No. 04

ブータン王国

建設事情資料集

昭和58年1月

国際協力事業団

無償設

[redacted]

83－03

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1. 自然条件／社会条件

1. 自然条件／社会条件

1－1 一般事情

ブータン王国は，ヒマラヤ山脈の中にある王国であり，その面積は約４７,０００平方キロメートルで，北緯２６.５度～２９.０度，東経８８.５度～９２.０度の間に位置する。国の北部は中国（チベット），南部・西部および東部はインドと国境を接している。

この国の気候は，明らかに以下の三つの気候帯に分類できる。

(1) 亜熱帯性気候帯

インドに隣接する南部地域の標高1,０００メートル以下の高温多湿で密林を形成する亜熱帯性気候帯である。

(2) 温帯性気候帯

中央地域の標高1,０００～3,０００メートルの渓谷帯で，温帯性の気候と植生の地帯である。首都 Thimpnu もこの地帯に位置する。

(3) 高山性気候帯

中国に隣接する北部地域の雪の深い3,０００メートル級の高山と渓谷地帯がこの気候帯に入る。

南部国境に沿った低地帯を除いて，国土全域は山岳地帯といえる。分水嶺となる高山が地域の境界となっており，これらの高山地帯を水源地とする大小多数の河川が北から南に向けて流出している。現在の農耕地は国土の９パーセントであり，約７０パーセントの国土は森林に覆われており，残余の土地は荒野となっている。

全人口は約１００万人で，人口密度は１平方キロメートル当り２１人である。現在の人口統計では年間人口増加率は，2.1パーセントと推計されているが，この数字はやや多いと言われており，年間1.6～1.8パーセント位が実態に近いと推定されている。人口密度は地域による差が大きく北部高山地帯の居住者は非常に少ない。都市化は未だ少なく（首都 Thimphu をふくむ二大都市でも，それぞれ人口約２万人）一応の道路網もあるが，全国的に見れば圧倒的に農村地帯が多い。

1－2　自然環境

(1) 気候条件

1) 気候地帯

ブータン国のような山国における気候条件は複雑である。しかし，この複雑な気候も概括的には，標高に基づいた広範囲の三気候帯に分類されている。S・P・Chatterjee 教授はこの急変する気候の特徴について，次のように生き生きと説明されている。「ブータン国内を一日旅行するだけで，シベリヤの冬の厳寒，サワラ砂漠の酷暑，温暖で快適なイタリーの地中海性気候の全部を経験できる。」

この国の気候は次の三つの気候帯に大別される。

① 山麓地域における高温の亜熱帯気候帯

② ヒマラヤ山地の温帯性気候帯

③ 大ヒマラヤ山脈尾根地域のツンドラ気候帯（高山性気候帯）

（Fig.1－1参照）

名気候帯での基礎的気象要素は，標高差による温度差によって，分類されている。標高1,２００メートルから1,５００メートル地帯は高温多湿の亜熱帯で，年間降雨量は約2,０００ミリに達し，亜熱帯性森林の繁茂がみられ，一部にサバンナ地帯をふくむ。亜熱帯性気候帯から標高が上がるにしたがって，複雑な温暖性または冷涼性の気候地帯が広がっているが，地図上で精密にこの状況を示すことは困難である。この地帯の冬はほどよい寒さから厳しい寒さまでの差があり，夏は温暖で降雨が多い。この地帯の低地では米・バナナ・オレンヂその他の低地作物が豊かに実り，集約的農業が行われている。海抜3,０００メートル前后の高地帯では，冬が寒く，夏が短く涼しいために，穀物の生産増強が困難である。この気候地帯の低い部分は狭い谷間であるが，山の南側の斜面に多い広葉樹林は，多湿な亜熱帯気候帯の樹林に似た植生を示している。標高が高くなるとともに，常緑の松柏類が多くなってくる。この気候帯で標高3,０００メートル以上の高地になると，冬は厳寒となり，夏は短かく冷涼であり，一般の作物栽培は困難である。この地域は降霜地帯であり，大麦・馬鈴薯などの耐寒性作物だけが昔ながらの慣行で栽培されている。標高5,３００メートル以上は農耕不能地で，自然林の高山性ツンドラ気候帯である。

2) 気象条件

ブータン国では亜熱帯性気候から高山性気候まで広範囲にわたっているうえ，各地

での気象条件の変動が大きい。また気象統計も少ないので，Fig．１－２の各地の気象状況がほとんど唯一の資料と言える。

最高気温は３８℃（Wangdiphodrang）から１８℃（Gogona）までの変動し，平均最高気温は２９.３℃である。全国的には７月から８月にかけて気温が最高に達するが，Wangdi-Phiela では３月，Sarbhang では９月が最も暑くなる。最低気温は１３℃（Sarbhang）から(−)７℃（Paro） までの差がみられ，全国平均は(−)0.３℃である。一般的に１２月から１月が最も寒い時期である。

Fig.１－２の各地における夏（８月）と冬（１月）のそれぞれ最高・最低平均気温を読みとり，この平均気温とそれぞれ各地の標高との関係を検討した結果，次の相関係数と回帰方程式を得た。

夏（８月）では，　$r = -0.88^{**}$

$y = 31.24 - 0.00535x$

冬（１月）では，　$r = -0.97^{**}$

$y = 22.29 - 0.00721x$

ここにxは標高（メートル）を，yは平均気温（摂氏）を示す。

この調査により，ブータン国でも標高と気温の間には密接な関係のあることが究明され，標高１００メートル上がるごとに，夏期では0.５３℃，冬期では0.７２℃ずつ低下することが初めて明らかにされた。

降雨量はTable １－１およびFig．１－２ に示した。ブータン国における降雨量は７月から８月が最も多く１２月から２月が最も少ない。また一般的には，６月から９月が雨季，１１月から２月が乾季に分けられる。降雨統計からみて，ブータン国における降雨の特徴としては，年間降雨量は標高が低くなるにしたがって，多くなる傾向があり，最大5,０００ミリ近くに達するところがある。例外として，Gaylegphug，Tashigang，Wangdiphodrang およびMongar 地区のように，山で囲まれた盆地形のところでは，同じ標高の他の地区よりも降雨量は少ないが，Gogona 地区ではこれに反し標高の割には降雨量が多い。この資料の範囲内では，最高年間降雨量の4,５００ミリ（phuntsholing）から最少年間降雨量の４５０ミリ(Missigang)までと，国内各地の降雨量の変動は大きい。

ちなみに，日本の雨量は最小網走の８３９mm，最大尾鷲（四国）の4,１１８mm

の間に分布し，東京は1,460mmである。

晴天日数はFig.1－2の5地点で記録されている。月別の年間最大晴天日数は1月，2月または12月に起こり，その日数は月間27日から30日である。年間最少晴天日数の月は8月，7月または9月に起こり，月間3日（Gogona）から11日（Thimphu）である。上述した5地点の観測記録から判断すると，月間晴天数と月間降雨量との間には，明らかに負の相関関係（逆比例的関係）が認められる。

Fig. 1 – 1 Climatic Regions in Bhutan

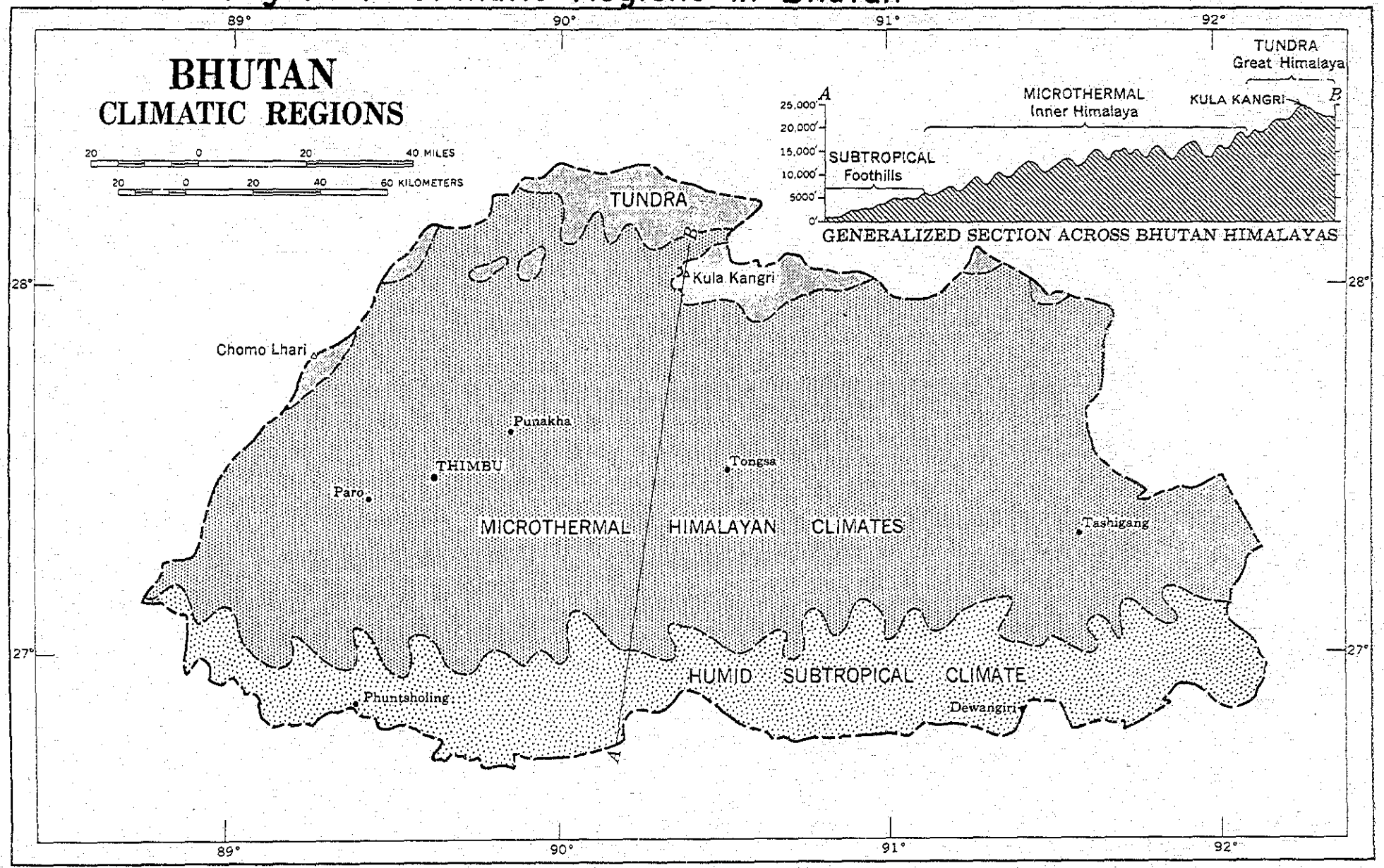
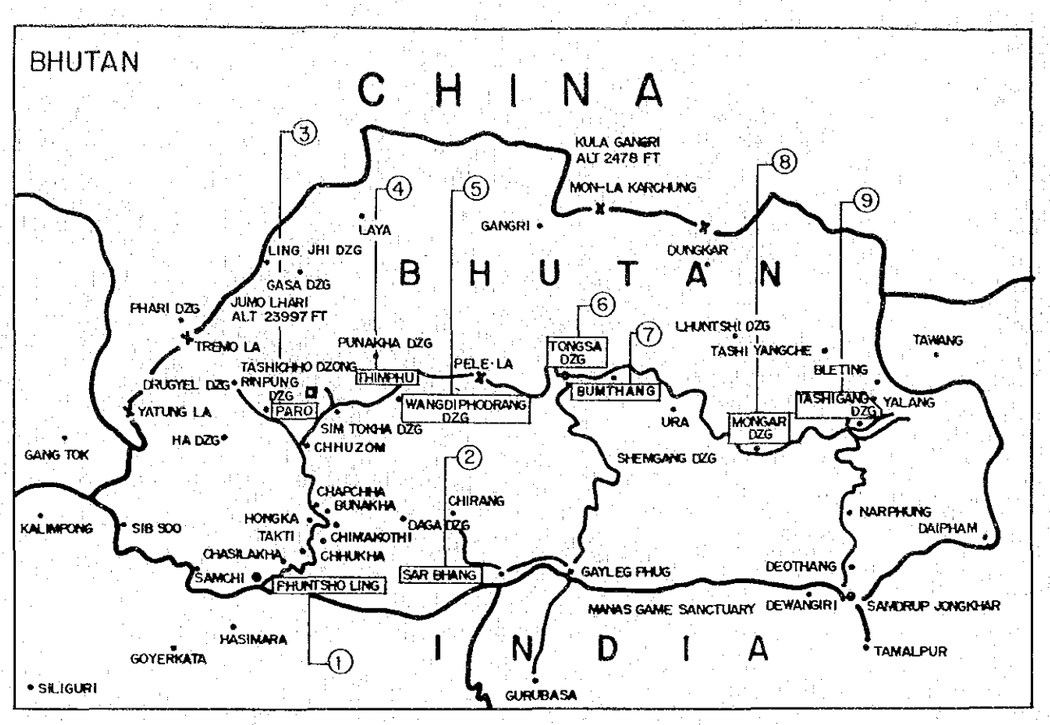
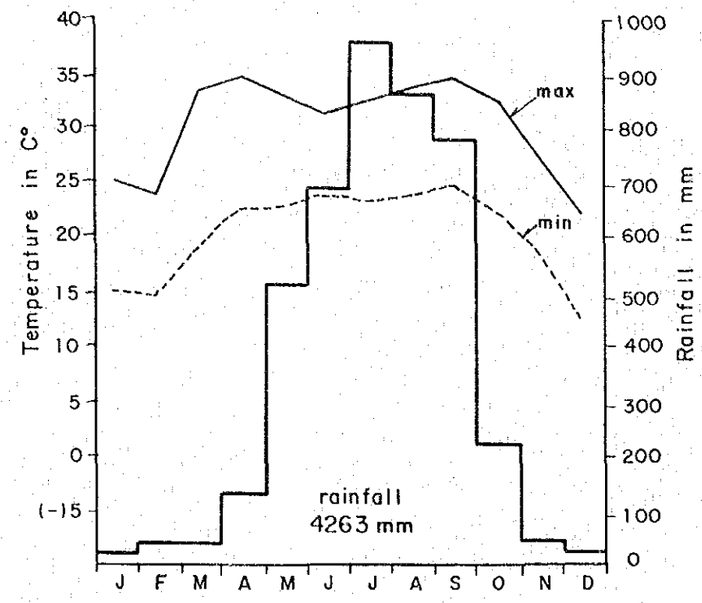


