expenses/allowances. ■ Teaching and/or laboratory equipment. ■ Teaching materials and supplies (printed material, software, online platforms, etc.). ■ Distribution/Advertising. ■ Facilities. ■ Intellectual Property. ■ Coordination. ■ Infrastructure for online training (if required). <p>Individual Costs (per participant)</p> <ul style="list-style-type: none"> ■ Materials to be collected. ■ Accessories (pens, pencils, folders, etc.). ■ Coffee break/meals. ■ Transfers/travel allowances. | <ul style="list-style-type: none"> ■ Experts (Number of experts, fees per expert-day, number of days required by the expert). ■ Travel expenses. ■ Coordination. ■ Standards. ■ Expenses of equipment transportation. ■ Distribution/Advertising. |
| D. Projects with Regulating Entities | E. Projects with Educational Institutions | F. Projects with Secondary Laboratories |
| <ul style="list-style-type: none"> ■ Travel expenses. ■ Events for awareness raising and training activities (see costs in cell B). ■ Distribution material. ■ Items required in order to hold meetings (rental of conference rooms, coffee breaks/meals, materials). | <ul style="list-style-type: none"> ■ Events for awareness raising and training activities (see costs in cell B). ■ Audio-visual material: hours of technicians and support secretary; hours of Production and Editing (external); rental and supply costs; actors/scriptwriters/art director. ■ Distribution/reproduction costs. | <ul style="list-style-type: none"> ■ Events for awareness raising and training activities (see costs in cell B). ■ Travel expenses. ■ Hiring of Experts. ■ Acquisition of Standards. ■ Items required in order to hold meetings (rental of conference rooms, coffee breaks/meals, materials). |

2.5 Cooperation between Institutes

| Tool 2.5 Cooperation between Institutes | |
|---|--|
| Description | Receive support from or provide support to other NMI(s) for knowledge transfer or development of capabilities by means of consulting, training or exchange of information. |
| Objectives | <ul style="list-style-type: none"> ■ To promote training between NMIs. ■ To promote consulting between NMIs. ■ To promote exchange of information and materials. ■ Support NMIs in developing or rendering new services. |
| When it applies | 'Service planning' and 'Implementation' stages. |
| Requirements | Knowledge SIM-NMI capabilities. |
| Resources | Medium to High (for travel expenses). |
| Tool Limitations | External support is required in case of limited resources. |
| Steps | <p>2.5.1 Identify support areas.</p> <p>2.5.2 Request support using official channels.</p> <p>2.5.3 Establish follow-up procedures between NMIs involved.</p> <p>Please review summary table for each step on the following page.</p> |
| Templates/Forms | None. |
| Example 1 | Training in multimeter calibration and group calibrations. (INDECOPI provided support to GNBS) Annex 2.5/E1 . |
| Example 2 | Task group in order to adapt online training materials from INMETRO for the Caribbean. (INMETRO provided support to working group) Annex 2.5/E2 . |

Steps for Tool

2.5.1 Identify support areas.

Identify specific aspects where the support of another NMI is required, for instance:

- in what courses,
- any consultancy,
- teaching material, documents, videos,
- experiences.

Identify an associate NMI and contact information depending on the type of support required, as well as dates and estimated time frame for support activities.

2.5.2 Request support using official channels.

Explain to your Director the advantages of a colleague's support, and ask that colleague to place an official request for necessary support and assistance from the Director of the relevant NMI.

If NMI resources are limited, request support from specialised organisations that may provide support in your country or region.

2.5.3 Establish follow-up procedures between NMIs involved.

In some cases, it is difficult to match the agendas of two NMIs. It is therefore advisable to establish follow-up procedures for progress reports.

In some cases, it is advisable to appoint a specific working group that includes personnel from participating institutes.

Consider having online meetings whenever possible.



2.6 Preparation of a Pilot Consulting Project

| Tool 2.6 Preparation of a Pilot Consulting Project | |
|---|---|
| Description | Preparation of a consulting project, based on service design (See Tool 2.1). A pilot consulting project is an experience to: <ul style="list-style-type: none"> ■ Gain knowledge on the typical characteristics of the type of industry where services will be offered. ■ Test methodology design. ■ On-the-job training (actual practice) of the team of consultants. ■ Raise awareness in the industry about benefits of contracting in-depth consulting. |
| Objectives | <ul style="list-style-type: none"> ■ To choose pilot companies. ■ To prepare required documents. ■ To prepare team of consultants. |
| When it applies | During 'Service planning' stage. |
| Requirements | <ul style="list-style-type: none"> ■ Tool 2.1, Selection and Design of Service or Project. ■ Negotiating skills. |
| Resources | Low to medium (in the case of travel expenses). |
| Tool Limitations | It is necessary to involve a person with good negotiating skills who will contact the industry to sell a pilot project idea. |
| Steps <u>Note:</u> The recommendations presented in this Tool are based on CENAM-Mexico's MESURA Methodology | 2.6.1. Invite and encourage one or more companies to join a pilot project. 2.6.2 Choose the pilot company or companies. 2.6.3 Prepare a check-list or questionnaire. 2.6.4 Select and train the team of consultants. Please review the summary table for each step on the following page. |
| Templates/Forms <u>Note:</u> These forms were shared by CENAM-Mexico (MESURA Program) | Process map (Annex 2.6/F1). Metrological Needs (Annex 2.6/F2). Standards and Instruments (Annex 2.6/F3). Procedures (Annex 2.6/F4). Personnel (Annex 2.6/F5). |
| Example | Preparation of a pilot project (carried out by LATU) (Annex 2.6/E1). |

Steps for Tool

2.6.1 Invite and encourage one or more companies to join a pilot project.

Highlight benefits of Metrology consulting with companies identified during ‘Needs assessment’ stage.

Speak to them about:

- Economic impact of Metrology.
- Metrology and improvement of competitiveness for the company.
- Relationship between product quality and Metrology.
- Metrology as an element in the decision making process.

You may offer this service to the company as a collaboration project (with no revenue for the NMI) or sell the service for a charge to recover costs.

Pilot project may be applied to a company or a group of similar companies (such as SMEs).

Interview prospective companies to be aware of feasibility and their interest in participating in the pilot project.

2.6.2 Choose the pilot company or companies.

From the group of prospective companies, choose those that comply with the following characteristics:

- They are representative of the sector.
- They have a good relationship with the NMI.
- They are interested in improving the quality of their metrology system.

Once the pilot company or companies have been defined, carry out documentary research that will allow you to have more information about the pilot companies. It is useful to conduct research on:

- Products manufactured or services offered by the company.
- Key processes for manufacturing the product or offering the service.
- Certifications (for example ISO 9000).
- Regulations for products or services.
- Main national and international clients.
- Company size.
- Key contacts in the company (people involved in measurements and in their quality).

2.6.3 Prepare a check-list or questionnaire.

Depending on the goal or scope of the designed consultancy, prepare some forms to collect information about the pilot company or companies during the consultancy project.

The following forms have been designed by CENAM for the MESURA Program and they are being shared with the readers of this Guide.

Process Map ([Annex 2.6/F1](#)).

Metrological Needs ([Annex 2.6/F2](#)).

Standards and Instruments ([Annex 2.6/F3](#)).

Procedures ([Annex 2.6/F4](#)).

Personnel ([Annex 2.6/F5](#)).

Note:

The methodology of the MESURA Program is protected by copyright.

2.6.4 Select and train the team of consultants.

Organise an interdisciplinary team of consultants. These consultants should have the following skills:

- Skills to generate good understanding between those receiving advice and the consultant team.
- Skills to overcome conventional barriers.
- Skills to conceptualise all the information logically and systematically.
- Skills to coordinate a team.
- Skills to integrate the team members and achieve goals in a timely manner.
- Skills to understand the complete process and its metrological requirements, to assess whether the measurements are made correctly throughout the process and whether they are sufficient to ensure the process tolerances.

Train consultants in the methodology to follow during the pilot project and the use and purpose of Templates/Forms. Compare them with the information you researched about the company.

2.7 Design of an Annual Training Program

| Tool 2.7 Design of an Annual Training Program | |
|---|--|
| Description | Design an annual training program in Metrology based on user priorities and lessons learned from previous courses. |
| Objectives | <ul style="list-style-type: none"> ■ To offer courses according to users' needs. ■ To use NMI resources efficiently; to build-up, adapt and consolidate the design of existing courses instead of designing new courses. |
| When it applies | Planning of training services. |
| Requirements | Documents (records) from previous courses (statistics, evaluation of results, materials). |
| Resources | Low. |
| Tool Limitations | Time limitations. Some activities depend on information requested from metrologists. |
| Steps | <p>2.7.1 Analyse current offer of courses vs. requested courses.</p> <p>2.7.2 Analyse the structure and content of courses with high demand (both those currently offered and those not offered).</p> <p>2.7.3 Develop proposals for designing new versions of courses.</p> <p>2.7.4 Document the procedure to set the time frame, carry out and evaluate courses offered in the annual program.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | None. |
| Example | Preparation of an annual program based on material of previously taught courses, carried out by LACOMET (Annex 2.7/E1). |

Steps for Tool

2.7.1 Analyse current offer of courses vs. requested courses.

Identify:

- Courses requested in the last 2-3 years (number, name and specialty).
- Number of trained participants.
- Evaluation results.

Prepare a report on findings, including graphs to illustrate results.

Identify most requested courses.

In the [Annex 3.3/E1](#) you may find an example of the report.

2.7.2 Analyse the structure and content of courses with high demand (both those currently offered and those not offered).

Ask the expert metrologists to:

- Study structure and content of the material from the courses demanded and not currently offered.
- Select materials that may be useful to all types of participants; be mindful that new courses will be aimed at heterogeneous groups with participants from different companies, experience and education.

2.7.3 Develop proposals for designing new versions of courses.

Ask metrology experts to propose new materials based on:

- New standards (or updated versions).
- New technologies.
- New methods.
- Explicit requests from clients.

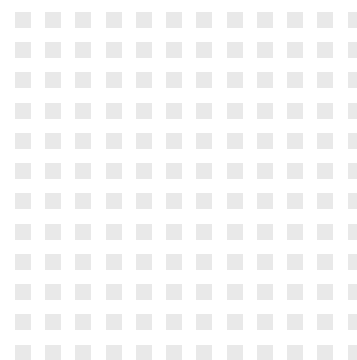
2.7.4 Document the procedure to set the timeframe, carry out and evaluate courses offered in the annual program.

Document administrative procedure to set the timeframe, carry out and evaluate courses taught during the annual program. Include the following in the procedure:

- Criteria for selecting instructors.
- Criteria for evaluating instructors.
- A tool for course evaluations based on service impact indicators. For example:
 - Content, quantity and course material.
 - Number of instructors trained to teach courses.

2.8 Preparation of Training Workshops

| Tool 2.8 Preparation of Training Workshops | |
|--|---|
| Description | Promote and prepare a workshop targeting the industry and NMI users in general. |
| Objectives | To carry out all inherent activities to prepare an effective training workshop successfully. |
| When it applies | 'Service planning' stage. |
| Requirements | Tool 2.1, Selection and Design of Service or Project. |
| Resources | Low. |
| Tool Limitations | Workshop preparation may take several months. |
| Steps | <p>2.8.1 Prepare Workshop program.</p> <p>2.8.2 Prepare budget (see Tool 2.4).</p> <p>2.8.3 Plan necessary human resources and equipment.</p> <p>2.8.4 Prepare event logistics.</p> <p>Please review summary table for each step on the following page.</p> |
| Templates/Forms | None. |
| Example | Workshop preparation: Introduction to Metrology and Calibration for industries, performed by St Kitts and Nevis Bureau of Standards (Annex 2.8/E1). |



Steps for Tool

2.8.1 Prepare workshop program.

Invite a specialist in the field to prepare the workshop program.

