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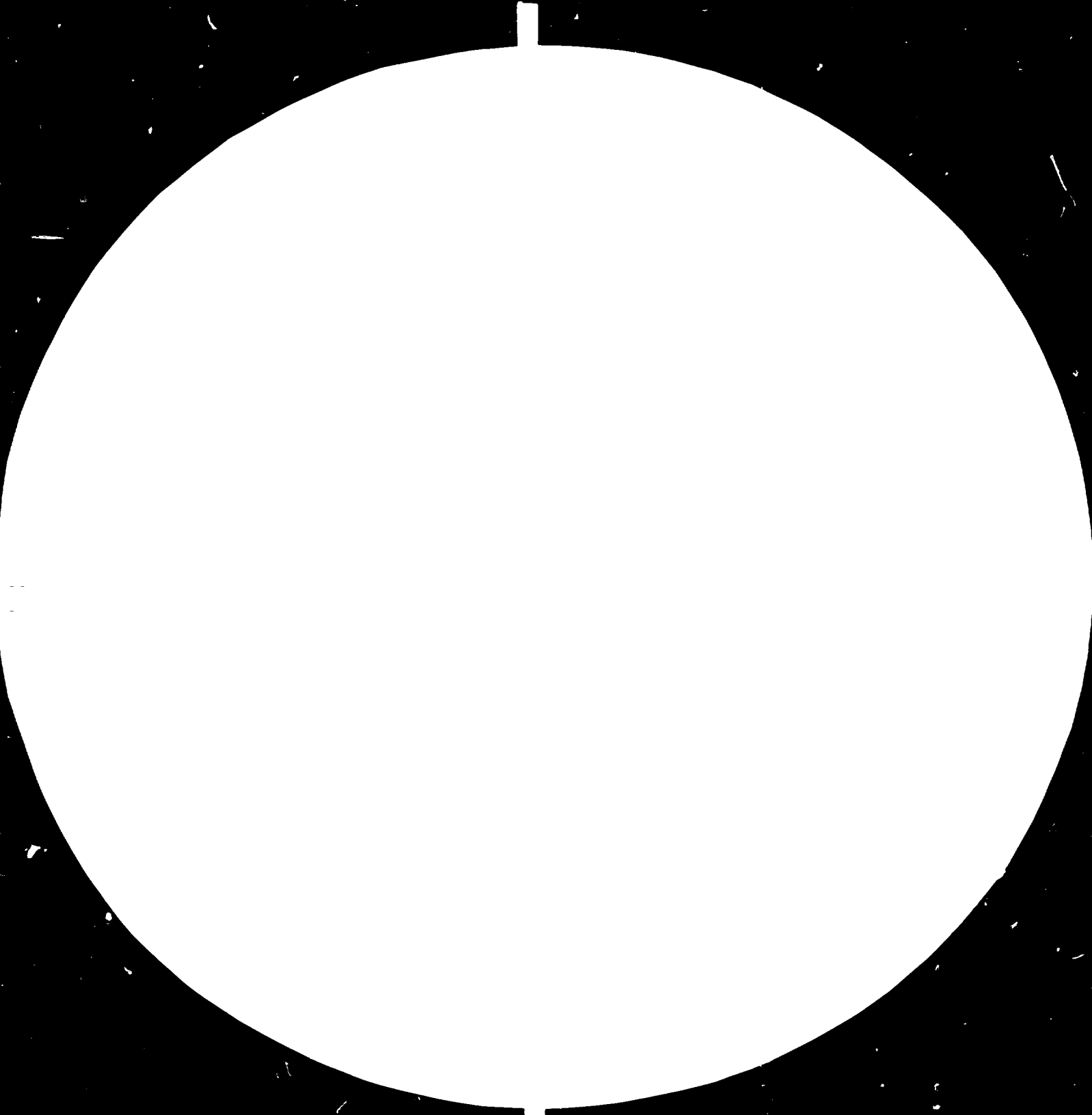

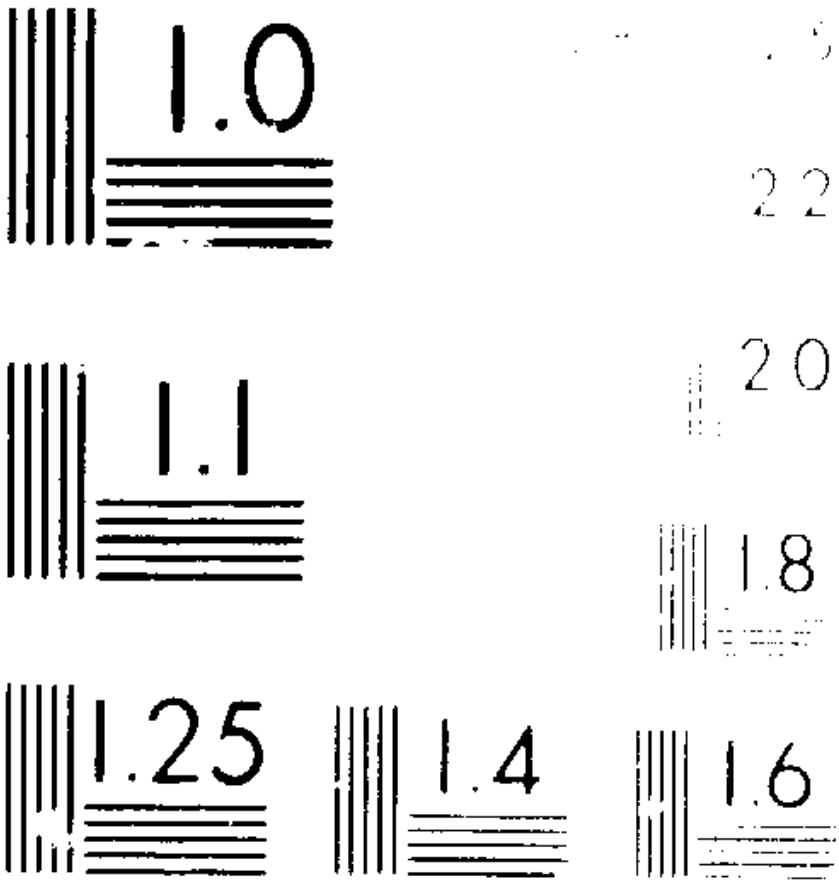
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Malawi. ASSESSMENT OF PRESENT STATUS AND NEEDS OF STANDARDIZATION AND RELATED ACTIVITIES

RP/MLW/80/003/A/31.3.K 11-01

MALAWI

TERMINAL REPORT

Prepared for the Government of Malawi

by

Dr. Ahmad Geneidy

UNIDO Consultant, Standardization, Certification and Quality Control

"This report has not been cleared with the United Nations Industrial Development Organization which does not, therefore, necessarily share the views presented."

Baghdad, Iraq

C O N T E N T S

CONTENTS

A N N E X E S

ABREVIATIONS

ACT	The MBS Act
AD	Assize Division
ANSI	American National Standards Institute
ARSO	African Regional Organization for Standardization
ASTM	American Society for Testing and Materials
BSI	British Standards Institution
BT	Blantyre, Malawi
CAC	Codex Alimentarius Commission
CCS	Central Committee for Standardization
CP	Code of Practice
GDP	Gross Domestic Product
ISO	International Organization for Standardization
LL	Lilongwe, Capital of Malawi
MBS	Malawi Bureau of Standards
MK	Malawian Kwacha (1 US$ = 0.9 MK)
MSB	Malawi Standards Board
MTI	Ministry of Trade and Industry
NSB	National Standards Body
QC	Quality Control
SABS	South Africa Bureau of Standards
TC	Technical Committee
UPVC	Unplasticized Polyvinyl Chloride

SUMMARY

In recognition of the importance of standardization and quality control as effective tools for the administration and improvement of the national economy, the Government of Malawi requested UNIDO to assist in assessing the present situation and identifying the means for the strengthening of these activities. In response to this request, UNIDO assigned the present Consultant in September/October 1981.

The critical study of the Consultant revealed that -although the MBS has exploited to the maximum possible all of the resources put under its disposal, and has even made some significant achievements (e.g. in the very successful control of Malawi's first commodity: tobacco) - yet one cannot overlook the fact that, after nine years since its establishment in 1972, it could not meet the ever-growing needs of the national economy in general and the industrial sector in particular. This is clearly demonstrated by the following analysis of its four main fields of activity:

1. Standards writing: The number of standards issued (published and unpublished) does not exceed 15 (i.e. 1.7 standards/year) at a time when the country needs tens of standards every year.

2. Testing: Apart from facilities for testing some, but not all - quality parameters of food and some chemical products, there are no facilities for testing even the locally produced paints and varnishes, packaging materials, plastics, leather and leather products, building materials, textiles, metallic goods, etc. To make things worse, the overwhelming majority of such facilities are not available elsewhere in Malawi.

3. Certification Marking: In this field, which is extremely important to the country at large as an effective means to protect the consumers and to persuade manufacturers to adopt Malawi Standards, the MBS was unable to grant the mark to more than two producers. Even in these two cases, the critical testing is carried out abroad which - in addition to being costly and thus discouraging manufacturers to apply for the mark - is a lengthy process which may render the quality control not only meaningless, but also hazardous.

4. Industrial Metrology: This field - although being one of the main duties of the MBS - has not yet been approached at all.

The failure of the MBS to support the economic development of Malawi is simply due to its meagre resources. Consequently, in order to enable it to play its due role, it is necessary to strengthen it through:

1. Consolidating the machinery and mechanism of the elaboration of Malawi Standards.

2. Expanding its testing capabilities by providing facilities for the quality testing of various materials and goods.

3. Setting up a sound national certification marking system.

4. Initiating calibration services.

5. Training and up-grading its staff.

To be effective, such strengthening should be provided at both levels: national and international.

At the national level, strengthening should take the form of a substantial increase in the MBS staff, especially the scientific and technical personnel, during the coming three years.

At the international level, strengthening should take the form of:

1. Provision of international expertise (33 man-month)

2. training and upgrading abroad of 17 MBS staff members (34 man-months)

3. supply of testing equipment (K 200,000 i.e. $ 220,000)

To this end, the Consultant designed a project tailored to the specific needs of the MBS, as revealed through his mission, and formulated the relevant project document.

Parallel with the Project, the Consultant presented many practical and detailed recommendations with a view to enhance the rationalization and effectiveness of the national standardization system. These recommendations are meant to assist the MBS Director in his efforts to improve and streamline its operation.

It is hoped that the implementation of the Project and other recommendations will put the MBS in a position where it could play its rightful role in supporting the industrial development and improving the national economy of Malawi.

INTRODUCTION

The Government of Malawi approached UNIDO to recruit a consultant in order to assist in assessing the present situation of standardization and quality control and to recommend the measures for the strengthening of their infrastructure. To this end, UNIDO assigned the present Consultant to carry out a 1-month mission in Malawi. The relevant Job Description is reproduced as Annex I.

The Consultant was detailed from his post as Project Manager of a UNIDO project in Iraq on 20th September 1981, was briefed in UNIDO Headquarters in Vienna on 22nd and 23rd and arrived inMalawi on 26th September. He was attached to the Malawi Bureau of Standards (MBS), his counterpart being its Director whose particulars are shown in Annex II.

During his mission, the Consultant paid many technical visits to Government departments, research institutes, industrial enterprises and other bodies (Annex III), studied numerous documents, had useful discussions with many interested persons and finally held several round-up meetings with the concerned authorities to brief them of his conslusions and ascertain their views to his recommendations (Annex IV). On 21st October 1981, he left Malawi for debriefing in Vienna.

Due to the tight and lengthy programme the Consultant carried out in Malawi, the present Report has been prepared in his duty station: Baghdad. It summarizes his activities, findings and recommendations.

MISSION OBJECTIVES AND WORK PROGRAMME

A. MISSION OBJECTIVES

As mentioned in the Job Description (Annex I), the main objectives of the present mission are:

- to identify the needs of the Malawi Bureau of Standards (MBS)
- to prepare a project proposal reflecting these needs.

B. WORK PROGRAMME

In the light of the mission objectives and duties as expressed in the Job Description, the Consultant established the following work programme:

1. Study of the Government structure with special reference to the Ministry of Trade and Industry (MTI).

2. Study of the economic system, its various sectors and their contributions to the national economy.

3. Study of the industrial sector; its composition, nature, importance, present status and future trends.

4. Study of standardization activities in Malawi:

   a. Malawi Bureau of Standards (MBS)

      - Legislation
      - Regulations
      - Objects
      - Malawi Standards Board (MSB)
      - Organizational structure
      - Staff: number, qualifications and present and future needs.
      - Finance

- Premises
- Standards Information and Documentation
- Elaboration of national standards
- Testing
- Certification marking
- Export inspection
- Import control
- Metrology
- Regional and international activities

b. Assize Division, MTI

- Legislation and regulations
- Premises and facilities
- Activities
- Staff

c. Metrication Board

d. Malawi Electrical Calibration Centre.

5. Technical visits to the following bodies:

a. Research Institutes and Testing Laboratories

- National Research Council
- Tea Research Foundation, Mulanje (LL)
- Bvumbwe Agricultural Research Station (BT)
- Materials laboratory (LL)

b. Industrial Enterprises

- ADMARC Canning Factory Mulanje
- Southern Bottlers (soft drinks) (BT)
- David Whiteherad and Sons (Textiles) (BT)
- Portland Cement Co. (BT)
- Tiles Ceramic Co. (BT)
- Pipe Extruders (LL)
- Packaging Industries (BT)

e. Other Personalities and Bodies

- Principal Secretary, MTI (LL)
- Chairman, MSB (LL)
- Tobacco Control Commission (TCC) (BT)
- Export Promotion Council (BT)
- Electricity Supply Commission (ESCOM) (BT)
- Dept. of Statutory Bodies, Office of President and Cabinet (OPC) (LL)
- Development Division, OPC (LL)
- Treasury (External Aid) Section, Ministry of Finance (LL)

6. Study of the food control activities in Malawi.

7. Preparation of a preliminary report on the needs of the MBS and the importance of giving priority to its strengthening.

FINDINGS

A. INTRODUCTION

Standardization is a universal discipline that is applied beneficially to all domains of human activity where it creates order, simplicity, economies in all resources, in addition to the protection of life and health. It is regarded as an important tool for the administration of the national economy in general and the industrial development in particular.

It was, therefore, deemed necessary - before tackling the main core of the present mission, i.e., the standardization activities in Malawi - to conduct a brief preliminary study of the various sectors of the national economy with special reference to the industrial sector.

After studying and assessing the various aspects of the Malawi Bureau of Standards (MBS) in some details, the other standardization bodies will be dealt with. Finally, the specific topics mentioned in the Job Description namely "testing facilities" and "food quality control" will be treated.

The present chapter of the Report deals with the findings and some recommendations related to the above subjects in the order mentioned before. This, in fact, follows the same sequence of the Work Programme.

B. THE REPUBLIC OF MALAWI

Malawi is a landlocked country in East Central Africa lying entirely within the tropics. The total surface area is 118,484 sq.km. of which more than 24,000 sq.km. are taken up by Lake Malawi and other smaller lakes. The last census of 1977 gave a population of 5.9 million.

Malawi won its independence on 6th July 1964, and exactly two years later, Malawi became a Republic within the Commonwealth.

The new capital is Lilongwe (110,000) in the Central Region, while Blantyre City (250,000), where the MBS is seated, is the largest commercial and industrial city in Malawi. It is the main Centre of the Southern Region.

There are presently 16 ministries; with special importance to standardization activities are the Ministries of Trade and Industry, Health, Agriculture and Works and Supplies. The Ministry of Trade and Industry is responsible for practical encouragement, development and regulations of Malawi's external and internal trade as well as industrial development. It comprises the Trade Division, the Industrial Development Division, the Cooperative Audit Section, the Government Loans Board and the Assize Division. It also has statutory responsibility for the Electricity Supply Commission of Malawi (ESCOM), the Malawi Export Promotion Council (MEPC) and the Bureau of Stands ds Board.

Over 90% of the active population is engaged in agriculture. The Gross Domestic Product (GDP) per head in 1980 was estimated to be Kwacha 160 (US$ 178) at current prices.

With agricultural resources being predominant, Malawi's economy is essentially based on the agricutural sector. However, a good deal of interest has been given to promote industrial development.

The Government's objectives have always been to make the country self-sufficient in staple food, expanding exports of primary products and generating new exports of manufactured agroindustrial products. The promotion of exports increases earnings of foreign exchange needed to buy imports, especially capital goods required for the development of infrastructure and industries.

Previously, the Government operated a Three-Year "Rolling" Development Programme. The Government's first Five-Year Development Plan (1981/82 - 1985/86) was presented in the National Assembly on 20th March 1981.

The major objectives of the Five-Year Plan are to restore the economy's internal and external balance. On the external front, the intention is to reduce the volume of imports and boost the volume of exports through diversifying away from the present major exports (tobacco, tea, etc...) into other crops and agro-industrial exports.

A clear view of the national economy of Malawi can be obtained from Tables 1-3. Table 1 shows the "Percentage Share in GDP Originating from the Various Sectors", Table 2 indicates the "Growth Rates of GDP and Selected Sectors", while Table 3 illustrates the "Percent Shares in Total Domestic Exports of Goods".

Table 1 - Percentage Share in GDP Originating from the Various Sectors

	1965	1975	1980	1985
Agriculture (including sugar)	51.4	45.0	42.6	42.2
Manufacturing	9.5	12.8	12.9	14.8
Distribution	8.5	12.2	12.9	13.3
Public Administration	12.5	11.1	12.0	11.5
Building	3.8	5.0	5.1	4.3
Electricity and Water	0.7	1.4	1.6	1.9
All others (transport + banking + real estate)	7.6	12.5	12.9	12.0
Total	100.0	100.0	100.0	100.0

Source: Economic Planning Division
Malawi Statistical Yearbook 1975, 1976, 1979,
National Statistical Office (NSO)

Table 2 - Growth Rates of GDP and Selected Section

	Growth Rate (% per year) 1979/86
Agriculture (including sugar)	3.8
Manufacturing	7.4
Public Administration	3.6
Building	1.2
Electricity and Water	9.7
Others	Not available
Overall GDP	4.4

Source: Economic Planning Division

Table 3 - Percent Shares in Total Domestic Exports of Goods

	1965	1975	1980	1985
Tobacco	38.0	48.1	46.6	51.0
Tea	27.7	20.4	13.4	9.7
Sugar	-	11.6	16.1	7.9
Groundnuts	12.2	6.1	7.0	9.0
Cotton	8.1	1.8	2.0	1.8
Rice	0.4	1.5	1.3	2.3
Pulses (beans, peas, etc.)	7.0	1.3	-	-
Manufacture (+ minor crops)	6.6	9.2	13.6	18.3
	100.0	100.0	100.0	100.0

Source: Malawi Statistical Yearbook 1975, 1979, Monthly Statistical Bulletin, March 1981. National Statistical Office (NSO).
Government Economic Report, 1981.

2. AGRICULTURE

The good arable land and the wide range of climatic conditions enable Malawi to grow both tropical and sub-tropical crops. They include maize, rice, cassava, millet, beans ,peas, groundnuts, cashew nuts, macadamia nuts, sugar cane, tea, cotton, tobacco, coffee, chillies, tung, sunflower, castor, gram, sorgham, sesame, wheat and a wide range of fruits and vegetables.

Maize is the main subsistence crop and covers some 80% of all cultivated land. Paddy rice production is increasing and is becoming a significant crop in the lakeshore area.

In 1980, the principal agricultural exports were in the following proportion by value:

Tobacco	52%
Tea	20%
Sugar	18%
Groundnuts	5%
Cotton	2,5%
Rice	1,5%
Total	100,0%

Except for small quantities of wheat for the manufacture of flour, Malawi does not import food grains. In fact, Malawi normally has a surplus of food grains (maize, rice and millet) and is an exporter of some. Maize is the staple food of the majority of Malawians but cassava is the subsitence crop and staple food in the lower lakeshore areas.

The agricultural sector's output has grown appreciably over the years in an effort to make the country self-sufficient in staple food as well as to increase earnings of foreign currency. However this sector's proportion of GDP has contracted over the years from 57.4% in 1965 to 45% in 1975 to the estimated figure of 42.2% in 1985. This gradual fall results from the more rapid growth of other sectors, rather than any absolute contraction in agriculture. The most obvious of these growing sectors are manufacturing and electricity and water supply (Table 1). Their growth (1980 - 85) offsets the contracting shares in public administration and building as well as in agriculture.(*)

3. MINERALS

Few proven mineral deposits of commercial value have been found. The only major mineral production is the quarrying of limestone for the manufacture of cement, the supply of which (e.g. 113,000 tonnes in 1979) adequately meets the domestic demand.

Around 20 other types of minerals have been confirmed present but none of them has so far been commercially exploited to any great extent.

(*) Economic Report, Malawi Government, 1981

Extensive bauxite deposits on Mulanje Mountain and coal deposits in the northern part of the country have been investigated with a view to their utilization. The coal deposits are to be developed, but the bauxite is not considered economical to exploit at the present time. Significant ceramic deposits have been found in the north. Investigations are continuing on various mineral deposits including sulphides, phosphates, kyanite, monazite and radioactive ores, glass sands and ceramic clays. The possibility of gas and oil being found under Lake Malawi is being considered.

4. INDUSTRY

Due to the importance of the industrial sector to the present mission, it will be dealt with, in some detail , in the following part of the Report.

D. THE INDUSTRIAL DEVELOPMENT IN MALAWI

The industrial sector in Malawi is largely concerned with the processing of agricultural commodities. There are several state-owned timber mills supplied by planted pine and eucalyptus forests. On the Viphya Plateau there are 70,000 hectares of pine forests which the Government plans to utilize partly for a small pulp and paper mill and possible for fuel and fertilizers.

Goods manufactured in Malawi are quite numerous and include: meat, dairy, grain mill, sweets, bakery products, edible oils, canned food, soft drinks, malt liquors, cigarettes and pipe tobacco, cattle cake, cleaning and toilet preparations, pharmaceuticals, stationery, packages, paints and varnishes, matches, fertilizers, cordage goods, cotton piece goods, ready made clothing, blankets, tents, shoes,UPVC pipes, sawn timber, furniture and wood products, venetian blinds, metal doors, frames and windows, agricultural implements, refrigerators, electrical appliances, cement, bricks and tiles.

Thus, the main industries in Malawi are food processing and brewing, textile and clothing and light engineering/metal fabrication. Small-scale brickmaking is one of the major non-agricultural industries in terms of people employed.

Much of the growth in output of the manufacturing sector, which is largely agro-based, mainly occured from 1964 - 1970, a period when most of the import substitution industries sprung up. During that period, the share of this sector in the GDP rose rapidly. A good number of such industries have expanded their capacities not only to adequately supply the domestic market, but also to export part of their output.

The industrial sector includes about 100 manufacturing companies each having greater than Kwach 100,000 (US$ 111,000) annual value added, and another 100 companies with between Kwacha 10,000 and 100,000 (US$ 11,000 and 111,000) annual value added.

A general knowledge of the industrial sector could be obtained from the fact that the capital costs of projects given licences (excluding tobacco and tea processing) during the period 1967 to 1979 amount to Kwacha 88.1 million (US$ 97.9 million) distributed as follows:

	Million Kwacha	Million $
Food products and bevages	63.3	70.3
Agricultural implements	5.8	6.4
Chemicals	3.5	4.0
Motor assembly and parts	3.5	4.0
Timber and furniture	3.0	3.3
Clothing and Textiles	2.9	3.2
Plastics	2.1	2.3
Paper products	0.6	0.7
Electrical	0.4	0.4
Miscellaneous	3.0	3.3
Total	88.1	97.9

Some of the potential projects proposed for the period 1981-85 (1980 prices) are as follows:

	Million Kwacha	Million $
Fertilizers	56.2	62.5
Ethanol	3.0	3.3

Cont.	Cont.	
	Million Kwacha	Million $
Polypropylene bags	2.4	2.7
Vegetable oils by solvent extraction	2.4	2.7
Sawmill expansion	2.2	2.4
Tannery	1.6	1.8
Used oil refinery	1.3	1.4
	69.1	76.8

Other significant potential projects (1981 - 85) include:

Expansion of natural rubber output
Dairy expansion
Plastic products expansion
Ceramics and glass
Cement expansion
New foundry
Rolled steel products
Particle-board or fibre-board
Textile expansion

Tables 1 - 3 above show very clearly the important place the industrial sector occupies among the various sectors of the national economy of Malawi. The importance of this sector could be further appreciated by the following facts:

a. While monetary manufacturing, has historically accounted for only about 15% of monetary GDP and 12% if subsistence sectors are included(*) it must also be noted that it is equivalent to fully two-thirds of the monetary sector of agriculture, forestry and fishing. Although this drops to about 28% if estimates for non-monetary agriculture are included, manufacturing is nevertheless an important sector. It provides about 35,000 jobs which is 10% of the total domestic wage employment.

(*) National Accounts Extracts.

b. The net output in 1980 is as follows (*):

Agriculture	K 84,000,000
Industry	K 60,000,000
	K 144,000,000

c. The Gross Fixed Capital Formation (GFCF) for the two sectors is estimated as follows. (**)

	1981-1985	1986-1990
Agriculture	K 120,000,000	K 150,000,000
Industry	K 240,000,000	K 290,000,000
	K 360,000,000	K 440,000,000

CONCLUSION

In the light of the above tables and discussion, it follows that - among the various sectors of the national economy of Malawi - the industrial sector ranks the second being preceded only by the agricultural sector. Some important indices are:

a. The share of manufacturing in the GDP has increased - and will increase- steadily (1965 - 1985), while that of agriculture has shown - and will show - the opposite trend.

b. The share of manufacturing in domestic exports has also increased steadily since 1965. In 1985, it will contribute by 18% to total exports.

c. The monetary manufacturing is equivalent to fully two-thirds of the monetary sector of agriculture, forestry and fishing.

d. The Gross Fixed Capital Formation (GFCF) of the manufacturing sector at the end of the present decade (1981-1990) will be double that of the agricultural sector being K 530,000,000 against K 270,000,000.

(*) Industrial Development Programme Guidelines, by Dr. M. Oksal and Mr. D. Edwards, UNDP/UNIDO.

