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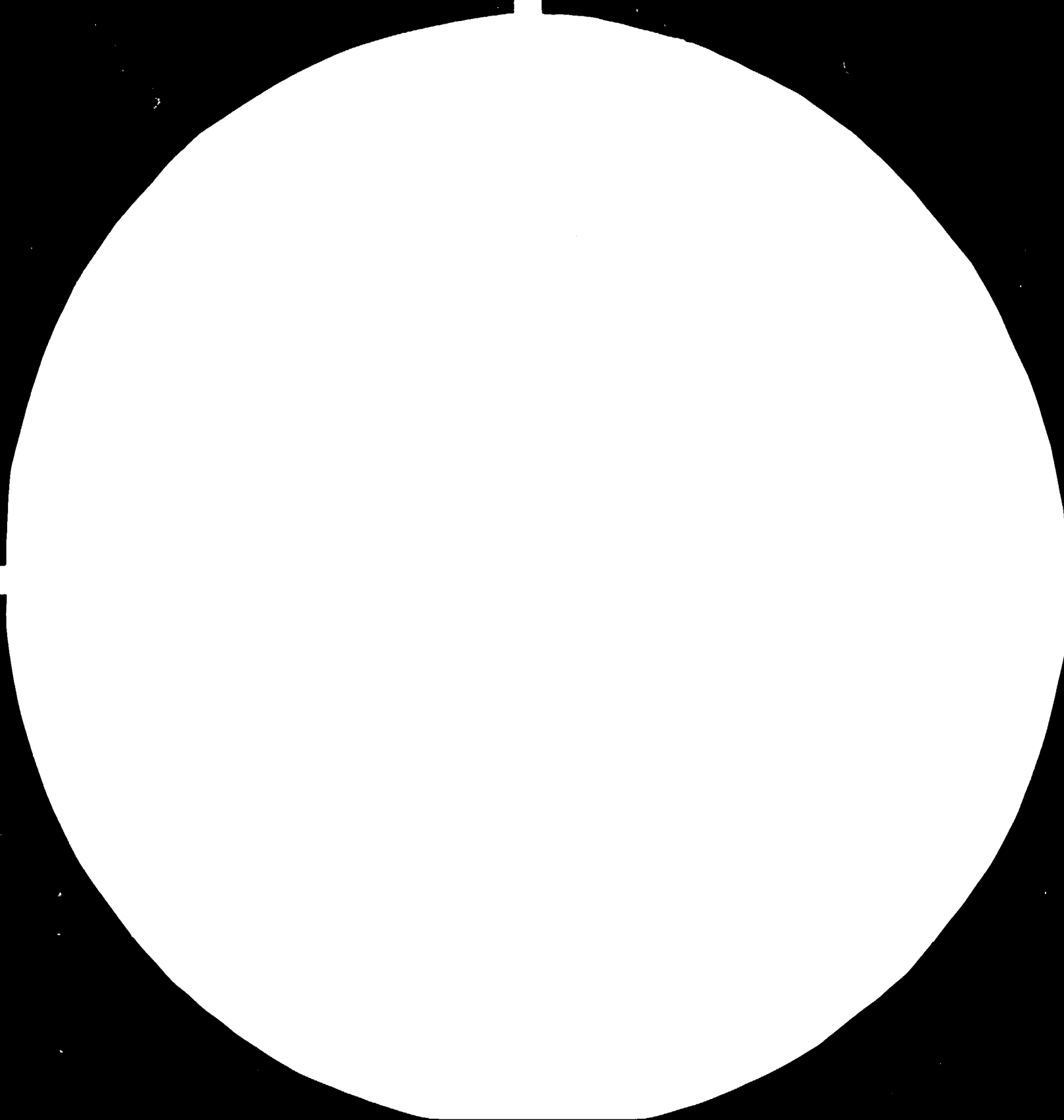

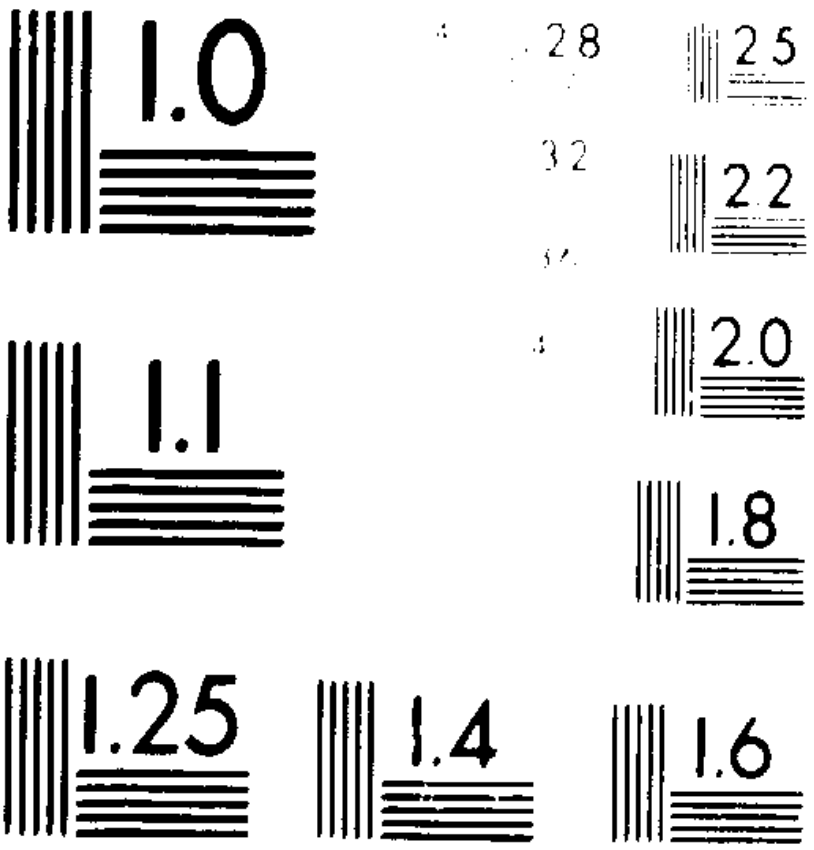

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2 November 1984
English

ESTABLISHMENT
OF
A NATIONAL STANDARDS BODY IN BHUTAN

DP/BHU/82/023
BHUTAN

TERMINAL REPORT

Prepared for the Royal Government of Bhutan

by

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UNIDO Consultant, Standardization and Quality Control

Thimphu, Bhutan

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GLOSSARY AND PRINCIPAL ACRONYMS

BSI	British Standards Institution
CAC	Codex Alimentarius Commission
GATT	General Agreement for Tariff and Trade
GDP	Gross Domestic Product
IEC	International Electrotechnical Commission
ISI	Indian Standards Institution
ISO	International Organization for Standardization
MW	Megawatt
NSB	National Standards Body
NU	Ngultrum (UN Rate in October 1984 Nu. 1=US$ 0.085)
PWD	Public Works Department, Ministry of Development
QC	Quality Control

I N T R O D U C T I O N

In order to promote the development of industry and trade, in particular the export earnings, the Government of the Kingdom of Bhutan aims to develop resource-based industries coupled with the simultaneous development of standardization and quality control. For this reason the Government has earmarked under the UNDP/IPF an amount of US $ 155,000 over the period 1984-86 (including a preparatory assistance phase) for the establishment of a technical assistance project to cater for the development of an appropriate national standardization and quality control cell or institute.

In order to review various structure options, the project calls for a preparatory phase, under which a UNIDO expert will, inter alia, examine the need, scope and structure for the creation of the said cell or institute, draft an appropriate technical assistance project document aimed at assisting the Royal Government of Bhutan to establish a national integrated system of standardization, quality control and metrology, and finally prepare a report with recommendations on the whole subject.

To this end, UNIDO assigned the present Consultant for a 2-month mission, the terms of reference of which are shown in the relevant Job Description (Annex I). The mission started on 11th

September, 1984, and on his way to the field, the Consultant had a 3-day stopover in New Delhi to discuss with the Indian Standards Institute's authorities the possibility of having the assistance of ISI in the future and development of a national service in standardization, quality control and metrology in Bhutan.

In carrying out his assignment, the Consultant conducted a detailed study of the national economy of Bhutan with special emphasis on the industrial sector and external trade. He also studied numerous publications, reports and other documents (AnnexII), paid technical visits to several representative industrial enterprises (Annex III), and had extensive discussions with executives in the relevant government departments, corporations and other interested bodies (Annex IV).

The present report summarises the activities, findings and recommendations of the Consultant.

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I. WORK PROGRAMME

In the light of the purpose and duties of the present mission as spelled out in the Job Description (Annex I), the Consultant established the following work programme shortly after arrival in the field.

A. GENERAL

1. Brief study of the recent history of Bhutan.
2. Study of the Government system and structure.
3. Identification of the main ministries, departments, institutions, commissions and other bodies that have - or should have - interest in standardization and its related fields (certification, testing, quality control and metrology).

B. NATIONAL ECONOMY

1. Study of the general characteristics of the national economy, the sectoral composition of the GDP/GNP and the reletive importance of each sector.
2. External trade.
3. Study of the economic development plans.

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C. INDUSTRY AND TRADE

Study of:

1. The functions and activities of the Ministry of Trade, Industries and Forests with special reference to the Department of Trade and Commerce and the Department of Industries and Mines.
2. Industrial development : its evolution, present state and future trends.
3. Effect of the industrial sector on the national economy.
4. Industrial policy and strategy.
5. Nature and characteristics of the industrial sector : public, joint and private.
6. Relative weights of the industrial groups within the sector and the main products in each group.
7. Industrial exports
8. Internal trade

D. STANDARDIZATION

1. Study of legislation, bodies, activities - if any - related to standardization and its associated fields.

E. TECHNICAL VISITS

Paying technical visits to:

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1. Some representative industrial enterprises of various sizes and types in the public, joint and private sectors, including :

   a. Penden Cement Authority : large-scale industry, public sector.

   b. Samchi Distillery : large scale industry, public sector.

   c. Gedu Wood Manufacturing Corporation : medium - scale industry, public sector.

   d. Bhutan Fruit Products : medium - scale industry, joint sector.

   e. Kuensum Confectionery : small-scale industry, private sector.

   f. Tashi Paper Factory : cottage industry, private sector.

2. Government departments, organizations and other bodies interested in standardization and its related fields, including

   a. Department of Industries and Mines, Ministry of Trade, Industry and Forests.

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b. Trade Promotion Division, Department of Trade and Commerce, Ministry of Trade, Industries and Forests.

c. Internal Trade Division, Department of Trade and Commerce, Ministry of Trade, Industry and Forests.

d. Public Works Department, Ministry of Development.

e. Department of Health Services, Ministry of Development.

f. Customs, Ministry of Finance

g. Government Purchase.

h. Chamber of Commerce and Industry.

i. Polytechnic.

F. INTERVIEWS AND DISCUSSIONS

Interviews and meetings with executives in the government and UNDP Office to discuss the findings and recommendations of the Consultant.

G. CONCLUSION

Preparation and submission of the Consultant's terminal report.

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II. BHUTAN AND HER ECONOMY

A. THE COUNTRY

The Kingdom of Bhutan has an area of 46,500 sq. km. situated in the eastern Himalayas between 26.5 and 29 degrees north, latitude; and 88.5 and 92 degrees east longitude. The country is relatively compact with a maximum north-south distance of 170 km as the crow flies, and a maximum east-west distance of 300 km. It is landlocked bordered in the north by China (Tibet) and by India in the south, west and east. The nearest sea port is Calcutta 700 km by road from Phuntsholing, the main gateway town. Thimphu, the capital (population 20,000), is in western Bhutan, about 180 km by road to the north of Phuntsholing.

Bhutan's borders are, for the most part, natural ones. The formidable natural barriers and the relatively remote location enabled Bhutan to remain in almost complete isolation.

Bhutan is almost entirely mountanous with flat land limited to the broader river valleys where population is more concentrated and in small sections of the Duars in the South. More than half of the area is under natural forest and about 5% is cultivated or inhabited, pasture or shrub account for a little over 4%.

The population of Bhutan is 1.165 million (1982), now estimated at about 1.3 million.

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B. GOVERNMENT STRUCTURE

The Government has grown steadily, in response to full-time administrative needs. Until the mid-1960s, general administration was relatively simple and handled directly by the Royal Secretariat, while development activities were undertaken by the Development Secretariat, which had been created in 1961 to administer Indian economic assistance. As the development effort accelerated and administration and international relations became more complex, it was felt necessary to create a system of ministries together with a Cabinet. Thus in 1968, four ministries were created - Home Affairs; Finance; Trade, Industry and Forests; and Development. In 1971, the Ministry of Communications and Tourism and the Ministry of Foreign Affairs were added. Also in 1971, the Planning Commission was formed; it is headed by His Majesty the King as Chairman. It is likely that several of the larger departments will eventually become separate ministers.

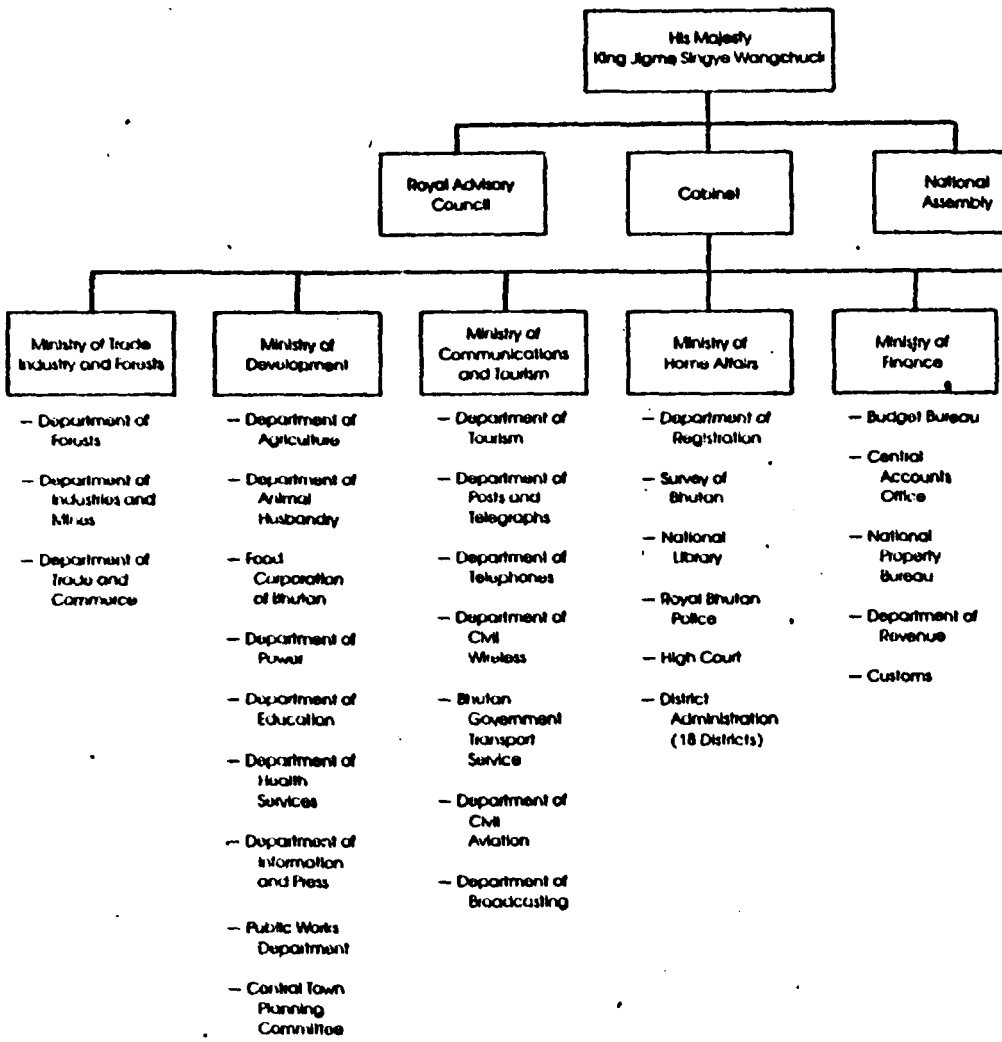
Chart 1 shows the present government structure.

C. THE NATURAL RESOURCES

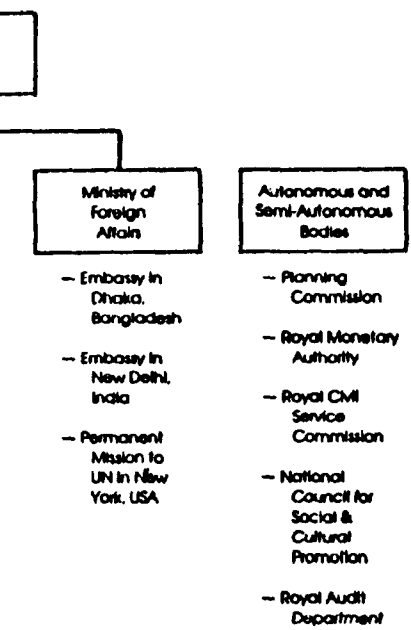
Bhutan is, on the whole, relatively well endowed with natural resources, and in resource-scare neighbouring countries, there are ready markets for many of those resources and their products.

CHART 1

BHUTAN
STRUCTURE OF GOVERNMENT



Source: Royal Government of Bhutan


Ministry of Foreign Affairs
– Embassy in Dhaka, Bangladesh
– Embassy in New Delhi, India
– Permanent Mission to UN in New York, USA
Autonomous and Semi-Autonomous Bodies
– Planning Commission
– Royal Monetary Authority
– Royal Civil Service Commission
– National Council for Social & Cultural Promotion
– Royal Audit Department

More than half of the land area of Bhutan is covered with natural forests, constituting a major resource. At present, extraction is only a small fraction of the annual forest increment, while some of the forest is decaying of overage. There is thus significant potential for forest-based exports from Bhutan.

Bhutan's mountainous terrain and its location on the steep southern watershed of the himalayas range give it enormous hydro-power potential estimated at about 20,000 MW. This potential has barely been tapped, although Bhutan's first major hydro-power station (336 MW) is currently under construction. The bulk of the power generated is expected to be exported to India. Additional projects on the Wangchu river amounting to a further 2,000 MW in capacity have already been identified, however, the potential of these projects is probably small compared to those of the Manas and Sankosh rivers whose flows are each several times that of the Wangchu.

Bhutan's mineral resources include limestone, dolomite, coal, gypsum, graphite, copper, lead, zinc, marble, slate and talc. The mineral resources in greatest quantity are limestone and dolomite. Although the limestone quality is for the most part not high, it is adequate for cement. One cement factory with an annual capacity of 100,000 metric tons is already in operation and a second larger project is being considered.

