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Standardisation - A strategy for Development

Establishment of a National Standards Body

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

(Inner page)

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Foreword

To be filled by UNIDO

Acknowledgements

UNIDO wishes to acknowledge gratefully the following organisations for providing materials and granting permission to reproduce them in the document :

African Regional Organisation for Standardization (ARSO)

Codex Alimentarius Commission (CAC)

International Accreditation Forum (IAF)

International Electrotechnical Commission (IEC)

International Laboratory Accreditation Co-operation (ILAC)

International Organisation for Standardisation (ISO)

International Telecommunications Union (ITU)

World Trade Organisation (WTO)

1. INTRODUCTION

1.1. Historical background

Standardisation is a concept that has been practiced in many parts of the world since the beginning of human civilization. Examples of early standardisation attempts could be found in the civilizations of Mesopotamia, Sumer, Egypt and Babylon. In the Indian sub continent, the Indus valley, Mohenjedaro and Harappa civilizations all offer evidence of standardisation in water supply and drainage, house building and weights and measures.

The most fundamental standards consciously and deliberately evolved by the ancients were those for weights and measures which laid the foundations of measurements. Specimens of standardized weights in ratios of 1: 2: 4: 8 and a decimally sub divided length scale have been unearthed at several sites of Indus valley. They are dated to about 3500 B.C.

The modern form of standardisation began in the middle ages. For example in Rome, lead pipes were specified by their dimensions and mass. In 1477, bricks were standardized in England, by an Act of Parliament. The invention of the steam engine and the onset of the industrial revolution in the nineteenth century created the conditions conducive to the growth of the standards movement.

The advent of mass production using interchangeable components that took place about the same time across the Atlantic was another important step towards development of the standardisation movement. Early nineteenth century European engineers such as Joseph Whitworth and Henry Maudslay devoted their primary attention to develop machine tools. They were built with fine craftsmanship and were general purpose tools of great flexibility and precision. However, the parts turned out on these machines were essentially of a 'one-off' character, mating parts being fitted individually to one another.

In contrast, in America during this same period there was great demand for goods and an acute shortage of skilled labour. American engineers were therefore concentrating their attention on work of a repetitive character, giving rise to a large volume of interchangeable parts produced with a minimum of skilled labour. This system now known as 'mass-production' was known originally as the 'American system' of production. The most significant example of it was the famous Model T-Ford motor car, considered by some as a crude piece of engineering, yet the most sophisticated mass-produced product in the world at that time.

'Mass-production' gave rise to an immediate need for standardization of components and products. The skill moved away from the system of craftsmen building individual machine tools to teams of design engineers and production line planners designing and building machines capable of producing a large number of similar products.

Product standards were an absolute necessity for this type of manufacture, although at this stage (beginning of the twentieth century) they were almost all individual company standards. With the end of the First World War, national standards forged ahead in almost every industrialized country, except in the USA where company standards had gained such a hold. Machine tools had reached such a degree of precision that mass-produced components could be made to very close tolerances. This gave rise to a large number of dimensional standards, which persists even to this day.

By 1901, the world had recognized the importance of standardisation and the first national standards body, the British Standards Institution (BSI) was established in the United Kingdom. The First World War and the Second World War led to the setting up of intensive armament industries in many European states. The armament factories utilized mass production techniques and this was a contributory factor to the development of strong national standards movements in these countries.

Another factor which gave a spurt to the standardisation movement at this post war period was the creation of the United Nations Standards Co-ordinating Committee to bring together the existing national standards bodies into an international forum. Although such a forum known as International Federation of National Standards Associations (ISA) had existed earlier, it had been rendered inactive during the war time hostilities. The co-ordinating committee of the United Nations met in 1946 and brought into being what is today known as the Internal Organisation for Standardisation (ISO).

1.2. Economic benefits and trade facilitation

Application of standards brings in overall economies in terms of human effort, materials and energy consumption, control of waste and pollution etc. Standards also ensure safety, health and protection of life; safeguarding of consumer interests by maintaining optimum quality of goods and services and above all provides a means of communication among manufacturers, consumers and all other stake holders.

The present form of integrated standardisation encompassing standards formulation, product and systems certification, laboratory testing, quality assurance and metrology yields significant benefits to the economy of a country. Thus establishment of a national standards system is a pre-requisite for industrial development of a country.

In recent times trade facilitation through harmonisation of national standards has received considerable attention. In 1995, the members of the World Trade Organisation signed two significant agreements, namely the Technical Barriers to Trade (TBT) agreement and the Sanitary and Phyto-sanitary (SPS) agreement. The TBT agreement requires that national standards and regulations do not become barriers to trade. The SPS agreement attempts to protect the flora and fauna and health of a country.

Strong standards systems capable of delivering the desired benefits do not emerge spontaneously. Decisive steps have to be taken to establish the necessary legal and organisational structure. Also a considerable period of time is required to develop a national standards system to its full potential.

2. INTERNATIONAL STANDARDISATION BODIES

2.1.International Organisation for Standardisation (ISO)

The International Organisation for Standardisation (ISO) formulates international standards for all fields other than the fields of electrical, electronics and telecommunications and has published (up to end of 2004) nearly 15000 international standards.

ISO is a network of national standards bodies of 145 countries, on the basis of one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system. It is a nongovernmental organization which occupies a special position between the public and private sectors. Many of its member institutes are part of the governmental structure of their countries, or are mandated by their governments. Some ISO members have their roots uniquely in the private sector, having been set up by national partnerships of industry associations.

ISO is able to act as a bridging organization in which a consensus can be reached on solutions that meet both the requirements of business and the broader needs of society, such as the needs of stakeholder groups like consumers and users.

ISO standards are formulated by technical committees, sub committees and working groups. The workload of the technical committees is shared by the membership. Secretariats of the different technical committees are held in a large number of member countries.

2.1.1. Membership

Developing countries can pay significantly reduced membership fees through the correspondent and subscriber categories of membership.

Correspondent members:

- Receive all documents concerning ISO, including copies of drafts and final ISO standards;
- Receive, as an observer member of a Technical Committee, all its documents and can assist in its discussions; and
- Have the right, as an observer member, to attend ISO's General Assembly and to participate in the work of the policy development committees as well as in the committee on reference materials (REMCO).

Subscriber members receive:

- General information about ISO (ISO bulletins, ISO press service)
- The ISO Catalogue, ISO Memento and ISONET Directory;
- A 70% discount on the first copy of international standards; and
- ISO manuals.

2.1.2. ISO DEVCO

The ISO development committee (DEVCO) is mandated to assist developing country members in their national and internal standardization activities. It aims to:

- Identify the needs and requirements of developing countries in the fields of standardization and related areas (quality control, metrology and certification, etc.) and assist developing countries, as necessary, in defining these needs and requirements.

- Provide a forum for the discussion of all aspects of standardization and related activities in developing countries, and for the exchange of experiences among the developed and developing countries.
- Advise the ISO Council on developing country matters.

DEVCO membership is open to interested member bodies as participating or observer members, and to interested correspondent members as observer members. It has a chairperson, from a developing country member, and a secretariat based at ISO in Geneva. Its budget allocation represents 3.4% of the total ISO budget.

DEVCO meets once a year prior to the General Assembly, and has a three-year activity plan known as DEVPRO, or ISO Programme for Developing Countries. DEVPRO's activities include:

- Regional training seminars held in developing countries on topics related to standardization,
- Fellowships for further training of officers of ISO members in developed countries,
- Technical Committee secretariat training,
- Sponsorships to attend technical meetings, and
- Publication of manuals on technical matters related to standardization. These are free to developing country members.

The details of ISO development program is published every three years.

2.2.International Electrotechnical Commission (IEC)

The International Electrotechnical Commission (IEC), founded in 1906, prepares and publishes international standards in the electrotechnical field, covering electronics, magnetics, electromagnetics, electro-acoustics, telecommunications and energy production and distribution. IEC also embraces general disciplines such ,as terminology and symbols, measurement and performance, dependability, design and development, safety, and the environment. The main objective of IEC is to promote international cooperation on all questions of standardization and related matters (such as conformity assessment) in the fields of electricity, electronics and related technologies, and thus facilitate international trade in these fields.

The IEC central office, located in Geneva, Switzerland, plays an important part in the smooth progress of work through support to TCs and SCs, as well as to the national committees. It supervises proper application of the statutes, rules of procedure and directives, and implements council and council board decisions under the supervision of the executive committee. It takes part in the organization of the annual general meeting as well as grouped or individual meetings of TCs and SCs, convened on invitation by national committees.

2.2.1. Membership

An IEC member is called a national committee, and represents its country's electrotechnical interests in IEC management and standardization work. A national committee consists of :

- Standards developers,
- All levels of governmental agencies,
- Manufacturers, providers, distributors and vendors,
- Consumers and users,
- Professional societies and trade associations.

There are two types of membership, full members and associate members. Full members can participate fully in IEC's international standardization activities, each having equal voting rights. Associate members have observer status. They can participate in all IEC meetings, but they have no voting rights and cannot be elected to any official position. For countries with limited resources, associate membership allows for a more limited form of participation.

2.2.2. IEC Affiliate Country Programme

The IEC Affiliate Country Programme is aimed at all newly industrializing countries around the world. The programme offers such countries a form of participation in IEC without the financial burden of actual membership, making full use of all ICT tools to reduce costs of participation to virtually zero. The programme has two principal aims:

- To encourage greater awareness and use of IEC international standards in newly industrializing countries; and
- To help newly industrializing countries understand and participate in the work of IEC.

The programme enables a country to participate in IEC and benefit from affiliation in a variety of ways. Affiliates will be able to use relevant IEC international standards and learn how to monitor relevant technical work in TCs, with a view to establishing an IEC national committee and seeking IEC membership in the future. Benefits of participation in the programme include:

- Access to IEC technical documents in electronic format (documents up to final draft international standards),
- Means to start and maintain a library of relevant IEC international standards,
- Attendance at meetings held during the IEC general meeting including council (as observers),
- Representation within IEC through Affiliate Country Forum,
- Opportunity to participate in IEC's conformity assessment schemes,
- Guidance from the IEC central office on how to establish a national committee of IEC and how to track technical projects of interest; and
- No participation fee.

2.2.3. IEC Affiliate Country Forum

The IEC Affiliate Country Forum, comprising all IEC affiliates, acts as their collective voice with the IEC governing bodies. The goal of this forum is to:
Identify issues in the work of IEC relevant to newly industrializing countries:

- Seek a common position for affiliates and communicate this position to the relevant technical or management committees, and
- Develop a virtual network centered on a dedicated website, specifically designed to cater to the needs of affiliates.

The forum is led by an elected representative (person, not country) who has the right to attend IEC council, standardization management board and conformity assessment board meetings. The forum conducts its work electronically, with the forum secretariat provided by the IEC central office. The secretariat moderates the flow of forum documents, and prepares submissions from the forum to other relevant IEC committees.

2.3.International Telecommunications Union (ITU)

The International Telecommunications Union (ITU) was originally established in 1865, as an impartial international institution. Since 1947, it has been part of the United Nations System. Its main objectives are to promote international cooperation between its member states for the improvement and rational use of telecommunications of all kinds, to promote standardization activities within the telecommunications sector. The secretariat of ITU is located in Geneva, Switzerland.

2.3.1. Membership

The membership consists of governments, sector members and associate members. All members have equal status. To become a member, a government must accede to ITU's constitution and convention. Before passing this accession process, new non-United Nations member States also have to be approved by a two-thirds majority of the existing member countries.

Sector members are defined as recognized operating agencies, scientific or industrial organizations, financial or development institutions, and other entities dealing with telecommunications matters. They should be approved by the administration of the member State concerned. Regional and other international telecommunications, standardization, financial or development organizations are eligible to become sector members.

During the Plenipotentiary Conference in Minneapolis 1998 the class of associate membership was introduced as a way for small entities or organizations to participate in the work of ITU. However, their rights of collaboration within the study groups and meetings are limited.