(**) Project Team, May 1980

e. Excluding the growth rate 1979/86 of the very small sector of electricity and water (1.7% of GDP), the manufacturing sector shows the highest rate (7.4% per year) and equals double that of the agricultural sector (3.8% per year).

It should be emphasized here that in all of the above data, the manufacture of sugar was included in the agricultural sector rather that in the manufacturing one. If added to the latter, as it should be, then the actual importance of manufacturing will be much more appreciated. For example, in Table 1, the real share of the agricultural sector in the GDP in 1985 will be 38.1% and not 42.2% while that of manufacturing will be 18.9% and not 14.8%. Similarly, the share of manufacturing in domestic exports in 1985 will be 26% and not 18%. This means that while the manufacturing sector will still be the second sector contributing to the GDP, its actual importance to the national economy is much more than is deemed.

It follows, therefore, that the industrial sector plays and important role in the national economy and that this role will be growing steadily in the future. A sector of such an increasing importance should, therefore, be provided with adequate institutions to furnish the service infrasturcture so essential to its healthy growth. In other words, the strengthening of the industrial sector in Malawi, should be accompanied by strengthening of these institutions. The national standards body is one of the most important of such institutions.

E. THE NATIONAL STANDARDS BODY: THA MALAWI BUREAU OF STANDARDS (MBS)

1. INTRODUCTION

Following the rapid growth of industry in Malawi since independence, it was decide to establish the Malawi Bureau of Standards (MBS) through the Malawi Bureau of Standards Act which was passed on 22nd December 1972. At that time, standards which were in force in Malawi largely depended upon the contacts a particular industry had with those in other countries. Generally, British Standards, South African Standards and Central African Standards (CAS) were commonly used. The latter were the standards developed under the defunct Federation of Rhodesia and (the then) Nyassaland. Most of the standards used were in the fields of construction and building industries and other allied fields.

The Bureau was officially opened on 6th December 1974. However it became operational in June 1973 when it set up a fully operational laboratory for the quality assessment of all the Malawi tobacco sold at the Tobacco Auction Floors for export.

2. LEGISLATION

On 22nd December 1972, an Act (Cap. 51.02) was issued"to establish the Malawi Bureau of Standards and the Malawi Standards Board, to provide for the incorporation of the Malawi Standards Board as a body corporate; to vest the management and control of the Malawi Bureau of Standards and the Malawi Standards Board, to promote standardization of commodities and of the manufacture, production, processing or treatment thereof, and further to provide for matters incidental to, or connected with, the foregoing."

The Act contains six parts:

PART I: Preliminary (definitions of terms used)
PART II: The Malawi Bureau of Standards
PART III: Malawi Standards Board, its Powers, Functions, etc.
PART IV: Standardization Marks, etc.
PART V: Inspectors, their Appointment, Powers, etc.
PART VI: General (Offences, Regulations, etc.)

In the Consultant'a opinion, the Act is quite comprehensive in sufficient detail and is very pertinent.

3. REGULATIONS

The Act authorizes the Minister of Trade and Industry to "make regulations for the better carrying out" of the Act. (Section 30).

According to this Article, the following regulations have been issued:

a. Government Notice Nr. 138 (on 10th Oct. 1973)
THE MALAWI BUREAU OF STANDARDS (STANDARDIZATION MARKS) REGULATIONS, 1973.

b. Government Notice Nr. 87
THE MALAWI BUREAU OF STANDARDS (STANDARDIZATION MARKS) (AMENDMENT) REGULATIONS, 1979.

This amendment deals with the permit fee, marking fee and inspection fee.

At present, a well prepared "Draft Rules and Procedures Governing Technical Activities of the Malawi Bureau of Standards" is under consideration.

4. OBJECTS OF THE MBS

Section 4 of the Act states the objects of the Bureau as follows:

a. to promote standardization in industry and commerce;
b. to prepare, frame, modify or amend specifications and codes of practice;
c. to recommend the adoption in whole or in part, with or without amendment, of any specification or code of practice;
d. to make arrangements or provide facilities for the testing and calibration of precision instruments, gauges and scientific apparatus, for the determination of their degree of accuracy by comparison with standards, approved by the Minister on the recommendation of the Board, and for the issue of certificates in regard thereto;
e. to make arrangements or provide facilities for the examination and testing of commodities and any material or substance from or with which they may be manufactured, produced, processed or treated, and of the manner in which this may be done;
f. to control, in accordance with the provision of this Act, the use of standardization marks and distinctive marks;
g. to encourage or undertake educational work in connexion with standardization;

h. to provide for co-operation with any person, association or organization outside Malawi having objects similar to those of the Bureau;
i. to assist any Ministry, Government Department, local authority, other public authority or any statutory corporation in the preparation and framing of any specifications or codes of practice required by it;
j. to provide for co-operation with the representatives of any branch of Industry, Ministry, Government Department, local authority, other public authority or any statutory corporation or with any person with a view to bringing about standardization in connection with commodities;
k. to frame, amend or substitute draft building regulations for the benefit of local authorities;
l. to provide for the testing of locally manufactured or imported commodities with a view to determining whether such commodities comply with the provisions of the Merchandise Marks Act or any other law relating to standards of quality.

It is gratifying that the Act rightfully provides a systems approach to standardization. The MBS is almost an integrated body in the sense of dealing not only with standards as such but also with the overwhelming majority of all other related activities such as inspection, testing, certification marking, industrial metrology, education, training, technical information, consultancy services and regional, multi-national and international liaison and participation.

5. THE MALAWI STANDARDS BOARD (MSB)

The MBS is managed and controlled by the Malawi Standards Board which, according to the amended Section (7) of the Act, consists of nine members as follows:

"a. one member appointed by the Minister (of Industry and Trade) and designated by him as Chairman of the Board;
b. one member appointed by the Minister and designated by him as Vice-Chairman of the Board;

c. three other members (who shall be persons with special knowledge or experience of matters relating to the objects of the Bureau) appointed by the Minister; and
d. four other members appointed by the Minister."

Originally, the Board was to be composed of five members only, then Section (7) was amended in 1977 to increase the membership from five to nine.(*) This is, in fact, a very opposite amendment since standardization is a universal discipline that is involved in all human activities. Consequently, as many of the most related bodies as is practically feasible, should be represented on the board which is responsible for national standardization activities.

Although the bodies to be represented on the Board are not specified in the Act, yet, in actual practice, care is extremely exercised to ensure the representation of the most relevant bodies on the Board. Thus, at present, Board members represent the following bodies:

1. Ministry of Works and Supplies
2. The University of Malawi
3. Electricity Supply Commission of Malawi (ESCOM)
4. Ministry of Health
5. Malawi Bureau of Standards
6. Consultants and Contractors Registration Board

In addition, the following three bodies are ex-officio members:

1. Ministry of Trade and Industry
2. Ministry of Finance
3. Controller of Statutory Bodies

It is thus seen that the Board is very well composed. However, since Malawi's economy is mainly agricultural and will remain as such for at least some decades to come, and since the Chamber of Commerce and Industry of Malawi represents the commercial and industrial communities, it is recommended that the MBS would consider the representation of these two bodies on the Board.

(*) On passing by, it might be pertinent to mention here that in amending Section "7", Section 12(5) - fixing the quorum by three members - was not correspondingly amended. It is, therefore, recommended to amend the present text of Section 12(5) to increase the quorum from 3 to 5.

6. ORGANIZATIONAL STRUCTURE

The planned organizational structure shows the MBS to be composed of:

a. Director
b. Deputy Director
c. Four Assistant Directors heading the four divisions:

- Standards
- Technical Services
- Liaison
- Common Services

The Organizational Chart is shown in Annex V, but most of the posts are vacant. The total number of the MBS staff amounts to 32 (Annex VI)

7. STAFF

The MBS is directed by Dr. F.M. Banda. Being the Consultant's counterpart, the particulars of Dr. Banda are given in Annex II which shows very clearly his academic qualifications as well as his scientific background and experience. Dr. Banda is quite knowledgeable in the various aspects connected with standardization. Besides, he has good managerial capabilities and possesses a pleasant personality. In addition to his national activities, Dr. Banda is quite active at the regional and international levels; at present he is the President of the African Regional Organization for Standardization (ARSO).

It is the strong conviction of the Consultant that, if given the necessary facilities and resources, the Bureau will be certainly able to make a remarkable breakthrough under the directorship of Dr. Banda and the very wise and efficient leadership of the Chairman of the Board, Mr. T.S. Mangwazu.

The scientific personnel of the MBS (Annex VII) consists of four university graduates: a Chief Chemist (expatriate), two chemists/analysts and one standards engineer, the latter being seconded to the Bureau from a local enterprise. One of the chemists attended a 10-week training course in QC in Sweden and another 6-week course in standards work in the British Standards Institution (BSI). He is, therefore, ideally suited to be engaged in standardization and/or QC activities rather than in testing.

It is thus seen that the MBS's suffering from a severe shortage has naturally affected - to a very large degree - the activities of the MBS as will be revealed later in this Report.

8. FINANCE

Section 17 of the MBS Act stipulates that "the funds of the Board shall consist of:

a. such sums as may be payable to the Board from moneys appropriated by Parliament for the purpose;

b. such moneys or assets as may accrue to, or nest in, the Board whether in the course of the exercise of its functions or powers or otherwise;

c. such moneys or other assets as may accrue to, or vest in, the Board by way of grants, subsidies, bequests, donations, gifts, subscriptions, rents, interest or royalties from the Government or another source;

d. such sums as are derived from the sale of any property, real or personal, by, or on behalf of, the Board;

e. revenue obtained by virtue of the provisions of sub-section (2).

The operating accounts for the three fiscal years 1978/79, 1979/80 and 1980/81 are shown in Annex VIII which reveals two important facts:

a. In two years time, the Government doubled its grant to the MBS (from MK 65,630 in 78/79 to 131, 992 in 80/81). Needless to say that this is really gratefying as it indicates the strong support of the Government which is absolutely indispensable to the efficient and effective operation of the MBS. It is earnestly hoped that such support will continue in the future.

b. In the three years under consideration, the income from MBS services rose steadily at a relatively high rate. In the last fiscal year 1980/81, it amounted to MK 43,768 (US$ 48,145) which is quite appreciable

particularly if we take into consideration the shortage in resources under the disposal of the MBS. Services income during the last three years constitutes 37% of the Government grant and 26% of the total income. Needless to say that these precentages could be increased considerably if the MBS is provided with enough manpower and equipment. These two items are the two factors which limit the activities of the MBS and hence the services it renders. The more they are provided, the more the income from MBS services will increase. Hopefully, the MBS might ultimately reach a stage where it could be, more or less, self-supporting.

9. PREMISES

The MBS is housed in three adjacent modern buildings in the City of Blantyre.

The first building, of about 320 m^2, is composed of offices mainly for MBS management with a floor area of 225 m^2 linked to a laboratory with a floor area of 95 m^2 (in addition to ablution facilities).

The second building, which accommodates the library and offices, is of a floor area of about 200 m^2. This building is linked to a third and larger building of floor area of about 310 m^2 housing various laboratories. Just before the arrival of the Consultant in the field, laboratory equipment were moved from the first to the third building leaving the old laboratory space of 95 m^2 almost empty. This latter could hardly accommodate the majority of the testing equipments recommended to be provided within the proposed project "Strengthening of the MBS". There will be not enough room to accommodate the inevitable increase in MBS staff and services. Unfortunately, there is no possibility for the vertical extension of the existing buildings since the respective foundations were designed for only one floor.

It is, therefore, recommended that the MBS should seek collaboration to implement "Phase II" of its plan taking into consideration that the foundation should be able to support one or two additional floors to be built when the need arises.

10. LIBRARY

The library is an indispensable part for any national standards body (NSB). As a matter of fact it is the foundation and the starting point for any standards activity especially in developing countries. It is, therefore, of the utmost importance for any NSB to have a good standards library.

The MBS library occupies an area of almost 30 m^2 in addition to the office of the librarian (10 m^2). In the Consultant's opinion the area is quite enough as it could meet the present needs as well as those of the immediate future.

In addition to a complete set of Central African Standards (CAS) of which Malawi was a member, the library holds complete sets of standards issued by the NSBs of Ethiopia, Israel (English), South Africa (SABS), Thailand, UK (BSI) and USA (ANSI).

Moreover, there is a regular supply of standards issued by the Codex Alimentarius Commission (CAC) and ISO as well as those issued by the NSBs of Austria, Canada, Denmark, Finland, Ghana, Greece, Japan (English), Kenya, Mauritius and Sweden.

All of the above standards are kept up-to-date by the issuing organization.

The libary subscribes in the following periodicals:

a. Appropriate Technology
b. Analytical Abstracts
c. The Analyst
d. Journal of Testing and Evaluation (ASTM).

There are two books on standardization in addition to those issued by ISO. There are also some books on analysis and testing but no books on QC or metrology.

The Consultant will provide the MBS with a publication he is preparing at present concerning a comprehensive literature on standardization and related domains (certification, testing, quality control and metrology). Meanwhile he recommends that the MBS should acquire ASTM standards, which are very useful for standards on materials and their testing, as well as the publications listed in Annex IX. Some of the latter publications are old but, nevertheless, are very interesting. The list has been prepared taking into consideration the funds available for books and journals in the MBS budget.

11. ELABORATION OF NATIONAL STANDARDS

This function is the core of activities of any NSB. As a matter of fact it is its very "raison d'être".

The first Malawian Standard, MBS 1, was published in 1973 barely a year after the MBS Act was passed by the Government. This Standard came about as a result of a demand from the mineral water producing industry. Since there was but little time for the Bureau to respond to this pressing demand by forming a technical committee (TC) for the elaboration of this standard, the South African standard was adopted directly.

The second standard was published in 1976, i.e. three years after the publication of the first one. The total number of approved standards are 15, six of which are awaiting publications. In addition, there are 28 draft Malawian standards (DMS) in the pipeline.

Beside the nine Malawian standards published so far, the MBS has issued the first of the special publications, namely, SPO 1 "Guide to the Use of International Metric System (SI) Units in Malawi".

Annex X lists all Malawian standards, published and awaiting publication, as well as draft Malawian standards.

The elaboration of national standards is carried out by the traditional method, namely through the formation of technical committees.

The first TC was established in 1976. This was followed by two others in 1978, five in 1979 and eight in 1980 (Annex XI). These TCs have been set up following specific requests from the Government, industry and other bodies.

Annex X, showing all standards documents prepared so far, is summarized in Table 4 from which the following could be concluded:

a. Concerning the type of industry involved, the order of importance is as follows:

Industry	Nr. of Documents prepared	Percent of Total
Plastics	27	62,8
Food	8	18,6
Electrical	5	11.6
Materials of Construction	3	7.0
	43	100.0

b. Concerning the aspect of standardization involved, the order of importance is as follows:

Table 4 (next page)

TABLE 4: CLASSIFICATION OF STANDARDS DOCUMENTS

INDUSTRY / STAGE	PLASTICS		FOOD			ELECTRICAL		MATERIALS OF CONSTRUC.		TOTAL
	PRODUCT	TEST	PRODUCT	TEST	CP	PRODUCT	TEST	PRODUCT	TEST	
STANDARDS (published)	5		1			2		1		9
STANDARDS (awaiting publication)			2	1		3				6
DRAFT STANDARDS	1	21	2	1	1			1	1	28
T O T A L	6	21	5	2	1	5	-	2	1	
GRAND TOTAL	27		8			5		3		43

ASPECT OF STANDARDIZATION	No. of DOCUMENTS PREPARED	PERCENT OF TOTAL
Testing standard	24	55.8
Product "	15	34.9
Safety "	3	7.0
Code of Practice	1	2.3
	43	100.0

So far, the discussion in this section of the report has been confined to a general review and a brief analysis of the standardization activities of the MBS. The following paragraphs will be devoted to discussing the rate of elaborating national standards and whether this rate does or does not meet the ever increasing needs of the country.

It has been mentioned before that the industrial sector in Malawi covers the following industries: meat, dairy, grain, mill, sweets, bakery products, edible oils, canned food, sugar, soft drinks, malt liquors, cigarettes and pipe tobacco, cattle cake, cleaning and toilet preparations, pharmaceuticals, stationery, packages, paints and varnishes, matches, fertilizers, cordage goods, cotton piece goods, ready made clothing, blankets, tents, shoes, UPVC pipes, sawn timbes, furniture and wood products, venetian blinds, metal doors, frames and windows, agricultural implements, refrigerators, electrical appliances, cement, bricks and tiles.

In order to raise the productivity of the above industries, improve quality, reduce costs,protect the consumers and reap all of the other benefits of standardization, it is necessary to specify and standardize the above types of products. However, this does not mean- in any way - that the number of standards that have to be issued is equal to the number of products produced. To illustrate this fact one may mention that, in order to standardize unplasticized polyvinylchloride (UPVC) pipes, the MBS had to issue four separate standards according to the end use of the pipes whether they are to be used for cold water services under pressure at ambient temperature not below 20°C, or for above-ground non-pressure applications where continuous temperatures in excess of 60°C, are not encountered or for below-ground non-pressure applications or used as conducts for electrical wiring.

Even this represents but a small proportion of the whole picture because for every type of product, many standards may have to be issued depending on the aspect(s) that should be standardized whether related to designation, classification, terminology, composition, manufacturing, sampling, inspection, testing, quality control, packaging, labelling, handling, transportation, storage, usage,performance, safety, maintenance, etc...

Although the picture has already become more and more complicated, yet it does not reflect the whole story because of the simple fact that for the same aspect (e.g. testing) more than one standard may be required. For instance; for the standardization of testing methods for UPVC conduits and pipes, the MBS had to prepare 20 standards documents (see Annex X). This is very common in standards work and not confined to MBS or similar NSBs. Thus, in the UK, for the testing of paints, the BSI issued 55 standards documents containing 252 pages A4 size, while for the testing of textiles, the total number of pages amounts to more than 600 pages A4 size.

To the huge number of standards that has to be elaborated as explained above, one must add another huge number of standards to cover the various aspects of the multiplicity of raw and intermediate materials necessary for the production of the locally produced goods. Needless to say that this will bring the number of standards required to several hundreds.

So far, the Consultant has limited the discussion only to the present needs of the industrial sector in Malawi. In this connection, it should be strongly emphasized here that this has been done only for the sake of simplifying the demonstration of the volume of activities the MBS should carry out. The work of the MBS is, in no way, limited to locally made industrial products. These is still a very large amount of standardization activities involved in other domains such as:

a. elaboration of standards for sectors other than industry (e.g. agriculture, trade, housing, construction, etc...)

b. elaboration of standards for imports.

c. elaboration of basic standards of common interest to many sectors and domains (e.g. quantities and units, preferred numbers, etc.)

d. elaboration of standard codes of practice (e.g. the building code which is specifically mentioned in the MBS Act. Section 4.k);

e. elaboration of standards for the newly emerging, and very important, fields (e.g. environmental protection);

f. periodic revision of all standards issued and to be issued in order to keep pace with the achievements of science and technology, otherwise standards will stifle progress.

Again, to this very large volume of standardization activities the MBS has to carry out at the national level, one should add similar important activities at the regional and international levels. The MBS was entrusted by ARSO to hold the technical secretariats for two important ARSO TCs, namely: "Agriculture and Food Products" and "Chemistry and Chemical Engineering" and to hold the chairmanship of the latter committee. In addition, the MBS has to participate actively in the work of the two international organizations namely the Codex Alimentarius Commission (CAC) and ISO. One striking example of the importance of such participation is represented by the ISO standard for tea, the second crop of Malawi - being next only to tobacco - which accounted for 13.4% of the domestic exports in 1980. According to that ISO Standard - in the elaboration of which the MBS did not participate - the Malawian tea is deprived of the place it rightfully deserves as being one of the finest brands in the world.

In the light of the above discussion, it becomes very clear that the standardization tasks the MBS has to perform, in order to fulfil the national objectives for which it was established, are very extensive and the load is very heavy. There is a very great deal of work that should be done in the field of standardization as hundreds of national standards have to be elaborated, issued, implemented and followed up.

So far, i.e. during the nine years that elapsed since its establishment, the MBS published only nine standards (at a rate of one standard per year) while six others are waiting publication. All in all, the rate of elaborating national standards is about 1.7 standards per year which is, very clearly, far from being enough to meet even a very minute percentage of the need for national standards. This is, obviously, not due to any inefficiency or negligency on the part of the MBS, but onl· due to the severe shortage in its technical manpower; there is only one standards engineer who joined the Bureau last year seconded from a local enterprise.

At this point, no further discussion or comment is needed: the situation is self-explanatory.

12. PREPARATION OF PURCHASING SPECIFICATIONS

It was foreseen by the Ministry of Trade and Industry, as far back as 1973, that the MBS could assist greatly in the central bulk buying activities by advising through standards the Central Tender Board which coordinates government and parastatal purchases. To this effect, liaison was established between the MBS and that Board. The outcome of this was the formation through the initiative of the MBS of a "Plenary Committee" composed of 25 members representing the Office of the President and Cabinet, nine ministries, MBS and 5 even other concerned bodies. This General Conference of the Central Committee for Standardization convened on 14 July 1977 under the chairmanship of the MBS Director to establish the "Central Committee for Standardization" (CCS)

In this meeting, the General Conference:

a. recommended that the membership of CCS be nine including the Chairman who would be appointed by the Minister of Trade and Industry while the members be appointed by the Director of the MBS in consultation with the Chairman;

b. recommended that the first Chairman should be the Chief Controller of Stores, Ministry of Works and Supplies;

c. agreed that the Secretariat of the CCS be held by the MBS.

The first meeting (founding conference) of the CCS was held on 22 September 1978. In this meeting, the CCS ratified the "Policy and Guide for Standardization of Purchases" according to which the functions of the CCS are:

a. to co-ordinate and standardize all Government and semi-government purchases through the formulation and implementation of CCS buying specifications;

b. to promote standardization by acting as a forum where proposals for the development and formulation of new national standards could be made;

c. to advise the MBS (and therefore the Malawi Standards Board) on general matters related to standardization of locally manufactured commodities since government is the largest consumer in the country.

It is thus seen that:

a. the CCS functions under the aegis of the Ministry of Trade and Industry, while the MBS is responsible for the preparation of the buying specifications upon request;

b. the CCS specifications would serve as the forerunners and precursors of national standards for those commodities locally manufactured;

c. the formation of the CCS represents another approach to stimulate national standardization in Government and statutory corporations through co-ordinated large-scale purchases.

It is obvious that the CCS specifications were meant to be similar to the Federal Specifications (FS) of the USA Government, and that one of the main reasons behind their preparation is the time factor. This has been spelled out by the Chairman of the Plenary Committee as follows:

"...the manner in which a buying specification is formulated is completely different from the procedures adopted for the formulation of National Standards. A buying specification will be required at the time purchases are made. Therefore the time taken from the drafting to the approval of the drafting to the approval of a buying specification will be much shorter than that for a National Standard which can even take as much as five years".

The method of preparing CCS specifications was stated in the "Policy and Guide for Standardization and Coordination of Purchases" as follows:

"The Bureau shall prepare the specification by consulting all available specifications as well as all interested consumers and manufacturers in regard to the specific requirements and other technical aspects relating to the proposed specification. Official technical committees are not appointed by the Bureau as in the case of national specifications. Every proposed CCS specification shall be sent to interested manufacturers, government organizations, and other consumers for their information and comment. After receipt of comment the specification is amended, if necessary, and submitted to the CCS for approval and acceptance. The Bureau shall print and issue the specification after approval".

It is thus noticed that the only difference in the two methods for the elaboration of national standards and CCS specifications is that, in the latter case, no TC is convened. Instead, the MBS has to prepare the draft CCS specification by "consulting all available specifications as well as all interested consumers and manufacturers", persumably by correspondence. As a matter of fact, this is a lengthy process involving much time and effort on the part of the MBS. In the traditional method for elaborating national standards, the MBS prepares the draft standard "by consulting all available specifications" followed by discussion in a TC representing the main manufacturers, consumers and other interested bodies. This discussion, which is carried out in person , has two distinct advantages:

a. it is easier, speedier and more effective in reaching consensus than by correspondence;

b. the TC shares some of the work load which, otherwise, should be borne by the MBS.

The situation becomes more complicated by the decision to "select a working committee consisting of a few peoples to visit the firms concerned, investigate and discuss possibilities for drafting of CCS specifications" which simply means the introduction of an additional time - consuming step.

It could be thus concluded that although the objectives aimed at, through the establishment of the CCS, are very useful, yet one cannot overlook the following two facts:

a. that the CCS specifications are to be formulated by the MBS which, as has been demonstrated, is already heavily loaded and severely under-staffed;

b. that the procedure for the preparation of CCS specifications entails longer time and greater effort contrary to what has been aimed at.

In view of the above, it is strongly recommended that the MBS should critically review, assess and evaluate the whole situation in order to decide whether:

a. the CCS should continue functioning as scheduled, or

b. to introduce modifications in the machinery and methodology of CCS, or

c. to keep CCS just as an advisory body to MBS, or ultimately

d. to abolish this approach altogether.

On passing by, it is recommended that, in case alternative a. or b. above is adopted, the title of the CCS should be changed as it is mis-leading. The MBS is recommended to consider another title which should be more descriptive of the true functions of the CCS such as "Central Committee for Purchase Specifications" (CCPS) and the specifications themselves could be called Central Purchase Specifications (CPS). Another title for the Committee could be "Committee for Government Purchase Specifications" (CGPS) or simply "Committee for Government Specifications" (CGS). In such case the specifications could be called "Government Purchase Specifications" (GPS) or simply "Government Specifications" (GS).

In any case, it is recommended that the MBS should obtain the Federal Specifications of the VS Government or, at least, those specifications which might be of interest to Malawi.* These Federal Specifications should prove very useful, not only for the preparation of purchase specifications, but also, in many cases, for the elaboration of national standards.

Lastly, in order to encourage manufacturers, to implement national standards, it is strongly recommended that the MSB should consider the introduction of a new section in the Act to stipulate that government and parastatal bodies should only purchase goods conforming to Malawi Standards whenever they exist.