Make sure to select topics that best fit the needs and training of target participants.

If there are no experts for a specific topic in your NMI, request support from an associate NMI (see Tool 2.5).

Include following information in the program:

- General goal.
- Specific goals.
- Who the target is.
- Topics.
- Duration.

2.8.2 Prepare budget.

See Tool 2.4.

2.8.3 Plan necessary human resources and equipment.

With the goal of the Workshop as a reference, carry out the following activities:

- Designate instructor(s) from your NMI or from another NMI. If you need support from another NMI, begin negotiations in advance.
- Designate coordinators and people in charge of organising the Workshop.
- Choose a comfortable place with appropriate space for training.
- Prepare or make available computers and/or necessary equipment.

Prepare access to facilities in the event that laboratory exercises are included.

2.8.4 Prepare event logistics.

Prepare a plan for:

- Inviting the attendants.
- Registration process.
- Welcoming attendants.
- Carrying out the workshop.
- Evaluating the workshop.

2.9 Training of Trainers/Instructors

| Tool 2.9 Training of Trainers/Instructors | |
|---|--|
| Description | Train and evaluate NMI personnel in competences required to render training services, develop a program for on-the-job training of trainers/instructors (OJT). |
| Objectives | To ensure the quality of training services offered by the NMI. |
| When it applies | When organising and/or expanding training services. |
| Requirements | Planning in advance. Training of trainers should be contemplated in the strategic planning and the operational work plan. |
| Resources | Medium. |
| Tool Limitations | „On-the-job training of trainers“ programs must be updated on an ongoing basis, adjusting to the needs of teams giving and receiving training. |
| Steps | <p>2.9.1 Select personnel that can be ‘trainer/instructor’.</p> <p>2.9.2 Prepare the „On-the-job training of trainers“ program.</p> <p>2.9.3 Implement, evaluate and record results.</p> <p>2.9.4 Add new instructors to the team.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | None. |
| Example | On-the-job Training and Evaluation of Instructors Program – carried out LATU (Annex 2.9/E1). |

Steps for Tool

2.9.1 Select personnel that can be 'trainer/instructor'.

NMI instructors represent the Institute when standing in front of a group. Therefore, it is important to select the most suitable personnel to take on this role in accordance with certain skills and characteristics, in addition to the technical knowledge required.

a) Define the instructor's profile

Depending on the type of training course, demand and activities, an instructor must comply with a certain profile. Identify:

- Technical knowledge required (topic and degree);
- Level of competences (assistant instructor, main instructor, senior instructor);
- Level of representation;
- Availability;
- Commitment to quality and excellence.

b) Select candidates for instructor

Most of personnel have experience in technical aspects and probably some prior experience in communication. When choosing the instructor, explore and analyse the following:

Required knowledge: laboratory development, current performance, prior experience.

Training skills: prior experience/ability to prepare, teach and evaluate training activities; or technical contents (articles, posters, speeches).

Representation: information and commitment to NMI role; attitude and opinion with regard to rules and procedures, fairness, social responsibility.

Availability: personal and professional interests, availability/dedication to the task and to stay updated with training skills.

Commitment with development and continuous improvement: personal performance and NMI services.

2.9.2 Prepare the "On-the-job training of trainers" program.

The best way to confirm your choice is by training instructors and testing their knowledge and training skills, thus ensuring they can take on training activities and adapt to NMI requirements and procedures.

The "On-the-Job training of trainers/instructors" program should take the NMI candidates through gradual stages and levels of responsibility.

Define the program including:

– **A set of activities** to be developed by the candidate, depending on the skills he/she must improve/develop.

Preparation and design of contents:

Candidates may prepare/improve contents, presentations, exercises or demonstrations, study materials, methodologies and tools.

Implementation of training activities: consider the participation of candidates to teach courses that are normally offered by the NMI progressing through various levels: as an *Observer*; as an *Assistant Instructor* (communicates part of the content or coordinates some exercises/demonstrations); as *Instructor* (teaching a full course under direct supervision or supervision directly after the course).

Evaluate the training activities: the candidate(s) may collaborate in the preparation of tools and methods for evaluation; collect and analyse feedback from attendants, teaching team and users.

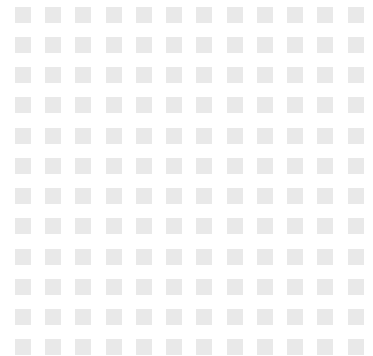
Prepare a time frame. Distribute selected activities; establish dates, people in charge of supervision, documentary source to verify compliance and evaluation tools.

2.9.3 Implement, evaluate and record results.

- Supervise implementation with continuous follow-up (make adjustments as necessary).
- Evaluate on the basis of different sources: opinion of supervisors and main instructor; results; opinions of those surveyed.
- Collect and record documentary source and evaluation results.

2.9.4 Add new instructors to the team.

Include new instructors who cooperate in planning/developing activities that respond to users' demands and are in compliance with NMI strategic and operational planning as related to training services.



2.10 Organisation of Group Calibration

| Tool 2.10 Organisation of Group Calibration | |
|---|--|
| Description | <p>Provide calibration services in fields the NMI cannot cover currently.</p> <p>The group calibration is a tool for pooling calibration demands of users and providing calibration through another competent NMI. This tool may be combined with training and development of your own capabilities. This concept may last indefinitely or may lead to the development of competencies in the NMI to implement the service in the future.</p> |
| Objectives | <ul style="list-style-type: none"> ■ To expand NMI calibration services by including other NMI capabilities. ■ To raise industry awareness. ■ To establish traceability to clients/users in the country. |
| When it applies | When there is a calibration demand in the country that cannot be satisfied by the NMI. |
| Requirements | NMI must pool demands, coordinate with more developed NMIs and organise logistics. |
| Resources | Medium. |
| Tool Limitations | Intense awareness actions are required to promote and facilitate organising group calibration. |
| Steps | <p>2.10.1 Invite companies to participate and compile technical information.</p> <p>2.10.2 Identify an expert provider (NMI in the region) of calibration services.</p> <p>2.10.3 Determine the terms of reference of the project.</p> <p>2.10.4 Coordinate and group together companies interested in group calibration.</p> <p>2.10.5 Prepare group calibration logistics.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | None. |
| Example | Organisation of group calibration of multimeters, performed by GNBS. (Annex 2.10/E1) |

Steps for Tool

2.10.1 Invite companies to participate and compile technical information.

Pursuant to stakeholder analysis, the NMI identifies satisfied or unsatisfied demand for calibration of a specific instrument (example: analytic scales, coordinate-measuring machines, etc.).

Invite identified stakeholders and speak to them about:

- Benefits for the company.
- Social and economic impact of Metrology.
- Metrology and its positive impact on competitiveness.
- Relationship between product quality and Metrology.

2.10.2 Identify an expert provider (NMI in the region) of calibration services.

NMI identifies another competent NMI in the region (accredited or with CMCs in the required field, if possible) and negotiates terms for support, coaching or subcontracting the calibration for its clients.

2.10.3 Determine the terms of reference of the project.

Prepare a document about terms of reference.

Include at least the following elements:

- Conditions for users' participation.
- Conditions for NMI subcontracting.
- Flowchart and time frame.
- Calculation of costs and benefit-cost ratio.
- Logistics and resources.

2.10.4 Coordinate and group together companies interested in group calibration.

Contact interested companies and inform them of:

- Terms of reference.
- Equipment requirements.
- Calibration cost.
- Time frame.

Follow-up on interested companies and ask them to confirm their participation.

2.10.5 Prepare group calibration logistics.

Prepare logistics for:

- Dates for receiving equipment and participation charge.
- Reception of equipment.
- General procedure for the exercise.

Communicate logistics to the companies that have confirmed their participation.

2.11 Standardisation of Protocols for Proficiency Tests

| Tool 2.11 Standardisation of Protocols for Proficiency Tests | |
|--|--|
| Description | Offer recommendations for preparation of the Proficiency Tests (PT) protocol, pursuant to the ISO/IEC 17043 standard. Standardise protocol preparation process, improving its understanding and evaluation, providing both the organising laboratory and the participating laboratory with clearer tools. |
| Objectives | Standardise the Proficiency Test protocol: <ul style="list-style-type: none"> ■ To provide laboratories with a base model to follow in the preparation of their protocols, pursuant to the ISO/IEC 17043 standard. ■ To identify key points for Proficiency Test protocols. ■ To define organisation and coordination roles involved in a PT process. |
| When it applies | Protocol will be used whenever a Proficiency Test is arranged. |
| Requirements | <ul style="list-style-type: none"> ■ Detecting the need to offer Proficiency Tests to users. ■ Approval of primary feasibility study (Human resources trained in ISO/IEC 17043 standard, equipment, building, competent laboratory, infrastructure). ■ Planning design and approval for Proficiency Tests to be offered. |
| Resources | High. |
| Tool Limitations | This tool cannot be applied when a calibration or testing laboratory does not have a system implemented according to the ISO/IEC 17025 standard and does not have basic technical requirements to organise a Proficiency Test. Likewise, the tests regarding stability, homogeneity and determination of value, when applicable, must be performed by a laboratory (hired or not) accredited according to ISO/IEC 17025 standard or by an NMI laboratory (it is even better if it has declared CMCs). |
| Steps | 2.11.1 Hold a meeting with the technical committee or organising staff. 2.11.2 Prepare the Proficiency Test (PT) protocol. 2.11.3 Technical review of the Proficiency Test protocol. 2.11.4 Review, approve and publish the Proficiency Test protocol. |
| Templates/Forms | „Proficiency Test Protocol“. |
| Example 1 – Uruguay | Standardisation of Proficiency Test Protocol for the Detection of Salmonella spp. in Meat Products. Annex 2.11/E1 . |
| Example 2 – Chile | Proficiency Test Protocol L-14 „Calibration of bridge type or depth micrometers, analogue, with measuring range of (0 to 25) mm and resolution of 0,01 mm“ Annex 2.11/E2 . |

Steps for Tool

2.11.1 Hold a meeting with the technical committee or organising staff.

The technical committee or organising staff come together to review each point of the plan already approved and a timeframe is determined for each of the Proficiency Test process stages.

Keeping minutes of the meeting of the technical committee or the organising staff is strongly recommended; key points defined for Proficiency Tests should be included.

For meetings to be effective and efficient, it is advisable to establish a clear agenda. For example, the coordinator prepares an agenda, which is sent well in advance to all members on the committee. Define topic priorities and approximate time to be devoted to each one.

After the meeting there should be a conclusion for each topic, and if there are activities to be carried out, the terms/dates of completion must be set. Determine who will prepare the minutes and distribute them after the meeting.

