GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

FOREST DEPARTMENT

REVISED WORKING PLAN
FOR
THE FORESTS OF CHITTAGONG DIVISION
(For the years 1978-79 to 1987-88)

VOLUME I

COMPILED

BY

DIVISIONAL FOREST OFFICER
WORKING PLAN DIVISION, CHITTAG

GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

MINISTRY OF AGRICULTURE AND FOREST

Section II (Forests)

No. II/For-82/81/817, dated the 18th November, 1981

To: THE CHIEF CONSERVATOR OF FORESTS, BANGLADESH, DACCA.

SUB : *Revised Working Plan for the Forest of Chittagong Division (for the years 1978-79 to 1987-88).*

With reference to his Memo. No. CCF(T)W-618/517, dated 11th July, 1981 on the abovementioned subject, the undersigned is directed to say that Government have been pleased to approve the Revised Working Plan for Forests of Chittagong Forest Division (Volume I) for the period from 1978-79 to 1987-88, sent with his Memo. referred to above.

M. A. QUADER HOWLADER
Section Officer.

PREFACE

Chittagong Forest Division comprising of an area of 3·01 lakh acres of forest (Reserve Forest 2·11 lakh protected Forest 0·67 lakh Acquired Forest 0·15 lakh and Vested Forest 0·07 lakh acres) is located within the n..thern half of Chittagong Civil District, in the Sadar North and Patya Subdivisions. These forests play a vital role in the national economy and is responsible for feeding a host of wood-based industries and for supply of railway sleepers and other forest produce for domestic consumption.

The forest is a low-yielding type and comprises of an irregular and abnormal forest. From the Partition of the Subcontinent in 1947, attempts were made to convert these forests into a regular type by clear-felling followed by plantation of valuable species. The accessible forest areas of this Division were badly affected due to heavy fellings to meet war-supply during 1942-43 to 1944-45.

The first regular Working Plan was prepared by Mr. Q. Ghani covering the period from 1950-51 to 1969-70. On the basis of this plan, new centres were opened for clear-felling followed by Plantations. The plan was based on "long rotation" and the annual total felling prescription was fixed at 602·0 acres for the whole Division. With the passage of time, this was found insufficient to meet the growing demand of the country and could not fit in with the increased pace of development activity of the country. With the second 5 year development plan of the erstwhile Pakistan Government ; starting from 1960-61, many development schemes were initiated to affect a speedy conversion of the forests into a plantation forest and in the process higher yield of timber was obtained to meet the requirements of the country. This necessitated the revision of Mr. Q. Ghani's Working Plan and subsequently Mr. Baten's revised Working Plan came into operation from 1968-69 for a period of 10 years.

Mr. Ba'en's Plan introduced short and long rotation working Circles and the annual prescribed yield went upto 5,316·0 acres. This prescription was executed almost fully in the pre-liberation period but the quality of the plantation raised to cover the area was not up to the expectation. The emphasis given on the plantation of non-teak commercial species, without adequate knowledge of raising such species mixed with teak, resulted in a larger proportion of teak in the plantations and relatively poorer success with non-teak species. In some centres non-teak species had totally failed. The growth of teak was also not up to

the mark as these areas were not very suitable for growing better quality teak. The poor growth of teak is also due lack of tending operations, mostly due to non-availability of adequate fund.

With liberation of the country in 1971, the felling was suspended by Government orders to allow things to settle down and to improve the law and order situation in the country. The felling was re-introduced from 1975-76 but to a lesser extent, though the demand of forest produce increased considerably. In the post-liberation period unrecorded felling increased and the forest coupes could not keep pace with the demand. This will be evident from the following recorded production figures for timber from the forests of Chittagong Division :

(a) 1950-51 ... .. 2·95 lakh cft.

(b) 1968-69 ... .. 14·14 lakh cft.

(c) 1977-78 ... .. 4·54 lakh cft.

This has resulted in the shortage of timber in the market and consequently the price has gone high. It is also found at the close of the operation of Mr. Baten's Working Plan that when the total prescription was at 53,160·0 acres for 10 years, actually 21,526·0 acres were felled and planted. Out of the plantations raised during the period, 13,978 acres were enumerated. The enumeration result shows that out of 13,978 acres, 2,831 acres have totally failed. This failure is mostly due to the fact that the choice of species were improper technique of growing non-teak species were not fully known and lack of fund or delay in release of fund resulting in poor maintenance and ultimate failure of certain plantations.

The present working plan has been introduced with a view to meet the mainifold demands of the people and the wood-based industries. This also provides elaborate prescriptions for plantting non-teak species with poly-bag nursery stock and elaborate maintenance schedules. To meet these objectives, "Nursery and Plantation Manual" had been prepared in 1975 and circulated to all concerned.

To cope with the demand of forest produce and for speedy conversion of the irregular and abnormal high forest, the forest areas have been divided into short, medium and long rotation working circles based on end-use utilization concept.

In the short rotation working circle, 16,878·0 acres of easily accessible areas adjacent to important consumption centres have been taken up. This constitutes 5-6% of the total areas of the forest. The prescribed annual coupe has been fixed at 1,125·20 acres in centres to meet the demands of fire-wood, house-post, fence-posts, agricultural implements, transmission poles, etc., and to feed the Hard-Board, Particle Board and Match factories. The rotation for this working circle has been fixed at 15 years.

The medium rotation working circle comprises of 83,816·0 acres (28% of the total forest area) in the relatively less accessible areas of the forest. The annual coupe has been fixed at 2,725·0 acres spread over 20 centres with retation of 30 years, to be planted with species which can meet the requirements of Agriculture implements, fire-wood, transmission poles, match industries, box planking, ply wood industries and small-sized sawn timber.

The long rotation working circle comprises of 2,00472·0 acres of relatively in-accessible areas (67% of the total area of the forest). The minimum annual coupe has been prescribed at 1,633·0 acres and the maximum at 3,266·0 acres spread over 23 *centres* with a rotation of 60 years to be planted with valuable timber species to meet the requirements of ply-wood, sleepers, and other large sized construction timber.

The plan also provides for proper up-keep of bamboo and thatch areas and their improvement, in order to meet the demands of the village population. Provision has also been made for planting of bamboos with seeds/seedlings raised in poly-bags in the years when bamboos flower, in all the annual coupes of short and medium rotation working circles where from bamboos have disappeared due to excessive cuttings in the past.

The current revenue from the forests of this Division is to the tune of Taka 75·0 lakh per year. The normal expenditure is Tk. 21·0 lakh per year. The annual revenue is expected to go beyond Tk. 100 lakh with the increase of production during the tenancy of the present working plan. It is, therefore, expected that sufficient fund will be made available by Government in time including recommended man power to successfully implement the full prescription of the working plan, so that these forests contribute their maximum towards the Gross Domestic products of the country in future years.

The preliminary working plan report was approved by the C.C.F., *vide* his memo. No. প্রকা উন্নি-'-১২-৭৫/৬০১ (২)' তাং ১০-১-১৯৭৫, The field-work was started from the winter of 1975-76 and completed by 1978-79. During the period, 2 D.F.Os. were transferred and some of the staff posted

to this division did not join in time. In spite of these difficulties, the pressent D.F.O. Mr. Shafique Ahmed Khan, took sufficient pains to complete the field work and the writing of the working plan by October, 1979 ; for which his name deserves special mention. The working plan of Chittagong Division has been prepared in 2 volumes. Volume I in 2 (tow) parts covers the past working and the prescriptions for future, and V lume II contains numbers of appendices including the index map.

M. R. CHOUDHURY

Deputy Chief Conservator of Forests,
Development Circle,
Mohakhali, Dhaka-12.

DHAKA;
The 26th April, 1980.

INTRODUCTION

The undersigned took over the charge of Working Plans Division Chittagong, on the 24th October, 1977. Though the prelimeniary Working Plan Report was approved by the Chief Conservator of Forests, *vide* his memo. No. প্র:ব: স:/ডব্লিউ-১২/৭৫/৬০১(২) তাং ১০-১ ১৯৭ and the field work was started in 1975-76, there was little progress in the enumeration of plantations or the compilation work till 1977-78. It may be mentioned here that the Working Plan of Chittagong Division expired in 1977-78 and advance prescriptions were issued by this Division ; as the Working Plan was not ready due to unavoidable reasons. The enumeration of Plantations, collection of data and compilation of the Working Plan was geared up with scanty field staff and the limited reasources of the Division by the undersigned from the middle of 1978.

The compilation of data and the drafting of the Working Plan was taken up simultaneously with the enumeration of the plantations which was a formidable task particularly with Skeleton field staff and which could not be completed before June, 1979. The drafting of the Wroking Plan was taken up forthwith.

In Part I of this Working Plan, latest informations and Statistics have been incorporated. Area distribution under different Ranges have been revised, in view of the re-organization of Ranges and Subdivisions in the recent years. Chapters on Geology, Rock and Soil have been entirely revised and rewritten incorporating lates informations based on Reports of Soil Survey Directorate. The Forest-types in Chapter II have been described as per revised classification adopted by Sir Harry Champion, S.K. Seth and G.M. Khattak.

Agricultural customs and needs of the population have been inserted on the basis of the latest information and Statistics collected from various sources. The utilisation of the produce has also been thoroughly revised according to latest information. The chapter on Statistics of growth and yield have been re-written, incorporating up-to-date data on growth, volume and yield-tables in consultations with the Forest Mansuration Division of the Forest Research Institute, Chittagong, and on the basis of some of the data collected in the field over the period of years. While details have been dropped out from various Chapters, attempts have been made to go into details of subjects which require immediate and greater attention and many Chapters have been completely re-cast.

Part II of this Working Plan have been compiled on the basis of the final Working Plan report. The Short, Medium and Long Rotation Working Circles have been introduced with emphasis on selection of suitable and fast-growing species in view of the needs of the local People and the increasing demands of the wood-based Industries *vis-a vis* the immediate need for afforestation of barren-areas.

Special attention have been paid to the under-planting of Bamboos in the current year's plantations when bamboo seeds are available and tending and maintenance of Sun-Kholas.

The prescriptions of this plan have been based on data collected and compiled from various sources and the field records of the Ranges. The prescriptions have also been kept flexible to accommodate future expansion.

Wild-life management, which has come into prominance during the last few years, specially in view of decrease in wild-life wealth due to lack of protection and poaching, deserves special attention. Special provision has therefore, been made for Conservation and propagation of wild-life in this Working Plan. In addition to "Wild life' Sanctuaries" already being proposed under the Scheme of Wild-life Management and Game Reserve sponsored by the Wild-life Conservation Circle at Rangapani, Hazarikhil and Horwalchari blocks of Bariyadhala Range. covering a total area of 7,184·00 acres, it has been proposed to set aside 2 (two) new blocks (1) Khurusia, (2) Sukbilash under Rangunia Range covering a total area of 3,496·00 acres, *i.e.*, a grand total of 10,680·00 acres have been proposed for creation of Wild-life Sanctuaries in near future as per recommendations of Conservator of Wild-life Circle.

An area of 1,289·00 acres comprising Ghagra block under Ichamati Beat of Hathazari Range has been earmarked for Bangladesh Forest Rangers College, for imparting field training to Ranger students in Nursery, Plantation, Thinning, Marking, Survey, Alignments of roads. etc., and training in compilations of Working Plans.

Volume II of this Working Plan contains all necessary Appendices referred to in this Working Plan, ancillary statements and the enumeration data prepared on the basis of the field-works.

The staff of the Working Plans Division, Chittagong, specially Mr. A. Hamid, F.R. and M/s. Nazir Ahmed and Alauddin Khan, Deputy Rangers have worked with whole-hearted enthusiasm and vigour in collecting data, completing the rigorous enumeration works of plantations and helping in the compilation work.

All staff of Working Plans Division, Chittagong including the above executive staff and Mr. A. Rashid, Head Assistant, Mrs. Dipali Rani Paul, Office Assistant, Mrs. Sulekha Chowdhury, Office Assistant, Mr. Mahfuzul Karim, Draftsman had to work very hard even beyond office hours throughout the period of compilation of this plan. Their untiring zeal and devotion have paved the way towards the preparation for this working plan and hence they deserve special appreciation.

The writer also wishes to record his appreciation for the co-operation extended by M/s. Nazrul Islam, Dilip Kumar Das, Divisional Officers of Forest Research Institute, Mr. S. Das, Chief Research Officer, Forest Research Institute, Mr. Harun Rashid J.R.O. and Mr. B. Kingston, UNDP Consultant attached to F.R.I., during the compilation of this plan.

Thanks are also due to Dr. M. Omar Ali, Director, Forest Research Institute and Mr. A. Aleem, Conservator of Forests, Eastern Circle for their suggestions and the interest taken during the preparation of this plan.

The writer is specially indebted to Mr. M. R. Choudhury, Deputy Chief Conservator of Forests, Development Circle, Dhaka, for his constant guidance and the painstaking efforts to go through the entire manuscript, making necessary corrections and suggestions for its improvement throughout the preparation of this plan. But for his able guidance and constant supervision, it would not have been possible to compile this plan within the stipulated time.

Thanks are due to Mr. A. Hamid, Chief Conservator of Forsts, Bangladesh, for the interest taken during the preparation of this plan.

Last but not the least the writer wants to express his sincerest thanks to Mr. Ali Akbar Bhuiyan, Divisional Forest Officer, Chittagong Division, and his staff for their active co-operation throughout the compilation work.

S. A. KHAN
D.C.F.
Divisional Forest Officer,
Working Plan Division, Chittagong.

CHITTAGONG :
The 21st October, 1979.

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GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

FOREST DEPARTMENT

REVISED WORKING PLAN

FOR

THE FORESTS OF CHITTAGONG FOREST DIVISION

VOLUME I

GLOSSARY

GLOSSARY OF VERNACULAR TERMS AND NAMES OF PLANTS

A. Vernacular terms with explanations :

Chara, Chhara	: A stream
Dhala	: A path across Hills generally following depressions.
Jham, Jhooming, Jhuming	: The practice of shifting cultivation.
Jhumia	: Cultivators practicing shifting cultivation.
Khal	: A stream or a canal.
Khodda, Kheda	: A device/operation to catch wild Elephants by driving them to a stockade.
Koch	: Formation of a crust of salt on the surface of the earth, generally found in areas near the tidal forests of the Chakarai Sundarban.
Khashmahal	: The branch of revenue department under the Deputy Commissioner dealing with lands owned by the Government.
Kunki	: A female Elephant.
Nala	: A stream or ravine.
Sampan	: A kind of boat, typical of the district of Chittagong used in rivers and seas.
Saranga	: A river boat made of a dugout.
Sunkholas	: Savannah like grass land covered with sungrass (Imperata cylindricu) used for thatching rural houses.
Taungya	: The practice of growing agricultural crop along with forest plants in young stage of the plantation.
Para Jungle	: Tidal mangrove forests.

B. Vernacular and Botanical names of plants :

Vernacular names.	Botanical Names.
Adaliya	: Meliosma pinnata Roxb.
Ail	: Xylocarpus molloccensis (Lam) Room. Syn. Carapa molluccenesis. Lam.
Alkushilata	: Mucuna pruriens DC.
Am	: Mangifera indica Linn.
Amra	: Spondias pinnata (linuof) Kurs. Syn. S.. Mangifera. Wild.
Jungli-am, Uriam	: Mangifora sylvatica Roxb.
Amloki, Alamati, Amla	: Emblica officinalis Gaertn. Syn. Phyllanthus emblica linn.
Ashok	: Saraca indica Linn.
Assam lata	: Eupatorium odoratum.

Vernacular Name.	Botanical Name.
Lana Assar	: Ptorospormmum semisagittatum Ham.
Assar, Aswar	: Microcos paniculata Linn. Syn. Growia microcos Linn.
Arjan, Arjun	: Polyalthia simiarum.
Arsol, Goda, Hornia	: Vitex Glabrata R. Br. Vitex lomonifolia wall. Vitex Poduncularis Wall. Vitex pubeseeons Vahl.
Badam, Jungli badam, Kat badam	: Terminalia catapa Linn.
Badrang, Bazna	: Fagrara budrunga Roxb. Syn. Zanthoxylum budrunga Dc.
Babora	: Terminalis belerica Roxb.
Baittya Garjan	: Dipterocarpus soaber Ham. Syn. Dipteroearpus alatus.
Banderhola, Kacha	: Duabanga grandiflora (Roxb.) Walp. A. DC. Syn. Duabanga sonneratioides.
Banderlotya, Bonsonalu	: Cassia nodosa Ham.
Bankunch, Mandraj, Dulia Maricha	: Micromelum pubesceus Bl.
Banspata	: Podocarpus norifolia Don.
Bansua Jarul, Mon Jarul	: Lagerstroemia macrocarpa wall.
Bot	: Ficos bengalousis Linn.
Jiri-Bot	: Fious bonjamina linn.
Batana, Batna	: Quercus spp. Castanopsis tribuloides A. DC.
Bara Kumiria lata	: Smilax macrophylla.
Bariala Bans	: Bambusa vulgaris Schrad.
Barta, Lakooch	: Artocarpus lakoocha Roxb.
Bazali Bans	: Toinostachyum griffithii Munro.
Bola	: Semicarpus anacardium linn.
Bhadi, Jiulbhadi	: Lannea coromandelica (Heutt) Merr. Syn. Lanuea granis Engl.
Bhadi, Silbhadi	: Garuga pinnata Roxb.
Bhait, Bhaint	: Clogodendrum petasites (Loup) S. Moo. Syn. Clerodendrum infortunatum Cooke.
Bhuikumra	: Jacquemontia paniculata Hall, f.
Bagaserra kanta	: Mezeneuron cucullatum.
Bahal, Bohal	: Cordia dichotoma Forest. Syn. C. Nyxa Roxb.

Vernacular Name.	Botanical Name.
Boilam, Boilsur	: Anisoptera glabra Kurz.
Bolas, Jhumka-bhadi, Chorkanta	: Engolhardtia spicata Bl.
Bora bean, Tiyan Baen	: Avicennia officinalis Idnn. Syn. Aviconnia tomentosa Jacq.
Bormala, Khoia	: Callicarpa macrophylla Vahl.
Bura	: Macaranga denticulata Muell.
Chagul-Kuri	: Ipomoa pos-caprao sweet.
Chakua, Chakkua-Korai	: Albizzia Chinensis Merr. Syn. Albizzia stipulata Boiv.
Chalta, Chalya	: Dillenia indica, linn.
Chalmoogra, Chaulmugra	: Hydnocarpus kurzii (King) Warburg. Syn. Taraktogenos kurzii king.
Champa, Champa-ful	: Michelia champaca linn.
Chapalish	: Artocarpus chapasha Roxb.
Chatim, Chhatian, Chhatim	: Alstonia scholaris R. Br.
Chikrassi	: Chickrassia tabularis Adr. Juss.
Chotoiya, Muli, Bans	: Molocanna bambusoides Triw.
Chulta-kanta	: Dalbailgia spinosa R. Br.
Chundul, Mainakat	: Tetrameles nudiflora R. Br.
Civit, Am-Chundal	: Swintonia floribunda.
Barpatta	: Maplophragma adenophyllon (Wall.) D. Syn. Heterophragma adenophyllum Seem.
Dakrum, Rangkat	: Mitragyna parvifolia (Roxb) Korth. Syn. Stephegyne parvifolia Korth.
Dakrum, Ranghat Maldee.	: Adina cordifolia Hook.
Daloo, Bans	: MNeohouzeana dullooa Gamble.
Dhakijam	: Syzygium grande (Wt.) Walp. Syn. Eugenia grandis Sight.
Dhalijam	: Syzygium spp.
Dhaligarjan, Sil Garjan	: Dipterocarpus gracilis Bl. Syn. Dipterocarpus pilosus Roxb.
Dharmara, Kamrang	: Stereospermum personatum (Hassk.) Chatt. Syn. S. Chelonoides C.B.Cl.
Dhepajam	: Cleistocalyz operculatas (Roxb.) Merr. Syn. Syzygium cerasoideum (Roxb.) Peng. Raizda.
Paniyajam, Hanibak	: Syzygium formosanum (Hayata) Mori.
Dhulia-maricha	: Clausena excavata Burm.