13. TESTING ACTIVITIES

Testing is one of the main activities closely connected with standardization. In the framework of the functions of the MBS, testing is necessary:

- to elaborate and amend national standards
- to verify the conformity of products to national standards
- to operate certification marking scheme
- to inspect exports
- to control imports

In addition, since there are very few chemical laboratories which can perform a relatively wide range of tests for other bodies in Malawi, the MBS laboratory plays a very important role in providing general testing services to the Government, industry and commerce. In fact, the demand for such services is increasing year by year.

With the few testing equipment available in the MBS (Annex XII) it is possible to assess some of the quality parameters of foods, drugs and some other chemical products which the Bureau is requested to test such as water, milk, butter, cooking oils, beans, fruit, squashes, alcoholic beverages nuts, tobacco, cereals and pulses, layers mash, cottonseed cake, caustic soda, etc.

* Federal Specifications could be obtained from:
Specification Sales (3FRI)
Bldg. 197, Washington Navy Yard
General Services Administration
Washington D.C., 20407
U S A

Special emphasis should be given to the significant advances the MBS has made in the testing of nicotine and sugar in tobacco, the volume of which is increasing steadily. The Bureau has gained international recognition in this activity through participating in the monthly testing of international standard samples supplied by the Imperial, Tobacco Group in Briston, UK, for analysis at 16 different stations throughout the world. The statistical data compiled from the analysis results has shown the MBS to rank among the best laboratories in the world.

Another achievement worthy of mentioning here is the bald step taken by the MBS to contribute to safeguarding the health of the public by the testing of some pharmaceutical products manufactured locally. Such products were not previously tested elsewhere. It is hoped that other drug manufacturers will follow and subject their production to third party certification by the MBS. Drug samples are analyzed to the British Pharmacopoeia (BP), British Pharmaceutical Codex (BPC) and the European Pharmacopoeia.

In addition to the main laboratory, the MBS has, in another locality in Blantyre, a fully equipped aviation fuel testing laboratory which is the only one of its kind outside Shell Companies in the Southern African Region where recertification of aviation fuel is conducted. It is equipped with IP (Institute of Petroleum) and ASTM equipment.

The total number of samples tested in the MBS laboratories is as follows:

Year	No. of samples
1978/79	1133
1979/80	1602

As discussed above, with the available technical facilities under the disposal of the MBS, most -but not all(*)- of the quality characteristics of foods and some chemicals could be assessed. Apart from this, there are no testing facilities, whatsoever, to conduct quality physical testing of

(*) Examples of some of the quality characteristics of foods which could not be assessed in MBS laboratories are vitamins other than vitamin C, lactose, and phosphate in milk, saccharin in beverages, flow, point in oils, bacteria count, etc...

locally made or imported paints and varnishes, paper, packaging materials, plastic and rubber products, leather and leather products, textiles, building materials, metals and mechanical and electrical goods and appliances. To make things worse, the overwhelming majority of such testing facilities are not available elsewhere in Malawi.

The lack of such facilities affects adversely the totality of the MBS activities namely; the elaboration and amendment of national standards, conformity testing to standards, certification marking, export inspection and import control. In addition, it also affects the tasks and activities of many Government bodies, industrial firms and trade enterprises. There are many cases where the MBS had to turn down requests for testing from these bodies for lack of testing facilities.

In many cases, the MBS had to send samples to be tested abroad. Apart from being costly and involving the expenditure of foreign currency, the procedure is time-consuming as it may take several months to get the results. The high costs of testing abroad (*) had prevented many bodies to have the testing results they were so eager to get, while the time factor renders the inspection and control ineffective or even meaningless. There should be no undue time lapse between taking the samples and getting the results as otherwise no proper measure could be taken in time.

Consequently, it is concluded that there is an urgent and persistent need to strengthen the testing capabilities of the MBS, to cover, at least, the types of goods produced in Malawi.

14. CERTIFICATION MARKING

It goes without saying that the mere elaboration of national standards is not an end in itself. The benefits of standardization will be obtained only if the standards are adopted. The adoption of standards could be either voluntary or mandatory.

In Malawi, national standards are, voluntary in nature. However, it is possible, in principle, to enforce them by law. Section 21 of the MBS Act states that:

(*) may amount up to US$ 1000

1. Subject to the provisions of subsections (2), (3), (4), (5) and (6), the Minister may, by notice published in the Gazette

   a. on the recommendation of the Board

      i. declare any standard specification for any commodity of for the manufacture, production, processing or treatment of any commodity to be a compulsory standard specification for that commodity or, as the case may be, for the manufacture, production, processing or treatment of that commodity as from a date to be specified in the notice which shall be a date not less than two months after the date of the notice;

      ii. amend any compulsory standard specification with effect as from such a date so fixed,

   b. prescribe, in respect of any compulsory standard specification, a distinctive mark for any commodity which complies with that specification or which has been manufactured, produced, processed or treated in accordance with that specification;

   c. withdraw any notice issued under paragraph a. or b., or amend any notice issued under paragraph a., as to the date fixed in terms of the said paragraph, or amend any mark prescribed under paragraph b.

2. The Board shall not recommend to the Minister that a standard specification be declared a compulsory standard specification for the manufacture, production, processing or treatment of a commodity and the Minister shall not declare a standard specification to be such a compulsory standard specification unless the Board or the Minister, as the case may be, is satisfied that it is not practicable to achieve the purposes of such a compulsory standard specification by the compulsory standard specification for the commodity".

It seems from Section 21 that the Malawian Legislator, while admitting the legal enforcement of national standards in principle, is not very much in favour of resorting to this mandatory application except for very strong reasons. In such case, certification marking should acquire much greater importance as almost the only available means to encourage the implementation of national standards.

The MBS operates, from 1st January 1978, a voluntary certification marking scheme for UPVC conduits, pipes and fittings produced by a local manufacturer. As a matter of fact, this scheme represents a success story worthy of special mention. The local manufacturer first experienced difficulties in introducing these new products in the local market. There has been general resistance in accepting these products. The company was then convinced that the certification marking of the MBS would be the answer to product acceptability, consumer confidence and increased sales.

To this end, Malawi standards were promulgated and the related four permits (licences) were issued granting the Company the right to use the Standards Mark of the Bureau. This Mark helped greatly in increasing the production of the Company four times since the operation of the scheme i.e. in 3 years.

The method used by the MBS in operating certification marking schemes is a very simplified version of the traditional procedure. The MBS uses the testing equipment available in the manufacturer's premises and once or twice a year samples are drawn and sent abroad for check testing. Complaints from purchasers and consumers about the quality of marked products are welcomed and whenever a complaint is found to be genuine, free -of-cost replacement is arranged in respect of sub-standard goods.

So far, the certification marking system covers only two manufacturers: the one mentioned above and another producing fibreglass sinks.

The MBS must be credited for operating these two schemes in spite of the lack of testing facilities, a problem which the Bureau solved by resorting to outside laboratories. However, one should not overlook the fact that relying on outside testing facilities should entail some risk on the part of the MBS, a risk which it accepted willingly or rather boldly. Although this

should be greatly appreciated, yet it should not be followed in all other cases especially if the products carry health or safety hazards. This is because, in such cases, if the results of outside tests become negative, then the MBS will certainly face an awkward situation since during the time between drawing the samples and getting the results from abroad, the defective production -bearing the mark - would have been used or consumed by the consumers. Such a situation will greatly hurt the MBS in addition, of course, to the producer and consumer.

At this point, one may argue that, legally, the NSB is not liable for any harm caused by a product bearing its mark, the liability being that of the producer only(*). Although this fact, which is not known to many people, is absolutely true, one should differentiate between two completely different cases: a harm caused by a product not bearing the NSB mark and the same harm caused by an identical product but bearing the mark. In both cases, the producer and consumer have been severely hurt: the producer has lost his reputation in addition to being liable for all the consequences and repercussions, and the consumer has been endangered in his health, safety or life. in the second case, the NSB -being the owner and granter of the mark- has been also greatly hurt as its prestige has been certainly undermined irrespective of the fact that it cannot be held responsible for any harm caused by a defective and marked product. To the public, who is not well aware of the legal aspects of the case, the situation is simply as follows: a product, certified by the recognized national body as comlying to its standard, has endangered the health, safety or life of someone. Then, what confidence could the public have in such a body? And once the NSB loses the confidence of the public, it will never be able to achieve its national objectives: and here lies the real danger.

Perhaps the above discussion might have gone a little bit too far, but it should have indicated, very clearly, the necessity of having reliable testing facilities within the easy and quick reach of the certifying body.

(*) It is gratifying that this principle has been stated very clearly in the MBS Act (Section 26)

Another issue connected with the certification activities of the MBS, is that the two schemes operated so far, cover UPVC pipes and fittings and fibreglass sinks. The consumers (users) of such products - to whom the mark is directed - are, mainly, large consumers who can afford the means of ensuring whether or not these products conform to the required standards. Then, what about the ordinary consumer who cannot afford such means?! So far, nothing has been done to protect him and help him in selecting the right products: products that are wholesome, safe and reliable. Certainly, the MBS could not be blamed for that as it cannot turn down applications to use its mark just because of the reason mentioned above since, after all, it is very useful to cover any product by the certification marking scheme. Such coverage will contribute widely in getting the benefits of standardization and certification whatever the product may be. However, particularly at the present stage, it is of the utmost importance to give greater consideration to the ordinary consumer. No effort should be spared to enable the MBS to extend the certification system to cover as many consumer products as possible. In order to realize this objective, the MBS needs:

a. the elaboration of enough national standards to cover the majority of consumer goods;

b. enough technical staff knowledgeable in QC techniques to carry out technical inspection and evaluation of manufacturers's systems and to conduct surprise visits to their premises;

c. adequate testing facilities to verify the conformity of products to national standards;

d. enough number of chemist/analysts/physicists/engineers to carry out conformity testing.

Unfortunately, the MBS, as has been mentioned before, suffers from a big shortage in these resources.

Summing up, the above discussion on the certification activities of the MBS, one could state the following legitimate conclusions:

a. In order to gain the benefits of standardization, standards have to be implemented.

b. In Malawi, where there is no great tendency to enforce standards by law, certification marking acquires greater importance as an effective means for the implementation of national standards.

c. As a consequence, there is a persistent need to consolidate and extend the certification marking system to cover the overwhelming majority of the local production with greater emphasis on consumer goods

d. To realize this objective, it is indispensable to strengthen the human and material resources of the MBS.

In a nutshell "In order to enable the MBS to achieve the objectives of national standardization through the operation of a proper and effective certification marking system, it is absolutely necessary to strengthen it in terms of staff and testing facilities"

15. EXPORT INSPECTION

Higher standards of goods are conducive to larger exports which in turn lead to the increase of foreign exchange earnings and hence to the improvement of the balance of payment so important to the national economy, especially in developing countries.

It is gratifying that the MBS has made a remarkable stride in this field through its control of tobacco, Malawi's first export commodity constituting almost half of its total exports of goods (Table 3). Malawi ranks now the largest producer of tobacco in Africa and the second largest world producer (next only to the USA) and the largest world exporter of fire-cured tobacco (exported to 55 countries allover the world).

Due to the importance of tobacco to the national economy of Malawi, the Government established the Tobacco Control Commission (TCC), a statutory corporation whose aim is to coordinate the sale of tobacco at the Tobacco Auction Floors. A Government's notice was issued laying down the maximum limits of pesticides such as Dieldrin, Aldrin, DDT and Lindane in tobacco. The General Notice Nr. 160 of the Malawi Government empowered the MBS to monitor all these residues to ensure that no suspect or contaminated tobacco is ever sold at the Tobacco Auction Floors.

Accordingly, the MBS -after being provided with adequate analytical instruments- started to exercise its inspection of the tobacco and, thus, played a major role in attaining a high reputation for the Malawian tobacco in foreign markets. Through this effective control, Malawi succeeded in removing almost completely the sources of contamination of tobacco with the pesticides, thereby rendering Malawi's tobacco -according to a statement by Dr. Macdonald of the Tobacco Research Board of Zimbabwe the cleanest in Africa and the third cleanest in the world.

The very successful results achieved by the export inspection of tobacco by the MBS should furnish strong impetus to extend the same procedure to other export commodities. As a matter of fact there is already a persistent need to realize this as soon as possible due to the place exports occupy in the national economy and the fact that a major objective of the present Five-Year Plan (and almost certainly of future plans as well) is to promote exports.

To this end, the Consultant should like to strongly recommend the issuance of an Export inspection act as it will be instrumental in protecting and enhancing the reputation of Malawian exports in foreign markets. The act could be similar -in principle- to the Export Inspection Law issued in Japan in 1957. The remarkable results obtained by this Law have led many countries to follow suit such as Thailand (1960) Republic of Korea (1962) India (1963) and Iran (1963).

The Consultant discussed his recommendation in a joint meeting with his counterpart Dr. F.M. Banda, Director, MBS and Mr. N. Mwaunghulu, Director, Malawi Export Promotion Council (MEPC), both supporting it wholeheartedly.

It is very gratifying that Mr. Mwaungulu has shown very keen interest in the proposal considering such an act as an efficient tool which would be of great help in his efforts to boost Malawian exports. Both Dr. Banda and Mr. Mwaungulu were provided with a copy of the Japanese Law.

Finally, the Consultant should like to point out the fact that - as in the case of extending the certification marking system- the extension of export inspection system would certainly require strengthening of the MBS in terms of staff and testing facilities.

16. IMPORT CONTROL

The inspection and control of imports are imperative means to protect the public and the national interest against the entry in the country of sub-standard goods.

In this field also, the MBS -with its limited facilities- has contributed widely as it caused the rejection of many imports on health and safety grounds. Examples can be found in the rejection of contaminated medical injection fluids, cashew nuts (K 100,000), electrical appliances (K 250,000) etc...etc...

Needless to say that the MBS activities in this field should be greatly consolidated.

17. METROLOGY

Section 4(d) of the MBS Act states that one of the objects of the MBS is:

"to make arrangements or provide facilities for the testing and calibration of precision instruments, gauges and scientific apparatus, for the determination of their degree of accuracy by comparison with standards, approved by the Minister on the recommendation of the Board, and for the issue of certificates in regard thereto".

In spite of the importance of precision measurements to the industrial development of Malawi, nothing -so far- has been done towards the realization of the above object.(*)

18. REGIONAL AND INTERNATIONAL ACTIVITIES

The MBS is quite active at the regional and international levels.

At the regional level, the MBS is an active member of the Regional Co-ordinating Committee for Africa of the FAO/WHO Codex Alimentarius Commission (CAC). It was elected member of the Interim Steering Committee of the African Regional Organization for Standardization (ARSO) which formulated its constitution and work programme. In 1979, the MBS was elected for membership in ARSO Council and in 1980, its director was elected as ARSO President for a 3-year term. It holds the secretariat for two ARSO TCs, namely; "Agriculture and Food Products" and "Chemistry and Chemical Engineering" in addition to the chairmanship of the [illegible]ter TC. The MBS director was also appointed by ISO as its Regional Liaison Officer for Africa. Moreover, the MBS participates positively in the regional activities of the Commonwealth Science Council related to standardization.

At the international level, the MBS is a correspondent member of ISO and is currently considering to become a full member. It is also the contact point in Malawi of the Codex Alimentarius Commission.

F. OTHER STANDARDIZATION BODIES

1. THE ASSIZE DIVISION, MINISTRY OF TRADE AND INDUSTRY

The Assize Division (AD), established in 1956, is responsible for Malawi's weights and measures. The Division is now based in the Capital Lilongwe.

To ensure fair trading, the Weights and Measures Act (Cap 48:04) was issued on 1st January 1960 "to provide for the uniformity of measures of

(*) Metrological activities of the "Malawi Electrical Calibration and Repair Centre" of the Department of Posts and Telecommunications will be discussed later.

weight, length and capacity, the assizing and re-assizing of weighing or measuring instruments, weights and measures, better protection of the public in relation to the sale of articles and other transactions by weight or measure and for other matters incidental thereto".

This Act, administered by the Assize Division, provides for the following:

"a. The care and maintenance of the national primary, secondary and working standards of weights and measures;

b. the approval of new weighing and measuring instruments as suitable for use in Trade in Malawi;

c. the testing and stamping of all new and rephaised weighing and measuring equipment;

d. the regular inspection of weighing and measuring apparatus in use for trade throughout the country;

e. the annual assize of all weights, measures, weighing and measuring instruments in use in trade; and

f. the marking of quantities on pre-packed goods offered for sale and the ensuring of correct weight and measure of most articles which are pre-packed in standard quantities, e.g. sugar, tea, coffee, milk and bread."

In order to implement the Act, a number of subsidiary legislations have been issued in the form of regulations such as:

a. Weights and Measures (Assize) Regulations.
b. Weights and Measures (Assize Board) Regulations.
c. Weights and Measures (Assize Fees) Regulations.
d. Weights and Measures (Assize's Certificate) Regulations.
e. Weights and Measures (Exemption) Regulations.
f. Weights and Measures (Sales of Articles) Regulations.
g. Weights and Measures (Standards) Regulations.

The last regulations deal with the authentication of standards, verification of working standards, errors allowed, adjustment of a working standard and the place where local standards are kept.

The Division's laboratory is still based in Blantyre. It has an area of 20 m^2 and is temperature controlled at 20°C. Table 5 shows the current status of Malawi's standards of Measurements.

Testing and calibration work at this laboratory is restricted to the AD's own standards.

The equipment verified include all types of weighing and measuring devices as well as petrol pumps. No weighbridges are verified but the AD will soon get the necessary facilities from the UK in addition to a new and modern precision balance.

There are three professional personnel under the Principal Assizer, and all of these are members of the Institution of Trading Standards Administration of the UK. In addition, one semi-qualified assize works also for the AD.

As investigated by the Consultant, the AD, with its limited resources, has done-and is still doing- a very good job especially if we take into consideration its activities in the metrication movement of Malawi. However, there is a great need to consolidate its activities. To this end, the Consultant wishes to present the following recommendations:

a. That the Weights and Measures Act-issued 22 years ago - should be replaced by a modern one taking into consideration the metrication of Malawi. In this connection, the model "Law on Metrology", an International Document of the International Committee of Legal Metrology (CIML 1975 D.I. Nr. 1),(*) should prove very useful in drafting the new act. It should be regarded as a general proposal which has to be perfected according to the individual legislative requirements of each country.

(*) The consultant provided the MBS with a copy of this Document.

TABLE 5: CURRENT STATUS OF MALAWI'S STANDARDS OF MEASUREMENTS

PARAMETER	UNIT	TYPE OF STANDARD	UNCERTAINTY	TRACEABILITY
Mass	Kilogram	Primary	+ or - errors as allowed by Regulations	Department of Trade, Legal Metrology Branch, 26 Chapter St. London SWIP, UK National Physical Lab. Teddington, UK
Length	Metre	"	"	"
Capacity	Litre	"	"	"

b. That the MBS should apply for correspondent membership in the International Organization of Legal Metrology (OIML), an inter-governmental organization concerned solely with standardization in the field of legal metrology. This organization could be contacted at the following address:

Le Directeur
Bureau International de Metrologie Legale
11, Rue Turgot
75009 Paris
France

c. That the AD should be strengthened in terms of staff as well as verification and transportation facilities.

Before ending this part of the Report, the Consultant wishes to raise an institutional and organizational issue which he deems very pertinent to the present mission. It is related to the proper connection between the AD and the MBS.

Metrology, the science of measuring, could be divided into theoretical (scientific, fundamental) and applied. The latter type could be further divided into legal and otherwise (sometimes called industrial metrology). Thus we have three types of metrology: theoretical, industrial and legal.

There is no standard pattern to follow in carrying out these types. In some countries, the three types are handled by three different bodies as in Egypt. Until very recently, this was also the case in the UK where the three types were respectively handled by the National Physical Laboratory (NPL) the British Calibration Service (BCS) and the Metrology, Quality Assurance and Standards Division of the Department of Trade. Very recently, the BCS has been attached to the NPL. In the USA, the National Bureau of Standards (NBS) is responsible for the whole field of metrology. It supervises and operates the "National Measurement System" through accreditation schemes in collaboration with the various Standards Laboratories scattered all over the country. Such integration within the field of metrology is found in many countries whether developed (e.g. German Federal Republic) or developing (e.g. Pakistan, Philippines, etc.)

In many other countries, integration takes place not only within the field of metrology but also within the broader field of standardization which encompasses: standards-writing, implementation of standards, testing, certification marking, quality control, metrology, training and consultancy services (e.g. Brazil, Czechoslovakia, GDR, Iraq, Kenya). Still, in other countries, integration may go further to embrase industrial research (Malaysia, USSR), preshipment inspection and even hallmarking (e.g. Iran).

It should be emphasized here that, in recent years, there has been a growing awareness, especially among developing countries of the benefits -and hence the preferncе- of the systems approach to, i.e. integration of, standardization. This issue has been discussed at length and then recommended in several regional and international gatherings such as the ISO Conference held in Mexico City in 1973, the "Algeria ISO Seminar on Standardization for Developing Countries" held in Algeria in September 1976 and the Commonwealth Science council Seminar on Integrated Approach to Standardization held in Nicosia, Cyprus in April 1980.

In Malawi, legal metrology is the responsibility of the AD, while the other types of metrology plus specifications and related activities - are the concern of the MBS. needless to say that the integration of these two bodies will result in obvious advantages which could be summarized in:

a. conservation and best utilization of the limited resources whether human or material,

b. greater efficiency and effectiveness in rendering metrological services.

<u>It is therefore recommended that the Ministry of Trade and Industry should consider, and take the necessary measures to the integration of the AD into the MBS.</u>

2. THE METRICATION BOARD

a. INTRODUCTION

Both the metric and Imperial systems of measurement are legal in Malawi. Although the metric system was accepted and used voluntarily in some important sectors, it was the Imperial system which predominated in primary agricultural marketing and retail trade outlets. Those sectors which opted to use the metric system did so out of necessity, such as outside influences.

Malawi's neighbouring countries as well as her trade partners were either completely metric or were converting.

The Metrication Board under the chairmanship of the Secretary for Trade, Industry and Tourism was established primarily to advise the Government on the introduction into Malawi of the metric system of weights and measures subject to the principle that any metric undertaken should be necessary and in the public interest.

In 1971, a survey was carried out to determine the extent of metrication in Government departments, industrial and commercial organizations and other interested sectors of the economy. Over half of the respondents were found to be using the metric system to some extent and, of the 37.8% not using the system, most saw a need to change at some time. Another survey conducted in 1976/77 showed that a large and increasing proportion of trade and industrial activities were performed in metric units of measurement and the majority of these not already using the system saw the need to do so.

b. METRIC CONVERSION

On 26th January 1979, the Ministry of Trade, Industry and Tourism issued the public announcement that His Excellency the Life President has approved January 1982 as the date by which the metric conversion programme will be completed in Malawi. All companies, organizations

and trade associations were encouraged to examine their position on metrication and submit plans to the Metrication Board for consideration.

Following this announcement, the Metrication Board directed a working party, comprising the Director of the Malawi Bureau of Standards and the Government Assizer, to prepare and submit recommendations on metric conversion in Malawi for the Board's consideration at its next meeting taking into consideration the deadline date of January 1982.

c. METRICATION BOARD POLICY

The Metrication Board outlined the following board principles:

a. The eventual adoption of the usage of a single coherent measurement system based on metric units is acknowledged in the national interest.

b. This single system should be used for all measurement purposes and trade transactions.

c. Planning of and preparation for the changeover to the metric system in the public and private sectors should be made by the sectors concerned and should be coordinated by the Metrication Board through its Coordinating Committee so as to achieve maximum benefits at minimum cost to the public, industry, and to Government at all levels. Endeavour should be made not to allow the prices to rise as a result of the conversion.

d. Information about the metric system should be disseminated to the general public and the introduction of the system should be fostered where it will have maximum educational impact with relatively low costs.

e. The changeover to the metric system should be planned and coordinated so as to complete the process in three years making sure that the cost of the changeover is borne by the sector concerned and should not be transfered to the consumers.

d. MEASURES TAKEN

In order to enable the Metrication Board to successfully adopt the metric system and complete the changeover in three years, the following steps were taken:

a. The establishment of a Co-ordinating Committee as follows:

Chairman:	Metrication Board Chairman
Vice-Chairman:	The Treasury
Secretary:	Joint Secretariat (MBS/Assize Unit)
Members:	Chairmen of the six sub-committees
	Ministry of Justice
	Ministry of Trade, Industry and Tourism

The terms of reference were:

i) to coordinate all the changeover activities,
ii) to steer, guide and coordinate the activities of all the sub-committees,
iii) to revise the Weights and Measures Act and to assist other Government legislations particularly where units of measurement are referred to,
iv) to provide the secretariat services to all the sub-committees with a view to ensuring maximum implementation to the policy of the Metrication Board,
v) to report frequently to the Board on progress made in the overall changeover programme with respect to the deadline date,
vi) to ensure that the legislation is implemented in all the sectors of the economy.

b. The establishment of the following six sub-committees:

i) Publicity Sub-committee
ii) Commerce Sub-Committee
iii) Industry Sub-Committee
iv) Agriculture Sub-Committee
v) Education and Science Sub-committee
vi) Government and Miscellaneous Sub-committee.

The main functions of these sub-committees are:

i) to assist the Co-ordinating Committee in the implementation of the Boards policy in various sectors of the economy,
ii) to undertake specialized activities such as publication of conversion tables, metric guide books for teachers, engineers, etc..., pamphlets, leaflets, etc... in the cause of implementing the policies of the Metrication Board.