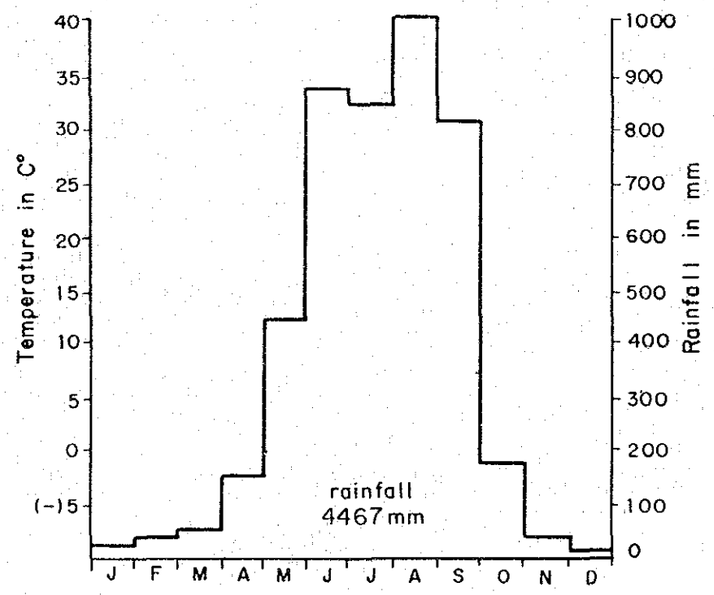
Fig. I-2 CLIMA



② SARBHANG (ELEVATION 365 meter)



① PHUNTSHOLING (ELEVATION 235 meter)



③ PARO (ELEVATION 2362 meter)

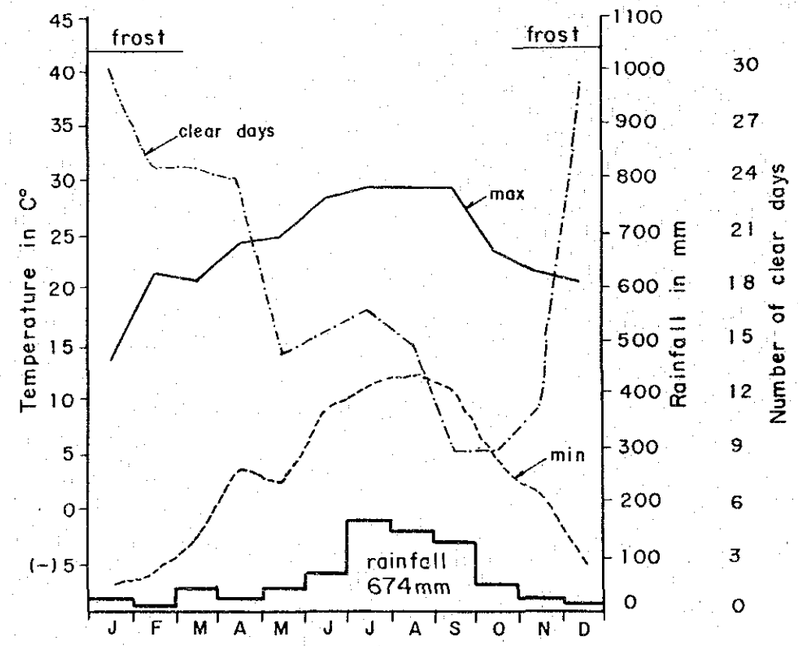
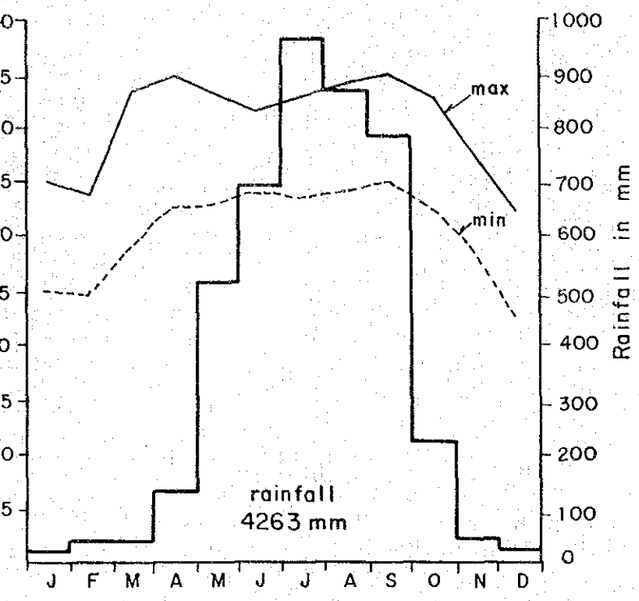
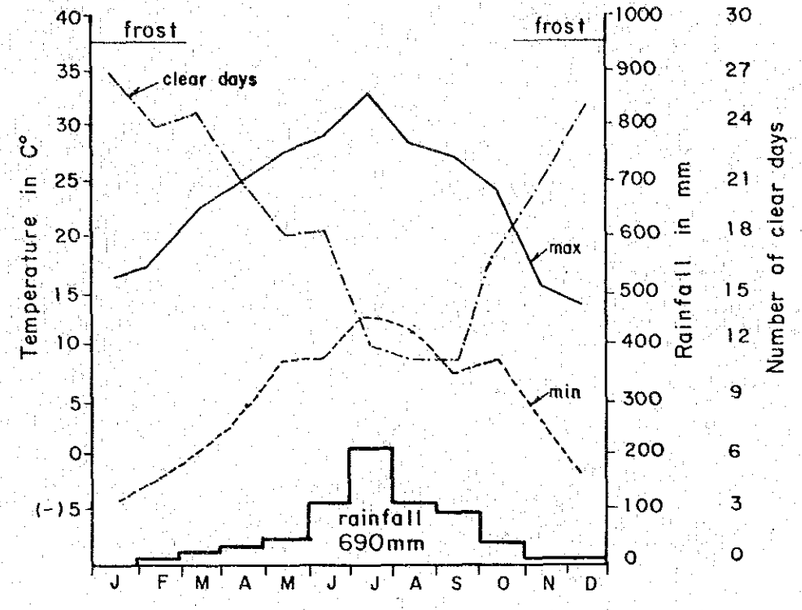


Fig. 1-2 CLIMATIC CONDITIONS

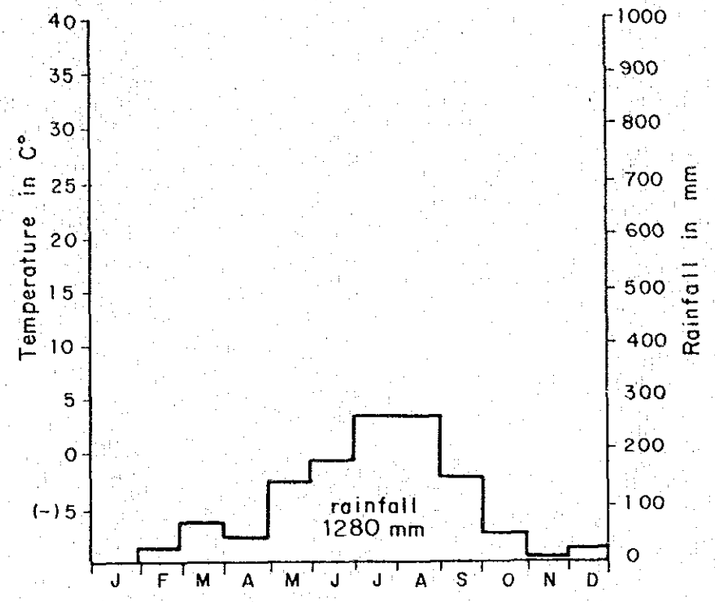
② SARBHANG (ELEVATION 365 meter)



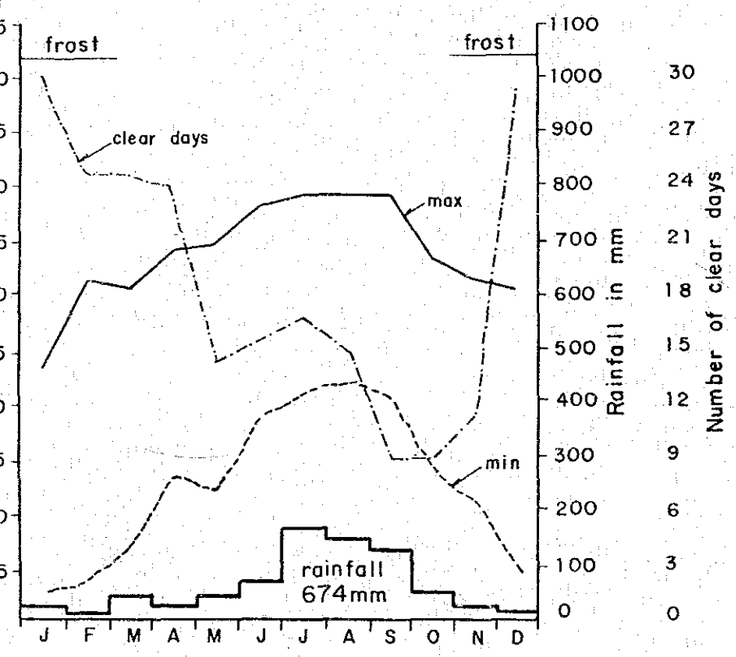
④ THIMPHU (ELEVATION 2400 meter)



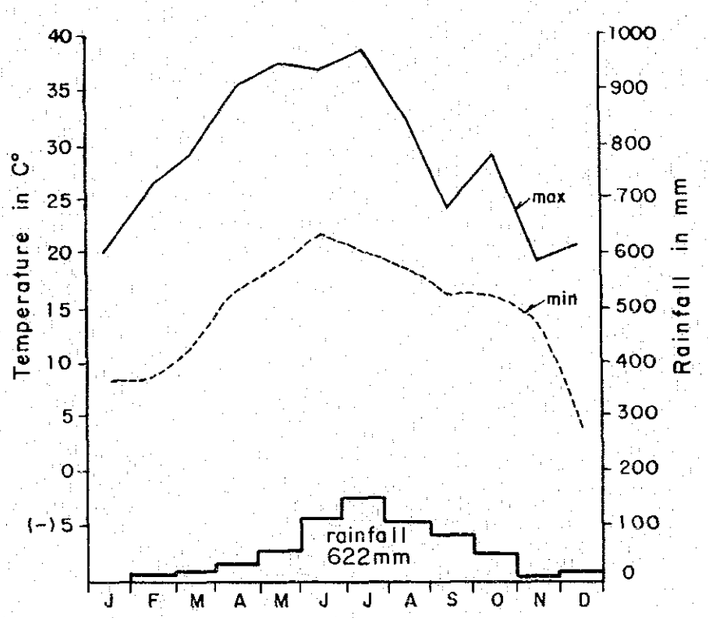
⑥ TONGSA (ELEVATION 2170 meter)



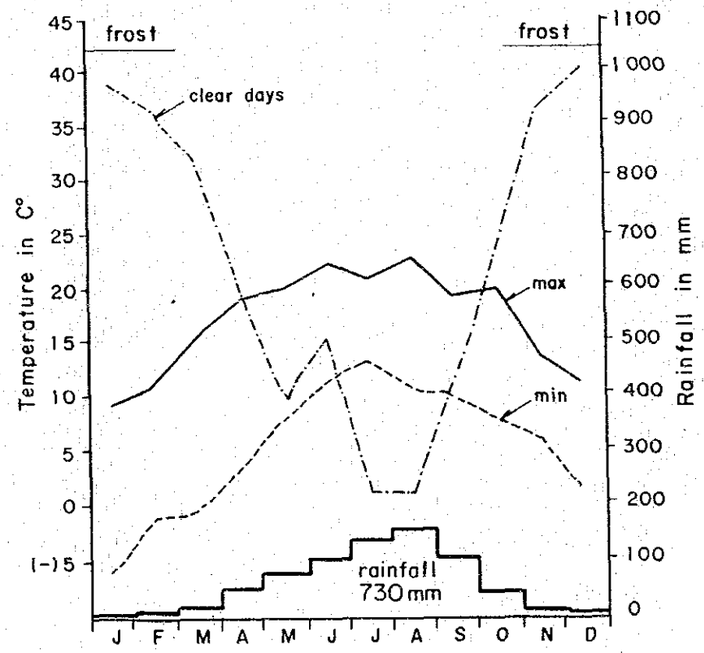
③ PARO (ELEVATION 2362 meter)