Vernacular Name.	Botanical Name.
Dudya, Tali	: Palaquium polyanthum Wall. Syn. Dicoopsis poyantha Benth.
Dulia Baen, Sada Baen	: Avicennia alba Bl.
Dulya, Dhalya Garjan	: Dipterocarpus alatus Roxb. Syn. D. Costatus Ridl.
Gab	: Diospyros embroyopteris pers.
G amar, Gamari	: Gmelina arborea Roxb.
Garjan	: Dipterocarpus spp.
Gewa	: Excoecaria agallocha linn.
Gila	: Entada phaseoloies Merr. Syn. Entada Scandens Benth.
Goda, Arsol, Horina	: Vitex spp. D.C.
Golak chakulia	: Vraria lagopoides.
Goomdilata	: Bauhinia anguina R. Br.
Goyam jam	: Eugenia (Syzygium) spp.
Gundroi, Kostori	: Ginnamomum cecidodaphne Meisson.
Gulancha	: Tinospora eordifolia Meirs.
Gutgutya	: Protium serratum Engl. Syn. Bursera serrata Colebr.
Betmara	: Heynea trujuga R. Br.
Hantal, Hital	: Phoenix paludosa R. Br.
Hansak	: Xanthophyllum flavescens R. Br.
Hargaza	: Dillenia pentagyna Roxb.
Haritaki	: Terminalla chebula Retz. Terminnlia citrina R. Br.
Moos, Kanak-Cuampa	: Pterospermum acerifolium Willd.
Hawa	: Rhisophora conjugata Kurz.
Herba, Sheora	: Streblur asper Lour.
Hogla	: Tgpha spp. (Telephantina & Tangust).
Bara Horina	: Eriglossum edule BC. Syn. Panoovia rubiginosa Baill.
Horina, Arsol, Goda	: Vitax sup. (V. Peduncularis Wall V. Pubescens Vahl.)
Jalpai	: Eleocarpus spp (E. Robustus Bl., Elrugosus Roxb., E. Verunna Ham.).
Jam	: Syzygium spp.
Jum-Chattar	: Cycas pectinata Griff

Vernacular Name.	Botanical Name.
Jarul, Kanta Jarul	: Lagerstroemia speciosa (Linn) Pers. Syn. L. flosreginae Retz.
Sidha Jarul	: Lagerstoemia parviflora Roxb.
Jhaw, Hari	: Casuarina equisetifolia Forst.
Jhumka Bhadi, Kschhara Bhadi, Chorkata-lej	: Engelhardtia spicata Bl.
Jiul Bhadi, Bhadi, Jiuli	: Lannea cormandelica (Houtt.) Merr. Syn. Lannea Grandis Engl.
Jonaki-Jam	: Turpinia pomifera DC.
Jau, Juin	: Jasminum scandens Vahl.
Junguriya, Jumurja	: Derris robusta Bth.
Kacha, Bandarhola	: Duabanga grandiflora (Roxb) Walp. Syn. Duabanga conneratioides. Mam.
Kadam	: Anthocephalus cadamba Mig.
Kainjal, Loha bhadi, lou bhadi	: Bischofia javanica Blume.
Kala Baen, Tiyan Baen	: Avicennia officinalis Linn.
Kala Boil, Chamfata, Kalagota	: Sapium baccatum Roxb.
Kala Koroi	: Albizzia Lebbek Benth.
Kala Jam	: Syzygium cumini (linn.) Sheals. Syn. Eugenia Jambolona lam.
Kalda, Kukur-chura, Bis-phal	: Pavetta indica linn.
Kali-Bans	: Oxytenanthera nigro-ciliata Mun.
Kaliserri-Bans	- Oxytenanthera auriculatam Parain.
Kamdeb, Pooia	: Calophyllum polyanthum Wall.
Ponyal, Sultan-Champa	: Colophylum inophyllum linn.
Kamini	: Muraya paniculata Jack. Syn. M. exotica linn.
Kamkui, Kantakhosi	: Bridelia retusa Spring.
Kanak, Konak	: Schima wallichii Choisy.
Kanak-Champa, Hatipoila, Moos.	: Pterospermum acerifolium Willd.
Kanak-Jarul	: Terminalia crenulata Heyna.
Kanchan, Ponraj	: Bauhinia spp. (B. variegata linn. B. racemosa lamk., B. acuminata linn.
Kosoi, Kanta-Koroi, Itcharl	: Anogeissus acuminata Wall. Syn. A. lanceodata Wall.
Kao	: Garcinia spp.
Karamphala, Dhundul	: Xylocarpus granatum Koeing. Syn. Carapa obovata Bl.,

Vernacular Name.	Botanical Name.
Karauk, Kerung	: Poogamia pinnata (linn.) Pierre. Syn. Pongamia glabra vent.
Karma-lata	: Merremia vitifolia Mall. F.
Kassalong	: Aegiceras corniculatum Blanco. Syn. A. majus Laerta.
Karoola, Phata Kharoola, Kharullah	: Aprosa roxburghii Baill A. oblonga Muill.
Kuanria-lata	: Smilax prolifera R.
Keobong, Roskao, Lotkao	: Carallia lucida Auct.
Kechua	: Glochidion lanceo arium Dalt.
Kela, Kala	: Musa spp. (Musa sapientum Linn. Var sylvestris, M. Crnata R.).
Keonra, Panyator	: Glochidion multiloculare Muell.
Kerba, Keora	: Sonneratia apetala.
Kestoma	: Glochidion multiloculare Muell.
Khagra-ghas	: Saccharum spontaneum Linn.
Khoirjam	: Eugenia (Syvium) barringtonii. Eugenia (Syvium) cymosa.
Kichara bhara Jhumka bhadi	: Eogeloardtia spicata Bl.
Kom	: Nauclea sessilifolia Roxb.
Koroi	: Albizzia procera. Benth
Koroi, Kanta koroi	: Anogeissus acuminata Wall.
Kukurchita	: Litsea sebifera Pers.
Kumiri-lata	: Smilax roxburghiana Wall.
Kurus, Kurchi	: Holarrhena antidysenterica Wall.
Bhui-kadam	: Hymenodictyon excelsum Wall.
Kusum, Jaina	: Schleichera oleosa (Loun.) Oken. Syn. Schleicheratrijuga Wills.
Lakooch, Barta Bon-Kanthal.	: Artocarpus lakoocha, Roxb.
Lat-babul	: Acacia concinna DC.
Lohabhadi, Loubhadi	: Bischofia javanica Blume.
Madaomosta	: Dechasia kurzii Kg.
Madar, Madder	: Erythrina variegaMa linn. Syn. Erythrina indica lam.
Mahngany, Mehogini	: Swietenia macrophylla King. Swietenia mahagoni linn.
Mainakat, Chunkul	: Tetrameles nudiflora R. Bri.
Mainkanta, Mainphal	: Randia dumeturum.

Vernacular Name.	Botanical Name.
Mandara	: Acrocarpus fraxinifolius Wgt.
Marmaria lata, Harjora	: Vitis quadrangularis wall.
Maula, Palas-lota	: Butea parviflora Roxb. Syn. Spatholobus rexburghii Bth.
Minjiri	: Cassia siamea lamk.
Mitenga-Bans	: Bambusa tulda. R.
Mon-Jarul, Bansua-Jarul, Botna-Jarul	: Lagerstroemia macrocarpa Wall.
Moos, Kanak champa, Matipoila	: Pterospermum acerifolium Willd.
Muli, Chotoiya. Bans	: Melocanna bambusoides Train.
Nageswar, Nagkesar	: Mesua ferrea Linn.
Nali Jam	: Syaygium laciforum (Roxb) Wall. Syn. Eugenia clavifora Roxb.
Naricha, Noa-Maricha	: Maesa ramentacea A. DC.
Narikel, Narikeli	: Pterygota alata (Roxb.) R. Br. Syn. Sterculia alata Roxb.
Raktan, Narikel, Sheradong	: Lophopetalum fimbriatum Wight.
Natinga, Kakra	: Bruguiera conjugata (Linn.) Merr. Syn. Bruguiera gymnorhiaa.
Nunia, Nuniagach	: Aegialitis retundifolia R.
Orah-Bans	: Dendrocalamus longispathus Kz.
Surujbed, Toon, Suruj	: Cedrela toona Roxb.
Talii, Dudya	: Palaguium polyanthum Wall. Syn. Dichopsis polyantha Benth.
Tara	: Alpinia allughas Roscoe.
Teak, Shegun, Shagwan	: Tectona grandis linn.
Telsur, Tersol	: Hopea onorata Roxb.
Telya garjan, Tali garjan	: Dipterocarpus turbinatus Gaertn.
Tetoiya, Tetuya koroi	: Albizzia odoratissima Benth.
Tejbohal, Kosturi	: Cinnamomum cecidodaphne Meissen.
Toon, Suruj	: Cedrela toona Roxb.
Tula, Simul	: Salmalia maababrica Schott & Endl. Syn. Bombax malabarium DC. Salmalia insignis Schott. & Endl. Syn. Bombax insigne Wall.
Tushia	: Bruguiera carypophylloides DC.
Uchanti	: Ageratum conyzoides linn.
Udal	: Firmiana colorata. R. Br. Syn. Sterculia colorata Roxb. Sterculia villosa Roxb.

Vernacular Name.	Botanical Name.
Uriam, Jangliam	: Mangifera sylvatica Roxb.
Vrichiya, Nuna-gach	: Tamarix gallica. Barberis strigosus Clematis spp.
Jum-Ali, Mitha Ali	: Dioscorea spp.
Ekna, Ekan	; Erianthus ravance. Lantana camara linn. leea spp. Loranthu spp. Banda, Dhera.
Millettia cinera Bth.	: Sabia limeniacea Wall.
Jharu, Phul Jharu	: Thysanolsena maxima.
Rangkot, Dhas	: Woodfordia flori Munda Saliab. Zanthocymus spp.
Pacca saj, Kanak Jarul	: Terminalia crenulata Heyne.
Padauk	: Pterocarpus dalbergiodes Roxb.
Pani saj, Paniya jarul	: Terminalia myriocarpa Henrok.
Parul	: Stereospermum Skaveolens DC.
Patyuni	: Combretm acuminatum R.
Patipata	: Clinogyne dichotoma Salisb.
Phata Kharoola	: Aporosa roxburghii.
Pitali	: Trewia nudiflora linn.
Pooia, Kamdeb	: Callophyllum polyanthum Wall.
Pitraj	: Aphanamixis polystachya Parker. Syn. Amoora ruhituka W. & A. Dyscxylum spp.
Pitulipata	: Phrynium imbricatum R.
Punag, Sindur, Kamela	: Mallotus philippinensis Muell.
Puti Jam	: Syrygium spp.
Pynkado, Lohakat	: Xylia dolabriformis Benth.
Raktan, Sheadong	: Lophopetalum fimbriatum Wight.
Rangkat, Haldu	: Adina cardifolia. Hook.
Rohinia	: Kandelia roxburghiana.
Salpani	: Desmodium motorium.
Sankar Jata	: Uraria Picta. Desv.
Satian, Chhatim	: Alstonia scholaris R. Br.
Shaugan	: Scaphiam wallichii.
Sheera, Herba	: Streblus asper. Lour.
Sheradong, Raktan	: Lophopetalum fimbriatum. Wight.
Shegun, Shagwan, Teak	: Tectona Grandis. Linn.

Vernacular Name.	Botanical Name.
Shourala, Sonalu	: Gassia fistula. Linn.
Sil-Batna, Sol-Batna	: Querous velutins. Lindi.
Silbhadi, Bhadi, Jiga	: Garuge pinnata. Roxb.
Sil garjan, Dhali garjan	: Dipterocarpus gracilis. Bl. Syn. Dipterocarpus pilosus. Roxb.
Simul, Tula	: Salmalia malatarica schott & End. Salmalia ingignis, Schott & Endl.
Sundri	: Heritiera minor. Roxb. Horitiera fomes. Buch.
Sungrass	: Imperata cylindrica. Syn. Imperata arundinacea. Cyrill.

GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

FOREST DEPARTMENT

REVISED WORKING PLAN
FOR
THE FORESTS OF CHITTAGONG FOREST DIVISION

(For the Period from 1978-79 to 1987-88)

PART I

SUMMARY OF FACTS ON WHICH PROPOSALS ARE BASED

REVISED WORKING PLAN FOR THE FORESTS OF CHITTAGONG FOREST DIVISION

PART I

SUMMARY OF FACTS ON WHICH THE PROPOSALS ARE BASED

CHAPTER I

THE TRACT DEALT WITH NAME AND SITUATION

1. **Name and Situation** – Chittagong district lies in the extreme South-East of Bangladesh between 20°-35′ and 22°-59′ North Latitude and 19°-27′ and 92°-22′ East Longitude. It consists of a narrow strip of land about 116 miles long, from the Feni river in the North to the Naaf river adjoining Burma in the South. It lies between the Bay of Bengal in the West and the Chittagong Hill Tracts district on the East.

2. The Chittagong Forest Division lies within the sadar (North) Subdivision and Patiya Subdivision [formerly Chittagong Sadar (South) Subdivision] of the civil district of Chittagong. It extends from the Feni river in the North to the Northern boundary of Cox's Bazar Subdivision in the South , from Chittagong Hill Tracts in the East to Noakhali district and the Bay of Bengal in the West. The town of Chittagong, the Headquarter of the Forest Division is situated on the right bank of the Karnafulli river, about 12 miles above the point it joins the Bay.

3. The Bangladesh Railway serves the Division. The Chittagong-Laksam, Chittagong-Nazirhat and Chittagong-Dohazari section of the Railway are running through this Forest Division.

CONFIGURATION OF THE GROUND

4. **General Configuration**—The Forests of the Division are confined to the Hill-Ranges in the Northern half of the Chittagong Civil District. These Ranges alternate with broad alluvial valley. *Chandranath* hillock situated near Sitakunda is about 1335′ above mean sea level and is the highest peak in the district. The terrain in the hills is exceedingly irregular and composed of ridges from which numerous spurs run off in various directions.

The hills are composed of very soft sand-stones and shales. They erode very easily as soon as forest cover is removed. The ranges are generally running North-South.

Note—*The previous record put the Chandranath Hillock at 1152′ (Gazetteer) and 1155′ (Working Plan). Recent measurements by P.W.D for Microwave Station shows the height to be 1335′.

5. **Rivers**—The Karnafuli is the principal river which enters the district at Chandraghona approximately 38 miles above its mouth. This portion remains navigable by launches and small water crafts throughout the year. The Halda is its largest tributary. The Sangoo river, after a course of 130 miles over a rocky bed, enters the district and flows into the sea, 10 miles south of Karnafuli. The rivers are tidal throughout the district.

GEOLOGY, ROCK AND SOIL

6. **Geology and Rock**—The district of Chittagong has been stratiographically (Geologically) surveyed Reconnaissance Soil Survey has also been carried out by the Directorate of Soil Survey.

Geologically, the Hills of Chittagong comprise a part of Garo-Hill Ranges. The anticlines are aligned approximately North—North-West to South-South-West in Chittagong. These Hills are underlain by tertiary and quaternary sediments laid down in the deep geosyndinal trough. The rocks of Chittagong Hills have been considerably folded, faulted, uplifted and then deeply dissected to form long sub-parallel North-South Ranges. Between these linear Ranges, occur extensive low-lying area of strongly dissected relief where sandy shales and little consolidated sand-stones predominate, whose age varies from Miocene to Pliocene periods. Rivers and streams flow longitudinal valleys probably mainly along shale-beds but occasionally through the main ridges in narrow gorges. The average alevation of the Hill Ranges is approximately about 200 feet above mean sea-level. The eastern Ranges are higher in elevation than the Western Ranges.

The Hill Ranges comprise of unconsolidated rocks of Dupi Tila formations and weakly consolidated rocks of Tipam Surma formations.

7. **Brief descriptions of the Geological Formations**—(i) *Dupi Tila formation*—These rolling hills comprise of the unconsolidated sediments of upper Tertiary anticlinal and synclinal systems. The ramnents occurring on the edges of the anticlinal systems usually form ranges of low rolling hills with gentle to steep slopes, rounded tops and ranging in height from 50 feet and above. These hills have been apparently shallowly dissected, but those lying at the outskrit of the higher hill ranges have been deeply and broadly dissected. The valleys comprise of the recent alluvial and colluvial sediments.

The Dupi Tila formations comprise of unconsolidated sediments of the late Miocene and Pliocene period. The sediments consist mainly of medium sands mixed with clays and silts. Locally, coarse and some

gravel may occur. Most of the sediments have coarse 'fossil' mottles at variable depths indicating the existence of ancient fluctuating water-tables. The mottled zone is locally underlain by a concretionary or a lateritic layer. This layer locally occurs at or near the surface, is very hard and varies in thickness from a few inches to a few feet. The Dupi Tila formations are also characterised by the presence of cross-bedding and local occurrence of fossilized or silicified wood fragments.

(ii) *Tipam-surma formations*—The higher hills consist of the cores of the higher anticlines. These are semi-consolidated to consolidated sediments, which have been deeply dissected to form the series of rugged high hills with steep to very steep slopes.

Tipam-Surma formations compose the innermost cores of the anticlines. The Tipam formations is of middle Miocene age, composed of consolidated ferruginous sand-stones, silt stones, sandy shales and compacted sands. The shale bed underlying the Dupi Tila formations is known as the Cirujan clay. The Tipam sand-stones also include some conglomerates and occasional fossil wood. The Surma formations being of early Miocene age, comprise of the oldest outcropping rocks in the district. It includes two stage—Boka Bil and Bhuban. The Boka Bil stage consists of sandy shales, silt and sand-stones which form the interior of most anticlines. The Bhubans comprise of sand-stones, shales and conglomerates. The rocks may include lime concretions locally. Valleys are very narrow with sharp gradient, giving an over all V-shaped appearance. The Table annexed herewith shows the Physiography and land-forms in relation to kind of deposits, Geological formations and age. (*Ref.*—Report on Reconnaissance Soil Survey of Chittagong district, 1976).

Table showing physiography/Land-Forms in Relation to Kind of Deposits, Geological formations and Geological Age.

Geological age	Geological formation		Kind of deposite	Physiography/Land form
QUATERNARY.	RECENT	Recent alluvia and sails.	Silty and clayey tidal (Unripened and stratified) muds; beach sands; youog and old medium to moderately fine textured Moghna estuarine alluvial (Locally calcareous) young and old medium to fine textured Chittagong ; Chittagong Coastal tidal alluvia; moderately coarse to fine textured riverine alluvia of Karnafully, Halda, Feni and Ichamati rivers; coarse to fine textured mixed alluvial and colluvial piedmout deposits.	Coastal and estuarine mudbanks; Moghna estuarine floodplaim; young and old Chittagong Coastal tidal flood-plaim; Karnaphuli meander flood-plaim and monor river (Fen, Halda and Ichamati) floodplaim; piedmout alluvial plaims and valleys.
	PLEISTOCENE.	..	..	Not recognized.
	PLIOCENE	Dupi Tila Series	Unconsolidated to semi-consolidated folded fine to coarse grained sandstones, interbedded with saft, often mottled gray and brown, siltstones and shales. The sand deposits, frequented by croosbeddings, are characterized by localized occurrence of quartzitic gravels, plinthitic and lateritic layers and silicified woods.	Rolling to steep low hills, mostly with rounded tops, comprising the remants of shallowly dissected low antictines and steeply dissected edges of higher anticlines.
		Upper middle Tipam Series.	Semi-consolidated to consolidated folded fine grained Sandstones interbedded with shales and silt stones, locally including calcareous concretions.	Very steep medium high to high hills; with rugged conical tops, comprising the remnants of closely and very steeply dissected interor of higher anticlines.
TERTIARY	MIOCENE	Lower Surma Series.		
		(1) Boka Bil Stage.	Consolidated folded sandy shales with some fine grained sandstones.	
		(2) Bhubban Stage.	Consolidated folded fine grained sandstones with some shales and conglomerates. Sandstones locally large calcaretions.	
	OLIGOCENCE.	Upper.		

*In this report, the hills of the survey area informally grouped according to their over all elevation above mean-sea-level as (1) Low hills-below 250', (2) Medium high hills-250'—500' and (3) High hills above 500'.

Soils—The soils developed on the unconsolidated and compacted rocks of Dupi Tila formations are usually moderately well to excessively drained deep and probably the oldest ones in the area. They have been developed under forest or thickets often having a thin layer of wormcasts over the surface. Topsoils are dark greyish brown to dark brown; sandy loam to loam ; moderately granular or crumby ; neutral to strongly acid when moist and medium to very strongly acid when dry. Subsoils are yellowish brown to yellowish red ; sandy loam to silty clay loam ; moderate to strong blocky structure ; strongly to very strongly acid. Some soils contain a hard concretionary or indurated lateritic layer at variable depth. Substratum is often weakly to strongly motteled gray, brown or red, and may contain some quartzitic gravels.

Soils of Tipam Surma formations are formed on hard rocks have very steep slopes and shallow profiles than those formed on soft rocks. Sandy loam to clayey laom soils are developed in weathered sandstones or layey sandstones ; silt loams and sioty clay loams on weathered siltstones and shales respectively. The soils are usually well to excessively drained. These are developed mainly under forest cover and have a thin layer of wormcasts over the surface. Topsoils are mainly thin, dark brown to dark greyish brown ; sandy loam to silty clay loams ; weak to moderate clocky structure and slightly to strongly acid. The subsoils are pale brown to yellowish brown, locally strong brown ; sandy loam to silty clay loam; weak to strong blocky, with thin pad coating and medium to strongly acid. Often the subsoils are gravely or contain broken pieces of rocks to a variable degree. In some cases a thin layer of soil incorporated with humus virtually rests on solid rocks. Where the soils are thicker the sub-stratums are frequented with rock fragments which rests on solid rocks.