2.3.2. Provisions for developing countries

A number of initiatives have been taken within ITU in an attempt to help developing countries:

- The Telecommunications Development Sector (ITU-D), one of the three sectors of ITU, deals with issues concerning developing countries. The Telecommunications Development Bureau (TDB) works directly with Telecommunications Standardisation Bureau(TSB) to facilitate the participation of developing countries in the standardization process.

- In 2000, ITU initiated a series of joint meetings between the directors of ITU-T and ITU-D and representatives of developing countries. These meetings, which were held in developing countries, aimed at explaining what ITU was doing and emphasizing the need for greater participation of developing countries in the standardization process. Over the next few years, ITU-T plans to hold several meetings of study groups in developing countries.

- ITU makes provision for a sliding scale of membership fees for developing countries, to the extent that some countries pay no membership fees.

- ITU has a project called Electronic Commerce for Developing Countries that aims to play a central role in promoting and coordinating programmes to accelerate technology transfer to developing countries as well as stimulating cooperation between public and private sectors to create technologies suited to developing countries. The short-term goal is to let developing countries benefit from the expansion of electronic commerce technologies. The long-term goal is

to facilitate the expansion of electronic commerce and stimulate the development of the ICT infrastructure.

- Discounts of 15% are granted on ITU publications to member States and sector members participating in the work of ITU. A discount of 80% on all ITU publications is granted to administrations of the LDCs, as well as to libraries of educational institutions (for online subscriptions and CD-ROM publications only).

2.4.Codex Alimentarius Commission (CAC)

The Codex Alimentarius Commission (CAC), located in Rome, is an intergovernmental body. Its objectives are the protection of the health of consumers and assuring fair practices in food trade. CAC sets standards on food quality and safety, and is thus responsible for establishing food standards for commodities and guidelines, and codes of hygienic or technological practice. In addition, CAC sets maximum levels for food additives and veterinary drugs, and maximum limits for pesticide residues in foodstuffs. The Agreement on SPS specifically cites Codex standards, guidelines and recommendations, which have become the benchmark against which national food measures and regulations are evaluated within the legal parameters of the WTO Uruguay Round Agreements.

2.4.1. Membership

Membership is open to all member States and associate members of FAO or WHO. Membership is non-discriminatory - all members have the same status. Member countries do not pay annual dues to CAC, which is funded jointly by FAO (81%) and WHO (19%).

2.4.2. Provisions for developing countries

A number of initiatives have been taken within CAC in an attempt to enhance the participation of developing countries.

- The secretariat makes efforts to hold information and training workshops before or after Codex committee meetings (especially regional coordinating committees).

- An FAO/WHO Trust Fund, held in WHO, was launched in February 2003. The focal point of the fund is Codex; it is aimed at enhancing the participation of relevant experts from developing countries and countries in transition in CAC work and help to build national capacity.

- Codex members that hold the secretariats of Codex commodity and general committees have been encouraged to involve developing country members as cohosts or vice-chairs. This is intended as an interim measure to provide developing countries with experience in the operation of Codex committees.

- CAC has increased the frequency of meetings of the Commission from two-yearly to yearly. Given that many developing countries concentrate their resources on attending meetings of the Commission, this could serve to enhance participation.

2.5.WTO and international standardization

The World Trade Organization (WTO) is the international organization dealing with the global rules of trade between nations. Its main function is to ensure that trade flows as smoothly, predictably and freely as possible.
The International Organisation for Standardisation (ISO) together with International Electrotechnical Commission (IEC) and International Telecommunication Union (ITU) has built a strategic partnership with WTO. The political agreements reached within the framework of WTO require underpinning by technical agreements. ISO, IEC and ITU, as the three principal organizations in international standardization, have been given the complementary task of providing the technical support for the growth of the global market.

2.6.The Agreement on Technical Barriers to Trade (TBT)

The Agreement on Technical Barriers to Trade (TBT) - sometimes referred to as the Standards Code - aims to reduce impediments to trade resulting from differences between national regulations and standards. As far as international consensus-based standards are concerned, the Agreement invites the signatory governments to ensure that the standardizing bodies in their countries accept and comply with a "Code of good practice for the preparation, adoption and application of standards", embodied in Annex 3 to the Agreement and which is known as the WTO Code of Good Practice.

On behalf of the WTO, the ISO/IEC Information Centre records the acceptance of this Code by the national standards institutes.

2.7.Background to the Agreement on Technical Barriers to Trade

The Agreement on Technical Barriers to Trade is one of the 29 individual legal texts of the WTO Agreement which obliges Members to ensure that technical regulations, voluntary standards and conformity assessment procedures do not create unnecessary obstacles to trade. Annex 3 of the TBT Agreement is the Code of Good Practice for the Preparation, Adoption and Application of Standards. In accepting the TBT Agreement, WTO Members agree to ensure that their central government standardizing bodies accept and comply with this Code of Good Practice and agree also to take reasonable measures to ensure that local government, non-governmental and regional standardizing bodies do the same.

2.8.The contribution of international standards

The TBT Agreement recognizes the important contribution that international standards and conformity assessment systems can make to improving efficiency of production and facilitating international trade. Where international standards exist or their completion is imminent, therefore, the Code of Good Practice says that standardizing bodies should use them, or the relevant parts of them, as a basis for standards they develop. It also aims at the harmonization of standards on as wide a basis as possible, encouraging all standardizing bodies to play as full a part as resources allow in the preparation of international standards by the relevant international body, including the ISO and IEC.

In the interest of transparency, the Code requires that standardizing bodies that have accepted its terms notify this fact to the ISO/IEC Information Centre located at the ISO Central Secretariat in Geneva, either directly or through the relevant national/international member of ISONET. At least once every six months, standardizing bodies having accepted the Code must publish their work programmes and also notify the existence of their work programmes to the ISO/IEC Information Centre. Other important provisions relate to the preparation, adoption and application of standards.

2.9.The WTO agreement on the application of sanitary and phytosanitary measures (SPS)

The Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) sets out the basic rules for food safety and animal and plant health standards. It allows countries to set their own standards. But it also says regulations must be based on science. They should be applied only to the extent necessary to protect human, animal or plant life or health. Moreover, they should not arbitrarily or unjustifiably discriminate between countries where identical or similar conditions prevail. The WTO Member countries are encouraged to use international standards, guidelines and recommendations where they exist. However, members may use measures which result in higher standards if there is scientific justification. They can also set higher standards based on appropriate assessment of risks so long as the approach is consistent, not arbitrary.

2.10.WTO General Agreement on Trade in Services (GATS)

The success achieved in areas concerned with trade in goods led the WTO to consider whether the methods used for goods, involving reference to International Standards, could be applied with equal success in the field of services. The GATS agreement covers all internationally-traded services (for example, banking, telecommunications, tourism, professional services, etc.) and was developed in response to the huge growth of the services economy over the past 30 years and the greater potential for trading services brought about by the communications revolution.

3. DEVELOPMENT STRATEGY AND LEGISLATION

3.1.Development strategy

The first step that needs to be taken for the .establishment of a national standards system is the setting up of a national standards body (NSB). Enactment of the necessary legislation to establish the NSB at an early stage is therefore vital. The details of the required legislation are given in section 4.

At this stage it may be necessary to investigate whether an existing institution could be reorganised to function as the National Standards Body. The concept of integrated standardization embraces the activity of maintaining and disseminating national measurement standards. This means that if a legal metrology unit exists in the country, the possibility of incorporating this unit within the NSB should be considered.

Once the necessary legislation has been promulgated and the basic foundations laid, it is necessary to define a strategic plan the NSB will follow in the initial phase of its operations. A few guide lines that may be followed for this purpose are given here.

The new national standards body, at its very inception, should not be expected to carry out all the functions and activities of a well established national standards system. Such an approach would be impracticable both financially an operationally. An often used approach is to initiate the operations of the: NSB with a few activities needed in the context of the development strategy of the country. The remaining activities may then be undertaken as the demand for them is generated and the NSB develops its technical capability.

Careful consideration should be given to the activities which need to be started at the commencement of operations. Most NSBs of developing countries have commenced their operations with formulation of standards followed by their implementation through laboratory testing and operation of product certification schemes. It must be pointed out that this approach could take a lengthy period of time, sometimes as much as ten years to bring about the desired results.

It is possible to find examples of NSBs which have deviated from this particular route in order to obtain a quick impact on the national economy, some of these have commenced operations by testing products in accordance with a foreign national standard, a regional standard or an international standard or document. (e.g. BS, AFNOR, ASTM, ISO/IEC or Codex standards). In these cases however a careful examination of the foreign or international document as to its suitability for the local situation should be carried out.

A few countries have also followed the practice of adopting international, regional or foreign standards directly with minor amendments and using these for test and other purposes ; the so called cover sheet method. In the present context of international and regional standards development, the latter approach is feasible as increasing numbers of product standards are being made available under ISO, IEC and regional standards bodies such as ARSO, COPANT etc.

3.2.Legislation

The establishment of a national standards system requires the promulgation of at least two pieces of legislation, namely:

a) A National Standards Law; and
b) A National Measurement Law

In those countries where a weights and measures Act or similar legislation is available, the necessity for a national measurement law may not arise. Nevertheless it is prudent to examine the existing laws when a new NSB is being set up in order to streamline the legislative structure and remove any conflicts or inherent ambiguities that may exist.

In addition to the basic laws, a number of regulations outlining the detailed procedures for implementation of the various provisions contained in the basic laws would be required.

3.3.The National Standards Law

The main objective of promulgating a national standards law is to make provision for the establishment of a national standards body (NSB) and to set up the legal framework required for the operation of the national standards system.
Generally, the law specifically provides for:

a) The name of the national standards body;
b) The establishment of a Governing Board for the NSB;
c) Establishment of technical committees ;
d) Establishment and operation of a product certification scheme ;
e) The establishment and operation of laboratory testing facilities ;
f) Establishment and operation of information, documentation and training services ;
g) Establishment and operation of ancillary services falling within the aims and objectives of the NSB
h) The promulgation of subsidiary legislation (regulations) under the main law in order to obtain legislative backing for specific activities to be undertaken by the NSB.
i) In addition depending on the particular policies followed in a given country, the standards law may make provision for :
j) The custody and maintenance of primary measurement standards ;
k) The establishment and operation of systems certification services i.e. ISO 9001, ISO 14001, ISO 22000 etc.;

The law also spells out:

a) Objectives, functions and powers of the NSB;
b) Composition of the Governing Board ;
c) Duties and powers of the Governing Board ;
d) Appointment of Chairman, Vice Chairman and Secretary of the Governing Board ;
e) Appointment of the Chief Executive Officer of the NSB and his/her status in the Board ;
f) Duties and functions of the Chief Executive Officer ;
g) Basic modes of financing of the NSB ;
h) Offences and penalties; and
i) Other provisions such as appeals procedures and protection against liability in connection with certification systems.

3.4.Regulations

Regulations are introduced to amplify and give technical details of the main provisions enacted in the law. Regulations may be framed as and when legislative support is required for a particular activity to be undertaken by the NSB. However as a general rule the number of regulations proclaimed should be kept to a minimum. Generally regulations will be required for effecting the following activities:

a) Operation of a product certification scheme ;

b) Operation of systems certification schemes if these are to be undertaken by the NSB;

c) Issue of mandatory standards if such is required ;

d) Mandatory product certification if such is envisaged.

3.5.The National Measurement Law

A national measurement law is required to establish the infrastructure of a national measurement system.

The complimentary guide "Establishment of a National Metrology Service"(2) contains full details of the steps required for the establishment of the national measurement system. Reference may be made to this document

4. NATIONAL STANDARDS BODY

4.1.Aims and objectives

The aims and objectives and the functions to be carried out by a national standards body would depend on the context of the adopted development strategy and the political / economic system of the country. However there are a few fundamental objectives which all national standards bodies should strive to achieve, namely,

a) the co-ordination of standardization and related activities at company, national, regional and international levels ;

b) the promotion of the adoption and application of national standards by all sectors of the economy ;

c) the promotion of standardization as a technical activity and an integral yet distinct function of management in the country ;

d) the promotion of quality management practices in the national economy and the promotion of metrology as a necessary adjunct to standardization ; and

e) the promotion of productivity through standardization in industry and other sectors.