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D. THE ECONOMY

Patterns of economic activity are simple and still strongly rooted in the past. These were mainly dictated by physiographic features. Settled agriculture concentrated in small communities spread out along the main river valleys of the inner Himalaya and in the southern foothills swiftly flowing rivers, mountainous terrain, and dense forests separated these settlements, and led to an economy of small subsistence-oriented communities. Beyond and between these settlements, migrant herders grazed herbs of sheep and yaks on alpine grasslands. Thus the economy of Bhutan is essentially rural based consisting of subsistence agriculture supplemented by livestock rearing and cottage industries based on traditional handicrafts with 95% of the work force being employed in agriculture and related activities - mainly subsistence farming and animal husbandry. Parallel to this traditional economy, a small and tightly controlled modern sector has emerged over the past 20 years.

The first efforts at estimating the Gross Domestic Product (GDP) of Bhutan with sectoral break-down was undertaken by the Planning Commission in 1981 for the year 1980/81, the only recent year for which such estimates were prepared. Table 1 presents these estimates.

Even though the shares of agriculture and animal husbandry have undoubtedly declined with the emergance of the modern sector,

Table 1: GROSS DOMESTIC PRODUCT AT MARKET PRICES, 1980/81

	Nu million	Percentage
Agriculture and Related Sectors	645.2	63.2
Agriculture	409.4	40.1
Animal Husbandry	76.5	7.5
Forestry	159.3	15.6
Industry	63.5	6.3
Manufacturing and Processing	33.3	3.3
Mining	8.6	0.8
Power	2.7	0.3
Construction	18.9	1.9
Services	311.8	30.5
Transportation and Communications	33.4	3.3
Tourism	11.0	1.1
Financial Institutions	15.4	1.5
Trade	28.6	2.8
Social Services	34.8	3.4
Public Administration	106.6	10.4
Rental and Other Services	82.0	8.0
Total GDP	1,020.5	100.0

Source: Planning Commission.

they still accounted for almost half (48%) of GDP, with subsistence agriculture comprising up to 90% of total production. This high contribution is indicative of the high dependence of the majority of population on traditional activities. About 90% of the population is primarely dependent on agriculture. The main cereal crops are paddy, maize, wheat, barley and buck wheat. Paddy is the main preferred crop. Animal husbandry is an important component of the rural economy in Bhutan, playing a vital subsistence role.

Forestry accounted for an estimated 15.6% of GDP, reflecting its importance as the main source of domestic energy and as a source of construction materials and exports.

Industry (including power, mining and construction) comprised only 6.3% of GDP, a strong indicator of Bhutan's early stage of development. Manufacturing contributed 3.3% to the GDP with small and cottage industries and mining contribution at 0.9% and 0.8% respectively reflecting the nascent situation of industrialization and

(1) Although on the basis of a full year's production at the Penden Cement factory (production began in January 1981), industry's share would have risen slightly to 7.1%.

the lack of development of mineral resources as most of Bhutan's significant mineral deposits are undeveloped. Three relatively large industries - the cement plant, a distillery complex and a fruit products processing plant - accounted for most of the manufacturing value added. Power was a particularly small contributor (0.3%), due to the very low level of development of Bhutan's hydropower potential, but this share will increase dramatically with the commissioning of the Chukha project in 1984/1985.

Services comprised a relatively high 30.5% of GDP, but public administration and direct government services, including health and education, accounted for 45% of those. Tourism contributed only 1.1% of GDP, despite its significance as a revenue and hard currency earner. Trade, Commerce, banking, communications and transport were only small contributors, reflecting the subsistence nature of most of the rest of the economy.

The above statistics reflect the basic economic characteristics which Bhutan has in common with other least developed countries, in particular the very low level of per capita income and the predominance of the agricultural sector in the economy. The economy of Bhutan is thus essentially rural based, with 95% of the work force being employed in agriculture and related activities - mainly subsistence farming and animal husbandry.

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III. INDUSTRIAL AND TRADE DEVELOPMENT IN BHUTAN

A. INTRODUCTION

Conscious efforts towards Bhutan's socio-economic development began only with the First Five Year Plan in 1961. To implement the Plan, a self-contained Development Secretariat was established. Directorates of agriculture, animal husbandry, health, education, hydropower and publicity were created, while the existing directorate of forestry and the Bhutan Engineering services (BES)- the predecessor to the Public Works Department - were strengthened.

The Planning Commission was established in 1971. Although it is headed by His Majesty the King, the Chief Operational responsibilities rest with the Deputy Minister for Planning who has a ministerial rank in the Cabinet. Although financial responsibilities were officially transferred to the Ministry of Finance beginning in 1981/82, the Planning Commission still has the strongest say in deciding how resources will be allocated.

At the beginning of the First Plan, the economy of Bhutan was predominantly a rural barter economy where industries were limited to traditional handicrafts.

B. INDUSTRIAL DEVELOPMENT

1. Policies and Promotional Activities

The government has made extraneous efforts to initiate industrialization in the face of severe constraints. The domestic market is limited due to the small size and low incomes of the population, there are shortages of physical infrastructure (especially power), shortage in skilled and even unskilled labour and a general lack of entrepreneurial capacity. The highly rural and subsistence nature of the economy has meant that entrepreneurs have been relatively few and slow in Forthcoming. The government, moreover, rightfully decided that it was important that industries and trades stay in Bhutanese hands and, consequently, direct measures to promote industrialization from within were taken. In the early 1970s, in an attempt to promote Bhutanese entrepreneurship, the government began making direct loans to selected individuals who seemed to show good entrepreneural instincts. With these loans, the individuals were to invest in small industries - e.g. soap making, candles, sawmills - and in trade. By 1979, about Nu: 10 million had been lent under this scheme, and while it has resulted in the establishment of a number of basic industries and in a small domestic class of entrepreneurs, it proved a costly way of achieving those goals.

In 1979, this somewhat adhoc approach to industrial development stopped and the National Commission of Trade and Industries was established. This Commission meets quarterly under the chairmanship of His Majesty the King. It is served by a working committee the primary purpose of which is to review industrial proposals prior to presentation to the National Commission, not only for economic and technical feasibility but also ensure that the project will be genuinely Bhutanese owned. The Commission normally expects the owner to finance about one-fourth of the project costs through equity in the case of small-and medium-scale projects, and about one half the costs in the case of cottage industry-scale projects. During 1979/80 - 1981/82, the Commission approved about 30 projects including : eight mining projects, a brick factory, a block and flushboard factory, two lime kilns, two automobile workshops, two oil mills, a talcum powder factory, and an aerated water factory.

Prior to mid-1982, almost all projects approved by the National Commission were eligible for government-guaranteed loans from the Bank of Bhutan.

It is worth while to mention that there are certain specific local conditions which affect the formulation of industrial policies in Bhutan, mainly :-

(a) The small population of Bhutan limits the domestic market as negligible for any industrial item produced in the country. Therefore, barring few small ones, all worth while industries have to be essentially export-oriented.

(b) The land-locked condition of the country warrants that the basic raw materials for all proposed industries will have to be essentially resource-based as otherwise the high cost of transportation of important raw materials will make the industries non-viable.

(c) The perpetual shortage of both skilled and non-skilled manpower warrants that the industries of Bhutan have to be essentially capital intensive unlike the pattern in other developing countries where the conditions are totally opposite to that of Bhutan in terms of manpower.

In order to enhance and consolidate industrial development in the country, the government formulated and applied a specific strategy relating to the establishment and development of public sector industries and at the same time parallel promotional policies relating to the private sector. While in all cases it is intended to ensure the use of the most

appropriate technology, nevertheless in view of the overall labour shortage, generally speaking, more capital intensive methods of production are encouraged.

It is recognized that given the fledging status of industrial development in the country and the major constraints existing, the government - in order to meet the national objectives for this sector - has to play an important role through direct public sector investments, at least in the medium term. This role is promotional and pragmatic in nature and is designed to fill a gap. The internal conditions for large scale private investment are presently relatively unfavourable and entrepreneurial abilities limited. Private investment is therefore, not forthcoming. In a country like Bhutan where a plethora of teething problems exist, the public sector has to take all the initiatives to start off the chain reactions of economic development.

In view of the fact that different supportive policies have to be adopted depending on the size, technology and marketing needs of industries, these have been classified into four categories : large, involving fixed capital other than land in excess of Nu: 10 million; medium, from Nu: 1.5 - 10 million; small, from Nu: 0.1 to 1.5 million

21/ ...

and cottage industries. All large and medium industries come under the purview of the National Commission for Industries and have to be scrutinized and approved by this body before being taken up.

Large scale projects are expected to be natural resource based and highly capital intensive. Due to the existing constraints and the need for the government to maintain a commanding role in the exploitation of non renewable resources such as minerals, forests etc., to ensure their efficient utilization, it is envisaged that all such industries, at least initially, are likely to be in the public sector. Through the establishment of such industries the early exploitation of the natural resource potential can be begun and also, a major contribution to internal budgetary resources can be made quickly.

Medium scale industries can be wholly owned by private individuals and groups. However, as they will require greater technological and entrepreneurial skills, they will be directly supported and supervised by the Department of Industries. Support would be in the form of the training of entrepreneurs and skilled manpower, marketing assistance, Government guarantees for obtaining Bank loans, etc. It is expected that most medium scale industries will be natural resources based and export oriented.

22/ ...

appropriate technology, nevertheless in view of the overall labour shortage, generally speaking, more capital intensive methods of production are encouraged.

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21/ ...

Small scale and cottage industries are primarily reserved for the private sector. They are expected to be based on local raw materials and skills, and cater for localized internal markets, although it is understood that at the larger end of the scale more modern techniques of production will be used. The objective is to encourage the practice of traditional craft skills with improved technology, and promote the processing of agricultural and livestock products, thereby increasing value added and rural income. The promotion and supervision of such industries is to be decentralized to the Dzongkhag (District) level where local entrepreneurs and groups of craftsmen will be encouraged to set up such industries. Concessional loans will be provided on a case - by - case basis. In the case of larger units, the Department of Industries will also provide the required technical and marketing support.

In order to promote private sector industrial development, the Royal Government has undertaken a number of programmes. To foster entrepreneurial development, several training programmes have been instituted whereby potential entrepreneurs can get training in basic management and accounting practices. So far such training has been given through a fellowship programme in institutions outside the country. However, during the Fifth Plan it is proposed to

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establish a Management Institute in the country which will hold courses in relevant areas. In the area of marketing support, since most medium and large industries will be export-oriented, the Department of Trade and Commerce has instituted a programme of marketing assistance. This consists of setting up a trade information system and establishing a trade promotion cell to assist exporters both in Indian and third country markets. The Department has also drawn up a programme to obtain expert assistance for marketing studies, product adaptation, export marketing techniques, etc.

While major progress has been made in developing the overall infrastructure of the country, the absence of adequate local infrastructure has been an important factor in inhibiting the growth of private industry. To remedy this situation and support the establishment of small and medium scale industries, a programme of developing industrial estates in different parts of the country has been taken up. So far, three such estates have been established and a fourth one is planned in the Fifth Plan. The programme involves the development of land, construction of roads, and provision of electricity and water supply.

In the past, a number of fiscal incentives in the form of concessional loans and bank guarantees were given

to small scale units by the Department of Industries and Mines. These incentives have been recently discontinued in view of the proposed establishment of an Industrial Development Bank. A comprehensive scheme of financial incentives and support measures will be taken. The financial package is expected to include assistance in project identification and preparation, concessional lending for industrial investment, equity participation, underwriting, providing guarantees, negotiating and channelising external loans, etc.

For the regulation and control of industrial and commercial undertakings, a Companies Act has been prepared and is under consideration by the Government at the moment. The Act which has a simplified structure appropriate to the needs of the country, will provide the legal framework for dealing with project approval and licencing, capital structure, maintenance & audit of accounts, etc. On the basis of this new legal instrument, the Government will be in a position to monitor investment and direct the use of scarce resources, monitor and control the operations of industrial and commercial enterprises.

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2. Industrial Development in Five-Year Plans

It is difficult to trace the progress of industrialization as a result of development plans due to the lack of the relevant statistics. As mentioned before, the only estimates of the GDP were made by the Planning Commission in 1981 for the year 1980/81, i.e. after the completion of the first four development plans. These estimates, shown in Table 1 show that the contribution of the manufacturing sector, after the completion of the Fourth Plan, amounted only to 3.3% which is far below the 13% average of low-income developing countries. Of this amount, cottage industries are estimated to account for about one-fourth of this. The total employment in the organized sector was only 2000. Table 2 shows the composition of industrial production in 1980/81.

The figure of 3.3% contribution to the GDP after 20 years of development does not, from the first sight, give any optimistic impression of industrial development in Bhutan neither at present nor in future. However, a closer analysis of the objectives and characteristics of these Plans will completely alter that impression.

Table 3 shows the outlays for the Five Year Plans.

Table 2: INDUSTRIAL PRODUCTION BY SECTOR, 1980/81

	Nu million	Percent
Food Processing	14	9.7
Distillery Operations	47	32.4
Chemical Products	19	13.1
Cement	36	24.8
Forest Industries	3	2.1
Mining	18	12.4
Miscellaneous	8	5.5
	145	100.0

Source: Government of Bhutan.

TABLE 3

OUTLAYS FOR THE FIVE-YEAR PLANS (NU. IN MILLIONS)

Sl. No.		First Plan 1961-66 Outlays	%	Second Plan 1966-71 Outlays	%	Third Plan 1971-76 Outlays	%	Fourth Plan 1976-81 Outlays	%
1.	Agriculture	1.908	1.78	21.583	10.67	58.348	12.3	259.048	23.5
2.	Animal Husbandry	1.501	1.40	5.812	2.87	24.232	5.1	61.490	5.6
3.	Forestry	3.213	5.00	6.907	3.42	28.394	6.0	110.262	10.0
4.	Power	1.514	1.41	9.130	4.51	30.075	6.4	50.500	4.6
5.	Industry and Mines	1.115	1.04	1.005	0.50	25.211	5.3	175.000	15.8
6.	Public Works Department	62.920	58.70	70.540	34.88	84.582	17.8	128.319	11.6
7.	Road Transport	7.490	6.99	11.954	5.93	9.471	2.0	-	-
8.	Posts and Telegraphs	0.533	0.50	5.882	2.91	11.386	2.4	16.905	1.5
9.	Communication	-	-	-	-	14.834	3.1	37.336	3.3
10.	Tourism	-	-	-	-	14.093	3.0	12.500	1.1
11.	Education	9.445	8.81	35.707	17.66	90.040	19.0	134.601	12.1
12.	Health	3.147	2.94	16.677	8.25	38.117	8.0	54.582	4.9
13.	Information & Publicity	0.037	0.03	1.394	0.69	4.041	0.8	11.041	1.0
14.	Headquarters	3.492	3.26	8.797	4.35	15.272	3.4	34.302	3.1
15.	Preservation of Ancient Monuments	-	-	0.584	0.29	2.100	0.4	-	-
16.	Miscellaneous	10.687	10.14	6.235	2.78	24.004	5.0	20.314	1.9
	TOTAL	107.182	100.00	202.207	100.00	475.2	100.00	1106.2	100.00

NOTES:

The total outlay given here includes expenditure on the Penden Cement Plant and Gaylegphug Agricultural Project, which are being directly financed as Special Projects. The expenditure on these schemes within the Fourth Plan period is Nu.185.0 million, and the original plan outlay does not include this expenditure. The total outlay, however, does not include the expenditure on the Chukha Hydro-electric Project which is also being financed by the Government of India and set up by them on a turnkey basis, as almost the entire power output will be exported to India; also, financial size of this project compared with the total Fourth Plan expenditure is so large as to distort the picture of the relative importance of the different sectors. The expenditure on this scheme during the plan is over Nu.400 million and if included in the total outlay specified above would increase the total Fourth Plan expenditure to Nu.1.529 million.

Although the two major aims to national economic policy have always been to improve the living standards of the people and the attainment of overall economic self-reliance, yet the specific priorities in each Plan have to be varied. Since development had to be started from scratch, the main priorities in the early phase of the Plans were broadly the development of the necessary infrastructure.

Under the First Plan (1961/62 - 1965/66), development expenditures (both capital and recurrent) amounted to Nu: 107.2 million the highest priority was ending Bhutan's isolation. Accordingly almost two-thirds (65.7%) of the total Plan outlays was allocated to the Public Works Department for road and transport development. Importance was also accorded to education (8.6%), forestry (5%) and health (2.9%) Industry and Mines got only 1%.

The second Plan (66/67 - 70/71) showed a considerable increase in total expenditures (89%) and ushered in a widening of priorities which resulted in a significant diversification in the composition of expenditures. Road development continued to be of prime importance receiving one-third of the total Plan outlay.

However, this does not reflect the true picture, the main road projects were being undertaken by the Border

Roads Organization (BRO) outside the Plan, thus there was no decline in overall priority attached to roads development. Social services; education (17.7%) and health (8.3%) remained a high priority, but the increase in the allocation to agriculture and animal husbandry from 3.2% in the First Plan to 13.6% in the Second Plan was a significant change in strategy. Power, including the first hydro-power plant, accounted for 4.5% of outlays. Manufacturing and mining got the second lowest share (0.5%) only a very little higher than Ancient monument preservation (0.3%).

The Third Plan (1971/72 - 1975/76) was the first implemented by the Planning Commission, although much of the preparation preceded it. Overall expenditures increased by 135%. It maintained the general pattern of priorities except that the relative expenditure on road and transport development was curtailed to 19.8% as again most investment in roads took place outside the purview of the Plan. Social services again increased in priority accounting for 27% of total outlays (education 19% and health 8%). Agriculture and animal husbandry rose to 17.4% of outlays. The power did not include outlays for the Chukha project, which was being undertaken and financed separately. For the first time, industry and mining got a modest share(5.3%).

The Fourth Plan (1976/77 - 1980/81) is notable both for the continued growth in expenditures - total outlays increased

by 133% over the Third Plan - as well as relatively even distribution of expenditures. These included several large-scale investment schemes such as the Penden Cement Plant and a relatively large surface irregation development scheme in the Gaylegphug area. Road development and maintenance, education and manpower development etc. continued unabased. However, emphasis shifted to the development of agriculture and animal husbandry which, for the first time, were accorded the highest priority accounting for 29.1% of total outlays. Also, industry and mining were given the second highest priority (15.8%) representing three times their share in the Third Plan (5.3%). However, four-fifths of the sector's outlays were accounted for by the Penden Cement Plant. Forestry also increased significantly over the Third Plan, from 6% to 10%. The increases in these sectors were primarily permitted by the sharp decline in the shares of transport related investments (from 19.6% to 11.6% of outlays) and in education and health (from 27% to 17% of outlays), but in all these three sectors, actual outlays rose by about one half.

Bhutan's accomplishments under the first four plans must be considered impressive despite the somewhat adhoc nature of the plans themselves. The country ended its physical in-accessibility and linked the main regions of the country through a well conceived basic road network

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constructed under difficult physical conditions. Basic social infrastructure was established in many parts of the country, and due to the heavy emphasis on education, literacy rose from virtually zero to about 10%. But perhaps the most impressive gains were those made in the area of development administration.