In general, the soils of Tipam Surma formations are less acid in reaction compared to the soils of Dupi Tila formations. Mist soils may lack iron-manganese concretions in their profiles like the soils of Dupi Tila formations but may contain cemented iron-pans, broken pieces of sandstones, shales, conglomerates and laterites in them.

According to the Reconnaissance Soil Survey carried out between 1971—73 by the Directorate of Soil Survey the Soils of Chittagong District are described as follows :

According to the Reconnaissance Soil Survey recently carried out by the Department of Soil Survey Bangladesh, in respect of Chittagong Sadar North and Sadar South Subdivision, the Soils of Chittagong belong to various series depending on their Physiographic and Geological formations.

A brief description of the soils in general of various region and satratum covering Chittagong district is given below :

Approximately 60%—65% of the soils of Chittagong North and Chittagong South Subdivisions of the area surveyed are formed in recent and sub-recent alluvial sediments of tidal and river flood plains and of piedmont alluvial plains and valleys. Most of these soils are seasonally flooded, medium to moderately fine textured and have low contents of organic matter. They are moderately alkaline to wildly acid in reaction and are locally slightly saline. Extremely acid soils, however, locally occur on the coastal mangrove tidal flood plain. The rest are fairly oxidized, well to excessively drained, moderately coarse to moderately fine textured, medium to very strongly acid soils developed in the un-consolidated very steep hills.

In most soils three layers can be recongnized—Top soil, sub-soil and sub-stratum. The top-soil of flat agriculture land is generally puddled and has a compact plough-pan at its base. It is usually 5"—6" thick but some what thinner in clays and some times thicker in lighter textured soil. It generally becomes medium to strongly acid when dry. The top-soil is important for supplying plant nutrients and its properties determine wheather tillage is easy or, difficult. The plough pen, which usually becomes very hard when dry, may impede root and water penetration.

The sub-soil is the layer below the top-soil which is not disturbed by tillage operations but which has been charged from its original condition by soil forming processes. This layer is more strongly structured than the top-soil and the underlaying sub-stratum. It may be absent in some very young soils which have stratified alluvium or partially weathered bedrocks below the top-soil. The sub-soil is important in determining internal soil drainage and dry-season moisture retuntion and also in supplying plant food.

The sub-stratum is the material underlaying the sub-soil or where there is no sub-soil, the layer directly below the top-soil. It is commonly stratified in case of alluvial soils or locally gravelly, strong or very strongly mottled in case of hill soils and generally less structured than the sub-soil.

Soils developed in tidal flood plain alluvium occupy about one third of the surveyed area. About one-sixth of the tidal landscape is occupied by tidal mud derived from different sources. This mud occupying the regularly tidally flooded mudbanks is mostly un-ripened and strongly saline.

Soils developed on the floodplains of the Karnafuli and other rivers occupying about 7 (seven) per cent of the area are either above normal flood level or seasonally shallowly flooded on ridges and shallowly to moderately deeply flooded in basins. They are grey to olive-grey with brown and locally pale brown to dark brown with some olive-grey mottles., silts loams to silty clay loams, moderately to strongly structured on the ridges and grey with brown mottles. Silty clay loams to silty clays strongly structures in basins. They are neutral to stro gly acid in reaction. Usually the Karnafuli flood-plain soils are relatively more brightly mottled and acidic than the other river flood-plain ones. Locally stratified sandy or silty soils occur on river banks and young char lands in river channels.

Soils occupying the piedmont alluvial plains and valleys cover about one-fifth of the survey area. On the extensive piedmont plains and broad valleys imperfectly to poorly drained soils have a grey to olive-grey with brown mottles, mainiy silt loam to silty clay loam, moderately to strongly structured and neutral to medium acid sub-soil. Locally sandy loams on ridges and silty clays in basins occupy small areas having strongly acid re-action. Some of the higher valley soils are moderately well drained, have brown, loamy, moderately structured and very strongly acid sub-soils. The narrow valley soils usually with imperfect to poor drainage are generally relatively greyer and less developed than the piedmont plain soils. They have a grey with some brown and strong brown or red mottles (iron straining along root channels), sandy loam to silty clay loam, locally silty clay, weakly to strongly structured and strongly to very strongly acid sub-soil. Locally, where seepage water keeps the valley wet well into or throughout the dry season, very poorly drained soils occur. Organic soils sometimes cocur in such areas.

Soils developed in the hills with un-consolidated rocks are moderately well to excessively drained, mainly deep and probably the oldest soils in this region. They are yellowish brown to yellowish red, sandy loams to clay loams, moderate to strong blockly and strongly to very strongly acid and have few to many iron-manganese concretions. Locally some soils contain hard concretionery or indurated lateritic layer at a depth close to the surface.

Soils occuring on hills with consolidated rocks are mainly developed in weathered sandstones, shales and locally siltstones. The soils developed in weathered sandstones are mainly sandy loams to clay loams and these developed in shales are silty clay loams. They are well to somewhat excessively drained, pale brown to yellowish brown, mainly sandy loams to silty clay loams, weak to strong blocky and medium to strongly acid in sub-soil.

High rate of erosion and occasional land slip seldom allow to develop old and deep soils on the steep to very steep slopes.

9. **Climate**—Chittagong is situated in the Tropical Zone and as such it is subject to Tropical Climate. But its situation with the sea to the West and the Ranges of Hills to the East has neutralised the extremes of the climate to a considerable extent. It forms a belt of the Country narrow compared with its breadth lying along the Sea-coast backed by hilly region to the End, and arrangement favourably for free play of land and sea breezes. The movement of the air from a comparatively cold region towards the more highly heated plains causes a uniformity of Temperature more marked than in other ports of country. The position of the district on the coast line of North-East angles of the Bay of Bengal also helps to get the heavy rain as the moist winds of the South-West monsoon converge in this direction. Chittagong is remarkable for its uniform Temperature, high Humidity and heavy rainfall from May to October. The climate is thus moist warm and equable, vegetation is luxuriant and the District is green almost throughout the year.

Temperature—The average maximum Temperature is lowest in December-January, when it is about 78·8°F and highest in April when it is 88·7°F giving a variation of 10°F. The variation in minimum temperature however is nearly double as great rising from 55°F in January to 76·8°F in June, *i.e.*, about 22 F. The smaller variation in day temperature is due to the moderating influence of the sea-breezes in consequence of which the temperature near the coast is not much higher than at sea.

The daily range of temperature as given by the difference between the average maximum, and average minimum temperature, month by month, varies from 18·5°F to 23 F in the cold weather months and it falls as low as to 10·6°F in July, During the summer months it is never more than 10·5°F but it increases rapidly after October and reaches its maximum in February. The highest temperature recorded at Chittagong since 1870 is 101°F in 1888 and lowest 45°F in 1878 giving a total range of 56°F.

The following Table gives the temperature data in °F at Chittagong recorded since 1967 to 1978 by the Metereological Department :

Table showing average Temperature (°F)

Months	1967		1968		1969		1970		1971		1972	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.	Mean Max.	Mean Min.	Mean Max.	Mean Min.	Mean Max.	Mean Min.	Mean Max.	Mean Min.
1	2	3	4	5	6	7	8	9	10	11	12	13
January ..	78·2	61·1	77·2	57·1	77·1	55·5	78·1	55·9	78·3	58·5	76·9	56·8
February ..	83·2	61·9	80.3	60.8	84·0	59·4	82·5	61·1	81·6	60·9	79·1	56·8
March ..	85·7	68·8	87·4	69.2	87·4	68·8	87·5	69·5	*	*	86·5	68·0
April	89·7	73·6	89·2	74.4	90·0	73·2	90·1	75·2	*	*	85·5	73·2
May	90·7	77·4	90·2	75.6	92·1	76·9	89·8	78·4	88·8	75·9	90·9	78·0
June	89·3	78·3	86·1	76·3	88.6	76·3	88·5	77·8	86·2	76·9 (b)	89·3	77·9
July ..	87·5	78·0	88·2	77·2	87·8	77·1	86·5	76·9	85·0	76·1	89·5	79·1
August	87·3	77·3	86·9	76·1	85·9	76·1	87·6	77·2	84·7	75·7	84·7	76·3
September ..	86·3	76·8	89·2	76·9	89·1	77·0	87·4	76·9	88·4	77·0	90·3	78·4
October ..	86·6	74·3	87·6	74·3	87·8	74·0	86·5	75·0	87·9	75·6	83·9	74·6
November ..	82·6	63·7	84·6	67·1	85·0	66·5	82·4	67·5	82·4 (b)	66·4 (c)	86.2	68·9
December ..	79·9	59.4	80·2	58·9	79·9	58·6	78·5	58·9	*	*	81·6	59·4

N.B.—*(a) Observation not taken due to liberation war.

(b) Observation taken for 29 days only.

(c) Observation taken for 28 days only.

Table Showing Average Temperature (°F)—*Concld.*

Months	1973		1974		1975		1976		1977		1978	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.	Mean Max.	Mean Min.	Mean Max.	Mean Min.	Mean Max.	Mean Min.	Mean Max.	Mean Min.
1	14	15	16	17	18	19	20	21	22	23	24	25
January ..	81·3	57·7	77·0	56·0	77·5	56·7	78·3	55.8	78·7	57·0	76·3	54·9
February ..	84·7	62·6	82·0	58·8	82·4	61·6	81·6	60·2	80·9	60·0	83·0	61·1
March ..	87·0	66·0	85·6	68·3	88·9	69·6	88·6	69·2	87·2	70·1	88·0	70·0
April ..	89·9	75·6	88·1	74·5	90·0	75·3	91·3	74·3	87·0	72·0	91·0	77·0
May ..	89·1	74·8	90·0	75·3	90.3	75·5	91·7	94·9	87·1	75·1	90·2	72·0
June ..	88·5	78·0	87·0	76·0	90·1	77·7	87·6	74·1	87·1	75·9	Not available.	
July ..	88·7	77·6	84·0	76·0	85·5	75·8	85·0	75·0	86·9	75·4	Do.	
August ..	87.0	77·0	86·5	77·1	87·7	77·2	87·8	75·4	88·0	76·3	Do.	
September ..	87·0	74·0	87·9	76·5	88.3	76·6	90·1	76·2	89·7	76·4	Do.	
October ..	88·1	78·9	89·0	76·5	88·0	76·5	87·7	73·0	88·5	74·5	Do.	
November ..	83·7	68·8	84·6	72·4	81·6	66·9	85·4	69·6	85·2	69·2	Do.	
December ..	77·0	59·0	78·8	58·7	77·3	56·8	78·8	60·2	80·5	60·2	Do.	

10. **Humidity**—The humidity of the atmosphere is lowest in January and February, after which there is a steady and slow increase till May. With the commencement of monsoon in June, there is a large increase, though the cloud is greatest and rainfall highest in July, humidity does not reach maximum till September, when there is 91% saturation. During the whole monsoon it various from 80 to 90 per cent.

The follwing Table shows Humidity in % as recorded by Chittagong Meteriological Department from 1967 to 1978:

Table Showing Humidity (%) percentage.

Months	1967			1968			1969			1970		
	00 Hrs.	03 Hrs.	12 Hrs.	00 Hrs.	03 Hrs.	12 Hrs.	00 Hrs.	03 Hrs.	12 Hrs.	00 Hrs.	03 Hrs.	12 Hrs.
1	2	3	4	5	6	7	8	9	10	11	12	13
January ..	91	81	74	91	78	62	88	72	64	91	77	62
February ..	94	77	73	89	70	63	85	63	63	89	71	63
March ..	91	74	71	90	82	70	91	73	73	91	73	71
April	91	74	71	91	72	73	93	78	74	92	76	74
May	89	76	74	89	75	77	89	71	72	91	77	76
June	91	81	84	92	84	84	94	83	86	93	82	83
July	92	83	84	92	83	82	93	83	86	85	89	87
August ..	93	84	84	93	85	85	96	87	87	95	84	84
September ..	94	86	84	93	79	78	95	81	81	94	84	83
October ..	95	80	79	93	82	79	94	81	75	95	86	82
November ..	94	77	67	92	77	71	95	80	70	94	82	76
December ..	93	80	70	93	78	70	94	81	71	93	79	68

Table Showing Humidity (%) percentage—*Concld.*

Months	1971			1972			1973			1974		
	00 Hrs.	03 Hrs.	12 Hrs.	00 Hrs.	03 Hrs.	12 Hrs.	00 Hrs.	03 Hrs.	12 Hrs.	00 Hrs.	03 Hrs.	12 Hrs.
1	14	15	16	17	18	19	20	21	22	23	24	25
January ..	91	79	70	91	81	67	89	71	63	94	79	66
February ..	84	70	60	85	68	57	87	70	64	87	66	60
March ..	*	*	*	93	73	70	86	76	62	95	80	74
April ..	*	*	*	91	77	77	90	74	77	93	76	79
May ..	93	77	74	91	74	77	95	79	81	92	78	83
June ..	95	85	86	91	80	82	95	85	85	94	86	83
July ..	97	89	88	93	84	83	93	83	85	97	91	90
August ..	96	87	88	95	87	87	91	83	83	95	89	86
September ..	95	85	86	94	80	77	92	82	77	95	81	83
October ..	89	82	83	94	81	75	88	83	81	93	81	79
November ..	96	84	76	93	78	71	95	87	80	93	84	80
December ..	*	(c) *	*	91	78	67	95	85	77	91	79	66

N.B.—*Observation not taken due to liberation war. (c) Observation taken for 28 days only.

Months	1975			1976			1977			1978		
	00 Hrs.	03 Hrs.	12 Hrs.	00 Hrs.	03 Hrs.	12 Hrs.	00 Hrs.	03 Hrs.	12 Hrs.	00 Hrs.	03 Hrs.	12 Hrs.
1	26	27	28	29	30	31	32	33	34	35	36	37
January ..	90	77	60	93	79	62	85	77	65	83	68	56
February ..	89	73	64	90	74	66	88	82	64	88	67	57
March ..	87	72	62	90	76	91	88	80	72	82	76	78
April ..	91	75	73	90	73	71	90	80	78	92	70	79
May ..	91	77	75	93	82	81	95	81	77	91	82	80
June ..	93	79	79	94	85	86	93	84	84	91	81	80
July ..	95	89	85	98	91	81	94	86	86	Not available.		
August ..	93	83	83	91	75	75	93	85	84	Do.		
September ..	95	83	81	93	75	76	93	83	79	Do.		
October ..	95	85	83	95	80	65	93	82	74	Do.		
November ..	95	83	77	93	81	73	93	81	73	Do.		
December ..	94	83	68	91	80	67	91	79	64	Do.		

11. **Rainfall**—Owing chiefly to difference in elevation and the increasing height of Hills towards the East and the North-East, the rainfall varies considerably from place to place, the amount of rainfall usually diminishing towards the North. Thus the annual (normal) rainfall is about 102·08″ at Chittagong which increases to 132·01″ at Cox's Bazar. In July rainfall averages about 23·53″ which drops to an average of about 7·09″ in September and 10·42″ in May. Hence rainfall is high throughout the Forest Division. The annual (average) rainfall for 6 years from 1961 to 1966 was 119·34″. About 80% of the years total rainfall occur between June and September.

The following Table gives the rainfall data recorded in inches at Chittagong from 1967 to 1978.

Table Showing Rain fall in Inches

Months.	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
1	2	3	4	5	6	7	8	9	10	11	12	13
January ..	0·63	0·27	0·00	0·02	0·03	0·00	0·20	0·00	0·00	0·00	0·09	0·00
February ..	0·00	0·44	0·00	0·40	0·00	0·74	0·33	0·00	0·00	0·24	1·53	0·00
March ..	4·90	0·32	4·67	0·07	*	0·00	0·93	6·21	0·01	0·00	0·00	0·07
April ..	4·98	1·89	9·88	5·13	*	6·66	6·81	3·30	2·68	2·35	19·37	1·89
May ..	3·50	12·09	1·19	6·15	2·91	3·84	14·99	13·43	12·29	5·54	13·09	14·73
June ..	86·80	23·20	26·68	11·67	44·28	19·73	18·78	47·78	13·84	38·72	19·63	31·14
July ..	26·69	42·53	26·68	28·60	37·35	15·04	16·52	37·38	35·58	49·85	22·25	Not available.
August ..	21·68	14·45	28·03	15·83	36·82	24·76	11·01	24·18	11·87	18·37	11·61	Do.
September ..	13·06	2·83	10·00	12·48	8·44	4·26	11·23	14·66	12·19	3·83	6·47	Do.
October ..	8·76	3·64	1·14	14·94	2·31	3·17	8·31	12·49	9·33	8·25	2·84	Do.
November ..	0·00	0·24	1·23	5·89	4·38(c)	0·10	10·19	3·84	5·44	9·90	0·45	Do.
December ..	0·00	0·00	0·00	0·00	*	0·00	1·54	0·00	0·00	0·39	0·03	Do.
Total ..	17·00	103·90	109·50	101·18	136·79	78·30	100·84	162·27	103·23	137·44	97·36	47·83

N.B.— *Observation not taken due to liberation war. (c) Observation taken for 28 days only.

12. **Winds**—In October the wind blows most frequently from North to South and during the next four months there is a steady, slow change of direction; the wind blowing from the West. In March, the wind is usually from North during the night and from the South during the day, but as the month advances the Southernly wind gradually increases until it prevails entirely. The cold weather winds being mostly landwinds are comperatively dry, and the moisture in the atmosphere increases very little, till the Southernly winds set in. During the monsoon months, the winds blow from the South-West and the air steadily becomes more charged with moisture till September which is the dampest month in the whole year.

13. **Cyclones and Cyclonic Storms**—Cyclones which lashed the coastal districts of Bangladesh including Chittagong are of Tropical nature. In the Bay of Bengal, the frequency of occurrence is highest between the period May to October. A tropical cyclone is generally born in the worm moist air over-lying the ocean South of Latitude 20°.

The wind velocity varies from 15 to 150 miles per hour. The average rate of travel is about 250 miles per day, when intensified it gets nearly stationary or slowed down in speed.

The duration of a tropical cyclone averages between a couple of hours to a week.

The cyclones which occasionally occur in the months proceeding or following the full-establishment of South-Westernly monsoon are prone to give rise to devastating storms. Chittagong has suffered terribly from these storms at different times. This kind of storm also gives rise to destructive tidal-waves (tidal bore) which sweeps inland causing wide-spread damage to human life and property.

Records are available for very destructive storms which lashed Chittagong district during the last 174 years. One of the earliest was that of 1876 which caused widespread damage.

Another disastrous cyclone occurred in 1897. Cyclones also occurred in 1960, 1963 and 1965. In all these cyclones, the human as well as livestock casualty was very high apart from damages to property and crop.

The cyclone of November, 1970, followed by tidal bore, however, has surpassed all previous records in its ferocity and destructiveness. The approximate velocity of this cyclone was estimated to be between 150—200 miles per hour.

The damage in terms of human-life, cattle-heads and property was colossal. Till another one follows, this cyclone of 1970, probably can be taken to be the worst disaster of the century.

14. **Floods** —Among other natural calamities floods are worthy of mention. The district experienced floods occasionally. One of the earliest incidences of flood was in 1904 which caused heavy damage to crops and communication system.

In 1969 there was another disastrous flood. Almost all the important roadlinks and railway lines were affected causing heavy damage to crop and property.

15. **Water Supply** —Some forest areas lie within the range of the main rivers or their tributaries and have satisfactory water supply. Areas lying outside these rivers or tributaries have poor water supply. Supply of good drinking water in many places is a problem to forest staff, forest villagers, or local people. Many Range or Beat Offices are to arrange their own sources of water supply such as tube-wells, ring-wells or tanks. Some depend on the sub-soil water taken out through temporary devices.

16. **Distribution and Area** —The forests of the Chittagong Division lie in the Chittagong Sadar (North) and Patiya Sadar (South) subdivision of Chittagong district and extend from Feni river in the North bordering Comilla Forest Division to the boundary of the Cox's Bazar Forest Division, North of Matamuhuri river. Most of the forest areas are accessible by motorable roads, bridle-paths and rivers. Some are connected by railway.

The detailed distribution of area with names of blocks, felling series, and cutting section has been shown in Appendix II.

No survey or field measurements could be done for the forest areas during the revision of this plan. However, the area of most of the Ranges/Beats have been checked up in the field with maps as far as possible and corrected from the available records in the Divisioanl Office, Range/Beat Offices.

The present distribution of area of Chittagong Forest Division is as follows :

(1) Total area of Reserved Forests	..	2,10,852·00	acres.
(2) Total area of Protected Forests	..	67,320·48	acres.
(3) Total area of Acquired Forests	..	15,328·72	acres.
(4) Total area of Vested Forests	..	7,665·00	acres.
Total ...	..	3,01,166·20	acres.

The total area at present under the administrative control of Chittagong Forest Division is roughly equal to 3,00,000·00 acres or approximately 475·0 Sq. miles. The legal position regarding the various categories of forest land, as shown above, has been specified under para. 23.