2.11.2 Prepare the Proficiency Test (PT) protocol.

Personnel in charge of PT process prepare this protocol based on a previously defined form, covering each stage of the process. Two PT protocol examples are shown in [Annexes 2-11-E1](#) and [2-11-E2](#). The following key aspects may be distinguished in this protocol.

- *Description of parameters and matrix/instrument:* Pursuant to detected needs, parameters and matrices/instruments of the Proficiency Tests are defined.
- *Description of sample/instrument, preparation, homogeneity and stability tests as applicable:* It is fundamental in the case of chemical PTs to have a clearly defined and validated procedure to follow for the preparation of samples for a PT, and to define the procedure to carry out homogeneity and stability tests. In the case of physical PTs it is necessary to describe exactly the instrument that will be used as a PT item and which parameters the test will follow so that participants may verify whether they are within the scope of the test. Instrument stability must be tested and its adequacy must be determined on the basis of results.
- *Timeframe:* It is very important for the organisation of the participating laboratory, as well as for the PT provider, to have a timeframe where all the activities involved in the PT process are shown.
- *Participation cost:* The cost of participating is defined taking into consideration all associated costs, presuming a certain number of participants (which may actually be fewer or more), and subject to market factors.
- *Confidentiality clause:* What people will have access to client results and what information will be found in the final report must be clearly established. A decision has to be made as to whether the participant will be identified or not by the company name.

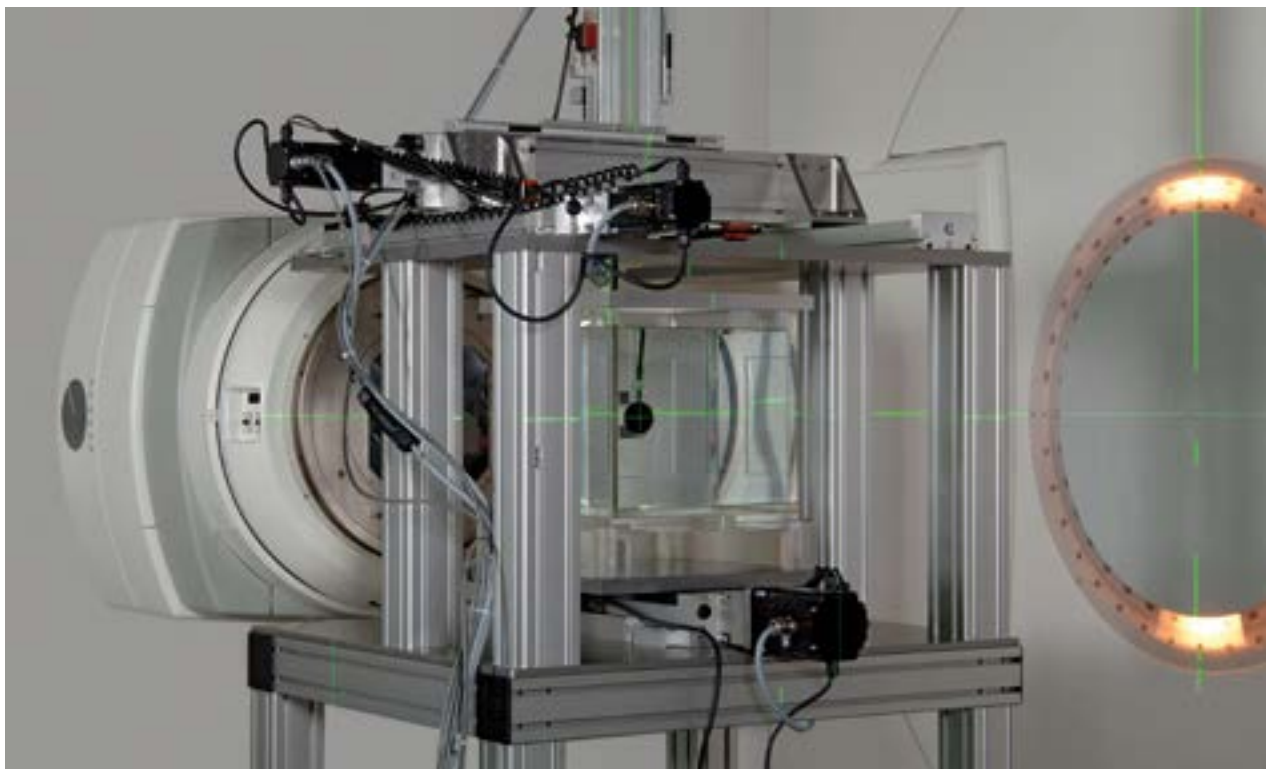
One-on-one meetings with the personnel in charge of the PT process are advisable (at least three) in order to prepare a protocol, and then make minor changes via email.

2.11.3 Technical review of Proficiency Test protocol.

Technical experts review the whole document for final approval, emphasising technical aspects. Protocol amendments may be presented if adequate.

2.11.4 Review, approve and publish the Proficiency Test protocol.

Reviews and/or amendments are made and subsequently approved by the Proficiency Test coordinator, before the protocols are sent to potential participants.



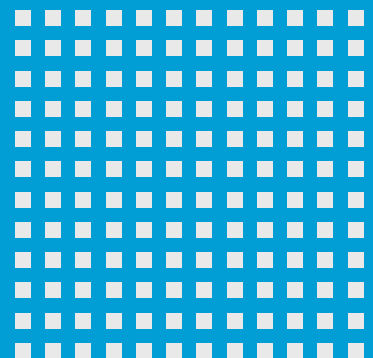
Stage 3

Implementation

Tools

The following tools offer recommendations for the implementation of operational plans and activities.

The first tool (Integration of External Counterparts) may be applied to any service/project. Other tools are specifically applicable to consulting, training or group calibration services and to projects with regulating entities, secondary laboratories and educational institutions. In the title of each tool we have specified to which service or project it belongs.



3.1 Integration of External Counterparts

| Tool 3.1 Integration of External Counterparts | |
|---|--|
| Description | Invite external agencies, chambers, associations or other stakeholders to participate as organisers or promoters of an NMI event or project. |
| Objectives | <ul style="list-style-type: none"> ■ To increase the degree of closeness to users. ■ To facilitate or accelerate the achievement of expected impacts. ■ To increase sustainability, follow-up and continuity of services. |
| When it applies | Especially during the 'Implementation' stage; however, it may be applied at any time. |
| Requirements | Good negotiating skills. |
| Resources | Low. |
| Tool Limitations | Involves intense awareness raising activities among chambers, agencies and other stakeholders. |
| Steps | <p>3.1.1 Invite chambers, associations, external agencies or other stakeholders to carry out jointly events or projects. (See Tool 1.4).</p> <p>3.1.2 Organise events/projects jointly with partner institutions.</p> <p>3.1.3 Work jointly in the implementation and even in future processes of the new service.</p> <p>Please review summary table for each step on the following page.</p> |
| Templates/Forms | None. |
| Example | Alliance between the LATU and the Chamber of Industries of Uruguay (CIU) for development and marketing of a new metrological service (Annex 3.1/E1). |

Steps for Tool

3.1.1 Invite chambers, associations, external agencies or other stakeholders to carry out jointly events or projects.

It is very helpful to work with key stakeholders in the following instances:

- Awareness raising events.
- Seminars.
- Development of standards or technical regulations.

In the case of **awareness raising events or seminars**, it is most advisable to work with a chamber or with representatives of associations because:

- The awareness raising effort may be easily multiplied by its members.
- It is likely that the industry will have a closer relationship with the chamber than with the NMI.
- Chambers or associations are authorised to provide logistics and facilities.

In the case of **development of standards or technical regulations** it is very helpful to invite regulators, technicians, team repairers and consumers to joint events.

After the meeting or seminar, attempt to form alliances with the chamber/association and foster win-win relationships.

3.1.2 Organise events/projects jointly with partner institutions.

To organise an awareness raising event or seminar jointly, distribute some of the following tasks among the members of the chambers/agencies or allied institutions:

- Event promotion.
- Participants registration.
- Opening the workshop, course, seminar, etc.
- Participation in panel discussions.
- Meeting on quality and competitiveness.
- Analysis of event results and impact.

To develop standards or regulations; invite stakeholders who are part of the development process of the standard or regulation. Prior training such as an introduction to Metrology and the standard will be most useful.

3.1.3 Work jointly in the implementation and even in future processes of the new service.

It is possible to cooperate with chambers as partners in the implementation of a new service with similar advantages as those mentioned above.

When **standards or regulations are developed**, it is advisable to get stakeholders involved also in the application of this standards.

3.2 Implementation of Pilot Consulting Projects

| Tool 3.2 Implementation of Pilot Consulting Projects | |
|--|--|
| Description | <p>Implement the consulting service, just as designed, in a selected pilot company.</p> <p>A pilot consulting project is an experience aimed at:</p> <ul style="list-style-type: none"> ■ Gaining a notion of the typical characteristics of the type of industry where services will be offered. ■ Testing the methodology design. ■ Providing practical training for the team of consultants. ■ Raising awareness in the industry of the benefits of contracting in-depth consulting. |
| Objectives | <ul style="list-style-type: none"> ■ To define the scope of the consulting project and its duration. ■ To test whether the design of the consulting services suits the state of the industry. ■ To make adjustments to the consulting service. ■ On-site training of consulting team. ■ To establish presence in the industry and announce/promote the new service. |
| When it applies | 'Implementation' stage. |
| Requirements | <ul style="list-style-type: none"> ■ Select a company that values the NMI as a competent entity and a leader in Quality and Metrology. ■ Tool 2.6, Preparation of a Pilot Consulting Project. |
| Resources | Low to medium (travel expenses). |
| Tool Limitations | High and long term investment for training of consultants. |
| Steps | <p>3.2.1 Make sure to identify information at 3 levels of knowledge.</p> <p>3.2.2 Have an opening meeting.</p> <p>3.2.3 Interview process line and laboratory personnel.</p> <p>3.2.4 Have a closing meeting.</p> <p>3.2.5 Process results and share them with the company and stakeholders.</p> <p>Note: The recommendations presented in this item are based on the methodology of CENAM-Mexico's MESURA Program.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | <p>Process map (Annex 2.6/F1), Metrological needs (Annex 2.6/F2), Standards and instruments (Annex 2.6/F3), Procedures (Annex 2.6/F4) Personnel (Annex 2.6/F5).</p> |
| Example | Pilot experiences in 3 companies of the food, pharmaceutical and metal mechanic sectors, carried out by LATU (Annex 3.2/E1). |

Steps for Tool

3.2.1 Make sure to identify information at 3 levels of knowledge.

Explore, during the visit, the knowledge of the company at 3 levels of depth. The levels are:

- Strategic level: Address this type of information with directors and senior management.
- Tactical level: Address this information with managers.
- Technical and operational level: Address this information with technicians and production personnel.

Make sure to identify these levels of information at all times.

3.2.2 Have an opening meeting.

The Management and the people you will be interacting with during the visit must be present at the opening meeting.

During this meeting try to look for the information at the strategic level.

The activities for the opening meeting are:

- Introduce yourself and your team.
- Explain the purpose of the visit and the expected results to the participants.
- Ask about strategic level information. Speak about company core business, clients, markets, competitors, key competences, Metrology related issues, key processes with high incidence on Metrology.

3.2.3 Interview process line and laboratory personnel.

Visit the process line and/or laboratories. Now you have the opportunity to collect information about the tactical and technical level.