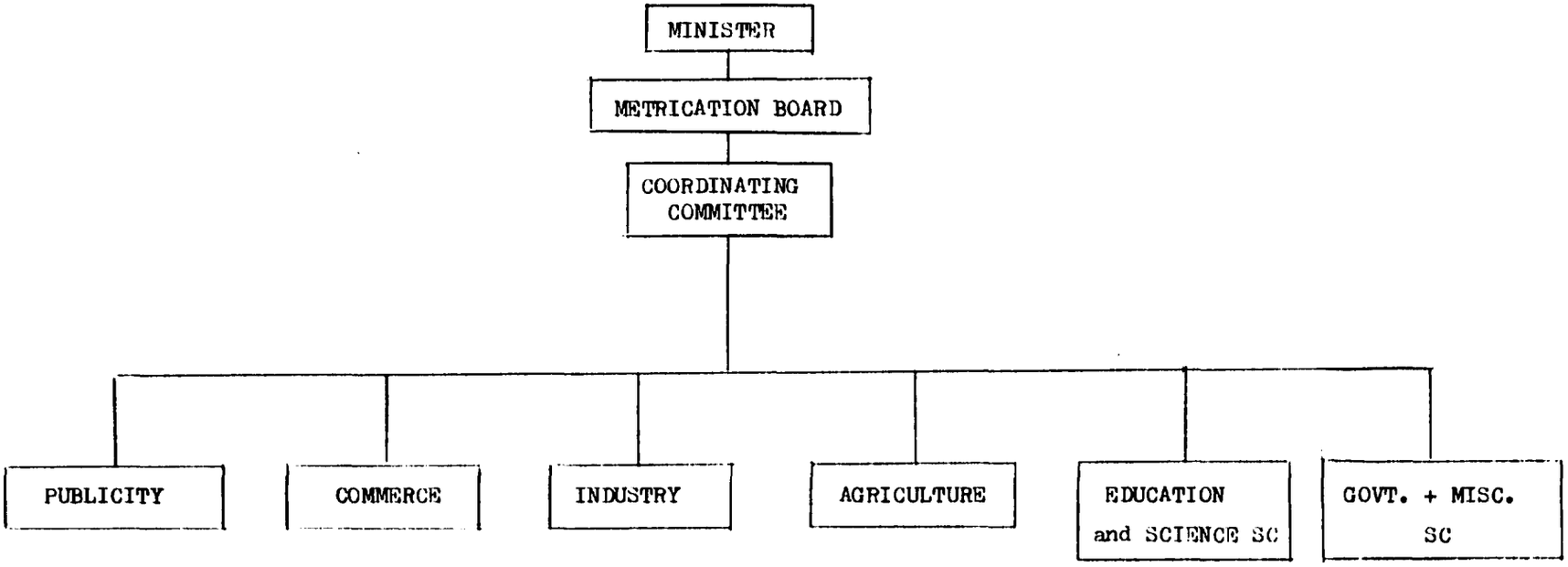
The composition and terms of reference of each sub-committee were clearly specified.

c. The overall activities of the metric conversion was implemented in a line organizational chart shown in Appendix I.

d. The implementation of the changeover was phased over the 3 years (1979 - 82) and a time table for each year was prepared showing the activities to be carried out into the various sectors of the national economy. Strict adherence to the time table was achieved as far as possible.

e. STATUS QUO

At the time of the present mission (Sept./Oct. 1981), Malawi should have been converted to the metric system almost completely since the deadline was set at 31 December 1981. However, for reasons outside the control of the Metrication Board and its Secretariat, this has not been



LINE ORGANIZATIONAL CHART

the case. For example, trade and wholesale transactions in 16 out of the 24 districts have been metricated. Fifty four scales for veterinary purposes are still to be converted. There is a need for 500 metric sets of weights. Kilometers are normally used for road distances but signs using miles are still to be seen occasionally. In traditional markets, the local measure of quantity called mbale (plate) is used for loose food, while fruit is sold singly or by displayed heaps of items, usually five. This will, naturally, continue for some time but does not affect the overall picture.

On the other hand, many large areas have been converted completely. Thus, the Post Office, the Railways and the sugar industry have been metricated. This is also the case with agricultural marketing where about 4000 spring balances have been metricated in the Agricultural Development and Marketing Corporation (ADMARC).

F. CONCLUSION

Taking into consideration the circumstances out of the control of the Metrication Board and its Secretariat, one should conclude that the metrication has been successful and that the conversion has been planned and implemented very systematically.

Some of the factors that have led to the above conclusion and which should be commended are:

a. Setting a target date by the Life President and hence the lead taken by the Government whether in the actual conversion or in the educational and informational activities.

b. A well planned conversion programme spread over a definite period (3 years)

c. Great emphasis on education and publicity. Text books were revised and teaching the metric system received far greater interest. A "Think Metric" campaign has been prepared and was launched on 15 February 1980.

The department of Information received K 7000 (about US$ 7800) as the cost of 5000 posters. A booklet entitled "Malawi Goes Metric" was published by the Metrication Board to act "as a guide in helping individuals to understand and then use the metric system at a stage when everybody will be expected to think in the metric system". Another booklet entitled "Correct Metric Symbols and Notations" was published by the MBS. Many tables were distributed giving commodities in metric unites with the corresponding prices.

d. Sincere cooperation between the MBS and AD as well as among all other concerned bodies.

e. Correct approach. This has been manifested in various aspects.

Firstly, conversion in the manufacturing sector was implemented industry, whereas conversion in commercial transactions in the retail trade was done on an area by area basis.

Secondly, all concerned bodies were urged to use "hard" metrication of sizes (i.e. true metric modules) rather than "soft" metric conversion where sizes remain the same. They were also encouraged to consider, where relevant, the introduction of a policy of rationalization through the use, as far as possible, of the Renard Series of Preferred Numbers since they had been shown to confer considerable cost savings.

Thirdly, great consideration was given to effect the conversion with minimum costs. For example, although the general policy was that the cost of conversion should lie with the organizations concerned, the Government made bulk purchases. Thus the Minister of Trade and Industry purchased in bulk the country's requirements for metric weights from 20 kg to 10 g denomination as well as metre rods used in the sale of goods by measure of length. Another example could be found in the packaging industry. To reduce cost, the date for complete metrication was so fixed that the packaging industry could use up all imperial packaging materials.

3. MALAWI ELECTRICAL CALIBARATION AND REPAIR CENTRE

a. ESTABLISHMENT

Following inverstigations in 1968 into the need for establishing facilities for the calibration and repair of electronic/electrical test equipment in Malawi, the Centre was set up in 1975 under the Post Office Administration Dept. of Posts and Telecommunications for operation on a Commercial Basis. It is the only body in Malawi which offers comprehensive calibration facilities from DC voltages to microwave frequencies.

b. MALAWI CALIBRATION SERVICE

It is a National Service set up to provide authenticated calibration of electrical/electronic test equipment used by Government departments, public corporations and other organizations. A certificate of Calibration provides a high degree of assurance of the correctness of the calibration of the particular equipment identified on the certificate.

c. SCOPE OF ACTIVITIES

The objectives of the Centre are to provide comprehensive electrical measurement services from DC to microwave frequencies, the main functions being:

a. To set up and maintain standards of all electrical parameters that require to be measured.

b. To provide a calibration service based on these standards, for electrical/electronic test equipment used in Malawi.

c. To provide an initial calibration and/or evaluation service for all new electrical/electronic test equipment purchased for Government use.

d. ACCOMMODATION

The Centre comprises the following three laboratories:

a. Standard and Precision Calibration
b. General Calibration
c. Electrical/Electronic Repairs, including some mechanical repairs.

The first laboratory is temperature controlled at 20 $\pm$ 1°C and the other two at 23 $\pm$ 1°C. The Repair Laboratory contains a clean air facility for the repair of equipments which require clean air conditions. The General Calibration Laboratory has a screened modular enclosure for carrying out measurements which require an electric noise-free environment.

e. TRACEABILITY OF MEASUREMENTS

The traceability of measurements are refused to the British Calibration Service (BCS) standards. Hence all prime standard equipment has a BCS Certificate of Calibration showing validity of accuracy.

f. ADVISORY PANEL

It comprises the Manager of the Centre and representatives of main user departments or organizations. It was set up to resolve problems and difficulties that arise from time to time, and also to act as a technical forum for the exchange of information on matters involving electrical calibration and measurements.

The Malawi Bureau of Standards is represented on the Advisory Panel.

g. MAINTENANCE OF RECORDS

The Centre operates a recall system, advising the user department/ organization when an item is due for re-calibration. A calibration Certificate is issued in respect of each item repaired/calibrated detailing all tests undertaken.

Each item repaired/calibrated by the Centre bears a label and shows the date last calibrated and the recommended re-calibration date.

h. STANDARDS AND CALIBRATION EQUIPMENT

a. Thermal transfer standard.
b. Transfer standard (four standard cells)
c. Standard cell comparator.
d. 12-bank standard cells (house standard)
e. Various standard resistors
f. DC calibrators
g. AC "
h. VSWR measuring equipment (1. 02 to 1.6) using swept frequency method, up to 4 GH2 (approx.)
i. Wide-band response measurements, up to 16 GHz, using coaxial wideband detectors.
j. Oscilloscope calibrator.
k. Microwave power meter calibrator.
l. VHF, UHF and SHF sweep oscillators.
m. VLF/LF tracking receiver and frequency difference meter, for frequency calibration.
n. Measuring oscilloscope (200 MHz bandwidth)
o. AM depth (%) measurement facility
p. FM deviation (up to 500 KH) using Bessel zero method, with spectrum analyzer.
q. Frequency counters, up to 16 GHz.
r. Teletype-type teleprinters (5-code and 8-code types) and associated pulse generators.
s. High-level RF oscillators up to 30-Watt (50-200 MHz).
t. Precision multiwatt power meters up to 300 MHz.
u. Standard modulation mater (accuracy $\pm$ 1% FSD).
v. RF voltmeters and true RMS millivoltmeters.
w. Spectrum analyser.

i. TEST EQUIPMENT WHICH CAN BE REPAIRED AND CALIBRATED

a. AM and FM signal generators
b. Telegraphs signal generators
c. Telegraphs distortion measuring sets.
d. Noise generators.
e. Selective level measuring sets.
f. Oscillators, including sweep oscillators.
g. Frequency counters.
h. AM and FM modulation meters.
i. RF value voltmeters
k. General purpose oscilloscopes.
l. Transistor and valve testers.
m. Distortion analysers
n. Audio and RF power meters.
o. Pulse testers.
p. Wavemeters
q. Universal bridges
r. Cable test sets.
s. Reflectometers
t. Noise receivers.

j. USERS

The Centre's facilities are available for use by Government departments and other users such as the Post office (biggest user), Police, Army, Railways, Broadcasting, Ministry of Works, Sugar Corporation of Malawi (SUCOMA), Electrical Supply Commission of Malawi (ESCOM), Department of Civil Aviation, Chancellor College and Polytechnic.

During the four months (1.4.1981 - 1.8.1981) the Centre received 316 instruments (including 279 from the Post Office) and repaired/ calibrated 272 instruments (including 240 from the Post Office).

In the Consultant's opinion, the Centre is very well organized and operated. It renders very useful services to the various sectors of the country.

G. TESTING FACILITIES IN MALAWI

1. MALAWI POLYTECHNIC, CHICHIRI, BLANTYRE

It has facilities for mechanical testing, e.g., tensile, Brine II hardness, compression, bending, torsion. The main equipment available are Avery universal test machine (Type 7 109 DC J) and Avery torsion test machine (Type 6609C GG Model E 662 32).

2. INDUSTRIAL ANALYSIS UNIT, CHEMISTRY DEPARTMENT, CHANCELLOR COLLEGE, UNIVERSITY OF MALAWI, ZOMBA

The Unit undertakes commodity testing, offers chemical advice and helps in problem solving. It also offers ample opportunities to chemistry students on the practical application of industrial and analytical chemistry. Its activities are aimed towards outside organizations at a nominal fee.

3. GEOLOGICAL SURVEY DEPARTMENT, ZOMBA

This Department, which operates under the Chief Geologist, has facilities for determining element concentration in geological samples.

4. MATERIALS LABORATORY, MINISTRY OF WORKS AND SUPPLIES, LILONGWE

The Materials Branch of the Design Department, Ministry of Works and Supplies maintains a relatively large control laboratory in Lilongwe with district laboratories in Mzuzu and Blantyre as well as field laboratories on certain construction projects. The Materials Laboratory undertakes soil survey, site investigations and the testing of construction materials for both Government agencies and engineering consultants and contractors. The Branch also acts in an advisory capacity and carries out experimental work.

Construction materials tested in this laboratory include cement (not all properties could be tested), bitumen, bricks and aggregates. Tests are carried out according to BS, SABS and invery few cases ASTM.

The laboratory does not carry tests on lime, gypsum or steel bars. There is no tensile testing machine.

The staff consists of:

1 civil engineer
1 chief technical officer
2 technical officers (3 years after high school)
2 technical assistants
1 superintendent.

5. CENTRAL VETERINARY LABORATORY, LILONGWE

The Milk Testing Section of this Laboratory carries out some chemical and bacteriological analyses of milk and milk products. The main equipments of the Laboratory are:

- Atomic absorption spectrophotometer (Perkin Elmer)
- UV/VIS Spectrophotometer (Beckman 24)
- Spectrophotometer (EEL)
- Flame photometer
- UV lamp
- pH meter
- Mettler swingle pan balance.

6. PUBLIC HEALTH LABORATORY, CITY COUNCIL, BLANTYRE

This laboratory has been established very recently. It contains testing equipment such as spectrophotometer, incubator, autoclave, microscope, etc...

7. THE CHITEDZE AGRICULTURAL RESEARCH STATION, LILONGWE

This Station, which is a Government department, was established in 1949. It carries out chemical analysis of soils, plants, feeds, water, fertilizers and physical analysis of soils. It is under the Principal Agricultural Research Officer.

The main testing equipments available in the Station are:

- 1 Atomic Absorption Spectrophotometer
- 1 Flame Photometer (EEL)
- 1 UV/VIS Spectrophotometer. Pye Unicam SP 200/2.
- 1 VIS Spectrophotometer Pye Unicam 600/1
- 1 VIS Spectrophotometer. Bausch and Lomb SP 20
- Conductivity Bridge. Mullard Type E 7566

8. BVUMBWE AGRICULTURAL RESEARCH STATION, BVUMBWE

This station was founded in 1940. During the early 1940's, it initiated a series of experiments principally aimed at assaying factors affecting the growth and production of montana tung. In 1950, the programe expanded to include investigations into, and improvement of, dairy farming and the production of coffee and citrus. The year 1963 saw an intensified research work on annual crops such as maize and ration beans.

Of interest to the present mission are the following units:

a. Soil Physics Unit
b. Soil Chemistry Unit
c. Oil and Plant Analysis Unit.

Fertilizer imports are tested to check whether or not the rated concentrations are within limits. Soils are tested to determine the effect of fertilizers on them. Properties tested are aggregate stability, permeability, organic matter, cation exchange capacity, total nitrogen, salinity, etc... The main testing equipment are incubator, colorimeters, flame photometer, UV spectrophotometer and atomic absorpiton photometer. Also the Station checks, the oil, content of all nuts. Before exporting tung oil, it is tested according to Malawian Standard MBS 10 "Standard Specification for Tung Oil". "The Station also issues certificates of fitness for exported fresh fruits and vegetables.

9. THE TEA RESEARCH FOUNDATION OF CENTRAL AFRICA, MULANJE

As the name implies, this Foundation is a regional organization concerned only with tea. Malawi is second only to Kenya in tea production but is the first in terms of production per unit area (2000 kg/hectare).

It is natural that testing in the Foundation is carried out only to serve research purposes in this very specific field. In addition, the Foundation is suffering from shortage in the scientific staff.

It is worthy to mention here that the Foundation is very much concerned at present with research aiming at suggesting "THIOFLAVIN" as a more objective and true criterion for the elaboration of quality standards for tea. It is deemed that the criteria (solid matter and fibre content) on which the present ISO standard for tea is based, do not allow the differentiation between high quality tea brands (such as Malawian tea) and other ordinary brands. This issue is very important to the economy of Malawi since tea is the second export commodity next only to tobacco. It also indicates very clearly:

a. the importance of research work to the economy of the country,
b. the importance of research to the elaboration of national/ international standards,
c. the importance of the participation of developing countries in international standardization to protect their national interests.

Close cooperation between the Foundation and the NSBs of the region is essential to ensure the presentation of the Foundation's views to international standardization circles.

10. LABORATORIES IN INDUSTRIAL PLANTS

Some factories maintain testing laboratories for the control of their processes. A brief description of some of such laboratories is given below in an effort to have a general view of the available facilities.

The Portland Cement Co. has a laboratory where limiestone, clinker, shale, coal and cement are tested. Some samples are sent to another NSB for countercheck. They have an Avery machine 500,2000 kN.

The David Whitehead and Sons Ltd. also has a fairly good laboratory for quality control testing. Routine testing is carried out continuously.

The ADMARC Canning Factory keep quality check of sugar content, Brix degree and grading. There are no checks on metallic contaminants, pesticide residue or micribiological tests.

The National Oil Co. examines the physical quality of rice while the oil cake is analyzed for the oil content.

The Groundnut Kernel Grading Factory has a well equipped laboratory where facilities for aflatoxin examination are available but none for the determination of pesticide residues.

10. CONCLUSION

Testing facilities in Malawi could be grouped in five distinct types:

1. The MBS Laboratory (has been discussed previously)
2. Laboratories of universities and colleges.
3. Laboratories of Government departments
4. Laboratories of research stations
5. Laboratories of industrial plants.

The last four types generally carry out tests for the internal use of the main bodies to which they are attached whether related to educational, research or control purposes. In such case, routine testing services are not within the scope-nor the capability- of these laboratories. Moreover, they are mainly concerned with testing of some properties of some products in some fields mainly food and materials of construction.

On the other hand, the MBS Laboratory seems to be the most well equipped laboratory in Malawi in terms of both material and human resources especially in the fields of chemicals and food industries. These two fields could be covered, in an almost complete way, by the addition of some equipment. In all other fields, the MBS can not rely on any testing facilities elsewhere in Malawi either because such facilities do not exist at all or became the existing facilities are not very much reliable.

Since testing is at the very root of any standardization and quality control activity, then it becomes extremely important to strengthen and expand the testing activities of the MBS. As a matter of fact, it is the duty of the MBS - according to its statute - to provide for the testing of the various types of commodities not only for in-house purposes but also for outside users as well.

In the Consultant's view, the MBS should eventually take the lead in promoting testing activities in the country. This will have profound effect on the performance of standardization and quality control activities, at the enterprise and national levels, in all sectors and areas and this -in turn- will contribute to the improvement of the national economy.

To this end, the following is recommended:

a. The testing facilities of the MBS should be greatly strengthened.

b. Calibration facilities should be established.

c. The MBS should advise, guide and assist the relevant bodies -especially in the industrial sector -in-:
   - setting up and/or consolidating their testing facilities
   - using standard test methods,
   - calibrating their testing equipment periodically.

d. The MBS should establish, organize and operate a "National Testing System" through laboratory accreditation schemes whereby laboratories could be accredited (recognized, approved, certified) to carry out certain tests according to their capabilities.

Ultimately, Malawi will have, at the disposal of all, several testing facilities in the various areas of the country, where reliable test results could be obtained. This is quite useful in Malawi which extends 900 km in length.

I. FOOD CONTROL IN MALAWI

1. INTRODUCTION

As mentioned in the Job Description, one of the main tasks of the present mission is to "assess and make recommendations on the establishment of a QC system for the food industry".

To function more effectively, a QC system for the food industry should preferably be an integral part of a more comprehensive food control system organized and operated at national level by all parties concerned. Consequently, before discussing the QC in the food industry, it would be useful to discuss first the present status of food control in Malawi.

The main "ingredients" of a food control system, whether at the national or the industry level, are:

a. Legislation
b. Regulations and/or standards
c. Staff (administrative and enforcement machinery)
d. Testing facilities

Each one of these ingredients will be discussed briefly.

2. PRESENT STATUS OF FOOD CONTROL IN MALAWI

a. Food Legislation

There is no one food control legislation in Malawi. Instead, there are separate legislations each dealing with a specific type of food, in addition to a general Public Health Act. Some of these legislations are as follows:

The Milk and Milk Products Act of 1972 provides for the conditions of the production, processing and marketing of milk and milk products.

The Public Health (Condensed Milk) Rules provide for the conditions of condensed milk, labelling of condensed milk an minimum standards of quality in respect to fat and total solids content.

The Fisheries Act of 1973 deals with licensing for commercial fishing, registration of fish importers and exporters, etc...

The Meat and Meat Products Act of 1975, the Meat Marketing Act of 1975 and the Meat Inspection Regulations of 1976 provide for such things as inspection of carcasses, grading of carcasses, licensing of butchers, etc...

The Liquor Act of 1979 provides for the establishment of licensing board, etc... It does not stipulate the control of quality of intoxicating liquor or beer, etc...

b. Food Regulations and Standards

Generally, there are no detailed regulations specifying:

- quality compositional requirements for the various types of food such as milk and milk products, edible fats and oils, spices and condiments, cereals, fresh or canned vegetables and fruits, liquors, etc...
- permissible food additives
- maximum limits of metallic and microbiological contaminants, pesticide residues, etc.

So far, the MBS has issued food standards, only one of them has been published. These are:

- MBS 1-1973: Mineral Waters
- MBS10-1981: Tung Oil (awaiting publication)
- MBS11-1981: Artificial Vinegar (" ")
- MBS12-1981: Methods of Test for Artificial Vinegar (" ")

c. Staff

The Public Health Department of the Ministry of Health has enforcement machinery spread throughout the country.

d. Testing Facilities

Testing laboratories play a very prominent role in the food control system. As a matter of fact, no food control can be performed without testing facilities which provide the analytical sypport for inspection.

Testing facilities in Malawi were mentioned earlier. Some of them carry out tests for food and food products.

3. NECESSITY OF ESTABLISHING FOOD CONTROL SYSTEM IN MALAWI

A good food control system renders many benefits. It protects the consumers against fraud and health hazards, helps to protect national food supplies, reduces food losses, contributes to assuring food security, maintains better nutritional status for the population, prevents the dumping of contaminated or sub-standard food, promotes the local food industry through improved processing techniques and promotes food exports thus increasing foreign exchange earnings.

In Malawi, as seen above, such food control system does not exist. There is no comprehensive food control act, there are no detailed regulations or enforced standards to protect the consumers; there are no central food testing laboratories where all of the critical chemical and bacteriological

quality parameters of foods could be checked, while the existing scattered testing facilities are not very adequate and need to be greatly strengthened in terms of equipment and staff.

It is, therefore, necessary to establish such a food control system as soon as possible. Naturally, the first step would be to issue the relevant act which should provide for the protection of the consumer against:

- accidents occuring from physical, chemical or biological causes in food,
- misuse of food additives,
- fraud, adulteration, mislabelling and wrong advertisement, etc.

The proposed act should cover all types of food that are imported or produced locally for domestic consumption.

This issue was discussed at length with the Principal Administrative Officer of the Ministry of Health and the Consultant recommended that a food control act should be issued preferably on the basis of the FAO/WHO Model Food Law which is a comprehensive legislation that provides for the setting up of a food control authority, prohibitions against sale of unsafe food, control of imports, standards and regulations, administration and enforcement, and legal proceedings.

During the meeting, which was attended by his counterpart Dr. F.M. Banda, the Consultant was advised that there had been an FAO Consultant on mission to Malawi (26.4 - 25.5.1979) who forwarded the same view (Mr. D.S. Chadha Report, p 12). It was agreed that there is a need for UN assistance in this regard.

It is, therefore, recommended that the MBS should take the initiative to request a UNIDO Consultant under SIS to assist in the drafting of a food control act and to advise on the development of food standards.

4. MBS AND THE FOOD CONTROL AUTHORITY

It is anticipated that the recruitment of the UNIDO Consultant mentioned above, the drafting and enactment of the food control law and the setting up and functioning of the food control authority will take almost three years. During this period, the MBS could assume the role of the food control authority could be conveniently accommodated within the corresponding broader ones of the MBS which possesses the four ingredients necessary for any technical control activities namely, legislation, standards, administrative and enforcement machinery and testing facilities. This is clearly demonstrated in the following way:

a. Legislation: the MBS Act which provides for its establishment, its objects, management, activities, etc...

b. Standards: the MBS is authorized to prepare standards for all types of commodities as well as codes of practice (Section 4 of the Act)

c. Enforcement: the MSB could recommend to the Minister of Trade and Industry to declare any standard to be a compulsory standard with or without the prescription of a distinctive mark (Section 21). The MBS staff could be appointed as inspectors (Section 24) with the right to inspect any premises, operation, records, etc... at any time (Section 25). The MBS is authorized to take legal processes against offences (Section 29).

d. Testing: The MBS IS AUTHORIZED TO TEST COMMODITIES (Sections 4 and 15) and has already a good laboratory which -after the addition of very few testing equipments- is well qualified to carry out the quality testing of food whether chemically or bacteriologically.

It is thus seen that the MBS could accommodate very conveniently the objects, duties and functions of the food control authority. Whether this accommodation would be temporary or permanent is a matter that could be decided upon later on, but the fact remains that the MBS could start immediately food control activities within its normal functioning.

In this regard, it should be strongly emphasized that - irrespective of any consideration to functioning as a food control authority - the MBS should have to devote a large portion of its activities to food because it cannot overlook the fact that the elaboration and implementation of food standards must be a national top priority. In addition, there is a favourable point in this issue represented by the fact that the MBS, by giving greater interest to cover the food field, will - automatically - cover that group of products which should be given the next priority, namely export commodities because, luckily enough, Malawian exports are either food products (tea, sugar, groundnuts, rice, canned food, etc.) or products that are usually linked with food (tobacco).

It is, therefore, strongly recommended that the MBS should start the preparation and implementation of an integrated standards programme for the QC of food. This could be carried out in the following way:

1. The MSB would set up a "Food Standards Council" or "Food Control Council" composed of representatives from:
   - Ministry of Trade and Industry
   - Ministry of Health
   - Ministry of Agriculture
   - Universities
   - Research Institutes
   - Malawi Export Promotion Council
   - Chamber of Commerce and Industry of Malawi
   - Agricultural Development and Marketing Corporation (ADMARC): representing food industry since it has several food processing plants.
   - Women Union of Malawi: representing consumers
   - MBS

2. The terms of reference of this Council would be:

   - to formulate the general policy to be adopted in order to realize food control,

- to approve long- and short-term plans for the elaboration and implementation of national standards covering the various aspects of food produced for local consumption, imported or exported,
- to recommend the standards which should be made compulsory with or without certification,
- to follow up the execution of the plans,
- to recommend any measure that should be taken to achieve the objectives of food control.