17. The forest of Chittagong Forest Division, at present, are divided into 2 (two) Forest Subdivisions and a number of Forest Ranges for better administration and smooth running of the works of the Division as detailed below :

(I) **Chittagong (North) Forest Subdivision :**

	Name of Forest Range.	Area in acres.
(1)	Olinagar	3,591·00 acres.
(2)	Karerhat	32,171·00 acres.
(3)	Baraiyar Dhala	26,456·00 acres.
(4)	Narayanhat	44,015·18 acres.
(5)	Hathazari	36,270·51 acres.
(6)	Sitalpur	8,685·74 acres.
	Total	1,51,189·43 acres.

In addition to the above Ranges, the following non-teritorial Ranges are also under the administrative control of North Forest Subdivision.

(7) Town Range ..
(8) Survey Range .. } Attached to Divisional Office.
(9) Special Range. (F.C.C.O.)

(II) **Chittagong (South) Forest Subdivision :**

	Name of Forest Range.	Area in acres.
(1)	Rangunia	29,507·00 acres.
(2)	Patiya	31,171·00 acres.

Name of Forest Range.	Area in acres.
(3) Dohazari	9,814·00 acres.
(4) Padua (Satkania)	24,443·00 acres.
(5) Chunati Nursery Range	15,664·00 acres.
(6) Jaldi	19,103·00 acres.
(7) Kalipur	9,522·34 acres.
(8) Madarsha	2,565·43 acres.
(9) Barabakia	8,187·00 acres.
Total ..	1,49,976·77 acres.

The Chittagong Forest Division has, therefore, 18 Ranges at present with a total area of 3,01,166·20 acres.

It may be mentioned that approximate 5,000·00 acres of area has been leased to B.F.I.D.C. from various blocks of this Division for rubber plantation project up to 1977-78. During 1978-79 another 1,200·00 acres have been allotted for the same purpose.

18. **State of Bounderies : Condition** —During the last plan period (1968-69 to 1977-78) and prior to that period some survey and demarcation had been done in this Division under the Scheme of "Survey and Demarcation of Boundaries of existing Forests".

The total milage covered prior to 1968-69 is 105 miles. Total milage covered since 1968-69 to 1977-78 is 135, *i.e.* the total milage covered so far is equal to 240 miles, as it appears from the available records. The details are available in Appendix—III. Due to lack of maintainance and pilferage many of the boundary pillars are either damaged or lost. It is necessary to continue this operation till the entire boundary of the forests of this Division is covered to prevent fraudulent/illegal occupation of forest land by unauthorised persons or encroachers in the absence of well-demarcated boundary lines.

It may be mentioned that the boundaries of this Division in most places follows a tortuous line along the edges of the Hills, twisting in and out of innumerable small valleys, re-entering into the Hills which have been converted to cultivated fields. It is, therefore, extremely difficult to maintain clear and demarcated boundaries in all regions of the Division.

19. Revisional Survey Maps (Settlement or R.S. sheets 16"-=1 mile) form the basis of the Forest Maps. Unfortunately residual error at the time of Cadastral Survey for the Revisional Settlement Maps were adjusted outwards from the village lands to adjacent plots of forest and errors in the maps are regretably frequent. A number of such errors have been recorded on 4"-=1 mile maps, which have been brought up-to-date during the revision of this working plan by incorporating all later inclusions and exclusions in the areas of Reserved Forests. Attempts shall also be made to re-print Block Maps, Range Maps in near future in addition to corrected Index Map of the Division already prepared.

20. **Length** —The total length of boundaries of forests of this Division is 1,006·0 miles (approximately) out of which approximately 170·0 miles are natural. Out of this length 240 miles have been demarcated so far by pucca boundary pillars.

21. **Method of Demarcation** —Proposals for future policy regarding maintenance of boundaries are given in Chapter V, Part II, Para 224.

22. **Legal Position** —Before the date of reservation, the forests were classed as "Waste Lands" and had been administered by the Revenue Department as "Khas mahals."

23. The list of Gazette notification together with date of reservation, deforestation, vesting, acquisition and transfer to other Divisions is given in Appendix IV.

A thorough scrutiny of all available records of this Division revealed that the legal status of various categories of forest-land under the administrative control of this Division is not yet very clear except in the case of Reserved and Protected Forests. Almost all the Reserved and Protected Forests have been duly notified under Government Gazette notification from time to time.

A list of Gazette notifications with date of reservation, deforestation and transfer to other Division, etc., is given in Appendix IV-A.

The Protected Forests of this Division have also been notified under Government Gazette notification from time to time since inception of this division. A list of notification declaring Protected Forests is given in Appendix VI.

It may be mentioned that this Division has approximately 7,665 acres of Vested Forest. Since 1954, after the lapse of so many years, the legal position of these forests still remains as Vested Forest within the

meaning of the Private Forest Ordinance, 1959, *i e.*, the ownership of the land and the share of net profit, if any, is still retained by the owner of these forests. As forest is a non-retainable property under private ownership as per State Acquisition and Tenancy Act, attemps should be made to notify the areas as Protected or Reserved Forests as soon as possible so as to avoid future legal complications. A list of Gazette notifications declaring the forest areas as Vested Forest is given in Appendix VI.

It may also be mentioned that this Division has an area of 15,528·72 acres of land still as Acquired Forests. The available records show that proposals for reservation of the acquired forests have been submitted to appropriate authorities from time time, between the period 1965 to 1971. Notification under section 4 of the Forest Act, 1927, has not yet been issued and the proposals have not been followed up. It is necessary to pursue the matter and get the area Reserved without further delay so as to avoid legal complications in future.

A list showing the proposal submitted for reservation of the Acquired Forest is given in Appendix VI.

24. The control of Unclassed State Forests of Chittagong Hill Tracts lies with the Deputy Commissioner of that district. But some mouzas of Chittagong Hill Tracts under Bandarban, Rangamati (Sadar) and Ramgarh (Khagrachari) subdivisions fall within the administrative jurisdiction of Chittagong Forest Division in matters relating to forest produce. The details of these mouzas are given in Appendix V.

The royalty on the forest produce which is removed from these mouzas of Chittagong Hill Tracts district is collected by the staff of the Chittagong Forest Division at Forest Toll Stations located in the Civil district of Chittagong.

25. **Transit Rules**—Rules to regulate the export of timber from private lands and to control the movement of the forest produce within or outside the district are most necessary both to safe-guard the interest of the Government and those of the owners of the many of the plots of privately-owned forests and jungle-land which occur throughout this district and which are often intricately intermingled with Government forest land. These are known as Transit Rules. T. Rules framed under *Calcutta Gazette* notification No. 9566-For., dated the 22nd September 1942, were valid till 1958. Subsequently these rules were revised to suit the changed circumstances and Rules under the tittle of "Forest Transit Rules of Chittagong, Cox's Bazar and Comilla districts" were formed under the then Government of East Pakistan, *vide* Gazette notification No. 2410-For, dated the 26th December 1959.

Further, the jurisdiction of these rules were extended to the district of Noakhali, *vide* Government notification No. 1/For-206/73/649, dated the 25th September 1973.

It may also be mentioned here that to make the above Transit Rules of 1959 more effective and up-to-date and to extend its jurisdiction over the Timber Depots, Saw Mills, Railway or Sea-routes. Draft (Revised) Transit Rules have been submitted under the Title "Chittagong and Cox's Bazar Forest Transit Rules, 1974" .....

The said Draft Transit Rules are awaiting approval of Govt. Once approved, these rules are expected to be more effective in controlling forest produce on transit to and from the district.

26. **Rights and Concession**—There is no right or concession of any sort in the Reserved Forests of this Division except in a specific case of right of pilgrims for which special rules have been framed, *vide* notification No. 2413-For, dated the 26th December 1959.

CHAPTER II

THE FOREST

Composition and condition of the crop

27. The Forests appear to owe their characteristic appearance to a secondary status leading to evergreen or semi-evergreen forest. The Chittagong flora, as Dr. Prain points out, has however, distinctive characters of its own, resembling most nearly the flora of Arakan, but having a considerable admixture of species characteristic of Kacchar and Khasia Hills.

Considering woody species only, the Chittagong flora differ from the Eastern Himalayan flora by the absence of Sal (Shorea robusta) and from that of Burma proper by the absence of Teak. The outstanding feature of the forest vegetation is the frequent occurrence of different species of the general Dipterocarpus, Quercus and Eugenia (Syzygium) Spp.

28. Though the predominate type is a tropical semi-evergreen forest, microclimatic and edaphic factors such as aspect, atmoshpheric humidity, water-supply and soil often determine the vegetation to a large extent.

29. As practically all the accessible areas were subjected to jhum or shifting cultivation, virgin forest is seldom noticed in the Division and the present crop consists mostly of secondary re-growth still in the process of succession to the climax evergreen type. This process of succession has however, owing to mal-treatment, often given way to a process of regression to a drier scrubby type of forest or to a Savannah type in certain areas. This is particularly the case near the Sunkholas (Savannah areas) which are burnt annually, and near the boundary of the reserved forest bordering the villages.

The forests are so mixed in character that it is difficult to adopt an useful classification. However, the "Forest Type" may be described as per revised classification of Sir Harry G. Champion, S. K. Seth and G. M. Khattak in "Forest Types of Pakistan" (1965).

31. According to these authors, the Forests of Chittagong Division may be classified as below:

Type I.—Tropical Wet Evergreen Forests:

(a) Chittagong wet evergreen forests.

(b) Chittagong secondary garjan forests.

Type II.—Tropical Semi-Evergreen Forests :

(a) Chittagong Tropical semi-evergreen forests.

(b) Semi-evergreen scrub forests.

(c) Semi-evergreen Savannah woodland.

(d) Moist bamboo brakes.

Type I.—TROPICAL WET EVERGREEN FORESTS.

32. **General Description**—Lofty and dense evergreen forests 120'--150'ft. high with even taller emergent trees. Consociations (gregarious dominants) are rarely met with and ordinarily two-thirds or more of the upper canopy trees are of species contributing not more than 1 % of the total number : a few species however do occur semi-gregariously in groups of moderate size. Some of the emergent trees have clear boles 100' ft. long and 15' ft. or more in girth but they may be heavily buttressed as in *Swintona*; they are mostly very briefly-deciduous though the main canopy and lower storeys maintain the evergreen nature of the forests as a whole dense; it has been demonstrated elsewhere that in such forest, apart from the scattered giant emergent trees projecting well above the main canopy, differentiation into definite canopy layers probably does not exist (RICHARDS, 1952). The bark is almost always smooth. The leaves tend to be of medium size and rather thick, entire and glossy, rarely hairy or much divided.

Epiphytes are numerous including aroids, ferns, mosses and orchids. Climbers vary greatly in amount being sometimes large and conspicuous but often not so, on the whole they tend to be less noticeable than in the rather lighter semi-evergreen forests. Ground vegetation in typical cases may be almost absent; elsewhere, a carpet of monocotyledonous herbs or selaginella and ferns; grass is absent or quite inconspicuous. The undergrowth is sometimes a tangle of canes, creeping bamboo and palms, which may replace the high forest as cane brake along water courses. Erect bamboos are unusual but may occur locally.

Distribution—Restricted to the eastern and southern parts of Bangladesh in Chittagong and Sylhet Divisions.

Locality Factors : *Temperature*—The mean annual temperature lies between 72° and 78° F. but the mean annual minimum temperature is much lower being 60° to 65° F. The January minimum is about 50° to 60° F.

Rainfall and Humidity—Rainfall is normally over 100″ and may be much more. There is a difinite 'dry' season of about 4 months with less than 2″ of rainfall in a month. This affects the vegetation less in the sheltered valleys and on the steeper slopes on cool aspects where the type seems to be best developed.

Rock and Soil—The type is found in Bangladesh solely on Tertiary and decent rocks, mainly sandstones with shales and pebble beds locally. The soil is accordingly light and sandy, becoming more loamy on the shales and some of the alluvial sites. Topography—Mostly hilly ground and alluvial ground between.

General Floristics—The Dipterocarpus are characteristic of the emergent stratum where the briefly deciduous Dipterocarpus spp. and the Anacardiaceous Swintonia (Civit) often predominate. Sterculiaceae, Artocarpus, and Syzygium generally form an important part of the upper canopy, whilst Lauraceae and Cupuliferae, more typical of the temperate forests, are often present. Mesua ferrea and Hopea are generally to be found, though not abundant. Some bamboos occur and are liable to increase if the upper canopy is broken, but they are typically absent in the undisturbed forest where canes and palms are the chief woody monocotyledens. Tree-ferns occur but not commonly, though epiphytic and groundferns are abundant. In the shrubby undergrowth Rubiaceae and Acanthaceae are frequent and locally herbaceuas monocotyledons predominate.

Subdivisions Seres, etc.—As there are fairly distinct differences between the two main occurrences of the set evergreen forest, they are dealt with separately. Most of the forests of this type have long been exposed to the practice of shifting cultivation so that virgin forest is restricted and not always easy to recognise. Much further study is needed of the composition and ecology to permit of a satisfactory analysis of the associations present and an understanding of their relationship to one another and to the semi-evergreen types with which they merge almost imperceptibly. The following subdivisions are recognised.

33. *Chittagong Wet-Evergreen Forest* : **Description**—As for the type.

Distribution—In deep valleys or in localities shaded by lofty hills where there is a plentiful water supply.

FLORISTICS :

Chittagong Division (Hazarikhil)

I. Dipterocarpus pilosus, D. turbinatus.

II. Chickrassia tabularis, Holigarna spp., Amoora spp., Salmalia insignis, Syzygium grande, Caryota urens, Hopea odorata, Castanopsis spp., Artoearpus chaplasha, Lophopetalum fimbriatum, Pterospermum acerifolium, Vitex spp., Hydnocarpus Kurzii, Turpinia spp., Plalaquium spp., Alstonia scholaris, Tetrameles nudiflora, Schima wallichii.

II. (a) Melocanna bambusoides, Bambusa tulda, Neohouzeana dullooa.

III. Meliosma simplicifolia, Maesa ramentacea, Micromelam pubescans, Murraya exotica, Clausema excavata.

IV. Monocotyledons (Curculigo, Alpinia, Phrynium, Dracaena, etc.)

V. Combretum spp., Anonacea, Bauhinia anguina.

34. *Chittagong Secondary Garjan Forest* : **Description**—The characteristic future of this type is the gregarious occurrence of the several species of Dipterocarpus (Garjan) often with hardly any other species in the open top canopy. The Garjan trees are rarely as fine or as large as the scattered ones of the climax forests. There is typically a lower storey of the species of the semi-evergreen into which the type runs without a break. The canopy is very light at the time of leaf-fall of the Garjans, though they are almost evergreen.

Distribution—The type occurs extensively in the southern part of Chittagong Division, *i.e.* (in the northern part of Cox's Bazar Division) and more localized in the adjoining tracts.

Locality factors—These forests are typically found on the redsoiled tillas of older alluvium but also on low bills, especially on N.E. to E. aspects on the ridges. The majority of the areas are greatly affected by human influences and leaf-fires may occur.

FLORISTICS:

I. Dipterocarpus turbinatus, "D. costatus" D. Alatus (damp, low-ground only).

II. Syzygium spp., Quercus spp., Pterospermum semisagitatum, etc. (much as in the climax wet-evergreen type).

II. (a) Bamboos are rarely met with, sometimes Memocanna bambusoides and Bambusa tulda.

III. Melastoma, Eupatorium odoratum, Clerodendron viscosum.

IV. Calyeopteris.

Appearances strongly suggest that this is not a climax type, even edaphic, but has originated through human influences acting on the climax evergreen or semi-evergreen type. The persistance of the old Garjans and their continued regeneration on intensively maltreated village lands is most striking and it is evident that they are harder than their associates. A period of such treatment, which often includes a leaf-fire, favours the Garjans against their competitors and emphasises their semi-gregarious nature.

Type 2.—TROPICAL SEMI-EVERGREEN FORESTS.

35. **General Description**—Generally similar to the wet-evergreen forest described above and on present information difficult to differentiate from it. The chief feature is the appreciable proportion of deciduous trees in the main canopy including several genara and even species that also occur in the moist deciduous forests. Not only are more trees deciduous but the leafless period is longer and the canopy is correspondingly lighter during the period of minimum rainfall (November to March). This in turn is reflected by the somewhat greater prevalence of epiphytes and climbers, as well as bamboos which later, to some extent, replace the canes and palms of the climax evergreen. The higher trees are possibly more commonly buttressed than in the evergreen.

Distribution—In the eastern and southern part of Bangladesh in the the region of high rainfall and largely on hilly ground.

Locality Factors: *Temperature*—The data given for the wet-evergreen. There is a tendency for the semi-evergreen to occur on the more freely drained sites and drier aspects.

Topography—On the lower slopes of the hills from plains level up 200'ft. or somewhat more.

General Floristics—In the upper canopy Dipterocarpus spp. are usually but not always present with evergreens such as Mangifera, Lophopetalum, Amoora, Cinnamomum and Syzygium, but also a fair proportion of deciduous forms such as Tetramcles, Artocarpus, Salmalia, Duabanga, Garuga, Albizzia, Cedrela and Chickrassia. The lowar canopy is largely evergreen with various Meliaoca, Louracea, Myrtaodae and Cupuliferae. Bamboos of many species are typical and with then a few dwart palms such as Licuala-Grasses are rare or absent but other Monocotyledons such as phrynium, Alpina and Clinogyne are locally abundant especially in wet places. Rubiaceae and Acanthaceae are also usually common in he shrub layer.

Subdivisions—Data are inadequate for differentiation of the several types and associations that undoubtedly exist. Edaphic variants and degradation stages with their secondary seres cannot at present be distinguished from those of the wet-evergreen. The following subdivision are noted below :

(a) Chittagong tropical semi-evergreen forest.

(b) Semi-evergreen scrub forest.

(c) Semi-evergreen savannah woodland.

(d) Moist bamboo brakes.

36. (a) **Chittagong Tropical Semi-Evergreen Forest : Description**—As for the type.

Distribution—Throughout Chittagong and the Hill Tracts on all free drained sites; being replaced by the wet-evergreen on the moister and more sheltered parts.

Locality Factors—Rainfall tends to increase towards the south from about 100″ or less at Chittagong on the coast and Rangamati well in the interior, to cover 150″ in Cox's Bazar. The increase is almost entirely concentrated in the May-September S.W. monsoon period. Soil factors are as for the group.

FLORISTICS:

I. Diptorocarpus costatus, D. turbinatus, D. pilosus, Artocarpus chaplasha, Swintonie floribunda, Pterygota alata., Holigarna spp., Mangifera longipes, quercus spp., Salmalia insignis, Stereospermum chelonoides.

II. Dillenia pentagyna, lannea grandis, Dysoxylum binectariferum, pterospermum semisagittatum, Meliosma pinnata, Zanthoxylum flavescens, Vernomia arborea, Vitex spp.

II. (a) Oxytenanthera nigroeiliata etc.

III. Rubiaceae, Melastoma, etc.

Note—These forests appear to have been influenced by human activities to a varying extent. The prevalence of Dipterocarpus is marked and the line between this type and the secondary Garjan Forest is very uncertain.

37. (b) **Semi-Evergreen Scrub Forest**—This is low-evergreen forest as described in the previous Working Plans. In many places, the mixed evergreen and semi-evergreen forest in easily accessible situations, as along the reserved forest boundaries has been reduced by long continued grazing and cutting to an irregular cover consisting mainly of evergreen trees of the original middle storys, often coppiced, with scattered taller mostly deciduous trees such as Albizzia spp. Lannea coromandelica, Garuga pinnata, Salmalia, Sterculia, spp. Ficus spp. and occassionally a big Dipterocarpus tapped for grajan-oil. There is a tangled undergrowth in which the exotic weed Eupatorium may be conspicuous and weedy climbers are often strongly developed. Examples are numerious in other divisions as well.

38. (c) **Semi-Evergreen Savannah Woodland**—After clear felling and temporary cultivation, especially where repeated, heavy grass growth is liable to become established and get burnt periodically. This treatment tends to eliminate almost all the evergreen species and result in a very open Savanna type with scattered nearly all deciduous trees of poor height and condition over dense grass.

It appears probable that with protection from burning (and sometimes grazing also) the tree cover would extend and gradually thin out the grass after which the progression towards the semi-evergreen type might begin.

39. (d) **Moist Bamboo Brakes**—It is possible that the bamboos which are so characteristic of the region occupied mainly by the semi-evergreen forests, may locally be entitled to climax status though it appears very probable that in most cases where they are found extensively without overwood, this condition is due to former clearing. For this reason, and because it is difficult to assign precise site-factors determining their dominance as a possible edaphic-climax type, the brakes are described as a Secondary series. A more or less complete cover of bamboos of both clumped and single stemmed types, the latter (notably Melocanna) being most general. There are usually, but by no means always, scattered trees typical of the evergreen or semi-evergreen climax standing singly over the bamboo especially in depressions, both evergreen and deciduous species being represented. The shade cast by the bamboos is such that there is normally no undergrowth, but in the more open parts it is developed to a varying extent. The several species tend to be concentrated in separate groups though with appreciable overlap. Melocanna appears to flower and die gregariously at 45-50 year interval producing exceptionally large and heavy "seed". These bamboos are cut annually in very large quantities for the manufacture of pulp.