Tactical level: understanding key processes. To understand the process you may use graphic tools such as:

- Process maps (manufacturing companies).
- Block diagram of the measurement system (calibration laboratories).
- Flow chart (testing laboratories).

Technical and operational level: understanding of the key operations and identification of metrological needs and resources. To collect this information you may apply forms used in the CENAM MESURA Program.

Process Map ([Annex 2.6/F1](#))

Metrological needs ([Annex 2.6/F2](#))

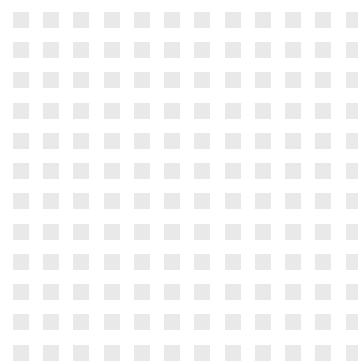
Standards and Instruments ([Annex 2.6/F3](#))

Procedures ([Annex 2.6/F4](#))

Personnel ([Annex 2.6/F5](#))

Note:

The methodology of the MESURA Program is protected by copyright.



3.2.4 Have a closing meeting.

Preparation for closing meeting:

Prior to a closing meeting, meet with consultants and:

- Discuss technical findings.
- Evaluate the needs-resources balance.
- Highlight main points of the process and the company's perspectives.

During the closing meeting:

Present findings and promote a preliminary validation by the company.

Try to present findings of the 3 above-mentioned levels of knowledge: strategic, tactical and operational.

3.2.5 Process results and share them with the company and stakeholders

Prepare a report with the findings and recommendations discussed with the company during the closing meeting.

Highlight the advantages the company will gain if it were to implement the recommendations and improvements presented in the report.

It is useful to classify findings according to the implementation time frame, so the company will have an idea of what is involved in putting them into practice.

It would be ideal to have a meeting with the company and stakeholders to present the report.



3.3 Implementation of Training Workshops

| Tool 3.3 Implementation of Training Workshops | |
|---|---|
| Description | Carry out training workshops targeting the industry and NMI users in general. |
| Objectives | <ul style="list-style-type: none"> ■ To carry out training events with a wide reach (large number of companies). ■ To promote NMI training services |
| When it applies | During the implementation itself. |
| Requirements | Identified stakeholders that should attend the workshop. Preparation of Training Workshops (Tool 2.8) |
| Resources | Medium to High. |
| Tool Limitations | Ongoing follow-up on participants is required in order to offer support for servicing their metrological needs and to get maximum advantage from the training workshop. |
| Steps | <p>3.3.1 Run workshop according to plan. 3.3.2 Evaluate the workshop. 3.3.3 Follow-up on the participants for other services.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | None. |
| Example | Workshop: 'Introduction to Metrology and Calibration for industries', performed by St Kitts and Nevis Bureau of Standards (Annex 3.3/E1) |

Steps for Tool

3.3.1 Run the workshop according to plan.

Permanently monitor the workshop to make sure it is run according to plan.

Take into account the contributions of participants and research how far expectations have been met or what new needs have arisen.

3.3.2 Evaluate the workshop.

At the end of the workshop, request an evaluation. Process and analyse evaluation results. Evaluate whether workshop goals have been achieved and if speakers or instructors have managed the time effectively.

3.3.3 Follow-up on the participants for other services.

Follow-up on training needs and other metrological services: courses, consulting services in different areas and topics that have been identified during the Workshop.

3.4 Implementation of Group Calibrations

| Tool 3.4 Implementation of Group Calibrations | |
|---|---|
| Description | Describe procedures to carry out group calibrations. This tool is a continuation of what has been described in Tool 2.10 about Organisation of Group Calibrations. |
| Objectives | To render calibration services to a group of interested companies (Group Calibration) with the help of a competent NMI from the region. |
| When it applies | During the implementation itself. |
| Requirements | <ul style="list-style-type: none"> ■ To have completed Tool 2.10 Organisation of Group Calibration. ■ For the organising NMI: Capability to organise and coordinate group calibrations. ■ For the subcontracted NMI: Infrastructure (equipment, procedures, and facilities) and personnel trained in calibration performance. |
| Resources | Medium to High (in the case of travel expenses). |
| Tool Limitations | <p>The group of companies that may participate is usually small due to time or resource limitations for moving personnel and/or laboratory equipment to the laboratory where calibration will take place. It is important to agree with the expert from the subcontracted NMI on the maximum number of pieces of equipment to calibrate.</p> <p>Costs may be high due to the travel costs of experts and the acquisition of reference standards.</p> |
| Steps | <p>Performance depends on two types of applications:</p> <ul style="list-style-type: none"> – Travel circuit within the country for on-site calibrations (for instance, analytical scales or coordinate-measuring machines). – Calibration in the laboratory with equipment delivered for the exercise (for instance, multimeters). <p>3.4.1 Preparation. 3.4.2 Calibration. 3.4.3 Documentation of the results of the group calibration.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | None. |
| Example | Group Calibration of Multimeters, performed by Guyana GNBS. Annex 3.4/E1. |

Steps for Tool

3.4.1 Preparation.

When arranging a circuit in the country for on-site calibrations each company must be prepared to receive an expert at the scheduled time for on-site calibration. The equipment to calibrate must be available and in proper condition for calibration.

In the event of a series of calibrations in the organising laboratory, the equipment to be calibrated must be reviewed, cleaned, and in compliance with the temperature stabilisation process or other calibration conditions; thus the expert may begin as soon as he/she arrives without undue delays.



3.4.2 Calibration.

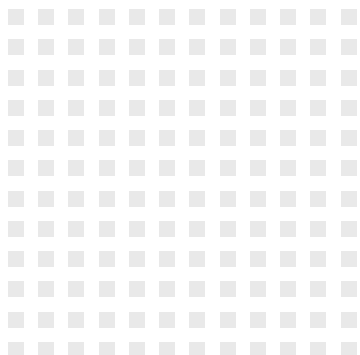
Follow the instructions of the expert to carry out the calibration procedure on your equipment.

Learn from the expert as much as possible to be able to repeat the calibration in the future without his/her presence.

3.4.3 Documentation of the results of the group calibration.

Documenting results of the group calibration. Include the following:

- Participants' name, position and company.
- Company to which the participants belong.
- Characteristics of the equipment.
- Name, position and NMI of the expert who conducted the exercise.
- Metrological characteristics of the standards and reference materials (if applicable).
- Calibration results.
- Calibration reports on each equipment.



3.5 Building Networks of Secondary Laboratories

| Tool 3.5 Building Networks of Secondary Laboratories | |
|--|---|
| Description | Establish recommendations for building secondary laboratory networks. |
| Objectives | <ul style="list-style-type: none"> ■ To support calibration laboratories so that they can obtain their accreditation. ■ To adopt actions to improve the technical capability of the laboratories. ■ To integrate the laboratories as a work team in order to unify criteria. |
| When it applies | When there are several Metrology laboratories in the country rendering calibration services of the same magnitude and acting as accredited laboratories or in the process of accreditation. Furthermore, when said laboratories are interested in improving their technical competence. |
| Requirements | <ul style="list-style-type: none"> ■ That participating laboratories render calibration services at the time or that they have applied knowledge of what is involved in Metrology and calibration. ■ Competencies questionnaire for interested laboratories. |
| Resources | <ul style="list-style-type: none"> ■ An instructor with knowledge of ISO/IEC 17025 and available for at least four hours per week to teach and prepare the courses or consultancies. ■ Availability of online connection. |
| Tool Limitations | When there are no laboratories rendering calibration services in the country. Potential problems as to Internet access for online sessions. |
| Steps | <p>3.5.1 Making contact and collecting information.</p> <p>3.5.2 Project design.</p> <p>3.5.3 Confirmation of participation.</p> <p>3.5.4 Training plan development.</p> |
| Templates/Forms | Questionnaire to identify capabilities of participating laboratories (AA_3-5_CEHM-CuestionarioLaboratorios). |
| Example 1 | Building a network of Secondary Laboratories in Honduras (Annex 3.5/E1). |

Steps for Tool

3.5.1 Making contact and collecting information.

Identify and contact companies that render calibration services and even repair measurement instruments. You may review the list of users who have contacted your NMI through another activity, for instance, training or other activities previously carried out with the NMI.

Request interested parties to fill out a questionnaire to obtain general information about the competencies and services of participating laboratories, as well as to detect whether there is interest in implementing quality management systems or in obtaining an accreditation.

A questionnaire example is included in [Annex AA-3-5](#).

3.5.2 Project design.

Analyse the information contained in the questionnaires about the capabilities and services of the participating laboratories.

Based on this information formulate project goals and scope, as well as a training plan and a description of the advantages to be gained by the participating laboratories. It is recommended that you prepare a *Power-Point* presentation with this information and present it to the participating laboratories in the way you deem advisable, whether in groups or individually.

3.5.3 Confirmation of participation.

After the project design has been prepared, confirm the participation of each laboratory taking part.

Preferably, request a commitment letter from them in order to comply with expected products of the training and/or consultancy delivered. Make them aware that the NMI is investing resources in each one of them.

3.5.4 Training plan development.

Work out a plan and time frame for the training and make it known to participants. Include the necessary training sessions and/or consultancies in the plan, as well as the necessary elements to develop the competencies the laboratories need based on the analysis you developed with the questionnaires.

The basis of the training is to develop competences required to implement a system based on ISO/IEC 17025, but also consider other topics the participants require in order to render quality services.



3.6 Implementation of Regulations

| Tool 3.6 Implementation of Regulations | |
|--|--|
| Description | Offer recommendations to implement a regulation at national level considering the involvement and training of stakeholders as the main element. |
| Objectives | For those involved (stakeholders): <ul style="list-style-type: none"> ■ To know the scope of legal Metrology and clarify the role of the regulator in these matters. ■ To know the scope of the metrological standard/regulation and its application to the model approval and initial verification. ■ Establish points of agreement and commitment to draw up a resolution providing compulsory metrological controls. |
| When it applies | In „Regulation“ drafts. |
| Requirements | <ul style="list-style-type: none"> ■ Identification of required metrological standard draft or drafts. ■ Research on related regulators. ■ Identification of initial verification procedure or procedures (IVP). |
| Resources | <ul style="list-style-type: none"> ■ Competent personnel to work out metrological standard(s) or regulations and initial verification procedure(s) (IVP). ■ Economic resources to purchase and translate the international reference standard. ■ Conference room with projectors and computers for presentations on legal Metrology, metrological standards and initial verification procedures. |
| Tool Limitations | This tool cannot be applied if the regulator or regulators do not wish to participate or have not expressed their commitment to participate at the agreed upon meetings. |
| Steps | <p>3.6.1 Work on a metrological standard draft and initial verification procedure.</p> <p>3.6.2 Identify the regulator or regulators and other stakeholders.</p> <p>3.6.3 Inform stakeholders and/or train them in legal Metrology topics and metrological standards draft.</p> <p>3.6.4 Work on the draft resolution providing a compulsory metrological standard.</p> <p>3.6.5 Invite the regulators to voice their opinion on the draft resolution.</p> <p>3.6.6 Publish the resolution providing a compulsory metrological standard/ regulation and established metrological controls.</p> |
| Templates/Forms | None. |
| Example 1 | Development of Peruvian metrological standards Annex 3.6/E1 . |

Steps for Tool

3.6.1 **Work on a metrological standard draft and initial verification procedure.**

Work out the metrological standard draft (or equivalent) and IVP, preferably on the basis of an annual NMI work plan.