⑤ WANGDIPHODRANG (ELEVATION 1374 meter)

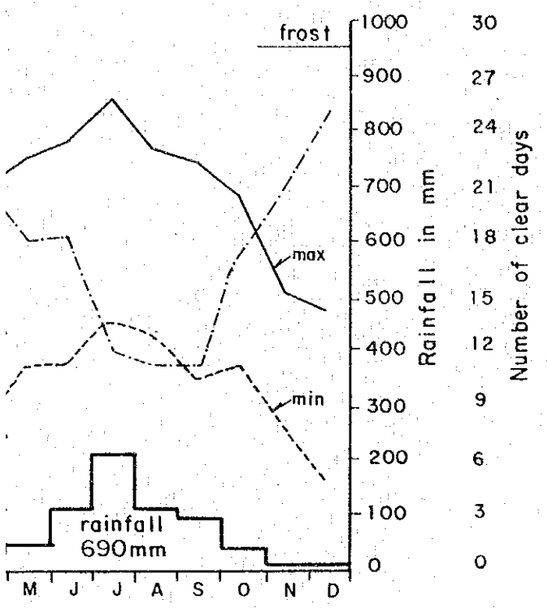


⑦ BHUMTHANG (ELEVATION 2800 meter)

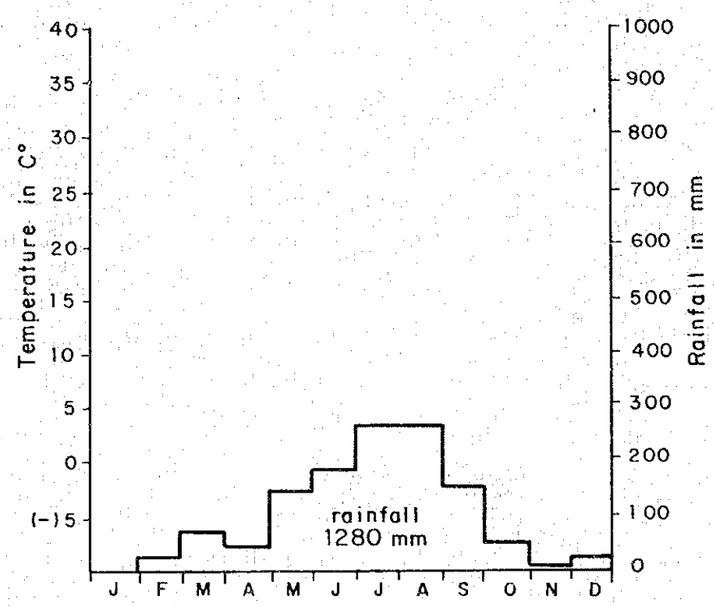


IONS

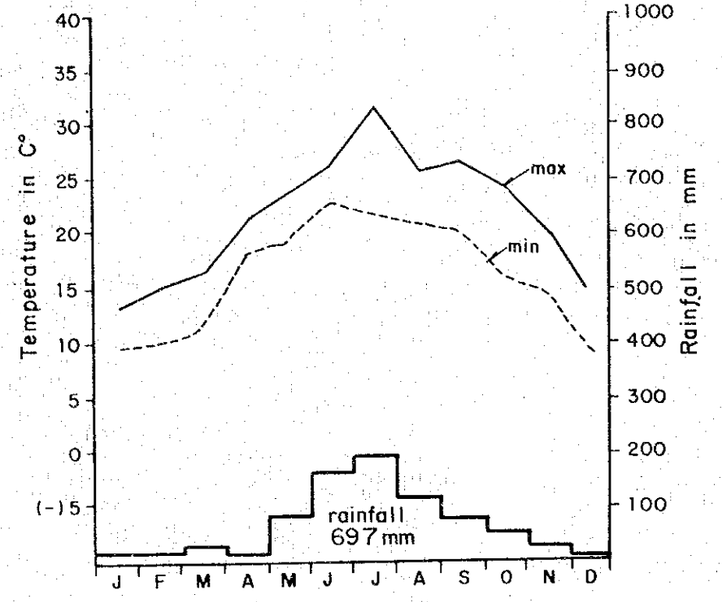
PHU (ELEVATION 2400 meter)



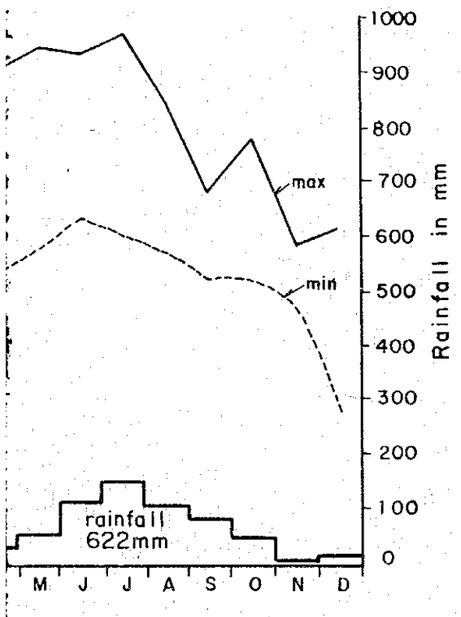
⑥ TONGSA (ELEVATION 2170 meter)



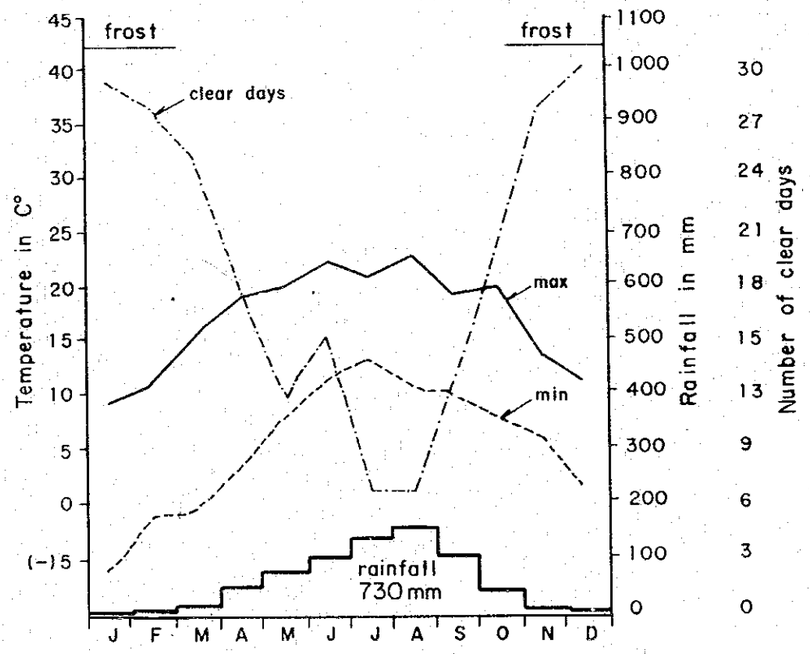
⑧ MONGAR (ELEVATION 1520 meber)



IPHODRANG (ELEVATION 1374 meter)



⑦ BHUMTHANG (ELEVATION 2800 meter)



⑨ TASHIGANG (ELEVATION 990 meter)

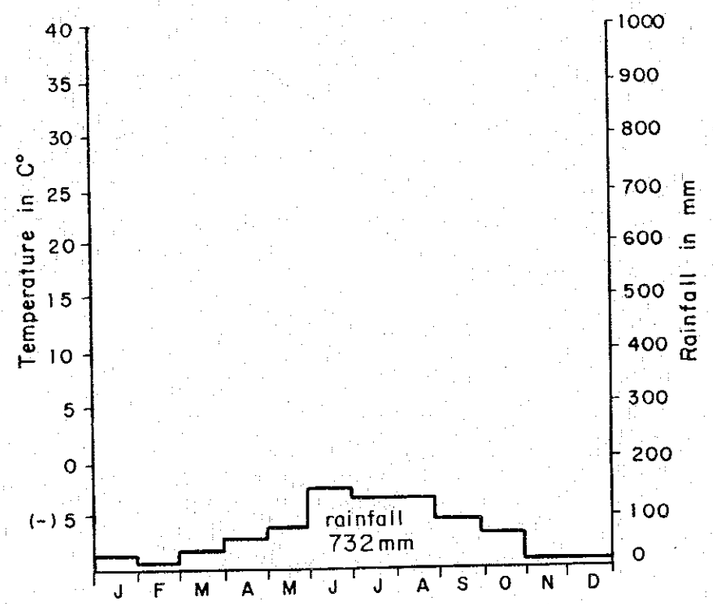


Table 1－1　ブータン王国の地区別年間降雨量（単位：ミリ）

地　区	標　高（メートル）	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	年間降雨量（ミリ）
Phuntsholing	234	24	34	46	165	431	880	874	1010	811	166	15	7	4,468
Sarbhang	326	22	27	25	128	509	697	970	862	789	206	26	2	4,263
Samchi	610	20	150	57	236	499	656	669	554	－	55	16	－	2,910
Gaylegphug	196	77	－	5	43	92	170	384	1,098	278	8	－	8	2,164
Paro	2,362	13	4	40	30	44	71	144	135	104	49	9	2	674
Tongsa	2,172	11	27	60	57	157	185	256	257	148	60	7	14	1,239
Mongor	1,520	10	10	23	10	85	152	181	104	71	47	3	1	698
Tashigang	991	16	11	34	50	76	136	124	128	87	51	2	0.3	732
Wangdiphodrang	1,374	6	4	10	17	46	117	146	113	97	56	3	8	622
Thimphu	2,392	2	11	12	22	48	103	149	152	121	70	－	0.5	691
Bhur (Gaylegphug)	(200)	20	29	84	179	354	1,093	1,454	820	712	240	53	37	5,074

(注)　数値は次の期間の平均である。

Thimphu …… 1972－1975，　Bhur …… 1973－1982，　その他 …… 1956－1971

Table 1－2　Bhur における日照時間

月 / 年度	1	2	3	4	5	6	7	8	9	10	11	12	平均(時間)
1980	6.8	5.9	6.1	－	－	－	2.6	3.4	4.3	7.4	7.0	8.6	5.8
1981	4.4	5.3	5.5	5.4	5.2	6.1	2.7	2.9	3.9	7.9	9.2	7.9	5.5
1982	6.1	4.9	5.6	3.6	5.8	1.1	2.6	3.8	3.5	－	－	－	4.1
平　均	5.8	5.4	5.7	4.5	5.5	3.6	2.6	3.4	3.9	7.7	8.1	8.3	5.4

1－3　社会環境

(1)　GNPの構成

１９８０－１９８１年の中間統計による総人口1,００３,０００人を基礎として，市場価格によって計算したＧＮＰ（国民総生産）の部門別概算額および総額はTable 1－3のとおりである。これによると，ブータン国のＧＮＰは１０億２０５０万Nu.すなわち１億１３３０万 us $であり，国民１人，１年当たり1,０１７Nu または１１３us $である。

ＧＮＰの構成としては，農業およびその関連部門が６３％と主要な部分を占め，これに次いでサービス部門が１３％，政府および行政部門が１０％，工鉱業部門が約５％という割合となっている。この統計からも明らかなように，ブータン国の基礎的な経済的特徴は，他の最貧国と同様に，国民１人当たり生産がきわめて低く，その経済は圧倒的に農業に依存していることがわかる。

Table 1−3　ブータン国のＧＮＰ構成（概算，単位百万Nu・）

部　門	ＧＮＰに占める金額	比率 (%)
1. 農業および関連部門	645.2	63.2
a・農　業	409.4	40.1
b・畜　産	76.5	7.5
c・林　業	159.3	15.6
2. 製造業および鉱業	52.9	5.2
a・製　造　業	23.7	2.3
b・小企業および家内工業	9.6	0.9
c・鉱　業	8.6	0.8
d・観　光	11.0	1.2
3. サービス業	133.8	13.1
a・電　力	2.7	0.3
b・通　信	5.8	0.6
c・運　輸	27.6	2.7
d　建　設	18.9	1.8
e・社会福祉・保健・教育等	34.8	3.4
f・財政制度	15.4	1.4
g・商　業	28.6	2.9
4. 政府および行政	106.6	10.4
5. 純賃借料収入	82	8.1