4.2.Functions

The functions listed below directly arise from the aims and objectives outlined above :

a) formulation and promulgation of national standards ;

b) the operation of a product certification scheme ;

c) the provision of systems certification services ;

d) the provision of quality control and quality management advisory services ;

e) the provision of laboratory testing facilities and undertaking of testing for industry ;

f) Provision of training facilities in standardization, quality control, metrology and related fields;

g) Provision of documentation and information services.

h) The following functions could be classified as optional activities. i.e. they may be undertaken depending on the technical capability of the NSB and the policies followed in the country :

i) Maintenance of national measurement standards and their dissemination through provision of calibration services;

j) Operation of the WTO/TBT enquiry point ;

k) Provision of technological advice and consultancy services to industry and Government ;

4.3.Management

A worldwide study of the presently operating NSBs indicates that the management and ownership of these have been dictated to by the national needs of the countries in which they operate. Generally the ownership pattern can be classified into four main categories :

a) Fully government owned and managed bodies ;

b) Dual bodies i.e. Regulatory functions carried out by a government agency and the service functions carried out by a corporatised , privately managed body ;

c) Privately managed, but partly government funded bodies ;

d) Completely privately funded and managed bodies.

Although these four types can be considered to be different in form, their aims and objectives are similar. Since this guide is primarily meant to benefit developing countries, the discussions that follow focuses on the fully government owned type of organisation.

4.4.Organisational structure

One of two types of organizational structure, horizontal approach(Figure 4.1) or vertical approach (Figure 4.2) may be considered. In the horizontal approach, sections are created to carry out the different activities of the organisation. Staff in these sections specialise only in the activity allocated to that section. e.g. standards formulation, product certification etc. In contrast in the vertical approach staff are assigned with several functions from different standardization activities.

Some NSBs adopted the vertical approach during the initial stages of their development, as with this approach only a few technical officers are required. However this approach has been found to give rise to operational difficulties and conflicts of interest as the work of the NSB develops. The horizontal approach is therefore recommended to be adopted at the very inception of the NSB, even though this may require a few more staff members and other resources.

4.5.The Governing Board

The Governing Board is equivalent to the board of directors of a company. Its members are appointed by the Government through nominations received from organisations representing the main economic sectors of the country and relevant independent organisations.

The Governing Board is the main policy organ and the financial regulator of the organisation. It has two main functions, to workout policy guide lines to ensure that the activities of the NSB can play an appropriate role in the development of the national economy and to regulate the executive activities of the NSB through a chief executive officer and a cadre of staff.

The Governing Board has a number of duties and powers. General recommendations with respect to the composition, duties and powers follows:

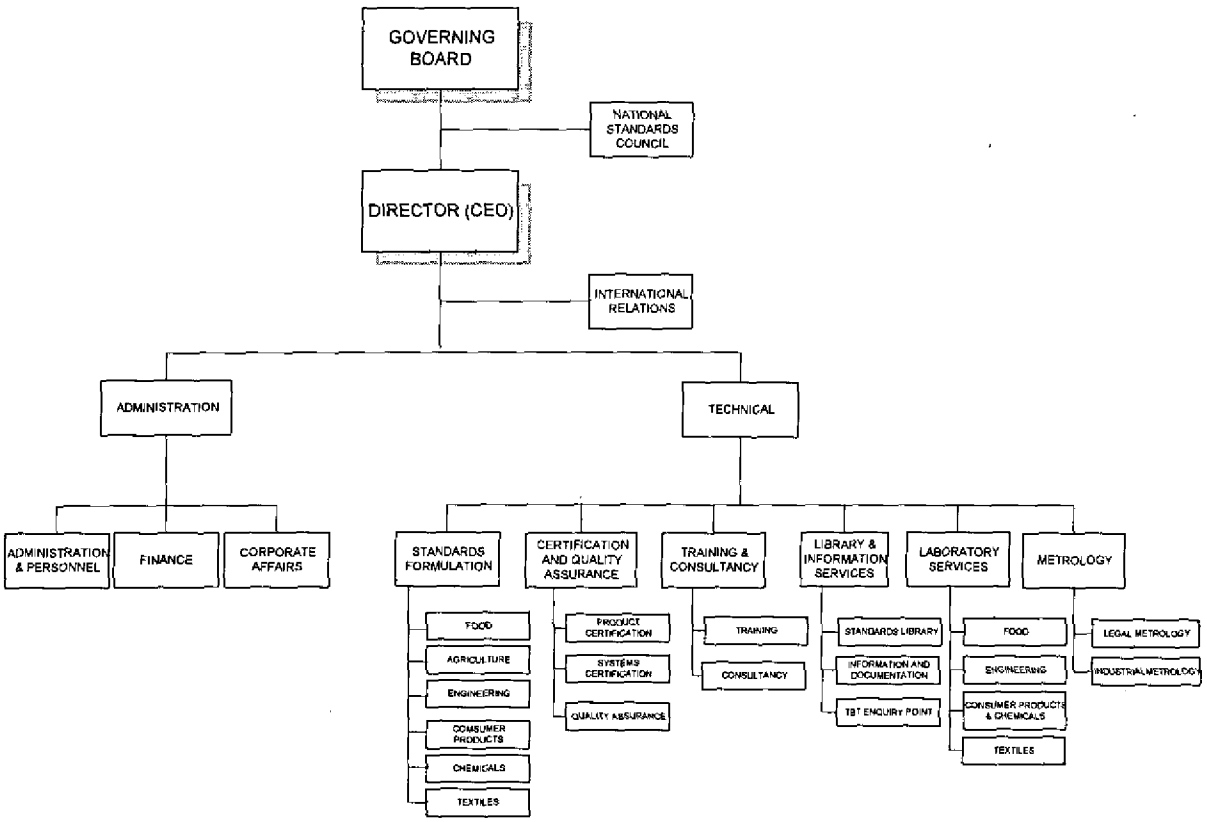

Figure 4.1 –Organisational structure (Horizontal approach)

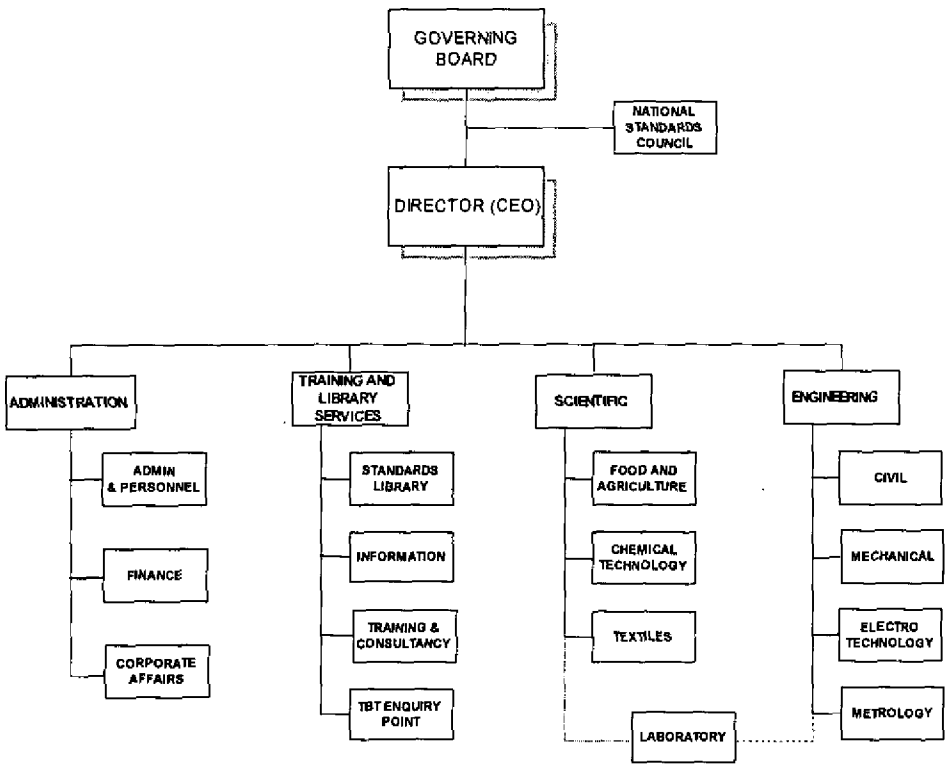

Figure 4.2 –Organisational structure (Vertical approach)

4.5.1. Composition

Generally the Governing Board should be representative of the following sectors of the economy:

- education
- agriculture
- manufacturing
- trading
- transport and shipping

In addition the following members may be added :

- consumer interests represented by a consumer federation or association
- Government represented by the appropriate ministry and
- a few independent research and/or scientific organisations .

The composition should be carefully balanced so as not to give any particular group overwhelming advantage.

4.5.2. Duties of the Governing Board

The major duties of the Governing Board are as follows:

- advising the Government on national policy on activities which has a direct bearing on standardization, metrology, testing and quality (SMTQ)
- advising the NSB on determination of priorities for the national standardization programme
- Responsibility for overall administrative and financial operation of the NSB

4.6.Chief Executive Officer

The Chief Executive Officer (CEO), variously known as Director-General, Director, General Manager is the administrative head and is directly responsible to the Governing Board. His main duties, as a manager, are to direct, organize and plan the activities of the organisation in accordance with policies laid down by the Governing Board for achieving the objectives of the NSB. The chief executive officer is supported by professional, technical and administrative staff.

The appointment of a suitably qualified CEO is vital for successful operation of the NSB. A few necessary attributes of a CEO are indicated below:

- suitable qualifications preferably in science or engineering.
- considerable experience either as Head of an organisation or in a senior management position in the public or private sector. Standardisation or quality management experience would be the

ideal. However in the absence of persons having such experience, expertise in other fields, particularly related fields such as consumer affairs should be recognised.

4.7.Staff

One of the problems a newly established NSB of a developing country would face will be in the area of recruitment of its technical cadre. In countries where standardization is a new concept, it is difficult at first, to find technical staff with the requisite expertise in all aspects of standards work.

Standardisation is essentially a technical activity and emphasis should be put on this when recruiting staff. The appointment of technical staff will depend on the activities to be undertaken by the NSB at a particular time and therefore may have to be spread over a longer period of time. The duties and responsibilities associated with each post to be created should be clearly identified.

Many newly emerging standards bodies particularly in the developing world have recruited young graduates having degrees in appropriate disciplines of science or engineering. These officers are trained on the job, under the supervision of at least one senior officer having considerable experience in standardization work. If such an officer is not available in the country, it may be necessary to obtain the services of an expatriate officer or consultant for a short period , in order to train the initial technical cadre.

Another aspect that needs to be kept in mind is the numerical balance between technical and non-technical staff. This is crucial to the smooth running of the organisation. As the NSB gains experience over a few years of operation, the optimum ratio that needs to be maintained will emerge from its internal assessment procedures. Generally a ratio of 1: 2 technical / non-technical staff is an optimum figure to aim at.

Table 4.1 indicates the minimum educational levels required for the cadre of technical officers. In addition an intermediate level (technician level) may also be required in some sections, particularly the laboratory. The technical officers required for the metrology section are not indicated as these will be found in the UNIDO Guide ,' Metrology in Developing Economies-Establishment of a National Measurement System'.