The scope of the metrological standard draft must cover regulations for measuring instruments identified as a priority.

Acquire the international reference standard for each one of the measuring instruments identified. Have them translated, prepared and published for public opinion according to internal procedure provisions.

Consider the possibility of obtaining regulations from another NMI or regional regulations (for instance: MERCOSUR) that have already been translated and are currently in force.

3.6.2 **Identify the regulator or regulators and other stakeholders.**

The regulators who are in charge of enforcing the provisions of future regulations and the mandatory application of metrological control are defined according to the measuring instrument treated in the metrological standard draft.

Furthermore, select inspection bodies that may participate in the initial verification of measuring instruments subject to metrological control.



3.6.3 **Inform stakeholders and/or train them in legal Metrology topics and metrological standards draft.**

Invite related regulators and inspection bodies to a presentation of the topics of the metrological standard draft.

During the course of the presentation, explain the scope of legal Metrology, main points (technical) of the standards draft and its application for the approval of the model and initial verification.

Attempt to establish points of agreement and commitment for drawing up a resolution of compulsory metrological controls. Take advantage of this opportunity to raise awareness among stakeholders of the importance of Metrology in all fields of action.

Insofar as possible, prepare a plan to train stakeholders in basic Metrology and the standard.

3.6.4 **Work on the draft resolution providing a compulsory metrological standard.**

Bring together a work team to prepare a draft resolution providing the compulsory metrological controls as prescribed in the metrological standard.

3.6.5 **Invite the regulators to voice their opinion on the draft resolution.**

Serve notice to regulating entities, attaching the draft resolution to make the standard compulsory as well as all metrological controls derived from it.

Establish a time period for receiving opinions.

3.6.6 **Publish the resolution providing a compulsory metrological standard/regulation and established metrological controls.**

Once the term to receive comments is over, prepare the corresponding resolution evaluating and taking into consideration the opinions received.

Publish the text of the resolution in the Official Gazette where the mandatory metrological standard/regulation, the corresponding metrological controls and other related matters are established.

3.7 Metrology Training for Teachers of Formal Education

| Tool 3.7 Metrology Training for Teachers of Formal Education | |
|--|--|
| Description | Offer recommendations on training in Metrology topics for teachers of formal education. |
| Objectives | <ul style="list-style-type: none"> ■ To prepare the necessary conditions so that Metrology training is adequate at the level of teachers who are being trained ■ To ensure that the training is effective, from planning until follow-up. |
| When it applies | In projects where the objective is to strengthen the relationship of educational institutes with NMIs and to improve/update knowledge of Metrology by the teaching body. |
| Requirements | <p>The following is necessary to apply this tool:</p> <ul style="list-style-type: none"> ■ Raise awareness among senior executives of the education sector. ■ A deep commitment on the part of the personnel in charge of training teachers on the impact of Metrology in education, and an ability to pass on this motivation; in addition to the experience in Metrology. ■ That the training be considered part of the operational program of the NMI. |
| Resources | <p>Secondary level:</p> <ul style="list-style-type: none"> ■ Human resources: technical teachers; personnel to follow-up on the distribution processes ■ Material resources: informational or teaching material (printed, audio-visual, online) as well as costs associated to receiving groups of participants for training. |
| Tool Limitations | Complying with requirements, no limitations are foreseen for the application of this tool. |
| Steps | <p>3.7.1 Define and analyse target audience.</p> <p>3.7.2 Choose the type of training and its length.</p> <p>3.7.3 Design goal and contents.</p> <p>3.7.4 Prepare material.</p> <p>3.7.5 Advertising/distribution of information and registration of participants (concurrently with 3.7.4).</p> <p>3.7.6 Implementing training.</p> <p>3.7.7 Follow-up actions.</p> <p>3.7.8 Post-course follow up.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | None. |

| | |
|------------------|---|
| Example 1 | Strengthening educational bases at primary and secondary level for correct SI use. (Annex 3.7/E1). |
| Example 2 | Full Day Cycle of Conferences about Metrology and its Benefits for Universities in Peru (Annex 3.7/E2). |
| Example 3 | Developing and strengthening metrology knowledge, skills and capabilities in technical education in Uruguay (Annex 3.7/E3). |

Steps for Tool

3.7.1 Define and analyse target audience.

Considerations with regard to target audience:

- Background: prior knowledge of quality and Metrology topics.
- Function: level and scope of teaching role (basic, senior secondary or university).
- Availability: Ease/availability to move to the event site and to be absent from his/her duties for training events.

3.7.2 Choose the type of training and its length.

Considering the characteristics of the target audience, decide:

Type of training:

- Modality: on-site, blended, distance.
- Type: Course, workshop, Seminar, Diploma course.

Duration:

- Brief: 8 to 12 hrs. (overview of the importance and influence of Metrology),
- Intensive: 16-40 hrs. (development of competences for the application of knowledge; theory and practice),
- Extended: more than 100 hrs. (to go deep into/specialise in a subject, for example, a Diploma course).

3.7.3 Design goal and contents.

The **goal** and selection of **topics** and exercises must be designed according to participants profile and roles.

For specialized training related one hundred percent to identified roles and needs of teachers involved, it is recommended to run a validation with them, or rather with a representative of the institution whose teachers will be trained.

If necessary, a test may also be designed to be set before beginning the training and at the end.

3.7.4 Prepare material.

It is important to consider that Metrology educational material must:

- Be of the highest possible quality: this will make a good impression on the teachers as they will see that the material was prepared professionally and that Metrology is a serious business.
- Be supplemented with pre-existing material from other NMIs.
- Make reference to international documents.
- If possible, it should be designed jointly among several NMI to be used as an international reference (using the best specialists and resources available) (see Tool 2.5).

3.7.5 Advertising/distribution of information and registration of participants.

Concurrently with the preparation of materials, once the contents have been defined, a person appointed by the NMI should proceed with the advertising/distribution based on the Institute's standards and procedures, or those of the Institution whose teachers will be trained.

It is advisable to give out an official attendance certificate at the end of the training.

If an international institution is sponsoring, make this fact known during advertising/distribution and/or include it in the certificate as a supporting institution.

3.7.6 Implementing training.

Training recommendations:

- Identify how Metrology is applied by participants while teaching, in order to make any necessary adjustments in the training course and steer the presentation towards benefiting teachers.
- Answer audience questions with confidence. This fosters confidence towards the NMI.
- Promote networking during training, both among teachers and with the NMI.
- Share references of international teaching materials on Metrology.
- Establish mechanisms to ensure that participants profit from the training course.

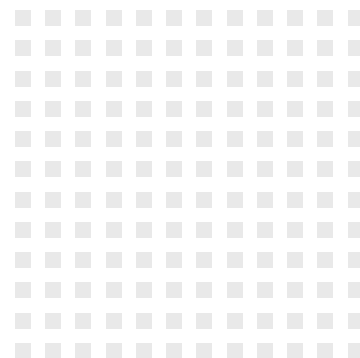
3.7.7 Follow-up actions.

Consider the following actions for follow up:

- Evaluate the service and effectiveness of the training pursuant to NMI standards or procedures, and share results with those involved in planning and execution.
- Make sure to keep a full list of all attendants for subsequent actions.

3.7.8 Post-course follow-up.

- Renew contacts made during the training to continue strengthening the relationship between the educational institutions and the NMI.
- Confirm with them whether the NMI may be of support in any Metrology service they might require:
 - joint projects,
 - consultancies,
 - calibrations,
 - other courses,
 - etc.



3.8 Entrepreneurs Show

| Tool 3.8 Entrepreneurs Show | |
|-----------------------------|---|
| Description | Establish recommendations for an entrepreneurs show with the stakeholders. The entrepreneurs show is an event carried out by a group of companies in cooperation with the Ministry of Industry in your country. |
| Objectives | <p>Main objectives of the Entrepreneurs Show are the following:</p> <ul style="list-style-type: none"> ■ To provide tools to aspiring entrepreneurs so they can fulfil their aspirations. ■ To share experiences with entrepreneurs in order to develop their leadership and entrepreneurship. ■ To showcase the main investment opportunities in the country. |
| When it applies | Implementation. |
| Requirements | <ul style="list-style-type: none"> ■ The Entrepreneurs Show must take place at a timely moment during the Project. ■ It is necessary to evaluate the needs of the country first, and ■ To obtain funding from the private and/or public sector interested in these kinds of activities in order to properly arrange the event. |
| Resources | <ul style="list-style-type: none"> ■ Experts for discussions. ■ Financing. ■ Tools (presentations, videos, flyers, etc...). ■ Announcements in the media (written, oral, TV). |
| Tool Limitations | Support is required from the Ministry or any other organisation representing the industry. |
| Steps | <p>3.8.1. Identify entrepreneurial participants.</p> <p>3.8.2 Prepare a program, identify and invite experts for presentations.</p> <p>3.8.3 Establish a marketing method to announce the event and prepare the registration process.</p> <p>3.8.4 Carry out the entrepreneurs show</p> <p>3.8.5 Follow up on key participants.</p> <p>Please review summary table for each step on the following page.</p> |
| Templates/Forms | None. |
| Example 1 | Participation of the Ministère du Commerce et de l'Industrie in Haiti at the Entrepreneur's Show (Annex 3.8/E1). |

Steps for Tool

3.8.1 Identify entrepreneurial participants.

After evaluating the country's needs, identify the entrepreneurs. The ideal entrepreneurs must meet the following characteristics:

- Entrepreneurs with extensive experience in their specific field.
- Experts with knowledge on the topics to be presented to the public
- Alliances between public and private sectors.

3.8.2 Prepare a program, identify and invite experts for presentations.

Prepare a program based on the target audience. Identify experts for presentations on topics included in the program.

Invite experts and ask them to prepare a presentation according to your plan.

3.8.3 Establish a marketing method to announce the event and prepare the registration process.

Publicise the event in all the possible media:

- Written: newspapers, magazines, brochures
- Oral: radio, chat about the „entrepreneurs show“ in other events.
- Television: commercials or participating on TV programs

3.8.4 Carry out entrepreneurs show.

Carry out the event according to plan.

Identify contacts you may involve in your projects.

Keep contact information of attendants for subsequent contact.

3.8.5 Follow up on key participants.

After the entrepreneurs show, stay in touch with the participants who may become involved in your project.

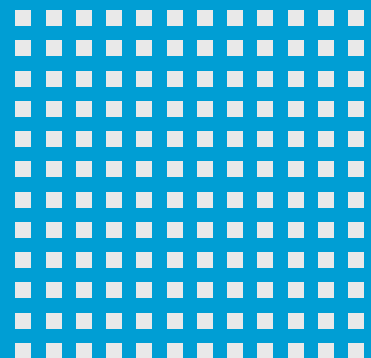


Stage 4

Evaluation

Tools

These tools were developed with the purpose of evaluating how appropriate the service/project was and its impact on the NMI and its users.