As development administration and planning capacity increased, so did the sophistication of the Plans. From beginnings more or less exclusively on the development of major infrastructure, the Plans increasingly began focusing on development activities designed to affect more directly areas of livelihood of the population i.e. the focus of development efforts became more production oriented. This is very well illustrated by the fact that the sectors of agriculture, animal husbandry, forestry, power, industry and mining were given 8.6% of the total outlays in the First Plan, 22% in the second Plan, 35.1% in the Third Plan and 59.1% in the Fourth Plan. As far as industrial development is concerned, the industry and mining sector was accorded 1% of the total outlays in the First Plan, 0.5% in the second Plan, 5.3% in the Third Plan and 15.8% in the Fourth Plan. It could, therefore, be concluded that organized industrial development in Bhutan began with the implementation of the Fourth Plan (1976/77 - 1980/81).

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The Fifth Plan

It is the most ambitious development plan undertaken by the government so far. The size and complexity of the Plan was in-escapable. The preparations of this Plan far exceeded those of its predecessors and have much to do with its covering six years (1981/82 - 1986/87) instead of the usual five.

The targets of the Fifth Plan are ambitious in almost every respect. The total outlays under this Plan (which excludes those for the Chukha Project) which stand at Nu: 4338.1 million, are almost three times the outlays of the Fourth Plan. Public investment is projected to rise from about 16% of GDP in 1980/81 to an average of about 30% during the Fifth Plan period peaking at over 45% of GDP during 1984/85. Of the total outlay, Nu: 3176.1 million or about 73% is expenditure allocated for investment and Nu: 721 million were allocated to industry and mines constituting about 23%.

The declared underlying objective of the Fifth Plan is to increase Bhutan's economic self-reliance.

The major change in development strategy under this Plan was the decision to undertake several large export-

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oriented industrial projects based mainly on Bhutan's large forest and mineral resources. These projects would exploit, in the first instance, the large protected Indian market for those resources and their products. The profits from these industries, it was felt, would enable Bhutan to meet its objective of covering recurrent expenditures from revenues by the end of the Fifth Plan period.

The macro-economic objectives of the Fifth Plan envision Bhutan achieving an overall growth rate of 8.5% during the Plan period. Not surprisingly, the areas of most rapid growth are expected to be power (as a result of the commissioning of the Chukha project during 1984/85), industry (reflecting the new resource-based industries to be established during the Plan period) and tourism.

In formulating the Fifth Plan, the main policy outlines were :

1. The entire trade and industrial development in the country will only be permitted to develop along the lines laid down by the Government.

2. The main thrust of the trade and industrial policy in the immediate future will be towards building and creating basic infrastructure required for the expansion of trade and industrial activity.

In the Fifth Plan, currently under implementation, the major objectives of the government relating to the industrial sector which have influenced the content of the industrial policy are :

1. To maximize the value added generated from natural resources particularly from minerals, forests and agricultural produce.

2. To increase incomes and generate higher government revenues.

3. To promote exports particularly with those with a high value-added content in order to improve the balance of trade position and earn foreign exchange.

4. To encourage and improve traditional crafts in cottage industries in order to supplement rural incomes.

Therefore, a specific strategy exists relating to the establishment and development of public sector industries and, at the same time, parallel promotional policies relating to the private sector.

In realization of the above mentioned objectives, industrialization based on natural resources and indigenous raw materials received major emphasis in the Fifth

Plan. As a part of the self reliance programme, industrialization was given high priority, as investments in this sector yield quick and tangible returns and strengthen the resources of the government. Industrialization is also necessary for the processing of local raw materials for domestic consumption and for maximizing the benefits from trade. The export of processed products with a high indigenous value-added component is more beneficial than the sale of low-value unprocessed raw materials.

The great emphasis the government has placed on industrial development can be appreciated if industrial outlays are compared with outlays of other sectors of the national economy as represented by Table 4. This Table indicates very clearly that the most notable characteristic in the Fifth Plan is the increase in the shares of industry. For the first time industry has been given the highest share (17.4%) of all other sectors followed by power (16.5%).

The breakdown of the outlays in the industries and mines sector is shown in Table 5.

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(1) Estimates in this Table are not strictly comparable to earlier figures due to the change in definitions earlier. Nevertheless, the increased investments on, and predominance of, the industry and power sectors is evident.

Table 4

FIFTH PLAN SECTORAL ALLOCATION OF EXPENDITURES

	Recurrent		Capital		Total	
	Nu. M	%	Nu. M	%	Nu. M	%
iculture (1)	73.2	6.3	421.6	13.3	494.8	11.5
mal Husbandry	66.7	5.7	55.4	1.7	122.1	2.8
ests	44.9	3.9	237.8	7.5	282.1	6.5
er (2)	16.0	1.4	699.0	22.0	715.0	16.5
ustry and Mines (3)	35.8	3.1	721.0	22.7	756.8	17.4
lic Works Department (4)	87.0	7.5	449.9	14.2	536.9	12.9
il Aviation	5.6	0.5	94.4	3.0	136.9	2.3
ts and Telegraphs	19.2	1.7	5.8	0.2	100.0	0.6
munications	30.8	2.7	35.8	1.1	25.0	1.5
rism	4.2	0.4	31.1	1.0	66.6	0.8
cation	209.2	18.0	130.8	4.1	35.3	7.8
lth	110.7	9.5	74.6	2.3	340.0	4.3
rm tion & Publicity	5.5	0.5	0.5	0.3	185.3	0.3
quarters (5)	442.3	38.0	181.8	5.7	15.0	14.4
ellaneous	10.9	0.8	27.6	0.9	624.1	0.9
TOTAL	1,162.0	100.0	3,176.1	100.0	4,338.1	100.0
emented by Dzongkhags	423.6	36.5	687.7	21.7	1,111.3	25.6
emented by Centre	738.4	63.5	2,488.4	78.3	3,226.8	74.4

Including Irrigation and Food Corporation
Excluding Chukha
Including Trade and Commerce
Including Urban Development
Including Non-Development Sectors

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Table 5

OUTLAY: INDUSTRIES & MINES SECTOR
(1981-87)

Programme	Fifth Plan Outlay		
	Total	Development	Maintenance
Regular Programmes			
Industrial Estates	1.420	1.225	0.195
Training	6.638	6.638	-
Feasibility Studies & Reports	6.035	6.035	-
eological Survey of Bhutan	18.482	10.000	8.482
Establishment Expenses	13.340	5.577	7.763
	45.915	29.475	16.440
Investment			
Graphite Mining & Beneficiation	10.000	10.000	-
Slate Mining & Processing	3.600	3.600	-
Calcium Carbide	95.500	95.000	-
Polythene (HDPE) Industry	7.160	7.160	-
Nanglam Cement Plant	516.000	516.000	-
Gypsum	5.000	5.000	-
Cottage & Small Industries	22.181	22.181	-
thers (including Phyto Chemical studies and IDC)	3.555	3.555	-
Total: Investment	662.496	662.496	-
Grand Total	708.411	691.671	16.440

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The largest single investment in the industries and mines sector is the Nu: 516 m Naglam Cement Plant. It accounts for 12% of total proposed outlays and for 75% of those proposed in industry. This project envisions the construction of a 1500 metric tons per day plant to exploit limestone, coal and gypsum deposits. Other major industries under consideration include a Nu: 95 million calcium carbide project and a high-density polythene pipe project aimed at supplying rural water supply projects. It is also proposed to invest in several new mining projects, including graphite mining and beneficiation and gypsum and to expand existing slate mining operations. Gypsum would be used by the cement industries as well as be exported, while slate would be used to meet domestic roofing needs, thereby replacing the need for imported corrugated iron. The government has also identified a number of smaller industrial projects valued at about Nu: 20 million, which it is hoped will be carried out by private entrepreneurs in the districts.

As a result of the very favourable change of giving industry the highest share of outlays in the Fifth Plan, the contribution of this sector to GDP will be dramatically increased as indicated by Table 6 which shows the composition and growth of GDP before and after the Plan.

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Table 6

COMPOSITION AND GROWTH OF GDP, 1980/81-1986/87
(Nu. in million, constant 1980/81 marked prices)

	1980/81		1986/87		Average Annual Growth Rate
	Amount	%	Amount	%	
riculture and Related Activities	645.2	63.2	1,007.0	60.2	7.6
Agriculture	409.4	40.1	796.0	47.6	11.7
Animal Husbandry	76.5	7.5	106.0	6.3	5.6
Forests	159.3	15.6	105.0	6.3	-5.0
ustry	63.5	6.3	292.4	17.5	29.0
Manufacturing and Mining	41.9	4.1	146.0	8.8	23.1
Construction	18.9	1.9	25.4	1.5	4.4
Power	2.7	0.3	121.0	7.2	88.5
rvices	311.8	30.5	373.8	22.3	3.1
Tourism	11.0	1.1	22.0	1.3	12.3
Communications	5.8	0.6	9.0	0.5	7.6
Transport	27.6	2.7	37.0	2.2	5.0
Financial Institutions	15.4	1.5	27.3	1.6	10.0
Trade	28.6	2.8	59.0	3.6	12.8
Social Services and Public Administration	141.4	13.8	127.0	7.6	-1.6
Rental and other Services	82.0	8.0	92.5	5.5	2.0
TOTAL GDP	1,020.5	100.0	1,673.2	100.0	8.5

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Apart from power, the manufacturing and mining sector will have the highest average annual growth rate (23.1%). As a matter of fact, this high annual growth rate is one of the main focuses of the Fifth Plan. The contribution of the industrial sector to GDP will be more than doubled after the implementation of the Plan as it will rise from 4.1% in 1980/81 to 8.8% in 1986/87.

3. Present Situation

Although industry and mining are at an infant stage of development in Bhutan, the share of this sector in GDP was already estimated to be 4.1% in 1980/81 and will rise to 8.8% in 1986/87.

At present there are about 70 industrial units of various sizes in the private sector, most of them being natural resource based. Of these 26 units are wood-based industries. In addition to these, there are about 27 sawmills spread allover the country. Some of the more important factories in this sector are a fruit preservation and processing unit, a steel furniture factory, a gum resin factory, a match factory and a number of units making tea chests, tea chest battens and packing cases. There are also several

hundred small agro-industries comprising rice, wheat, maize, and oilseed mills located in various areas of the country.

In the government sector, until recently there were only three distilleries and a slate mining company. However, during end of 1981, a 100,000 tons capacity cement plant was commissioned at Penden in Southern Bhutan. As a result of the establishment of this plant the contribution of the industrial sector to the GDP increased. During 1981/82 the total value of production from Penden Cement is estimated to be worth Nu: 65 million. After meeting the domestic requirements, a large part of the cement production of Penden is being exported to India.

In the mining sub-sector, apart from the limestone mining operations of the Penden Cement Factory, the main mining operations are the government-run slate mine near Wangdiphodrang and a marble mine at Paro which is currently inactive; three coal mines; and six dolomite mines; and two limestone mines, all in southern Bhutan. Slate and marble are used domestically, as transport costs to India are excessive, but dolomite chips, lime and coal are exported to India.

Projects initiated within the Fifth Plan included gypsum mining, brick company, high density polythene

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pipes. Pipeline projects include another large cement plant (150,000 metric tons capacity) block-board and particle board factories, one synthetic resin plant, graphite mining and beneficiation plant, calcium carbide plant, one coal chemicals unit, etc.

At the moment, the total fixed capital employed in the industrial sector is approximately Nu: 176.3 million, while the total employment in industry and mining numbers about 4177 persons.

A large percentage of industrial outputs is imported at the moment. However, giving the rich forest and mineral resources of the country, the potential for enhanced agricultural production and the planned increase in power generation, there is enermous scope for significant expansion of resource-based and agro-based industries.

In the absence of proper statistics, Table 7 gives a qualitative picture about the relative growth and sizes of the public, joint and private sectors.

Annex V lists all products manufactured in Bhutan.

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Table 7 : REVENUE EARNED
FROM THE
PUBLIC/JOINT/PRIVATE SECTOR INDUSTRIES
(1981/82 - 1983/84)

Sector	1981/82	1982/83	1983/84
Public Sector	13,162,322	37,887,024	51,735,867
Joint Sector	341,674	439,108	441,000
Private Sector	143,612	132,030	173,759
	13,647,608	38,458,162	52,350,626

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4. Future Prospects

During the past 20 years, and in the face of very difficult circumstances, Bhutan has been able to make great progress in its journey towards an all round economic development. The main factors behind this progress are :

1. Bhutan is well managed and has built almost from scratch a still fairly small, but nevertheless dynamic, development administration which has shown itself prepared to take sometimes difficult economic decisions and then promptly implement them.

2. The government is strongly commited to development and is making an efficient use of the resources at its disposal.

3. The development strategy is fundamentally sound and well adapted to the country's unique circumstances.

4. The economic potential of Bhutan is considerable; it includes, in particular, vast hydro-electric power resources, forests, covering about 70% of the land, as well as agriculture, especially horticulture.

5. Bhutan has developed an impressive stock of basic economic infrastructure.

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Thus Bhutan is now at a watershed in its developmental path. The stage is set for a structural transformation of the economy.

In the specific field of industrial development the same sound stage has been set for a new and strong development momentum.

Although some constraints to extensive industrialization and weaknesses in the national infrastructure still persist, certain favourable conditions have emerged as a result of past developments, which present an opportunity for the undertaking of industrial development on a significant scale for the first time. These conditions are.

1. The availability of cheap abundant power from the Chukha Hydel Project by 1984/85.

2. The identification of a number of commercially exploitable mineral deposits.

3. An adequate development of the physical infrastructure necessary to permit the establishment of resource-based industrial ventures at selected sites.

Bhutan has managed to build up from scratch and only in a few years, a small but modern and dynamic industrial

sector which will soon be able to contribute about 9% of the GDP.

The government adopts an industrial development strategy which has a twin thrust :-

1. To undertake a number of relatively large export-oriented resource-based projects designed to exploit nearby markets.

2. To promote the development of private industries.

To consolidate and expedite the industrialization process in the country, the government has worked out the framework of an industrial policy to promote future industrial development with both financial and other incentives like interest rate, Subsidies, provision of loan capital, the development of industrial estates, the establishment of an Industrial Development Bank, etc.

Undoubtedly, there is a great potential for the development of new industries based on agricultural, forestry and mineral resources. And as industries usually breed industries, the small but dynamic industrial sector that now exists will grow steadily and will soon gather momentum and emerge as a progressive sector which would

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be able to play a great role in the development of the national economy of Bhutan.

It is thus concluded that, based on the certain amount of basic infrastructure that has been developed over the years, the small dynamic industrial sector that already exists, the rich and bountiful resources available in the country,(1) the government total commitment to development especially its policy and strategy to promote trade and industrial prospects for industrial development in Bhutan appear optimistic and chances of success seem quite good.

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(1) In the field of power, Bhutan has a potential to generate about 20,000 MW. This immense potential has been only barely tapped by the construction of the big hydro-electirc power station at Chukha which will only generate 336 MW. i.e. 1.7% only of the power potential. The remaining potential leaves the door very wide open for establishing electrochemical and electrometallurgical industries.

C. TRADE DEVELOPMENT

1. Introduction

Until about the middle of this century, Bhutan had flourishing trade lines with her neighbouring countries as she was geographically in an advantageous position with Tibet and the rest of Central Asia in the north, and the Indian territories in the south, east and west. The 18 duars or passes into Bhutan from the plains of India and the existence of several passes in the north serving as entries to Tibet (now in China) made Bhutan a transit country for trade between India and Tibet. This activity, however, did not influence the internal economic conditions of the country, which were based on a system of self-sufficient agriculture and barter-based trade. Until the inception of developmental activities in the 1960s, therefore, the importance of trade and commerce was very limited.

As sources by way of finance and manpower to meet the developmental needs were very limited, the Royal government had to draw up its priorities. Therefore, the first development plans, of necessity, were wholly devoted to the development of basic infrastructure; like roads, power, manpower, agriculture, animal husbandry and forests.

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Development of trade and commerce had, therefore, received very low priorities.

Since certain amount of the basic infrastructure required has been developed over the years, priorities of the government are being adjusted and geared towards achieving economic self-reliance. Under the new priorities laid down, development of more infrastructure in the country still holds high priorities along with the development of other important sectors. For economic growth of the country, the Royal Government has accorded high priorities to the development of these sectors including industry and trade.

2. External Trade

For an economy that nearly 20 years ago functioned without trade, Bhutan's present dependence on trade is suprisingly high-imports in 1981/82 amounted to about 40% of the GDP; exports to about 17% resulting in a large trade deficit equivalent to about 23% of the GDP. This is due to the expansion that has taken place in the past 20 years of planned development.

Almost 96% of the trade is conducted with India, mainly because of Bhutan's landlocked position, but also

because a state of free trade exists between the two countries. Imports from India cover a wide range of consumer, intermediate and capital goods. The largest imports are of metal and metal products (18.6%), petroleum products (14.2%), food grains (5.5%), transport equipment (5.4%) and textiles and clothing (5.3%). The main exports are cement and agricultural produce(potato, apple, orange, big brown cardamom, ginger and vegetables). In addition, other exportable items are timber, tea chest plywood and battens, resins, minerals and a wide range of handicrafts. Of manufactured products till recently, only some processed fruit products were being exported but of late cement is emerging as a major export item. Agricultural products accounted for 27% of all exports followed by forestry products at 15%. In 1981/82 with a full year of functioning of the Penden Cement Plant, 71,000 metric tons of cement were exported to India accounting for 27% of total exports.

Trade with countries other than India accounted for less than 6% of total trade flow in 1981/82 but has been growing of late. Imports from overseas essentially comprise machinery and equipment financed by aid from international agencies and bilateral donors which have been substantially in the form of grants so far. The other major import is of automobiles much of which are financed

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from Bhutan's own hard currency accruals. A small quantity of imports of consumer items are also financed from Bhutan's own reserves. Almost 85% of exports were accounted for by cardamom and almost the entire balance by rosins.

Owing to Bhutan's free access to the large nearby Indian market, India is likely to remain Bhutan's main trading partner. However, a growing need to expand exports to third country markets in order to earn foreign exchange, is emerging as Bhutan would have to spend more foreign exchange for import of spares, etc. and to service external hard currency debts as a result of increased international borrowings.

3. Industrial Exports and Trade Development

The growth and development of the economy require substantial imports of machinery, equipment and other goods not produced locally. To pay for these imports the economy needs to generate sufficient foreign exchange. International trade, therefore, plays a significant role in the development of the economy. Because of the importance of foreign exchange earnings to the economy, the state of the balance of payments is one of the most significant factors influencing the level of economic activity.

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In an effort to assess the effect of the balance of payment on the economic development in Bhutan, the Consultant compiled Table 8 which shows the trade balance in the last three years (1981-1983) and Table 9 which indicates exports to third countries during the same years.