(2) 国家予算の配分

第４次５箇年計画（１９７６－１９８１年）および第５次５箇年計画（１９８２－１９８７年）における予算配分はTable１－４のとおりである。従来，予算配分では農業部門に最優先的に割り当てられてきたが，最近少しずつその額が減少する傾向がみられる。このことは農業を軽視することではなく，第５次計画では特に新規の商工業計画に対する支出が急増したことによるものである。第５次５箇年計画では，この国の豊かな天然資源を最大限に開発することによって，経済構造を変革し充実しようとしている結果である。したがって，総額１億Nu.またはそれ以上の巨額を要する６つの主要投資事業が第５次計画で推進されることになっている。これらの大型事業の中の２つは発電部門，３つは工業部門，残りの１つは国立航空の設立である。Table１－４により，発電部門・工業および鉱業部門の予算急増がはっきり認められる。農業および公共事業の重要性もまだ十分認められている。予算の比較からは，社会部門の重要性，特に教育の重要性は減少している。

要するに，予算配分上では，全予算に対する農業予算の比率は年ごとに減少するが，絶対数は明らかに著しく増加していて，農業の重要性を如実に示している。

Tabla 1－4　国家予算配分表*（単位　百万Nu）

計画 / 部門	第4次計画（1976－1981） 金額	比率（パーセント）	第5次計画（1981－1987） 金額	比率（パーセント）
農業	259.05	23.5	491.8	11.2
畜産	61.49	5.6	122.1	2.8
林業	110.26	10.0	304.2	6.9
発電	50.50	4.6	715.0	16.3*
工鉱業	175.00	15.8	760.5	17.4**
公共事業	128.32	11.6	536.9	12.3
民間航空	－		100.0	2.3
郵便・電信	16.91	1.5	25.0	0.6
通信・交通	37.34	3.3	66.6	1.5
観光	12.50	1.1	50.9	1.2
教育	134.60	12.1	337.8	7.7
保健	54.58	4.9	183.1	4.2
報道・広報	11.04	1.0	15.0	0.3
中央官庁	34.30	3.1	628.6	14.4
古代遺跡保存	－	－	－	－
その他	20.31	1.9	40.0	0.9
合計	1,106.20	100.00	4,377.5	100.00

* Chukha 発電プロジェクト分を除く。

** 商業および貿易をふくむ。

2. 建 設 事 情

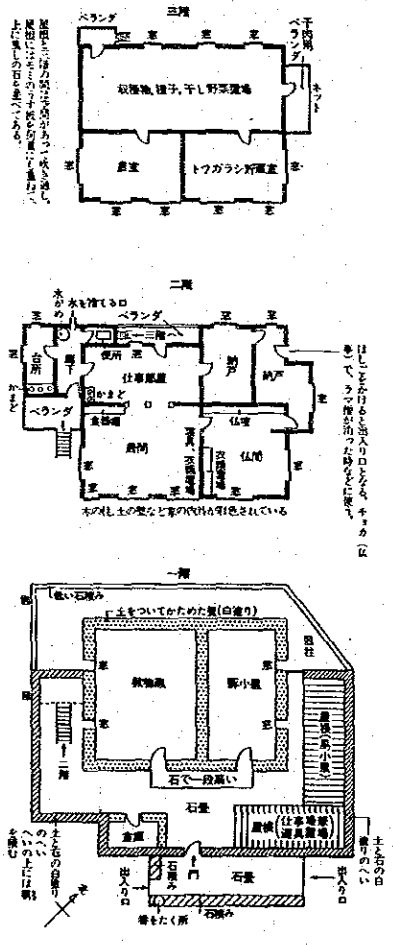
2. 建　設　事　情

2－1　建　築　様　式

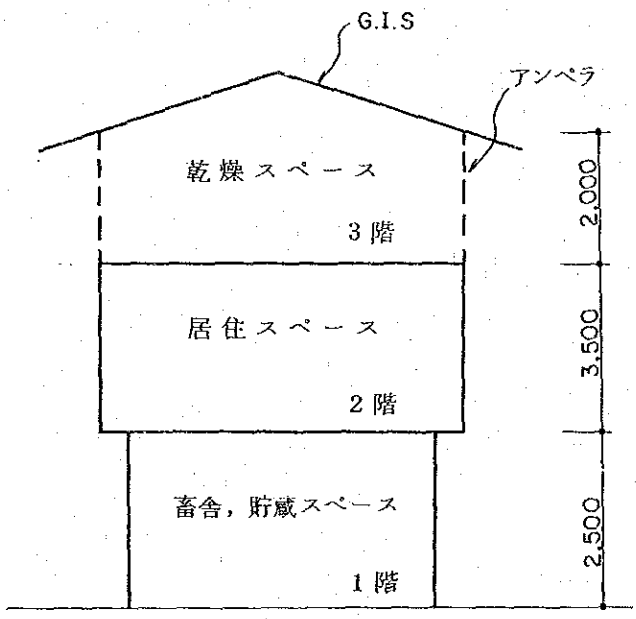
ブータン国の建築様式は，農村建築および城砦建築などにみられる伝統的様式とアパート，学校，事務所，ホテルなどにみられる近代的様式があげられる。

(1)　伝統的様式　－　その１：農村建築

ブータン国の農家は，ほとんどすべてが独立家屋で２階又は３階建が普通で座式起居の生活様式である。１階は，穀物蔵，豚小屋，馬小屋に，２階は，居間，仏間，仕事部屋，台所などの居住スペースに，屋根裏部屋である３階は，収穫物，種子，干し野菜置場にそれぞれ利用されている。（Fig．２－１参照）



平　面　図

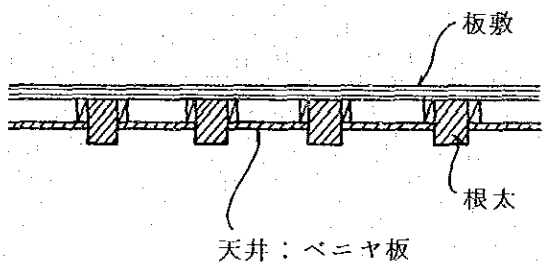


断　面　図

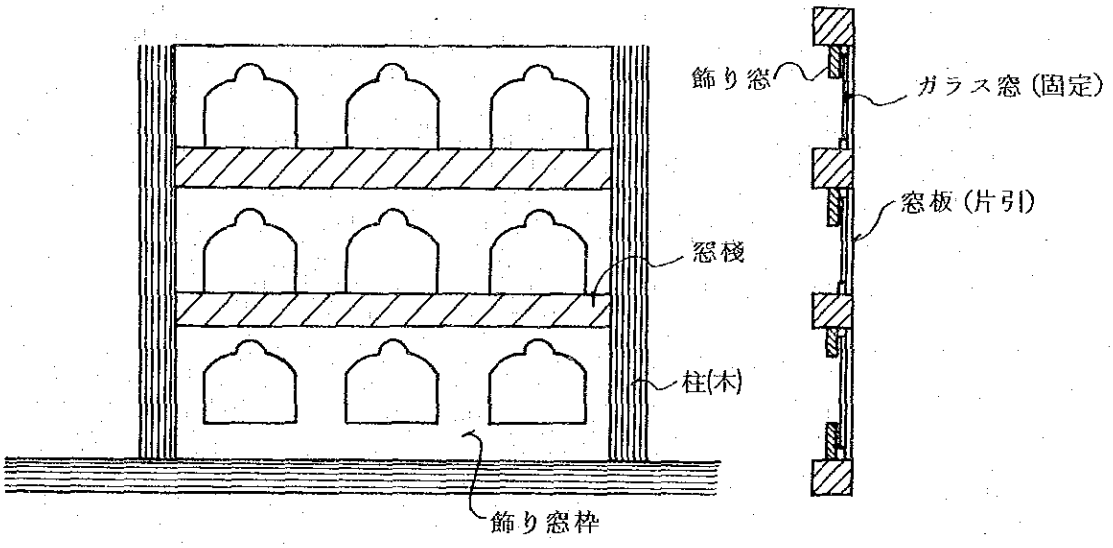
Fig．２－１　ブータンの農家

建築概要は，下記の通りである。

構　　造：	1階	土壁（厚さ50 *cm*）
	2階，3階	木造の骨組＋しっくい
	屋根	木造
外部仕上：	外壁	プラスター
	屋根	亜鉛引鉄板又は板葺
内部仕上：	床	板敷
	内壁	プラスター
	天井	ベニヤ板



窓　：　木製―伝統的デザインが今日なお生きている。



工事方式：　施主，親戚の材料，労力の提供によって施工する直営方式

(1) 伝統的様式 ― その２：城砦建築

ブータン建築の代表作は，何と言っても，城砦建築である。あの上部にいくに従って，少しずつ内側に傾いた白壁，広大な中庭，それに華麗な回廊に古典的な美しさを感じる程である。この印象的な建築物は，山岳国ブータンの山の中腹や川の合流地点などに建立され，現在に至るまで，その地域の行政及び祭事の中心地として栄えている。その中でも，首都Thimphu 谷の入口にそびえるシントカ城は，１６２７年に建てられ，その後のブータン城のモデル建築として，その様式が国中に伝えられ，もてはやされた城として有名である。(Fig. ２－２ 城砦建築参照)

この城砦建築に関して，特筆すべきことは，[1]設計図，施工図は皆無だったこと

[2]日本の校倉造り風の釘を使わない建築物であったこと

[3]周囲の地勢とみごとに調和していること

などある。

壁　：（石積，プラスター仕上
　　一部土壁

屋根　：　木造（亜鉛引鉄板）

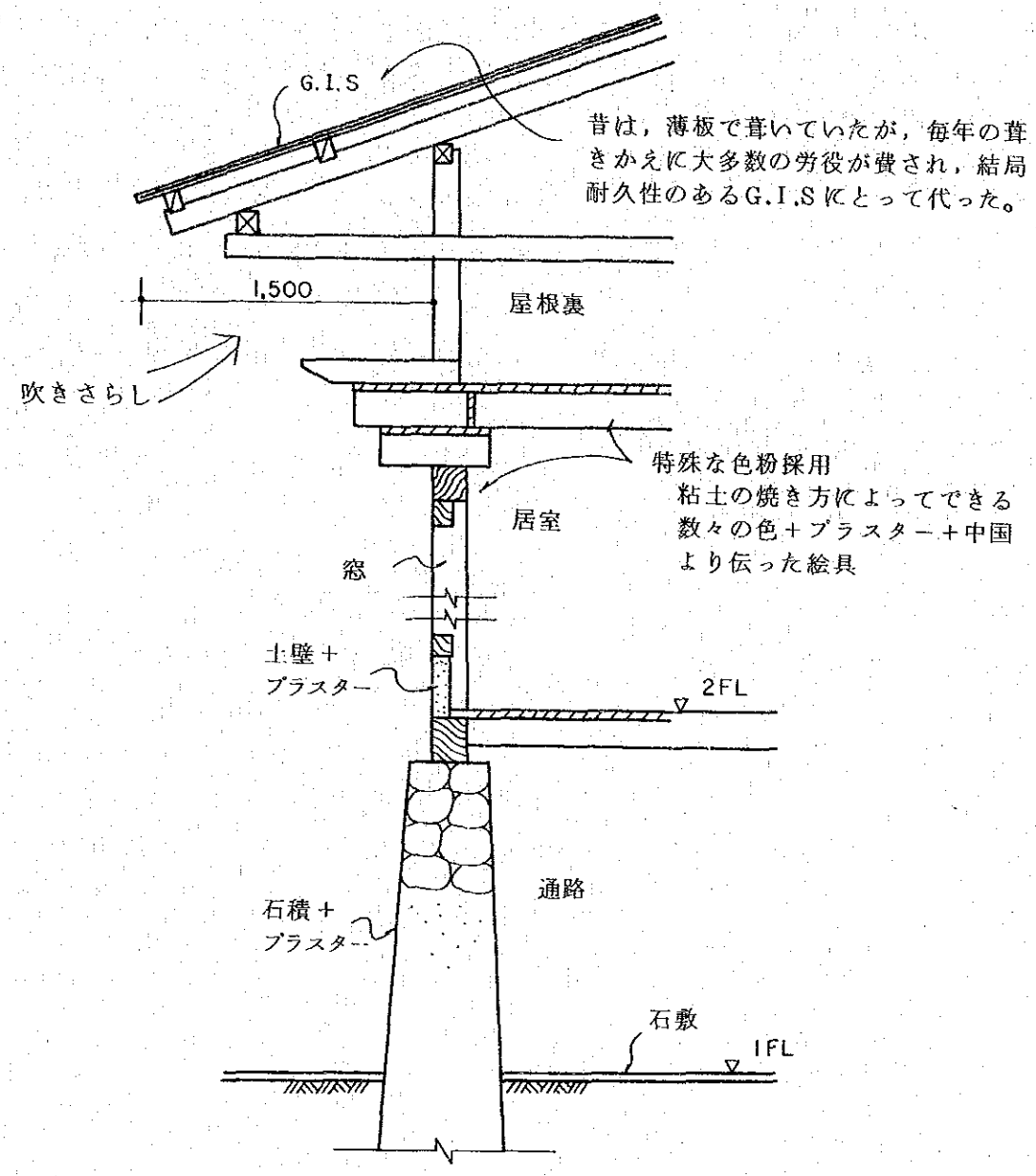


Fig. 2－2　城　砦　建　築

(2) 近代的様式 － アパート，学校，事務所，ホテル

最近，ブータン国内にセメント工場が建設され，普通ポルトランドセメントが，簡単に入手されるようになったため，建築工法にも変化があらわれはじめた。つまり，従来の土壁建築から鉄筋コンクリートや補強コンクリートブロック建築に移ってきたことである。これらの近代建築は，アパート，学校，事務所，ホテル建築などにみられる。さらに生活様式も座式から椅子式へと変化している。

また，これらの近代建築は，多くの建築施工業者（２－４参照）及び設計技術者を生み，ブータン建築の技術アップにおおいに貢献した。今日の近代建築の設計および監理は，開発省建設局を中心に行われている。

工事は，発電所やベニヤ工場などの大型プロジェクト以外は，ほとんど請負工事方式が採用されている。

2－2. 建築基準

ブータン建築の建設に関する法律は，インドの建築基準法に準じて起草されてはいるものの，未だ法律としての規制はなく，指針の段階である。以下に掲載された基準法の適要範囲は，ThimphuとParoの都市中心部のみである。

なお，この基準法が本中央センターの建設予定地に適要されないことは，すでに農業局を通じて確認済みである。

(1) LAW, CODE, STANDRAD, ETC.