4.1 Evaluation of Chains of Impacts

| Tool 4.1 Evaluation of Chains of Impacts | |
|--|---|
| Description | Evaluate the project's chains of impacts. The evaluation of impacts proposed in this tool is based on the standard of the DCED (Donor Committee for Enterprise Development) for the Results Measurement for Private Sector Development. |
| Objectives | <ul style="list-style-type: none"> ■ To identify positive changes for users of the new service developed. ■ To identify positive changes with regard to the development of NMI capabilities. |
| When it applies | 'Evaluation' stage. |
| Requirements | <ul style="list-style-type: none"> ■ Ongoing communication and exchange of information with users after a service/project. ■ Strategic vision to identify impacts. |
| Resources | Low. |
| Tool Limitations | This tool does not offer any instructions to measure the economic impact. |
| Steps | <p>4.1.1 Identify the project's chain of impacts (input, output, outcome and impact).</p> <p>4.1.2 Establish indicators for expected results and impacts.</p> <p>4.1.3 Regularly monitor compliance with indicators for the outcomes and impacts.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | None. |
| Example | Examples of chains of impacts prepared by phase 2 participants (Annex 4.1/E1). |

Steps for Tool

4.1.1 Identify the project's chain of impacts.

There are different kinds of results that affect the project's impact:

- **Output:** Changes caused by input (activities). Knowledge, new or improved technical capabilities developed as a result of input. The output is produced.
- **Outcome:** Benefits resulting from the use of output by target associates or groups. The outcome is achieved.
- **Impact:** Significant changes in the political, social or economic aspects in the sector or country to which the direct results of the project are contributed.

Every one of these elements may be drawn into a diagram, assigning block lines for each of them. Specific examples of chains of impacts of some participants may be reviewed in the annex ([Annex 4.1/E1](#))

4.1.2 Establish indicators for expected results and impacts.

Indicators are parameters that allow us to verify whether the 'output' is produced and whether the 'outcome' and impacts have been achieved. One or two indicators may be assigned for each of these elements.

They may be of a quantitative (numerical approach) or qualitative type (subjective approach or based on perception).

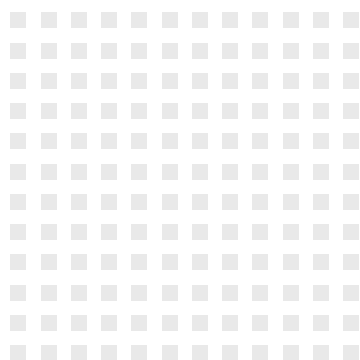
Specify for each indicator:

- Name of the indicator.
- Initial value.
- Expected final value.
- Documentary source.
- Assumptions or risks.

4.1.3 Regularly monitor compliance with indicators for the outcomes and impacts.

Depending on the project's progress rate, establish a time period to monitor compliance with indicators for output, outcome and impacts.

Make adjustments based on the results to meet the impacts expected.



4.2 Periodic Evaluation of Service

| Tool 4.2 Periodic Evaluation of Service | |
|---|--|
| Description | Evaluate Service adequacy and feasibility. |
| Objectives | <ul style="list-style-type: none"> ■ To evaluate the following service characteristics: <ul style="list-style-type: none"> • Time and manner. • Technical competence of personnel. • Satisfaction of users' needs. ■ To evaluate balance between resources and results. ■ To evaluate whether the service should continue to be offered pursuant to NMI duties. |
| When it applies | <p>In the 'Evaluation' stage, in cases where NMI has developed a new service or consolidated an existing one.</p> <p>This tool does not apply to projects, for example, the development of a regulation or the development and implementation of a Metrology Law; Tool 4.1 is recommended for these cases.</p> |
| Requirements | Keep records of services. |
| Resources | Low. |
| Tool Limitations | To get better results from the evaluation it is important to involve NMI Management. |
| Steps | <p>4.2.1 Evaluate service effectiveness.</p> <p>4.2.2 Evaluate the adequacy of the service offered.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | None. |
| Example 1 | Evaluation of training services of LACOMET (Annex 4.2/E1). |

Steps for Tool

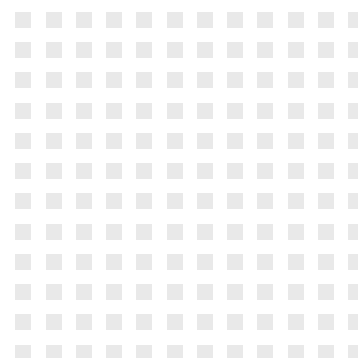
4.2.1 Evaluate service effectiveness.

Effectiveness is related to the achievement of goals. Thus, in this step you should evaluate the achievement of the service goals.

Analyse evaluation of the clients' service and the number of services performed. Compare these results with the service objectives.

If your NMI has established service indicators, evaluate compliance with the indicator.

If the goal was not achieved, make adjustments to the service or operations plan.



4.2.2 Evaluate the adequacy of the service offered.

You may evaluate the adequacy of the service offered based on:

1. The NMI role: Evaluate products and results of services and evaluate whether they conform to the NMI role, mission and vision.
2. Balance between resources invested and benefits obtained: Cost-benefit evaluation.

4.3 Evaluation of the Service “Proficiency Tests”

| Tool 4.3 Evaluation of the Service “Proficiency Tests” | |
|--|--|
| Description | Offer recommendations for preparing and carrying out the evaluation of the Proficiency Tests service, as a tool for later analysis and decision making, focused on improving the service and meeting the clients’ requirements and expectations. |
| Objectives | Evaluate the quality of the Proficiency Tests with regard to: <ul style="list-style-type: none"> ■ Client requirements. ■ Quality criteria established internally by the NMI. |
| When it applies | <ul style="list-style-type: none"> ■ It is applied during the final stage of the Proficiency Test, once the closing meeting has been held, or rather, once the results of the PT have been delivered to the clients. |
| Requirements | <ul style="list-style-type: none"> ■ Planning the Proficiency Test. ■ Running the Proficiency Test. |
| Resources | <p>Medium:</p> <p>Material resources are required for the preparation and application of the tool, according to how it is applied. On the other hand, human resources are required for processing and analysing the results.</p> |
| Tool Limitations | This tool cannot be applied if, for some reason, the proficiency test is not completely finished, including the stages of analysis and delivery of results. |
| Steps | <p>4.3.1 Prepare an assessment survey.</p> <p>4.3.2 Apply the assessment survey.</p> <p>4.3.3 Analyse assessment results and produce a report.</p> |
| Templates/Forms | Quality survey of the process of intercomparisons and Proficiency Tests. |
| Example 1 | Evaluation of the Proficiency Testing Service rendered by the Chemical Metrology Department of LACOMET. Annex 4.3/E1 . |

Steps for Tool

4.3.1 Prepare an assessment survey.

This involves designing a printed or digital survey to assess the service. During this step, all internal guidelines established in your quality management system must be followed for approval and application.

The survey must be designed considering aspects that have been defined as critical to the laboratory, from which parameters for the analysis and improvement of the service may be obtained.

4.3.2 Apply the assessment survey.

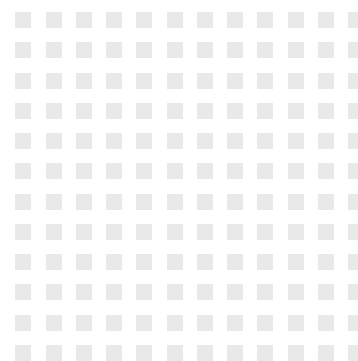
The survey may be done during a closing meeting, although it should be noted that it is hard to bring all participants together for a meeting of this kind. Another option is to send the service assessment together with the final report of the Proficiency Test results.

A survey must be applied for each participating laboratory.

4.3.3 Analyse assessment results and produce a report.

After the survey, the data must be processed and analysed. People must be appointed for this task; they may be the customer service unit along with the quality managers. Results should be submitted to the Directors or those in charge of making decisions on the future of the service and any improvements to it.

On the other hand, the survey itself as a tool must be reviewed regularly to ensure that questions are adequate for organisational purposes and service improvement.

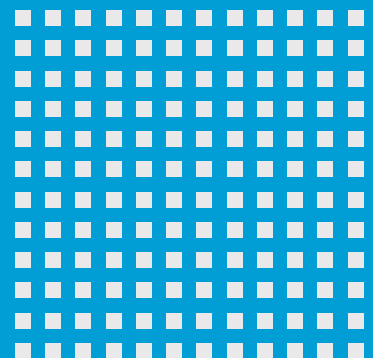


Stage 5

Support Processes

Tools

These tools must be applied throughout the service's development and consolidation process.



5.1 Coaching

| Tool 5.1 Coaching | |
|-------------------------|---|
| Description | Include an expert as a coach who will guide participants in the development/consolidation of the service and will help in broadening your point of view on the topic. |
| Objectives | <ul style="list-style-type: none"> ■ To support the NMI throughout the process and advise on any actions that need to be implemented for the work/project plan. ■ To guide participants in identifying opportunities and overcoming any challenges and obstacles that may arise. ■ To help participants obtain the information required to move forward in the project, acting as the contact line to refer them to the expert areas that may assist them. |
| When it applies | Throughout the project. |
| Requirements | <ul style="list-style-type: none"> ■ Commitment from participants receiving the coaching. ■ Commitment from the coach. |
| Resources | Medium (in the event of travel expenses for the coach). |
| Tool Limitations | <p>Financial resources and coach availability</p> <p><u>Note:</u> During Phase 1 (2009-2011), one representative of each Working Group received coaching. In the second phase (2012-2014), willing participants could request assistance from the coach.</p> |
| Steps | <p>The following activities may be carried out in any order.</p> <p>Promote the use of online sessions to follow-up on the work plan and discuss implementation of the service/project.</p> <p>Promote the use of video conferences when the coach needs to give a presentation to a group of members of the NMI or the industry.</p> <p>Share documents that may help participants to implement the service.</p> <p>Determine any activities that require personal participation of the coach and arrange for him/her to go to your NMI.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | None. |
| Example 1 | Coaching experiences in the three Working Groups of Phase 1 (Annex 5.1/E1). |

Steps for Tool

5.1.1 **Promote the use of online sessions to follow-up on the work plan and discuss implementation of the service/project.**

During follow up it is highly advisable to promote on-line sessions. There is a wide variety of online software for online meetings.

Working Group experiences with this type of tools are proof of the efficiency of online meetings instead of e-mail communications.

5.1.3 **Share documents that may help participants to implement the service.**

During follow-up sessions, the coach may identify aspects where the participants require documents and Templates/Forms to be sent. On these occasions it is good if the coach can send any available information by e-mail.

In other cases the coach may act as a liaison/contact for other NMI areas to send out documents to participants.

5.1.2 **Promote the use of video conferences when the coach needs to give a presentation to a group of members of the NMI or the industry.**

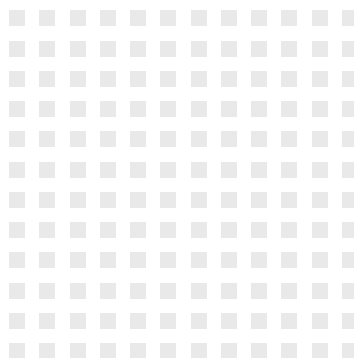
If your NMI has infrastructure for video conferences, make use of this channel and organise events where the coach may participate remotely. This also applies to video conferences held by other speakers and recommended by the coach.

Some examples of the events where the coach may participate in this manner are:

- Conferences on awareness raising seminars.
- Open meetings: workshops, seminars, etc.
- Training for a group of NMI colleagues.