From Table 8 it is concluded that :-

(1) Value of exports in the last three years showed a steady decrease

(2) The overwhelming majority of exports (over 96%) is directed to India which does not result in gaining hard currency.

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(1) It should be noted that in the discussion of the balance of payments, it will be assumed all imports are paid by Bhutan which, in fact, is not the case as a considerable percentage of imports are financed by aid flows from international agencies and bilateral donors. However, the government recognizes that "a larger proportion of future imports of equipment, materials and consumer goods will be outside the aid structure, and will therefore, need to be financed through exports, in particular exports yielding foreign earnings."

Consequently, the assessment of the trade balance is quite relevant and should lead to valid results.

Table 8 : BALANCE OF PAYMENTS (1981 - 1983)

(Value in N_)

Year	Country	Exports		Imports		Trade Balance		
		Value	%		%	Surplus	Deficit	%
1981	India	166,340,000	96.8	451,024,000	95.9	-	284,684,000	95.3
	Others	5,468,468	3.2	19,487,719	4.1	-	14,019,251	4.7
	Total	171,808,468	100.0	470,511,719	100.0	-	298,703,251	100.0
1982	India	156,938,259	98.5	440,779,057	89.3	-	283,840,798	84.9
	Others	2,365,887	1.5	52,949,783	10.7	-	50,584,096	15.1
	Total	159,303,946	100.0	493,728,840	100.0	-	334,424,894	100.0
1983	India	136,916,417	97.5	320,048,512	81.2	-	183,132,095	72.2
	Others	3,451,030	2.5	73,968,646	18.8	-	70,517,616	27.8
	Total	140,367,447	100.0	394,017,158	100.0	-	253,649,711	100.0

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(3) Imports from overseas shows a steady and considerable increase being Nu: 19.5 million in 1981, 53 million in 1982 and 74 million in 1983.

(4) Deficit in foreign currency shows a steady and considerable increase being Nu: 14 million in 1981, 50.6 million in 1982 and 70.5 million in 1983.

On the other hand, Table 9 indicates the following:

(1) Cardamom constitutes the greater majority (over 71%) of all Bhutanese exports to overseas countries. Consequently, hard currency earnings of Bhutan fluctuates depending on the price of that agricultural produce, a situation which should be avoided as far as possible.

At this point, it might be argued that a solution may be found by diverting some exports from the Indian market (which does not result in hard currency earnings) to overseas market. In this connection, fresh fruits and vegetables evoke existing ideas of a ready export market but with the present level of production and the existing drawback in transportation, their exports beyond the neighbouring areas of India does not, in reality, seem to be a promising possibility, at least in the foreseen future. Dolomite being a low-value bulky item, has no prospects for export beyond India, except for a small quantity in Bangladesh.

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Table 9 : EXPORT TO THIRD COUNTRIES (1981 - 1983)
(Value in Nu)

Commodity	1981		1982		1983	
	Value	%	Value	%	Value	%
Cardamom	4,517,35	82.6	1,907,013	80.6	2,472,766	71.6
Apple	-		47,568	2.0		
Sawlogs, soft	-	-	-		77,246	2.3
Sawn timber, soft	27,575	0.5	-		-	-
Rosin	692,730	12.7	-		-	-
Bracelets, silver	4,715	0.1	-		-	-
Handicrafts	226,098	4.1	211,840	9.0	384,291	11.1
Milled rods	-	-	199,266	8.4	516,727	15.0
T O T A L :-	5,468,468	100.0	2,365,687	100.0	3,451,030	100.0

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Exports of timber to overseas markets have, however been limited by high costs of production and transportation and the inability on part of the exporters in Bhutan to meet the volume and specification requirements of export orders on a consistent basis. As a result, greater emphasis is being given to promoting exports of value-added timber products like wooden mouldings and beadings which have a reasonably better prospects for export. Of the other export items to India there only remain three major products namely, canned fruit products, alcoholic beverages and cement are in good demand in India. The possibility of exporting them to overseas markets could be fully explored and assessed and, if positive, the feasibility of increasing their production should be considered (either by expanding the existing units or by establishing new plants) so that the production would satisfy the demand of both Indian and overseas markets. These three commodities have the advantage of being value-added products.

From the above discussion, it is concluded that :

(1) The balance of payment is not in favour of Bhutan. Moreover, the deficit in foreign currency increased steadily in the last three years.

(2) Hard currency earnings - so vital to the economic development of Bhutan - fluctuate considerably since

they depend, to a very large extent, on the exportation of one agricultural produce (cardamom) whose price is subject to the vagaries of international market forces.

(3) In order to lessen Bhutan's vulnerability upon a primary commodity, there should be a considerable increase in the exportation of industrial products to overseas markets.

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IV. ASSESSMENT OF THE NEED FOR AN INTEGRATED STANDARDIZATION SYSTEM IN BHUTAN

A. INTRODUCTION

Standardization is a universal discipline that could be - or rather should be - applied to any national activity irrespective of its nature. However, it is in industry and trade that it has its greatest and far reaching effects notwithstanding, of course, its importance and benefits to other sectors such as health, education, communication, transport, administration, etc...

Thus, in order to assess the real need for standardization and quality control in Bhutan, it was - therefore - necessary to carry out a general study of the national economy of Bhutan (Chapter II) with special emphasis on the evolution, present status and future development of the two important sectors of industry and trade (Chapter III).

The present chapter starts with discussing the role that standardization and quality could play in promoting these two sectors in the context of achieving the overall social and economic development of Bhutan and the realization of her cardinal

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objective of self reliance. By identifying the magnitude and extent of this role, it would be possible to achieve a true assessment as to whether or not there is a real need for a national integrated system of standardization.

The assessment thus reached, will then be reviewed in the light of the views expressed by the Royal Government as well as of the industrial and trade sectors.

Finally, the present Chapter ends with a detailed discussion of the issues which might be raised in regard to the Consultant's assessment.

B. ROLE OF STANDARDIZATION AND QUALITY CONTROL IN NATIONAL DEVELOPMENT

In the industrial sector, it has been indicated that :-

(a) Although economic development in Bhutan started by the First Plan in 1961, organized industrial development has only begun few years ago. Starting almost from scratch, it was necessary that the first plans should emphasize on building the essential physical infrastructure. Thus outlays for industry were as low as 1% of the total outlays in the First Plan and even 0.5% in the second Plan. In the Third Plan, outlays for industry figured modestly (5.3%). It could be considered that organized industrialization in Bhutan began with the Fourth Plan(1976/77-1980/81) at the end of which the contribution of industry to the GDP rose from almost nil to 4.1% and the value of production reached Nu: 145 million (about US $ 18.5 million).

(b) In preparing the Fifth Plan, industrialization was given high priority as investments in this sector yield quick and tangible returns and strengthen the resources of the government. Industrialization is also necessary for the processing of local raw materials for domestic consumption and for maximizing the benefits from trade. The export of processed products with a high indigenous value-added component is more beneficial than the sale of low-value unprocessed raw materials.

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(c) Consequently, the Fifth Plan was characterized by giving industry the highest outlays of all sectors (17.4% of the total Plan outlay). As a matter of fact, the high annual growth rate of industry(23.1%)-being second only to power - is one of the main focuses of the Fifth Plan. As a result, the contribution of the industrial sector to the GDP will be more than doubled at the end of the Plan period as it will rise from 4.1% in 1980/81 to 8.8% in 1986/87.

(d) In support of industrial development, the Royal Government of Bhutan adoped a specific strategy relating to the establishment and development of the industrial public sector and, at the same time, parallel promotional policies relating to the private sector including both financial and other incentives like interest rate subsidies, provision of loan capital, the development of industrial estates, the establishment of an industrial Development Bank, etc.

(e) Based on the certain amount of basic infrastructure that has been developed over the years, the small dynamic incustrial sector that already exists, the rich and bountiful resources available in the country, the government commitment to development especially

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its policy and strategy to promote industry and trade, prospects for industrial development in Bhutan appear to be optimistic and chances of success seem good.

(f) Although the industrial sector is still in its infancy, experience has shown that industries breed industries especially if one takes into consideration the stimulating and catalyzing effects of the above mentioned factors. Consequently, this small but dynamic sector will soon gather momentum and emerge as one of the most progressive and influencial sectors in Bhutan's economy.

It follows, therefore, that in order to safeguard, and consolidate a sector of such growing importance which would greatly help in achieving the national objectives of economic and social development, the importance of standardization-which has led to the Industrial Revolution, mass production, mechanization and automation - cannot be overlooked. Standardization furnishes one of the most important elements in the scientific and technical infrastructure so essential for the healthy development and growth of industry.

In the Trade sector, on the other hand, it has been indicated that :-

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(a) Value of exports in the last three years showed a steady decrease.

(b) The overwhelming majority of exports (over 96%) is directed to India which does not result in gaining hard currency.

(c) During the last three years, imports from overseas showed a steady and considerable increase being Nu: 19.5 million in 1981, 53 million in 1982 and 74 million in 1983.

(d) During the same period, deficit in foreign currency showed a steady and considerable increase being Nu:14 million in 1981, 50.6 million in 1982 and 70.5 million in 1983.

(e) A growing need to expand exports to third country markets is emerging in order to earn foreign exchange since Bhutan would have - because of her ambitious developmental activities - to spend more foreign exchange for the import of spares and other items not produced in the country and to service hard currency debts incurred as a result of increased international borrowings.

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(f) Since cardamom constitutes the greater majority (over 71%) of all Bhutanese exports to overseas countries, hard currency earnings fluctuates considerably as they depend - to a very large extent - on the exportation of one agricultural produce whose price is subject to the vagaries of international market forces.

It follows, therefore, that if Bhutan is to secure and increase her foreign exchange earnings - so vital for her continued economic and social development - no effort should be spared to promote the exportation of her industrial products to overseas markets. This implies - of necessity - that these products should be competitive in the world market place.

It goes without saying that with world markets, it is very hard to break in but very easy to be thrown out, so stiff is the competition. The question of competitiveness in the international market place is not only a matter of the authorities taking the appropriate measures, it is also a matter of significant efforts being made by producers and exporters themselves to ensure that cost increases are kept to a minimum, productivity is maximized and the appropriate quality is produced. Success in world markets depends on

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the supplier's ability to satisfy customers on a wide range of factors, including good design, reliability, maintainability, safety, energy consumption, environment considerations and price,[1] the extent to which a product or service satisfies these needs determines its quality. Needless to say that ensuring the above factors is the main objectives of national standards. It used to be said. "Trade follows the flag", the "flag" is now a "standard".

It is thus seen that for the proper development of industry and trade, Bhutan has to make full use of the standardization discipline.

As a matter of fact, this is not confined to the industrial and trade sectors only, but applies equally to all other sectors. Whether at the national or international level, modern economy is composed of immense networks of transition points through which goods and services flow from

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(1) As regards price, Bhutanese products are - unfortunately - at a rather disadvantage due to the increased transportation costs incurred as a result of Bhutan being a land-locked country. In order to compensate for this, excellence in other quality parameters will be needed; a pretty tough job which calls for very efficient and effective application of the philosophy and techniques of Company Wide Quality Control (CWQC).

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the producer to the consumer. In order to ensure the smooth and healthy flow of these goods and services proper requirements should be set up and met at these transition points. These are nothing but standards. In this respect, standards play the very important and essential role of a lubricant which makes the economic machinery moves and without which such machinery will inevitably come to a halt. Standardization is now well recognized as an efficient and effective tool for the administration and promotion of the national economy.

The wide adoption of a national integrated system of standardization and its related disciplines to the various sectors of any national economy brings out important benefits such as :

1. Creation of order, discipline, rationalization, simplicity and efficiency in any activity.

2. Provision of the best solutions to recurrent problems.

3. Internal organization of any enterprise

4. Increased productivity.

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5. Full and efficient exploitation and use of indigenous raw materials.

6. Reduction of production and distribution costs.

7. Improvement of the quality of goods(including product life, reliability and maintainability) and services as well.

8. Ensuring safety in the production and use of goods.

9. Protection of life and health.

10. Improvement of the environment.

11. Safeguarding the interests of consumers and producers alike.

12. Ensuring fair commercial transactions.

13. Facilitation of the flow of trade.

14. Control of imports.

15. Promotion of exports.

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16. Facilitation of communications and promoting mutual understanding and goodwill.

17. Elimination or reduction of waste and promotion of overall economy in terms of human efforts, materials, energy and money.

18. Administration and rationalization of the national economy.

19. Improving gross Domestic Product.

20. Contribution to the raising of the standard of living.

Unfortunately, these immense and important objectives, which involve material and non-material benefits, are intangible, a fact which accounts for the low appreciation of the merits of standardization on the part of all concerned, government, industry, trade and the public at large especially in developing countries.

In this respect, it may be interesting to note that many theoretical and practical studies have been-and are being-conducted to estimate the economic benefits of

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standardization,[1] other benefits being absolutely impossible to evaluate. While it is not the intention of the Consultant to treat this subject to any degree, yet suffice it to say that in developed countries, there are documented cases where the cost-benefit ratio of standardization at the enterprise level reached as high as 1:50 (e.g. Canada). At the national level, this ratio reaches, in average, 1:10 (e.g. USSR). Certainly, the ratio is much higher in developing countries. And this is only one aspect of the benefits, namely; the economic benefits resulting mainly from variety reduction, not to mention other benefits especially those connected with such aspects as the ease of communication and the protection of life, health, safety and environment.

Because of their immense benefits to the national economy, the discipline of standardization and its related domains (testing, quality control, certification, accreditation and metrology) have become the main national concern in developed countries and in many developing countries as well. Attaining high quality of goods and services has become a national goal which stands on equal footing with

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(1) Especially by the International Organization for standardization (ISO) and the International Federation for the application of standards (IFAN).

other goals receiving the highest priority. The major objective has become the development and management of QUALITY, the ultimate aim being to further and continuously raise and improve the QUALITY OF LIFE AT ALL LEVELS OF DEVELOPMENT

It is, therefore, concluded that Bhutan - in her endeavour to rationalize and promote her economic and social development and to attain its cardinal objective of self-reliance, she has to make a national commitment to an integrated system of standardization and its related disciplines such as quality control, certification and metrology. In order to furnish the institutional infrastructure for this national integrated standardization system, a national standards body should be established.

C. THE ROYAL GOVERNMENT AND STANDARDIZATION

It is most gratifying that the importance of standardization and quality control as efficient and effective tools for industrial and trade development/institute was not overlooked by the Royal Government of Bhutan which has experienced the drawbacks of the absence of these two disciplines shortly after its new entrance to the community of exporting countries. Consequently the Government has not missed any opportunity to express its views.

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In its "Country Report" presented to the Twenty Third Session of the Committee on Trade which was held in Bangkok from 18th - 24th November 1980, the government stated that: "In addition to over all high costs, the products suffer from lack of QC in terms of grading, sorting and packaging by international acceptability standards. The absence of an internationally recognized organization competent to issue phyto-sanitary certificates also add to the problem of exporting agricultural cash crops to countries other than India". In conclusion, the Report enumerated 12 areas where assistance is required to promote Bhutan's exports. The first of these areas reads as follows :-

"(a) Setting up of quality and packaging standards of the exportable goods and the creation of an appropriate infrastructure thereof".

The adverse effects of the absence of standardization of products through a recognized institute which constitute a major bottleneck to conduct trade in general - and foreign trade in particular - are not confined only to agricultural produce. Almost all of the country's products suffer from this drawback. For example, the tea-chest plywood and battens produced in the country have to be sold even in the Indian market at a lower price as these products do not carry any standard marking, sometimes they are even not accepted by buyers.

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(1) Agricultural items

In the Country Programme for Bhutan, presented on 18 February 1981 to the UNDP concerning assistance for the period 1980-1985, the government stated in page 13 that : "41. The development of the industry and mining sector is inhibited by : the limited size of the domestic market; power constraints; the lack of entrepreneurial experience and finance; and the absence of the necessary supporting information and services, including feasibility and marketing studies, and QC or certification provisions".

42. The policies and objectives of the Royal Government for the development of the sector are to : (a) establish small and medium - scale resource based industries, mechanized to the maximum degree possible, (b) provide support for the private sector and private entrepreneurs; (c) promote appropriate QC and standards; (d) .....; (e) ..... and (f)...."

To implement its policy and objectives, the Royal Government took a very commendable practical step by earmarking under the UNDP/IPF and amount of US $ 155,000 over the period 1984-86(including a preparatory assistance phase already implemented through the present mission) for the establishment of a technical assistance project to cater for the development of an appropriate national standardization and QC cell or institute.

Meanwhile, the Royal Government - on its part - included in its Fifth Plan (1981-87), the necessary provisions for the establishment of a national standards body. The Main Document of the Fifth Plan stated the following (p110) :

"BHUTAN STANDARDS INSTITUTE

In order to ensure adherence to quality standards, the Bhutan Standards Institute is to be set up in the Fifth Plan, with an outlay of Nu: 7.3 million. The Institute will be an autonomous body which will oversee the laying down of appropriate standards of quality, taking into account safety, hygiene, reliability and the requirements of outside markets."

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(1) On passing by, it might be relevant here to mention that the name of the proposed NSB to be set up in Bhutan deserves a second thought since its acronym (BSI) may be confused with that of the British Standards Institution,(BSI). Therefore, if the word "Institute" is to be retained in the name of the proposed NSB, then it might be recommended to call it "Standards Institute of Bhutan" with its acronym as (SIB) which has the further advantage of being easily pronounced. There are also other alternatives. Similarly, it is further recommended that the abbreviation for Bhutanese standards(BS) should not be mixed with that for British Standards(BS). Several alternatives could like-wise be suggested and considered later on.

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Table 10 shows the outlay of the Trade and Commerce Sector in the Fifth Plan.

As a matter of fact, the expenditures allocated to start the establishment of the Bhutan Standards Institute clearly indicates the justifiable importance the government attaches to standardization and QC activities.

D. INDUSTRY, TRADE AND STANDARDIZATION

Although the previous discussion and statements provide strong justification and support to the establishment of a NSB in Bhutan, the Consultant deemed it necessary to explore the views of industrialists, businessmen and top executives working in industry and trade. To this end he paid technical visits to some representative enterprises of various sizes(large, medium and small) both in the public and private sectors.

It is gratifying that all persons interviewed-with the exception of only one who had few reservations to be dealt with shortly-expressed their persistent need and full support to the setting up of a NSB in Bhutan.

Industry and trade needs for standards covered almost all fields : agricultural and food products, various materials,

Table 10

OUTLAY : TRADE AND COMMERCE SECTOR (1981-87)
(Value in Nu million)

	Programme	Fifth Plan Outlay			
		Development	Maintainance	Total	%
1.	Purchase of Transport equipment and Handling Facilities	14.270	-	14.270	29.5
2.	Direction	0.780	13.050	13.830	28.6
3.	Bhutan Standards Institute	2.966	4.320	7.286	15.1
4.	Trade Data Collection Cell	4.127	1.040	5.167	10.7
5.	Trade Promotion Cell	3.959	0.890	4.749	9.8
6.	Training and Consultancy Services	3.048	-	3.048	3.3
	Total	29.050	19.300	48.350	100.00

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construction work,[1] ..... and handicrafts. The Consultant was very pleased to hear of the need to standardize handicrafts since many think that they are not amenable to standardization. In this respect the Consultant wishes to attract the attention to these products. Handicrafts provide employment and occupation to rural labour and low-income section of the population. In addition, they acquired growing importance as earners of hard currency in the last three years as shown in Table 9 (p56). Needless to say that standardization of these products will greatly erhance their value and thereby promote their exports.