TABLE 4.1-RECOMMENDATIONS ON TECHNICAL STAFF

Area	Category	Level	Basic qualifications
Standards formulation	Basic & General	Technical officer	Science Degree or Higher Diploma
	Food	Technical officer	Food science/technology or equivalent or Higher diploma in Food science or technology or equivalent.
	Agriculture	Technical officer	Agriculture, food science or related degree/Higher diploma or equivalent
	Chemicals and Consumer products	Technical officer	Chemistry Degree or Higher Diploma including Chemistry or Physics.
	Engineering	Technical officer	Engineering or Physics Degree or Higher Diploma including Physics.
	Textiles	Technical officer	Textiles /Apparel or related degree/Higher diploma or equivalent
Product certification		Technical officer	Science or engineering degree or equivalent

Area	Category	Level	Basic qualifications
Systems certification	Auditing	Technical officer	Degree in science or engineering and certificate of lead auditor (ISO 9000, ISO 14000, HACCP)
Training & Consultancy		Technical officer	Degree in science or engineering
Library & information services	Library	Librarian	Diploma or certificate in librarianship or equivalent.
		Technical officer	Diploma or certificate in librarianship or equivalent. or Degree in science
	TBT enquiry point office	Technical officer	Diploma or certificate in librarianship or equivalent. or Degree in science
Test laboratory	Food t	Technical officer	Food science/technology or equivalent or higher diploma in food science or technology or equivalent
	Microbiology	Technical officer	Microbiology/food science/ food technology or equivalent or higher diploma in microbiology/food science/food technology or equivalent
	Chemicals and consumer products	Technical officer	Chemistry Degree or Higher Diploma including Chemistry or Physics
	Materials	Technical officer	Degree or Higher Diploma in Materials Technology or equivalent .
	Electrical	Technical officer	Electrical/Electronics engineering or Physics Degree or Higher Diploma including Physics.
	Textiles /Apparel testing	Technical officer	Textiles /Apparel Technology or related Degree/Higher diploma or equivalent

4.8.Training of staff

- Staff training is an important aspect which should be organised at an early stage of operations. Basically all categories of staff will need some degree of training; the more important categories are listed below:

a) Senior management staff including the Chief Executive Officer ;
b) Technical officers ;
c) Administrative and support staff.

- Senior management staff will generally require short term training in order to organise and manage the institution efficiently. This type of training may be obtained by attending ISO/IEC training seminars and workshops conducted by UNIDO, JICA and many other national/international development agencies. Also it will be a good idea to visit well established overseas standards institutions in order to obtain a first hand knowledge of organisation and management. Apart from the knowledge on matters of standardization this category of staff will also need to acquire administrative skills in order to manage their respective divisions.

-

- Technical officers would generally require two phases of training. At the initial stage, it is preferable to provide a general training (Induction training) covering all aspects of integrated standardization to all the technical officers. Induction training is generally conducted by the 'Training Dept' of the NSB. However if such a Dept. is not operational at the early stages, Group training courses on standardization conducted by an outside agency should be utilized. Many countries conduct such courses and details are available from the ISO Central Secretariat.

- In the second phase specialised training should be made available in the different fields.e.g. product and systems certification, metrology, food testing, microbiology, materials testing, analytical chemistry, electrical products testing.

- The training of administrative and other support staff in their particular specialties should not be forgotten e.g. the administrative officer may require training in modem methods of personnel management , the finance officer may require training in computerised financial management techniques, the secretaries may require refresher courses in computer awareness and word processing, web searching etc.

- As the NSB acquires its cadre of trained personnel, the organisation should start its own programme for training new staff, and also for providing training for industrial personnel. Details of these are given in Chapter 12 -Training and Consultancy Services.

4.9.Technical departments

- The technical functions of the NSB are carried out by the technical departments supported by the technical committees. Fig 4.1 indicates the different technical departments needed to carry out the operations of a well developed national standards body utilizing the horizontal organisational structure.

- However at the initial stage of development of the NSB, only a few of the departments indicated may be needed. The specific departments needed may depend on initial activities to be carried out which in turn will depend on the national priorities. As the needs for national standards increase new departments may be added to cater for the consequential increases in work load.

4.10.National Standards Council

- A National Standards Council is appointed to set policy and provide guidelines for the work of the NSB. The NSC acts as an advisory body and represents the different sectors of the economy at the policy making level. Usually the NSB is appointed by the Governing Board of the NSB or in NSBs without a governing board by the Minister responsible for standardisation activities.

The main duties of the National Standards Council are :

- Approval and revocation of national Standards;
- Approval and revocation of conformity assessment licenses;
- Recommendation of mandatory certification marks for locally produced or imported products.
- Advise the NSB on establishment and implementation of national standards,
- Advise the NSB on the prioritization of standardization projects,
- Advise the NSB on programs to promote testing facilities and for the development of testing services, and
- Appointment of Technical Committees.

4.11.Technical committees

- Technical committees are mainly responsible for review of draft standards and providing general policy guidelines for the execution of technical work. Usually a two tier committee structure is utilised. A typical structure utilised by many well developed national standards bodies of developing countries is indicated in Fig 4.3

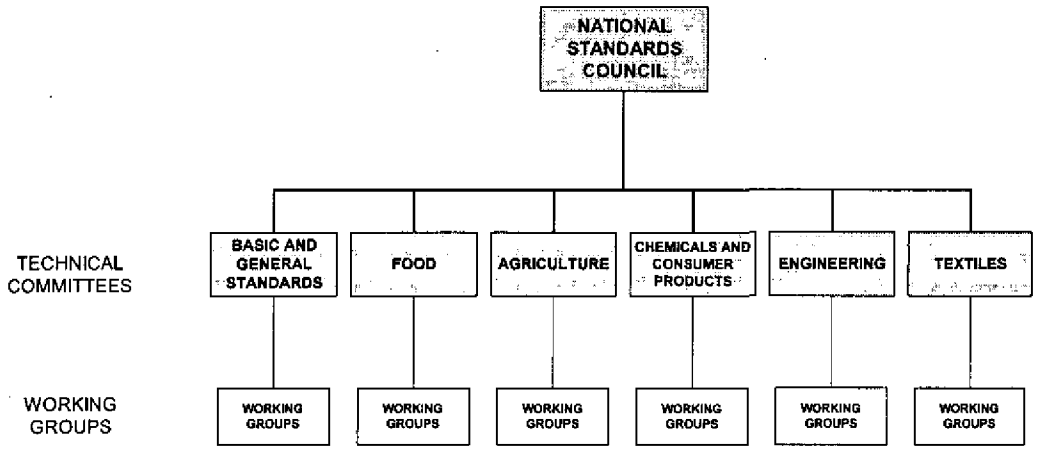

Fig 4.3 –Technical committee structure.

Technical committees (TC) may be established for the following sub-sectors:

Basic and general standards,
Food,
Agriculture,
Chemicals and consumer items,
Textiles,
Engineering (Building materials , Mechanical engineering ; Electrotechnology).

TCs are intended to represent the wider interests of the sub sector and therefore should comprise of members from agencies and institutions within the specific sub sector. e.g. Chambers of commerce and industry, research agencies, Govt. departments, and industrial associations representing the subsector and consumer organisations.

The main functions of a TC are :

- Review of standards submitted by the sub committees and submission to the Governing Board for approval,
- Indication of priority areas of work to be undertaken by the relevant technical department,
- Review of regional and international standards which are submitted for comment,
- Provision of policy guidelines on matters within its purview to the Governing Board , Chief Executive Officer and the relevant technical department.

If finding members to constitute the TC should become a problem, a simpler solution may be adopted by combining a number of them together. e.g. All fields of engineering may be represented by one committee, committees for Food and Agriculture may be combined, and Basic & General Standards may be combined with the TC for engineering.

The chairperson of TC may be elected by the committee itself but should be approved by the National Standards Council. The secretary of the committee should be a member of the technical staff of the NSB from the relevant technical department.

4.12.Sub Committees

Sub Committees are responsible for the preparation of the draft national standards. Separate committees need to be appointed for each subject under standardization. e.g. soap, batteries, electric cables etc.

The composition of the committee should reflect all the interests namely, manufacturers, large scale consumers, consumer organisations, research organisations, testing laboratories (including those of the NSB) and other relevant authorities. Persons having specialised knowledge of the subject matter may also be invited on a personal capacity.

The Sub Committees would refer their completed draft standards to the Technical Committee for review and submission to the NSC for approval. The chairperson of the Sub Committee should be an independent party (neither a manufacturer nor a consumer) and should preferably be appointed by the Technical Committee. The secretary is drawn from the relevant technical dept., of the NSB.

The Sub Committee would work in close association with the relevant technical department of the NSB. They need to meet as often as necessary, depending on the planned work programme of the NSB. Monthly meetings are usual in many countries.

In certain circumstances, such as formulating a test method to be incorporated in the standard, a smaller group of people , known as a working group may be appointed to undertake the task. The working group may consist of persons from the Sub Committee itself as well as co-opted members from outside of it. The working groups report to the Sub Committee which appointed them.

5. FORMULATION OF STANDARDS

The formulation of standards is one of the primary objectives of a NSB. This important function has to be approached with a definite philosophy and should be carefully conceived. The procedures recommended for the formulation of standards are stated in ISO/IEC Guide 59, Code of good practice for standardization.

These are :

b) Written procedures based on the consensus principle should govern the methods used for standards development.

c) Copies of the procedures of the standardizing body shall be available to interested parties in a reasonable and timely manner upon request.

d) Written procedures should contain an identifiable, realistic and readily available appeals mechanism for the impartial handling of any substantive and procedural complaints.

e) Notification of standardization activity should be made in suitable media as appropriate to afford interested persons or organizations an opportunity for meaningful contributions. This entails timely notification in appropriate media of new, current and completed standards development activities, and reporting on status changes as appropriate.

f) On the request of any interested party, the standardizing body shall promptly provide, or arrange to provide, a copy of a draft standard that it has submitted for comments. Any fees charged for this service shall, apart from the real cost of delivery, be the same for domestic and foreign parties.

g) Interested parties, wherever located, shall be provided with reasonable opportunity to review and comment on draft standards. Prompt consideration and response, if so requested, shall be given to all views and comments received, including for instance explanation why a deviation from relevant international standards is necessary.

h) Formal approval of standards should be based on evidence of consensus. All standards should be reviewed on a periodic basis and revised in a timely manner.

i) Proposals for the development of new or revised standards, when submitted according to appropriate procedures by any materially and directly interested person or organization, wherever located, should be given prompt consideration.

j) All approved standards should be published promptly. Copies should be made available under reasonable terms and conditions to any person, wherever located.

k) Proper records of standards development activity should be prepared and maintained.

Some of the above principles are also incorporated in the standards code of the TBT agreement. The NSB should write its own procedures for standards formulation incorporating these principles.

5.1.Program of work

It is instructive to draw up a programme of work for a period of about three to five years, preferably coinciding with the national planning duration of the country. A survey covering the various sectors of the national economy may be undertaken to determine the projects that need to be included and the priority to be allocated to each of them.

In deciding on the programme of work a clear philosophy needs to be formulated. The philosophy should :

-Consider a pragmatic approach that where suitable standards exist from outside sources, the NSB would adapt or adopt such standards for its needs,

-gear the efforts of the NSB towards regional and international harmonization of standards,

-As far as practicable take advantage of the experiences of other countries in a similar stage of development and socio-economic condition.

-Preparation of standards involves both manpower and materials. The material aspect is made up of technical information and laboratory facilities. The manpower needs should not only be considered in terms of the NSB, but in the wider context of the whole country, since people outside of the NSB will be needed in the technical committee work.

The following order of priorities may be followed:

1) Standards that would generate savings for the national economy

Standards, as the product of standardization, have a great influence on the economic development of a country. The economic benefits of a standard therefore need to be assessed.

Although the economic factors should preferably be analysed on a cost-benefit basis, this is not always possible. In certain situations subjective means will have to be used in order to decide whether a standardization activity is potentially beneficial or not.

2) Export products of the country

Products that are being exported from the country may benefit from standardization as their quality parameters would be precisely defined. Also it may be possible to persuade the Government to institute quality inspection schemes and safeguard the image of the country in overseas markets.

3) Products and services that affect the health and safety of the population

These are an important category of standards needed in most developing countries. Under this category a number of standards e.g. food hygiene, food colourings, food preservatives, potable water quality, safety of electrical appliances, fire safety of buildings etc., will need to be formulated.

4) Standards needed for safeguarding the environment and control of pollution

Concern about environmental pollution and the hazards arising from it has made standards defining upper limits of contaminants and methods of test an important category. Examples are standards required for control of industrial effluents, motor car emissions, noise pollution in and around industrial sites, river pollution etc.