5.1.4 **Determine any activities that require personal participation of the coach and arrange for him/her to go to your NMI.**

In some cases, video conferences and other remote tools may be insufficient, for example, when the experience and knowledge of the coach requires his personal presence (on-site training, interviews with the industry, as well as during pilot consulting projects, group calibration, etc.).



5.2 Monitoring

| Tool 5.2 Monitoring | |
|-------------------------|---|
| Description | Monitoring work plans to ensure project continuity and follow-up. |
| Objectives | <ul style="list-style-type: none"> ■ To promote the implementation of work plans conforming to plan. ■ To identify the progress and challenges of working groups. ■ To prepare periodic reports. |
| When it applies | Throughout the project. |
| Requirements | <p>The person in charge of monitoring must be available and have time to follow up promptly.</p> <p>There must be mutual commitment between participants and the person in charge of monitoring. This includes a commitment to guiding and following up on communications, assistance for online meetings, delivery of information, etc.</p> |
| Resources | Low. |
| Tool Limitations | None. |
| Steps | <p>5.2.1 Request work plans periodically.</p> <p>5.2.2 Monitor progress and make recommendations to improve work plan implementation every 4 to 6 weeks.</p> <p>5.2.3 Prepare reports on compliance with activities at the completion of each work plan, evaluate results, impacts, and make recommendations.</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | Periodic report of results (Annex 5.2/F1). |
| Example 1 | Follow up of the activities of the Working Groups in Phase 1. (Annex 5.2/E1). |

Steps for Tool

5.2.1 Request work plans periodically.

It is sufficient to prepare work plans for periods of 6 to 12 months to monitor and review results.

Begin by requesting work plans from participants. Set a deadline for the submission of their plans.

5.2.2 Monitor progress and make recommendations to improve work plan implementation every 4 to 6 weeks.

Follow-up activities every 4 to 6 weeks. These activities may be:

- Communications by email requesting progress reports or updates.
- Organising of online meetings
- Placing phone calls.

Send out reminders of dates on which key activities must be achieved.

5.2.3 Prepare reports on compliance with activities at the completion of each work plan, evaluate results, impacts, and make recommendations.

At the completion of a work plan, ask for a report including:

- Activities carried out, indicating both NMI and external participants.
- Activities that could not be carried out (indicating any possible obstacles).
- Diagram of the Chain of Results or Impacts.
- Challenges and opportunities (during the term and for the future).
- Good Practices.
- Next steps.
- General comments.

The annex includes a sample template for an ongoing report.

5.3 Ongoing Awareness Raising

| Tool 5.3 Ongoing Awareness Raising | |
|------------------------------------|--|
| Description | Ongoing activities aimed at raising awareness of Metrology. |
| Objectives | <ul style="list-style-type: none"> ■ To raise awareness of the importance of Metrology among stakeholders. ■ To promote decision making to strengthen metrological systems in industry, laboratories and other users. ■ To ensure sustainability of NMI services. |
| When it applies | Throughout the process. |
| Requirements | <ul style="list-style-type: none"> ■ Identified stakeholders. ■ Developed strategies for awareness raising. ■ Skills and knowledge in the field. |
| Resources | Low. |
| Tool Limitations | None. |
| Activities | <p>Awareness of Metrology may be raised through the following activities (in any order).</p> <p>5.3.1 During meetings and phone calls with stakeholders. 5.3.2 During courses. 5.3.3 Carrying out Awareness raising seminars (See Tool 1.4).</p> <p>Please review the summary table for each step on the following page.</p> |
| Templates/Forms | None. |
| Example 1 | Awareness raising activities carried out by the WG (Annex 5.3/E1). |

Steps for Tool

5.3.1 **During meetings and phone calls with stakeholders.**

Use simple vocabulary during conversations with interested parties. Seek opportunities to talk about benefits related to the improvement of their metrological systems.

5.3.2 **During courses.**

During a course, instructors usually insist on the importance of Metrology, and you may also:

Take 5 minutes, after returning from a break or lunch, to promote other NMI services.

Distribute flyers or invitations during Metrology events along with the participants' material.

5.3.3 **Carrying out Awareness Raising Seminars.**

See Tool 1.4.



5.4 Soft Skills

| 5.4 Soft Skills | |
|-------------------------|---|
| Description | <p>A soft skill is a competency that:</p> <ul style="list-style-type: none"> ■ Facilitates harmonious interaction with associates, colleagues, partners of a working group and any other person with whom we interact in the social and work environment. ■ It develops with experience. ■ It contributes to the success of any project. ■ It helps strategic decision making. |
| Objectives | To streamline the development of projects. |
| When it applies | Permanently. |
| Requirements | <ul style="list-style-type: none"> ■ Being open to change. ■ Broad-mindedness. |
| Resources | None. |
| Tool Limitations | It takes time to develop. Training helps but practical experience is what most leads to this. |
| Soft skills | <p>Soft skills that were identified as a priority for the management of “NMI-Metrology User Relations” projects and were addressed during their implementation are listed below:</p> <ul style="list-style-type: none"> ■ Strategic thinking/planning. ■ Leadership. ■ Communication skills and conducting an interview. ■ Group coordination. ■ Team work. ■ Efficient management. ■ Creation of alliances for cooperation. <p>Considering there is a lot of literature about these topics, there is no description in this Guide, but in the annex you will find a description of how these topics were addressed with the participants.</p> |
| Example 1 | Development of Soft skills associated to project implementation. (Annex 5.4/E1). |

5.5 Visibility of Results

| Tool 5.5 Visibility of Results | |
|--|--|
| Description | Highlight the importance of making a project visible. The visibility given to a project or service is very important. By means of VISIBILITY, we share the RESULTS with stakeholders, so marketing is a good option for making results known. |
| Objectives | To become aware of the importance of communicating different levels of results throughout the project (outputs, outcomes, impacts). |
| When it applies | Permanently. |
| Requirements | Access to marketing channels and techniques. |
| Resources | Medium to High (depending on marketing technique used). |
| Tool Limitations | None. |
| Considerations about Visibility | <p>Do not miss the chance to make the project's results visible. Consider the following:</p> <ul style="list-style-type: none"> ■ What must be made visible? All kinds of results: Outputs, Outcomes, Impacts or any results obtained during the process. (See Tool 4.1 Evaluation of Chains of Impacts) ■ What is the scope of visibility? Visibility must be: <ul style="list-style-type: none"> • INTERNAL (Director and areas related to the service/project) • EXTERNAL to the NMI (all the stakeholders) ■ Tools to achieve visibility: Marketing is useful to achieve visibility. If there are not enough resources for this, some alternatives are posting project information on the NMI web site, in newsletters or other common means of communication. ■ What type of information may be used to maintain visibility? <ul style="list-style-type: none"> • Workshop inputs – “NMI-Metrology User Relations”. • Periodic reports. • Publications. • Products. • Alliances. • Key results. • Etc. |
| Example 1 | Visibility of Results – Promoted by CENAMEP-AIP. (Annex 5.5/E1). |

Steps for Tool

Acknowledgements

- We are grateful to the SIM General Council and the SIM Professional Development Committee for supporting the PTB with the idea of the “*NMI-Metrology User Relations*” project.
- We are grateful to the Organization of American States for supporting the execution of the initial workshops and the follow-up.
- We are grateful to CENAM, INMETRO, INTI, LATU and PTB for promoting, supporting and carrying out this project.
- We are grateful to the participants of Working Groups and the Technical Committee for their fruitful cooperation and for sharing their knowledge and experience during the project. You will find the full list of participants who cooperated during the two phases of the project from beginning to end and who were members of the Technical Committee in the table below.

| Working Groups and Technical Committee Participants | |
|---|--|
| Working Group – Consulting | Hadyn Rhynd (BNSI), Robert Medford (GNBS), Henry Postigo Linares (INDECOPI), Junior Doran (MCI-Haiti), Claudia Santo (LATU) |
| Working Group – Training | Saúl García T.(CENAMEP), Jessica Chavarría Sánchez (LACOMET), Silvana Demicheli Bonilla (LATU), Antonio García Tarquino (SIC), Hiram Williams (SKNBS) |
| Working Group – Calibration | Simon Nyaaba (DBOS), Jermaine Softley (GNBS) |
| Working Group – Regulation | Monorde Civil (BHM), Javier Arias Real (CENAMEP), Ronald Brewster (DCCA), María del Carmen Vega Amonzabel/Luddy Pilar Huaracho Huarachi (IBMETRO), Mariela Trujillo (INN), Henry Postigo Linares (INDECOPI), Keemo Fyffe (GNBS), Marta Airaudo (LATU), I-Ronn Audian (SKNBS) |
| Working Group – Secondary Laboratories | Wendy Lilieth Chinchilla (CEHM), María del Carmen Altamirano Vargas/ Mónica Gualotuña/Juana Rodríguez (INEN), Patricia Pereyra (INDOCAL), Oscar Garrido González (INN), Diana Carolina Cantero Díaz (INTN), Jessica Chavarría Sánchez (LACOMET), Simone Fajardo Ferraz (LATU) |
| Working Group – Education | Hadyn Rhynd (BNSI), Saúl García T. (CENAMEP), Edwin Guillen Mestas (INDECOPI), Jermaine Softley (GNBS), Derlis Medina/Ruben Ricardo Ramírez (INTN), Juan Gabriel Pérez Olivas (LANAMET), Junior Doran (MCI), Silvana Demicheli Bonilla (LATU) |
| Technical Committee | <p>CENAM-Mexico: J. Salvador Echeverría Villagómez, Arquímedes Ruiz Orozco*, Carmen Marina Trejo Morales*, Gabriel Lugo Luevano*</p> <p>INTI-Argentina: Emilio E. Löbbe*</p> <p>INMETRO-Brazil: Taynah Lopes de Souza</p> <p>LATU-Uruguay: Silvana Demicheli Bonilla*</p> <p>PTB, Germany: Melanie Grad, Anja Kopyra*, Alexis Valqui, Clemens Sanetra (PTB consultant, Germany), Mahdha Flores Campos (PTB consultant, Mexico)</p> <p>*Participants marked with an asterisk were members of the Technical Committee in Phase 2.</p> |

Guide Preparation

■ **Contents:**

Results and information supplied by participants from the Working Groups of Phases 1 and 2, as well as by the Technical Committee.