1. Industrial standard : based upon (I.S. code)
2. Design code and standard for civil engineering : based upon (I.S. code, Ultimate strength design for R.C.C. & Semi rigid for steel)
3. Design code and standard for manufacturing materials : based upon (I.S. codes)
4. Condition of structure design
   a) Lateral seismic coefficient (applicable for the floor not less than 4 stories) : 0.08 (Seismic zone No V as per I.S. code 1893 - 1975.)
   b) Wind pressure : $q = 150\ kg/m^2$
   c) Compressive strength of concrete at 28 days : F_C= M150 = 150 kg/cm^2, M200 = 200 kg/cm^2, M250 = 250 kg/cm^2
   d) Tensile strength of ribbar : For Ultimate = 4250 kg/cm^2, Working = 2300 kg/cm^2
   e) Allowable tensile strength of structural steel : Ft = 1500 to 1600 kg/cm^2
5. Other conditions for
   a) Electric design : 3ø, 4W, 415V/240V, 50 cycle

(2) BHUTAN BUILDING RULES 1982

Under the provision of the functions of Central Town Planning Committee, the following rules are hereby notified: -

BUILDING RULES

These Rules shall be called the BHUTAN BUILDING RULES, 1982 and they shall come into force at once and shall apply to all the urban centres declared by C.T.P.C. from time to time.

PART I - Definitions

(i)	"Applicant'	shall mean a person who has applied in prescribed form to the Competent Authority for permission to erect/re-erect a building and shall include his authorised representative.
(ii)	'Balcony'	shall mean a cantilevered horizontal projection from the wall of a building not supported from the ground and having a railing and intended for human use.
(iii)	'Basement story	shall mean the story which is not below the ground story or which is any part more than half of the height below the main level of street for ground adjoining the building.
(iv)	'Building"	means any construction or a part of construction which is intended to be used for residential or other purposes, whether in actual use or not, and includes any out house stable, catteleshed, or a garage.
(v)	'Building line'	means regulatory line specified for each road, street or lane shown on the layout/zoning plan to define the portion in which a building or portion of a building may not be built except a compound wall.
(vi)	'Canopy"	means a horizontal or sloping projection from the outer wall of building primarily intended to give protection from weather.
(vii)	'Class of Building"	shall mean a building in one of the following categories: - (a) Residential building (b) Commercial building (c) Ware House, or Industrial building (d) Public building

(viii)	'Commercial building'	shall mean a building used or constructed or adapted to be wholly or principally for shops, offices, banks, cinemas or other similar commercial buildings.
(ix)	'Erection or re-erection'	shall mean any kind of building construction and shall include material alteration or enlargement of building.
(x)	'Factory'	shall include workshops, industrial, manufacturing, saw mill etc.
(xi)	'Front'	as applied to be a building shall mean the portion facing the main street and any other street from which it has access.
(xii)	'Ground floor'	shall mean the story which has its floor surface nearest to the ground around the building.
(xiii)	'Habitable room'	shall mean a room constructed or adapted to be used for living purposes and shall include a kitchen but not a bath room, water-closet or store-room.
(xiv)	'Height'	as applied to a building shall mean the vertical measurement of the building from the plinth height to half the height of room in case of sloping room and to the highest level of the building in the case of flat roofs.
(xv)	'Mazzanine floor'	shall mean a floor or a room or of rooms constructed within the height of a single story.
(xvi)	'Party wall'	shall mean a wall partly constructed on the plot of land and partly on adjoining plot and a common structure to both.
(xvii)	'Plinth level'	shall mean the level of the ground floor of a building and 'Plinth height' shall mean the height of the ground floor.
(xviii)	'Public building'	shall mean building used or constructed or adapted to be used; either ordinary or occasionally as a place of worship, or as hospital, college, school, club, theatre, public hall, public concert room, public exhibition, or public place or assembly or entertainment of persons or similar other public purposes.

(xix)	'Rear'	as applied to a building shall mean the portion which is on the opposite of 'Front'.
(xx)	'Registered Architect'	shall mean a person who on application, is registered as an Architect with the Central Town Planning Committee.
(xxi)	'Residential'	shall mean a building used or constructed or adapted to be used wholly or principally for human habitation and includes all garages, stables, cattle-sheds or any out house.
(xxii)	'Sewerage drain'	shall mean a drain for conveying solid or liquid filth and waste liquids, such conduit or pipe being the property of or vested in the Government or public authority responsible for the disposal of such sewerage.
(xxiii)	'Structural wall'	shall mean a load bearing wall or wall that carries load in addition to its own load.
(xxiv)	'Ware House and Industrial building'	shall include a factory, a workshop, a saw mill or repair motor garage.
(xxv)	'Water-borne sanitary installation'	shall mean any urinal, latrine water closet apparatus, bidet, slop sink, hospital sanitary fittings etc. from which the solid or liquid filth is intended to be discharged by flush of water and shall include all manholes, taps, gullies, soil pipes, waste pipes, ventilating pipes and drain connecting with sewers.
(xxvi)	'Zoning Plan'	shall mean the approved plan of the Central Town Planning Committee and kept in the office devining the layout of any site area, showing the street, the boundaries of building plots, open spaces, position of protected trees or other features such as specified land use, building lines, permissible heights of buildings, site coverage and such other restrictions on the development of land or building as may be prescribed.

PART - II

PROCEDURE FOR OBTAINING BUILDING PERMIT

1. BUILDING PERMIT: No person shall commence to erect any building without obtaining a building permit from the Executive Committee of C.T.P.C. in case of Thimphu City Corporation and Town Committees in case of other urban centres.

2. REGISTERED ARCHITECT: A Registered Architect shall be allowed to undertake the design of any building in Bhutan.

3. APPLICATION FOR BUILDING PERMIT: Every person who intends to erect or re-erect any building shall make an application in writing to the Competent Authority in a prescribed form alongwith the following drawings: -

(i) Site plan showing the position of building in the plot, the boundaries of the plot, the streets or roads adjoining the site alongwith the directions of North Point, drawn at a scale of 1/16 inch to a foot.

(ii) Plans, elevations and sections including the details of sizes of doors, windows, openings and other methods of ventilation and details of toilet and kitchen etc.

(iii) Drainage plans, engineering drawings as required.

Note:- The plan shall be drawn to scale not less than 1/8 of an inch to a feet and shall be only signed by the applicant and the Registered Architect or the Government Architect, who ever has prepared them.

4. GOVT. TYPE DESIGNS: If the applicant wishes to follow the type design for residential houses prepared by the Executive Committee, he may obtain the same at a fixed fee from the Office of the Ex. Committee.

5. OWNERSHIP TITLE: (i) Every application for building permit shall be accompanied by proof of ownership of the land, viz. attested copy of the registration of land or sale/lease deed or any other document acceptable to the Authority.

(ii) Building Permit fee - The scale of fees for building permit shall be as decided by the Authority from time to time.

6. PERMISSION TO OCCUPY: No person shall occupy a building before obtaining permission from the City Corporation/Town Committee. The application for occupation shall be made in a prescribed form.

PART - III

PLANNING & ARCHITECTURE CONTROL

7. RESTRICTION OF ZONING PLAN & ARCHITECTURE CONTROL SHEETS: The erection or re-erection of every building shall conform to the restriction of the Zoning Plan and the Architectural control.

8. SITE COVERAGE: The Site Coverage shall be according to the following slabs in case of residential buildings: -

First Two hundred sq.yards - Sixty percent

Next Two hundred sq.yards - Forty percent

Next Two hundred sq.yards - Thirty percent

Next Two hundred sq.yards or above. - Twenty five percent

Note:-
1. The cantilevered projections and balconies upto Six feet can be provided over and above.
2. A building constructed exclusively for a plant house upto 100 sq.ft. of floor area would be extra.
3. In case of the buildings, the site-coverage would be according to the provisions of the Zoning plan/Architectural control stipulated in each case by the Competent Authority to issue the permit.

9. PROVISION OF KITCHEN BATH & W.C.:

(i) Each residential unit for the use of family shall in addition to a living room/rooms shall at least be provided with: -
   (a) One kitchen
   (b) One bath room
   (c) One water closet

(ii) Where a residential building is intended for use of more than one family such as block of flats, the above requirements shall be repeated for every one residential unit.

(iii) Where community kitchens, bath rooms, W.Cs. are to be provided in a public building or a hotel, the standard of bath rooms and W.Cs. shall be regulated as per specified standards.

10. FLOOR SPACE OF HABITABLE & OTHER ROOMS:

a) The minimum size of habitable room excluding kitchen shall be 100 sq.ft. floor space and a width not less than 8' - 0" for every three rooms of the floor of 100 sq.ft. one habitable room of 60 Sft. floor space can be provided.
b) The minimum kitchen area shall be 40 Sft.floor space.
c) The minimum size of a water closet shall not be less than 14' -0" sft. and width not less than 3' -0".
d) The minimum size of a bath room shall not be less than 20 sft. floor space.
e) The minimum size of a toilet i.e.a water closet shall not be less than 14 sft. and a width not less than 30 sft. of floor space.

11. HEIGHT OF ROOMS:

a) No habitable room shall be of less than 8' -6" height in case of Northern Bhutan and less than 9' -0" in case of Southern Bhutan, the height being measured from floor to ceiling.
b) The floor to ceiling height of a water closet, a bath room and store shall not be less than 7'-6".
c) The height of mezzaning floor measured from floor to ceiling, with respect to any of the main floors, shall not be less than 7'-6". (2.28 metres).

12. LIGHT & VENTILATION REQUIREMENTS:

i) Habitable room.
A habitable room shall be provided for the purposes of light and ventilation, with windows, french windows clerestery windows, doors and other appertures having a total openable are which shall not be less than one sixth of the floor area.

The openings shall open directly on to a space at least 3.5 metres (10 ft.) wide which is itself faced to the sky or on to a varanda or clear heihgt not less than 2.28 metres (7'-6" opening on such a space.) The total openable area of all the opening shall not be less than 2.73 sq.metres (30 sq.ft.)

Note-1 If a window is partly fixed and partly openable only the latter area will be counted for the above purpose.

Note-2 No portion of a room shall be assumed to be lighted if it is more than 7.5 metres (24'-0") from the door or window which is taken for calculation as ventilating that portion.

ii) Kitchen.

A kitchen shall be provided with a smoke flue and ventilation through windows, ventilator having a minimum area equal to 1/6th of the floor area of the kitchen. A kitchen situated in a verandah adjoining an open space can be ventilated by a window at least .55 sq.metres (6 sq.ft.) in area and ventilator at least 0.64 sq.metres (100 sq.inches).

iii) Water Closet Room.

The water closet room located against the outside wall shall be provided with an opening or a glazed window not less than 0.186 sq.metres (2 sq. ft.) in area (inclusive of the frame) for lighting and a permanent ventilator of at least 80 sq.inches (0.052 metres) as per the top as practicable communicating directly with the external air.

a) In case of area, where natural ventilation is not available, mechanical ventilation shall be provided under special circumstances. Such system should be of sufficient capacity to exhaust at least 1.15 cub. metres (40 cubic ft.) of air per minute per water closet and per urinal for public toilet rooms and at least 0.73 C.M. (25 C.ft.) per minute per private exhaust.

b) It shall not be permissible to use pipe shafts as ventilating shafts and separate vent shaft shall be provided for exhaust.

c) In lavatories attached to shcools, offices, factories and public buildings where windows cannot be provided, the partition and doors of W.C. compartment shall be 15 cm. (6") clear from the floor and shall terminate 30 cm (12") below the ceiling level.

iv) Store rooms and the like:
A store room shall have ventilation through windows, ventilators or other appertures the area of which shall not be less than 1/12th of the floor area of the site and such openings and appertures may be provided inhabitable passage or verandah.

v) Basement story
Basement story shall be lit and ventilated by means of windows of a minimum area 1/8th of the total floor area; at least possible mechanical means of ventilation shall be provided sufficient to give three air changes per hour.

vi) A stair-case shall be adequately ventilated and lit to the satisfaction of the Authority to permit.