5) **Government requirements**

Government requirements for standards in particular fields fall essentially into two categories: public procurement and government legislation.

In most developing countries Governments tend to be the largest procurers of certain products for use in the country. Thus, the Government in order to be able to control the quality of items being purchased, may request standards on such items and require that purchases be made with reference to such standards.

Also, to safeguard the health and safety of its population, the government may wish to legislate on certain commodities with regard to minimum quality requirements. Such legislation may also apply to codes of practice intended to guide various trading concerns, in the manner in which they will be expected to carry on their activities.

5) **Feasibility of implementation through certification**

If a mandatory certification scheme whereby some products offered for sale have to conform to specific standards is considered for implementation, then for such a scheme to be viable, the relevant standards must exist. Thus, the need to prepare standards to satisfy this requirement should be borne in mind.

6) **Relation with other standards**

In many instances, standards rely on other standards for completeness. The work programme should take this factor into consideration. Particularly product standards meant for implementation should be complete. For example, a product standard without the relevant test methods would be unsatisfactory.

In order to determine priorities within the above categories quantitative information may be sought during the survey. The ISO Publication 'Benefits of Standardization' provides techniques for determining priorities using quantitative information. The list of priority projects may then be submitted to the standards policy advisory committee and Technical committees for their comments and review. A final list incorporating the views of all the parties consulted may be drawn up. However numerous requests for new standards are bound to arise during the planned period. These should be treated using the same priority allocation procedure and incorporated in the plan if justified. Otherwise they should be considered for the next planning period.

5.2.Methodology

Once the NSB has decided upon on the initiation of a standards project and its scope has been defined, the next stage is the process of development of the standard, at which time the following requirements should be borne in mind:

a) The standard should have a sound technological basis, be economically justifiable and have the potential to increase the rate of economic development in the country ;

b) The standard should be so processed that it will be accepted as widely as possible by the various interests in the community;

c) The standard should be implementable.

To attain these objectives, certain principles should be observed. Among these are :

a) *Fulfilment of an economic need-* The situation where a standard becomes an academic document without practical application is to be avoided.

b) *Consistency with the needs of the economy-Standards* should reflect prevailing industrial and commercial practices and needs and also any likely future developments.

c) *Safeguarding of interests* - Standards should accommodate the interests of both consumers and producers.

d) *Consensus view* -Standards should be established by adopting the consensus approach rather than using voting to settle issues.

e) *Latest advances* -In drafting standards, cognizance should be taken of the latest advances of science and technology. However, such advances should have to be of practical application in the country's current stage of economic and industrial development.

f) *Encouragement to development*- Standards should not limit the freedom of the designer and the innovator to improve on the existing state of the art. Thus it is not necessary to standardize designs. National standards should wherever possible, relate to performance characteristics.

g) *Consumer input*- Standards should take into account the needs of the consumers. This particularly important for product standards. Appropriate consumer representatives must be invited to the technical committees at all levels.

h) *TBT standards code requirements* - The standard should comply with the requirements of the standards code of the Technical Barriers to Trade (TBT) agreement of the WTO.

The following procedure is followed for the preparation of an individual standard or a group of related standards :

a) *Preparation of the first draft.* -This is usually done by the relevant technical department of the NSB. If sufficient expertise is not available within the NSB the first draft may be prepared by an outside expert or organization but in liaison with the NSB.

NOTE -Available data may be in the form of an existing foreign, regional or international standard, or data may be collected from a national or international institute. When data is readily not available, it is most imperative that facilities are made available to the NSB. or another acceptable institution, for undertaking research into the relevant parameters of the product or test method .

b) *Submission to the Drafting Committee.*- The first draft is submitted to the Drafting Committee for discussion and amendment. At this stage many views will be expressed by the members of the Committee and the draft amended accordingly. The principle of consensus will be the guiding factor at this stage. A number of Drafting Committee meetings will be required to come out with a draft standard suitable for circulation.

c) *Circulation of the draft standard for public comments.-The* draft standard is circulated to the main producers, consumer organisations, research institutions, professional associations, relevant Government departments and the general public for eliciting comments. Newspaper advertisements and other media may be used to publicise the availability of a draft standard for comments. A minimum of sixty days must be allowed for receiving comments.

d) Drafting Committee meets to consider comments received. The Drafting Committee is reconvened to consider the comments received and amend the draft accordingly.

e) Draft standard submitted to Technical Committee- The draft standard finalised by the Drafting Committee is submitted to the relevant Technical Committee for review and approval.

f) Draft standard is submitted to the National Standards Council for approval.

g) The standard is printed and published.

Deviations from the above procedure may be adopted by individual NSBs to suit their particular requirements. However the essential steps outlined above are necessary to achieve satisfactory national standards.

5.3.Consumer input

Consumers are one of the most important stakeholders of standards, especially for goods and services directly used by consumers. Here, the term "consumer" is understood to mean an individual member of the general public, purchasing or using goods, property or services, for private purposes.

An input from consumer interests should always be sought in the process of standards formulation. Thus, consumers must be represented at all committee levels. However, this may not be easily achieved in developing countries as in most of these countries, consumers are not well organised.

Even in those countries where some consumer groups or associations exist, they may face difficulties participating in the standards development process, due to a lack of financial resources and technological expertise. It is therefore necessary for the NSB to take special steps to bring in consumer participation.

To promote consumer representation in the work of national standards bodies, in 1979, ISO and IEC adopted recommendations on consumer representation in standardization. These recommendations were further strengthened by a statement issued by ISO and IEC in 2001. The recommendations given in the statement are reproduced below:

1. National bodies shall support ISO and IEC initiatives aimed at encouraging consumer representation in standardization.

2. There should be provision at the national level for consumer participation in the initiation and planning of the standards work programmes, both national and international, as well as in policy matters relevant to the consumer.

3. At the national level, consumer interests should be invited to participate in all technical committees executing standards projects affecting the interests of the consumer. The degree of participation should reflect the relative importance to consumer interests of the particular project.

4. If consumers are not able to finance their participation in the standardization process themselves, the national body should enable consumers to participate in priority areas of consumer interest. It should be recalled that consumers form an integral part of the consensus-building process.

5. Where a technical committee is developing an International Standard primarily of interest to consumers, national bodies should seek the active participation of consumers in national delegations. It is essential that the consumer representatives are involved when the delegation is briefed and that the consumer view is taken into account when decisions on the national position are taken.

6. To assist national bodies in this effort, technical committees should include a statement in their new work item requests to highlight the fact that a specific international standardization matter is of particular interest to consumers. (as required by the *ISO/IEC Directives, Part 1,* Annex C).

7. Standards work can be technical and complex by nature. Where possible and necessary, national bodies should provide consumer representatives with guidance and training on standards procedures and with briefings on technical issues, in order to make their contribution both effective and based on knowledge of real possibilities. Consumer representatives should receive early notice concerning

upcoming meetings and should receive documents in sufficient time to review them thoroughly. There should also be access for persons with disabilities, for anyone who requires it.

8. National bodies should ensure effective communication to consumer groups, other relevant organizations and the general public, on the results of their standards work of interest to consumers. Whenever possible, they should use publicity, expertise and new possibilities offered by technological development (such as the Internet), to encourage feedback and the application of standards.

9. National bodies should be encouraged to "sound out" consumer opinion through existing consumer organizations or, if no such organizations exist, on their own initiative.

10. During the standards-writing process, consumer input should be sought in particular at the following stages:

- During the establishment of standardization work programmes;
- as soon as a subject is proposed to the standards body for study, at the time the feasibility of the project is being established and prior to the establishment of the draft proposal;
- when establishing the scope of the standard (e.g. health and safety, fitness for use and environment), listing the characteristics, assigning the tasks to the members of the committee and determining whether research among consumers is necessary;
- during the technical committee's work, whenever a decision is to be made that affects the established scope and/or the required performance level(s);
- whenever national delegations are briefed for their participation in international standards work, encouraging representation of consumer interests on national delegations;
- following the circulation of the draft, when the committee considers all the comments received;
- at the voting stage.

6. IMPLEMENTATION OF STANDARDS

6.1.Voluntary and mandatory standards

In many developing countries selected national standards are declared mandatory, in order to effect speedy implementation. This is especially the case when the standard relates to a product or a service, which affects the health of the population or public safety.

At the stage of writing the national standard it is instructive to keep in mind whether the standard will be declared mandatory. This is important as requirements should be written in an objective manner enabling verification of parameters unambiguously.

Another vital factor to consider at the early stage is the effect the standard would have on the production of the item. In the case of voluntary standards this may not be critical, as manufacturers would have sufficient time to effect the necessary changes. However in the case of mandatory standards a careful assessment should be made and if necessary sufficient time allowed before the standard is declared effective.

Declaring selected national standards mandatory is another method of implementation. However this can sometimes lead to complicated legal proceedings. If the NSB is considering mandatory Standards it is necessary to set up an internal legal unit to handle the legal side of the implementation procedure.

In addition the NSB will need to set up an implementation department whose officers would sample the products under consideration from the producer's premises as well as from the open market and subject them to tests in accordance with the requirements of the mandatory standard. This would constitute a large volume of work considering the number of standards that may be declared mandatory .Of course there is also the alternative of declaring national standards mandatory and leaving the enforcement in the hands of other authorities in the country .This method assumes that the Governmental infrastructure of the country is well developed and that there are other organisations who are able to undertake the function of mandatory enforcement.

6.2.Referencing standards in other legislation

A successful method adopted in many countries for implementation of standards is through referencing them in other legislation. This procedure is quite successful in the area of food standards, environmental and pollution standards, safety standards and in a number of other fields. This is because in many countries legislation will be available defining the requirements for food products, environmental pollution and safety. There will also be other areas where such referencing may be possible. The NSB should make an initiative by commencing discussions with the relevant authorities implementing the legislation in order to issue regulations giving reference to national standards. This is necessary as the existing legislation may have been drafted and enacted prior to the commencement of national standardization activities.

Referencing national standards in the laws also brings in the added facility, that amendment of the legislation is not needed when the technical requirements have to be changed, due to advances in science and technology. The issue of a revised national standard is all that is called for.

6.3.Government procurement

Another useful technique of implementing standards is through the Government procurement program. In almost all developing countries the Government is the largest purchaser of goods

and services. If agreement could be obtained from the Government to insist on conformity with national standards when its agencies purchase goods and services, the implementation of national standards would have been effected to a large extent. The NSB should obtain agreement of the Government to instruct all its agencies to specify the national standard (whenever these exist) in tender documents for large scale purchases.

7. PRODUCT CERTIFICATION

Product certification is a third party guarantee provided by an independent organisation that a product continually conforms to the requirements of a standard. Although the certification is usually carried out against the requirements of a national standard, this is not always necessary, as certification could also be carried out against a regional, international or even a foreign national standard. Certain provisions need to be made in order to operate a product certification scheme.

7.1.Types of product certification

Six types of product certification schemes are given in ISO Development Manual 2. A brief description of these is given below:

Type 1-Samples of the product are tested for conformity-Sampling may or may not be statistically determined. Type 1 testing provides only a low cost snapshot without assurance of ongoing conformity

Type 2, Type testing with surveillance of the market – Type testing is conducted together with testing of samples from the market.

Type 3, Type testing with surveillance of production- Type testing is conducted and samples of the product from the point of production are tested for ongoing conformity.

Type 4, Type testing with surveillance of both the market and production-Type testing is conducted and samples of the product from both the market and the point of production are tested for ongoing conformity.

Type, 5 testing and assessment of the quality systems with surveillance of the quality system, production and the market -Type testing and assessment of the quality system used for the manufacture are conducted. Surveillance of the quality system is conducted and samples from both the market and production are tested for ongoing conformity.

Type 6, Assessment and surveillance of the quality system-An initial assessment of the quality system is made. Ongoing surveillance of the quality system is conducted. The quality system must include tests to assure compliance with product requirements.

The ISO Type 5 certification scheme is the most popular among NSBs.

7.2.Legal provision

Legal provision is required to operate a product certification scheme and to protect the product certification mark from infringement. These should be provided in the National Standards Law or regulations. Specialised legislation required for the operation of the scheme is enacted as regulations to the main law.