■ **Structure:**

Mahdha Flores
Melanie Grad
Alexis Valqui

■ **Compilation of information (on assignment by PTB):**

Mahdha Flores

■ Revision and contributions (in alphabetical order):

2011 Edition:





Alexis Valqui
Claudia Santo
Clemens Sanetra
Jessica Chavarría
Melanie Grad
Taynah Lopes de Souza
Salvador Echeverría

2014 Edition:

Anja Kopyra
Alexis Valqui
Carmen Marina Trejo
Emilio Løbbe
Silvana Demicheli
Taynah Lopes de Souza





2015 Edition:


Anja Kopyra
Alexis Valqui
Evelín Ambrosino
Mahdha Flores
Silvana Demicheli




| TOOL | Related forms | Related examples |
|-----------------------------------|---|---|
| Analysis to identify stakeholders | None | Identification of stakeholders for calibration services (Dominica BOS): Annex 1.1/E1 |
| 1.2 SWOT analysis | SWOT quadrants (Annex 1.2/F1). | SWOT analysis made during the Seminar 'Strategic importance for innovation and development' at the LATU (Annex 1.2/E1)  Report: 'Awareness raising seminar- Identification of SWOT demand' (AA 1-4_LATU-ReporteSeminaroSensibilización) |
| 1.3 Identifying demand | Invitation letter (Annex 1.3/F1) Form 'Survey of demand for consulting services' (Annex 1.3/F2) Form 'Survey of demand for calibration services' (Annex 1.3/F3) Form 'Survey of demand for training services' (Annex 1.3/F4) | Results of Survey of Demand for calibration services, performed by the Dominica Bureau of Standards (Annex 1.3/E1)  Report: 'Demand Identification Report' (AA 1-3_DBOS_DemandIDReport) Results of Survey of Demand for training services, conducted by LATU (Annex 1.3/E2)  Report: 'Survey Training' (AA 1-3_LATU_EncuestaCap) |
| 1.4. Awareness raising seminar | 'Seminar Evaluation' Form (Annex 1.4/F1). | Seminar 'Strategic importance of Metrology for the innovation and development' at the LATU (Uruguay) (Annex 1.4/E1)  Report: 'Awareness raising seminar- Identification of SWOT demand' (AA 1-4_LATU-ReporteSeminaroSens) |

| TOOL | Related forms | Related examples |
|--|--|---|
| 1.5 Identifying the offer | | Identifying offer carried out at the LACOMET 2009-2010. (Annex 1.5/E1) AA 1-5_LACOMET_Formato_Encuesta clientes Marzo 2010 AA 1-5_LACOMET_EncuestaClientes2010 AA 1-5_LACOMET_Propuesta de Plan Estratégico 2010-2014 AA 1-5_LACOMET_ResumenResultados |
| 1.6 Analysis of opportunities (gaps) | Questionnaire to survey the training offer by the NMI (Annex 1.5/F1) | Survey on NMI training offer (Developed by LATU – 2009) (Annex 1.5/E2) AA 1-5_LATU_RelevamientoNMIsEntrenamiento |
| 2.1 Selection and design of service or project | None | Analysis of opportunities of training and calibration services offered by LACOMET (Annex 1.6/E1) |
| 2.2 Strategic planning | None | Program of services established to respond to the needs of industry, carried out by the GDBS (Annex 2.1/E1) |
| 2.3 Operational planning | Work plan form (Annex 2.3/F1) | Development of Proficiency Tests supported by a Quality Management System established in LACOMET's strategic plan (Annex 2.2/E1) |
| | | Operational planning of WG-Consultancy – specifically of the GDBS (Annex 2.3/E1) April–October 2009 work plan (AA 2-3_GDBS_WorkPlan_WGCons_Abr_Oct11) November 2009–May 2010 work plan (AA 2-3_GDBS_WorkPlan_WGCons_Nov09_May10) June–October 2010 work plan (AA 2-3_GDBS_WorkPlan_WGCons_Jun_Oct10) January–May 2011 work plan (AA 2-3_GDBS_WorkPlan_WGCons_Jan_May11) |

| TOOL | Related forms | Related examples |
|---|--|--|
| 2.4 Budget preparation | <p>Template for budget preparation for training events (Annex 2.4/F1)</p> | <p>Preparation of budget for LATU courses (Annex 2.4/E1)</p> <p>Example Budget Course Mass Level II (AA 2-4_LATU_PresupuestoMetrologiaMasaNIVELII)</p> |
| 2.5 Cooperation between institutes | <p>None</p> | <p>Training in multimeter calibration and group calibrations. (<i>INDECOPI provided support to GNBS</i>) Annex 2.5/E1</p> <p>Working group in order to adapt online training materials from INMETRO for the Caribbean. (<i>INMETRO provided support to working group</i>) Annex 2.5/E2</p> <p>Support for execution of pilot project carried out with companies from Uruguay (<i>CENAM provided support to LATU</i>) Annex 2.5/E3 (<i>under development</i>)</p> <p>Training programs exchange (CENAMEP-LACOMET) Annex 2.5/E4 (<i>under development</i>)</p> |
| 2.6 Preparation of a pilot consulting project | <p>Process Map (Annex 2.6/F1)</p> <p>Metrological Needs (Annex 2.6/F2)</p> <p>Standards and Instruments (Annex 2.6/F3)</p> <p>Procedures (Annex 2.6/F4)</p> <p>Personnel (Annex 2.6/F5)</p> <p>Note: These forms were shared by CENAM-Mexico (MESURA Program)</p> | <p>Preparation of a pilot project, carried out by LATU (Annex 2.6/E1)</p> <p>Pilot Project General Report (AA 3-2_CENAM_GeneralReportPilot)</p> |
| 2.7 Design of an annual training program | <p>None</p> | <p>Preparation of an annual program based on material of previously taught courses, carried out by LACOMET (Annex 2.7/E1)</p> <p>Information about the current state of the existing training programs in the Costa Rican Laboratory of Metrology. (AA 2-7_LACOMET-InformeEstadoActualCapacitacion)</p> |

| TOOL | Related forms | Related examples |
|---|--|--|
| 2.8 Preparation of training workshops | None | Workshop preparation: Introduction to Metrology and Calibration for industries, performed by St Kitts and Nevis Bureau of Standards (Annex 2.8/E1) |
| 2.9 Training of trainers/ instructors | None | On-the-job Training and Evaluation of Instructors Program – carried out by LATU (Annex 2.9/E1) |
| 2.10 Organisation of group calibration | None | <p>Organisation of group calibration of multimeters, performed by GNBS. (Annex 2.10/E1)</p> <ul style="list-style-type: none">  Specification Multimeters participants (AA 2-10_GNBS_SpecificationMultimetersParticipant)  Preparation before calibration (AA 2-10_GNBS_PreparationBeforeCalibration) |
| 2.11 Standardisation of protocols for Proficiency Tests | Proficiency Test Protocol (Included in the Example mentioned in next column) | <p>Standardisation of Proficiency Test Protocol for the Detection of Salmonella spp. in meat products. Annex 2.11/E1</p> <p>Proficiency Test Protocol L-14 „Calibration of bridge type or depth micrometers, analogue, with a measuring range of (0 to 25) mm and a resolution 0,01 mm“ Annex 2.11/E2</p> |
| 3.1 Integration of external counterparts | None | Alliance between the LATU and the ‘Chamber of Industries of Uruguay- CIU’, (Annex 3.1/E1) |
| 3.2 Implementation of Pilot Consulting Projects | <p>Process Map (Annex 2.6/F1)</p> <p>Metrological Needs (Annex 2.6/F2)</p> <p>Standards and Instruments (Annex 2.6/F3)</p> <p>Procedures (Annex 2.6/F4)</p> <p>Personnel (Annex 2.6/F5)</p> <p><u>Note:</u> These forms were shared by CENAM-Mexico (MESURA Program)</p> | <p>Pilot experiences in 3 companies of the food, pharmaceutical and metal mechanic sectors, carried out by LATU (Annex 3.2/E1)</p> <ul style="list-style-type: none">  Pilot General Report (AA 3-2_CENAM_GeneralReportePiloto)  Metrology Workshop as Support of the Industry (AA 3-2_LATU_TALLER_METROLOGÍA_COMO_SOPORTE_29032011) |

| TOOL | Related forms | Related examples |
|---|--|--|
| 3.3 Implementation of Training Workshops | None | Workshop: 'Introduction to Metrology and Calibration for industries', performed by St Kitts and Nevis Bureau of Standards (Annex 3.3/E1) |
| 3.4 Implementation of Group Calibrations | None | Group Calibration of Multimeters, performed by Guyana GNBS. (Annex 3.4/E1) |
| 3.5 Building Networks of Secondary Laboratories | In the example is presented a sample of questionnaire to identify capabilities of participating laboratories (see next column) | Building a network of Secondary Laboratories in Honduras (Annex 3.5/E1)  Sample of questionnaire to identify capabilities of participating laboratories (AA 3-5_CEHM-QuestSeclab) |
| 3.6 Implementation of Regulations | None | Development of Peruvian metrological standards (Annex 3.6/E1) |
| 3.7 Metrology Training for Teachers of Formal Education | None | Strengthening educational bases at primary and secondary level for correct SI use. (Annex 3.7/E1) Full Day Cycle of Conferences about Metrology and its Benefits for Universities in Peru (Annex 3.7/E2) Developing and strengthening metrology knowledge, skills and capabilities in technical education in Uruguay (LATU) (Annex 3.7/E3) |
| 3.8 Entrepreneurs Show | None | Participation of the Ministère du Commerce et de l'Industrie in Haiti at the Entrepreneurs Show (MCI-Haiti) (Annex 3.8/E1) |
| 4.1 Evaluation of Chains of Impacts | None | Examples of chains of impacts prepared by phase 2 participants (Annex 4.1/E1) |
| 4.2 Periodic evaluation of service | None | Evaluation of training services of LACOMET (Annex 4.2/E1) |

| TOOL | Related forms | Related examples |
|--|--|--|
| 4.3 Evaluation of the service “Proficiency Tests” | Quality survey of the process of inter-comparisons and proficiency tests (included into the example) | Evaluation of the Proficiency Testing Service rendered by the Chemical Metrology Department of LACOMET. (Annex 4.3/E1) |
| 5.1 Coaching | None | Coaching experiences in the three Working Groups of Phase 1 (Annex 5.1/E1) |
| 5.2 Monitoring | None | Follow up of the activities of the Working Groups. (Annex 5.2/E1) |
| 5.3 Ongoing awareness raising | None | Awareness raising activities carried out by the WG (Annex 5.3/E1)  Strategic relevance of Metrology for innovation and development. Montevideo, Uruguay October 2009 (Annex 1.4/E1)  Seminar Report from INDECOPI (AA 5-3_INDECOPI_SeminarioReporte)  Report Seminar in MCI-Haiti (AA 5-3_MCI_Seminar) |
| 5.4 Soft skills | None | Development of Soft skills associated to project implementation (Annex 5.4/E1) |
| 5.5 Visibility of results | None | Visibility of Results – Promoted by CENAMEP-AIP (Annex 5.5/E1) |

Imprint

Published by

Physikalisch-Technische Bundesanstalt
Bundesallee 100
38116 Braunschweig
Germany

Responsible

Ulf Hillner
+49 531 592 9330
ulf.hillner@ptb.de
www.ptb.de/9.3/en

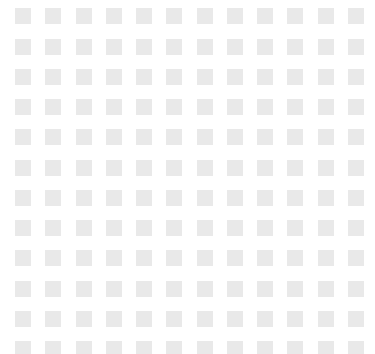
Text

Dr. Alexis Valqui, Anja Kopyra, Arquímedes Ruiz Orozco,
Dr. Clemens Sanetra, Carmen Marina Trejo Morales,
Emilio E. Löbbe, Gabriel Lugo Luevano, Mahdha Flores
Campos, Salvador Echeverría Villagómez, Silvana
Demicheli Bonilla, Taynah Lopes de Souza

Cover photo

Physikalisch-Technische Bundesanstalt

As of September 2015





Contact

Physikalisch-Technische Bundesanstalt

International Cooperation

Ulf Hillner

Phone +49 531 592 9330

Fax +49 531 592 8225

ulf.hillner@ptb.de

www.ptb.de/9.3/en