Distribution—These bamboo brakes occupy extensive areas in the Chittagong Hill Tracts and to a lesser extent in Chittagong and Cox's

Bazar Divisions, as also in parts of Sylhet, *e.g.*, Raghunandan Hills and Tarap Hill.

Locality factors—Climate and soild those of the group. shifting cultivation has long been practised all over the region and has very probably brought about a great extension of the type, if it is not the sole cause of its development.

Ecological status—It is possible that locally these bamboos can hold the ground as a primary edaphic subsclimax, but the occurrences considered here over large areas must usually be ascribed to Biotic factors. STAMP is of opinion that Memocanna "seems" to be able to spread into and destroy high forest without the help of man. This is supported by the authors of the Burma Working Plan Mannual who writes..... "(Melocanna) is intrusive and has undoubtedly spread over a considerable area of several types. Typically it is found on a shallow clay, but it has also displaced evergreen and other forests. As the dense growth precluded natural regeneration of most species the tendency is to reduce the growth over these areas to pure (Melocanna)". It is contrary to probabilities that bamboo can permanently oust tree forest, but is not impossible as a temporary phase.

INJURIES TO WHICH THE CROP IS LIABLE

40. **Encroachment**—This is a very serious problem of this division much of the workable areas including plantations already raised, is under encroachment in Karerhat Range of this division. Encroachment cases are also found in other areas of the division. Though it is difficult to furnish correct statistics of encroachment cases or forest land, the avialable records show that about 33,883 (Thirty three thousand eight hundred eighty three) families of encroachers were reported before liberation and this included refugees from the adjoining Hill Tippera district of India. Prosecution cases were also instituted against them from time to time. It may be stated that of all the forest land so far encroached, Karerhat Range appears to be worst-affected and about fifty per cent of the total numbers of the encroachers are likely to be found in this range alone. This is specially due to the influx of large number of regufees from the adjoining districts of Noakhali and Comilla. It is 'genuinely apprehended that the number of encroachers will be much higher today'. It may also be mantioned that all attempts to evict these encroachers have failed in the post. This has, therefore, posed a socio-economic problem and requires a clear-policy decision from the Govt. and to evict them, Co-operation of all Law-enforming agencies and the district Administration will be necessary.

41. **Jhooming**—Jhooming or shifting cultivation is also a problem specially in area adjoining to Chittagong Hill Tracts and near the habitation of tribal people to whom it is the hereditary method of cultivation. In the past it was one of the most destructive agents and the present denuded condition of the hills is partly due to the result of indiscriminate Jhooming in the past. Many of the forest of this division have common boundary with the unclassed state forest of Chittagong Hill Tracts where Jhooming is allowed. Such valuable areas are to be kept under constant watch specially during the time of Jhoom-burning, *i.e.*, from February to May every year.

42. **Incendiary/Accidental Fire**—Incendiary fires set by unscrupulous persons are not uncommon and at times causes damage to the plantations or the adjoining reserve forests. These are mostly in the form of "Ground-fires" but when the affected area is a Teak plantation, it may occasionally be "Crown-fire" as well. Such incendiary fires may be set by interested persons for obtaining good quality sungrass in hilly areas or for better and sufficient regeneration of foddergrass for grazing cattle. Accidental fires are also found to occur in the plantations as well as in the forest areas. During the last few years forest-fire has been found to be one of the greatest problems of the division. Many plantations were affected due to such fire. In the plantation affected by forest-fire most of the planted seedlings like Garjan, Gamar and Dhakijam could not recover from the injury. Teak seedling, however, recovered fairly well in spite of the burn injury since this is a fire-resistant species.

43. **Injuries by Animals**—Grazing by intruding cattle in young plantations is a problem and at times, is responsible for poor natural regeneration in the high-forest or stunted growth of the seedlings in youngs plantations. Since there is death of sufficent pasture-land for cattle of the local people, the forest areas in general, and at times, the plantation areas are also susceptible to grazing and it is very difficult to control the movement of cattle within a relatively vast area under the jurisdiction of limited number of the forest staff. Grazing, however, is not harmful in old and established plantations.

44. **Wild Animals**—Wild elephants were common in the past and did considerable damage to the forest. Now-a-days the number of wild elephants has gone down. Some hards of elephants wander between Panua reserve adjoining Tripura state and the northern boundary of Karerhat range. Herds also wander in the forest areas of Harbung, Khurusia and Jaldi regions. In the forests they damage paths and temporary bridges and break large quantity of bamboos. Wild boars, Barking deer, Langurs and Monkeys are common in the forests and do some damage specially

in the young plantations. Sambar is smaller in number and mountain-goats are rare. Wherever available, Sambars eat away the bark of young Gamar-Saplings and destroy seedlings of many other species. Chapalish leaves are relished by wild elephants and in the process of eating, damage is often done to the branches of Chapalish trees in addition to breaking large number of bamboos. Porcupines are a menace to soft-wood plantations specially that of Simul. The roots of this species are eaten up by procupines.

45. **Damage by Plants : Creepers**—The principal creepers belong to the natural orders Anonaceae, Meni-spermaceae, Malpighiaceae, Ampelideae Subiaceae, Leguminosae, Canneraceae, Combretaceae, Cucurbitaceae, Oleaceae, Dioscoreaceae and the principal species being, Tinospora Cordifolia, Vitis spp., Sabia limoniacia, Spatholobus roxburghii, Entada pur Soetha, Mucuna, Monosperma, Banhina anguina, Acacia Concinna, Combretum acuminatum, Jarmnium Scandens, Iposoea strigosa, Ipomeea paniculata, Dioscorea, Smilex macrophylla S. roxburghiana, and S. Prolifera etc. Considerable damage is caused by these creepers by precluding natural regeneration and covering the crowns and killing of the foliage of the existing crop. One of the greatest menaces is "michenia" (Michenia Scanderp family: Compositae) which has been found to do great damage to the young plantations of this division especially in the northern portion. This creeper locally known as "Pichash-lata" has invaded large areas of plantations, it is found to cover the entire crown of the trees in plantations and arrests the growth of trees. In the high forests also this is found to be a menace. It is very difficult to eradicate this creeper which is spreading in other areas of the division also.

46. **Assam Lata and Lantana**—Assam-lata (Eupatorium odoratum) and Lantana-camara are scramblers which are also menaces to the seedlings of artificial regeneration in the forest areas. Assam-lata is more destructive, whenever a clearing is made. Unless protective measures are undertaken, the area becomes covered with Assam-lata within a period of three years, which forms an impenetrable thicket.

47. **Sungrass**—Sungrass (Imperata cylindrica) hinders tree growth in plantations as well as in virgin forests. It destroys the fertility of the soil by its greater adaptability to dry blank areas. It is very difficult to eradicate this form the plantations since this is gregarious in nature having a strong-spreading-root system.

48. **Epiphytes and Parasites**—Epiphytic species of the genus *Ficus* and various species of Loranthus and viscum are generally found to cause damage. The attack of Loranthus on Gamar in pure plantations has proved so severe at Kaptai, Hazarikhil and elsewhere that the idea of planting this species as a pure crop has been abandoned.

49. As already mentioned, the district of Chittagong was subjected to wind-storms and cyclones of high velocities from time to time. Cyclones causing considerable damage accured in 1895, 1897, 1911, 1941, 1947, 1960, 1961, 1965, 1966 and 1970. The 1947 wind-storm caused heavy damage to the forest of this division. The Teak plantations of Jaldi Range were considerably damaged. The disastrous cyclone of 1970 affected the forests, habitation and people in the worst manner.

50. **Land-slides and Erosions**—Land-slides are not common in the forest area. The unrestricted cutting of trees, bamboos and forest cover specially in the hilly areas exposes the top-soil where erosion may take place.

CHAPTER III

UTILIZATION OF THE PRODUCE AGRICULTURAL CUSTOMS AND WANTS OF THE PEOPLE

51. The population of Chittagong Sadar (North) and Sadar (South) or Patiya Subdivisions, according to 1961 census, was 24,43,854. According to 1974 census this has increased to 35,06,150. The people of the district especially the rural people are mainly cultivators. Rice is the main agricultural crop of the district and Chittagong was one of the four districts which were surplus in rice production after liberation of Bangladesh. The other crops are cereals, pulses, spices, condiments, sunhemp, betel leaf, sugarcane, fruits and vegetables. Chittagong produces handsome quantity of Tea and a small quantity of Tobacco.

52. The rural people are largely dependent on the adjoining forest area for meeting their requirements of day-to-day life. The agricultural implements like plough-pieces, bullock-carts, cart-wheels needed by the people, are to be met from the forests.

The Sampans, Dugouts, fishing-boats and country-boats required by the fisherman are constructed out of timber from the forest areas or in a small proportion from the village-groves.

The rural people in general require the House-posts, Fencing-posts, Pan-bar-Stakes, Fenching stakes, Bamboo, Thatch-grass, etc., for rural constructions.

53. The villagers depend upon the neighbouring forests for grazing their cattle and supply of bamboos and thatch-grass for building houses. The larger bamboos are used for house-posts, and muli (Melocanna bambusoides) bamboos for ceiling, roofing and walling. The other uses of bamboos are fencing, basket-making supports or fencing-stakes in betel-leave (Pan) plantations which are very common in areas adjoining forests. These are also used for trapping fish. Timber is required by forest villagers and rural people for plough pieces, carts and other agricultural implements. Firewood is required in huge quantities by these people. Due to scarcity and insufficient supply of dry-firewood, even young plantation trees or shrubs are cut down (in green stage) for supply as firewood to rural as well as to urban areas and also to Pulp Mills to be converted to "Pulp" in mixture with bamboo-chips. Forest cannot meet the fuel-wood requirements of the district.

54. The fishermen require large trees for making boats, the floats for nets and large bamboos for stakes. The oars are made of timber. For making Sampans (typical of Chittagong and adjoining coastal districts)

large quantities of Toon (Cedrela toona) are used. Garjan (Dipterocarpus spp.) and Kamdeb (Calophyllum spp.) are also used. Garjan is also largely used for making bodies of large cargo and Ocean going boats, in addition to dugouts and country-boats. In recent years, fishing boats are being built with pressure treated garjan sawn timber under Danish assistance. This is a good beginning.

MARKETS AND MARKETABLE PRODUCTS

55. **Timber**—Chittagong and Chittagong Hill Tracts supply the bulk of all commercial timbers for meeting the country's requirement, apart from the supply obtained from the Sundarbans. In addition to meeting this internal demand, Chittagong and Chittagong Hill Tracts have recently started exporting some quantity of Teak, and other important commercial timbers to some foreign countries. Large quantity of commercial timbers is also transported to other districts of Bangladesh. Dhaka, the metropolitan city having largest demand for commercial timber for construction and development works, depends mainly on the supply from Chittagong Zone. The division's contribution to supply of sleepers for Railway of the country is considerable.

The wood-based industries of the country like Veneer and Ply-wood factories, cabinet-manufacturing plants, furniture making industries, carpentry and joinery-woods, etc., are also largely dependent on the supply of commercial timber from this zone. A number of wood-based industries are located around Chittagong of which the following deserve mention:

The cabinet-manufacturing plant of B.F.I.D.C. at Kalurghat, Rubi Ply-wood Manufacturing Co., M/s. A. K. Khan Ply-wood Co. Ltd., Chittagong Board Mills Ltd., Lam-wood Industries, Sangoo-valley Timber Industries, etc. The use of ply-wood and hardboard is increasing fast; ply-wood is being used for furniture, cabinet-making roofing, flooring, ceiling, partition, show-cases, inner lining of buses, trucks and autos. Hard-boards are also used for most of the above purposes. Ply-wood and hard-boards are also used for making packing boxes and light furniture as usual. The following are the important commercial timbers of Chittagong Zone and are described below in order of priority:

(1) **Garjan** (*Dipterocarpus spp.*)—This timber is commercially most important, its weight varies from 37 to 48 lbs. per cft. The woods of all the Garjans are very similar in colour and general appearance. The wood is greyish in colour, dull and has a rough feel. It presents a uni-colour surface without much grain or ring marking. When cut in the

quarter, it shows a fairly conspicuous silver grain effect. It darkens a bit on exposure, retain its reddish colour. Garjans are heavy, strong, hard, generally straight-grained, coarse-textured woods. All the Garjan season well with care. Air seasoning is preferable to kiln seasoning. The Garjans are considered fairly durable under cover.

These are easy to treat with preservatives. The Garjans are very easy to saw, work and peel. They cannot be finished to a smooth-surface but they can be brought to a finish suitable for paint or polish work.

The Garjans are available in large quantities. They are good quality constructional woods and if treated, they rank high among the country's building and general purpose timbers. When treated they are being used as reailway sleepers, electric transmission poles and other constructional works. Recently the popularity of garjan has increased considerably particularly for use in boatbuilding, railway sleepers and general construction works.

(2) **Jarul** (*Lager-stroemia speciesa*)—Weight 39 lbs. per cft. varies from 31 to 49 lbs. The sapwood is greyish-white, fairly wide, heart-wood is pale-red to brownish-red on exposure. It is a heavy to moderately heavy, moderately strong, moderately hard, medium coarse-textured wood.

Jarul seasons well with care. It is a slow drying wood. Kiln seasoning presents no difficulty. It is very naturally durable timber and is difficult to treat. It is easy to saw and work. It can be finished to a smooth surface, takes good polish. Being a good quality durable wood of about the same weight as Teak, Jarul is a valuable timber. It is well-known as a constructional timber and is much in demand for railway wagon work, floor boards, house building, boat-building, shoe-heels, boot-lasts and a variety of other purposes, *e.g.*, construction of railing clips and bridges due to its durablity under water. The availability is, however, limited in the forest.

(3) **Teak** (*Tectona grandis*)—Weight 40 lbs. per cft. varies from 31 to 52 lbs. The sap-wood is greyish-white, heart-wood is light golden brown. Teak has a characteristic smell and an oily feel. It is moderately heavy, strong, moderately tough, steady, hard, straight-grained, coarse-textured wood. Chittagong-Teak is the most important general purpose wood of the country and has got export value.

Teak seasons well with care. It dries quickly and can be easily seasoned in Kiln. Teak is the most durable wood with its heart-wood naturally durable and as such is one of the most durable woods of

the world. Teak is a relatively easy wood to saw and work and is popular in any work-shop. It can be finished to a fair-surface and takes polish well. It makes excellent plywood, both of the commercial types, it is also suitable for sliced ornamental veneers.

Uses of Teak are too well-known and too numerous to be described. It is the most important furniture-wood of the country and one of the most important woods in the world. In ship-building it is incomparable due to its great durability. Supply of Teak is, however, limited.

(4) **Gamar** (*Gmelina arborea*)—Weight 31 lbs. per cft. varies from 22 to 38 lbs. Gamar is a pale-yellow, greyish-white or raddish-white wood ageing to light russet or yellow-brown. The heart-wood is not distinct. It is a moderately heavey, steady, soft, moderately interlocked and often curly grained, medium coarse textured wood. It takes long to season. It is a very durable timber, but does not remain immune to termite attack if placed in contact with ground. Gamar is an easy wood to saw and work to a good finish. It can also be turned to a fair surface and takes paint and polish extremely well. It peels on a rotary lathe for making plywood. Being quite steady after seasoning, gamar is one of the best and most reliable timbers of the country. It is very durable for furniture, panelling, boatbuilding, doors and windows and pattern-making. The supply of gamar is also limited.

(5) **Chapalish** (*Artocarpus chaplasha*)—Weight 32 lbs. per cft. varies from 20 to 42 lbs. Chapalish varies in colour from gellowish brown to brown. It is moderately heavy, moderately strong, very hard, heavily interlocked grained and coarse-textured. Chapalish seasons well with care. Kiln seasoning presents no difficulty.

It is considered as durable timber. It is not easily treatable. Chapalish is easy to saw and work well. It is suitable for light and heavy constructional work, furniture, boat and ship-building. It is often very ornamental and worth selection for furniture and panelling. It is a good peeling wood and makes an excellent plywood. It is available in the Chittagong Hill Tracts and Sylhet forests of Bangladesh. Its supply is moderate.

(6) **Telsur** (*Hopea odorata*)—Weight 47 lbs. per cft. varies from 33 to 59 lbs. Telsur s dull greyish-brown or reddish-brown wood, sometimes showing a yellowish tinge. It is heavy, strong, very hard, heavily interlocked grained, medium textured. The wood cracks in seasoning; on the whole good reasult can usually be obtained with care and attention.

It is considered as a moderately durable wood. Untreated sleepers have been known to last for 15 years or more. The heartwood is not treatable. The sapwood treats readily.

It is a typical strong and durable constructional wood. It is used for boat-building. bridge work, piling, beams, rafters, masts, cart, building, railway-sleepers and many other purposes where its quality of strength, hardness and durability is required. In Burma it is reported to be the best general purpose wood next to Teak. The supply is very limited in the forests.

(7) **Boilam** (*Anisoptera glabra*)—Weight 35 lbs. per cft. varies from 30 to 42 lbs. The wood is pale reddish-brown resembling garjan but more variable.

It is a moderately heavy, moderately strong, moderately hard, interlocked grained, coarse textured wood. It cracks in seasoning and is difficult to season. It should be protected from quick drying.

The wood is fairly durable under cover and is easy to treat. It is easy to work but difficult to bring to a good surface. It is suitable for constructional work, planking, packing cases, sleepers and is locally very much in demand for boat-building. Limited supplies are available from Chittagong and Chittagong Hill Tracts.

(8) **Shil Koroi**—It is the trade name of wood probably belonging to Albizzia lebbek, A. procera and A. odoratissima, but mostly A. lebbek. The sapwood is white and often fairly wide. The heart wood is a rich walnut brown, often handsome, striped with brighter and darker markings and with a pleasant golden lustre which shows up well under polish. It is heavy, moderately strong, hard, slightly interlocked, coarse textured wood. It is considered as tough. It falls in the category of timbers which season well with care. Shil Koroi is moderately durable and difficult to treat. A. lebbek has the same weight and hardness as Teak but A. odoratissima weights 55 lbs per cft. It is harder than Teak :—

It is difficult to work but it can be finished well after filling the pores. It is not suitable for rotary veneer cutting, but for sawn or sliced-veneer it is excellent.

It is excellent for high-class furniture, interior decoration and panelling. It can be extremely handsome if a proper selection is made and the golden sheen which it retains permanently enhances its value.

It is found scattered all over the country, supplies come from the Chittagong, Chittagong Hill Tracts and Sylhet forests of Bangladesh. Supply is moderate.

(9) **Surujbet or Toon** (*Cedrela toona*)—Weight 32 lbs. per cft. varies from 24 to 38 lbs. The sapwood is greyish-white, heart-wood, pinkish brick-red when freshly cut ageing to a rich reddish-brown.

It is moderately heavy, moderately strong, moderately hard, heavily interlocked grained, medium coarse textured wood.

It seasons well with care. It is durable under cover; difficult to treat.

Toon is one of the most commonly used wood being cheep, easy, to work and easily seasoned. It is widely used in small work shops. It is used for various domestic building purpose, tea boxes, cigar boxes, toys, etc. It is also suitable for panelling and produces good veneer. It is found scattered in most forest areas of Bangladesh and the availability is very limited.

(10) **Champa** (*Michelia champaca*)—Weight 32 lbs. per cft. varies from 21 to 41 lbs. The sapwood is narrow and whitish or pale greyish, heartwood yellowish-brown. It is moderately heavy, moderately strong, soft, interlocked, medium fine textured wood. It seasons well with eare. The wood dries quickly. Kiln seasoning presents no difficulty. but kiln seasoned woods seem to loose colour during the process of drying.

Champa is durable under cover. It is difficult to treat. It is very easy to work, turn and finish. It takes stain and polish nicely.

Champa can be considered as first class timber for furniture in general, joinery and cabinet making and bent-wood work. It is also used for boat building, box-hooks panelling and household equipments. The wood of Champa may make good substitute for Sitkaspruce for aircraft-work. It makes excellent veneers for plywood. It is found in Chittagong, Chittagong Hill Tracts and Sylhet forests and the availability is very limited.

(11) **Bandarhola** (*Duabanga Sonneratioides*)—Weight 32 lbs. per cft. varies from 24 to 47 lbs. It is a light brownish-grey wood with no distinct layer of sapwood. It is a light to moderately heavy, weak, soft, slightly interlocked grained very coarse textured wood.

It is easy to season. The logs should be converted green and sawn quickly. It is fairly durable under cover and difficult to treat. It is a very easy timber to saw and work, though it requires a little time to bring to a smooth surface.

It is mainly used for planking, packing cases, ceiling boards, and light furniture. It is found in Chittagong, Chittagong Hill Tracts and Sylhet forests of Bangladesh and availability is limited.