13. BASEMENT STORY

a) Basement shall be permitted on any site expressively restricted in the Zoning Plan/Architectural control sheet provided that:-

i) The basement shall not be constructed under public verandah.

ii) The basement story shall not be used for residential purpose.

iii) No external apperture to a basement shall be in a position that any extraneous water has access thereto.

14. CATTLE SHED:

i) A cattle shed shall be at least 40'-0" away from the bed rooms and living room.

ii) Such a shed shall not be provided in a plot of size less than 10,000 sq.ft.

15. ADVERTISEMENT STAND AND STRUCTURE:

No structure shall be constructed to carry an advertisement except in the manner prescribed by the C.T.P.C. or the Officer authorised for this purpose.

16. NUMBER OF BUILDINGS: Each building shall bear a number in accordance with a Numbering Plan of Area/Town approved by the Honourable Chairman, Municipal Corporation and shall bear no other number.

17. DUST BIN: Every house shall have a dust bin for collection of garbage and if the Owner fails to do so, the same shall be provided by the Corporation and the charges as fixed by the chairman shall be payable by the Owner.

PART - IV

STRUCTURAL CONTROL

18. MATERIAL FOR WALL, PIERS/COLUMNS: (INCLUDING STRUCTURAL AND PARTY WALLS) Walls and piers/columns mentioned in the margin shall or blocks properly bonded and solidly out together with mortar or other good hard and suitable non-combustible materials such as iron or steel framing encases in concrete or reinforced cement concrete.

19. HOLLOW BRICK AND BLOCK WALLS: Where any all or any part of wall is constructed as a hollow wall:-

1) The minimum thickness of each leaf to cavity shall not be less than 7.5 cm. (3").
2) Where the outer leaf is half masonry unit in thickness the uninterrupted height shall be limited so as to avoid undue losening of ties due to differential movements between two leafs. The outer leaf shall therefore, be separated at least at every third story or at every 10 mtr. (33 ft.) of height whichever is less and every 10 meters (39 ft.) or less along the length.
3) The cavity between inner and outer parts of wall shall through out be of a width not exceeding 7.5 cm. (3").
4) The structural design shall be governed by the provisions 47 to 59.

20. DAMP PROOF COURSE: Every wall of a public building or domestic (including a pier forming a part of the wall or compound wall) shall be provided with a damp-proof course, except, when built of materials such as cement concrete of suitable proportion 1:2:4 with or without the addition of any commercial damp proofing material.

21. PROTECTION FROM MOISTURE FROM THE TOP: Where a wall is carried up above a roof so as to form a parapet it shall be properly coped or otherwise protected by means of a damp proof course to prevent water from running down the sides of the parapet or soaking into any wall.

22. WALLS, COLUMNS, SLABS AND OTHER ELEMENTS: The walls, columns, slabs and other elements of structural design shall be according to the coded and specifications adopted by the P.W.D. and in case of public buildings like Cinema etc. the structural drawing/drawings of the buildings shall have to be get authentification by the Executive Engineer, Public Works Department of the area.

23. FLOORS, ROOFS AND STAIRCASE: Every kitchen and fire place shall have a floor of concrete or similar fire proof material and shall be provided with a properly designed flue or Chimni. Under any Chimni opening to timber shall be within 15" and its height above the roof shall be at least 1'-6".

SECTION - IV

FLOORS, ROOFS, STAIRS & GENERAL

24. FLOORS:

1) All floors laid on ground shall be so constructed as to prevent damp raising by capillary action into the floor.

2) Every kitchen, latrine, urinal, bath room floors having top surface either of cement concrete 38 cm.($1^1/_2$") thick cement concrete 1:2:4 under topy layer of 6 cm. ($1=^1/_4$") thick one part of cement and $1^1/_2$ part of marble chipping by volume.

3) The floors and walls of every closet upto a height of not less than 50 cm (2 ft.) above the floors shall be cement plastered or finished in an impervious material.

25. ROOFS:

The roof of a building shall be so constructed as to be fire-resisting, rat-proof, weather-proof and shall be externally covered with a non-erodable material.

26. STAIRCASE, RESIDENTIAL BUILDINGS, SINGLE-FAMILY OR TWO FAMILY RESIDENTIAL BUILDINGS:

Every building more than one story high intended to be used as single-family or two family residential building shall be provided with at least one staircase having width 90 cm. (3') constructed of fire-resisting materials. However, the minimum width can be reduced to 75 cm (2'-6") in case if single family buildings.

Every building intended to be used as residential building for more than two families or a commercial building shall be provided with at least one staircase extended from ground floor level to the highest floor having minimun clear width in accordance with the following table;-

a) Number of users upto 10 (0.9M) 3'-0"
b) Number of users from 11 to 20 (1.0M) 3'-6"
c) Number of users from 21 to 100 (1.25M) 4'-0"
d) Increase (25 mm) 1" for every additional 15 persons until a maximum of 3.0M)9' is reached.

A single staircase of the width mentioned above may be replaced by two staircase each of a width at least equal to two-thirds the width prescribed for a single staircase provided neither of the two substituted staircase be less than (1.0 M) 3'-6" in which. Staircase so provided shall be built in fire resisting materials.

EXPLANATION:

For the purpose of this rule each 30 sq.ft. (3 sq. meters) of living floor space shall be deemed to be occupied by one person. While calculating living floor space, areas under bath, W.C., toilet, passage, verandah, stores and corridors shall be excluded.

27. MINIMUM DIMENSION OF STEPS:

No staircase in residential building shall have a rise more than 30.3 cm (8") and a tread of net less than 22.8 cm. (9").

28. STAIRCASE PUBLIC BUILDING AND WAREHOUSE AND INDUSTRIAL BUILDINGS:

No staircase in an educational, cultural, religious building or a warehouse and industrial building shall be of a width less than given below:-

a) Number of users upto 200 (1.4 mtrs.) 4'-0"
b) Number of users from 200 to 350 (1.8 mtrs.) 6'-0"
c) Increase by (25 mm) 1" for every additional 15 persons until a maximum of (3 Meters) 9' is reached.

A single staircase of the width mentioned in(c) above may be replaced by two staircase each of a width at least (1.8 meters) 6 feet.

Notwithstanding the above, the staircase private portions of educational, cultural, religious and public buildings or warehouse or industrial buildings on open to the general public may be of the size and material mentioned in rule 26.

No staircase in a public building or a warehouse and industrial building shall have a rise of more than 15 cm (6") and a tread of not less than 30 cm (12").

29. LOCATION OF STAIRCASE:

No part of the second or any higher story of any building shall be more than 30 meters (100'-0") from some staircase of ramp leading to the ground floor.

In every staircase atleast one hand rail shall be provided.

30. RULES FOR CHHAJJAS AND JHAMPS PROJECTING OVER PUBLIC:

No Chhajjas or Jhamps shall be allowed to project over the matalled portion of any road. They may be allowed to project over the pavement to a distance specified on the zoning map/control sheets/frame central sheets of the area, provided and an agreement on the prescribed form has been executed. The minimum clear head room under Chajjas or Jhamps shall be at least 2.1 m. (6'-9") measured from the top of the pavement to the most dependent portion.

31. RESPONSIBILITY FOR QUALITY AND WORKMANSHIP:

The person who applied for permission to erect or re-erect a building under Rule 7 shall be responsible for ensuring that all the building materials used in the building are sound, of good quality and properly but together and that the building is structurally stable.

PART - V

DRAINAGE CONTROL

SECTION I DRAINAGE

32. APPLICATIONS:

All premises shall be provided with suitable drainage, conforming to these rules in every way and connected to the city drainage in manner laid down in these rules.

The discharge of water from private/ government and industrial property into city sewer or any other disposal system shall be regulated and governed by the regulations of Municipal Corporations.

33. PROVISION OF GREASE PETROL AND OIL TRAPS:

Waste from the following fixtures or areas shall first be discharged into an approved apparatus for retaining objectionable matter.

Grease shall be fixed outside buildings or out buildings wherever practicable. Wherever a grease trap is used inside a building or out-building, it shall, where not readily accessible for removal of grease be so constructed and fitted as to be easily portable.

Non portable grease traps shall be constructed of glazed stoneware, brick in cement as per P.W.D. specifications.

Portable grease traps shall be constructed of stoneware, glazed earthern ware or other approved materials. The outlet from the grease trap shall be connected to drainage system through an interceptor trap.

The occupier of any property in which grease trap is fixed shall cleanse and maintain such grease trap so that it operates efficiently at all times and does not cause a nuisance.

34. ROOF AND SITE DRAINAGE:

The roof of the building (whether flat or sloping) shall be constructed so as to drain effectually to suitable and sufficient quarters, chutes or troughs which shall be provided for receiving and conveying all rains water that may fall on the roof. Such quarters, chutes or throughs shall be connected to a sufficient number of suitable down pipes so as to carry away all such water without causing dampeness in any part of the building or any adjacent buildings. Spout for discharge of rain water from the roof may be used, provided the water from such spout falls within the applicants' property.

35. NUMBER OF WATER CLOSETS:

Number of water closets in residential bldgs.

Every single family residential building shall be provided with not less than on water closet for every ten bed-rooms, whenever a bed-room is attached to private water closet rooms such room and such fixtures shall not be considered in the computation of the required number fixtures.

Every commercial and warehouse and industrial building shall be provided with water closet in accordance with the requirements of the table given below:-

No. of persons working or living in the building.	Minimum number of water closets,	Minimum number of lavatories or sinks.
1 to 9	1	1
10 to 24	2	2
25 to 49	3	3
50 to 100	5	5
Over 100	One water closet for each additional persons.	

Public Buildings:

a) In every school or college building, there shall be provided not less than one water closet for every twenty persons to be accommodated.
b) In every other public building, there shall be provided not less than one water closet for every one hundred and fifty persons to be accommodated.

Receptacle:

a) A water closet constructed in connection with a building shall comply with the following requirements:-
The pan, basin or other receptacle (hereinafter in this rule called 'the pan') shall be of non-absorbent material so constructed and fitted as to receive and contain, sufficient water and to allow any filth to fall free of the sites directly into the water. The Indian Type Plan may be without pool of water. In such cases special cisterns for flushing each pan shall be employed.

b) An efficient syphen trap with a minimum water seal of 3 inches immediately beneath or in connection with such pan so that sufficient water between the pan and drain or soil pipe is maintained.
'D' Trap shall not be fixed in connection with the water closet.

c) For the effectual flushing and cleaning of the pan, a special closed cistern with suitable ball cock and of not less than 5 gallons capacity shall be provided.

36. COMMUNICATION WITH SUPPLY PIPE:

No part of the water closet apparatus shall be directly connected with a water supply distributing pipe.

37. STORAGE TANK:

The Storage Tank shall be provided in every building to ensure 24 hours supply to toilets. The storage capacities shall be as follows:-

FLUSHING STORAGE CAPACITIES

Sl.No.	Classification of buildings.	Storage Capacities
i)	For tenements having common conveniences.	800 litres (175 gallons) net per W.C. seat.
ii)	For residential premises other than tenements having common conveniences.	270 litres (60 gallons) net one W.C. seat and 180 Litres (40 gallons) for each additional seat in the same flat.
iii)	For factories and workshops.	99 Litres (200 gallons) per W.C. seat and 180 litres (40 gallons) per urinal seat.

38. CONNECTION WITH SEWER AND USE OF SANITARY INSTALLATION: No connection of any drain to any sewer or storm water drain shall be made. No waterborne sanitary or drainage installation or any part thereof be taken into use until and unless a certificate has been issued by the Municipal Corporation/ Municipal Board that the said water borne sanitary or drainage installation as a whole, has been satisfactorily completed in compliance with the rules. The said sanitary installation wherever provided can be considered as complete only when these sanitary installation can be put the use on occupation of the building or portion of the building.

39. CARRYING OUT WORKS: All works required to be done for the installation or repair of sanitary fittings shall be entrusted to licensed plumbers only.

40. OBLIGATION OF A LICENSED PLUMBER: It shall be obligatory on the part of every licensee to ensure in reforming any work of water supply, sewer or drainage that he:-

i) Execute the work in accordance with the provisions of the rules and any special directions or orders given or issued there under by the Municipal Corporation/from time to time.

ii) Executes the work in a thorough and expeditious manner; and

iii) Uses materials of good quality only and free from defects; and

iv) Employs only competent operators and assistants; and

v) Obtains permission, whre necessary, for the execution of the work on over or through any private property, or any street, road part reserve or other public place or property; and

vi) Pays all fees payable to the Municipal Corporation for opening any public road street otherwise in connection with the work; and

vii) Restores upon completion of the work any part or any public road or street interfered with by the work to the satisfaction of the authority having control thereof; and

viii) Except where authorised in writing by the owner or his agent to omit restoration, restores any other property interfered with the work; and

ix) Takes all proper and necessary precautions so that no accident, damage or unnecessary inconvenience may be directly or indirectly occasioned by the execution of the work; and

x) Exercises at all times immediate supervision over the work.