7.3.Product Certification mark

Only one product certification mark should be used. The mark should be of simple design. Too many small details would cause difficulties with certain marking methods. Many marks are designed on the basis of the initials of the NSB. It is an advantage if the mark connotes the country concerned. Examples of product certification marks of a few countries are given below:

7.4.Safety mark

In some countries a safety mark is also used in addition to the product certification mark. A safety mark indicates that the product complies with safety requirements given in a standard. In many countries the labelling of a product with a safety mark on certain designated products is mandatory. Usually this requirement applies to dangerous and hazardous products such as electrical appliances, containers carrying explosive or hazardous substances etc.

Generally the same principles as used for product certification marking is used for safety marking as well. However, in many countries only ISO type 1 scheme that is initial type testing of the product is performed.

IEC EE-CB scheme implemented by the International Electrotechnical Commission is a safety marking scheme for certification of electrical appliances.

7.5.Certification committee

A Certification Committee consisting of members from the technical departments as well as outside independent organisations may be appointed to guide the NSB in the operations of the certification scheme. The functions of the Committee would be to review the operation of the scheme on a regular basis and provide policy advise to the Governing Board and The Chief Executive Officer. The Committee may also review the legislation and rules and regulations that are framed for the operation of the scheme.

7.6.Certification rules

Usually two sets of rules are required for the operation of a product certification scheme. These are 'General Rules' containing requirements applicable to all products which come under the product certification scheme and 'Specific Rules' which apply only to a specific product or group of related products. In other words 'Specific Rules' have to be framed for each product or group of related products which are to be certified.

7.7.Assessment of quality management system of enterprises

The major component of a product certification scheme at the enterprise level is the assessment of the quality management function of the enterprise in relation to the product for which certification is required. The requirements against which the assessment is to be made should be clearly written down in the general and specific rules. The assessment should also include test laboratories which are unutilized for routine testing of the product both within and outside the enterprise.

7.8.Mandatory or voluntary certification

Most countries prefer voluntary certification because then producers would show a genuine interest to improve the quality of their products voluntarily than by compulsion. Also voluntary certification induces producers to improve product quality over and above the requirements defined in the national standard, especially if nationally recognised awards are made to those enterprises who are able to maintain the product certification marks over a period of time, e.g. five or ten years.

In some countries, however, product certification is made mandatory for a set of designated products, mainly products affecting the health or safety of the consumer. Mandatory certification however requires considerable resources for enforcement, particularly in countries with a large geographical area. Charging fees for mandatory certification has been

found to be difficult in some countries, as manufacturers felt that this should be done out at the expense of the Govt.

8. SYSTEMS CERTIFICATION

Systems certification refers to the certification of a quality management system, environmental management system, or any other management system against the requirements of an internationally valid standard. The certification is carried out by an accredited certification body.

8.1.ISO 9000 series

The origin of the ISO 9000 series of quality management standards could be traced to the United States (US) military standards. The US military specifications MIL-I-Q9858 and MIL-I-45208 for quality inspection were the first standards to have specified requirements for quality assurance systems in the supplier's organisation. Subsequently these standards were published as Allied Quality Assurance Publications (AQAP) 1, 4 and 9.

In 1972, the United Kingdom, established UK Defence Standards 05/21, 05/24 and 05/29 based on the AQAP documents 1, 4, and 9. The famous British Standard BS 5750: 1979, parts 1, 2 and 3 were based on the presently obsolete UK Defence Standards 05/21, 05/24 and 05/29.

In 1985 the International Organisation for Standardization through its Technical Committee on Quality Management & Assurance (ISO/TC 176) undertook the preparation of a series of international standards for quality management and BS 5750 which had been used successfully by the British Standards Institution for quality system certification became the natural choice for basing the new international standard. After much deliberation and arguments ISO 9001, ISO 9002, and ISO 9003 were published 1987. These standards were then adopted by a significant number of national standards bodies including the United Kingdom and were published as their national standards. The ISO 9000 series was also published as a European Standard series EN 29000 by the European Committee on Standardization (CEN).

In 1994 a revision of the series was undertaken, and an updated and revised set of standards were published. In the meantime a large number of organisations obtained certification against ISO 9001 and ISO 9002 standards. The usefulness of the standards for quality assurance of products and services were beginning to be accepted worldwide though there were some organisations which were not entirely convinced by the necessity of a documented quality system as required by the standards.

A further revision of the standards was undertaken during 1996 to 2000 and a revised and improved set of standards known as ISO 9000: 2000 has been published. In the new standard certification can be obtained only against the ISO 9001 standard. ISO 9002 and ISO 9003 standards have been withdrawn. ISO 9004 has been published as a complimentary guidance document.

8.2.ISO 14000 series

The ISO 14000 environmental management system series provides a logical and documented system to assess the impact on the environment of industrial operations. The series consists of several international standards, from ISO 14001 to ISO 14050. However certification of environmental management systems is done only against ISO 14001. Related standards, ISO 14020, 14021 and 14024 provide guidelines for eco labelling of products.

In particular, the standard requires compliance with a country's environmental legislation and more importantly to have a continuous improvement system to monitor and reduce the environmental impact of industrial activities.

Similar to the ISO 9001 system, third party auditors independently provide certification to ISO 14001. Importer countries now increasingly require compliance to ISO 14001 and since developing countries do not have the requisite capacities, this well designed standard would become a de-facto trade barrier.

8.3.The Hazard Analysis and Critical Control Point (HACCP) system (ISO 22000)

HACCP has become synonymous with food safety. It is a worldwide-recognized systematic and preventive approach that addresses biological, chemical and physical hazards through anticipation and prevention, rather than through end-product inspection and testing.

The HACCP concept was pioneered in the 1960s by the Pillsbury Company, the United States Army and the United States National Aeronautics and Space Administration (NASA) as a collaborative development for the production of safe foods for the United States space programme. NASA wanted a "zero defects" programme to guarantee the safety of the foods that astronauts would consume in space. Pillsbury therefore introduced and adopted HACCP as the system that could provide the greatest safety while reducing dependence on end-product inspection and testing. HACCP emphasized control of the process as far upstream in the processing system as possible by utilizing operator control and/or continuous monitoring techniques at critical control points. Pillsbury presented the HACCP concept publicly at a conference for food protection in 1971. The use of HACCP principles in the promulgation of regulations for low-acid canned food was completed in 1974 by the United States Food and Drug Administration (FDA). In the early 1980s, the HACCP approach was adopted by other major food companies.

Recognizing the importance of HACCP to food control, the twentieth session of the Codex Alimentarius Commission, held in Geneva, Switzerland from 28 June to 7 July 1993, adopted Guidelines for the application of the Hazard Analysis and Critical Control Point (HACCP) system.

The revised Recommended International Code of Practice - General Principles of Food Hygiene was adopted by the Codex Alimentarius Commission during its twenty-second session in June 1997. The Hazard Analysis and Critical Control Point (HACCP) system and guidelines for its application is included as its Annex.

The Codex General Principles of Food Hygiene lay a firm foundation for ensuring food hygiene. They follow the food chain from primary production through to the consumer, highlighting the key hygiene controls at each stage and recommending an HACCP approach wherever possible to enhance food safety. These controls are internationally recognized as essential to ensuring the safety and suitability of food for human consumption and international trade.

The HACCP system, as it applies to food safety management, uses the approach of controlling critical points in food handling to prevent food safety problems. The system, which is science based and systematic, identifies specific hazards and measures for their control to ensure the safety of food. HACCP is based on prevention and reduces the reliance on end-product inspection and testing.
A new ISO standard, namely ISO 22000 incorporating the requirements of HACCP system is being formulated and is due to be published in 2005. Third party certification against ISO 22000 would become available in the near future.

8.4.SA 8000 standard (ISO 26000)

The SA8000 standard for socially responsible employment practices was published in 1998, by Social Accountability International (SAI). It is modelled on the well established ISO 9000 quality standard. However, unlike ISO 9000, it prescribes specific performance standards.
The SA 8000 code of practice is broken down into nine key areas:

- Child labour;
- Forced labour;
- Health and safety;
- Freedom of association and collective bargaining;
- Discrimination;
- Disciplinary practices;
- Working hours;
- Compensation;
- Management systems.

The SA8000 programme offers two separate routes for companies that want to demonstrate their commitment to social responsibility.

The first, membership of Social Accountability International (SAI), is designed for businesses that are involved in retailing. It involves making a commitment to do business only with socially responsible suppliers. SA 8000 members are offered a self-assessment package and other tools to help them implement a policy on social responsibility. They are expected to notify their suppliers of their intention to adopt SA 8000 standards, and to set a timetable for phasing out dealings with companies that fail to meet those criteria.

Member companies are also required to produce an annual report detailing their SA8000 objectives, and outlining progress that has been made towards those goals. SAI verifies these reports. The second route, certification, is intended for manufacturers and suppliers themselves. The process is a rigorous one which begins with the company contacting an accredited auditor. Having demonstrated compliance with existing regulations and assessed how current practice compares with the provisions of SA8000, the company is given the status of 'SA8000 applicant'.

The business then puts in place an SA8000 programme, which is scrutinized by a 'pre-assessment audit'. Any improvements that are recommended can be put into practice before the formal audit takes place.

Following the formal assessment, the company is again given the opportunity to put right any shortcomings, before being checked again. If at the end of this process the auditors are satisfied that the company is fully compliant, they will issue an SA 8000 certificate, valid for three years.

9. ACCREDITATION

Accreditation is the procedure by which an authoritative body gives formal recognition that a body or person is competent to carry out specific tasks such as laboratory testing or product / systems certifications.

Accreditation bodies have been established in many countries, often by government or with the encouragement of government, with the primary purpose of ensuring that laboratories and bodies performing product / systems certifications in the country are subject to review by an authoritative body. Accreditation reduces risk for government, business and customers by ensuring, through regular surveillance, that accredited bodies are independent and competent.

Accreditation is generally performed by a national accreditation body. There are mainly three types of national accreditation bodies; those providing only laboratory accreditation, those providing certification body (including inspection body) accreditation and those providing both certification body and laboratory accreditation.

The oldest accreditation body, namely the National Association of Testing Authorities (NATA) based in Australia belongs to the first category. Quite a number of early accreditation bodies only dealt with laboratory accreditation as the concept of accreditation developed as a result of the necessity to validate laboratory test results.

The publication of quality and environmental management systems standards such as the BS 5750, ISO 9000 and ISO 14000 and the subsequent development of systems certification against these standards gave rise to accreditation of systems certification bodies.

There are only a few accreditation bodies belonging to the second category, e.g. India, More recent accreditation bodies belong to the third category. Quite a number of such bodies are presently in operation in developed as well developing countries. Well known examples are: United Kingdom Accreditation Service (UKAS), Joint Accreditation System of Australia and New Zealand (JAS-ANZ), India (....) ,Singapore Accreditation Council (SAC), Department of Standards Malaysia (DSM) and South African National Accreditation System (SANAS).
The two bodies representing accreditation activities at the international level are the International Laboratory Accreditation Co-operation and International Accreditation Forum (IAF). Brief descriptions of these organizations follow.

9.1.International Laboratory Accreditation Co-operation (ILAC)

The International Laboratory Accreditation Co-operation represents laboratory accreditation activities at the international level. Established in the late 1970s, ILAC membership has grown rapidly and includes representatives from the world's major laboratory accreditation systems in Europe, Asia, North America, Australia and the Pacific. ILAC has three categories of membership; full member (presently 44), associates (presently 13) and affiliates.(presently 19).

ILAC operates a series of committees that investigate issues such as the harmonisation of international laboratory accreditation practices, the effectiveness of mutual recognition agreements in facilitating trade and the promotion of the aims and awareness of laboratory accreditation around the world

A principle objective of ILAC is to put in place a world-wide arrangement for mutual recognition of test /calibration certificates and reports. ILAC aims to demonstrate the equivalence of the operation of its Member Accreditation Bodies through this Arrangement.