3. In drawing up standards plans an integrated approach to the food sector should be taken into consideration in the sense that standards should cover the whole food chain from the production of produce through the various operations until retailing. Thus, the plan could include the following types of standards:

- Standards for agricultural produce such as tea, vegetables, fruits, cereals and pulses, etc... They prescribe quality and grade characteristics such as moisture content, extraneous matter, size,percent defectives, etc...
- Standards for processed food prescribing compositional requirements and other quality parameters. Of special importance are the general standards dealing with the permissible food additives, the maximum limits of chemical and microbiological contaminants and pesticide residues.
- Test standards specifying method of sampling and chemical and microbiological testing as well as organoleptic tests. These tests enable to check the conformity of products to the requirements of the standards.
- Codes of (Good) Practice prescribing the requirements for operation and activities connected with food such as processing, packaging, handling, storage and transportation. They also include such aspects as the sanitation of equipment, food hygiene and food inspection.

The importance of these codes should not be overlooked. For example, codes for the storage of produce help greatly in reducing post-harvest losses which are estimated to range between 5% and 30%. Therefore, the reduction of these losses, through good storage practice, will contribute to the food security, an issue which is receiving nowadays growing serious interest at all levels in the world. In September 1975, the 7th Special Session of the UN General Assembly adopted a resolution that "Further reduction of post-harvest food losses in developing countries should be undertaken as a matter of priority and a view to reaching at least 50% reduction (of losses) by 1985". It is worthy to mention here that ISO has recently issued ISO 6322 in 3 parts dealing with "Storage of Cereals and Pulses".

4. Food standards would be elaborated in the usual manner through technical committees set up by the MBS. These committees should take full advantage of existing regional and international standards. ISO has issued many standards on agricultural produce such as tea, coffe, spices and condiments. The Codex Alimentarius Commission (CAC) has issued general standards on labelling, contaminants, pesticide residues, etc. as well as codes on hygiene, handling and inspection of food. The Organization for Economic Co-operation and Development (OECD) has issued standards on fresh vegetables and fruits.(*)

(*) Could be obtained from:

OECD Publications Office
2, rue André-Pascal
75 Paris - 16 e
France

RECOMMENDATIONS(*)

A. GENERAL

1. The foremost recommendation which represents the main outcome of the present mission is that the MBS should be strengthened by providing it with adequate assistance at the national and international levels.

At the national level, assistance should take the form of a bigger Government grant mainly to enable the MBS to strengthen its staff especially the scientific and technical personnel. It is estimated that the MBS is in persistent need of at least five more scientific officers (engineers/chemists/physicists, etc.) in 1982, six in 1983, four in 1984 and two in 1985. These officers, together with those already employed, would cover all MBS activities, namely: standards writing, certification marking, testing, quality control and industrial metrology. The latter domain, though one of the main duties stated in the Act, has never been approached so far in spite of its importance to industry. Included in the personnel to be recruited in 1982, there should be a bacteriologist and, preferably, a civil engineer and a mechanical engineer.

It should be emphasized here that the expenses incurred in strengthening the MBS staff could be paid off since, by increasing its staff and technical capabilities, the MBS will be able to broaden and intensify its activities and services and hence its earnings in such a way that it might become self-supporting or, at least, the Government grant could be kept at a low figure.

At the international level, assistance should take the form of:

a. Provision of international expertise through the assignement of experts and consultants (33 man-month)
b. Training and up-grading abroad of 17 MBS staff members (34 man - month).

(*) In addition to these main recommendations, there are some others inherent in the previous chapter.

c. Supply of testing equipment to enable the MBS to verify the compliance of locally made goods to national standards (about K 200,000 i.e. $ 220,000)

To this end, the Consultant designed a project tailored to the specific needs of the MBS and prepared the relevant project document which is attached to this Report as Annex.

It is very strongly recommended that the MBS should secure UN assistance in implementing this project which will put it in a position where it could contribute substantially to the promotion of the national economy.

2. The staff is the pivot of any enterprise since it is the machinery responsible for discharging its duties. As a matter of fact, man is the most precious element in any enterprise, much more important than all other elements; he is the real key to true and lasting success. Moreover, the technical staff of NSBs in developing countries bear more responsibilities than their counterparts in developed countries. In developing countries, the staff members of the NSBs have to do most of the technical work of the TCs and -towards industry- they have to assume the role of advisers, guides and instructors.

Consequently, the MBS should aim at building a nighly qualified staff with deep specialized experiences. As a prerequisite for the realization of this important objective the MBS should provide the conditions that would encourage qualified people to join and continue working for it. It should then secure continuous training and up-grading by all possible means. Fortunately enough, the first stage of such training is available almost at no cost on the part of the trainees or their respective organizations. Such training is extended free to the technical staff of the NSBs in developing countries through fellowships granted by the UN, organizing governments or both.

It is therefore, strongly recommended that the MBS should not fail to take full advantage of the various training opportunities available abroad (Annex XIII).

B. STANDARDIZATION

3. Due to the large number of standards that should be elaborated, the time factor and the limited available resources, the MBS should carry out its activities through long term (3 - or 5-year) standards plans split into yearly ones. The number of standards in the plan mainly depends on the manpower available for standards writing and the average time for the elaboration of a standard. Plans should be realizable, fit the social and economic context of Malawi and should leave room for the periodic revision of national standards in order to keep pace with the advances in science and technology.

4. Since it is a basic principle in standardization that standards should meet local needs, the preparation of standardization plans should be mainly made on the basis of a comprehensive survey of the needs of the various bodies (ministries and Government departments, technical institutes and societies, chambers of commerce and industry, industrial enterprises, consumer organizations, etc...)

In addition to the results of the survey, there are other items which should be considered concurrently in selecting the subjects for the standards plan. These are:

a. export commodities,
b. products of industrial projects included in the development plan,
c. international standards which each country should consider for adoption immediately (an ISO/DEVCO document obtainable from ISO),
d. subjects proposed for standardization based on MBS own experience.

5. The selection of subjects for inclusion in the plan should be based on priorities established only through due consideration of local economic and social conditions.

For the quantitative estimation of priorities, very few methods are avaiblable (e.g. point system). A suitable one is mentioned in an ISO document(**) which, though suggested for international standardization, could basically be applied - with little modification to national standardization as well.

6. The field of food should be giventop priority, at least in the first long-term plan. This does not mean, in any way, that the plan should be devoted entirely to food standards, but rather that the greater portion of standardization activities should be directed towards that field. The grounds for this recommendation(*) are:

a. there is no comprehensive food control system nor regulations in Malawi. In such case, the MBS is the only statutory body which is highly qualified -and prepared- to fill the gap,

b. food standardization has a direct bearing on the economic and social development of any country,

c. food is directly connected with the protection of life, health and safety of the whole population,

d. the sector of food and related products (such as tobacco) is the largest sector contributing to the GDP (Table 1) and constituting not less than 80% of the total domestic exports of goods (Table 3).

e. the branch of food industries is probably the biggest among the various branches of the industrial sector in Malawi.

7. Tackling of the field of food should be done in an integrated manner, i.e. though the standardization of the various aspects of the food chain starting from raw materials (largely agricultural produce) to retailing including the intermediate stages of processing, handling, packaging, storage and transportation.

(**) Has been provided by the Consultant

8. In formulating the first plan, emphasis should be made, as far as possible, on product specifications rather than on other standardization aspects (e.g. terminology, methods of test, etc...)

9. The procedure adopted in the elaboration of Malawi standards should be as simple and time-saving as possible without impairing the quality of their technical contents. This could be realized by reducing certain administrative and formality matters connected with the setting up and operation of TCs. To help in this direction, the MBS Director could be authorized to assume more relevant responsibilities and this should be reflected in the "Draft Rules and Procedures Governing Technical Activities of the MBS" which is currently under consideration.

C. TESTING

10. In the interest of national standardization and QC activities, the MBS should aim not only at the strengthening of its own testing capabilities but also at strengthening of such capabilities in other bodies in the country. This task, which could be realized by constant advice, motivation and guidance, will pave the way to the operation, at a later stage, of a "national testing system" (see the section on "Testing Activities" in the preceeding chapter).

D. CERTIFICATION MARKING

11. Certification marking activities should be mainly directed towards products consumed/used by ordinary consumers with special reference to food products.

E. METROLOGY

12. Since Malawi has almost become metric and in order to provide sound internationally-based metrological services, measures should be taken, as soon as possible, to issue a new act on legal metrology. The model law recommended by the International Organization for Legal Metrology should be useful in drafting the said act.

13. Though a very useful body performing its duties to the best of its capabilities, the Assize Division (AD) should be strengthened to enable it to cover Malawi with regular and proper metrological inspection and testing.

14. For the conservation and best use of resources, both human and otherwise it is strongly recommended to gather all metrological activities under one roof by attacking the AD to the MBS.

F. EXPORT INSPECTION

15. Due to the important place exports occupy in the national economy of Malawi, it is recommended that separate Government notices, or-still better- a comprehensive act, should be issued to enforce inspection and control of export goods. The remarkable success of the MBS in the case of tobacco should be a strong impetus to such a step.

G. STANDARDS INFORMATION AND PROPAGATION

16. In view of the important role played by standards information in promoting standardization activities, the MBS should continue the development of the nucleus library already established. It should recruit a qualified librarian who must be trained in standards information and documentation preferably in ISO or any NSB or both. The MBS annual budget should always contain sufficient funds to procure the necessary references and equipment.

17. None of the activities of any NSB can be carried out without having direct contacts with many circles such as ministries and government departments, technical and scientific institutes and societies, industry, trade and the public at large. For these activities to be successful, the NSB will have to be made known through public relations especially in developing countries where standardization is a new, and unknown, part of the society. By helping to present the NSB actively, the public relations (PR department makes a major contribution to the implementation of standards. It is for such reasons that the PR department has become an established, vital and even respectable part of the NSBs in many countries.

It is, therefore, recommended that the MBS should have on its payroll a highly qualified and energetic public relations officer.

ACKNOWLEDGEMENT

Profound thanks must go to Mr. J. Malange, Principal Secretary, Ministry of Industry and Trade and Mr. T.S. Mangwazu, Chairman, MSB for their very stimulating discussions and kind support.

ANNEX I

UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO

October 1980

PROJECT IN MALAWI

JOB DESCRIPTION

RP/MLW/80/003/A/31.3.K 11-01

Post title Consultant in Quality Control, Standardization and Certification Marking.

Duration 1 month

Date required As soon as possible

Duty station Blantyre, Malawi; with possibility of travel within the country.

Purpose of project To identify the needs of the Malawian Bureau of Standards and prepare a project proposal reflecting these needs with special emphasis on the areas of quality control and certification marking.

Duties The expert will be attached to the Malawian Bureau of Standards and will specifically be expected to:

1. Review and assess the requirements of standardization and quality control in the light of the general objectives of the economic and industrial development of the country,

2. Visit existing testing and research laboratories in order to assess the testing facilities available in the country for the purpose of standardization, quality control and certification marking; and to specifically determine the present need for testing facilities for the building industry,

3. Assess and make recommendations on the establishment of a quality control system for the food industry.

4. Make recommendations on the establishment of a national certification marking programme,

5. Determine the staff requirements of the Malawian Bureau of Standards and recommend areas of training necessary for personnel engaged in these activities.

6. Prepare a report outlining the findings of his assignment and his recommendations to Government on further actions wich might be taken.

In addition, the expert will also be required to assist in the preparation of a project proposal for future UNIDO assistance in Malawi in the areas of standardization, quality control and certification marking.

Qualifications University degree in an engineering discipline or an applied physical science. Extensive experience in a senior and responsible capacity in the organization and management of standardization, quality control and certification marking programmes at a national level. Experience in developing countries desirable.

Language English

Background information

The Malawian Bureau of Standards (MBS) is now planning to establish a centre in Blantyre. At present they are facing accomodation problems, although facilities already exist for quality control of tobacco and pesticides control. On the basis of existing facilities the MBS plans to develop institutional facilities for quality control of food products and to establish a functional department for the MBS certification mark programme.

Immediate attention needs to be given to a serious problem the building industry is facing since the MBS and other institutions are unable to perform obligatory tests on prefabricated materials, especially plastic pipes. Production samples must be sent to neighbouring receiving results can sometimes amount to several months.

Malawi is one of 18 African countries which are members of the African Regional Standards Organization, and has continuously shown a great interest in participating in its activities, as well as sharing the responsibilities that such a participation entails.

PARTICULARS OF THE COUNTERPART

Dr. Fletcher Mpandasoni Banda: Director, MBS

Dr. Banda, born on 5 December 1945, got his B.Sc degree in Chemistry (major) and Biology (minor) from the University of Malawi in 1970 with a credit in the order of merit.

In 1973, he got his Ph.D. degree in Chemistry from the University of Sheffield, England, specializing in novel organic synthetic methods using electricity as a reagent, a branch of science popularly known as "Electro-organic Synthesis".

In September 1973, he was appointed as Lecturer in Organic Chemistry at the Chancellor College, University of Malawi.

In August 1975 he was appointed as Deputy Director, Malawi Bureau of Standards and in December 1978 he became the first Malawian Director of the Bureau.

Dr. Banda Participated in the following 3 useful training programmes:

1. Vocational Training Seminar on Laboratory Instrumentation, Loughborough University 1971.

2. Ninth International Training Programme on Standardization for Developing Countries, Indian Standards Institution, New Delhi (16 Dec. 1976 - 30 March 1977).

3. Chief Executive Programme, IMI, Dublin. (30 March 1981 to 6 June 1981).

Dr. Banda has wide experience in standardization at the national, regional and international levels.

His experience at the national level started in August 1975 when he was appointed Deputy Director of the MBS. In this capacity, he established the Standards Section of the Bureau, set up technical committees and developed several Malawian standards. He also established a formal standards Library and an Editing Section and was responsible for standards propagation. In December 1978, he became responsible for directing the standardization movement in Malawi.

Besides his contributions to national standardization, Dr. Banda assisted in the formulation of the Metrication Work Programme, its Implementation Plan and in the coordination of the metrication changeover activities. He is Joint Secretary of the Coordinating Committee of the Metrication Board and of all its sub-committees.

At the regional level, Dr. Banda participated in ARSO Interim Steering Committee that formulated ARSO Constitution, Work Programme and its first budget. In 1979, the ARSO General Assembly elected Dr. Banda for membership in its Council and in 1980, he was elected as President of ARSO General Assembly for a 3-year term.

At the international level, Dr. Banda participated as a resource personnel in the Training Seminar held in Blantyre in 1979 by the Commonwealth Science Council, ISO Training Seminar held in Lusaka in 1980 and ISO Public Relations Workshop held in Geneva in 1980.

Dr. Banda participates also in the ISO General Assembly and DEVCO meetings. At present, he is appointed by ISO as its Regional Liaison Officer for Africa.

ANNEX III

TECHNICAL VISITS AND DISCUSSIONS

a. Government Ministries, Department and Bodies.

1. Ministry of Health
   Principal Administrative Officer: Mr. A.B. Maosa

2. Malawi Export Promotion Council

   Director: Mr. N. Mwaungulu
   Senior Trade Officer: Mr. S.O. Hara

3. Weights and Measures Dept. Ministry of Trade and Industry

   Government Assizer: Mr. E. Hewitt

4. Electricity Supply Commission of Malawi (ESCOM)

   General Manager: Mr. Ashenson

5. Tobacco Control Commission

   Secretary: Mr. R. Buckingham

6. Design Department, Ministry of Works and Supplies

   Technical Officer: Mr. J.C. Maliseni

7. Malawi Electrical Calibration Centre

   Professional Officer: Mr. W.D. Simfuk we.

B. Research Institutes

1. Bvumbwe Research Station

   Senior Research Officer: Mr. P.P. Panje

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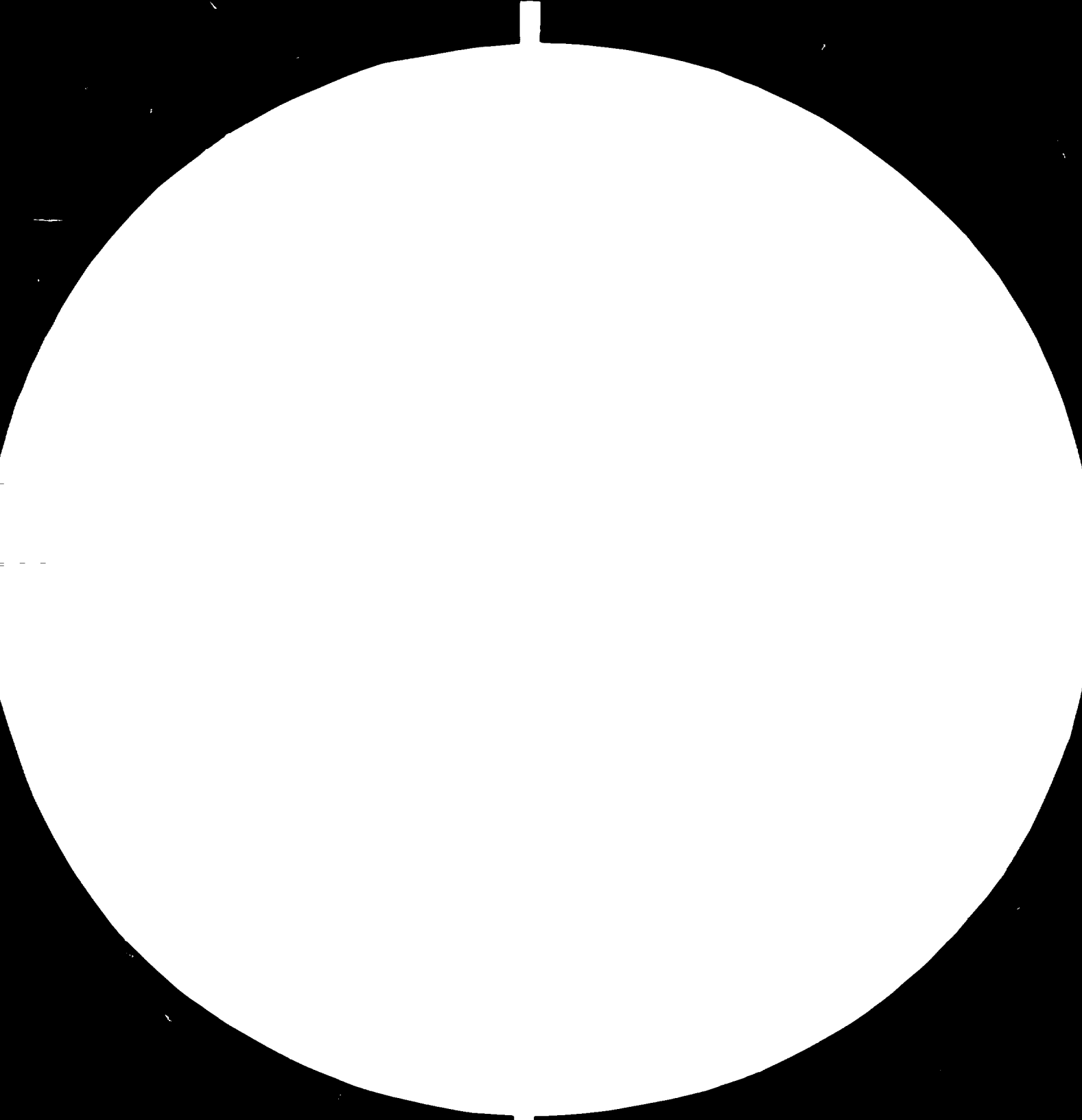

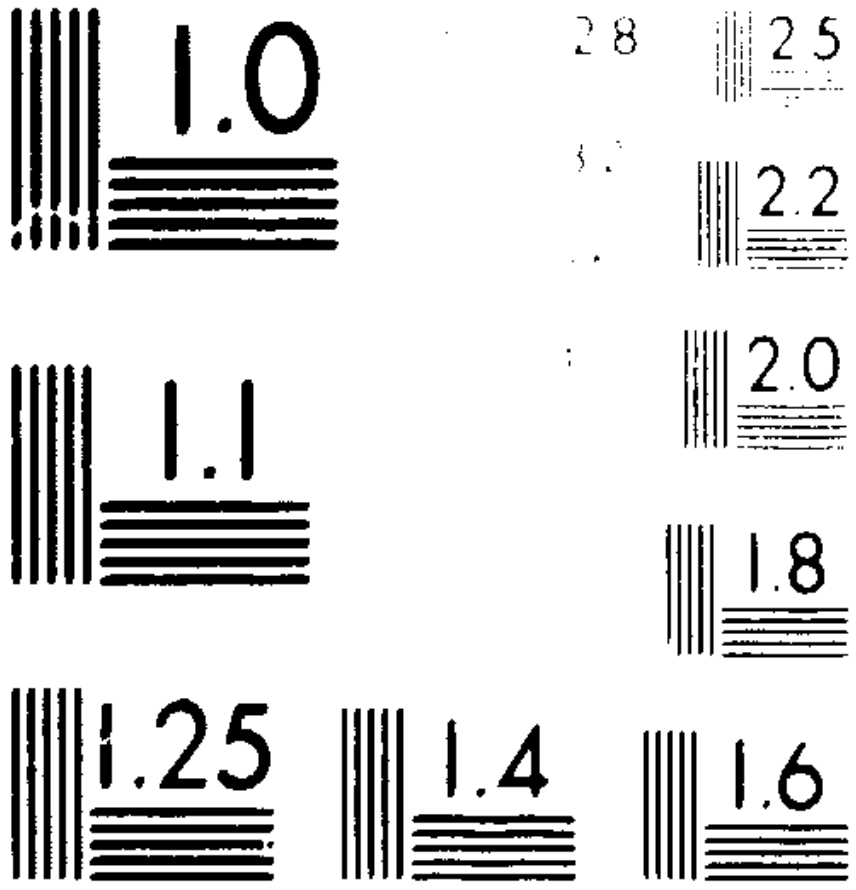
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2. Tea Research Foundation of Central Africa

Head, Biochemistry Dept.:	Dr. J.B. Cloughley

C. Industrial Enterprises

1. Packaging Industries (Malawi) Ltd.

General Manager:	Mr. E.L. Kapazira

2. David Whitehead + Sons (Malawi) Ltd. (Textiles)

General Manager:	Mr. Nr. Rutherford
Deputy General Manager:	Mr. R. Wooley

3. Aramic Co. Ltd.

Director:	Mr. B.V. Popat
Assistant Director	Mr. Ganatra

4. Portland Cement Co. (1974) Ltd.

Deputy Chief Executive:	Mr. E.B. Kadzako
Production Manager	Mr. K. Malinki
Chief Chemist	Mr. Kachinjika

5. Pipe Extruders Ltd.

General Manager	Mr. V.E. Livingston

6. ADMARC Canning Factory

General Manager	Mr. Rumney

D. Experts.

1. Dr. M. Oksal
   Project Coordinator

2. Mr. P. Edwards
   Industrial Economist

3. Mr. Norman Wigginton
   ITC Expert

ANNEX IV

ROUNDUP MEETINGS

1. Ministry of Trade and Industry:

   Mr. J. Malange - Principal Secretary
   Mr. Namarika - Under Secretary

2. Ministry of Finance

   Mr. Mbeye - Chief Executive Officer External Aid Section.

3. Department of Statutory, Bodies

   Mr. P.A.B. Kalirangine - Deputy Secretary

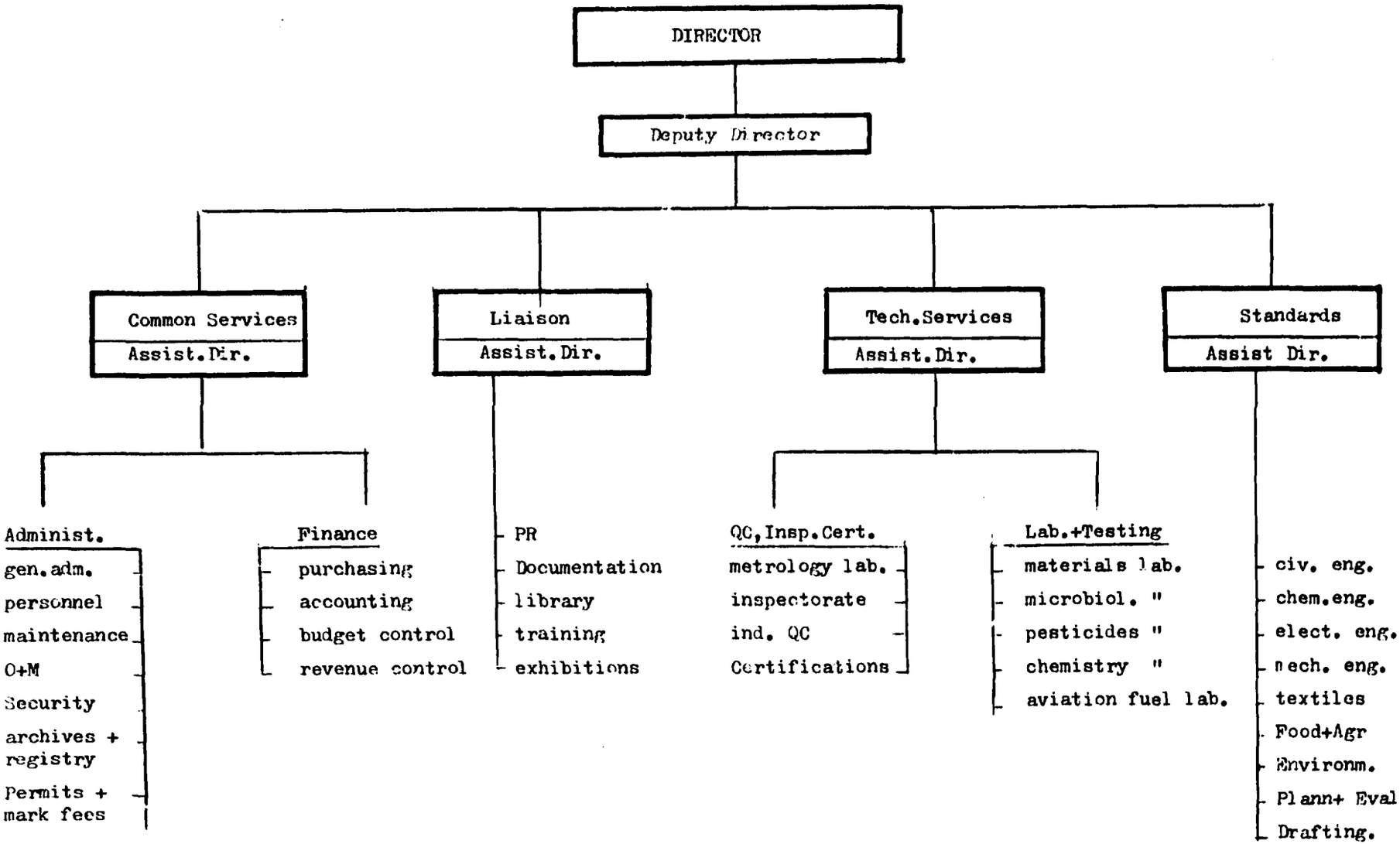
4. Office of the President and Cabinet, Development Division.