(12) **Jam/Dhakijam** (*Syzygium spp.*)—Weight varies from 42 to 62 lbs. per cft. The Syzygiums are reddish-grey woods sometimes with darker markings.

They are very heavy to extremely heavy, strong to very strong, hard to very hard, interlocked grained, medium coarse textured woods. The Syzyhiums as a class are timbers which crack badly in seasoning. The aim should therefore be to dry them slowly under favourable conditions. The timbers can be kiln seasoned without much degradation.

They are durable woods; they are difficult to treat. They are not difficult to work, saw and bring to a fine finish. They are good woods which deserve more attention than they have received in the past. If well selected some of them can be excellent furniture wood. Their ability lies more in constructional rather than ornamental spheres and they can be considered as suitable for beams, columns, doors and windows, boat-building, carts, sleepers, etc.

The main sources are the forests of Chittagong and Chittagong Hill Tracts. Moderate supplies are available from the forests. Other timber spps. in demand for beams, rafters, and plantings are Tali (Dichopsis polyantha) which is also used for boat-building. Jam (Syzygium jamolana) is used for house-posts and agricultural implements and Kala Koroi (Albizzia odoratissima) is used for cart-wheels.

Recently timbers other than Garjan such as Jam (Syzygium spp.), Kanak (Schima spp.), Batana (Quercus spp.) and Shil-bhadi (Garuga spp.) are being used for making railway sleepers, since supply of Garjan for railway sleepers is not enough.

(a) **Packing cases and boxes**—Woods for this purpose should have the following specifications :—They should be light, easily workable, and cheap. They should have good nail-holding power and be preferably of light colour. For packing-boxes for food-stuffs the wood should be free from any objectionable odour. Tea is generally packed in playwood-chests which are strong, light and cheap. Civit (Swintonia floribanda) is widely needed for making good tea-chests. Garjan (Dipterocarpus spp.) is also used for the same purpose. In addition, the following are some of the common local timbers used for packing cases and boxes:—Simul (Salmalia spp.), Mango, Uriam (Mangifera spps.), Chundul (Tetramelis spp.) Toon (Cedrela spp.), Bahal (Cordia spp.), Chatian (Alstonia spp.) and Champa (Michelia spp.).

(b) **Match-boxes** —Simul (Salmalia spp.) is a good timber for match-boxes but too weak for sticks. Other timbers suitable for splints and boxes are Chatian (Alstonia spp.), Civit (Swintonia spp.) and Aam (Mangifera spp.), Kadam (Anthocephalus spp.) and Pitali (Trewia spp.).

(c) For making pencils the best suited species is Banspata (Podocarpus nerifolia), which is scarcely available. Other species generally used for making pencils are Simul (Salamalia spp.), Chatian (Alstonia spp.), Pitali (Trewia spp.), Narikeli (Starculia spp.), Civit (Swintonia spp.) and Toon (Cedrela spp.).

The agricultural populations of Chittagong district are largely dependend on the forests of this division for meeting their requirements like house-build materials, firewood, fencing-stakes, agricultural implements, grazing and number of minor forest produce.

Though many of the bazars in the district are distributing centres for forests produce for the villagers and in some cases for the people living in and around important rail-head or market places; the more important centres for marketing of timbers and other forest produce are Nazirhat, Dohazari, Satkania and Chittagong Town—where timber and other forest produce are brought from various places for marketing.

56. **Minor Produce :** (a) **Bamboos** —Of minor forest produce, Bamboos are the most important, not only for the district but for the whole country. The bamboos are of cent per cent utilization value and are used by the village-folks and forest-dwellers for any and every purpose. This may quite justifiably be called the "Poorman's timbers" since this is used for construction of cheap-houses, house-posts, rafters, fencing-stakes, agricultural implements, posts for rowing boats, machans, pails, kitchen-post, bows and arrows, even for food. This is really an all-purpose produce. But unfortunately, this resource is dwindling every year in the Forest areas of Chittagong Forest Divison.

The best use, of course, is making good quality pulp in pulp and Paper Mills which, besides meeting country's total demands, earns valuable foreign exchange by export.

The principal species of Bamboos found in forest are :

(1) **Muli** (*Melocanna Bambusoides*) —is largely used for pulp and paper making in Chandraghona Paper Mills. Also used for wall, for floor-matting, roofing, fencing, basket-making and many other essential items of day-to-day life of people living in areas adjoining forest and rural areas.

(2) **Mitenga** (*Bambusa tulda*) —used for pulp and paper, houseposts, rafters, matting and baskets.

(3) **Daloo** (*Tenostachyum dullooa*) used for roofing, fencing and mat-making.

(4) **Orah** (*Dendrocalamus longispathus*) used for mat-making, fencing.

(5) **Kali** (*Oxytenanthera nigrociliata*) used for fencing and basketworks.

(6) **Bazali** (*Teniostachyum griflithii*) used for umbrella- sticks, supports to betel-leaf plantations.

(7) **Kaliseri** (*Oxytenanthera auriculata*) used for fencing and basket-making.

(b) **Sungrass** (*Imperata aroundinacea*)—Next in importance is the sungrass, the principal thatching grass. Large quantities of sungrass are used by rural people. Even in urban areas, some people use this for roofing. Supply of sungrass is not adequate from the forest areas of Chittagong District. Hence large quantities are brought from Chittagong Hill Tracts. Owing to spread of Assam-lota and lack of proper maintenance, the sankholas have deteriorated. Sungrass is collected by traders or villagers on the strength of permits or from sunkholalots annually disposed of in auction.

(c) Morcha and Kechya are also used for walling. Hogla (Typha spp.) and Patipata (Clinagyna dichotoma) for mats.

Medicinal Plants :

Medicinal plants are available in the forests of Chittagong, Chittagong Hill Tracts and Cox's Bazar. There are also available in the rural or urban areas of Chittagong Zone in varying proportions and also in other districts of Bangladesh. The following table shows the list of important medicinal plants that are available in Chittagong Zone :

Sl. No.	Local Name	Botanical Name	Family	Availability	Use
1	2	3	4	5	6
1.	Basak	Adhatoda-vasica	Acanthaceae	Pluntiful	In cough, fever etc.
2.	Bakful	Sesbania grandiflora	Leguminoseae	Do.	Jaundice, poisoning etc.
3.	Ghritakumari	Aloe vulgaris	Liliacese	Do.	In worm, Eye-disease etc.
4.	Chatian	Alstonia Scholaris	Apocynaceae	Do.	Pain, Sore, fever etc.
5.	Kalmegh	Andrographis-paniculata.	Acanthaceae	Do.	Stomach disorder, malnutrition etc.

Sl. No.	Local Name	Botanical Name	Family	Availability	Use
1	2	3	4	5	6
6.	Kadam	Anthocaphalus-Cadamba	Rubiaceae	Plentiful	Fever, antisceptic etc.
7.	Shatamuli	Asperagus racemosus	Liliaceae	Do.	Veneral-disease.
8.	Simul	Salmalia-malabaricum	Malvaceae	Do.	Tonic, purgative
9.	Palash	Butea frondosa	Laguminoceae	Do.	Do.
10.	Ponial	Calophylium-inophyllum	Guttiferae	Scanty	Rheumatism.
11.	Sonalu	Cassia fistula	Leguminoseae	Plentiful	Constipation, eczema etc.
12.	Toon	Cedrela toona	Meli-iaceae	Do.	Dysentery.
13.	Gab	Diospiros embryopteris	Eheraceae	Do,	Do.
14.	Garjan	Dipterocarpus turbinatus	Dipterocarpaceae	Do.	Bronchitis, V. disease.
15.	Gila	Enteda scandens	Leguminoseae	Do,	Worm, dysentery.
16.	Eucalyptus	Eucalyptus globulus	Myrtaceae	Moderate	Antiseptic, cough, fever.
17.	Kalajam	Syzyjium cumini	Myrtaceae	Plentiful	Dysentery, Appetise.
18.	Gamar	Gmelina arborea	Verbenaceae	Do.	Fever, purgative etc.
19.	Kurchi	Holarrhena anti-dysen-terica	Apocynaceae	Do.	Dysentery.
20.	Chalmugra	Hydnocarpus kurzii	Bixaceae	Do.	Leprosy, Skin-disease.
21.	Kamela	Mallotus philippinensis	Euphorbiaceae	Moderate	Purgative.
22.	Neem	Melia azadirachta	Mellaceae Cuttiferae	Plentiful	Fever, cough.
23.	Nageswar	Mesua ferrea	Gauttiferae	Do.	Heart-disease, gout.
24.	Champa	Michelia champaca	Magnoliaceae	Do.	Dispepsia, fever, gas
25.	Amloki	Phyllantus emblica	Euphorbiaceae	Do.	Heart and brain tonic
26.	Bahera	Terminalia belerica	Combretaceae	Do.	Tonic, purgative indigestion etc.
27.	Haritaki	Terminalia chebula	Do.	Do-	Do.
28.	Sarpagandha	Rawolfia serpentina	Apocynaceae	Scanty	Blood pressure.
29.	Ashok	Saracha indica	Leguminoseae	Do.	Female disease.
30.	Kumarilata	Smilax macrophylla	Idliaceae	Plentiful	Tonic
31.	Amra	Spondis mangefera	Anacardiaceae	Scanty	Indigestion.
32.	Tetul	Temarindus-indica	Leguminoseae	Plentiful	Purgative tonic.
33.	Arjun	Terminalia-arjuna	Combretaceae	Do.	Tonic, heart disease
34.	Saifool	Woodfordia floribuda	Lythraceae	Scanty	Tonic, female disease
5.	Nichirda	Vitex negunda	Verbenaceae	Plentiful	Malaria, headache
	Kul	Zizyphus jujuba	Rhamnaceae	Do.	Dispepsia, fever.

57. **Lines of Export**—Rivers and tidal creeks are numerous in Chittagong district and form magnificient natural communications but as the rivers keep near the centre of the valleys and tidal creeks do not extend more than five to ten miles from these. There are consequently large stratches of the country including reserves, without water-ways, Roads and railways, however, exist and artificial means of communication is also being developed day-by-day and the existing road-net-work developed gradually.

58. The following rivers serve as lines of export. The utility, however, is being reduced due to heavy siltation: The *Feni* river, tidal to Ramgarh, is suitable for floating bamboo-rafts and dugouts almost throughout the year and for logs during the rains. Forest produce is transported from the northern portion of Baraiyadhala-karerhat reserve of which it forms the northern boundary. It may be mentioned that the major portion of the produce floated down this river is brought from the Chittagong Hill Tracts.

The *Karnafuli* river with its tributaries is the main line of export from the Chittagong Hill Tracts. There is a sandbar at Kodala about twenty-three miles above Chittagong which reduce the depth of water to less than two feet at low-tide in the dry season. This river is used for transportation of produce from the northern portion of Patiya reserve.

The *Halda* is navigable by country-boats and motor-boats to Nazirhat during the rains, serves chiefly for transport of produce from a part of the Chittagong Hill Tracts Unclassed State Forests. Small quantities of bamboos are also floated through small streams from the eastern portion of Baraiyadala-Korarhat reserve and transported by this river.

The Dhurung and Sarta tributaries of the Halda are of minor importance and are used for extraction of produce from the Chittagong Hill Tracts only.

The *Sangoo*, tidal to Dhopachari, is navigable by boats of large capacity up to Dohazari. It is the only line of export from the Sangoo Reserve but is not suitable for rafting of timbers owing to the rocky nature of its bed above Bandarbans. It is used to a limited extent for the floating of bamboos only from the Sangoo R.F. of Chittagong Hill Tracts. Lower down logs, boats and bamboos are transported from the Unclassed State Forests. The river from the southern boundary of Patiya Reserve and is used for export of bamboos from the southern portion of this Range.

The *Chandkhali* canal along which minor produce is brought to Chittagong market connects Sangoo and the Karnafuli river opposite Chittagong Town.

The *Dalu*, a tributory of Sangoo and Tankawati and Hangor, tributaries of Dalu, are of minor importance.

The *Harbang*, a tributary of Matamuhari, carries bamboos from Chittagong Hill Tracts Unclassed State Forests.

59. The Bangladesh Railway connects Chittagong, Dohazari and Nazirhat with other markets of this country. These are used for the transportation of forest produce from the forests to Chittagong markets and other markets of the country. Steamers connect Sandwip, Hatiya, Barisal, Khulna and Dacca with Chittagong and are used to a limited scales for transportation of timbers. The Chittagong Port, the biggest in the country, is used for export of forest-preduce to foreign countries.

60. Extraction paths and fair-weather roads are used for the extraction of forest produce. The Chittagong, Cox's Bazar or Arakan roads dates back to Moghul period and is useful for extraction and transportation of forest produce. The Chittagong-Dacca Trunk Road is also used for the transportation of forest produce by trucks.

61. The cart-road from Baraiyadhala to Fatikchari passing through the forest is very important for extraction of produce from the Baraiyadhali reserve. The Arakan Road passes near the eastern boundary of Jaldi Range. This also passes through Padua, Chunati and Harbang beats of this Division, and a number of important markets for forest produce of adjoining Cox's Bazar Division. The Nazirhat-Chittagong road, Kaptai-Chittagong road and Rangamati-Chittagong road are also used extensively for transportation of Forest produce by trucks.

For better extraction more forest roads will have to be constructed in the forest areas.

62. **Methods of Exploitation and their cost**—All sales are arranged through auction or tender. Auctions are held annually for timber, firewood or at times for Bamboos. Departmental extraction for Teak or important species is also done.

Methods of Extraction—Most of the logs are sawn on the spot inside the Forest Coupe area. Big logs are sawn in saw-pits and the smaller logs are sawn on the saw-bench by using pit-saw. Cross-cut saw is used for logging and axe is used for felling. Sawn timber and round-logs, if any, are extracted by cart, truck or by boat or rarely in rafts from Chittagong forests. Firewood is cut into billets and then stacked whence it is transported by carts, trucks or by boats. In areas where road facilities exists timber, poles and firewood are transported by trucks.

63. **The Cost of Extraction**—The current rates for sawing varies from place to place. The rates for sawing at Dohazari is Tk. 8·00 per cft. at site. Carriage from forest up to Dohazari is Tk. 5·00 to 6·00 per cft. and carriage per mile per cft. is Tk. 1·00 to Tk. 1·25. The current rates for sawing at Nazirhat is Tk. 7·00 to Tk. 9·00 per cft. at site.

Carriage of timber and firewood from forest to Depot :

Timber:

(a) By Truck—Tk. 500·00 up to 50 miles per truck of 7 tons.
(b) By Cart—Tk. 8·00 per cft.
(c) By Boat—Tk. 7·50 per cft.

64. **Past and Current Prices : Timber**—About 15 years' back the rates for sawn timber per cft. in Chittagong market were Teak Tk. 35·00, Gamar Tk. 18·00, Jarul Tk. 16·00, Chapalish and Champa Tk. 16·00, Garjan Tk. 14·00, Chikrassi, Toon, Bandarhola Tk. 10·00, Koroi, Bhadi, Kanak Tk. 8·00, Simul Tk. 5·00.

The current market rates for timber of various species at the important sale centres of Chittagong Division, *i.e.* at Dohazari, at Nazirhat and at Chittagong town are shown in the following Tables :

Current Rates of Timber

1. At DOHAZARI :

Species	Round per cft.	Tk. sawn per cft.
	Tk. Tk.	Tk. Tk.
1. Garjan	35 to 40	55 to 65
2. Jarul	40 to 45	55 to 60
3. Chapalish	40 to 45	65 to 70
4. Gamar	45 to 50	80 to 85
5. Sil Karoi	40 to 45	60 to 70
6. Telsur	55 to 60	85 to 90
7. Bailam	45 to 50	75 to 80
8. B/Hola, Jam, Tali ..	25 to 28	45 to 50
9. Chatian, Toon, Lali etc. ..	24 to 28	40 to 45
10. Kamdeb up to 3'-6" of 55' long	2,000 to 2,500	∠per pieces (used as mast.)

Current Rates of Timber—*Contd.*

Species.		Round per cft. Tk.	Sawn per cft. Tk.
		Tk. Tk	Tk. Tk.
2. At NAZIRAHAT.	1. Garjan ..	.. 35·00 to 45·00	50·00 to 55·00
	2. Jarul ..	.. 45·00 to 50·00	70·00 to 75·00
	3. Chapalish ..	.. 35·00 to 40·00	70·00 to 75·00
	4. Gamar ..	.. 40·00 to 45·00	65·00 to 70·00
	5. Sil Karoi ..	.. 35·00 to 45·00	65·00 to 70·00
	6. Champaful ..	.. 40·00 to 45·00	80·00 to 90·00
	7. Telsur ..	.. 40·00 to 45·00	75·00 to 80·00
	8. Bailam ..	.. 35·00 to 45·00	75·00 to 80·00
	9. B/Hola ..	.. 25·00 to 30·00	50·00 to 60·00
	10. Jam ..	.. 25·00 to 30·00	40·00 to 50·00
	11. Tali ..	.. 30·00 to 35·00	40·00 to 50·00
	12. Kamdeb ..	.. 30·00 to 35·00	45·00 to 55·00
	13. Toon ..	.. 28·00 to 35·00	45·00 to 55·00
	14. Lali ..	.. 20·00 to 28·00	35·00 to 45·00
	15. Simul ..	.. 15·00 to 20·00	25·00 to 35·00
	16. Chatian ..	.. 20·00 to 25·00	30·00 to 35·00
3. At CHITTAGONG TOWN.			
	1. Garjan ..	.. 45·00 to 60·00	60·00 to 75·00
	2. Chapalish ..	.. 50·00 to 65·00	75·00 to 90·00
	3. Champa ..	.. 70·00 to 85·00	90·00 to 110·00
	4. Sil Karoi ..	.. 60·00 to 70·00	85·00 to 95·00
	5. Gamar ..	.. 75·00 to 85·00	90·00 to 110·00
	6. Bailam ..	.. 80·00 to 95·00	100·00 to 120·00
	7. Telsur ..	.. 80·00 to 95·00	100·00 to 120·00
	8. Jarul ..	.. 75·00 to 80·00	100·00 to 120·00
	9. Chikrashi ..	.. 40·00 to 50·00	55·00 to 65·00
	10. Jam ..	.. 40·00 to 50·00	55·00 to 65·00
	11. Pitraj ..	.. 40·00 to 50·00	55·00 to 65·00
	12. Tali ..	.. 40·00 to 50·00	55·00 to 65·00

Current Rates of Timber—*Contd.*

Species.	Round per cft.		Tk. Sawn per cft.	
	Tk.	Tk.	Tk.	Tk.
13. Toon	40·00 to 50·00		55·00 to 65·00	
14. Civit	25·00 to 30·00		30·00 to 35·00	
15. Chundul	25·00 to 30·00		30·00 to 35·00	
16. B/Hola	45·00 to 50·00		55·00 to 65·00	
17. Bhadi	50·00 to 60·00		60·00 to 70·00	
18. Guda	50·00 to 60·00		60·00 to 70·00	
19. Gugutia	50·00 to 60·00		60·00 to 70·00	
20. Teak-up to 2'-" to 3'-0"	100·00 to 150·00		200·00 to 250·00	

65. **Bamboo and other minor Forest produce**—The rates for Bamboo fluctuate according to species, quality and length of bamboos and the sale-centre :

The Rates for Bamboo:

1. At DOHAZARI:

(a) Bariala .. .. Tk. 10,000·00 per 1000 Nos.
(b) Muli .. .. Tk. 400·00 to Tk. 500·00 per 1000 Nos.
(c) Mitinga .. .. Tk. 500·00 to Tk. 600·00 per 1000 Nos.
(d) Dalu .. .. Tk. 400·00 to Tk. 500·00 per 1000 Nos.
(e) Orah .. .. Tk. 500·00 to Tk. 600·00 per 1000 Nos.
(f) Kaliserri .. .. Tk. 500·00 to Tk. 600·00 per 1000 Nos.

Poles (Balli)

u/1'-0"-15'-20' long .. Tk. 1·25 per ft.
u/1'-6"-16'-25' long .. Tk. 3·00 to Tk. 4·00 per rft.
u/2'-0"-25'-30' long .. Tk. 5·00 to Tk. 600 per rft.
u/3'-0"-30'-35' long .. Tk. 6·00 to Tk. 7·00 per rft.

Other minor Forest produce.

(a) Sungrass—Tk. 12·00 to Tk. 18·00 per shoulder load (2 bundles).

(b) Cane—Gollack cane—Tk. 2·00 per piece of 12′ long.

(c) Kurushpata—Tk. 700·00 to Tk. 800·00 per 1000 bundles.

(d) Cotton (Rui) (i) With seeds Tk. 250·00 to Tk. 300·00 per md.
(ii) Without seeds Tk. 1,000·00 to Tk. 1,100·00 per md.