As a consequence, the equivalent competence of laboratories accredited by these bodies is demonstrated. The market can then be more confident in accepting certificates and reports issued by the accredited laboratories.

Current membership and other details of ILAC could be obtained from its website.

9.2.International Accreditation Forum (IAF)

The International Accreditation Forum (IAF) represents national accreditation bodies providing accreditation for conformity assessment activities (product / systems certification, inspection) at the international level. Presently it has a membership of ..... bodies from ..... countries.

The IAF implements it s primary objective through a Multilateral Recognition Arrangement (MLA). Accreditation body members of IAF are admitted to the MLA after a stringent evaluation of their operations by a peer evaluation team that is charged to ensure that the applicant member complies fully with the relevant international standards and IAF requirements. Once an accreditation body is a member of the MLA it is required to recognize the certificates issued by certification bodies accredited by all other members of the MLA.

Accreditations granted by IAF MLA members are recognized worldwide based on their equivalent accreditation programmes, thereby reducing costs and adding value to industry and consumers. Certificates in the fields of management systems, products, services, personnel and other similar programmes of conformity assessment issued by bodies accredited by IAF MLA members are therefore relied upon in international trade.

Current membership and other details of IAF could be obtained from its website.

9.3.Laboratory accreditation against ISO/IEC 17025 standard

Laboratory accreditation is carried out by assessing a test or calibration laboratory against the requirements of the international standard ISO/IEC 17025 :2005. This international standard lays down quality system requirements for test and calibration laboratories. It was originally an ISO/IEC Guide (ISO/IEC Guide 25 -1978) and was published as an international standard in 1999. The most recent edition was published in 2005.

The standard lays down 15 management requirements and 9 technical requirements and has a similar format to that of ISO 9001 standard. In addition to quality system requirements, the standard also lays down requirements for personnel, equipment and laboratory environment. Once accreditation is awarded after the initial assessment, periodic assessments are carried out in order to ascertain the continuity of testing quality. In addition proficiency testing where samples of known value are distributed to a number of laboratories for testing and the results compared are also carried out.

9.4.Accreditation of Certification bodies

9.4.1. Product certification bodies

The accreditation of product certification bodies is carried out in terms of ISO/IEC Guide 65. Essentially the product certification body must operate a quality system based on the requirements of this guide.

9.4.2. Systems certification bodies

Certification bodies operating quality systems certification are accredited in terms of ISO/IEC Guide 62 (.). This guide gives specific requirements for bodies operating quality systems

certification. In the case of environmental management systems certification the relevant guide is ISO/IEC Guide 66.

10. PROMOTION OF QUALITY ASSURANCE

Promotion of quality assurance is an area which the NSB should take an active part from its very inception. Improvement of quality of locally manufactured products is the most economically beneficial activity that the NSB can contribute to. The roles the NSB could play in this area are many. Two important services the NSB could render are quality control advisory services and training of QC personnel.

10.1.Quality control advisory services

It will be found that technical know how on in plant techniques of quality control would be lacking in many enterprises. This expertise should be made available from the NSB. The NSB should train some of its staff in quality control techniques and make their expertise available to the enterprises. Organizing quality control departments within factories, instituting sampling and test procedures, control charts and other techniques of quality control and implementation of these techniques in association with the personnel of the enterprises are the main activities that could be undertaken.

Training of personnel of the enterprises in quality management techniques is another important function that should be undertaken by the NSB.

11. LABORATORY TESTING FACILITIES

11.1.NSB laboratories

Test laboratories are an essential component of a national standards system. However establishing comprehensive laboratory testing facilities is an arduous task especially in developing countries due to the heavy financial outlay that is required. Nevertheless the .NSB is well advised to plan for setting up of its own laboratories at an early stage of it s development. This does not prevent the NSB from using other laboratories available in the country, not only at the commencement, but even afterwards as it is quite difficult and very expensive to set up laboratories to cater to all fields of testing.

A good strategy to follow is to set up laboratories in those fields where there are none existing or the available ones are inadequate to meet the requirements of the NSB and the industry .It is a good practice to undertake a survey to determine the existing national capability before plans are drawn up for establishing new laboratories. It is best to avoid duplication of expensive test equipment although it is recognised that some duplication is required to build up redundancy. For example if there is only one AA spectrophotometer or a HPLC in the country and if these instrument become faulty then a serious problem would arise. On the other hand one would not attempt to duplicate very expensive equipment such as an ICP or universal testing machine of high capacity, unless there is very important need for such duplication. A balance has to be struck depending on the needs and the financial ability of the NSB.

Designing a test laboratory is a specialised task and therefore expert assistance should be obtained for the purpose. As a general guide the location of the laboratory should be free of constant vibrations as that would arise from heavy traffic on a nearby road, or electrical interference arising from power stations, power transmission lines or cables. Areas having heavy noise pollution should also preferably be avoided. A flat land is better than a hillock or undulating land where buildings may have to be located at different levels. These requirements are relevant to most laboratories, particularly to metrology laboratories.

The most important test fields to consider are :

- Food testing including microbiology,
- Chemicals and consumer products testing,
- Materials testing,
- Electrical & electronic products testing, and
- Textiles testing.

Other fields may be added depending on the specific requirements of the country.

Staffing of the laboratories is another important aspect to consider at an early stage. Graduate staff in the relevant disciplines should be recruited early and trained (See Table 2, Chapter 10). By the time the laboratory buildings are ready and equipment installed, the trained staff should be available for carrying out of the operations.

11.2.Quality of test results

It is necessary to take several precautions in order to ensure the validity and accuracy of test results. The most important steps are :

- Setting up of a quality system based on the ISO/IEC 17025 international standard,
- Carrying out regular internal quality assurance procedures,

- Participation in proficiency testing and inter laboratory comparison programs and
- To obtain accreditation from an internationally recognized accreditation body.

11.3.Laboratories of outside organisations

Necessarily the NSB will have to utilise the laboratories of many outside organisations to meet its testing requirements. It is preferable to use laboratories that have received accreditation for the specific tests that the NSB requires. If an accredited laboratory is not available in the country, tests should preferably be duplicated at more than one laboratory.

12. TRAINING AND CONSULTANCY SERVICES

12.1.Induction training for NSB staff

The following courses are appropriate for induction training:

a) Principles of standardization -A course covering principles of standards writing and servicing of technical committees.

b) Quality and environmental management –An outline of ISO 9000 quality management standards ISO 14000 environmental management standards and their implementation.

c) Food safety and standards - Management of food safety through HACCP and CODEX standards .

d) Conformity assessment- Principles of product certification and accreditation.

The induction training course should be about three weeks in duration with lectures and participatory sessions.

12.2.Training courses for industry

Once the NSB has gained sufficient experience in conducting its internal programmes, the training activity may be expanded by offering courses to personnel from industry. The following courses are recommended:

a) *In plant Quality Control*-This course should be aimed at QC personnel of manufacturing industries, particularly in plant operatives who are responsible for quality inspection at the factory floor level. It may also be taken up by middle managers.

b) *Total Quality Management (TQM)*- A course explaining the principles of TQM could be treated as an extension of (a) . The course is aimed at in-plant operatives, middle and senior managers who are involved in design, development and production.

c) *Company Standardization*- A course explaining the principles of writing company standards. The course is applicable to design and quality management staff.

The durations of the above courses must be decided upon depending on the depth of treatment of the subjects.

The training services may be expanded by adding courses as the training department gains sufficient expertise and experience.

12.3.Seminars and Workshops

The NSB should conduct a series of seminars and workshops. This should be a regular activity of the 'Training Dept' once it has got itself organised. One day seminars and two day workshops over a week end are generally popular with Top and Senior management of companies. The following titles are provided as examples:

a) Standardization, Quality Control and Certification -One day seminar for top management.
b) Product certification -Two day workshop for middle and senior managers.
c) Systems certification –One day seminar for middle and senior managers

12.4.Consultancy

Although provision of consultancy services may not be feasible at the early stage of development of a NSB, it is an area which should not be neglected.

The following are possible areas for provision of consultancy services:

a) Setting up of quality control systems in a company -Many companies may not have sufficient know how to set up a quality system for its operations. The expertise of the NSB staff could be put to good use.
b) Formulation of Company standards- Preparation of company standards is another consultancy field which the NSB may be able to execute with its resources on standards and technical regulations.
c) Training- The training of personnel maybe undertaken as a consultancy. Very frequently companies require their personnel trained in house. A long term training package may be delivered.
d) Diagnosis of product quality problems -This would require considerable expertise and support from the
e) NSB laboratories. Also the consultancy team need to be multi disciplined. Therefore it may not be possible to undertake these until the NSB has developed laboratory testing facilities and sufficient expertise

13. DOCUMENTATION, INFORMATION AND LIBRARY SERVICES

13.1.Standards library

An important activity which needs to be commenced at the very early stage is documentation, library and information services. These are operated from a specific section of the NSB. The section should start collecting foreign national standards, regional standards and international standards and build up a comprehensive stock of standardization material.

The library would be the repository of information for both the NSB staff and for outsiders who become involved in the NSB's standardization activities. It should have in stock not only standards from other national, regional and international standards bodies, but also general reference material on standardization and related activities. Reference books and current journals covering the areas of operation of the NSB should be available in the library so as to provide up-to-date information to the staff of the NSB.

The section should run an external information service in addition to the documentation and information services it may provide to the staff of the NSB.

The following services are usually rendered:

Dissemination of information on standards, quality assurance and metrology - A Newsletter is a good starting point for dissemination of information. It may be circulated to local organisations and if funds permit to overseas NSBs and the country's consular and trade representatives.

Current awareness service -A current awareness service where bibliographies of journals received are circulated.

Standards journal -A standards journal where information on the current status of standards projects undertaken by the NSB and topical articles are carried is another possibility.

13.2.ISO information network (ISONET)

ISONET is an agreement between standardizing bodies to combine their efforts to make information on standards, technical regulations and related matters readily available. ISONET is founded on the principle that in each country there is a body – usually the ISO member – which has a broad knowledge of standardizing and regulatory activities in that country. As a party to ISONET, the body in question agrees to expand this knowledge to the utmost extent and to share its experience and exchange information as required with similar bodies in other countries.

There is no membership fee for joining ISONET. To become its national member, an ISO member should apply to the Secretary General of ISO for registration. ISONET rules governing membership, rights and obligations are set out in the document ISONET principles and procedures (.).Electronic links between information systems of ISONET members are provided via WSSN.

In many countries, the ISONET information centre and the WTO enquiry point are one and the same. Even when separate centres have been set up, ISONET members cooperate fully with the WTO enquiry points and make available to them full information about the existing standards and the various specialized instruments and techniques for information handling and vice-versa.

13.3.*World Standards Services Network (WSSN)*

WSSN is a network of publicly accessible World Wide Web servers of standards organizations around the world (URL: www.wssn.net). The objective of WSSN is to simplify access to international, regional and national standards information available through the Web. WSSN aims to:

- link the Web sites of members of WSSN and beyond, through links provided on the sites of WSSN members, into a comprehensive global network through which users can obtain the information they need about standards and related activities,

- provide a harmonized environment for users to navigate through.

The ISO document 'Guidelines for the development of WSSN Web sites'(.) provides an overview of WSSN together with guidelines for development and linking of WSSN web sites.

13.4.TBT Enquiry point

Each WTO member has in its country an enquiry point capable of answering enquiries about the standards, technical regulations and certification systems in force in that country.

In most countries this enquiry point is set up within the NSB. The appropriate section for location of the TBT enquiry point within the NSB is the library and documentation section.

The functions of the TBT enquiry point are :

- Monitoring and downloading of notifications issued by other WTO members countries,

- Distribution of the relevant notifications together with clarifications, if necessary, to related technical institutions,

- Review together with relevant local agencies of notifications that is likely to affect the country's trade,

- Informing WTO secretariat of standards and technical regulations that will come into force in the country ().

- Dissemination of TBT requirements among stake holders in the country.

13.5.Publicity and public relations

Another important unit needed is a publicity and public relations unit. Since standardization is an unfamiliar concept, it is important that the NSB should provide the public with information on the essence of standardization principles and methodology. The importance of standardization for the industrial and economic development of the country should also be disseminated.