   Mr. E.I. Chiwewe - Chief Development Officer
   Mr. C.E. Mphaya - Development Officer

5. Mr. T.S. Mangwazu - Chairman, Malawi

   Standards Board and Group Managing
   Director, Press (Holdings) Ltd.

ORGANIZATIONAL CHART OF THE MBS



ANNEX V

ANNEX VI

MBS STAFF

Director	1
Chief Chemist	1
Scientific Officer	3
Technical Officer	4
Technical Assistant	4
Lab. Attendant	2
Administrative Officer	1
Administrative Assistant	1
Library Assistant	1
Technical Editor	1
Secretary	1
Copy Typist	2
Assistant Accountant	1
Accounting Assistant	1
Private Automatic Box Exchange (PABX)	1
Driver	2
Messenger	1
Office cleaner	2
Garden cleaner	2
Total	32

ANNEX VII

SCIENTIFIC PERSONNEL OF THE MALAWI BUREAU OF STANDARDS

NAME	ACADEMIC AND PROFESSIONAL QUALIFICATIONS	EXPERIENCE
Mr. R.A.Davis	* Licenceate of the Royal Institute of Chemistry L.R.I.C., * M.Sc. (1971) UK. * Associate of the Royal Chem. Society	Extensive experience in laboratory techniques and development.
Mr. A.S. Khulumula	* B.Sc. (Malawi), 1972. chem * Training in quality control in Sweden for 10 weeks, 1978 * Training in the Organization of Stand. Works in BSI for 6 weeks, 1981	Experience in quality control, factory inspection, certification marking and standards writing
Mr. D.P.H. Chisala	* B.Sc. (Malawi) 1977. chem.	Experience in analytical work in chemical laboratories.
Mr. C.M. Kasinja	* Diploma in Electrical Eng., 1973 * B.Sc. (Pulp and Paper Technology), 1977 * B.Sc. (Chem.Eng.), 1979	Whole tree pulping. Junior Factory Overseer (Sugar Corp. of Malawi) Standards writing activities.

ANNEX VIII

MBS ACCOUNTS FOR THE FISCAL YEARS 1978/79, 1979/80 and 1980/81 (*) (**)
(in Malawian Kwacha)

	1978/79		1979/80		1980/81	
INCOME						
.Govt.grant		65,630		78,322		131,992 (***)
.Testing fees		22,974		30,038		39,190
.Mark fees		1,398		2,731		3,695
.Sale of publications		107		584		182
.Members subscription scheme		—		—		701
.Interests + misc.receipts		933		2,002		6,035
		91,042		113,677		181,795
EXPENDITURE						
.Staff emoluments	38,809		70,461		83,149	
.Depreciation	14,489		13,372		15,117	
.Subscript.to int.organisations	6,338		9,228		9,141	
.Chemicals + glassware	6,396		7,388		8,451	
.Printing + stationery	3,520		6,803		5,702	
.External travelling	3,906		2,037		7,010	
.Postal services	2,301		3,881		4,998	
.Repairs + maintenance	6,769		2,390		1,153	
.books + journals (****)	628		1,228		2,070	
.Other operating costs	10,321		12,573		15,507	
		93,477		129,361		152,298
SURPLUS(DEFICIT) ON OPERATIONS FOR THE YEAR		(2,435)		(15,684)		29,497
REVENUE CONTRIBUTION TO CAPITAL EXPENDITURE		(1,580)		6,971		10,276
SURPLUS(DEFICIT)FOR THE YEAR		(855)		(22,655)		19,221
Accumulated surplus brought forward		61,349		60,494		37,839
ACCUMULATED SURPLUS CARRIED FORWARD		60,494		37,839		57,060

(*) The fiscal year starts on the 1st April

(**) 1 MK = 1.1 US$

(***) The Govt. grant was MK 137,377 from which MK 5,385 was deducted representing special funds held for the partially completed purchase of lab. equipment.

(****) Including vehicle expenses, electricity, water, rent, insurance, auditor's remuneration, stores, entertainment, bank charges and general expenses.

ADDITIONAL RECOMMENDED PUBLICATIONS ON STANDARDIZATION AND FOOD QC.

I. STANDARDIZATION

1. COLES, J.V.
   Standards and Labels for Consumer Goods.
   Ronald Press. N.Y., 1949

2. GAILLARD, JOHN
   Industrial Standardization, Its Principles and Applications.
   H.W. Wilson, N.Y., 1934

3. GLIE, ROWAN (ED.)
   Speaking of Standards
   Cahners Books, Boston, Mass, USA., 1972

4. HARRIMAN, NORMAN F.
   Standards and Standardization
   McGraw-Hill Book Co,, 1928

5. HARRISON, DEX
   Standards in Building and Modular Coordination.
   Earl F.N. Spon Ltd., London, 1955

6. HEMENWAY, D
   Industry Wide Product Standards
   Ballinger Publ. Co., Philadelphia, Pa., USA, 1975

7. JAPANESE STANDARDS ASSOCIATION
   Textbook for the Seminar on Company Standardization
   Japanese Standards Association, Tokyo, Oct 197

8. JAPANESE STANDARDS ASSOCIATION
Technique of Company Standards at Work.
Japanese Standards Association, Tokyo, April 1980

9. JAPANESE STANDARDS ASSOCIATION
How to Promote Company Standards.
Japanese Standards Association, Tokyo, April 1981

10. JAPANESE STANDARDS ASSOCIATION
Company Standardization.
Japanese Standards Association, Tokyo, 1981

11. JAPANESE STANDARDS ASSOCIATION
Method for Promoting Quality Control and Company Standardization.
Japanese Standards Association, Tokyo, 1981

12. KHAN, A.G.
Standardization and Its Value to Modern Industry.
Oriental Publishers, Karachi, 1948

13. LANSBURG, R. H. (Ed)
Standards in Industry
Am. Academy of Political & Social Science, Philadelphia, 1928

14. LEGGET, R.F.
Standards in Canada
Information Canada, 1971

15. MARTIN, BRUCE (Ed.)
The Co-ordination of Dimensions for Building
Royal Institute of British Architects (RIBA), London 1965

16. MARTIN BRUCE
Standards and Building
Royal Institute of British Architects (RIBA), London 1971

17. McNiece, H.
Industrial Specifications
John Wiley, Chapman & Hall, 1953

18. MELNITSKY, BENJAMIN
Profiting from Industrial Standardization
Conover-Mast Publications, Inc., N.Y. 1953

19. MUTUAL SECURITY AGENCY.
Increasing Productivity through Simplification, Standardization, Specialization.
The Agency, Washington D.C.

20. NAGARAJAN, R.
Standards in Building
Pitman Publishing, 1976

21. NATIONAL ASSOCIATION OF PURCHASING AGENTS
Standardization Manual
The Association, N.Y.

22. NATIONAL ASSOCIATION OF PURCHASING AGENTS
Standards: A Procurement tool : The Meaning of Standardization in the Economics of Purchasing
The Association, N.Y.

23. ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT (OECD)
Standardization of Fruit and Vegetables- Technical and Economic Aspects
OECD, Paris

24. PEISER, H.S. and BIRCH, J.A. (Ed)
Standardization in Support of Development:
Proceedings of a Seminar Held at the National Bureau of Standards. October 17-18, 1977. NBS. Special Publ. 507. GPO 1978

25. PERRY, J.
Story of Standards
Funk and Wagnalls.

26. RECK, DICKSON
National Standards in a Modern Economy
Harper & Bros., N.Y.

27. STARR, C.H.
Specification and Management of Materials in Industry
Thames & Hadson.

28. STEPHENS, K.S.
Preparing for Standardization, Certification and Quality Control.
Asian Productivity Organization, Tokyo, 1978

29. STRUGLIA, ELJ.
Standards and Specifications Information Sources
Gale Research Co., Detroit, 1965

30. SWEDISH STANDARDS INSTITUTE
Product Liability and Standardization.SIS Handbook 147
The Institute, P.O. Box 3295, S-103 66, Stockholm, 1981

31. WARNER,Sir FREDERICK
Standards and Specifications in the Engineering Industries.
The National Economic Development Office.(NEDO)
21 Milbank, London SWI UK 1978

32. WOODWARD, C.D.
Standards for Industry
Heinemann, London, 1965

UN, CID and UNIDO PUBLICATIONS

1. REPORT OF THE SYMPOSIUM ON INDUSTRIAL DEVELOPMENT IN AFRICA, Cairo, 1966. 1966, ID/CONF. 1/R.R.1

2. REPORT OF THE ASIAN CONFERENCE ON INDUSTRIALIZATION, Manila, Philippines, 1965, 1966, ID/CONF. 1/R.R.2

3. INDUSTRIAL STANDARDIZATION IN DEVELOPING COUNTRIES, 1964, ST/CID/2 (Sales No. 65.II.B.2)

4. The Promotion of Industrial Standardization in Developing Countries, Report of the United Nations Interregional Seminar, Helsingor, Denmark, October 1966. 1966, ST/TAO/SER. C/85 (Sales No. 66.II.B.12)

5. Standardization 66p. (Industrialization of developing countries: problems and prospects) (Sales No. 69.II.B.39, Vol.12)

6. Establishing standardization of Plastics in Developing Countries, 1969 (Sales No: E. 69.II.B.27)

7. Papers and Report of the Training Workshop for Personnel Engaged in Standardization, Addis Ababa, Ethiopia, 17-24 Nov. 1970 (ID/WG71)

8. Papers and Report of the Training Workshop for Personnel Engaged in Standardization, Santiago, Chile, 27 Sept - 5 Oct, 1971 (ID/WG97)

9. Papers and Report of the Study - Tour - Workshop on Quality Control and Certification Ma king for Industrial Products, Singapore, 20-25 May 1974. (ID/WG 180)

10. Papers and Report of the Group Meeting on Standardization and Quality Control in the Industrialization Process of Developing Countries, 7-12 September 1981, (ID/WG 346).

II. ANALYSIS AND TESTING OF FOOD

1. Food Analysis: Analytical and Quality Control Methods for the Food Manufacturer and Buyer. 3rd ed. of "Laboratory Handbook of Methods of Food Analysis
Leonard Hill Books, Pitman Press, 1975

2. HART, F.L. and H.J. FISHER
Modern food analysis, New York, Springer, 1971. 519 p.

3. GREHEM J.T.
A Student's Introduction to Food and Drugs Sampling Procedures
Institute of Trading Standards Administration

4. LOWE, D. ARMSTRONG & A.R. STILES
Pesticides-nomenclature, specifications, analysis, Use and Residues in Foods.
WHO.

5. NEWLANDER, J.A. and HENRY V. ATHERTON
Chemistry and Testing of Dairy Products.
Olsen Publishing Co., Milwaukee, Wisconsin, USA, 3rd rev. ed., 1964

6. PEARSON, DAVID
The Chemical Analysis of Foods.
Chemical Publishing Co., Inc. New York, 1971

7. PEARSON, D.
Laboratory Techniques in Food Analysis.
Butterworths, 1973

8. POMERANZ, Y. and CLIFTON E. MELOAN
Food Analysis, Theory and Practice
AVI Publishing Co., Inc., Westport, Connecticut. USA, 1971

9. SOCIETY OF CHEMICAL INDUSTRY
Residues of Pesticides in Foodstuffs.
The Society

10. WILLARD
Instrumental Methods of Analysis,
Affiliated East-West Press Private Ltd., India

III QUALITY CONTROL IN FOOD AND DRUGS

1. ARSCEL WB VAN, COPLEY, MJ AND OLSON, RL (EDITORS)
Quality and Stability of Frozen Foods: Time-Temperature Tolerance and its Significance
Wiley, 1969

B. BREELING, J.L. and M. NAGY.
Proceedings of a symposium on newer food processing technology: safety and quality assurance. Chicago, American Medical Association, 1973. 269 p.

3. CONNELL, J.J.
Control of Fish Quality
Fishing News (books) Ltd. 23 Rosemount Ave., West Byfleet, Surrey, England, 1975

4. COOPER, MURREY S. (Editor)
Quality Control in the Pharmaceutical Industry
Academic Press, Inc., 2Vol., 1972, 1973

5. EUROPEAN ORGANISATION FOR QUALITY CONTROL
Proceedings of the First European Seminar for Quality Control in the Food Industries.
Association Espanola para el Control de la Calided, Madrid 1973

6. FEISTRITZER, W.P.
Cereal Seed Technology: a manual of cereal seed production, quality control and distribution. FAO Agricultural Development paper No 98. FAO Plant Production and Protection series No 10. FAO, 2nd printing 1978 (238 p)

7. FISH INSPECTION AND QUALITY CONTROL
Fishing News (Books) Ltd.

8. GRAHAM, J.T.
Handbook on Food Quality and Description.
The Institute of Trading Standards Administration, 1973

9. GOULD
Food Quality Assurance

10. HENDRIX, C.M. AND J.E. JEFFERSON,
Quality control Manual for Citrus Processing Plants.
Lakeland, Florida, Staley Co., 1973. 180 p.

11. HERSCHDOERFER, S.M.
Quality Control in the food Industry
Academic Press, Inc. 3 vol., 1967, 1968, 1972

12. KRAMER, A. and BERNARD A. TWIGG
Quality control for the Food Industry
Vol 1 : Fundamentals
Vol 2 : Applications
AVI Publishing Co., Inc. 3rd ed., 1970, 1973

13. PROCEEDINGS OF THE SYMPOSIUM CELEBRATING THE CENTENARY OF THE SALE OF FOOD AND DRUGS ACT. London, October 1975
Food Quality and Safety: A Century of Progress
Ministry of Agriculture, Fisheries and Food,
London : HMSO, 1976

14. PROCEEDINGS OF 6th EUROPEAN SYMPOSIUM ON FOOD ENGINEERING AND FOOD QUALITY
Society of Chem. Ind., London, 1975

15. THORNER, M.E. and P.B. MANNING
Quality control in food service Westport, Connect,
Avi Publishing Co., 1976. 300P

16. WOODIS, T.C.
Fertilizer quality control in Indonesia. Muscle Shoals,
Alabama, Tennessee Valley Authority, National Fertilizer
Development Center, 1973, 74 p

IV PERIODICALS

1. ASTM STANDARDIZATION NEWS
(Formerly Materials Research and Standards)
Monthly. Also available in microform
Publ: American Society for Testing and Materials 1916, Race St.
PHILADELPHIA, Pennsylvania, 19103 USA

2. STANDARDS ENGINEERING

Every two months

Publ: Standards Engineers Society
2617 East Hennepin Avenue
MINNEAPOLIS, Minnesota 55413, United States of America

3. THE STANDARDS ENGINEER

Quarterly

Publ : The Institute of Standards Engineers
c/o Indian Standards Institution (ISI)
Manak Bhavan
9 Bahadur Shah Zafar Marg
New Delhi 110 002
India

ANNEX X

MALAWI STANDARDS

A. PRINTED STANDARDS

MBS 1-1973(*)	Standard Specification for Mineral Waters (18pp)
MBS 2-1976	Standard Specification for Non-Metallic Conduit and Fittings (for electrical wiring). (9 pp)
MBS 3-1976	Standard Specification for Unplasticized Polyvinyl chloride (UPVC)Sewer and Drain pipes and Pipe Fittings. (19 pp).
MBS 4-1976	Standard Specification for Unplasticized Polyvinyl Chloride (UPVC) Type 1. Pressure Pipes and Fittings (for cold water services) (23 pp)
MBS 5-1976	Standard Specification for Unplasticized Polyvinyl Chloride (UPVC) Pipes and Pipe Fittings for Use Above-Ground in Drainage Installations (15pp)
MBS 6-1979	Standard Specification for Burnt Clay Bricks (19pp).
MBS 7-1980	Code of Practice for the Installation of Unplasticized Polyvinyl Chloride (UPVC)Pipes (30 pp).
MBS 8-1980	Standard Specification for Manually Operated Air-Break Switches. (26 pp)
MBS 9-1980	Standard Specification for Plugs,, Socket Outlets and Socket Outlet Adaptors. (14 pp)

B. STANDARDS AWAITING PUBLICATION

MBS 10-1o81	Standard Specification for Tung Oil.
MBS 11-1981	Standards Specification for Artificial Vinegar
MBS 12-1981	Methods of Test for Vinegar
MBS 13-1981	Safety Specification for Flexible Cords for Power and Lighting Appliance.
MBS 14-1981	Safety Specification for Apparatus Connections for Portable Domestic Appliances.
MBS 15-1981	Standard Specification for Safety of Electrical Appliances.

C. DRAFT STANDARDS

DMS 9-1980	Determination of Dimensional Stability of Non-Metallic Conduit and Fittings (for Electrical Wiring).
DMS 10-1980	Determination of Flammability of Non-metallic Conduit and Fittings.

(*) Under revision

DMS 11-1980	Determination of Crushing of Non-metallic Conduit and Fittings.
DMS 12-1980	Determination of Impact for Conduit and Fittings.
DMS 13-1980	Determination of Dielectric Strength for Non-metallic Conduit and fittings.
DMS 14-1980	Determination of Resistance to Copper Contamination for Conduit and Fittings.
DMS 15-1980	Determination of Compatibility of Cables for Conduit and Fittings.
DMS 16-1980	Determination of Dimensions for UPVC Pipes and Fittings.
DMS 17-1980	Determination of Softening Point of UPVC Pipes and Fittings.
DMS 18-1980	Determination of Toxicity of UPVC Pipes and Fittings.
DMS 19-1980	Determination of Chemical Resistance of UPVC Pipes and Fittings
DMS 20-1980	Determination of Water Absorption for UPVC Pipes and Fittings.
DMS 21-1980	Determination of Resistance to Creep for UPVC Pipes.
DMS 22-1980	Determination of Thermal Reversion of UPVC Pipes.
DMS 23-1980	Determination of Resistance to Acetone for UPVC Pipes.
DMS 24-1980	Determination of Resistance to Hydraulic Pressure of UPVC Pipes.
DMS 25-1980	Determination of Resistance to Heat of UPVC Pipes.
DMS 26-1980	Determination of Resistance to Belling for UPVC Pipes.
DMS 27-1980	Determination of Resistance to Misalignment for UPVC Pipes and Fittings.
DMS 28-1980	Determination of Resistance to Deformation of UPVC Pipe Fittings and Socket Pipes.
DMS 29-1980	Determination of Temperature Cycling for UPVC Pipes and Fittings
DMS 33-1980	Methods of Test for Soft Drinks.
DMS 37-1981	Standard Specification for Ordinary and Rapid-hardening Portland Cement
DMS 38-1981	Standard Specification for Blow Moulded Plastics Containers of up to 5 litres capacity.

DMS 39-1981	General Standard for Labelling of Prepacked Foods.
DMS 40-1981	Standard Specification for Canned Pineapples.
DMS 41-1981	Methods of Test for Cement.
DMS 42-1981	Code of Practice for General Principles of Food Hygiene.

ANNEX XI

TECHNICAL COMMITTEES

Number	T. He	Date Established
MBS/TC1	Basic Standards	1979
MBS/TC2	UPVC Pipes and Fittings	1976
MBS/TC3	Burnt Clay Bricks and Tiles	1978
MBS/TC4	Electrical Safety Standards	1978
MBS/TC5	Tung Oil	1979
MBS/TC6	Packaging	1979
MBS/TC7	National Building Regulations	1979
MBS/TC8	Spices and Condiments	1979
MBS/TC9	Cement	1980
MBS/TC10	Processed Fruits, Vegetables and Juices	1980
MBS/TC11	Beverages	1980
TC11/SC1	Non-alcoholic Beverages	
TC11/SC2	Alcoholic Beverages	
MBS/TC12	Paints and Varnishes	1980
MBS/TC13	Chemistry	1980
MBS/TC14	Edible Oils and Fats	1980
MBS/TC15	Soaps and Detergents	1980
MBS/TC16	Primary Agricultural Products	1980

ANNEX XII

MAIN LABORATORY EQUIPMENT AT THE MALAWI BUREAU OF STANDARDS

Serial N°	Qty.	Equipment
1	2	Gas Liquid Chromatograph (GLC) and Recorders. Tracor 550
2	1	Gas Liquid chromatograph (GLC) and Recorder Carlo Erba
3	1	Atomic Absorption (AA) Spectrophotometer. Varian
4	1	UV/VIS Single Beam Spectrophotometer. Zeiss
5	1	Incubator (37°C). Heraus
6	1	Microscope, X1000. Zeiss
7	1	Super Minor Centrifuge. MSE
8	1	Water Bath (chiller/heater). Haake
9	1	UV Cabinet (TLC scanning)
10	2	pH meters
11	1	Orbital flask shaker
12	3	Ovens (one large and 2 medium)
13	1	Muffle furnace

In addition there are frigidaries, balances, soxhlet and other glass apparatus.

ANNEX XIII

TRAINING OPPORTUNITIES FOR STANDARDIZATION AND RELATED FIELDS

(in English)

1. AUSTRALIA

Standards Association of Australia (SAA)
Industrial Standardization (3 months)

2. HOLLAND

International Centre for Quality and
Management Sciences (ICQMS).
P.O. Box 2082
3000 CB Rotterdam
Management of QC (4 months)

3. INDIA

Indian Standards Institution (ISI)
Standardization (3 months)

4. INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

Training courses, workshops, seminars on various aspects of standardization, including Public Relations and Standards Information

5. JAPAN

Japan International Cooperation Agency (*)
Agency of Industrial Science and Technology (AIST)
Japanese Standards Association(JSA)
Industrial Standardization and QC (3 months)
Certification and Inspection System (2 months)

(*) It is strongly recommended that the MBS should make use of the several courses conducted in Japan. There is a JICA Field office in Malawi whose address is: P.O. Box 30083 Chichiri, Blantyre 3 (Tel. 633786)

5. JAPAN (Cont.)

Japan International Cooperation Agency (JICA)
Metrology and Measurement Standards (6 months)
Import and Export Food Inspection (3 months)

The Association for Overseas Technical Scholarships
2-12-13 Honkomagome
Blunkyo-ku, Tokyo
QC (6 Weeks)

6. SWEDEN

Swedish International Development Authority (SIDA)
Björklund + Sandholm
Box 28
S-182 51 Djursholm 1
QC (10 weeks)

7. UNITED KINGDOM

British Standards Institution (BSI)
Organization of Standards Work (5 - 6 weeks)

8. USSR

State Committee for Standards of the USSR Council of Ministers (GOST)
Standardization
QC
Metrology

ANNEX XIV

COMPREHENSIVE SURVEY ON THE STATUS AND NEEDS OF STANDARDIZATION AND RELATED ACTIVITIES IN MALAWI

The survey is to be conducted through the three attached questionnaires as follows:

1. The "Questionnaire on the Status and Needs of Standardization, Quality Control and Metrology in Industrial Enterprises" is to be sent to all industrial firms.

2. The "Questionnaire on the Needs for Malawian Standards" is to be sent to all other concerned bodies such as ministries and Government departments, technical institutes and societies, chamber of commerce and industry, dealers, cooperatives and consumer bodies, contractors, exporters and importers, etc...

3. The "Questionnaire on Testing Facilities" is to be sent to all bodies possessing testing facilities.

These multi-purpose questionnaires have been designed to achieve the following objectives:

a. To provide the MBS with a detailed panorama of the present status and needs of standardization and related activities in Malawi. Such information is extremely important as it will furnish the MBS with a solid realistic basis for designing and planning all its activities

b. To educate industrial enterprises indirectly on the importance of standardization and its related activities to their production indicating, at the same time, some of the main tasks they should carry out to improve the quality and reliability of their products.

c. To inform the various relevant bodies on the MBS and its major functions. (to enhance this objective, it is recommended that the questionnaires should be accompanied by a well-prepared pamphlet about the MBS.

d. To throw light on the areas where the MBS could help.

e. To invite, persuade and provoke the interest of all concerned bodies, especially industrial enterprises, to have closer cooperation with the MBS and to seek its assistance in their own interest.

MALAWI BUREAU OF STANDARDS
P.O. Box 946
Blantyre

STRICTLY CONFIDENTIAL

QUESTIONNAIRE
ON THE STATUS AND NEEDS OF STANDARDIZATION, QUALITY CONTROL AND METROLOGY IN INDUSTRIAL ENTERPRISES*

1. GENERAL INFORMATION

1.1 Name of Enterprise:
1.2 Type of Enterprise: Public/Mixed/Private
1.3 Year of Establishment:
1.4 Capital: K
1.5 Turnover,1981: K
1.6 N° of Employees:

Address:

Tel.N°:

Name of President/Technical Manager

2. PRODUCTS

PRODUCT**	CAPACITY***	Production				Exports				Standard Adopted****	Is product tested and where?			Method of Disposal of Substand. Prod.*****	Remarks
		1980		1981											
		Qty.	Turnover K	Qty.	Turnover K	Qty	Turnover K	Qty.	Turnover K		Yes	No	Place		
Main Prod.															
1.															
2.															
3.															
4.															
5.															
6.															
7.															
8.															
By-Prod.															
1.															
2.															

* Please fill in the space provided, if inadequate use separate sheet(s) indicating clause No.
** Please include range/size/type/concentration etc... as applicable.
*** Capacity should be based on an 8-hr operation per day for 300 days per year. Please mention production units
**** Please mention the designation of standard e.g. MBS..., ISO... etc... If using foreign collaborator's specifications write "collaborator", if using your own specifications write "Company"
***** Please write "Repair", "Rework", "Sold as second-rate" or "Thrown away" as applicable. Otherwise, leave space blank.