Interest in standardization was not confined to product specification but also covered weights and measures (legal metrology). There have been numerous complaints against short weighing and measuring in a variety of commodities ranging from fresh vegetables and other perishables to petrol.

Some of the results of this investigation were very interesting indeed. A general manager of a wood-based industry,

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(1) Bhutan lies in Earthquake zone 4 which necessitates special requirements in constructional work (e.g. foundation, etc.). While big contractors constructing large projects are aware of this fact, small ones may not be with the result that the buildings they construct would involve safety hazards as has been experienced in previous occasions. It follows, therefore, that the issuance of standard codes of practice in the construction field acquires great importance.

for example, stated that the standardization of the sizes of sawn timber would save at least 10% of all timber sawn in Bhutan.

While the Consultant is not willing to record all views expressed he, nevertheless, deems it worthy to elaborate on an important issue which was of common concern to many circles namely; the ISI Mark.

Some customers in India make a condition that the goods they buy from Bhutan should bear the ISI Mark which is not possible from the legal point of view. However, there are always ways to get around such case. One manufacturer had to establish a testing laboratory in India similar to the one in his factory just to overcome this difficulty. The equipment of this laboratory, which costed Nu. 150,000 is never used. Each of the other manufacturers (about six) has to sell his products to an Indian middle man, who is eligible to get the mark on these products.

The consequences of this operation are :-

1. loss of time and effort since obtaining the mark may take up to a whole year.

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2. loss of money incurred in travel to ISI and other authorities to get the mark.

3. loss of money involved in the introduction of the middle man.

4. loss of money due to higher certification fees as a result of the long distances to be covered by ISI inspectors.

5. loss of money incurred in establishing a duplicate laboratory in case of the manufacturer who set up testing facilities in India.

Needless to say that the establishment of a NSB in Bhutan, which would operate such certification marking system, would greatly result in reducing all these losses. Even mark fees will be reduced due to the shorter distances to be covered by Bhutanese inspectors. In addition, certification fees will be spent in Bhutan and not outside. Over and above, the national standards mark provides pride and prestige both to producers and consumers.

It was not possible to obtain a true figure of the amount of certification fees (other than expenses incurred as shown above) paid to ISI. However, based on the fees

paid by two manufacturers visited by the Consultant, it is estimated that the total annual fees paid by the seven industries (almost all small-scale industries) amount to from Nu. 100,000 to 120,000 (about US $ 8,000-10,000). This amount would be certainly more than cover the total outlays[1] that would be spent by the proposed Bhutan Standards Institute in operating the certification marking scheme for those seven small-scale industries. Certainly, certification income would be much more than the above figure since it was based on the assumption that the number of mark licensees would be only seven small-scale manufacturers. Undoubtedly, that number will be increased and that a number of medium-and large-scale industries will certainly join the system.

Generally speaking, the income generated as a result of operating a certification marking scheme makes such activities self-supporting. This is the case in most-if not in all- NSBs operating such system whether in developed (e.g. UK) or developing (e.g. India) countries. In the British Standards Institution (BSI). e.g., the Quality

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(1) Including staff salaries, testing expenses, administrative charges, depreciation of equipment, etc...)

Assurance Division (QAD) which has a staff of 346 and runs the certification marking system is a self-funding non-profit operation. It does not receive any grant from the British government in contrast to the other two divisions of BSI, namely "Standards" and "Technical Help to Exporters" (THE). Since it is, of course, not always possible to ensure that a particular certification and testing operation will generate sufficient income to cover its costs, the QAD, therefore, aims to produce a small surplus each year some of which is allocated to supporting new and developing services.(1)

The Consultant wishes to seize this opportunity to state that the establishment of a NSB in a developing country would not necessarily represent an increasing financial burden on the part of the government as the NSB will be able to generate income from its services and these services - and hence income - will grow as the NSB develop and grow over the years. In Zimbabwe, for example, the percentage of the government grant to total income of the NSB dropped from 43.5% in 1978 to 35.5% in 1980 to 30.6% in 1982. In Sri Lanka the same percentage dropped from 98.5% in 1975 to 82.5% in 1978 to 68% in 1981 to 56.6% in

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(1) Private Communication to the Consultant dated 16 August 1984.

1983. In India, the same percentage was, of course, 100% in 1947 when the ISI was established, since then it has dropped gradually to 21.4% in 1982, 18.6% in 1983 and to an estimated 16% in the current year. Table 11 prepared by the Consultant from ISI Annual Report, is very interesting as it shows :

(a) the various sources of income of ISI and the relative weight of each.

(b) the importance of certification marking system as the main source of income.

These two features may be roughly regarded as typical to many NSBs after some years of functioning.

Reservations

As mentioned before, the Consultant had a lengthy discussion with a businessman who showed certain reservations/doubts connected with the initiation of national standardization activities in Bhutan. It was quite evident that all such reservations/fears stem from one root namely, the misunderstanding of the philosophy, principles, objectives and methodology of the standardization

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Table 11 : ISI INCOME (1982, 1983)

	Source	Year Ending 31 March					
		1982			1983		
		Rs	% to Internal Income	% to Total Income	Rs	% Internal Income	% Total Income
1.	Membership Subscription	4,923,216	13.4	10.5	5,123,930	10.8	8.8
2.	Sales						
	Indian Standards	3,583,499	9.7	7.6	5,290,623	11.1	9.0
	Calculation Aids and Binders	151,510	0.4	0.3	151,958	0.3	0.3
	Overseas Publications	856,623	2.3	1.8	859,904	1.8	1.5
3.	Bulletin Advertisements	147,671	0.4	0.3	71,160	0.1	0.1
4.	Certification (1)	26,643,001	72.4	56.9	35,572,804 (1)	74.6	60.7
5.	Contributions	28,290	0.1	0.1	28,217	0.1	0.1
6.	Conferences (Delegates Fees)	29,360	0.1	0.1	-	-	-
7.	Training Fees	120,032	0.4	0.3	136,876	0.3	0.2
8.	Miscellaneous	317,645	0.8	0.7	436,297	0.9	0.7
	Internal Income	36,800,947	100.0		47,671,769	100	
9.	Government Grant	10,000,000		21.4	10,900,000		18.6
	Total Income	46,800,847		100.0	58,571,769		100.0

(1) Income relating to marking fees only has been taken on cash basis and not on accrual basis. A sum of Rs. 571,483 realisable on accrual basis during the year has not been included.

discipline. Although almost all of these reservations/ doubts/fears were cleared away, the Consultant deems it useful to discuss two of them in writing since he believes that they might be felt by others whom he had not the opportunity to meet.

The first reservation was connected with the future effect of Bhutanese standards on exports. The business-man was exporting almost all of his products to India according to Indian standards. It was evident that, to him, a Bhutanese standard means something different from the corresponding Indian standard. This is not necessarily so. There shall be nothing against adopting an Indian standard - not only in spirit but even in letter - if that standard have been implemented successfully in Bhutan and has proved to be useful to the people and/or the national economy. Many of the Indian standards themselves are either literal adoption of other foreign standards or adoption with few changes.

As a matter of fact, adoption of other standards (whether national, regional or international), in one way or another, is a very common practice in national standardization in developed and developing countries. In the UK, for example, a considerable number of ISO

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and IEC standards are adopted as British standards. In such cases, the standard, which is published in the BS style, is given both the BS and ISO code numbers. Another country in North Europe considers all ISO standards as her national standards. In the USA in addition to the adoption of international standards the American National Standards Institute (ANSI) adopts the standards issued at a lower level i.e. the Association/Society level such as the standards of the American Electrical Manufacturers Association(NEMA), the American Society for Testing and Materials(ASTM), the American Society for Quality Control (ASQC), the Underwriters Laboratories (UL), etc.... In such cases, the two code numbers of ANSI and the issuing association/society appear together on the standard which retains the shape, size and style of the standards of the issuing association/society. In adopting other national standards, Zimbabwe follows a much simpler method. The over-whelming majority of Zimbabwean standards are a direct endorsement of the corresponding standards issued by the South African Bureau of Standards(SABS). In order to save money, time and effort, the NSB of Zimbabwe, known as SAC4, acquires copies of the endorsed standard from SABS and simply sticks on each copy an "endorsement slip" stating that the standard has been endorsed as Zimbabwean standard and giving the date of endorsement and the code number of Zimbabwean standards.

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It should however, be emphasized that in all cases of adoption, whether totally or partially, the foreign standard is very carefully and thoroughly studied by a competent technical committee formed by the NSB to ensure that it is applicable and that its application is in the interest of the country.

Thus, if an Indian Standard has been applied successfully for several years without any adverse effect to the people or the national economy, then there should be nothing against adopting it as a Bhutanese standard.

The second issue which causes "fear" to some manufacturers is that they may be obliged, by legislation or regulation, to apply certain standards. As a matter of fact the Consultant does not see anything wrong in this and manufacturers should not worry about compulsory standards or compulsory certification. All countries resort, or should resort, to enforcement of standards as such or in the form of technical regulations in matters related to the protection of life, health, safety and environment. Apart from these fields, the degree of enforcement depends on several factors. Generally speaking, all national standards in countries with centrally - planned economies are mandatory. However, this is not always confined to

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such countries since the same principle is applied in some countries with free economy (e.g. Saudi Arabia). In Japan, the highly industrialized country with free economy and voluntary standardization system, the export of certain designated items is prohibited if not conforming to certain standards. The same is done in Egypt, India, Iran and several south east Asia countries. Switzerland applies the same principle only in regard to watches.

In India during the implementation of the 20-Point Programme[1] to offer increased consumer protection, the government - on the recommendation of ISI - introduced suitable measures for enforcing standards wherever necessary. Coverage under the ISI certification marking scheme or compliance to stipulated standards had been made obligatory for a number of products of direct consumption particularly those involving hazards to health and safety of life. These include food colours, cement, LPG gas cylinders, gas stoves, white printing paper, domestic electric appliances, power threshers for agricultural use, appliances used in mines and other hazardous areas, etc. .... Moreover, in keeping

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(1) Outlined by the Prime Minister on 14.1.1982.

with the objective of the 20-Point Programme, a number of additional items of mass consumption are being brought under compulsory enforcement of national standards. These include synthetic detergents, pencils, paper, bulbs, match boxes, oil stoves and stainless steel and aluminium utensils.

In conslusion, the manufacturers in Bhutan should be rest assured that the Government - or for this matter any government - would not enforce any standard which is likely to have any adverse effect on the people or the national economy at large. It is the absolute right - or rather duty - of any government to enforce any standard if it deems that its enforcement is in the interest of the country.

E. A NATIONAL STANDARDS BODY IN BHUTAN ?

It has been shown that the Royal government has come to the conslusion - and even has taken a preliminary positive step - to establish a NSB in Bhutan in an effort to develop trade and industry in particular and national economy in general. The same conclusion has been reached by the Consultant following his critical and comprehensive study of the economic situation and future in Bhutan as discussed in (B) above. In both cases, the conclusion came as a result not only of theoretical considerations - though strongly supported by national experiences

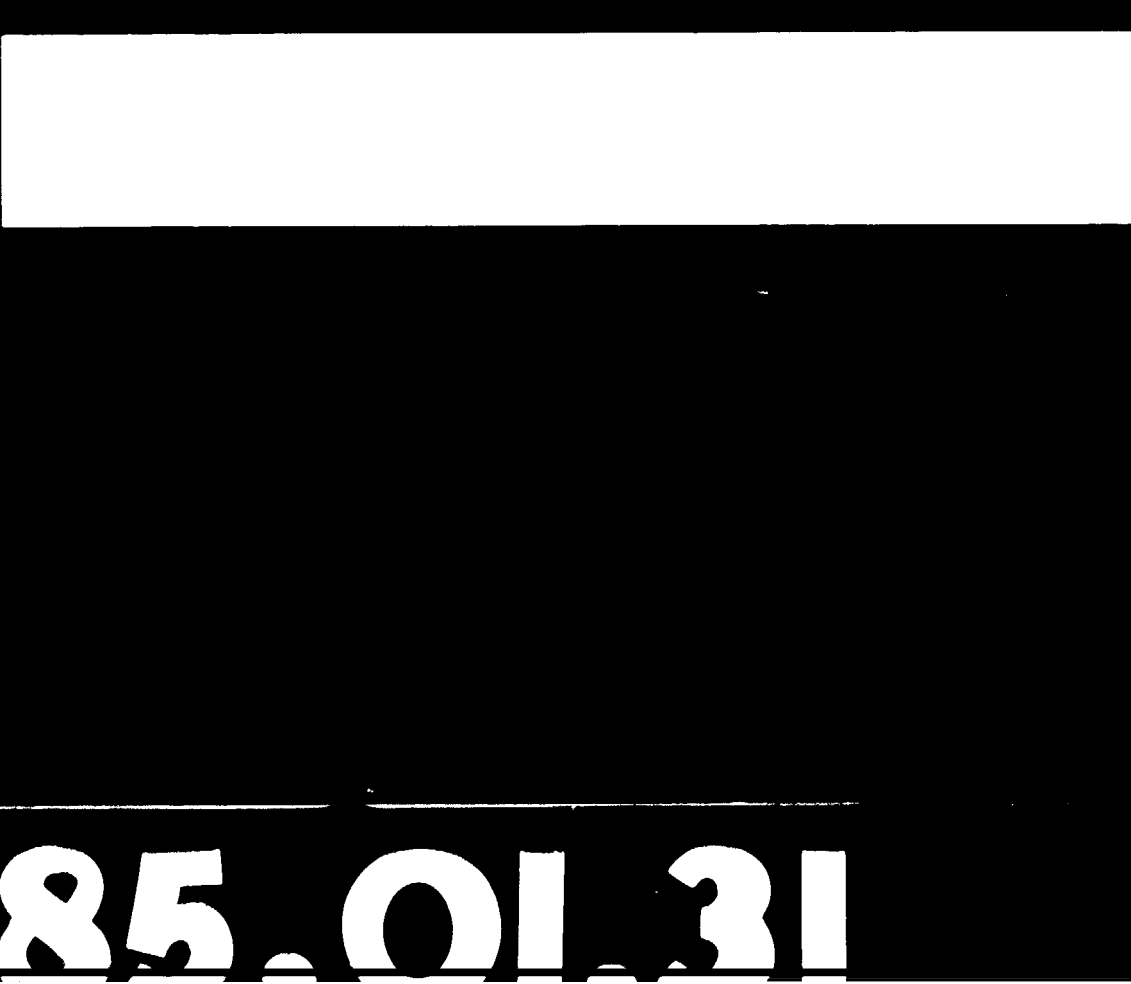
allover the world - but also as a result of actual Bhutanese cases where the absence of standardization and QC constituted considerable constraints to the proper development of the national economy of Bhutan.

However, it is felt that - in spite of all what has been said and demonstrated - such a logic and highly justifiable conclusion might raise some arguments which - in the Consultant's opinion - should be freely exposed in order to place a fair picture of the whole situation before all concerned authorities. Consequently, the Consultant takes the liberty to mention and discuss the major arguments or issues which he anticipates to be raised.

1. Why Not Adopt Foreign Standards?

The first argument may focus around the following:-

Bhutan is facing severe problems and is spending extraneous efforts in developing all sectors of her economy whether production or service sectors. And admitting - after all that have been said - that standardization furnishes an essential infrastructure for the developing of these sectors, would it not be a good compromise - or rather a good solution which gives rise to economy in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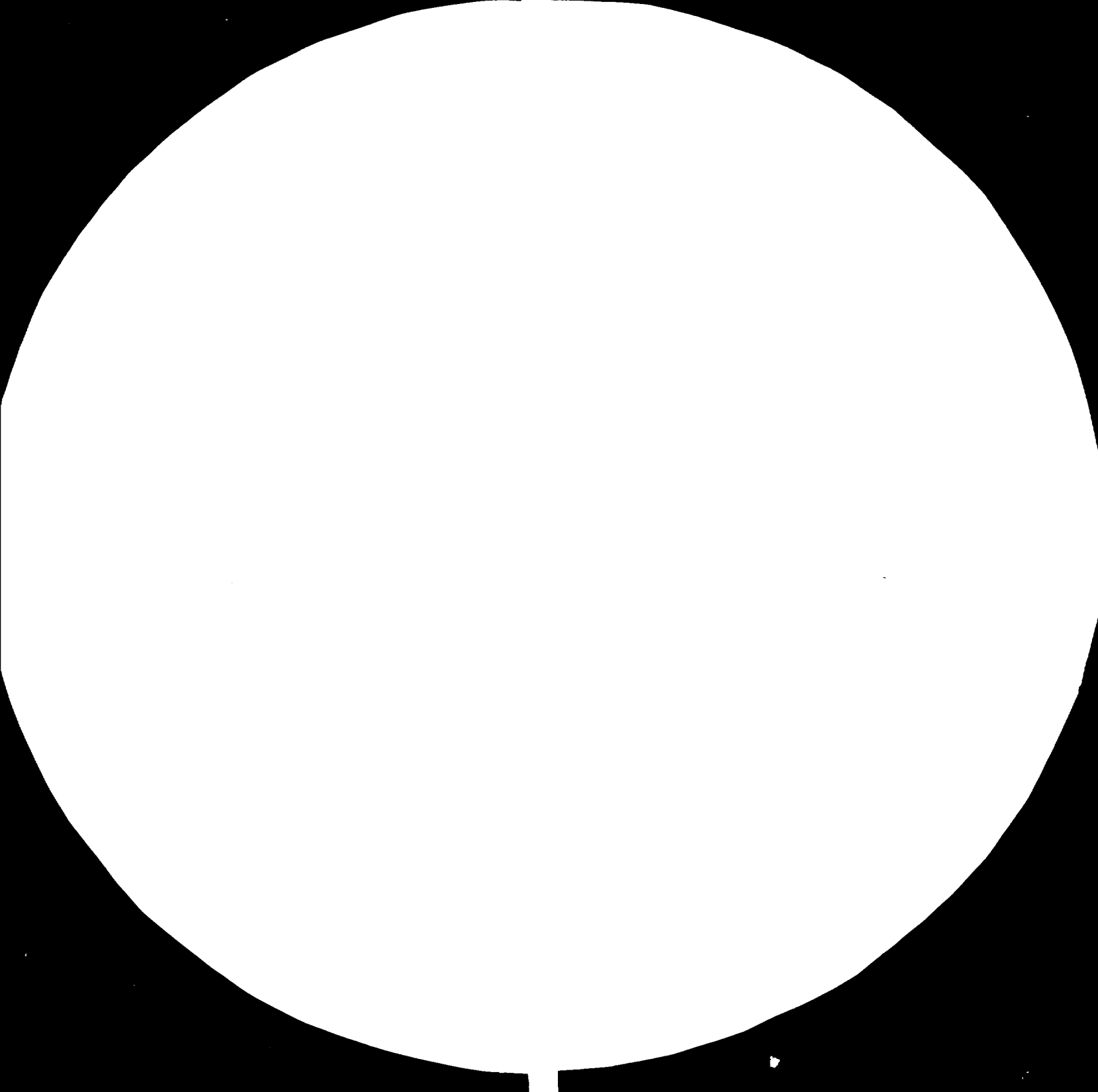