In case of default, he will render himself liable for action as deemed fit by the City Corporation/Town Committees.

41. MULTISTOREYED BUILDING: CONNECTION AND DISCONNECTION OF HOUSE REFUSE:

Every person who erects or re-erects or occupies a multistoreyed building shall be made adequate arrangements for disposal of garbage.

In case of multistoreyed building (over three storeys) every person who erects or occupies them shall make adequate arrangements for the disposal of garbage.

i) The garbage chute shall be circulat, not less than 375 mm. (15 inches) dia and made of Asbestas Cement or R.C.C. or a stone ware. It shall be fitted vertically without any bends. The garbage chute shall be properly ventilated and shall consist of a 150 mm (6 inches) including A.C. pipe laid in continuation of the main chute at the top and raising to about 6' (1.83 M) above the roof of the terrace of the building. The vent pipe shall be provided with a cowl to prevent rainfall and other nuisance. To mitigate smell nuisance, exhaust fall shall, it needed be provided just below the cowl.

ii) The inlet hopper shall minimum dia of 12" (300 mm) and sloping at 60 degrees to the horizontal. It shall be located from the point of view of the convenience of the resident of the building. The minimum height of the inlet hopper shall be 3' (0.90 m.)

iii) The sizes of collection capacity chamber will be governed by the number of appetuance served and are given in the table below.
A minimum storage capacity of 2 cfm (70 Cft)/ family or appertuances shall be provided. The location of the collecting chamber shall be fixed keeping inview the convenience of sweepers serving it.

The chamber shall be constructed of sound material and shall have a smooth finish to facilitate washing and maintaining it clean. A gully trap and sewer connection there from shall be provided.

iv) Adequate flushing arrangements shall be made for flushing of the shaft.

PART - VI

ADMINISTRATIVE CONTROL

42. POWERS OF C.T.P.C. TO SANCTION OR RE-ERECTION OF BUILDINGS:

The Competent Authority shall refuse to sanction the erection or re-erection of any building in contravention of any of these rules, provided that the C.T.P.C. shall have the authority to modify or waive upon terms and conditions as thought fit, any requirements of any of the rules provided further that applications for such waivers are made to the Authority in writing and accompany the application to erect or re-erect under Rule 3.

43. LAPSE OF SANCTION AFTER ONE YEAR FROM THE DATE OF SUCH SANCTIONS:

Every sanction for the erection or re-erection of any building which shall be given by the Competent Authority shall remain in force for one year only from the date of such sanction or for such longer period as the C.T.P.C. may allow under Rule 42. Should the erection or re-erection of the building have not been commenced within one year and completed within two years or such longer period as C.T.P.C., the sanction shall be deemed to ahve lapsed, but such lapse shall not bar any subsequent application for fresh sanction under the foregoing provisions of the rules.

44. ANY OTHER RULE:	The Authority may bring and add any other Rule for efficient administratives of these Rules.

ROYAL GOVERNMENT OF BHUTAN

NOTICE INVITING TENDERS

Sealed tenders are hereby invited for the work .....
.....
.....
so as to reach the undersigned by 18.00 Hrs on .....The tenders shall be opened in the presence of intending contractors, in the office of the undersigned, on the same date at 15.15 Hrs.

The estimated cost of the work is Nu ..... The time for completion of the work shall be ..... and shall be reckoned from the tenth day after issue of acceptance letter.

The tender documents containing detailed terms and conditions, schedule of quantities, list of materials to be issued departmentally, clauses of the agreement etc. can be purchassed from the office of the undersigned on cash payment of Nu. 5/- (Ngultrum five) only upto 12.00 Hrs. on the same date. The sale of tender documents will start immediately on issue of this notice inviting tenders. Contractors are advised to submit their application for issue of the tenders documents alongwith Nu. 5/- at the earliest so that they get proper time for detailed study of tender documents and submitting proper tender duly completed in all respects.

Earnest money of Nu..... must accompany the each tender, in the manner prescribed in terms and conditions. The tenders not accompanied by earnest money or otherwise not confirming to terms of conditions of tender documents shall be rejected without assigning any reason. The decision of Director, PWD shall be final in this respect.

Executive Engineer

For and on behalf of His Majesty's
Royal Govt. of Bhutan

Copy to: -

1. All the Contractors enlisted with Director, PWD, Thimphu.
2. Director, PWD, Thimphu.
3. All Executive Engineers, Under Bhutan P.W.D. for vide publicity.
4. All Asstt. Engineers, Under Bhutan P.W.D.
5. Notice Board.
6. Spares copies for tender documents & agreements.

Executive Engineer

Issued to: -

1. Name : -
2. Date : -
3. Cost of tender documents realized : - Nu. 5/-

Executive Engineer

.....

.....

FORM 'A'

Name of work: .....

Estimated cost Nu .....

I offer to do the following items at rates mentioned against each. The rates will hold good even if individual item exceed in quantity upto a maximum of 50%.

SCHEDULE OF QUANTITIES

Sl. No.	Nome of items	Qty.	Unit	Rate		Amt.	Remarks
				In fig.	In wores		
1	2	3	4	5 (i)	5 (ii)	6	7

* Column = 5 & 6 to be filled in by the Tender.

Total .....

I hereby undertake to execute the above work for His Majesty's Royal Govt. of Bhutan at my tendered rates quoted above. The agreement clauses have been gone through by me and I undertake to abide by all necessary provisions covered therein.

Signed in presence of (Contractor)

(1) Witness .....Dated the .....Firm .....

Address .....Day of .....

(2) Witness .....

Adress .....Place .....

ACCEPTANCE OF TENDER

The above tender alongwith the other provisions incorporated in agreement is accepted by me on behalf of His Majesty's Govt. of Bhutan.

Executive Engineer

Dated, the ..... day of 79

For & on behalf of

His Majesty's Government of Bhutan.

TERMS & CONDITIONS

(i) The Ex. Engineer or Director PWD do not bind themselves to accept the lowest or any particular tender. They shall have a liberty to reject any or all tenders without assigning any reason.

(ii) In the event of the tender being submitted by a firm,it shall invariable be signed by each parther/authorised partner thereof.

(iii) Earnest money @2-1/2% of the estimated cost shall,as per the provisions under the notice inviting tender be deposited either in cash at the time of submitting the tender or through Bank Draft on Bank of Bhutan payable to the name of the Executive Engineer of the Division to whom the work pertains.

(iv) Soon after the acceptance of tender, the tenderer shall be asked to enter into agreement with the Executive Engineer and he shall be bound by the clauses of the agreement in respect of all aspects of the work covered therein.

(v) The earnest money of the unsuccessful tenders will be refunded on obtaining clearance from Director, P.W.D., Thimphu.

(vi) The Tenders shall be valid for 90 days (ninety day) for acceptance by the department. If any contractor withdraws his offer before acceptance of any tender by the department his earnest money will be forfeited.

(vii) The schedule of quantities Form 'A' is enclosed and must be filled in carefully by the contractors before submitting their tenders. It should be signed by them at the appropriate place. Any correction/overwritings made by contractors before submitting the tender should also be signed by them.

(viii) Materials stipulated for issue by the department and conditions etc. are incorporated in Annexure-I.

(ix) Drawings/Plans of this work can be seen in the office of the undersigned during office hours on any day.

Signature of Contractor

Executive Engineer

.....

.....

for and on behalf of His Majesty's

Royal Govt. of Bhutan.

ANNEXURE - I

Materials to be issued by the Govt. to the Contractor.

Sl. No.	PARTICULARS OF MATERIALS	RATES AT WHICH THE MATERIAL WILL BE CHARGED TO THE.		PLACE OF DELIVERY
		Unit.	Nu. Ch.	

NOTE: - (i) The person or firm submitting the tender should see that the rates in the above schedule are filled by the Engineer-in-charge on the issue of the form prior to the submission of the tender.

(ii) In case the department is not in a position to supply the above listed materials, at any particular time, due to unforessen reasons, the contractor may purchase the same from market at his own cost provided:-

(a) A written permission to this effect is obtained by the contractor before hand.

(b) Nothing extra shall be claimed by the Contractor or this account.

(c) Sample of such materials proposed to be purchased from market it got approved from the Engineer-in-Charge.

(iii) The materials issued to the contract from P.W.D stores and after use if found excess on theoretical consumption basis the materials to be returned to the department by the contractor in good condition failing which the cost shall be recovered in double rate from the contractor's bill.

Signature of the Contractor.

Executive Engineer,
.....
.....
for and on Behalf of His Majesty's Govt. of Bhutan.

CLAUSE I (Security Deposit)

The person/firm whose tender(s) may be accepted (herein after called the contractor) shall permit Government at the time of making any payment to him for works done under the contract to deduct security deposit at the following rates, less the sum already deposited as earnest money.

i. 10% of the estimated cost up to tender for works costing up to one lakh.

ii. For works costing more than Nu. one lakh and up to two lakhs 10% on the first Nu. 1,00,000/- and 7-1/2% on the balance, and

iii. For works costing more than Nu. 2,00,000/- 10% on the first Nu. 1,00,000/- 7-1/2% on the next Rs. 1,00,000/- and 5% on the balance.

The security deposit shall be collected from the running bills of the contractor at the rates mentioned above and the earnest money if deposited in cash at the time of tenders will be treated as part of the security deposit.

The refund of security deposit to the contractor shall be made in accordance with the following precedure:-

(i) Subject to the Engineer-In-Charge recording a Certificate regarding satisfactory completion of the job, for works costing up to Nu. 1,00,000/- Security Deposit shall be refund to the Contractor after 3 months of the completion of the works and for works costing more than Nu. 1,00,000/- the refund of Security Deposit shall be made after 6 months from the date of the completion of the work.

(ii) The period of 3 months and 6 months referred to above are to be treated as "Defect liability" periods. If any construction defect in the work is noticed and brought to the knowledge of contractor during this period, the contractor shall have to make good the same, by employing his own resources. If he fails to do so all such defects will be made rectified by the Engineer-In-Charge or other person authorised by him and the cost of rectification of the defect will be recovered from the Contractor.

CLAUSE II (Extension of Time)

The time allowed for carrying out the work as entered in the tender shall be strictly observed by the contractor and shall deemed to be of the essence of the contract on the part of the contractor and shall be reckoned from the tenth day after the date on which the written order to commence the work is issued to the Contractor. The progress of work should be in proportion to the time that elapse from the date of the commencement of the work. If the contractor does not show reasonable progress of work in proportion to the time elapsed since commencement of work and he fails to start the work the Engineer-in-charge shall be at liberty to cancel his contract and forefeit the earnest money and levy such compensation limited to 10% of agreement amount as he may decide and the contractor shall not have any claim for the refund of that. In case of dispute regarding the levy of compensation or forefeiture of earnest money the decision of the Director, PWD, Thimphu shall be final and binding on both parties.

If, however, the contractor shall desire and extension of time for completion of the work on the grounds that he was unavoidably hindered in its execution of the work, he shall apply in writing to the Executive Engineer within 30 days of the date of hinderance on account of which he desires such extension as aforesaid, and the Engineer-in-charge shall, if in his opinion (which shall be final) resonable grounds be shown thereafter, authorise such extension of time, if any, as may in his opinion be necessary or proper.

CLAUSE III (Stores supplied by the Government)

If the specification or schedule of items provides for the use of any special description of materials to be supplied from Engineer-in-Charge's stores, if it is required that the contractor shall use certain Stores to be provided by the Engineer-in-Charge as shown in the schedule of materials hereto annexed, the contractor shall be bound to procure and shall be supplied such materials and stores available from time to time required to be used by him for the purpose of the contract only, and the value of the full quantity of materials and Stores so supplied at the rates specified in the said schedule of materials may be set off or deducted from any sums them due, or thereafter to become due to the contractor under the contract, or otherwise or from the security deposit, or the proceeds of sale thereof if the same is held in Government Securities, the same or a sufficient portion thereof being in this case sole for the purpose. All materials so supplied to the Contractor shall remain the asbolute property of Government and shall not be removed on any account from the site of the work, and shall be at all times open to inspection by the Engineer-in-Charge. Any such materials remaining unused and in perfectly good condition at the time of the completion or determination of the contract shall be returned to the Engineer-in-Charge at a place directed by him, if by a notice in writing under his hand he shall so require, but the contractor shall not be entitled to return any such materials unless such consent is given to him and have no claim for compensation on account of any such materials so

supplied to him as aforesaid not being used by him or for any wastage in or damage to any such materials. Provided that the contractor shall in no case be entitled to any compensation or damages on account of any delay in supply or non-supply thereof of all or any such materials and stores. Notes below annexure-I must be read by the contractors carefully.

CLAUSE IV (Measurements)

Before recording measurement of the work, the Engineer-in-Charge or the representative deputed by him shall give reasonable notice to the Contractor. If the contractor fails to attend the recording of measurements, even after such a notice or fails to countersign or to record the difference within a week from the date of measurements, the measurements recorded shall be treated as final and binding on the contractor. The contractor shall have no right to dispute the same.