3. RAW AND INTERMEDIATE MATERIALS

MATERIAL	Consumption 1980		Consumption 1981		Origin		Standard adopted in Procurem.**	Is material Tested and where?			Average % of conform. to stand.	Method of Disposal of Subst.mat.	Remarks
	Qty.*	Value,K	Qty.*	Value,K	local	imported		yes	no	place			
a.													
b.													
c.													
d.													
e.													
f.													
g.													
h.													
i.													
j.													

* Please mention also the units of measurement.

** Please mention designation of standard used e.g. MBS.... If purchasing by brand name, write "Brand", if purchasing from foreign collaborator write "Collaborator"; if according to your own specifications, write "Company".

*** Please write "Rejected" or "Red Rate" (denoting accepted at reduced rate) as applicable. Otherwise, leave the space blank.

3.1 Is there any difficulty in obtaining any material according to the required specifications/standard? Yes/No

3.2 If yes, please mention:

3.3 Place and method of storing materials?

3.4 Are there any special requirements/specifications for storing certain materials? yes/no
If yes, please mention those materials and facilities provided to comply with the requirements/specifications

4. PRODUCTION

4.1. Method of production: Batch/continuous

4.2. Number of shifts per day:

4.3. Brief description of production process:

4.4. Are there any technical and/or sanitary regulations you have to follow? Yes/No

4.5. If yes, please specify:

4.6. Is there any difficulty in complying with these regulations? Yes/No

4.7. If yes, please specify:

4.8. Do you have specifications/standards for:

	Yes	No
4.8.1. processing of materials?	...	...
4.8.2. labelling of products?	...	...
4.8.3. packaging of products?	...	...
4.8.4. storage of products?	...	...
4.8.5. storage of products?	...	...

4.9. Place and method of storing products:

4.10. Technical staff in production:

Name	Present Post	Qualification	Date of Graduation	Past Experience	Remarks
a.					
b.					
c.					

5. QUALITY CONTROL (QC)

5.1. Do you carry out any inspection/QC activity? Yes/no
5.2. Is there a special unit/section department for QC? Yes/No
5.3. If yes, what is its name?
5.4. To which section/department/division/person does it report?
5.5. Is there any QC manual? Yes/No
5.6. What are the control points?
5.7. Do you receive test reports from the suppliers of your materials? Yes/No
5.8. Do you use the following techniques for the QC of the production process:
- .Cause and effect diagram? Yes/No
- .Control Charts? Yes/No
- .Process capability? Yes/No

5.9. Is there any testing laboratory for QC? Yes/NO

STANDARD TEST METHODS

	Material or Product	Properties Tested	Adopted: MBS,ISO,BS, etc.	Remarks
a.				
b.				
c.				

5.11. Equipment Available:

	Apparatus or Instrument	Maker	Tests carried Out by Apparatus/Instrument	Remarks
a.				
b.				
c.				
d.				
e.				
f.				
g.				
h.				
i.				
j.				

5.12. Technical staff working in QC/inspection/laboratory:

	Name	Present Post	Qualifications	Date of Graduation	Post Experience	Remarks
a.						
b.						
c.						
d.						
e.						
f.						
g.						
h.						

		Yes	No
5.13.	Do you keep records of checking:		
5.13.1.	raw materials?	...	...
5.13.2.	intermediate products?	...	...
5.13.3.	finished products?	...	...
5.13.4.	packaging?	...	...
5.14.	Do you make use of such reports?	...	...

5.15. If yes, please specify

6. METROLOGY

6.1. Do you have reference standards to calibrate measuring instruments used in production or control?

6.2. If yes, please specify:

	Standard	Maker	Types of Measurements Performed	Year of Purchase	Year of latest calibration	Remarks
a.						
b.						
c.						
d.						
e.						

10.4. Safety Standards (Standards that specify provisions for averting hazards to people, animals and material objects such as plants, structures, products, etc...)
Examples: Safety in Cement Manufacture - Safety in Milking Parlours - Safety of Domestic Gas Appliances - Safety Footwear - Industrial Eye Protectors

a. f.
b. g.
c. h.
d. i.
e. j.

10.5. Test Standards (Standards that specify investigations, tests, analysis and measuring methods to verify the stipulated properties of material and products).
Examples: Testing of Cement - Sampling of Petroleum Products - Microbiological Examination of Meat Products)

a. k.
b. l.
c. m.
d. n.
e. o.
f. p.
g. q.
h. r.
i. s.
j. t.

10.6. Standard Codes of Practice (Standards that specify recommended practice for the design, manufacturing, setting up, maintenance or utilization of products, equipment, installations or structures).
Examples: Constructional Use of Cement - Painting - Earthing - Flooring - Thermal Insulation of Pipework - Milking Installations - Farm Dairy Buildings, etc...

a. f.
b. g.
c. h.
d. i.
e. j.

11. COOPERATION WITH THE MALAWI BUREAU OF STANDARDS

		YES	NO
11.1.	Are you aware of the activities and services of the Malawi Bureau of Standards (MBS) such as:		
	- issuing national standards?	...	...
	- giving advice on any specification?	...	...
	- granting the MBS mark?	...	...
	- testing of products?	...	...
	- sale of Malawi Standards?	...	...
	- sale of other national and international standards?	...	...
11.2.	Do you have any Malawi Standard? If yes, please state the standard(s) number(s):		
11.3.	Do you wish to subscribe in Malawi Standards?	...	...
11.4.	Are you using any of the Malawi Standards? If yes, please state the standard(s) number(s):	...	...
11.5.	Do you wish to participate in elaborating national standard(s) related to your activities?	...	...
11.6.	Do you wish to have your product(s) granted the MBS Mark to show consumers that your production complies with national standards?	...	...
11.7.	Do you wish to get technical assistance and guidance from the MBS:		
	- to enable you to comply with national standards?	...	...
	- to initiate company standardization in order to rationalize, speed up and reduce costs of the whole chain of activities starting from the design stage and ending at after-sales service?	...	...
	- to get a list of manufacturers/suppliers of certain testing equipment to strengthen your quality control activities?	...	...
	- to set up a testing laboratory in order to carry out regular quality control?	...	...
	- to carry out some tests in the MBS laboratories? If yes, state below the products and the properties to be tested.	...	...

	Product	Properties to be tested
(a)		
(b)		
(c)		
(d)		

	YES	NO
- to set up a quality control system?	...	...
- to solve quality problems?	...	...
- to have any of your measuring instruments/equipment calibrated to ensure accuracy in production and control? (measuring instruments/equipment are devices used for measuring physical quantities/properties. They include e.g. analytical weights, micrometers, verniers, industrial thermometers, pressure gauges, voltmeters, ammeters, etc.)	...	...

If yes, please state below the instruments to be calibrated:

(a)
(b)
(c)
(d)
(e)

- to complete the conversion to the metric system in your enterprise?	...	...

11.8. Do you wish to have some of your staff trained in:

- Standardization with special reference to company standardization?	...	...
- Quality control?	...	...
- SI Units and metrication?	...	...
- Chemical analysis?	...	...
- Food testing?	...	...

12. Do you have any other comment or request? ... ...

If yes, please mention below:

.....
.....
.....

Name of Person Filling in this Questionnaire	Post	Signature	Date
.....	.....	.....	.....

MALAWI BUREAU OF STANDARDS
P.O.Box 946
Blantyre

QUESTIONNAIRE
ON THE NEEDS FOR MALAWIAN STANDARDS

Name: Address:
Type of Business: Tel. N°:

In each of the following fields, what are the subjects you wish to be standardized by the MBS?

1. Communication (Information Standards) (Standards that specify terminological relationships, symbols or systems intended to promote clear and rational understanding)
Examples: Cement Terms - Drawing Symbols - Colour Identification of Pipelines, etc.)

a.
b.
c.
d.
e.
f.
g.
h.
i.
j.

2. Material and Product Standards (Standards that specify the physical, chemical and technological properties of materials and products)
Examples: Portland Cement - Kerosine Stoves - Canned Pineapples, etc...

a.
b.
c.
d.
e.
f.
g.
h.
i.
j.
k.
l.
m.
n.
o.
p.
q.
r.
s.
t.

MALAWI BUREAU OF STANDARDS
P.O. Box 946
Blantyre

QUESTIONNAIRE ON TESTING FACILITIES

Name: Address:

Type of Business Tel. N°:

1. Equipment

what are the testing Equipment/Apparatus/instrument Available?

Equipment	Maker	Test Carried Out	Remarks
a.			
b.			
c.			
d.			
e.			
f.			
g.			
h.			
i.			
j.			
k.			
l.			
m.			
n.			
o.			

2. Products

What are the products tested?

Product	Properties Tested	Standard Test Method Used MBS, ISO, BS, SABS, etc...	Remarks
a.			
b.			
c.			
d.			
e.			
f.			
g.			
h.			
i.			
j.			

3. Staff

who are the staff members engaged in testing activities?

Name	Present Post	Qualifications	Date of Graduation	Past Experience	Remarks
a.					
b.					
c.					
d.					
e.					
f.					
g.					

.....
Name of Person Filling in this Questionnaire

.....
Post

.....
Signature

.....
Date

3. Dimension Standards

a.
b.
c.
d.

4. Safety Standards

a.
b.
c.
d.
e.

5. Test Standards

a.
b.
c.
d.
e.
f.
g.
h.
i.
j.

(Standards that specify dimensions and tolerances of material objects.)
Examples: Modular Coordination in Buildings - Sizes of paper, Sizes of Clothes, etc...

e.
f.
g.
h.

(Standards that specify provisions for averting hazards to people, animals and material objects such as plants, structures, products, etc.)
Examples: Safety in Cement Manufacture - Safety Footwear - Safety in Electrical Appliances, etc.

f.
g.
h.
i.
j.

(Standards that specify investigation, test, analysis and measuring methods to verify the stipulated properties of materials and products)
Examples: Testing of Cement - Sampling of Petroleum Products - Microbiological Examination of Meat Products.

k.
l
m.
n.
o.
p.
q.
r.
s.
t.

6. Codes of Practice

a.
b.
c.
d.
e.

....

Name of Person Filling in this Questionnaire Post

(Standards that specify recommended practice for the design, manufacturing, setting up, maintenance or utilization of products, equipment, installations or structures)
Examples: Constructional Use of Cement - Painting - Earthing - Flooring - Thermal Insulation of Pipework - Milking Installations - Farm Dairy Buildings, etc.

f.
g.
h.
i.
j.

....

Signature Date

6.3. Technical staff working in metrology:

Name	Present Post	Qualifications	Date of Graduation	Past Experience	Remarks
a.					
b.					
c.					
d.					

7. METRICATION

7.1. Are you using metric units in all your operations? Yes/No

7.2. If no, what is the system used and the average percentage of metrication achieved in:

	Metric	Imperial	% Metrication
procurement of materials?	...	...	...
manufacturing process?	...	...	...
packaging?	...	...	...

7.3. When do you think metrication will be completed in your company?

7.4. To complete metrication, is there any difficulty? Yes/No

7.5. If yes, please specify:

8. CONSUMERISM

8.1. Who are the main consumers of your produts?

a.
b.
c.
d.
e.

8.2. Do you survey the market from time to time to know your consumers' attitude towards your products? Yes/No

8.3. Do you receive complaints from: Yes No

distributors? ... ...
consumers? ... ...

on

products? ... ...
packaging? ... ...
deterioration in storage? ... ...
reliability? ... ...
servicing? ... ...

8.4. Do you follow up consumer claims? ... ...

9. FUTURE PROJECTS (within the coming 5 years)

Project	Capital	Scheduled Date of Production	Main Products	Annual Capacity*	Standards to be adopted in prod.	Remarks
a.						
b.						
c.						
d.						

* Capacity should be based on an 8-hr operation per day for 300 days per year. Please mention production units.

10. PRESENT AND FUTURE NEEDS FOR NATIONAL STANDARDS

In each of the following fields, what are the subjects you wish to be standardized by the MBS?

10.1. Communication (Information) Standards (Standards that specify terminological relationships, symbols or systems intendend to promote clear and rational understanding.
Examples: Cement Terms - Drawing Symbols - Colour Identification of Pipelines,etc)

a.
b.
c.
d.
e.
f.
g.
h.
i.
j.

10.2. Material and Product Standards (Standards that specify the physical, chemical and technological properties of materials and products.
Examples: Portland Cement - Kerosine Stoves - Canned Pineapples, etc...)

a.
b.
c.
d.
e.
f.
g.
h.
i.
j.
k.
l.
m.
n.
o.
p.
q.
r.
s.
t.

10.3. Dimension Standards (Standards that specify dimensions and tolerances of material objects)
Examples: Modular Coordination in Buildings - Sizes of Ready Made Shirts, etc...

a.
b.
c.
d.
e.
f.
g.
h.

ANNEX XV

P R O J E C T D O C U M E N T

STRENGTHENING OF THE MALAWI BUREAU OF STANDARDS

UNITED NATIONS DEVELOPMENT PROGRAMME

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

PROJECT OF THE GOVERNMENT OF MALAWI

PROJECT DOCUMENT

TITLE: Strengthening of the Malawi Bureau of Standards (MBS)

NUMBER:

DURATION: Two years

PRIMARY FUNCTION: Institution Development

SECTOR: Industry (35)

SUB-SECTOR: Industrial Services and Institutions (3530)

GOVERNMENT IMPLEMENTING AGENCY: Malawi Bureau of Standards (MBS)
Ministry of Trade and Industry

EXECUTING AGENCY: United Nations Industrial Development Organization (UNIDO)

STARTING DATE: July 1983

GOVERNMENT INPUTS: Malawian Kwacha 1,252,030 (equivalent to US$ 1,361,100)

UNDP INPUTS : US$ 536,900

APPROVED:

.....	.....
On behalf of Government	Date
.....	.....
On behalf of UNDP	Date
.....	.....
On behalf of UNIDO	Date

CONTENTS

PART I LEGAL CONTEXT

This project document shall be the instrument referred to as such in Article 1, Paragraph 1 of the Assistance Agreement between the Government of Malawi and the United Nations Development Programme, signed by the parties on

The Government implementing Agency shall, for the purpose of the Standard Basic Agreement, refer to the Government Co-operating Agency described in that Agreement.

PART II THE PROJECT

A. Development Objective

The ultimate objective of the project is to contribute substantially to the improvement of the national economy through the wide application of standardization which creates order, simplicity and economy in every activity, leads to the full and efficient utilization of indigenous raw materials, increases productivity, reduces production and distribution costs, improves the quality of services and goods, protects life and health, safeguards the interests of consumers and producers, ensures safety in the production and use of goods, provides the best solutions to recurring problems, controls imports, promotes exports, ensures fair commercial transactions, helps the flow of trade, assists in improving the environment, promotes overall economy in terms of human effort materials, energy and money, rationalizes the various sectors of the national economy and ultimately helps to raise the standard of living.

B. Immediate Objectives

1. Strengthening of the institutional infrastructural framework of the Malawi Bureau of Standards (MBS) to upgrade the quality and efficiency of the standardization machinery and mechanism.

2. Expansion of the testing facilities of the MBS by the provision of facilities for the testing of various materials and goods to enable the MBS to carry out tests needed for the elaboration and amendment of national standards, the operation of certification marking system, the checking of product conformance to national standards and the control of imports and exports.

3. Consolidation of the certification marking activities of the MBS by the planning, organization and operation of a sound national certification marking system as an efficient means for the wide adoption of national standards

4. Setting up a standards laboratory and the introduction of industrial metrological activities to ensure accurate measurements with traceability to international standards.

5. Training of the local staff of the MBS and industry in carrying their activities in the most efficient way in the fields of standardization, certification marking, testing, quality control and metrology and assisting the MBS to set up a training unit.

C. Special Considerations

Not applicable.

D. Background and Justification

With agricultural resources being predominant, the economy of Malawi is essentially based on the agricultural sector. However, in order to speed up the development process of Malawi, a great deal of interest has been - is still being and will be - given to promote industrial development.

Much of the growth of the industrial sector, which is largely agro-based, mainly occured from 1964 to 1970, a period when most of the import substitution industries sprung up. Over that period the share of this sector in GDP rose rapidly. A good number of such industries have expanded their capacities not only to adequately supply the domestic market but also to export part of their output.

At present, the industrial sector covers the following industries: meat, dairy, grain mill, bakery products, edible oils, canned food, sugar, malt liquors, soft drinks, cattle cake, cigarettes and pipe tobacco, cordage goods, cotton piece goods, ready made clothing, blankets, leather products, fertilizers, soaps and detergents, paints and varnisher, paper products, sport goods, pharmaceuticals, cleaning and toilet preparations, matches, UPVC pipes, furniture, sawn timber, wood products, cement, bricks, tiles and metal doors, frames and windows.

As a result of the great interest in developing the industrial sector, this sector is making significant strides. This could be clearly demonstrated by the following parameters:

1. The share of the industrial sector in GDP has risen from 9.5% in 1965 to the high projected figure of 18.9% in 1985, while that of the agricultural sector shows quite the opposite direction since it will decrease from 57.4% in 1965 to 38.1% in 1985.

2. The percentage share of the industrial sector in the total domestic exports of goods will increase from 6.6% in 1965 to the projected figure of 26.2% in 1985.

3. The yearly growth rate of the industrial sector during 1979-86 is more than twice that of the agricultural sector.

It follows, therefore, that the industrial sector plays an important role in the national economy and that this role is increasing steadily among the various sectors, the industrial sector ranks the second, preceded only by the agricultural sector and its growth rate is the highest, being more than double that of agriculture. In 1985, the industrial sector will contribute by about one fith of the GDP and by more than one fourth of the total domestic exports.

A sector of such an increasing importance should be protected and safeguarded by providing it with adequate institutes to furnish the service infrastructure so essential for its healthy growth. Needless to say that the national standards body is one of the most important of such institutes.

As a matter of fact, the importance of standardization, as an efficient tool for industrialization, was not overlooked by the Government of Malawi. Thus, in December 1972, an Act (Cap: 51:02) was issued establishing the Malawi Bureau of Standards (MBS) as the sole statutory authority responsible for all matters related to standardization, certification, testing, quality control and calibration of instruments.

Although the MBS has been able to make good achievements within its capabilities, yet it was soon realized that it cannot play its rightful role in assisting the industrialization process since its development is far beyond that of the fast growing industrial sector. Consequently, the Government requested the assistance of a UNIDO Consultant in standardization, certification and quality control (RP/MLW/80/003) to assess the situation and to recommend the remedial measures to be taken.

The critical study conducted by the Consultant in September/October 1981 revealed clearly that, due to the meagre facilities at its disposal, the MBS is severely handicapped in its efforts to contribute substantially to the economic development of the country. The study emphasized that there is a persistent need to strengthen the MBS through:

1. improving the machinery and mechanism of the elaboration of national standards,

2. expanding the testing activities of the MBS by providing facilities for the quality testing of materials and goods such as food, textiles, building materials, paper and paper products, paints and varnishes, plastics and rubber, leather and leather products and metals. The importance of such expansion is appreciated by the fact that most of the above facilities are not available elsewhere in Malawi,

3. setting up a sound national certification marking system to eliminate the shortcomings of the rather crude scheme presently operated,

4. initiating calibration activities. So far, there has been no metrology laboratory whereby measuring instruments could be calibrated to ensure accurate measurements so essential for industrial and control activities,

5. training the local staff of the MBS and industry to upgrade the quality of the discharge of their duties and activities in the fields of standardization, certification, testing, quality control and metrology.

To meet the above needs, the proposed project has been designed and formulated. The implementation of this project will enable the MBS:

1. to improve and speed up the process of elaborating national standards and issuing them through long and short term plans based on established priorities.

2. to promote the wide adoption of national standards thus allowing the country to reap all the benefits of standardization.

3. to conduct all of its tests locally thus reducing its dependence upon other laboratories in the neighbouring countries. Apart from being expensive in terms of money and foreign exchange usage, testing outside the country involves long delays in getting the results - which usually amount to several months - thus rendering the control activities of the MBS meaningless;

4. to assure accuracy and precision of measuring instruments thus assisting in the accurate production and evaluation of goods according to the adopted standards;

5. to assure consumers of the minimum acceptable quality of goods;

6. to assist in implementing a sound national food control system thus protecting the life and health of the public;

7. to control imports thereby preventing the inflow of sub-standard goods;

8. to inspect exports to ensure their conformance to high quality standards thus contributing to export promotion, a factor of the greatest importance to the economy of Malawi since most of her foreign exchange earnings are derived from exports of agricultural production and some manufactured goods;

9. to meet the ever increasing demand for materials and goods testing from the Government, industry and commerce;

10. to offer consultancy services in the fields of standardization, certification, testing, quality control and metrology;

11. to initiate and conduct industrial research, a very important field so far untouched in Malawi.

It is thus anticipated that the implementation of the project will place the MBS in a position where it could play its due role in improving the national economy of Malawi.

E. Outputs

The following outputs, which will facilitate the achievement of the project's immediate objectives, are expected to be produced during the projects life:

1. Expansion of the capabilities of the Malawi Bureau of Standards through improvement of its institutional infrastructural framework, as well as its technical capabilities in the production of national standards and related activities.

2. A fully equipped operational quality control testing laboratories in the following product area:

- Agriculture and Food Products
- Textile products
- Chemical Products
- Mechanical and building materials
- Consumer goods.

3. An efficiently implemented national Certification Marking System which issues certificates and licences to producers manufacturing goods in conformity with national standards.

4. A metrology system involving the production of technical specifications of metrology standards, the appropiate supporting metrology laboratory for maintaining these metrology standards and the introduction of metrological activities within industry.

5. Trained national specialists in the principles of standardization, certification marking, industrial quality control, inspection, testing and metrology.

F. Activities

1. (a) Study of the existing legislation, organization and activities of the MBS.
   (b) Suggesting any suitable amendment to the legislation.
   (c) Preparation of a suitable organizational structure for the MBS with clear job descriptions for the technical staff.
   (d) Conducting a comprehensive survey of the status and needs of the industrial enterprises and other concerned bodies in the fields of standardization, testing, quality control and industrial metrology.
   (e) Working out, on the basis of established priorities, of a 3-year plan - divided into yearly programmes - for the elaboration of national standards.
   (f) Formulation of the internal rules of procedure for the Specifications Dept. of the MBS.
   (g) Formation of the technical committees necessary for the implementation of the first year programme of the 3-year plan.
   (h) Holding the technical secretariats of the technical committees and preparing the relevant documents.
   (i) Elaboration and issuing of national standards.

2. (a) Preparation of the detailed technical specifications of testing equipment and instruments in the fields of food, paints and varnishes, textiles, paper and paper products, leather and leather products, plastics and rubber, building materials and metals.
   (b) Contacting recognized equipment suppliers for submitting quotations.
   (c) Examination of quotations and procurement of equipment.
   (d) Installation and initial operation of equipment.
   (e) Staffing the laboratories and training of the technical personnel.
   (f) Conducting analyses and tests needed for the elaboration and amendment of national standards, the operation of the national certification marking system and the control of imports and exports.

(g) Preparation of the rules of procedure for the organization and operation of the Testing Dept. of the MBS.

(h) Participation in the elaboration and amendment of national standards on materials on test methods.

(i) Advising industry and other sectors on all matters relating to testing methods.

3. (a) Establishment of a national certification marking system and preparation of a manual on the procedures for its operation.

(b) Investigation of the quality control systems in manufacturing plants applying for the standards marks.

(c) Taking samples of finished products from the manufacturing premises and from the open market and their subsequent testing in MBS laboratories and other accredited ones.

(d) Assessing the quality capabilities of the relevant industrial plants.

(e) Assessing the degree of conformity of the relevant products to national standards.

(f) Granting the standards marks and licence to those applicants having adequate capabilities and producing goods conforming to national standards.

(g) Paying surprise visits to the licensees to ensure the maintenance of their production quality and adhesion to the conditions of granting the standards mark.

4. (a) Assessing the needs of Malawi for metrological standards.

(b) Preparation of detailed technical specifications of the basic standards and equipment in the fields of mass, length and force measurements.

(c) Contacting recognized equipment suppliers for submitting quotations.

(d) Examination of quotations and procurement of standards and equipment.

(e) Maintenance and installation of standards and equipment.

(f) Developing methodologies for the inspection, checking and calibration of measuring instruments.

(g) Initial operation of equipment and training of staff in metrologic services.

(h) Preparation of a manual on the operation of the Metrology Section of the MBS.

(i) Rendering metrological services to industry and other sectors.

5. (a) On-the-job training of the MBS staff through association with the international staff.

(b) Study tours for the Director and Deputy Director of the MBS.

(c) Training of the technical staff of the MBS abroad on project's fellowships.

(d) Conducting training courses in:

- standardization and certification marking (for MBS staff and industry)
- Materials Testing (for MBS staff and industry)
- Industrial Quality Control (for MBS staff and industry)
- Metrology (for MBS staff and industry)

G. Inputs

1. Government Inputs

(a) Staff

The Director of the MBS will be the counterpart of the Project Manager who will also work in close Co-operation with the department heads and such members of the MBS as appropriate.

The Government will also provide counterparts for the international staff as well as other staff and support personnel for the operation of the various departments of the MBS.

In addition, the Government will provide the administrative support personnel for UNIDO experts including a secretary/ typist and a driver.

(b) Training

The Government will nominate members of the staff for the fellowships and study tours and will cover the remunerations of the trainees during their training abroad.

(c) Facilities

The Government will provide:

- Adequate office buildings and testing laboratories and facilities for carrying out project activities. (Malawian Kwacha 120,000 equivalent to $ 133,300)
- Adequate funds for the procurement of books, periodicals, publications, etc.
- Adequate office space, office equipment and supplies for the international staff
- Appropriate clerical assistance for experts.

(d) Operative Funds.

The Government will privide funds for the operation and maintenance of equipment, buildings, etc. as well as for sundry expenses and the purchase of expendable equipment, chemicals and other supplies.

2. UNDP Inputs

(a) Assignment of International Staff

1. Project Manager: Expert in Standardization and Certification (18 m/m, Jan 1984)

Qualifications:

A highly qualified and experienced expert with ability to lead, guide and supervise a team of internationally recruited consultants. He should also possess administrative abilities.

A university degree in engineering, technology or science with extensive experience in the planning, organization and operation of standardization, and certification activities at the national, regional or international level. Preferably with experience in developing countries.