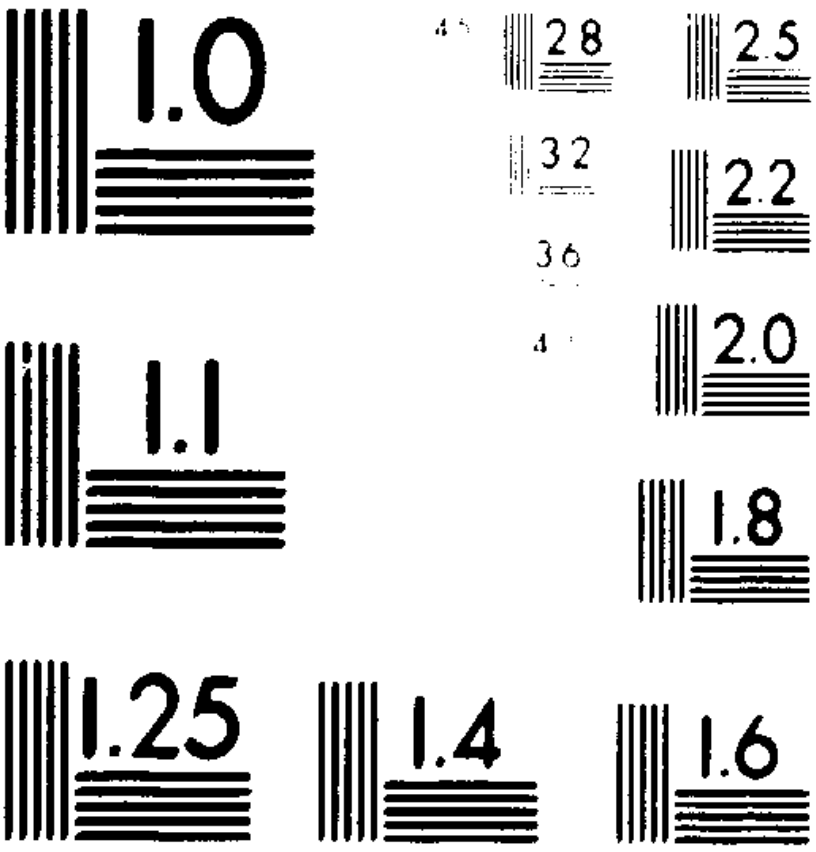

effort, time and investment - to automatically adopt the standards of another country which - as far as possible - has similar conditions to those prevailing in Bhutan?

Certainly, such question may seem to be a reasonable one. However, apart from the fact that it is very rare to find two countries having the same local conditions and facing the same types of problems, the fact ought not to be overlooked that culture, tradition and habits have considerable effect on determining the suitability of standards for adoption in a certain community.

Without going into too much theoretical discussion or referring to numerous examples encountered in other countries in support of the above statement, the Consultant will cite few examples he found during his investigations relating to the present mission. All these examples refer to Indian standards - which could undoubtedly be considered as the standards most suitable for application in Bhutan - and all relate to only one field of activity, namely, construction.

(a) There are huge deposits of slate in Bhutan. In the Bonsegeoma area of Wangdiphodrang district, the Royal Government initiated a slate mine <u>to produce roofing tiles</u>. The government has spent Nu: 1.5 million on the

construction of a 17km road and has also invested about Nu: 1.2 million in the form of bulldozer, vehicles, tractors, working capital, etc. The project has also received about Nu: 1.6 million worth of machineries, equipment, vehicle, etc. from the UNDP as assistance. However, the Consultant noticed that the greater majority of buildings in Thimphu for example - are roofed by corrugated galvanized iron (CGI) sheets which are imported from India whereas roofs covered with slate tiles manufactured in Bhutan from indigenous raw material are not often seen.

Discussing this issue with some users of these(CGI), they claim that the total cost including workmanship, incurred in using these products are almost the same as those incurred in using locally made slate tiles. Consequently, they prefer to use the former material as they were accustomed to adopt the Indian standard. Other users claim that roofs made from slate tiles leak during rainy season.

Bringing this issue to the Project Manager of Sha Slate Mines, Mr Bap Kinga gave a completely different and brighter story. He stated that technical and practical experience proved that :-

(a) Slate roofs cannot leak if installed in the proper manner.

(b) Slate roofs are more durable and long lasting much more than roofs covered by CGI sheets.

(c) Slate roofs are easier in maintenance whereas CGI sheets have to be painted every three years.

(d) Slate roofs are resistant to the very forceful winds of Bhutan whereas CGI roofs require to be anchored to the ground by steel ropes.

(e) Over and above, precise calculations of the overall costs incurred in both cases prove the use of slate tiles is cheaper 60% than the use of CGI sheets.

Since the Consultant cannot claim any expertise in this field, he is, therefore, not in a position to favour any of these divergent views. However, he is very confident of one thing and that is : if a NSB were existing in Bhutan it could have coordinated and pooled the knowledge and experiences of producers, users and all interested parties in the form of a technical committee - which is the traditional way of drafting a standard - to discuss thoroughly

and extensively all aspects related to roofing by CGI sheets and slate tiles. It is almost certain that they could have reached to an agreement on a standard in favour of using the locally made slate tiles.

Such a standard would benefit the national economy through :

1-exploitation of a natural resource found in huge quantities.
2-establishment and promotion of an industry based on an indigenous raw material with all its subsequent benefits.
3-lowering the cost of constructions
4-decreasing imports which would contribute to the improvement of the balance of payments.

This issue provides an example of the effect of the change in economic conditions on the possibility of adopting a foreign standard.

(b) The Indian standard on sanitary installations is not suitable for adoption in Bhutan.

This is an example of the unsuitability of a foreign standard due to the difference in habits of the people of the two countries.

It is, therefore, evident that the automatic adoption of foreign standards is not possible. The principle

on which adoption is based is "adapt then adopt". If a foreign standard - in its present form - is applicable, suitable and responds to the needs of the country, then it could be adopted. If not it has to be adapted, if possible. Again if not, an original standard has to be developed for the specific conditions of the country. But who could make such analysis and judgement? Certainly, no one is so qualified other than the NSB of the country which carries out comprehensive studies, and investigations and then convenes representatives of all concerned parties - including, of course, producers and consumers and others - who discuss all aspects of the matter thoroughly until they reach a decision which should receive general consensus.

Apart from the impossibility of the automatic adoption of foreign standards without thorough study and investigations, there are cases where local condition necessitates the issuance of original standards having no corresponding Indian standards. The following two examples taken only from the construction field, clearly demonstrate the above fact :-

(a) Mud bricks are commonly used in Bhutan for constructing houses even upto three storeys high. In India, such buildings are not considered as permanent structures and,

consequently, there is no corresponding Indian standard. Since mud brick buildings pose certain problems especially in installing conduit pipes, a solution has to be found in the form of a code of practice. This would be certainly in the interest of the poorer section of the society and those living in rural areas as it would help them to build adequate houses with cheap material.

(b) Especially in summer, the wind force is so strong in Bhutan that a great number of wooden roofs are thrown out. Consequently, there is a great need to find a solution, again in the form of a code of practice, giving the proper way of fastening the wooden truss to the main structure.

2. Why Not Delegate or Authorize Another NSB to Prepare Bhutanese Standards?

The next argument would naturally focus around the following question :

"Since it is not possible to adopt automatically foreign standards, then - due to the shortage of technical manpower as well as testing facilities in Bhutan - why not delegate the ISI to prepare Bhutanese standards especially if one takes into consideration the strong and very friendly ties between the two countries coupled with the vast experience ISI has acquired in standardization throughout the years?

Certainly, this would have been a very happy solution if it were feasible. But, unfortunately enough, it is not.(1)

To prepare and elaborate a standards document, the following steps should be carried out :-

(a) Study of the existing facilities and practices followed. Collecting statistics and technical and economic data. Practical investigations and testing may be required, as well as cost/benefit studies, process capability studies, etc....

(b) Study of the corresponding national/regional/international standards.

(c) Forming a technical committee (TC) comprising major producers, consumers, dealers, representative of concerned government departments (e.g. agriculture, health, industry, trade, education, planning, etc..), research institutes, testing laboratories, University/polytechnic/colleges, as well as individual experts/specialists. The sincere cooperation and joint efforts of all these concerned parties would certainly lead to

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(1) ISI authorities have also admitted this statement during the Consultant's stopover in New Delhi prior to his arrival in the field.

an agreement on the requirements that would realize the national interest at all fronts. The TC may have to convene several times to reach such an agreement.

(d) Distribution of this first draft to all interested parties not represented on the TC soliciting their comments/suggestions.

(e) Studying, discussing and scrutinizing the comments/ suggestions received and if necessary amending the draft accordingly. This step may call for the preparation of a second or even a third draft and their subsequent circulation.

(f) When a general consensus seems to be assured on a certain draft standard, the draft is properly edited, approved by the competent authority in the NSB, then printed and published as a national standard.

(g) After issuing and implementing the standards for some time, the NSB has to review them periodically to ensure that they keep abreast of the recent advances in science and technology. In the light of this revision, any standard may be re-confirmed, amended or cancelled altogether. However, any standard can be

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amended, if necessary, before its periodic revision. Some standards bodies carry out this periodic revision every three years (e.g. JISC in Japan), or five years (e.g. ASTM, BSI, GOST and ISO).

It is evident that the above procedure cannot be performed outside the country. This standards writing activity is only but one part, though very important, of the standardization discipline. Standardization is not merely the formulation of standards but it also means the implementation of these standards. Elaboration of standards will only mean a waste of time, money and effort if they are not implemented. Consequently, the NSB has to complement its standards writing activities by others in order to reap the benefits of standardization and to realize the very objectives of its establishment. Moreover, standardization is only one part of the integrated system; there are still activities to be done in the other parts such as quality control and metrology.

It is now well recognized that a NSB operating an integrated system of standardization, quality control and metrology would have to :-

(a) Promote the application and observance of national standards in the relevant sectors.

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(b) Advise the government on the standards and quality of local products to take into consideration when formulating its industrial strategy and policy as well as in preparing economic development plans.

(c) Advise the government on the necessity of enforcing certain standards and/or compulsory certification.

(d) Operate a certification mark system for products conforming to national standards in order to encourage their adoption, ensure fair competition and protect and guide consumers.

(e) Take legal measures against the violation of laws/acts/regulations concerning standardization, certification and legal metrology.

(f) Act as the focal point and clearing house for all information on technical requirements, technical regulations and others within and outside the country thus providing valuable service to industry, trade and other sectors of the national economy. The creation of a Standards Information Centre would greatly help the creation of a better national infrastructure for information transfer.

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(g) Act as the "Enquiry Point" stipulated in the Agreement on Technical Barriers to Trade known as the "GATT Standards Code" thus rendering valuable service to the external trade of Bhutan.

(h) Promote and encourage the adoption of standardization and QC programmes in industrial enterprises and assisting them in establishing standards and QC departments.

(i) Maintain national standards based on the SI[1] Units of measurement.

(j) Observe and promote the adoption of the SI Units of measurement in all sectors (industry, trade, education, etc...).

(k) Verify weights and measures used in commercial transactions to ensure fair dealings thus protecting the interests of the public.

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(1) Internationally recognized abbreviation of the modernized metric system (taken from the French "Systeme International" which means International System).

(l) Calibrate industrial and scientific measuring instruments used in industry and other sectors (educational and research institutes, health, testing laboratories, power, etc....) to ensure accuracy of measurement and traceability to international standards.

(m) Participate in the education of consumers and users to enable them to make judicious choice when buying and offering them useful criticism concerning commodities available on the local market.

(n) Control the quality of imports and exports.

(o) Play a vital role in the process of transfer, selection, adaptation and development of technology suitable for the country through the development of standards, certification, testing and metrology.

(p) watch against the introduction of conflicting standards brought in the country by foreign collaborators which render their subsequent coordination into a national standard either very costly or even impossible.

(q) Render technical service to industry through :

i - making access to the testing facilities of the NSB.

ii - promoting and improving their testing facilities.

iii - training their technical staff in standardization, testing, quality control and metrology.

iv - guiding to the introduction of the latest advances in science and technology.

(r) Operate a national programme for the accreditation of testing laboratories with its subsequent benefits such as :-

i - facilitation of trade through the international acceptance of test results by bilateral and multi-lateral recognition of laboratory accreditation system.

ii - providing national, regional and international recognition for local laboratories once capabilities are established.

iii - reducing dependence on overseas testing facilities, thereby reducing foreign exchange demands for testing abroad.

iv -establishing traceability to recognized standards and providing incentives for governmental, industrial and commercial laboratories to upgrade other capabilities.

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(s) Represent the country in regional and international standards bodies (ISO, IEC, CAC, OIML, CGPM) and actively participate in their activities to present the national viewpoint and local prevailing conditions so that they could be taken into consideration when elaborating regional and international standards.

(t) Represent the country in industrial and trade agreements as well as in national, regional and international conferences, seminars, etc.... related to its activities and exchange views and experiences.

It is very clear, therefore, that the above functions and tasks cannot be performed except by the national body of the country herself.

3. A NSB in a Small Country with an Infant Industry?

Although it might be argued that Bhutan is too small a country to have its own NSB and, moreover, her industry is still in its infancy, yet the answer to the above question is a very big "YES".

Concerning the small size of the country (whether in area or in population) one must not lose sight of the

fact that in developed countries many small-scale industries, not to mention the medium-and large-scale ones, have established and developed their own "Company Standards Departments" to organize and rationalize all of their activities. If this is the case with a small-scale industry, would not it be necessary for every country whatever small she may be - to establish and develop its own NSB???

This statement has not only come out from purely theoretical discussion and comparison, but it is also supported by practical evidence. Several countries - smaller than Bhutan and even not endowed with the bountiful natural resources as Bhutan - have successfully established & operated NSBs for many years and are presently gaining the benefits of adopting standardization systems. Among such countries are Barbados and Mauritius, just to name a few.

As regards the infant stage of industry in Bhutan - a fact which might seem to be conducive to postponing the establishment of the NSB until industry gets firm roots in Bhutan - the Consultant does not hesitate to say that this fact is at the very root of his strong recommendation to establish a NSB in Bhutan as soon as possible.

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Once economic development in general, and industrial development in particular, starts in any country, it should be accompanied by the concomitant establishment of her NSB. Many even go beyond this as they, rightfully, believe that the establishment of a NSB should precede industrial development. A NSB, being one of the main elements of the institutional infrastructure of industrialization, should precede industrial development just in the same way as the elements of physical infrastructure (roads, electricity and other forms of energy, water, transport, developed land, etc....) should precede economic development. A practical evidence of this principle is available in Bhutan herself. If the NSB were existing in Bhutan none of the drawbacks to industry and trade outlined by the Government, could have existed.

Developing countries should learn from the morals and lessons experienced in developed countries. History of standardization tells us that in the UK industrialization preceded national standardization by several decades, and when industrial production was about to enter - or rather had already entered - into a state of chaos near the end of the nineteenth century, England had to resort to standardization to impose order and discipline in industry which

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inevitably had to bear high costs. Thus the first NSB in the world was born in 1901 (now the BSI). No other country followed suit for the next 13 years. However, once World War I (WWI) broke out, several of the industrialized countries had to establish their NSBs during the War since they have realized that standardization is a vital tool for the rationalization and mobilization of all their efforts and resources. Almost all of the NSBs in the developed countries of today had their origin during WWI or the period just following it. The thorough and highly interesting study of Herbert Hoover after WWI indicated that the lack of standardization had caused wastage in American industry estimated at as high as 39%. Since WWII, developing countries have established their own NSBs at the rate of about two per year. As of today, more than two thirds of the member bodies of the International Organization for Standardization (ISO) are from developing countries.

A recent example on the cost of the late introduction of standardization in a certain field is again given by the UK where metrication (i.e. adoption of a different system of measurement standards based on the metric units) caused Britain millions of pounds. And presently, it is the very high costs to be incurred in changing to

the metric system that renders many American industries reluctant to metrication in spite of the encouragement it gets from the government, the National Bureau of Standards (NBS), the American National Standards Institute(ANSI) and other national bodies.

It follows, therefore, that neither the small size of Bhutan nor its infant stage of industry should be taken as a reason to delay the immediate establishment of a NSB.

F. CONCLUSION

It is now a well established and universally recognized fact that no country - whether big or small, with free or centrally planned economy and whether its economy is based on agriculture or industry or both - can promote its national development without the wide application of standardization and its related disciplines : quality control and metrology.

In the specific case of Bhutan, a thorough study and analysis of her national economy in general and her industrial and trade sectors in particular indicated very clearly the urgent need for standardization and quality control activities not only for the development of these two sectors but particularly

so for their great impact on securing foreign exchange earnings on which the continued development of Bhutan depends.

The urgent need for standardization and quality control has also been identified by the Royal Government several years ago as a result of the practical experience gained during the development process. There have been concrete cases where the lack of standardization and quality control had caused adverse effect on the development of external trade. In addition, the present mission found strong confirmation to the Government's views among those working in industry and trade.

It is very gratifying that the Royal Government has taken the first positive step for the establishment of a NSB in Bhutan by earmarking US $ 155,000 to this effect in the Third Country Programme together with allocating the necessary funds in the Fifth Plan.

During the course of the present study, the Consultant became well aware of certain prevailing constraints in Bhutan especially those connected with the shortage of technical manpower. Consequently, the study included the assessment of all other alternatives but indicated that all are impossible due to the very nature of the national integrated system of standardization, quality control and metrology. The commendable

and far-sighted resolution of the Government to initiate national standardization activities during the Fifth Plan - and its intention to continue in the Sixth Plan to be implemented in 1987 - represents a strong indication to its determination to overcome any constraint that is likely to impede the immediate establishment of the NSB.

It is, therefore, strongly recommended that Bhutan should - as soon as possible - set up its own NSB to act as the watch - dog for the national integrated system of standardization, quality control and metrology which furnishes a basic element in the technical infrastructure so essential for the development of the national economy.