CLUASE V (Removal of Sub-Standard materials)

The Engineer-in-Charge shall have full powers regarding removal from the premises of all materials, which in his opinion are not in accordance with the specification and in case of default, he will be at liberty to emply other persons to remove the same, without being answerable or acco-untable for any loss or damage, that may happen or arise to such materials. The cost so incurred on the removal of such materials, shall be recoerable from the Contractor. The Contractor shall treat all materials during dismantling of a structure, execavation of the site, for a work etc. as Govt. property and such materials shall be disposed of to the best advantage of the Govt. in accordance with the instructions, issued in writing by the Engineer-in-Charge.

CLAUSE VI (Inspection of work by Departmental officers)

All works during execution or executed in pursuance of the contract shall, at all times be open to inspection by the Engineer-in-Charge, or his superior officers, or even his authorised subordiates, and the contractor shall, at all times, during the usual working hours, and at all other times at which reasonable notice of the intention of Engineer-in-Charge, or his subordinate to visit the work, shall have to given to the Contractor, either himself be present to receive orders and instructions or have a responsible agent, duly authorised in writing, be present for that purpose. Orders given to the contractor's agent shall be considered to have the same force, as if they had been given to the contractor himself.

CLAUSE VII (Alterations additions in specification works)

The Engineer-in-Charge shall have power to make any alterations, additions to or substitutions for the original specifications, drawings, designs and instructions, that may appear to him to be necessary during the progress of the work, and the contractor shall carry out the work in accordance with any instructions which may be given to him on writings signed by the Engineer-in-Charge, and such alterations, omissions, additions, or substitutions shall not invalidate the contract and any altered, additional or substituted work which the contractor may be directed to do the manner above specified as part same conditions in all respects on which he agreed to do the main work. The time for the completion of the owrk shall be extended in the proportion that the altered, additional or substituted work bears to the original contract work. The rates for such additional, altered or substituted work under this clause shall be worked out in accordance with the following provisions in their respective orders.

i) If the rates for the additional, altered or substituted work are specified in the contract for the work, the contractor is bound to carry out the additional, altered or substituted work at the same rates as are specified in the contract for the work.

ii) If the rates for the additional, altered or substituted work are not specifically provided in the contract for the work, the rates will be derived from the rates for a similar class of work as are specified in the contract for the work.

iii) If the altered, additional or substituted work included any work for which no rate is specified in the contract for the work or cannot be derived from the similar class of work in the contract, then such work shall be carried out at the rates entered in B.S.R. 1976 for minus/plus percentage which the total tendered amount bears to be estimated cost of the entire work put to tender.

iv) If the rates for the altered, additional or substituted work cannot be determined in the manner specified in clause (I) to (III) above, then the rates for such work shall be determined by the Engineer-in-Charge on the basis of the prevailing market rates when the work was one. The decision of Director, PWD, Thimphu shall be final in this respect.

CLAUSE VIII

The contractor shall supply and provide at his own cost all materials (excluding those to be stipulated for use by the department), plants tools, appliances, implements, ladders, tackles Scaffoldings and temporary work required for proper execution of the work, whether original, altered or subsituted and whether included in the specification or other documents forming part of the contract or not, and which may be necessary for the purpose of satisfying or complying the requirement of the work as decided by the Engineer-in-Charge.

CLAUSE IX (Labour clause)

No labourers below the age of 14 years shall be employed by Contractor on the work. In respect of all labour employed on works by the contractor, the contractor shall comply with all rules formed by the Govt. The contractor shall at his own cost provide his labour with sufficient number of huts, on a suitable plot of land approved by the Engineer-in-Charge, keeping in view all the municipal by laws. The labour camp areas shall be neat and tidy and suitably lighted to avoid accidents to workers. The Engineer-in-Charge shall have full powers in pressing upon the contractor to remove from the site of work any person in contractor's employment, who may be incompetent or misconducts and the contractor shall comply with such instructions. The labour, required for the work shall be employed with by the contractor at his own cost, shall be on the strength on P.W.D. as far as formalities from department of manpower are concerned. If any labour runs way during the execution of work for whatever reason the contractor is required to inform the Engineer-in-Charge under intimation to department of Registration.

If any fine is imposed on labour or its employer under relevant rules of Bhutan Government, the same shall be borne by the contractor. Any compensation, whether for accident or death of labour, shall be paid by the contractor to the labour or his next of kins.

The labour arranged for the work by the contractor, on PWD, strength, shall be released by him soon after completion of work under the contract under intimation to P.W.D. and Department of Manpower, Contractor will be required to obtain clearance before claiming his final bill from the Department.

CLAUSE X (Ration for Labour)

On receipt of application from the contractor regarding his requirement of ration for labour employed on the work, suitable recommendations will be made by Deptt. to Food Corporation of Bhutan. All possible help will be extended by department for peditious contractor.

It may clearly be understood by the contractor, that department does not bind itself for doing so. Any loses suffered by the contractor on this account shall have no concern to department or the value of work done under this agreement.

CLAUSE XI (Arbitration)

All the disputes arising between the contractor and P.W.D. shall be referred to the works Advisory Board - Consisting of the Secretary General, Ministry of Development, Development Adviser, Chief Accounts officer, Dy. Director (F & A) and the Director P.W.D. The decision of the works Advisory Board shall be final and binding.

PROHIBITTED ACTS.

The following acts issued by the order of the Honourable Minister, Ministry of Home Affairs, Royal Government of Bhutan are strictly prohibited.

i) Killing of Animals by means of trap.

ii) Illicit poaching.

iii) Illicit fishing and fishing by poisoning the water.

Contractors shall be responsible themselves to guard against commission of the above said prohibited acts by any labour under him. And even inspite of such undertaking of the contractors if any offences are detected in breach of the terms, both the contractor(s) and labour(s) will be sentenced to imprisonment for six months.

Contractor

Executive Engineer,
Thimphu Division No. II, EWD,
Thimphu : Bhutan.

CONSTRUCTION FIRMS

The following is the list of contractors obtained from P.W.D. Thimphu Bhutan.

(1) Mr. Lha Tshering, C/O Bhutan Timber corporation, Thimphu.
(2) Mr. Rinchen Tshering, Shop No. 15, Upper Road, Thimphu.
*(3) M/S. Tashi Commercial Corporation, Phuntsholing.
(4) Mr. Kalden Dorji, Prop, Kaydee Timber Industries, Thimphu.
(5) Mr. Jochu Mondal, C/O OSD, Gomtu, Bhutan.
(6) Mr. Passang Dorji, Karma Tshongkhag, Thimphu.
(7) Mr. Gap Gayltshen, C/O BTS Thimphu.
(8) Mr. Lhenkey Gaytshen, Phuntsholing.
(9) Mr. Gasap Gyaltshen, Above Swiss Bakery, Thimphu.
(10) Mr. Gyaltshen Dukpa, Gyaltshen Furniture House, Gaylegphung.
(11) Mr. Tshering Namgayel, Kuenga Tshongkhang, Thimphu.
(12) Mr. Dorji Rinchen, Gaindi Tshongkhang, Thimphu.
(13) Mr. Thinley Dorji, Nima Tshongkhang, Thimphu.
(14) Mr. Tandi Wangchhuck, Shop No. 2 Shendup Tshongkhang, Thimphu.
(15) Mr. Gem Tshering, Thimphu.
(16) Mr. K.D. Bareily, Shop No. 3, Thimphu.
(17) Mr. Nado Changgeni, Thimphu.
(18) Mr. Kayshang Wangchhuck, Palden Khaysang, 99/1A Aorzin Lham, Thimphu.
(19) Mr. S.N. Pradhan, M/S. Kunzang Furniture Works, Thimphu.
(20) Mr. Jattu Dukpa, M/S. Jattu Furniture Works, Thimphu.
(21) Mr. Thuji Dorji, C/O Gap Gaytshen, Thimphu.
(22) Mr. Jurmi Singey, Thimphu.

* : The biggest company in Bhutan

CONSTRUCTION MATERIALS/EQUIPMENT PRICE

(PHUNTSHOLING RATES)

Materials/Equipment	Price (Rd)		Remarks
	Bhuntanese	Imported	
1. Reinforcing bars (Round) (Deformed)	-	5645.00 per MT.	
2. Ordinary Portland cement	-	765/MT.	1 bag: 50 kg:
3. Sand	100/100 cft.	-	
4. Gravel	90/100 cft.	-	
5. Cobble stone	175/100 cft.	-	
6. Hollow concrete block (8" size)	5.50/NO		
7. Red brick	-	410/1000 Nos.	
8. Timber (Local first class)	20/cft.		
9. Plank (various sizes)	20/cft.		
10. Slate (2' x 1' size)	4.10/No.		
11. Plywood (commercial)	-	3.35/sft.	
12. Accounstic board	-	-	
13. Plaster	-	-	
14. Ceramic tile (6' x 6" white)		38.75/doz.	
15. Mosaic tile	-	-	
16. Glass			
Sheet glass	-	5.60/sft.	Thickness: 3mm
Figured glass	-	-	Thickness: 4mm
Plate glass	-	-	Thickness: 5mm
Wired glass	-	17.00/sft.	Thickness: 6mm
17. Hardware			
Door closer	-	13.00/No	
Door hinge (4" size)	-	1.99/No	Iron.
Door knob	-		
Door bolt (8" size)	-	7.95/No-	Aluminium.
Door key	-		
Window stopper (hook & eyes 6" size)	-	4.25/No.	Aluminium

Materials/Equipment	Price (Rd)		Remarks
	Bhuntanese	Imported	
18. Terrazzo tile	-	-	Dimension: 250 x 250 x 22
19. Marble stone (white)	-	715/MT	Dimension: 1/4" size
20. Corrugated galv. iron sheet	-	13,420/MT	Dimension: (various sizes g 24 gauge)
21. PVC pipe	-	3.5/each	Dia.: 32 mm
22. Cast iron soil pipe	-	13.10/Rft.	Dia.: 4"
23. Cost iron manhole cover	-		
24. Copper tube	-	-	
25. IV cable	-		
26. CV cable	-		
27. CVV cable	-		
28. Transformer, 100 KVA	-	21,000 to 25,000	
29. Instantaneous gas water heater	-		
30. Boiler	-		
31. Water pump			
32. Ventilating fan 12"	-	1103=05	

CONSTRUCTION COST

Work Item	Unit	Unit Rate (Rd)	Remarks
1. Earth works			
Excavation	m^3	2.86	Ordinary soil
Backfill	m^3	1.77	
Removal	m^3	17.00	Within 1km (Mechanical transportation)
2. Concrete works			
Form (work for slab)	m^2	34.43	
Reinforcing bar (m.s.)	ton	6,900	
Reinforced concrete (1 : 2 : 4)	m^3	395.47	
3. Mansonry works Cabble stone masonry(1:4)	m^3	187.63	Incl, lintol
Half 8" thick Brick masronry, 1B (1 : 3)	m^2	40.70	Incl. lintol
Concrete hollow block masonry t = 120 m/m (1 : 4)	m^2	65.10	Incl. lintol/ reinforcement.
4. Carpentry works Wood truss	m^3	1089.31	Undressed
Other rough carpentry	m^3	1089.31	Undressed
5. Roofing works			
Corrugated galv. iron sheet	m^2	132.95	(24 gauge)
Slate	m^2	85.39	
6. Tile works			
Terrazzo tile	m^2	-	Incl. cement mortar bed.
Marble	m^2	63.27	Incl. cement mortar bed. (1 1/2" thick)
Ceramic tile	m^2	203.90	Incl. cement mortar bed
Mosaic tile	m^2	-	Incl. cement mortar bed

Work Item	Unit	Unit Rate (Rp)	Remarks
7, Wood door and window works			
Wood door (Sal wood)	m^2	3050.78	Excl. hardware
Wood window (Sal wood)	m^2	3050.78	Excl. hardware
8. Plastering works			
Cement mortar (1 : 4)	m^2	12.11	3/4" thick
Plaster 1 : 3	m^2	6.23	
9. Glasing works			
Sheet glass	m^2	130.20	
Figured glass	m^2	-	
Wired glass	m^2	-	
Plate glass	m^2	-	
10. Steel door works			
Steel rolling door	m^2	458.91	Excl. hardware/ case
Steel angle frame door	m^2	-	Encl. hardware
11. Painting works			
Vinyl emulsion paint	m^2	7.31	1 primary coat, 2 top coats.
Oil paint	m^2	2.50	- do -
Varnish	m^2	6.45	- do -
12. Finishing works			
Plywood	m^2	-	
Accoustic board	m^2	-	
13. Structural steel works (for roof structure)	ton	8,500	

Note: These rates are based on B.S.R. 81. Phuntsholing.
For Paro the present C.I. @ 25% is to be added.

2－7. 労　務　費

LABOURER'S COST

Note: A laborer marked with (*) means an imported laborer

Trade	Daily wage (Rp)	Trade	Daily wage (Rp)
Common laborer	7.70	Machine operator	16.00
Carpenter	14.30	Car driver	13.00
Manson	13.20		
Plasterer	13.20	Trade	Monthly wage (Rp)
Steel-1 bar worker	12.10	Office clerk	500.00 U.D.C.
Plumber	14.30	Engineer (10 years experience)	2000/- (consultant)
Mechanic	20.00	Boy	
Electrician Grade -I	13.00		

Overtime: /hr