Duties:

- Responsible with the Director of the MBS for the overall implementation of the Project's Work Plan and serves as the Chief Technical Adviser of expert team to the Director of the MBS.
- Responsible for supervising and co-ordinating the work of the international staff and, through them; as regards technical matters, the work of counterpart personnel.
- Responsible for all contacts with the Director of the MBS as well as UNDP/UNIDO for all matters related to the execution of this project.
- Responsible for the control of the proper use of UNIDO inputs as well as to ensure the development of the Project in line with the described objectives.
- Responsible for reporting to UNIDO.
- Advise the Director of the MBS on all aspects of technical, organizational, financial and operational matters related to the discharge and development of MBS activities.
- Advise the Director of the MBS on co-ordinating the activities of MBS with the concerned national, regional and international bodies.
- Advise the Director of the MBS on the selection of:

  i. international experts
  ii. MBS professional staff
  iii. Candidates for fellowships and other types of training.

- Assist in the assessment, organization and operation of activities in all of the technical departments of the MBS.
- Assist in detailed timing and/or budgeting of the various operations.
- Assess the present requirements and future needs of the MBS.
- Assist in the formulation and implementation of training programmes for the professional staff of the MBS.
- Prepare a final report setting out the findings of his mission and his recommendations to the Government on further action which might be taken.

- As Expert in Standardization and Certification Marking, the Project Manager will carry out the duties related to the corresponding objectives namely immediate objectives Nr 1 and 3 of this project. In this regard, he is specifically expected to:

  a. assist in working out a 3-year plan for the elaboration of national standards based on established priorities;
  b. assist in the formulation of the internal rules of procedure for the Specifications Dept. of the MBS and advise on its proper administrative and technical operation;

  c. advise on the establishment of a national certification marking system;

  d. assist in the formulation of the internal rules of procedure for the Certification Marking Section of the MBS;

  e. assist in the overall operation ans supervision of the national certification marking system;

  f. conduct training courses in standardization and certificatio

2. Consultant in Materials Testing (1 m/m July 1983)
(5 m/m August 1984)

Qualifications:

University degree or equivalent in engineering, science or technology with extensive experience in the physical testing of materials. Experience in the administration and management of testing laboratories would be an asset.

Duties:

The consultant will be expected, inter alia, to:

- prepare the technical specifications of the equipment for the physical testing of materials (paints and varnishes, paper and paper products, leather and leather products, textiles, plastics and rubber) according to international standards;
- supervise the installation and initial operation of the equipmen
- train the local staff on the testing of the above materials and the interpretation of results;
- identify the standard test methods to be used;
- assist in the formulation of the internal rules of procedure for the Testing Dept. of the MBS starting from sampling to the submission of test reports;
- assist in the overall operation and supervision of the Testing Dept. of the MBS;
- conduct training course on materials testing.

3. Consultant in Building Materials Testing

(0.5 m/m July 1983)
(1.5 m/m November 1984)

Qualifications:

University degree or equivalent in engineering, science or technology with extensive experience in the testing of building materials.

Duties:

The consultant will be expected, inter alia, to:

- prepare the technical specifications of the equipment for the physical testing of building materials and metals to international standards;
- supervise the installation and initial operation of the equipment;
- train the local staff on the testing of building materials and the interpretation of results;
- identify the standard test methods to be used.

4. Consultant in Industrial Metrology (1 m/m August 1983)
(5 m/m August 1984)

Qualifications

University degree or equivalent in engineering or the physical sciences with extensive experience in the organization and operation of metrological laboratories.

Duties

The consultant will be expected, inter alia, to:

- identify the requirements of initiating industrial metrological activities in the MBS.
- prepare the technical specifications of the physical standards (SI units) and equipment needed as well as the specifications for the facilities for maintaining these equipment;
- supervise the installation of equipment;
- train the local staff on the use of standards and equipment;
- identify the standard calibration methods to be used;
- assist in the formulation of the internal rules of procedure for the Metrology Dept. of the MBS;
- conduct training course (s) on industrial metrology.

5. Consultant in Industrial Quality Control (1 m/m January 1985)

Qualifications

University degree or equivalent in engineering, physical sciences or technology with extensive experience in quality technology.

Duties

The consultant will be expected, inter alia, to:

- conduct a condensed training course on industrial quality control with special enphasis on statistical techniques;
- advise the MBS on the promotion of quality control at the enterprise and national levels.

b. Training Provisions

Individual fellowships of a total duration of 32 m/m starting in July 1983 are provided for training outside Malawi. The nominees should possess adequate background and knowledge of the subject for which they are sent abroad. The details of the fellowship programme are as follows:

Field of training	duration	starting date
. Food analysis	2 m/m	August 1983
. Information and documentation	1.5 m/m	August 1983
. Standards propagation	1.5 m/m	September 1983
. Certification marking	2 m/m	April 1984
. Instrumental methods of chemical analysis	3 m/m	April 1984
. Industrial metrology I	2 m/m	April 1984
. Industrial metrology II	2 m/m	April 1984
. Paints testing	2 m/m	May 1984
. Paper and packaging testing	2 m/m	May 1984
. Plastics and rubber testing	2 m/m	May 1984
. Leather testing	2 m/m	May 1984
. Building materials testing	2 m/m	May 1984
. Metal testing	2 m/m	May 1984
. Statistical quality control	3 m/m	April 1985

In addition two study tours one month each will be provided for the management of the MBS as follows:

. Director, MBS	1 m/m	September 1983
. Deputy Director, MBS	1 m/m	May 1984

c. Equipment

Physical standards, non-expandable laboratory testing equipment and a vehicle will be provided at a total cost of US$ 220,000.

d. Miscellaneous

UNIDO will provide a part of the miscellaneous costs to cover reporting costs (technical reports, final reports, agency terminal report), sundry expenses and others in total value of US$ 7500

H. Preparation of Work Plan

A detailed Work Plan, in the form of a bar chart, for the implementation of the project will be prepared by the leader of the international staff assigned to the project, in consultation with the leader of the national staff. This will be brought forward periodically. The agreed upon Work Plan will be attached to the Project Document as Annex I and will be considered as part of this document. A tentative Work Plan is attached herewith as Annex I.

I. Preparation of the Framework for the Effective Participation of National and International Staff in the Project.

The activities necessary to produce the indicated outputs and achieve the project's immediate objectives, will be carried out jointly by the national and international staff assigned to it. The respective roles of the national and international staff will be determined by their leaders, by mutual discussion and agreement, at the beginning of the project, as set out in a Framework for Effective Participation of National and International Staff in the Project. The framework, which will be attached to the Project Document as an annex, will be reviewed from time to time. The respective roles of the national and international staff shall be in accordance with the established concept and specific purposes of technical co-operation.

J. Development Support Communication

It is of great importance for the effective realization of project's objectives that, during its implementation, a good communication should be established and maintained between the national staff of the MBS and the international staff of the project on the one hand, and the other sectors of the national economy, with special emphasis on industry, on the other hand. It is a specific objective of the Project to provide industry with the facilities and means which will enable it to utilize indigenous new materials in the most efficient way, to reduce production costs, to increase productivity and to raise the quality of manufactured goods. Other objectives of the Project are concerned with ensuring fairness in commerce and control of imports and exports. Consequently, the Project should hold strong communications with ministries responsible for industry, mining, electricity, agriculture, supplies, housing, external trade as well as with other bodies such as universities, institutes, chambers of industry and commerce, professional societies, unions and the like.

Because of the broad implications of the Project, a detailed "Plan for Development Support Communication" will be prepared jointly by the Project Manager and the Director of the MBS. This will include a list of government and private bodies and other outside organizations (national, regional and international), to whom relevant Project outputs should be communicated.

The key individuals for establishing the necessary channels of communication will be the Project Manager and the Director of the MBS. The active support of other Government officials will be essential.

K. Institutional Framework

The institutional framework for the implementation of the project should be provided by the MBS and other closely related organizations and government departments in Malawi. The objects, functions and the organizationel structure are as follows:

1. The objects of the MBS are:

   a. to promote standardization in industry and commerce;

   b. to prepare, frame, modify or amend specifications and codes of practice;

   c. to recommend the adoption in whole or in part, with or without amendment, of any specification or code of practice;

   d. to make arrangements or provide facilities for the testing and calibration of precision instruments, gauges and scientific apparatus;

   e. to make arrangements or provide facilities for the examination and testing of commodities and any material or substance;

   f. to control the use of standardization marks and distinctive marks;

   g. to encourage or undertake educational work in connexion with standardization;

   h. to provide for co-operation with any person, association or organization outside Malawi having objects similar to those of the Bureau;

   i. to assist any Ministry, Government Department, local authority, other public authority or any statutory corporation in the preparation and framing of any specifications or codes of practice required by it;

   j. to provide for co-operation with the representatives of any branch of Industry, Ministry, Government Department, local authority, other public authority or any statutory corporation or with any person with a view to bringing about standardization in connexion with commodities;

k. to frame, amend or substitute draft building regulations for the benefit of local authorities;

l. to provide for the testing of locally manufactured or imported commodities with a view to determining whether such commodities comply with the provisions of the Merchandise Marks Act or any other law relating to standards of quality.

2. The MBS is managed and controlled by the Malawi Standards Board which is a body corporate with perpetual succession and a common seal.

3. The Board consists of a Chairman, a Vice-Chairman and seven other members all appointed and designated by the Minister of Trade and Industry who also designates a Secretary to the Board.

4. The functions of the Board, as far as standardization is concerned, are:

a. to formulate, on broad national lines, the policy which, subject to the approval of the Minister of Trade and Industry, will be adopted by it with a view to achieving the objects of the Bureau, and

b. to advise the Minister of Trade and Industry in regard to any matter within his purview under the MBS Act.

5. The Board may establish committees to assist it in the performance of its functions and may assign any of its powers or functions to a committee so established.

6. Subject to the approval of the Minister of Trade and Industry, the Board appoints a person suitably qualified scientifically and technically as Director of the Bureau and also appoints such staff as the Board may deem necessary for achieving the objects of the Bureau.

7. The functions of the Director are to organize, carry out and direct the work of the Bureau in accordance with the policy adopted by the Bureau.

L. Prior Obligations and Pre-requisites

1. It is essential for the success and particularly for the timely completion of the project that the Government provides the required national staff and necessary budgetary resources. The assignment of the national staff before the project starts is particularly important, in order to allow the preparatory steps to be taken for starting the fellowships in the initial phase of the project.

2. The Government will ensure that the necessary offices, laboratory facilities and equipment are available.

3. The project Document will be signed by the Resident Representative on behalf of UNDP, and UNDP assistance to the project will be provided only if the above prior obligations have been met to UNDP's satisfaction.

M. Future UNDP Assistance

At the end of this project a very significant contribution would have been made towards standardization, quality control and metrology activities in Sudan. It is well known that industrial standardization must undergo constant improvement in line with rapid industrial and economic developments. Also, bearing in mind that institutional developmental activities usually take long periods of time for completion, future external assistance will inevitably be necessary to support the efforts of this project. The possible need to extend UNDP assistance beyond the duration of the present project, will be discussed and evaluated on the occasion of a tripartite review meeting at a suitable time during the execution of the project and after consultations between the Government of Malawi, UNDP and UNIDO.

PART III - SCHEDULES OF MONITORING, EVALUATION AND REPORTS

A. Tripartite Monitoring Review - Technical Reviews

1. The project will be subjected to periodic review in accordance with the policies and procedures established by UNDP for monitoring project and programme implementation.

2. One project review mission of one week duration should be undertaken 12 months after the start of the project.

B. Evaluation

The project will be subjected to evaluation in accordance with the policies and procedures established for this purpose by UNDP. The organization, terms of reference and timing of the evaluations will be decided by consultation between the Government, UNDP and the Executing Agency.

C. Progress and Terminal Reports

1. The experts/ consultants will submit reports at the end of each mission and a final report at the end of the last mission (in the case of return missions), in accordance with UNDP rules and procedures.

2. Each national fellow or trainee will prepare a final report according to UNDP rules and procedures.

3. The evaluation mission will prepare an evaluation Report according to UNDP rules and procedures.

4. The executing agency will prepare an Agency Terminal Report in accordance with UNDP rules and procedures.

PART IV - BUDGET

A. UNDP Contribution Budget

(See pages 24/25)

B. Government Contribution Budget

(See pages 26 - 31)

UNIDO

PROJECT BUDGET/REVISION

3. COUNTRY	4. PROJECT NUMBER AND AMEND.	5. SPECIFIC ACTIVITY
MALAWI		

10. PROJECT TITLE

Strengthening of the Malawi Bureau of Standards

15. 10. 11 PROJECT PERSONNEL EXPERTS / Post title	16. TOTAL		17. 1983		18. 1984		19. 1985		20.	
	m/m	$	m/m	$	m/m	$	m/m	$	m/m	$
11-01 Project Manager	18	124,200			12	82,800	6	41,400		
02 Materials testing	6	44,400	1	7,400	5	37,000				
03 Building Materials Testing	2	14,800	0.5	3,700	1.5	11,100				
04 Industrial Metrology	6	44,400	1	7,400	5	37,000				
05 Industrial Quality Control	1	7,400					1	7,400		
06										
07										
08										
09										
10										
11										
12										
13										
14										
11-99 SUBTOTAL:	33	235,200	2.5	18,500	23.5	167,900	7	48,800		

21. REMARKS

UNIDO

PROJECT BUDGET/REVISION

2. PAD NUMBER

4. PROJECT NUMBER	16. TOTAL		17. 1983		18. 1984		19. 1985		20.	
	m/m	$	m/m	$	m/m	$	m/m	$	m/m	$
12.01 OPAS Experts										
13.00 Support Personnel										
14.00 Volunteers										
15.00 Exoerts Travel		2,000		200		1,300		500		
16.00 ~~Other Personnel Costs~~ Mission costs		3,000				3,000				
17.01 Locally hired Experts										
17.02 Locally hired Experts										
19.00 Total Personnel Component		240,200		18,700		172,200		49,300		
20. SUBCONTRACTS 29.00 Total Subcontracts Component										
30. TRAINING 31.00 Fellowships	32	64,000	5	10,000	24	48,000	3	6,000		
32.00 Study Tours, UNDP G. Training/Meetings	2	5,200	1	2,600	1	2,600				
33.00 In-service Training										
34.00 Group Training (non-UNDP)										
35.00 Meetings/Consultations (non-UNDP)										
39.00 Total Training Component	34	69,200	6	12,600	25	50,600	3	6,000		
40. EQUIPMENT 49.00 Total Equipment Component		220,000		10,000		210,000				
50. MISCELLANEOUS 51.00 Operations — Maintenance		3,200		200		2,000		1,000		
52.00 Reports		3,000		200		300		2,500		
53.00 Sundries		1,300		100		700		500		
55.00 Hospitality (non-UNDP)										
59.00 Total Miscellaneous Component		7,500		500		3,000		4,000		
99 GRAND TOTAL:		536,900		41,800		435,800		59,300		

BUDGET COVERING GOVERNMENT CONTRIBUTION

(in Malawian Kwacha K)

COUNTRY: Malawi

PROJECT Nr.:

PROJECT TITLE: Strengthening of the Malawi Bureau of Standards

			TOTAL		1983		1984		1985	
			m/m	K	m/m	K	m/m	K	m/m	K
10.	PROJECT PERSONNEL									
10-01	Director	(SP1)	24	16,550	6	4,100	12	8,200	6	4,250
10-02	Deputy Director	(SP2)	24	14,600	6	3,600	12	7,200	6	3,800
10-03	Chief Scientist	(SP3)	24	13,550	6	3,350	12	6,700	6	3,500
10-04	Senior Scientific Of	(SLB)	24	13,150	6	3,250	12	6,500	6	3,400
10-05	Standards Engineers	(GdII)	114	46,600	24	9,600	60	24,000	30	13,000
10-06	Engineers/Chemists/ Analyst/Physicists.	(GdII)	258	99,500	48	18,000	132	49,500	78	32,000
10-07	Tech. Editor/Librarian	(GdII)	24	8,500	6	2,100	12	4,200	6	2,200
10-07	Assist Editor	(GdIII)	24	3,850	6	950	12	1,900	6	1,000
10-08	Library Assistant	(GdIV)	24	1,850	6	450	12	900	6	500
10-09	Senior Lab. Techn.	(GdIIIB)	24	6,100	6	1,500	12	3,000	6	1,600
10-10	Lab. Technician	(GdIII)	228	39,000	48	8,000	120	20,000	60	11,000
10-11	Senior Lab.Assist	(GdIV)	24	3,050	6	750	12	1,500	6	800
10-12	Lab. Assist.	(GdV)	276	20,450	60	4,250	144	10,200	72	6,000
10-13	Lab. Attendant	(GdVI)	90	1,980	18	380	48	1,000	24	600
10-14	Adm. Officer	(SLB)	24	12,900	6	3,200	12	6,400	6	3,300
10-15	PR Officer	(GdII)	24	8,500	6	2,100	12	4,200	6	2,200

BUDGET COVERING GOVERNMENT CONTRIBUTION (Cont.)

(In Malawian Kwacha K)

			TOTAL		1983		1984		1985	
			m/m	K	m/m	K	m/m	K	m/m	K
10.	PROJECT PERSONNEL (Cont.)									
10-16	Adm.Assist.	(GdIII)	42	8,900	6	1,250	24	5,000	12	2,650
10-17	Assist Accountant	(GdIII)	24	3,850	6	950	12	1,900	6	1,000
10-18	Accounting Assist.	(GdV)	42	4,750	6	650	24	2,600	12	1,500
10-19	Secretary	(GdIII)	24	3,700	6	900	12	1,800	6	1,000
10-20	Copy/Typist/ Receptionist	(GdV)	96	11,500	18	2,100	48	5,600	30	3,800
10-21	Clerical Officer	(GdV)	42	2,200	6	300	24	1,200	12	700
10-21	Private Aut.Box Exchange PABX	(GdV)	24	1,250	6	300	12	600	6	350
10-22	Driver	(GdV)	66	3,400	12	600	36	1,800	18	1,000
10-23	Subordinate Class Employees	(GdVI)	330	6,800	60	1,200	180	3,600	90	2,000
	Sub-total		1,920	356,480	390	73,830	1,008	179,500	522	103,150
15	Travel and Subsistence									
15-01	Internal Travel			8,000		1,750		4,250		2,000
15-02	Subsistence Allowance			3,300		700		1,700		900
15-03	External Travel			9,500		2,000		5,000		2,500
15-04	Subsist. Allowance and Accommod.			16,000		3,500		8,500		4,000
	Sub-Total			36,800		7,950		19,450		9,400

BUDGET COVERING GOVERNMENT CONTRIBUTION (Cont.)

(in Malawian Kwacha K)

	TOTAL		1983		1984		1985	
	m/m	K	m/m	K	m/m	K	m/m	K
Additional Personnel Expenses								
Protective Clothing and uniforms		3,950		850		2,000		1,100
Recruitment of Staff		3,300		700		1,700		900
Holiday Grants and Travel Concessions		6,600		1,400		3,400		1,800
Medical Aid Scheme		9,900		2,100		5,100		2,700
Staff Pension Scheme		19,700		4,200		10,000		5,500
House to Office Mileage allowance		1,600		350		850		400
Provident Fund		2,650		550		1,350		750
Staff Training Expenses		3,300		700		1,700		900
Sub-Total		51,000		10,850		26,100		14,050
Rent of Staff Houses		330,000		70,000		170,000		90,000
Total Personnel Component		774,280		162,630		395,050		216,600

BUDGET COVERING GOVERNMENT CONTRIBUTION (Cont.)

(In Malawian Kwacha K)

		TOTAL K	1983 K	1984 K	1985 K
40	EQUIPMENT				
41	Expendable Equipment:				
	Stationery	28,500	6,000	15,000	7,500
	General Stores and Cleaning Materials	4,850	1,000	2,500	1,350
	Lab. Chemicals and Glassware	24,700	5,200	13,000	6,500
	Minor Office Tools	950	150	500	300
		59,000	12,350	31,000	15,650
42	Non-expendable				
	Books and Journals	5,000	1,000	2,500	1,500
	Office Furniture and Equipment	10,000	2,000	5,000	3,000
	Lab. Equipment	40,000	10,000	20,000	10,000
	Domestic Furniture for Staff Houses	13,000	3,000	7,000	3,000
	Motor Vehicle and Bicycles	30,000	7,500	15,000	7,500
	Sub-Total	98,000	23,500	49,500	25,000
49	Total Equipment Component	157,000	35,850	80,500	40,650

BUDGET COVERING GOVERNMENT CONTRIBUTION (Cont.)

(In Malawian Kwacha K)

		TOTAL K	1983 K	1984 K	1985 K
50	Miscellaneous				
	Maintenance of Premises and Staff Houses	10,000	2,000	5,000	3,000
	Maintenance of Office and Laboratory Equipment	5,000	1,000	2,500	1,500
	Running Expenses for Vehicles	16,000	3,500	8,000	4,500
	Maintenance and Repairs for Vehicles	6,000	1,250	3,000	1,750
	Insurance and Licences	4,450	1,250	1,700	1,500
	Postage, Tel. and Telegrams	16,500	3,500	8,500	4,500
	Electricity and Water	17,800	3,800	9,000	5,000
	Printing of National Standards	23,500	4,500	12,000	7,000
	Printing of Bulletin and Reports	5,150	1,250	2,500	1,400
	Rent of Offices	4,000	1,000	2,000	1,000
	Insurance Charges	3,000	750	1,500	750
	Bank Commission, Interest Charges	650	150	300	200
	Audit Fee	5,200	1,200	2,600	1,400
	Allowances for Board Members	2,400	600	1,200	600
	Hospitality and Entertainment	3,900	900	2,000	1,000
	Anniversary and National Events	1,000	200	500	300

BUDGET COVERING GOVERNMENT CONTRIBUTION (Cont.)

(In Malawian Kwacha K)

		TOTAL K	1983 K	1984 K	1985 K
50	Miscellaneous (Cont.)				
	Membership Subscription ISO, ARSO, ...	41,000	10,000	20,000	11,000
	Conferences and Seminars	4,400	1,000	2,200	1,200
	Legal and Other Professional Fees	2,800	600	1,500	700
	Miscellaneous Losses and Deficiencies	1,000	200	500	300
	Total Miscellaneous Comp.	173,750	38,650	86,500	48,600
	GRAND TOTAL	1.105,030	237,130	562,050	305,850

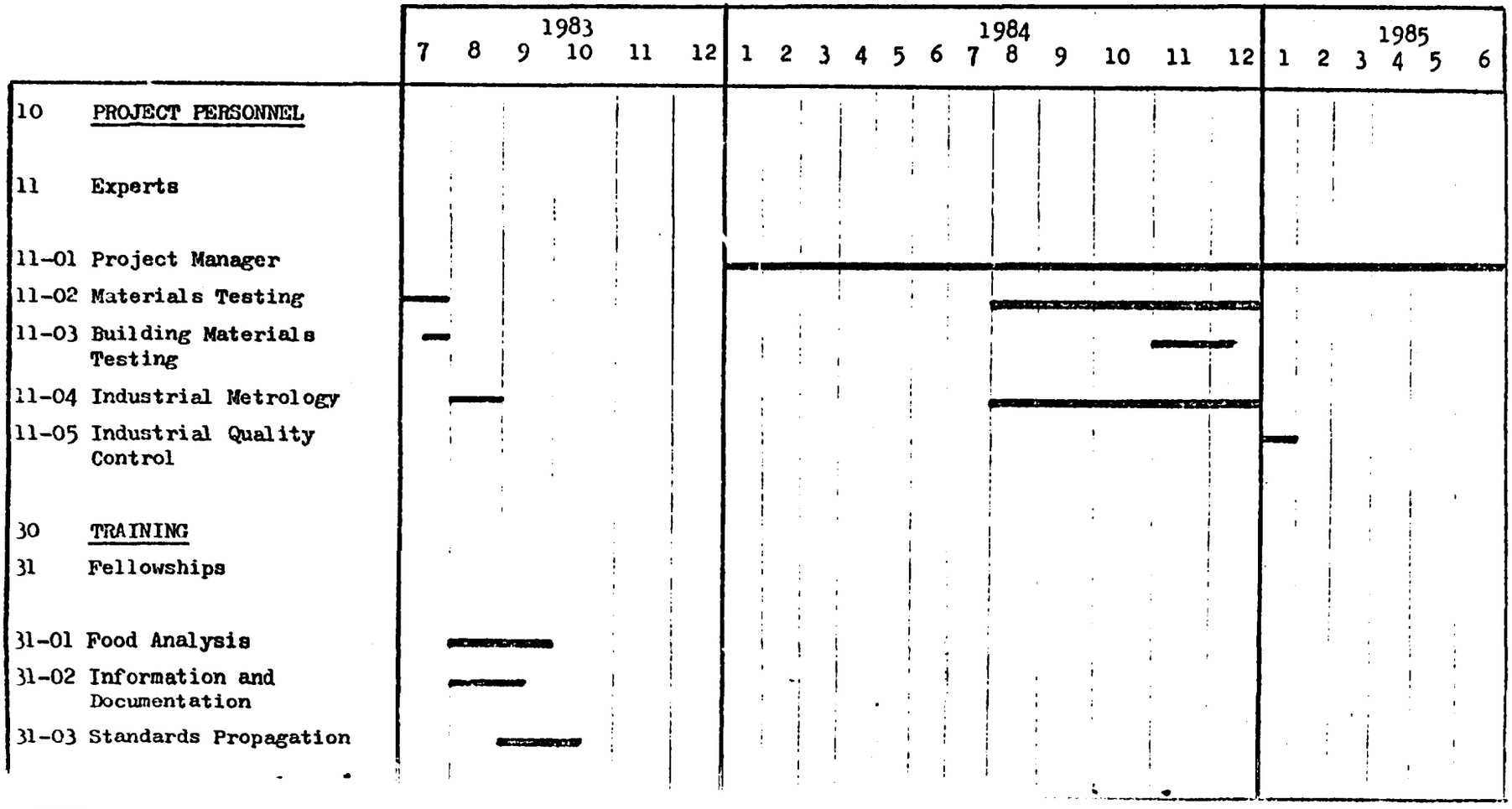
ANNEX I

WORK PLAN - BAR CHART

COUNTRY: Malawi

PROJECT No.:

PROJECT TITLE: Strengthening of the Malawi Bureau of Standards



WORK PLAN - BAR CHART (Cont.)