.Standardization has to be sold not only to the general public but also to the government and industry. Such selling would take various educational forms ,such as lectures, seminars, articles in local newspapers and press releases. Radio and television programs would be an invaluable contribution to this educational effort.

13.6.International relations

Relations with international standards bodies are important for the development of national standards activities as well as to represent the interests of the country at the international standards formulation process. The NSB should obtain the membership of the International Organisation for Standardization (ISO) and if finances permit the membership of the International Electrotechnical Commission (IEC) (See Chapter .. for details).

ISO membership enables the NSB to become a member of the international standards community and relations with foreign national standards bodies are established automatically. Exchange of new standards publications would be an essential part of this relationship. This is very helpful to build the standards library of the NSB.

In the field of metrology it is advantageous to obtain the membership (Full or Correspondent) of the International Organisation of Legal Metrology (OIML), particularly if the NSB is carrying out legal metrology activities.

Establishment of relations with other international agencies such as those of the UN family is also advantageous. Especially the United Nations Industrial Development Organisation (UNIDO) and the United Nations Development Programme (UNDP) are active in the standardization field for provision of technical assistance.

Above all the NSB should establish good relationships with national organisations such as universities, research institutes, chambers of commerce and industry and consumer groups and organisations.

An international relations unit needs to be established to carry out the above activities. In addition, this unit should also collect and collate the NSB and industry comments on draft regional and international standards especially on products relevant to the country. Work at regional and international levels can have a direct impact on the country and its NSB must provide an up to date response by consulting the relevant industry and trade groups as well as the Governmental authorities. The unit will thus act as a coordinating and monitoring center for national, regional and international standardization.

The NSB should actively participate in as many regional standards activities as possible.

14. PHYSICAL INFRASTRUCTURE DEVELOPMENT

4.1. Income generation

The cost of establishment and operation of a NSB is considerable. By charging fees for the services provided, a reasonable percentage of the operational costs could be recovered.

Areas of revenue generation include the following:

- Sale of Standards and other publications -Sale of national, regional, international and foreign standards may generate income. The NSB should become the national sales agent for regional, international and foreign standards by signing agreements with the respective bodies.

- Product certification -The operation of a product certification scheme would generate income in the form of product certification fees.

- Systems certification- The operation of a systems certification schemes (ISO 9000, ISO 14000, HACCP) would generate considerable income in the form of certification fees. However, systems certification schemes also entail significant expenditure to maintain accreditation for the specific certifications.

- Training courses -The provision of training courses on standardization, quality assurance, metrology and related subjects is another avenue for generation of revenue.
- Testing services -Provision of testing services to industry from the NSB's laboratories can bring in considerable income.

- Industrial calibration service -Provision of industrial calibration services such as calibration of laboratory balances, sets of weights, temperature indicators, pressure gauges and laboratory instruments can generate considerable income.

- Legal metrology service -Verification and stamping of weights and measures equipment used in trade is a statutory obligation on the part of the user. A significant amount of revenue could be generated under this operation. A realistic scale of fees should be fixed and indicated as a schedule to the, Measurement Regulations. .

- Consultancy work -Once developed, consultancy work could bring in a substantial amount of revenue. The scale of fees would depend on the nature of the consultancy work. Fees should be fixed so as to be competitive with other national agencies providing similar services. The fee should recover all the costs the NSB may incur, including salaries of staff assigned for the work.

- Documentation and Information service -It is possible to generate income through the provision of documentation and information services. Although this is a difficult area in developing countries since information is generally available free of charge. Usually packaged technical information which in many cases can be gathered from standards and technical regulations can be sold.

14.1. Physical infrastructure development

A National Standards Body would naturally depend on Government support for a large component of its operational expenditure. This is usually provided in the national budget, in the form of recurrent and development budgets.

The recurrent budget usually includes staff salaries and other running expenditure. The capital budget provides for capital development projects such as purchase of land, construction of buildings and purchase of capital equipment including motor vehicles.
Generally it is difficult to obtain funds for capital development projects and particularly in the short term. The chances of obtaining funds from the national budget for capital development projects are much improved if the expenditure is spread over a number of years. Generally a period of three to five years depending on the circumstances of the individual country is suitable.

Planning authorities of national Governments are more disposed to provide funds, if the utilisation of the funds is indicated in a project plan. The project plan should provide a detailed programme of activities of the capital development project, together with a statement of anticipated cash flow over the period of the project.

4.2.Technical assistance from UNIDO

The following technical assistance is available from UNIDO:

a) Technical advice on initiation and development of national standardization activities including specific advice on legislation and organisational structure for establishment of NSB ;

b) Formulation of Project Documents including recommended equipment for test and metrology laboratories and staff training requirements.

c) Training of technical personnel in the fields of standardization, quality assurance, metrology and documentation & information systems.

d) Logistic support in the form of technical guides, documentation and basic computer equipment.

e)

14.2. Assistance from other international organisations

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Financial and technical assistance, particularly for establishment and development of test and metrology laboratories are available from funds allocated to the country programme of the UNDP. Allocation of these funds to various projects is done by the national Government. Therefore, application for utilisation of UNDP funds has to be made to the planning authority of the national Government through the appropriate Government ministry.

It is necessary to submit a Project Document in the format specified 'by the UNDP or the executing agency. Details of the project document format and sources of funding are available from the office of the UNDP Resident Representative.

Other, UN agencies from which assistance is available are United Nations Educational, Scientific and Cultural Organisation (UNESCO) for development of documentation and

information services and International Trade Centre (ITC) for projects related to export products and standards.

Assistance is also available from regional political groups such EU, ASEAN, SADAC, SAARC and others.

14.3. Bilateral assistance

It is possible to obtain funding and technical assistance from a number of donor Governments and agencies usually for long term development projects such as setting up of test and metrology laboratories.

These are normally worked out on a Government lo Government basis, and proposals should be made to the planning authorities of the respective Governments. In making a proposal it is necessary to outline the salient features of the project, including the approximate cost, duration and the benefits that would accrue to the country. A detailed project plan is needed once donors have been identified.

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29. ISO/IEC Guide 66 :1999, General Requirements for Bodies Operating Assessment and Certification/registration of Environmental Management Systems (EMS)

ISO development manuals

30. Development Manual 1, Establishment and management of a national standards body
31. Development Manual 2, Operation of a certification system
32. Development Manual 3,Training of technical staff - national level and company level
33. Development Manual 4 ,Teaching of standardization in institutions of higher learning in developing countries
34. Development Manual 5, Development and organization of a company standard department
35. Development Manual 6, Application of standards
36. Development Manual 7, Participation in international standardization
37. Development Manual 8, Organization and development of a national standards information centre

APPENDIX 1- WTO/TBT CODE OF GOOD PRACTICE FOR THE PREPARATION, ADOPTION AND APPLICATION OF STANDARDS

General Provisions

A. For the purposes of this Code the definitions in Annex 1 of this Agreement shall apply.

B. This Code is open to acceptance by any standardizing body within the territory of a Member of the WTO, whether a central government body, a local government body, or a non governmental body; to any governmental regional standardizing body one or more members of which are Members of the WTO; and to any non-governmental regional standardizing body one or more members of which are situated within the territory of a Member of the WTO (referred to in this Code collectively as "standardizing bodies" and individually as "the standardizing body").

C. Standardizing bodies that have accepted or withdrawn from this Code shall notify this fact to the ISO/IEC Information Centre in Geneva. The notification shall include the name and address of the body concerned and the scope of its current and expected standardization activities. The notification may be sent either directly to the ISO/IEC Information Centre, or through the national member body of ISO/IEC or, preferably, through the relevant national member or international affiliate of ISONET, as appropriate.

SUBSTANTIVE PROVISIONS

D. In respect of standards, the standardizing body shall accord treatment to products originating in the territory of any other Member of the WTO no less favourable than that accorded to like products of national origin and to like products originating in any other country.

E. The standardizing body shall ensure that standards are not prepared, adopted or applied with a view to, or with the effect of, creating unnecessary obstacles to international trade.

F. Where international standards exist or their completion is imminent, the standardizing body shall use them, or the relevant parts of them, as a basis for the standards it develops, except where such international standards or relevant parts would be ineffective or inappropriate, for instance, because of an insufficient level of protection or fundamental climatic or geographical factors or fundamental technological problems.

G. With a view to harmonizing standards on as wide a basis as possible, the standardizing body shall, in an appropriate way, play a full part, within the limits of its resources, in the preparation by relevant international standardizing bodies of international standards regarding subject matter for which it either has adopted, or expects to adopt, standards. For standardizing bodies within the territory of a Member, participation in a particular international standardization activity shall, whenever possible, take place through one delegation representing all standardizing bodies in the territory that have adopted, or expect to adopt, standards for the subject matter to which the international standardization activity relates.

H. The standardizing body within the territory of a Member shall make every effort to avoid duplication of, or overlap with, the work of other standardizing bodies in the national territory or with the work of relevant international or regional standardizing bodies. They shall also make every effort to achieve a national consensus on the standards they develop. Likewise the regional standardizing body shall make every effort to avoid duplication of, or overlap with, the work of relevant international standardizing bodies.

I. Wherever appropriate, the standardizing body shall specify standards based on product requirements in terms of performance rather than design or descriptive characteristics.

J. At least once every six months, the standardizing body shall publish a work programme containing its name and address, the standards it is currently preparing and the standards which it has adopted in the preceding period. A standard is under preparation from the moment a decision has been taken to develop a standard until that standard has been adopted. The titles of specific draft standards shall, upon request, be provided in English, French or Spanish. A notice of the existence of the work programme shall be published in a national or, as the case may be, regional publication of standardization activities.

The work programme shall for each standard indicate, in accordance with any ISONET rules, the classification relevant to the subject matter, the stage attained in the standard's development, and the references of any international standards taken as a basis. No later than at the time of publication of its work programme, the standardizing body shall notify the existence thereof to the ISO/IEC Information Centre in Geneva.

The notification shall contain the name and address of the standardizing body, the name and issue of the publication in which the work programme is published, the period to which the work programme applies, its price (if any), and how and where it can be obtained. The notification may be sent directly to the ISO/IEC Information Centre, or, preferably, through the relevant national member or international affiliate of ISONET, as appropriate.

K. The national member of ISO/IEC shall make every effort to become a member of ISONET or to appoint another body to become a member as well as to acquire the most advanced membership type possible for the ISONET member. Other standardizing bodies shall make every effort to associate themselves with the ISONET member.

L. Before adopting a standard, the standardizing body shall allow a period of at least 60 days for the submission of comments on the draft standard by interested parties within the territory of a Member of the WTO. This period may, however, be shortened in cases where urgent problems of safety, health or environment arise or threaten to arise. No later than at the start of the comment period, the standardizing body shall publish a notice announcing the period for commenting in the publication referred to in paragraph J. Such notification shall include, as far as practicable, whether the draft standard deviates from relevant international standards.

M. On the request of any interested party within the territory of a Member of the WTO, the standardizing body shall promptly provide, or arrange to provide, a copy of a draft standard which it has submitted for comments. Any fees charged

for this service shall, apart from the real cost of delivery, be the same for foreign and domestic parties.

N. The standardizing body shall take into account, in the further processing of the standard, the comments received during the period for commenting. Comments received through standardizing bodies that have accepted this Code of Good Practice shall, if so requested, be replied to as promptly as possible. The reply shall include an explanation why a deviation from relevant international standards is necessary.

O. Once the standard has been adopted, it shall be promptly published.

P. On the request of any interested party within the territory of a Member of the WTO, the standardizing body shall promptly provide, or arrange to provide, a copy of its most recent work programme or of a standard which it produced. Any fees charged for this service shall, apart from the real cost of delivery, be the same for foreign and domestic parties.

Q. The standardizing body shall afford sympathetic consideration to, and adequate opportunity for, consultation regarding representations with respect to the operation of this Code presented by standardizing bodies that have accepted this Code of Good Practice. It shall make an objective effort to solve any complaints.