2. At NAZIRHAT:

Bamboos:

The rates of bamboos are as follows:

(a) Bariala	..	Tk. 10,000·00 per 1000 Nos.
(b) Muli	..	Ta. 300·00 to Tk. 400·00 per 1000 Nos.
(c) Mitinga, (d) Dalu, (e) Orah	..	Tk. 500·00 to Tk. 600·00 per 1000 Nos.
(f) Kaliserri	..	Tk. 600·00 to Tk. 700·00 per 1000 Nos.
(g) Bazali	..	Tk. 150·00 to Tk. 175·00 per 1000 Nos.

Poles (Balli):

u/ 1′—0″, u/ 1′—6″ } 12′ long—Tk. 1·50 per rft.

u/ 2′—0″, u/ 2′—6″ } 15′—20′ long—Tk. 2·50 to Tk. 4·00 per rft.

u/ 3′-0″-20′-25′ long—Tk. 4·50 to Tk. 7·00 per rft.

Sungrass—At the rate Tk. 15·00 to Tk. 20·00 per 2 bundles

3. AT CHITTAGONG TOWN :

I. **Bamboos:**

The rates of bamboo in Chittagong town are as follows:

(a) Bariala—Tk. 12,000·00 to Tk. 14,000·00 per 1000 Nos.

(b) Muli—Tk. 1,300·00 to Tk. 1,400·00 per 1000 Nos.

(c) Mit·nga—Tk. 2,000·00 to Tk. 2,500·00 per 1000 Nos.

II. **Poles:**

u/1′—6″ .. Tk. 2.00 to Tk. 2·50, 15′—20′ long per rft.

u/2′—6″ .. Tk. 4·00 to Tk. 6·00 of 25′—30′ long per rft.

u/3′—0″ .. Tk. 8·00 to Tk. 9·00 of 25′—30′ long per rft.

III. Other minor produce:

Sungrass—Tk. 20·00 to 25·00 per bhar per 2 bundles (size 4′—6″ girth).

66. Appendix VII gives the current schedule rates of royalty for various kinds of Forest produce in Chittagong Division.

CHAPTER—IV.

STAFF AND LABOUR SUPPLY

67. Staff—Chittagong Forest Division is limited to Chittagong Sadar (North) subdivision and Chittagong Sadar (South) recently named Patiya subdivision. It borders Cox's Bazar Subdivision in the South near Baraitali and Noakhali district in the north near Subhapur.

68. The present sanctioned strength of Officers, Assistants and subordinate executive staff is as detailed below :

Sanctioned strength of staff of Chittagong Forest Division as on 1st July, 1979.

Sl. No.	Category of staff	Total No. of staff.	Normal	Development.
1	Divisional Forest Officer ..	1	1	..
2	Subdivisional Forest Officer ..	2	2	..
3	Assistant Conservator of Forests ..	2	2	..
4	Extra Assistant Conservator of Forests (E.A.C.F.). ..	2	1	1 (Replanting scheme).
5	Senior Forest Ranger ..	1	1	..
6	Forest Rangers ..	19	17	2 (Replanting scheme).
7	Deputy Rangers ..	36	26	6 Do. 4 (Afforestation scheme).
8	Foresters ..	62	57	5 (Replanting scheme).
9	Forest Guards ...	195	164	27 Do. 4 (Afforestation scheme).

Sl. No.	Category of staff	Total No. of staff.	Normal	Development.
10	Patrol Guards ..	2	2	..
11	Fire Watchers ..	2	2	...
12	Mahut ..	3	2	1 (Replanting scheme).
13	Grass-Cutter ..	3	2	1 Do.
14	Bungalow Chowkiders	24	24	...
15	Boatman ..	9	9	...
16	Darwan ..	2	1	1 (Replanting scheme).
17	Night Guard ..	1	..	1 Do.
18	Orderly Peons ..	18	15	3 Do.
19	Plantation Mali ..	38	13	21 Do. 4 (Afforestation scheme).
20	Jeep Driver ..	5	3	2 (Replanting scheme)
21	Truck Driver ..	1	..	1 Do.
22	Sherang ..	1	..	1 Do.
23	Engine Driver. ..	1	..	1 Do.
24	Laskar ..	2	..	2 Do.
25	Tendel ..	1	..	1 Do.
26	Greser ..	1	..	1 Do.
27	Head Assistant	1	1	..
28	Assistant-*cum*-Typist	18	17	1 (Replanting scheme)
29	Office Peon ..	3	3	..
30	Dakwalla ..	6	5	1
	Total ..	462	370	92
	Total for Chittagong Divison.	462		

The strength of Staff does not seem to be adequate as compared to the volume of works to be handled. Protection and patrol duty to check pilferage in the forests or unauthorised occupation of Forest land have increased manifold. Hence the strength of Forest Guards, Plantation Malis and Foresters should be increased in future to cope with the increased work-load. The staffing pattern for excution of the working plan is given under Part II.

70. **Labour Supply** — It may be mentioned that most of the plantations and nurseries of this Division are being raised with hired labour as forest villagers are not available in many areas. There are a few forest villagers at present who reside in temporary sheds inside the forest areas within the "forest village" earmarked for them. Others almost invariably reside in or around the localities for better facilities of communication and living. Under the "Taungya System" the villagers have the right to raise multiple Agro-Forestry crop in the plantations to be raised.

These villagers are supposed to render all necessary help to forest staff while plantations are being raised or nursery or plantations are being tended. In exchange they enjoy dry or wet cultivable land to the minimum of 1—3 acres per head under the control of a village "Headman", elected/selected out of them. Sometimes the extent of land enjoyed by each of the forest villagers extends up to 5—10 acres. On top of this the forest villagers are given "cash rewards" for raising successful plantations in the 2nd year. All weeding and cleaning operations are also done on payment.

Hence, theoritically there should not be any dearth of labour for forest work particulary when they are being paid for. But in actual practice it is extremly difficult to produce labour for field work in certain seasons. This problem is aggravated between the period April to October—when these labours are found to be busy tilling their paddy lands or harvesting their crop. With the introduction of 'IRRI' cultivations—the problem has turned out to be more serious—since this paddy can be grown througout the year, provided there is irrigation facility.

In fine, labour supply is becoming a difficult problem for forestry work and may turn out to be still more problematic in future.

The rates of labour varies considerably in vorious areas depending on availability and the season of work.

The rates prevailing around Dohazari is as follows:

(1) For forest works (raising plantation, nursary, weeding, or cleaning)—Tk. 15·00 to Tk. 18·00 per head/per day of 8 hours.

(2) For construction/repair works.

(a) Carpenters	..	Tk. 25·00 to Tk. 30·00	per head/per day
(b) Helper	..	Tk. 15·00	" "
(c) Mason	..	Tk. 30·00 to Tk. 35·00	" "
(d) Helper	..	Tk. 15·00	" "

The rates at Nazirhat are somewhat cheaper:

(a) For forest works (nursery, plantation, weeding, cleaning, etc.)—Tk. 12·00 to Tk. 15·00 per head/per day of 8 hours.

(b) For construction/repair works :

(i) Carpenters : Tk. 25·00 to 30·00 per head/per day

(ii) Helper : Tk. 15.00 ,, ,,

The rates of labour for forest work or construction or repair works at Chittagong are comparable to above rates in the sub-urban or rural areas or inside the forest are lower due to availabitity of labour.

Sawyers are scarce and generally do not live inside the forests, work can be arranged by establishing camps inside the forest, *i.e.* in the coupes or at working site.

The rates of sawing, etc., has been shown under para.—63.

71. The rates of daily labour in some localities have been shown above. The average rate for labour for forest work is higher in Chittagong Division as compared to other forest Divisions and ranges between Tk. 15·00 to Tk. 20·00 per head/per day.

The daily wages of agricultural labour for Chittagong district for last 6 years has been shown in the following statement :

Statement Showing Daily Wages of Agricultural Labour.

Months.	Years.					
	1972	1973	1974	1975	1976	1977
	Tk.	Tk.	Tk.	Tk.	Tk.	Tk.
1. January ..	3·75	5.50	8·00	12·00	10·00	13·00
2. February ..	4·25	7·00	7·00	12·00	10·00	12·00
3. March ..	5·00	7·25	10·00	13·00	11·00	12·00
4. April ..	5·00	7·50	10·00	..	12·00	12·00
5. May ..	5·00	7·25	12·00	..	12·00	13·00
6. June ..	5·00	7·83	12·00	12·00	12·00	13·00
7. July ..	5·00	9·25	12·00	12·00	..	13·00
8. August ..	5·75	7·25	12·00	11·00	12·00	14·00
9. September ..	5·75	6·50	12·00	..	12·00	14·00
10. October ..	5·00	6·50	12·00	10.00	12·00	12·00
11. November ..	5·00	..	12·00	10·00	12·00	12·00
12. December ..	5·88	8·00	12·00	11·25	12·00	12·00

SOURCE—Year Book of Agriculture Statistics of Bangladesh, 1976-77.

CHAPTER V

PAST SYSTEMS OF MANAGEMENT

GENERAL HISTORY OF THE FORESTS

72. **General History**—The Chittagong Forest Division was one of the first forest divisions to be formed in the undivided Bengal.

73. Originally the forests were under the management of Revenue Department as Khas Mahal forests and their conditions deteriorated. With the passage of time it was felt nacessary to constitute some of the forests as reserved forests for the ultimate benefit of the people.

74. In the Chittagong Collectorate, an area was reserved in 1893, but the further progress of reservation was retarded by the long delay between the preliminary and final notifications. Although those forests were notified as proposed reserves under section 4 of the Indian Forests Act, in 1894, the first of these areas was reserved in 1901. Until 1909, forest policy in the collectorate, with the exceptions already mentioned, had not advanced beyond the state of creating reserves and collecting revenue. Subsequent to this date the working plan for the Chakaria—Sundarbans was drawn up and an area of twenty-six square miles came under systematic management. Till 1923, no other areas were placed under working plans.

75. In the year 1909, the original Chittagong Division was divided into two, *viz.*, Chittagong Forest Division and Chittagong Hill Tracts Forest Division. In 1920, Chittagong Division was divided into Chittagong, Forest Division and Cox's Bazar Forest Division but they were again amalgamated into one single division in 1933. At the beginning, although the division was known as Chittagong Forest Division, the reserve forest lay entirely within the Chittagong Hill Tracts.

76. The Chittagong Hill Tracts was first a political charge under the administration of the Collector of Chittagong, but were constituted a district in 1860 and a Superintendent was put incharge. Two years later, in 1862, it was decided to establish toll stations on the main rivers and to collect dues upon forest produce, which was floated down in large quantities to the Chittagong market. Toll was collected by the District Officer.

77. In the year 1864, for many reasons, it was thought advisable to vest the Hill-Chiefs with powers of collecting the tolls in question. The Karnafuli tolls were farmed to Rani Kalindi Chieftainess of the Chakmas, at an annual rental of Rs. 7,566; those on the Sungoo, Matamohari and Bagkhali to the Bhomong Chief for Rs. 2,215 a year. In 1868 the Mong Raja was appointed to collect tolls on the Feni, Dhurung and Sarta rivers. Government receiving one-third of the amount collected. The tolls represented a five per cent. *ad valorem* duty upon the market value of the produce at Chittagong. This system continued until April 1871, when the Forest Department assumed charge of all toll stations except the Feni, which owing to the Tripura Raja being co-share, it was thought necessary to leave with the District Officer.

78. The second important factor in the history of the division was a notification in the *Calcutta Gazette*, dated 1st February, 1871, declaring nearly all the Chittagong Hill Tracts district, *viz.*, 5,670 out of 6,882 square miles, to be Government forest in accordance with section 2, Act VII of 1865. Meantime, an Assistant Conservator of Forests was appointed to take charge of the division and from 1870, systematic inspection of forest tracts suitable for reservation was commenced. The forest staff consisted of one writer on Rs.70 per month, one office peon on Rs.6; six foresters on Rs. 15 and fourteen watchers on Rs. 5 to Rs.7 and practically the whole establishment had to be employed in collecting tolls.

79. In the year 1871, teak seed was obtained from Burma and plantations were started at Sitapahar in Chittagong Hill Tracts district and at Pahartali. The latter plantation was subsequently abandoned.

80. Sir William Schilich, K.C.I.E., the then Conservator of Forests, Bengal, inspected the forests in Chittagong Division in 1875. His inspection marked the beginning of a golden area for the management of Chittagong forests. The following paragraphs are extracted from his report :

"The system of forestry in force in the Hill Tracts until a few months ago may be shortly described as follows :

(a) The hill-man had the free run of the forests for their domestic requirements.

(b) Individuals who desired to export forest produce had to take out a so-called permit to cut or remove the material.

(c) On passing certain stations situated on the bank of the rivers comming from the Hill Tracts, the Government levied a toll from forest produce according to a sanctioned scale.

(d) The Commissioner of Chittagong was *ex-officio* Conservator of Forests for Chittagong and the Assistant Conservator of Forests was subordinate to the Deputy Commissioner of the Hill Tracts and through him to the Commissioner.

The effects of the above system have been detrimental to the forests as the free run of them, and the almost unrestricted cuttings told very severely on the growing stock of timber. Jarul, the most valuable of the Chittagong woods, appears to have had its natural death in the outer hills, whereas it appears in small patches only on proceeding to the inner hills. At the moment jarul may be said to have almost entirely been rooted out in the outer hills. Toon was formerly brought from the forests, and even exported to the Madras coast. It may be said to have become scanty in all accessible forests. Of Chapalish, a good stock is still available in the upper part of the valleys. Gamar and Kamdeb are still available. Chikrassi is found here and there but Telsur is rare, except on the higher ranges in the south. Thus it will be seen that the supply of the first class timber-trees has become very limited.

One of the enemies of forest conservancy was the practice of "Jhooming" over the greater part of the forests and the wasteful manner in which timber has been cut. Although the jhoomias may not cut and burn periodically all seedlings, saplings and young trees, there is no reproduction partly due to the fact that mature trees are removed year after year.

Besides, the above, enormous quantities of saplings and young trees have been destroyed annually through the practice of cutting Dugouts. The waste of timber in preparing these boats is very great, but it is surpassed even by the following practice. Dugouts except those of jarul are usually cut in the hilly parts of the forests at a distance of up to two miles from the banks of the floating streams. When a Dugouts is ready, a road or track from the boat to the floating stream is laid out. The next step is to cover the road with rollers about five feet apart, or in a round figure about 1,000 to the mile. For this purpose all the straight saplings and young trees in the neighbourhood are cut down indiscriminately up to some 30" to 500 for one Dugout. Such wanton destruction must cause real pain to any one who has seen the trouble and labour it costs, the amount of anxiety it causes, to raise timber-trees where the original forest has been destroyed.

Furthermore, it has hitherto been the practice of bamboo cutters to cut saplings and young trees of all kinds, and to remove them for house-posts. In short, there can be no doubt that the forests were on the road to ruin; and in fact, valuable timber trees are now only found high up the valleys, and in many cases in inaccessible places only."

81. In framing proposals for a change of management, it had to be borne in mind that the hill-people had to depend, for a long time to come at any rate, on jhum cultivation, and that they also seemed to rely to some extent on the money earned by the removal of timber. Furthermore, it was essential that the people should be entirely under the District Officer, and consequently the Conservator offered the following suggestions :

(a) Two classes of forests are to be formed, reserves and district forests.

(b) The reserves will be entirely under the management of the Forest Department, and district forests under that of the Deputy Commissioner of the Hill Tracts.

(c) No jhooming or cultivation of any other kind should be allowed in the reserves; no timber or other forest produce to be cut in, or removed from, the reserves without the permission of the Forest Department; the area to be managed for forest purposes only.

(d) The people of the District may supply themselves with forest material for their domestic requirements from the District Forests, with such restrictions as the Deputy Commissioner may impose from time to time. On the other hand, the export should be subjected to the following restrictions:

No logs of the undermentioned kinds will be allowed to pass the revenue stations unless they measure three cubits in girth, measured at three cubits from the thick-end; Jarul, Chapalish, Kamdeb, Gamar, Toon, Chikrassi and Teisur.

In addition, the Deputy Commissioner should set aside certain forests easy of control, in which no Dugouts are to be cut. This might be done after consultation with the Forest Department.

(e) With a view to discouraging the preparation of Dugouts and the excessive consumption of Jarul, the rates for Dugouts and for Jarul timber now levied should be enhanced 50 per cent. and the export of Dugouts of Jarul proibited altogather.

(f) The management of the revenue stations should be under the Forest Department, as hitherto.

(g) The Divisional Forest Officer should be under the order of the Conservator of Forests, Bengal, instead of under those of the Commissioner of Chittagong.

These proposals were approved by the Commissioner of Chittagong and they received the sanction of the Lieutenant Governor. Soon afterwards the Maini, Kassalong, Sungoo and Rangkheong valleys were declared reserves. The first forest reserves were created in 1875, and the total area of reserved forest at the end of the year amounted to 570 square miles. A policy was now drawn up for the administration of the unreserved or district forests, in which about 80,000 people lived and jhoomed. The measures of control suggested in (b), (d) and (e) noted above were put into practice and in regard to (f) all forest produce taken beyond the limits of the Hill Tracts was to be paid for according to certain rates, the revenue to be collected by the Forests Department in the shape of a toll, on the rivers coming from the Hill Tracts. At the same time it was decided to close the reserves for timber extraction, supplies being plentiful in the unreserved areas. Two elephants were brought from Burma for inspection work. During this year part of each of the new reserves was demarcated. In 1877, bridle-path makng was commenced, thirty-four miles being cut along the eastern and western boundaries of the main reserves. During this year and the next creepers were cut on 17,454 trees in the same reserve. After this, such work appears to have been dropped. Rangkheong and Sungoo valleys were inspected and demarcated with the object of extending the reserves.

83. From 1st June, 1878 till 1st April 1888, the collection of dues at toll station was transferred from the Forest Department to the Superintendent, Chittagong Hill Tracts. There was a considerable decrease in the revenue and the arrangement was not a success so that the management was again handed back ot the Forest Department. A new set of rules for administration of the Chittagong Hill Tracts was drawn up, whereby forest business had to be transacted through the Superintendent. In 1879, a headquarters bungalow was built at Rangamati and toll stations at Chandraghona, Shyllock, Ichhamati and Matamuhuri; additional toll stations were erected at Halda, Idgaon and Rezu in 1881. Proposals for the extension of the forest reserves had been pending for several years. These proposals matured between the years 1880 and 1883. The total area of reserved forest in 1884 amounted to 1,345 square miles all within the Chittagong Hill Tracts Civil District. The creation of these reserves necessitated a large expenditure at a time on demarcation work by the

staff, much difficulty being experienced owing to lack of labour. Plantations were extended and some creeper cutting was done. From 1886 to 1889 revenue dropped owing to people's refusal to enter the Unclassed State Forests, as they were afraid of Kuki (the general Bengali name for inhabitants of Lushai Hills) raids.

84. In the year 1893, the headquarters of the division were transferred from Rangamati to Chittagong and the departmental buildings at Rangamati were sold by public auction. During 1894-95, the Assam Bengal Railway was constructed. The first inspection bungalows were constructed at Amlighat (Olinagar) and Hazarikhil.

85. Forest produce was sold at half the usual rates to relieve the distress of the people of 1895 cyclone and of 1897 famine. As a result the revenue dropped considerably. Before the district could recover from the famine, a second cyclone followed in October 1897 which, in addition to other destruction, ruined the Sitapahar plantations and brought great havoc throughout the forest. Teak plantations in Sitapahar suffered severely being all but demolished and the work of years was ruined in a few hours. "At least 50 per cent of the trees were uprooted and of the balance, the majority, had their head taken off, only a few of the younger trees, protected by the greater height of the surrounding trees, escaped injury. Over 3,005 acres, 4,164 trees were uprooted and 1,125 badly broken. Many of the trees were five feet in circumference and of good straight boles. Where teak was mixed with other species such as gamar, the damage was less than where it was pure."

86. After the reservation of Barayadhala-Korerhat reserve in the collectorate in 1893, forest offences increased considerably. The receipts for 1898-99 were the largest for the previous twelve years, due mostly to the demand for timber to replace boats wrecked in the cyclones. The "Helen Grey", a steam launch with 4 ft. 8 inches draught, was purchased for the Divisional Forest Officer at a cost of Rs.16,179 but the draught was too deep for the Chittagong rivers and she was transferred to the Sundarbans in 1903. About this demarcation and collection of tolls again occupied much of the time of the forest staff.

87. In 1904-1905, the area of unclassed state forest was reduced to 3,753 square miles to allow for the balance to be transferred to Assam and, in October 1905, with the partition of Bengal, the division came under the jurisdiction of East Bengal and Assam.

88. 120 cases of illicit jhooming, involving 1,059 persons in 1905-1906 in the Maini valley led the Maini reserve, and area of 337 square miles, being disafforested. In the same year a proposal to reserve the Nasf Sundarbans, which had been under discussion for several years, was withdrawn by the Government. The preliminary report for the Chakaria Sundarbans working plans was approved in 1908, but the plan did not come into operation until the year 1913-14.