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V. ESTABLISHMENT OF A NATIONAL STANDARDS BODY IN BHUTAN

A. INTRODUCTION

After assessing the urgent need for establishing a NSB in Bhutan, this final chapter deals with a brief discussion of the main elements involved in this establishment, the measures to be taken by the Royal Government which should precede the implementation of technical assistance programme in collaboration with UNDP/UNIDO. It is envisaged that a two-phase project should be implemented.

It should be emphasized at the outset that the establishment of such a multi-disciplinary body is far from being an easy matter especially in the face of the shortage of technical staff in Bhutan. Very careful planning and extraneous efforts are, therefore, very much needed.

B. MAIN ELEMENTS IN THE ESTABLISHMENT OF A NSB

The main elements are :-

1. Legislation
2. Premises
3. Staff
4. Library
5. Laboratory

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1. Legislation

Legislation is essential to furnish the legal framework for the operation of a national integrated system of standardization, quality control and metrology.

2. Premises

Adequate premises should be secured to accommodate the NSB. In the very first stage, the minimum requirements are as follows :-

2	Office rooms
1	Room for the library
1	Conference room
1	Room for secretariat and typing

The headquarters of the NSB could be located in the capital, Thimphu. In this connection, the Consultant wishes to point out the probable difficulty that may arise in convening the members of the technical committees to be charged with the drafting of Bhutanese standards. Thimphu will be the best location for the representatives of almost all government departments. However, this will not be the case with the representative of producers. The overwhelming majority of industrial enterprises in Bhutan are located in

or around the southern cities, Phuntsholing, Samchi, Gaylegphug and Samdrupjongkhar. Travel from the nearest of these cities to Thimphu, i.e. Phuntsholing, takes six hours, while travel from any of the other places takes up to a whole day. It follows, therefore, that representatives of producers in the technical committees will have to lose three days (including, at least, two work days) in order to attend a meeting of the relevant technical committee.

3. Staff

The staff is the pivot of any enterprise since it is the machinery which is responsible for the proper discharge of its functions. Needless to say that "man" is the most precious element in any enterprise, much more important than other elements; he is the real key to success.

Being the competent national authority responsible for setting standards of goods and services, the NSB should be able to employ and attract talents to its staff. Moreover, the technical staff of the NSB in developing countries usually bear more technical responsibilities than their counterparts in developed countries. Very often, they may be called upon to assume the role of

advisers, guides and instructors to industry. It is, therefore, essential that the NSB should always aim at building up a highly qualified staff with specialized experiences. This task becomes more difficult - and more pressing as well - due to the fact that, with the exception of very few countries, standardization is not normally taught during the educational process.

Another characteristic in NSB staff is the great diversity of specializations needed. The NSB being, on the one hand, a multi-disciplinary body (standardization, testing, quality control, quality assurance and metrology) and on the other hand, dealing with all types of goods and services, should employ in its staff almost all sorts of specializations : analysts, chemists, bacteriologists, statisticians, physicists , technologists, and all kinds of engineering (agricultural, chemical, metallurgical, civil, mechanical, industrial, electrical, electronic, etc...) beside , of course, staff at the technician level (e.g. mechanics, electricians, inspectors, laboratory assistants, etc..).

Considering all of the above factors, one could appreciate the size of the problem which would face the establishment and development of a NSB in Bhutan which suffers from a serious shortage in the technical staff.

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In Bhutan, there is no university but a diploma level polytechnic and a technical school.

The Royal Bhutan Polytechnic runs a 5-year programme for the training of diploma - level technicians in civil and electrical engineering. The entrance requirements for the first two years, which constitutes a pre-diploma course, is a Class VIII pass, while the entry requirement for the next three years, a diploma course, is a Class X pass. About 60 students are admitted each year. In the Consultant's opinion, these diploma technicians could be employed in the NSB beside, of course, degree graduates who have been educated in foreign colleges and universities.

Since its establishment in 1965, 298 technicians have been graduated from the technical school including :-

103	electricians
97	general mechanics
88	motor mechanics

When asked about the possibility of establishing a fourth department in the Technical School for laboratory assistants, the Principal informed the Consultant that he had proposed this to the Department of Education. Needless

to say that the Consultant strongly supports the proposal since such assistants are very much needed by many sectors, especially if one considers the severe shortage in Bhutanese chemists. When working in the QC laboratories of industrial enterprises, these laboratory assistants could contribute widely to the cause of improving product quality.

The government is very well aware of the problems imposed by the severe shortage of Bhutanese technical personnel and, consequently, attached great importance to manpower development. As a result, a project was concluded with ITC during the end of 1983. "Manpower Development: Trade" (BHU/83/016).

It is gratifying that the Government was keen to include in the project four fellowships in standardization and QC as follows :-

Subject	m/m	Starting Date
Quality Control	12	September 1985
Quality Control	12	" "
Standardization : Study tour	1	January 1986
Standardization	3	June 1986

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4. Library

The availability and maintenance of an adequate standards library is at the very heart of any national standardization activity.

It is essential, therefore, that the proposed Standards Cell (pending the establishment of the NSB), should start - once it is created - to build up its standards library. This could be accomplished in the following manner:

(a) The first step would be to contact ISI to provide a complete set of its standards. Undoubtedly, the ISI will welcome to present the set to the Standards Cell as it did to some NSBs. The Consultant has discussed this issue with the ISI authorities when he stopped over in New Delhi.

(b) The Standards Cell should join some international standards bodies such as the Codex Alimentarius Commission (CAC) and the International Organization for Standardization (SO) to begin with. The CAC, whose membership is free, will provide the Cell with a complete set of its food standards. The ISO will provide the new standards it issues after membership.

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(c) Through membership in ISO, the Standards Cell would have the privilege of exchanging publications with other member bodies of ISO. However, pending the issuance of Bhutanese standards, there would be nothing against contacting some NSBs which publish their standards in English - requesting the provision of complete sets of these standards. Contact would be made with some developed countries (e.g. Australia, NZ, UK,...) and the developing countries of the region. It is the experience of the Consultant that some NSBs would be willing to present complete sets of their standards gratis, but transportation costs are usually prohibitive. Consequently, it is advisable that - when contacting the NSBs - the Standards Cell should make it clear that it would be prepared to pay the cost of transportation.

5. Laboratory Functions

Testing is one of the main activities very closely linked with the implementation of an integrated system of standardization, QC and metrology. In order to discharge its functions and duties, the NSB is in great need for laboratories :

(a) to carry out investigational testing to provide the necessary data for the elaboration and amendment of national standards.

(b) to carry out tests necessary for the operation of the certification marking system (CMS).

(c) to check the conformity of goods to compulsory standards (if any).

(d) to test products covered by voluntary standardsfor the regular assessment and evaluation of the quality level of national production. Such assessment will be greatly useful to the Government, industry and the NSB itself; it will enable the government to follow up the quality of local products and take the necessary measures, the manufacturers to improve the quality of their products and the NSB to check the applicability of national standards and to set specification limits.

(e) to maintain national physical standards.

(f) to verify weights and measures.

(g) to calibrate precision measuring instruments used in industry, research institutes, testing laboratories, etc...

(h) to develop new testing methods.

(i) to upgrade the capability of the testing staff in industrial enterprises by training them to update their knowledge with the latest developments in testing techniques to increase their competence with the view to better equip them to the proper control of the production in their enterprises.

(j) to design, develop and make specialized testing equipment which are not available in the market but are needed to identify the characteristics of certain products.

(k) to administer laboratory accreditation system.

Naturally during the first years of a newly established laboratory, it would not be able to carry out all of the above function but only the essential ones, namely functions (a) to (f) and very probably a part of (g) also.

In addition to functioning as the testing arm of the NSB, the laboratory would be of great use to other bodies in a country like Bhutan where there is no other laboratory which can carry out a relatively wide range of tests. It

will play a very important role in providing general testing services to the government, industry and commerce. For example, there is no laboratory for testing food and food products which is necessary for public health. Thus the government could use the NSB testing facilities as "Food control laboratory" likewise, these testing facilities could also be used as customs laboratory. In this connection it should be emphasized that the Department of customs in Bhutan is planning to join the harmonized system of Custom Cooperation Council Nomenclature (CCCN) in 1986. Also increasing business with other countries is already on the way especially with Bangladesh. In such circumstances, the Department of Customs should have access to testing facilities. The Collector of Customs expressed the very urgent need and support to the establishment of testing facilities which are necessary to the Department of Customs to carry out their functions properly. The NSB laboratory will also be very useful to industry by carrying out tests required by industrial enterprises especially some medium - scale and all small-scale industries which have no testing facilities. Moreover, the laboratory could carry out some research work connected with the improvement of product quality thus acting as a nucleus for industrial developmental research activities.

Testing Facilities in Bhutan

There is an obvious shortage in testing facilities in Bhutan. The available ones are :

(a) two small testing laboratories in the Public Works Department (PWD) one for soil testing and one for materials testing.

(b) a microbiological laboratory in the General Hospital.

(c) electrical standards and electrical equipment maintenance, repair and testing.

Unfortunately, it was not possible to make a personal survey of testing facilities in industrial enterprises (1) due to the short duration of the mission. The Consultant visited only Penden Cement Authority (PCA) which has a cement testing laboratory. There is also a research and development laboratory in Gedu Wood Manufacturing Corporation.

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(1) In this respect, the Consultant strongly recommends that in concluding industrial projects, the Bhutanese side should insist that testing facilities should be provided by the foreign collaborator as well as a QC Manual. Also, the training component of the project should include training in industrial QC.

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First Phase of Establishing the Laboratory

Since it is not possible - nor needed at present - to establish a laboratory that is capable to test all types of products, it is recommended to begin with establishing testing facilities for testing agricultural and food products (including bacteriological testing) as well as carrying out general chemical analyses. This recommendation is based on the following grounds :

(a) The lack of such facilities in Bhutan.
(b) Food items should be the first to undergo control.
(c) The food industry in Bhutan is a main industry.
(d) General chemical analysis will serve a number of industries other than the food industry.
(e) This type of testing is the most needed by the Department of Customs.
(f) Food items constitutes a considerable proportion of exports.

Equipment

Needless to say that, being the national reference body in the field of testing, laboratory equipment should be highly accurate to render reliable results.

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Location

Almost all manufacturing industries are located in Southern Bhutan, where the necessary infrastructure is present and where labour and raw materials - many of which are imported from India - are more readily available. More than half of the manufacturing establishments are located in Phuntsholing and about half of these are in the industrial estate. Most of the remaining industries are located in Samdrupjongkhar, Gaylegphug and Samchi, where there are also small industrial estates. All these places are easier and quicker to reach from Phuntsholing than from Thimphu.

At the moment, all imports from third countries are through Phuntsholing. From India, there are some imports through two other entry points. It is estimated that about 80% of all imports (from India and third countries) pass through Phuntsholing.

For all these reasons, it is recommended that the laboratory as well as the certification section should be located in Phuntsholing.

Table 12 shows the distribution of industries in the various districts of Bhutan. It is clear that Samchi,

where Phuntsholing is, accommodates the only two large-scale industries and half of the medium-scale industries. It should, however, be emphasized that beside these industries shown in the Table, the laboratory could also serve a number of large-and medium-scale projects such as Gedu Wood Manufacturing Corporation, 45 km on Phuntsholing-Thimphu highway, Bhutan Board Products Ltd at Tala and the big Calcium Carbide project at Pasakha, 10 km from Phuntsholing, and several other projects under study.

A list of industries and their products in Phuntsholing is given in Annex V.

Site

The laboratory should ideally be sited in a pleasant environment away from the urban centre and the industrial area to minimize problems arising from contamination. It should also be away from sources of mechanical vibration and shock as well as from sources of electro - magnetic interference. The Consultant recommends a site on the hills near Phuntsholing similar to the site of the Technical School and preferably adjacent to it, in which case the labboratory could make use of the workshop and other facilities of the School.

Table 12

EXISTING INDUSTRIES DISTRICT WISE AND SCALE OF INDUSTRY

District	Large	Medium	Small	Cottage	T o t a l
Samchi	2	5	7	18	32
Gaylegphug	-	4	3	8	15
Samdrupjongkhar	-	1	3	12	16
Thimphu	-	-	-	6	6
Mongar	-	-	-	1	1
Paro	-	-	2	1	3
Chirang	-	-	-	3	3
Bumthang	-	-	1	1	2
Tongsa	-	-	-	1	1
Shemgang	-	-	-	1	1
GRAND TOTAL :	2	10	16	52	80

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In deciding on the area required one should take into consideration the inevitable need to expend the activities of the laboratory in the future to cope with the development of the industrial and trade sectors. Experience has shown that even if expansion does not seem likely at the time, provision should be made for future expansion. In the estimation of the Consultant a plot of land of at least half a hectare should be acquired.

Design

It should be strongly emphasized that testing laboratories pose certain problems particular to their specific nature. Consequently the functional design of these laboratories becomes of basic importance since it affects efficiency in many ways, places limit on flexibility, is reflected in the operational costs and is a very important element in the development of safe working practices.

One of the main points which should be followed is the modular principle. In laboratory buildings, a module of 3m is recommended; this is the distance from centre to centre of two peninsular benches, and it is based on a bench width of 1.5m with space of 1.5m between. In a one-module laboratory, it is the distance between the centre of one partition

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and the centre of the next; it is based on a wall thickness of 10 cm, a bench 70 cm wide on one side and a table 75 cm wide on the other. If it is necessary to have greater flexibility, then a module of 1.5 m must be used.

The building must be planned for security, safety and flexibility. A laboratory building is intended to last for many years during which time the nature of work is almost certain to change and hence the design should be left as flexible as possible so that changes of emphasis in the work can be accommodated.

Some of the topics that should be given attention when designing and planning a testing laboratory are :

Building

- isolation of foundation (if necessary)
- materials of construction
- dimensions and shapes of windows and doors
- prevention of floods
- floor covering (e.g. should be non-slippery and resistant to acids and solvents)
- materials for drainage of laboratory wastes and handling of these wastes before being released into main sewers
- first-aid facilities
- colour of interior

Laboratory Planning and Fittings

- use of modular furniture units
- arrangement of benches
- space between benches
- material of benches and bench tops for various uses
- fume cupboards
- reagent shelves
- writing spaces
- sinks
- lab space and bench surface per analyst

Laboratory Services

- mechanical services
- electric light and power
- ventilation
- water supply
- fume cupboard exhaust system
- air conditioning (some tests should be carried out in standard conditions e.g. temperature, relative humidity)
- use of false ceilings and floor ducts

Fire and Safety Protection

- handling of pollutants especially toxic and noxious fumes
- ducting system
- fire breaks in vertical ducts
- fire - proof rooms and cabinets

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- traffic flow, the egress pattern and the proportion of the laboratory
- automatic fire detection systems (heat and smoke detectors)
- sprinkler system
- safety showers
- storage of hazardous chemicals
- position of power outlets
- hand extinguishers, hose reels and hydrants.

In mentioning the above topics, the Consultant only aims to demonstrate the complexity and diversity of factors that should be taken into consideration. As a metter of fact, laboratory building and planning has become a very specialized field which undergoescontinuous development. Beside the increasing literature available, there are several national and association standards dealing with the various aspects of this field such as DIN(1) 1946, DIN 4034, DIN 4102, DIN 12912, DIN 12914, DIN 12915, DIN 12916, DIN 12920, DIN 12922, DIN 12923, DIN 18160, DIN 18225 and the standards issued by the National Fire Protection Association, USA.

Before designing and planning a new testing laboratory, it is always adviseable to visit some recently

(1) Deutsche Industrie Norm (German Industrial Standard)

built laboratories engaged in similar work. It is, therefore, recommended that the Bhutanese architect, who will be in charge of building the laboratory, should visit some laboratories in two or three developed countries. To this end, provision has been made for a study tour of six weeks in the UNDP/UNIDO Technical Assistance Project prepared by the Consultant.

C. MEASURES TO BE TAKEN BY THE GOVERNMENT

It is recommended that the government should take the following measures immediately :-

1. Creation of a "Standards Cell" within the Ministry of Trade, Industries and Forestry pending the establishment of the NSB.

2. Recruitment of the Head of the Cell. He should be devoted, of adequate calibre and status, having a deep sense of responsibility and should also have management skills.

3. Recruitment of an adequate number of technical staff to be trained on the job and abroad on standardization and testing.

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4. Preparation of premises to accommodate the Standards Cell consisting of two office rooms, one conference room, library and a room for secretariat and typing.

5. Acquisition of a suitable plot of land of atleast half hectare preferably on the hills of Phuntsholing to set up the laboratory.

6. Participation in some international standards bodies.

In this connection, it should be emphasized that standards are the best means of transfer of technology and that international standards comprise pure, and tested knowledge. Applying that knowledge is, therefore, safe and no trial and error procedures are needed. Over and above, being international standards, they have been accepted by the international community. Adopting such standards, therefore, will greatly benefit external trade. Thus from the technical and economic points of view, it must be beneficial to a developing country to base her standardization activities on international standards and not to choose exclusively a particular standard system, even of a developed country, as basis for its own system. Developing countries should always try to stick to international standards.

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It is, therefore, in the interest of the national economy of Bhutan that its NSB should promote internationalism in its activities by joining and actively participatin in international standards body.

To begin with, the Standards Cell should join the International Organization for Standardization (ISO) as correspondent member starting January 1985. In addition to having access to a large volume of international information and know-how, membership in ISO will enable the Standards-Cell :

(a) to have direct and free access to the national standards of the 90 member bodies of ISO.

(b) to make use of ISO services aiming at promoting national standardization in developing countries.

Another "must" is the FAO/WHO Codex Alimentarins Commission (CAC) which is in charge of elaborating international food standards. Fortunately enough, joining CAC will not entail any financial obligations on the part of Bhutan. Membership of CAC is open to all countries which are members of both FAO and WHO. To join CAC, the government should contact the Executive Director of either FAO or WHO nominating the "Standards Cell" as the Contact Point" in Bhutan.

7. Formation of a nucleus for Standards Library, equipping it with suitable furniture and equipment and recruitment of an assistant librarian.

8. Acquisition of a complete set of Indian Standards.

9. Contact with some NSBs in developed countries as well as in the developing countries of the region (publishing their standards in English) to provide their standards and/or catalogues.

B. UNDP/UNIDO TECHNICAL ASSISTANCE

To establish her NSB, Bhutan is in persistent and urgent need for international assistance to be provided by UNDP/UNIDO after taking the above preliminary steps. It is recommended that such technical assistance should be planned and implemented in two phases as follows :-

1. Phase I (1985/86) :

This phase, to be carried out in the Fifth Plan and Third Country Programme, would focus on the following activities.

1. Drafting and passing of the necessary legislation (Standards Act/Law, Bye laws, Rules and Regulations) to furnish the legal framework for the establishment

and operation of the national integrated system of standardization, quality control and metrology.

2. Training of national counterparts abroad on UN fellowships on standardization, testing and certification.

3. Training of national counterparts on-the-job by UNIDO Consultants.

4. Formation of Bhutanese technical committees in charge of drafting national standards. On-the-job education and training of committee members. Elaboration, approval, issuance and publication of the first Bhutanese standards.

5. Acquisition of foreign standards, references, periodicals and other publications in the fields of standardization, testing certification and quality control.

6. Designing and planning of the testing laboratories taking into consideration the requirements in the foreseen future. Building of the laboratories, equipping them with office and laboratory furniture,

glassware, chemicals and analytical and testing apparatus and instruments, etc. Starting the functioning of the laboratories for the analysis and testing of agricultural and food products as well as chemical products. The laboratories could also function as the Customs laboratory in these fields and as Food Control Laboratory for the establishment and operation of Food Control System.

7. Preparation of procedural manuals for the organization of standardization activities as well as for the management and organization of the administrative and technical activities of the laboratories.

2. Phase II (1987-1990)

This phase, to be carried out in the Sixth Plan and the Fourth Country Programme, would focus on the following activities :-

1. Extension and diversification of the Institute's activities relating to the elaboration of Bhutanese standards.

2. Consolidation of the Standards Library to become a Standards Information Centre. Joining the Standards network of ISO known as ISONET. Signing of the GATT

Agreement on Technical Barriers to Trade known as GATT Standards Code. Operation of Bhutan's "Enquiry Point".

3. Initiation of activities in certification marking. Choice of the National Standards Mark. Preparation of the relevant regulations and rules. Establishing the method to be followed. Working out the procedural manual with all necessary forms. On-the-job training of national staff. Issuance of licences granting the standards mark to producers adopting national standards.

4. Extension of laboratory's premises and activities to include the necessary facilities for :

   a. Instrumental methods of chemical analysis.

   b. Physical and mechanical testing of materials and goods (selected items).

   c. Workshop.

Acquisition of the necessary equipment. On-the-job training of national staff.

5. Preparation and issuance of metrological legislation stipulating the adoption of SI(Systeme International) Units as the only legal units of measurement in Bhutan.

Acquisition of the national, reference, inspection and working standards in selected fields.

On the job training of the national staff and initiation of activities in the following two domains :-

a. Legal metrology (verification of weights and measures used in commercial transactions).
b. Industrial metrology (calibration of measuring instruments used in industry.

Preparation of procedural manuals with all standard forms relating to the above activities.

6. Training of the national staff abroad in standardization, certification, testing, quality control and metrology.

7. Rendering the following services :-

a. Consultancy services to the government, industry and trade.
b. Testing and calibration services.
c. Guiding industrial enterprises on improving their testing facilities and training their staff in modern testing techniques.

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To assist in the speedy implementation of the UNDP/ UNIDO assistance, the Consultant is working out the relevant Project Document for Phase I.

It is earnestly hoped that the implementation of the above two phases would ensure the establishment and functioning of the proposed institution on sound basis.

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ACKNOWLEDGEMENT

The Consultant wishes to extend his deep appreciation and profound thanks to Dasho C. Dorji, Joint Secretary, Department of Trade and Commerce and Industries and Mines for his very keen interest and his full wholehearted support to the mission.

He is also very grateful to Mr. D.P. Basnet, Deputy Director, Department of Trade and Commerce, who has given much of his time and effort to facilitate the implementation of the Consultant's tight programme, to Mr. Dhanraj Subba, Senior Office Superintendent who was his pleasant companion in his visits and meetings and to all officers of the Department for their kind cooperation.

The Consultant wishes also to extend his cordial thanks to the many executives, engineers and all whom he had met in the various government departments, enterprises and other bodies for kindly providing him generously with all required information.

He must also record his deep thanks to Mr. Raj Kumar Dar, UNDP Resident Representative, for his very useful guidance and kind support, and through Mr. Dar to his dedicated team of

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officers who rendered every possible help. He is especially indebted to Ms. P. Franceschinis, JPO who has spared no effort to help him out and gave freely of her time at the cost of personal inconvenience and in the face of the pressure of her heavy duties.

Mrs. Rinzin Pem, Secretary of the Department of Trade and Commerce, deserves the Consultant's heartfelt thanks and praise for her sincere effort and the meticulous care and keen attention she has given to the manuscript.

Finally, this acknowledgement cannot be concluded without mentioning the people of Bhutan. In a country which has been almost isolated from the outside world for centuries, it was not unexpected to find her people cautious or, at the very best, indifferent towards foreigners. Surprisingly enough, the contrary was found. The Consultant, during his 2-month stay in Bhutan, has never encountered a single occasion where he had not been treated in the most decent manner from the top executive in his office to the layman in the street. The warm welcome was always there and the pretty smiles were everywhere. This very civilized attitude, together with the beauty Nature gifted Bhutan with, rendered the Consultant's stay in this lovely Himalayan Kingdom as pleasant as it was.

Heartiest thanks to the people of Bhutan.

UNITED NATIONS

ANNEX I

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO

Project in the Kingdom of Bhutan

JOB DESCRIPTION
DP/BHU/82/023/11-01/3/3K

INTERNAL

Post title Expert in Standardization and Quality Control

Duration Two months

Date required As soon as possible

Duty station Thimphu; with travel within the country

Purpose of project To assist the Government in working out adequate recommendations for the creation and future development of the national institutional infrastructure in standardization, quality control, testing and metrology.

Duties The expert will be attached to the Department of Commerce and will specifically be expected to:

1. Review and assess in depth the existing situation with regard to activities in the field of standardization, quality control and metrology;

2. Prepare a draft project document covering a UNIDO technical co-operation project aimed at establishing the basis for a future integrated system of standardization, quality control and metrology;

3. Prepare a detailed plan of action and programme of work for the implementation of the project;

4. Study the possibility of having the assistance of the Indian Standards Institute as a substitute for a national service in standardization, quality control and metrology.

The expert will also be expected to prepare a final report setting out the findings of his mission and his recommendations to the Government on future action which might be taken.

..../2.

Applications and communications regarding this Job Description should be sent to:

Project Personnel Recruitment Section, Industrial Operations Division
UNIDO, VIENNA INTERNATIONAL CENTRE, P.O. Box 300, Vienna, Austria

V.81-33106

Qualifications

University degree or equivalent in applied physical sciences with extensive experience in administration, organization and operation of a national system of standardization and quality control.

Language

English.

Background information

The Kingdom of Bhutan is a totally land-locked country, bordered by China and India. As the country is almost entirely covered by mountains, problems of trade and transit are likely to become of considerable significance with economic growth and the expansion of external trade. The total population is estimated to be around 1,2 million. There are only two towns, including the capital Thimphu, with a population of over 20,000.

The economy of Bhutan is essentially rural, with 95% of the work-force being employed in agriculture and related activities - mainly subsistence farming and animal husbandry.

Industry is in a stage of infancy with a number of small-scale units having been established in recent years. The few larger scale enterprises that exist are a horticultural processing factory, three distilleries, a match plant and a cement factory. The industrial sector's share in the GNP is around 11%. At present there are about 44 industrial units of varying sizes. The cement plant at Penden having a 100,000 tonne capacity will soon be going into production.

There is of course, much scope for the development of new industries in the future based on agriculture, forestry and mineral resources. Due to a lack of local technical expertize and an overall shortage of labour in the country, the Government has worked out the framework of an industrial policy to promote future industrial development.

Historically the Kingdom of Bhutan has been part of a free trade area with its' southern neighbour India. In spite of the fact that there are some advantages in having free access to the huge Indian market, the Government is interested in developing an independent foreign policy as a substantial industrial growth is envisaged over the next ten years, and imports from these countries are expected to increase considerably.

In view of this, the importance of the export sector and of hard currency earnings is also going to increase substantially in the future.

With regard to a standardization service, the Indian Standards Institute (ISI) fulfils the role of a national body on standardization and quality control in the Kingdom of Bhutan at the moment. Although India might in future remain the main market for Bhutanese products, the Government, being aware that

a national integrated system of standardization, quality control and metrology is a basic precondition for future successful development of trade, in particular, export earnings, small and medium scale resource-based industries, is eager to begin the creation of the national infrastructure in standardization, quality control and metrology.

ANNEX II

PUBLICATIONS AND DOCUMENTS STUDIED

1. Information on Industries and Mines Development.
   Department of Industries and Mines, Ministry of Trade, Industry and Forests, 1984.

2. Basic Principle which will be Pursued by the Ministry of Trade, Industry and Forests in the Course of Implementation of Industrial Programmes during the Fifth Five Year Plan.
   Ministry of Trade, Industry and Forests.

3. Policy for Trade and Industry.
   Ministry of Trade, Industry and Forests, 1979.

4. National Forest Policy.
   Department of Forestry, Ministry of Trade, Industry and Forests, 1974.

5. Country Economic Memorandum. Two volumes.
   Planning Commission, January 1983.

6. Bhutan : Development in a Himalayan Kingdom.
   World Bank, April 1983.

7. Country Report to the Twenty-Third Session of Committee Trade. Bangkok 18th - 24th November, 1980.
   Department of Trade & Commerce, Ministry of Trade Industry & Forests.

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8. Third Country Programme for Bhutan, February 1981.

9. Resource Based Industrial Plan for Bhutan - Vol. I-V.
The National Industrial Development Corporation Ltd. New Delhi, 1978-79.

10. Bhutan : Trade and Industry Aspects. A Bibliography.
Trade Information Centre, Thimphu.

11. Handicraft Development Programme for the Royal Government of Bhutan.
International Trade Centre UNCTAD/GATT, 1984.

12. Product Adaptation and Marketing of Bhutanese Handicrafts.
Conrad Sanchez, ITC, August 1984.

13. Establishing a Trade Information Centre.
E. Lomingo - Barker, ITC, August 1984.

14. Report on Mission to Bhutan and Nepal.
A. Zeweri, UNIDO, May 1980.

15. Report on Export Promotion.
Export Division, State Trading Corporation of Bhutan.

16. Policies and Progress on Economic Development with Special Reference to Industrial Investment and Fiscal Policies.

17. International Trade Including Import - Export Policies and Export Promotion Measures.

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18. The Role of Small Scale and Cottage Industry Sectors in Industrial and Economic Development with Special Reference to Support Measures.

19. A Review of the Fifth Plan.

Department of Trade and Commerce.

20. Department of Trade and Commerce Sixth Plan. 1987/88 - 1991/92.

Department of Trade and Commerce.

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ANNEX III

TECHNICAL VISITS TO INDUSTRIAL ENTERPRISES

1. Penden Cement Authority, Gomtu.

   Mr. Rinchhen Dorji - Managing Director
   Mr. Nishit Chanda - Works Manager
   Mr. R.S. Sharma - Production Manager

2. Dechhen Bottlers Pvt. Ltd./Kunlay Cable Industries

   Mr. Kinley Tshering - General Manager

3. Druk Board

   Mr. A.K. Sengupta - Technical Manager

4. Druk Mentha and Allied Products

   Mr. P.K. Basu - Chemist

5. Karma Steel Factory

   Mr. Shasnidharan Nair - Supervisor

6. Phuntsholing Pencil Slat Factory

   Mr. K. Gangadharan - General Manager

7. Chemical Laboratory of the Calcium Carbide Project.

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ANNEX IV

PERSONS WITH WHOM DISCUSSIONS TOOK PLACE

1. Ministry of Trade, Industry and Forests

Dasho C. Dorji	-	Joint Secretary

2. Department of Trade and Commerce, Ministry of Trade, Industry and Forests.

Mr. D.P. Basnet	-	Deputy Director

3. Department of Industries and Mines, Ministry of Trade, Industry and Forests.

Mr. Ugyen Namgyel	-	Joint Director
Mr. Tika Sharma	-	Industrial Development Officer
Mr. Tshenchok Thinley	-	Assistant Director

4. Department of Health Services.

Dr. J. Norbu	-	Coordinating Officer
Dr. Mahanta	-	Officiating Superintendent, General Hospital

5. Department of Agriculture.

Mr. J.D. Awasthi	-	Deputy Director

6. Royal Civil Service Commission (RCSC)

Mr. Sitty Dorji	-	Employment Officer

7. Public Works Department.

Mr. Mingma Dorji	-	Executive Engineer(Planning)

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8. Sha Slate Mines, Department of Industries and Mines.

Mr. Bap Kinga	-	Project Manager

9. Tashi Commercial Corporation

Mr. G.C. Bhura	-	Managing Director

10. Department of Customs

Mr. D. Wangdi	-	Collector of Customs
Mr. Sonam Rinzin	-	Assistant Collector of Customs
Mr. P.S. Chhetri	-	Customs Officer
Mr. Tshewang Tenpa	-	Customs Officer.
Mr. H.B. Gurung	-	Trainee Officer

11. Export Division, State Trading Corporation of Bhutan.

Mr. H.R. Pradhan	-	Deputy Director

12. Regional Office (Department of Trade and Commerce)

Mr. Phala Dorji	-	Regional Trade Officer

13. Industrial Estate Officer (Department of Industries and Mines).

Mr. Dophu Tshering	-	Estate Manager

14. Don Bosco Technical School

Mr. Kelzang Chhodar	-	Officiating Principal
Mr. Bumchu Wangdi	-	Deputy Chief Supervisor of Mechanical Section

15. Tea-Chest Battens Manufacturing and Sales Corporation

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16. Indian Standards Institution, New Delhi.

Mr. S. Subrahmanyan	-	Deputy Director General
Mr. S. Karmakar	-	Director, Laboratories
Mr. V. Vij	-	Director, Information services
Mr. Sohrab	-	Deputy Director, International Relations

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ANNEX - V

LIST OF ALL PRODUCTS AND GOODS MANUFACTURED IN BHUTAN

PHUNTSHOLING

1.	Penden Cement Authority	:	Portland Cement
2.	Samchi Distillery	:	Liquors
3.	Bhutan Fruit Products	:	Jams, Fruit, Juices etc.
4.	Thumps Up (Dechen Bottlers Private Ltd.)	:	Cold drinks
5.	Tashi Engineering Works	:	Repairing & Maintenance Works
6.	Tashi Tarpauline	:	Hood clothes etc. (Canvas)
7.	Mentha and Allied Products	:	Mentha Oil
8.	Karma Steel Factory	:	Steel Furniture
9.	Tashi Matha Factory	:	Bhutanese Cloth
10.	Gyaltshen Press	:	Printing & Binding Work
11.	Kuensum Confectionary	:	Sweets & Biscuits
12.	Gunny Bags	:	Bags for packing cement etc.
13.	Kuenley Cables	:	Mfg. of PVC wire & Cables
14.	Dolomite Powder	:	Dolomite Powder for fertilizer
15.	Druk Jhari Industries	:	Bhutanese Tea
16.	Karten Oil Mill	:	Mustard Oil from Mustard seeds and oil cakes
17.	Tashi Bakery Unit	:	Cakes etc.
18.	Norbu Meeber Candle Factory	:	Candle
19.	Wangdi Tyres	:	Resoling & Valcanisation of Tyres
20.	Ping Ice-cream	:	Ice-cream Candy
21.	Hire of Tractor	:	Tractor for Hiring purposes
22.	Choden Engineering	:	Repairing & Maintenance Work
23.	Chimmi Tyres	:	Resoling & Valcanisation of Tyres
24.	Automobile Battery Unit	:	Reconditioning of automobile battery
25.	U.L.Lime Industries	:	Lime stone
26.	Yangkhil Bakery	:	Biscuits, Cakes etc.

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27.	Tashi Carpet Factory	:	Carpets
28.	Tashi Paper Factory	:	Handmade Bhutanese paper
29.	Noodle Unit	:	Noodle & Phing
30.	Gyaltshen Oil Mill	:	Mustard oil from Mustard seeds and oil cakes
31.	Pugli Jhari Unit	:	Bhutanese Tea
32.	Jhari Unit	:	Bhutanese Tea

GAYLEGPHUG

33.	Deki Polythene	:	Polythene Pipes
34.	Bhutan Brick Corpn.	:	Red Bricks
35.	Gaylegphug Distillery	:	Liquors
36.	Sugar farm	:	Sugar Canes for sugar
37.	Bricks Factory	:	Red Bricks
38.	Ugyen Oil Mill	:	Mustard Oil & Oil Cakes
39.	Ugyen Soap & Candle Factory	:	Washing Soap & candle
40.	Gyaltshen Oil Mill	:	Mustard Oil & Oil Cakes
41.	Pema Tyres	:	Resoling & Valcanising of tyres and tubes
42.	Baral Oil Mill	:	Mustard Oil and Oil Cakes
43.	Ice-cream Unit	:	Ice-candy
44.	Bakery Unit	:	Biscuits & Cakes
45.	Ganesh Shoe Unit	:	Manufacturer of different types of shoes
46.	Noodle Unit	:	Noodles
47.	Sugar Crushing Unit	:	Sugar

SAMDRUP JONGKHAR

48.	Eastern Bhutan Distillery	:	Liquors
49.	Confectionery Unit	:	Sweets & Chocolates
50.	Pema Tyres	:	Resoling & Valcanising of Tyres and Tubes
51.	Pema Battery Unit	:	Reconditioning of Batteries
52.	Pema Motor Works	:	Repairing & Maint. of Vehicles

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53.	Chimmi Biscuit Factory	:	Biscuits & Cakes
54.	Chimmi Tyres	:	Resoling & Valcanising of Tyres and Tubes
55.	Lama Oil/Rice Mill	:	Mustard Oil & Oil Cakes and husking Rice
56.	Shoe & Bedding	:	Mfg. of Shoes & Leather goods
57.	Prakesh Oil Mill	:	Mustard Oil & Oil Cakes
58.	N.R. Candle Factory	:	Candles
59.	Weaving Unit	:	Traditional Clothes
60.	Norkhil Dying	:	Mainlys for weaving unit
61.	Dairy Farm	:	Not yet commissioned
62.	Chillie Powder Unit	:	- do -
63.	Ice-cream Candy	:	- do -

THIMPHU

64.	Nado & Chhimi Tyres	:	Resoling & Repairing of Tyres and Tubes
65.	Druk Sherig Press	:	All Printing Matters
66.	Warm Winter Industries	:	Woolen Sweaters
67.	Knitting Unit	:	- do -
68.	Apple Juice Unit	:	Pure Apple Juice
69.	Workshop	:	Repairing of Vehicles

CHIRANG

70.	Roofing Tiles Unit	:	Bricks Tiles for roofing purposes
71.	Pathak Oil Mill	:	Mustard Oil & Oil Cakes
72.	Pottery Making Unit	:	Wooden cups, Dapa etc.

PARO

73.	Oil Mill	:	Mustard Oil & Oil Cakes
74.	Paro Bricks Factory	:	Red Bricks
75.	Food Processing Unit	:	Canned food stuff

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MONGAR

76.	Mini Oil Mill	:	Mustard Oil & Oil Cakes

BUMTHANG

77.	Workshop	:	Repairing & Maintenance of vehicle are done
78.	Food Processing Unit	:	Canned food stuff

TONGSA

79.	Oil Expeller	:	Mustard Oil and Oil Cakes

SHEMGANG

80.	Oil Expeller	:	Mustard Oil & Oil Cakes