89. The Chittagong Hill Tracts Division was formed by the splitting of the Chittagong Division in 1909. The former was at first a minor charge, but, after consideration, it was decided to make over the principal toll stations near the borders of the Chittagong Hill Tracts, to the Divisional Forest Officer, and the Division then became a major charge. The Chittagong Division then consisted of ten blocks, a total area of 570·0 square miles all lying within the regulation district, the forests in the Hill Tracts being all included in the new division. During this year a preliminary working plan report was submitted for the Baraiyadhala-Karerhat reserve, but the working plan was never completed.

90. In 1912, with the re-partition of Bengal and Assam, the Chittagong Division was transferred back to Bengal. From this time onwards till 1917, a great deal of time had to be spent on the demarcation of the collectorate reserves and the preparation of the boundary maps. In 1916, an attempt was made to open small fuel coupes in the Baraiyadhala -Karerhat reserves, but was a failure as pass holders refused to cut green firewood in the areas.

91. Khedda or Elephant-catching operation was started during the seasons 1915-16 and was carried on from time to time. Owing to the lack of proper arrangement to bring out elephants from the stockades, many elephants caught by the lease-holders died in the early years and in 1919, the forest department undertook the catching. Even with untrained staff a large number of elephants were caught while the percentage of mortality was greatly reduced. The catching of elephants has since been transferred to lease-holders.

92. The scarcity of game in the forests of the district is accounted for by the large number of guns in the hands of the villagers. In 1917-18, a monopoly for the collection of elephant tusks was given, in the hope that by this means illicit export of Ivory from the Hill Tracts would be reduced. The monopoly was later on withdrawn.

93. In April 1920, the Division was again divided, blocks lying in the Cox's Bazar Subdivision being transferred to the new Forest Division. The Sungoo reserve and the adjacent Unclassed state forests were added to the Chittagong Division.

As a result of recommendations made by the Bengal Retrenchment Committee in 1932, the amalgamation of the Chittagong and the Cox's Bazar Forest Division and the creation of two Forest Subdivisions, *viz.*, the Sadar and Cox's Bazar in the new Chittagong Forest Division was brought into effect from 1st July, 1933. Later on the two Subdivisions were again subdivided into four Subdivisions. The Unclassed state

forests of the Chittagong Hill Tracts were put under control of the Deputy Commissioner, Chittagong Hill Tracts and Chittagong Division consisted of the reserved and protected fotrests of the Chittagong Sadar Subdivisions including the Sungoo reserve. In 1960, Sungoo range was separated from the Chittagong Division and a new division has been proposed for the same with a new Working Plan. Accordingly a Working Plan has been written for the period 1967-68 to 1986-87, but the proposed Division has not been started. The area is still under the control of Chittagong Forest Division.

PAST SYSTEM OF MANAGEMENT AND THEIR RESULTS

94. **Prior to working plans**—Prior to the handing over of the forests to forest department there was no systematic management and unregulated fellings led to the removal of the valuable trees from the easily accessible places. Due to the difficulty of extraction the quantity of the timber removed was, however, small and the forests were gradually recovering from the past maltreatments. The position regarding bamboos were, however, different. Pass-holders naturally cut the best and most easily available bamboos which resulted in partial exhaustion of the supply, especially near the thickly populated villages. Hence the supply of Bamboo decreased gradually.

95. **Cowan's working plan**—Separate working plans for the old Chittagong and Cox's Bazar Divisions were prepared in 1923 and prescriptions were given for a period of twenty years. Cowan divided the forests into the following working circles :

I. The Timber Working Circle.

II. The Bamboo Working Circle.

III. The Jaldi Coppice Working Circle.

The best timber areas were put into the Timber Working Circle.

The Bamboo Working Circle included areas on the western side of the Baraiyadhala-Karerhat and South Sitakunda Reserves. A two year rotation was suggested in this Working Circle for the exploitation of bamboos wherever possible. The Jaldi Coppice Working Circle proscribed coppice with standard fellings on a cycle of twenty years in the forests of Jaldi Range.

RESULTS OF PAST WORKING

96. **Results of past Working**—In the Timber Working Circle the plan prescribed a system of Clear-felling and artificial regeneration. In operation it was found that the demand was not sufficient to enable the existing timber coupe to be disposed of at reasonable prices and shortage of staff and labour difficulties added to the trouble. Plantations were started at a number of places, but after a few years, clear-felling work was abandoned in all but one or two centres and it was found more or less impossible to operate the main prescriptions of the plan.

97. During the year 1930, the Chittagong Division took over large areas of what had previously been Khas-mahal forests, some of these areas were constituted into new Reserved Forests, others were made into Protected forests. The policy of the forest department was then aimed at meeting all local demands for timber from the more scattered areas of protected forest, while the reserves were to be conserved and protected for future needs. Accordingly, Government in their letter No. 5185-For., dated May 5, 1939, directed that the unexpired portion of Cowan's Working Plan be cancelled and that the revision of the plans be held in abeyance for the present.

98. Subsequently parts of the reserves were worked to a small extent under the provisions of simple local working schemes, which were submitted to the conservator from time to time for approval. Though it was not possible to work up to the prescriptions of Cowan's Plan as far as felling of timber was concerned, the unregulated extraction of bamboos and poles continued on permit system. This has led to further denudation of the forests. Though only inferior species of poles were supposed to be cut, in practice, the permit-holder cut any pole which he could get conveniently, and generally the most vigorous and straight saplings were systematically cut down. This was the position of the management of the Division when the war with Japan began in December, 1941.

99. **History of the Forests during the Japanese War**—When the Japanese invaded Burma in early 1942, an enormous stream of Indian refugees poured up the coast through Arakan into Chittagong. The Japanese came as far as Akyab and could easily have taken Chittagong, had they followed up their Burmese victories. In Chittagong, in the summer months of 1942, the administration was prepared for the worst; boats were concentrated, sawmills removed to North Bengal and elephants evacuated; these measures all being designed to deny facilities to the enemy, should they decide to overrun the Chittagong area. With serious

trouble in Arakan between the Arakanese and the Colonists from Chittagong the position in the southern parts of the district was very strained and rumours were frequent. Forest work was, at this time, more or less at a standstill.

By the end of 1943, the build up for the Arakan counter-offensive had begun. The main line of communication to the south, the Arakan Road ran down the middle of the southern part of the district; many air-fields camps, roads and jetties were built throughout the district and for their construction vast quantities of timber, bamboos and other forest produce were needed.

The forest department undertook to organise the extraction and delivery of all the timber required. It was fortunate in possessing a large executive staff, throughout the district, and many of the sections of the Arakan Road through forest areas which, hitherto, had never been properly worked. The huge demand for forest produce during the years 1942-43 to 1944-45, however, resulted in all accessible parts of the forests being heavily depleted in stock.

100. **Postwar Period and Nent's Scheme**—During the years 1945-46 and 1946-47, some selection and clear-felling coupes were worked and sold. Plantation programme which had mostly been in abeyance during the war, was generally extended and special works of improvement undertaken under the post-war Reconstruction Schemes. During the period a large number of trees were sold for domestic consumption on permit system throughout the forest, the only limitation being that trees above a certain girth could be felled.

101. **Ghani's Working Plan**—In post-partition period, separate working plans for the Chittagong Division including Sungoo and Cox's Bazar Divisions were issued from 1950-51 to 1969-70. Ghani divided the forests of Chittagong Division in the following working circles :

I. Timber Working Circle.

II. Selection-*cum*-Improvement Working Circle.

III. Sungoo Working Circle.

IV. Bamboo (Overlapping) Working Circle.

V. Protected Forests Working Circle.

Areas with existing poor quality crop where regeneration was inadequate were put into Timber Working Circle. Areas in which extraction was difficult and labour for plantation works were not available were put into Selection-*cum*-Improvement Working Circle.

Forest of Sungoo R.F. not practicable to exploit profitably, was put into Sungoo Working Circle. To provide for a sustained supply of bamboos a two-years cycle was suggested for the expl itation of bamboos. In the Protected Forest Working Circle, exploitation fellings were prescribed with girth limit.

Results of Past Working—In the timber working circle the plan prescribed a system of clear-felling and artificial regeneration on a very small scale, *i.e.*, 602 acres annually. In operation, it was found that the yield was insufficient to meet the demand of timber and fire-wood due to the rapid development of the country in post partition days. After a few years, larger areas were clear-felled and plantations raised under the different development schemes and the prescriptions for selection-*cum*-improvement working circle and protected Forest Working Circles were abandoned after considerable uncontrolled fellings in these areas for quite a few years. Sungoo reserve was separated and proposed for a new working plan with Matamuhuri. The condition of Bamboo was found to be much deteriorated due to introduction of two-year cutting cycle and cutting to young bomboos.

102. **Baten's Working Plan**—Ghani's Working Plan for Chittagong Division was meet for 20 years from 1950-51 to 1969-70. Since putting this plan into opreration, changes took place in respect of demand of forest produce, methods of exploitation; disposal and marketing etc. Further, to keep pace with the development activities (through the 5-year plans of erstwhile East Pakistan) there was greater scope for development and improvement of the forests. Hence, Ghani's Working Plan was modified and revised by S. A. Baten and a revised working plan was prepared for the forests of Chittagong Division for the period 1963-69 to 1977-78 after accommodating the excess felling carried out for executing development scheme.

Baten's Working Plan reduced the number of working circles as prescribed in Ghani's Plan in the following manner:

I. Long Rotation Working Circle.

II. Short Rotation Working Circle.

III. Bamboo (Overlapping) Working Circle.

I. Long Rotation Working Circle:

A total area of 2,00,472·55 acres of reserved, protected and acquired forests were allotted to this working circle. Areas suitable for growing quality timbers like Teak, Garjan, Chapalish, etc., which take long time to mature-were put to this working circle. The Silvicultural system prescribed was Clear-felling followed by artificial regeneration based on a rotation of 60 years.

The workiing circle was divided in 9 (nine) felling series and 23 cutting sections. 32,460·0 acres of area of this working circle were included in the periodic Block I.

The species selected for raising plantations under this working circle were :

Top priroity : Teak, Garjan, Chapalish, Gamur, Jarul, Champa, Mehogany Gam etc.

Second priority : Tali, Telsur, Panishaj, Chikrasi, Kanok, Kanjal, Pitraj, Bandarhola etc.

Third priority : Nageswar, Gondrai etc.

The yield prescribed by area was 3,246·0

II. Short Rotation Working Circle:

A total area of 98,815·74 acres of reserve, protected and acquired forests were allotted to this working circle. The objective of this working circle was to grow hard wood and soft-hard-wood of fast-growing species to the provide a sustained supply to the wood-based industries and to the local people for agricultural implements, house-posts and firewood. The working circle was divided into 7 felling series and 13-Cutting Sections. The Silvicultural system prescribed was Clear-felling followed by artificial regeneration. An area of 20,700·0 acres were included in periodic Block I. The rotation was fixed at 30 years and the annual yield was fixed at 2,070·0 acres.

The species selected was—

Top priority : Simul, Kadam, Civit, Chundul, Pitali etc.

Second priority: Narikeli, Raktan, Kamdeb etc.

Third priority : Kanjal, Kushum, Haritaki, Teak etc.

III. Bamboo (Overlapping) Working Circle :

This working circle extended over the entire area of approximately 2,18,000·0 acres of reserved forests of Chittagong Division and as such was overlapping the long and short rotation working circles. Since occurrence of bamboos in the protected, Vested, Acquired forests of this Division was very negligible, these forests were not included in this bamboo overlapping working circle. The object of management of this circle was to provide sufficient and regular supply of bamboos to the local people.

For exploitation of bamboos a cutting cycle of 3 years was prescribed for all bamboos during the plan-period. Bamboo-coupes were formed having well-marked boundaries by principal charas or streams in various ranges of this Division. The coupes were sold in annual auction and arrangement was made to work these coupes on a 3 years Cutting Cycle. Cutting rules were framed for regulating the extraction of bamboos from the coupes.

103. **Results of working**—It may be mentioned that no enumeration was carried out during the preparation of Baten's Working Plan to evaluate the success or failures of the plantations raised during the previous plan period. The area prescribed for felling was far too big and was not supported by adequate knoweldge of growing non teak species as per prescription and the required in puts for raising a successful plantation. Large areas were taken up in initial years for felling under development scheme, but could not be planted up with the species recommended in the plan.

There was a preponderance of teak plantations and where non-teak was tried, there was great failures. The staff were also not mentally and physically equipped for raising such a large plantations with non teak species.

The results of working of Baten's Working Plan are summarized below:

Enumeration of the plantations of Chittagong Division Carried out during the revision of the present plan show that more than 50% of the plantation raised so far are not up to the mark in respect of quality or growth due to neglecting the maintenance and thinning operations.

The enumeration results (*Vide* Appendix No. VIII also indicate that the quality of the Teak plantations raised during the last plan period are comperable to those of site quality—III to site quality—IV/V of standared yield tables of Laurie and Sant Ram. Of the Teak plantation raised and enumerated it appears that 25% to 30% are over-stoked to the extent of 100% to 150% or more. This clearly indicates that thinning has not been carriedout in some of the plantations without due regard to the question of intensity or spacing. The second thinning and onwards were not carried out in the regular sequence as per prescription of the plan mainly due to shortage of fund. As a result the Teak plantations show poor growth and increment-through the number of steams per acre, in many cases is considerably more than required.

Further, it may be mentioned that approximately 25% to 30% of the area planted during this plan period are blank and may be treated as failure. Sporadic attempts have been made to re-stock these failed plantations or the blank areas but the results were not encouraging. The growth and stocking in plantations raised with species other than Teak have not been very satisfactory due to various reasons.

The probable reasons for failure of plantations raised during last plan-period, among others, may be the following:

(I) The technical knowledge for growing non-teak species was not adequate. Where teak and non-teak species were combined in one area, the different timing for raising teak and non-teak species created administrative problems. Teak gives best growth when planted with the premonsoon showers in last week of April or 1st week of May; whereas non-teak species mostly grown out of seeds and naked-rooted seedlings from nurseries can only be planted in June with the monsoon rains. In practice, teak was delayed and put together in June resulting in poor growth. The delayed in weeding and inadequate intensity of weeding have also resulted in poor growth in teak and failure in non-teak species.

(II) Paucity of fund and lack of timely release of fund also affected nursery and plantation works considerably.

The results of working of Baten's Working Plan may further be analysed as detailed below:

Long Rotation Working Circle:

As already stated, the top priority species prescribed under this working circle were Teak, Garjan and Chapalish.

In actual practice top priority was laid on Teak alone and the percentage of Teak planted varies from 60% to 75% and the rest 25% consisted of all other species. The reason for doing so was perhaps the greater changes of survival of Teak when planted as stumps, the capacity of this species to with-stand fire-hazards compared to other species and the fact that the forest staff in general are more acquinted with the Silviculture and the Nursery technique of teak. Other species such as Garjan, Chapalish and Jam did not survive well due to suppression by weeds a dvarious other reason. The raising of large scale Teak in plantations under this plan as well as the previous plan and delayed thinning which did not favour evergreen under growth had a deteriorating effect on the soil. Recent enumeration of the plantations have shown that most of Chittagong Forest Divisions Teak Plantations at Hazarkhil and Andarmanik where the quality goes up-to-II. Garjan and Jam when planted with care and where these are successful have shown good results.

Short Rotation Working Circle :

The plantations raised under this working circle, in most of the cases, were not up to the mark. In some cases the plantations may be treated as failure. The main reason perhaps is the wrong selection of species for most of the sites and lack of knowledge to grow non-teak. There was also gross deviation from the prescriptions of the working plan. It has been found, in some cases, that instead of the putting the species prescribed as per priority fixed by the working plan for this working circle, Teak has been raised in areas unsuitable for the species.

It may be mentioned that during the plan period (1968-69 to 1977-78) a total of 21,526·29 acres of plantations have been raised under normal and development scheme under Chittagong Division covering long and short rotation working circles as against a prescription of 53,160·00 acres.

To sum up, it may be stated that a total of 47,471·82 acres of plantations have been raised in Chittagong Forest Division since its inception. Out of this 21,526·29 acres have been raised during the last working plan period (1968-69 to 1977-78). Enumeration of these plantations were taken up taking representative samples varing from 10% to 20% of the total area. The results thus obtained show that more than 50% of these plantations are not up to the mark.

In the case of Bamboo, working cirle, the cutting rules do not appear to have been followed. Due to large demand of bamboos in the localities, large scale cutting of immature bamboos have taken place resulting in considerable shirnkage of already dwindled bamboo areas and from many accessible areas, bamboos have disappeared causing great hardship to local people.

SPECIAL WORKS OF IMPROVEMENT UNDERTAKEN

104. **Roads and Buildings**—Though no major road-making schemes have been contempleted in the past for this division, some trunk-roads like Chittagong-Cox's Bazar Road and Chittagong-Dhaka Road were existing since long. Besides a number of connecting roads, fair-weather roads, bridle-paths, & feeder-roads served the useful purpose extraction & transportation of forest produce to and from Chittagong Forest Division. During the last plan period the trunk roads in question as well as many other roads have been considerably improved, allowing movement of heavy vehicles, under the Development plans from time to time, as such the difficulties of extraction of transportation of forest produce within & outside the division have been considerably resolved. During the last plan period a number of office & residential buildings have been constructed th oughout the division along with some rest houses for the touring officers. This has improved the accommodation facilities considerably.

It is, however, necessary to construct further office-*cum*-residential buildings as well as rest houses for touring officers in view of increasing number of officers, subordinate and ministrial staffs in the division. It may be mentioned that most of the old offices or residential buildings & rest houses are in dilapidated conditions and requires through repair and in many cases, reconstructions for which necessary fund is not available at the moment. The normal grants in the divisional budget are not adequate for the purpose. The transport facilities available in the division appear to be satisfactory. The division has been provided with 3 Jeeps, 1 Truck, 1 Pickup, and a slugboat during the last plan period for facility of touring and better protection of the forest. Some motor cycles have also been provided to the executive staffs for quick movement and effective patrol in the forest area wherever communication facilities exists.

PAST YIELD

105. The out turn of Timber & other Forest produce from the forest of Chittagong Forest Division as available in the last plan, is reproduced here for a comperative study :

Statement showing the out turn of Forest produce from Chittagong Forest Division for the period from 1936-37 to 1963-64.

Year	Timber in round cft.	Fuel in stock cft.	Bamboos Nos.	Other produces (value).
1	2	3	4	5
	A Reserved, Protected and Khas Forests			
				Taka
1936-37	1,53,000	31,56,824	1,76,80,996	20,899
1937-38	2,14,309	33,61,432	2,17,47,720	22,355
1938-39	2,21,309	43,52,897	2,09,58,166	1,92,333
1939-40	2,14,478	27,80,071	2,00,34,845	34,041
1940-41	2,26,550	34,50,295	1,83,81,946	34,910
1941-42	2,06,768	23,06,601	1,54,65,061	38,235

Year	Timber in round cft.	Fuel in stock cft.	Bamboos Nos.	Other Produces (*Value*).
1	2	3	4	5
				Taka
1942-43	14,86,950	19,70,037	1,03,80,758	41,107
1943-44	21,07,399	21,03,916	99,85,416	17,767
1944-45	62,75,495	91,53,350	1,43,41,055	41,057
1945-46	12,19,769	46,24,666	1,58,19,564	58,659
1946-47	5,27,206	29,60,395	1,94,11,304	22,478
1947-48	6,36,771	32,51,373	2,16,09,289	39,101
1948-49	3,28,515	35,55,588	2,57,71,453	35,702
1949-50	4,23,079	47,32,294	3,70,67,559	49,050
1950-51	2,95,000	4,04,000	2,32,72,000	21,677
1951-52	3,17,850	27,73,803	1,59,89,332	32,780
1952-53	3,52,549	29,23,925	3,03,16,916	29,706
1953-54	5,00,322	52,17,236	2,70,56,485	31,414
1954-55	6,22,000	22,64,000	2,25,74,700	2,33,320
1955-56	6,46,588	54,38,576	4,29,84,356	34,709
1956-57	5,99,369	55,43,814	4,22,35,811	31,288
1957-58	5,70,350	53,34,184	4,30,30,000	39,697
1958-59	8,88,560	24,09,710	3,52,75,315	44,678
1959-60	7,54,000	18,52,000	2,03,70,000	76,271
1960-61	9,59,000	18,40,000	1,75,59,000	82,944
1961-62	10,76,000	16,93,000	1,16,83,000	64,345
1962-63	8,89,000	13,98,000	1,01,28,000	1,15,715
1963-64	13,89,400	12,25,000	2,02,36,525	83,636

The outturn yield beyond the years recorded in the last plan are shown below:

Statement showing outturn of Forest produce from Chittagong Forest Division for the period from 1964-65 to 1977-78.

Year	Timber in round cft.		(Reserve) Revenue in	(U.S.F.) Revenue in
	Reserve	U.S.F.	Taka	Taka
1964-65	13,99,000·0	41,000·0	15,50,000	2,46,000
1965-66	9,33,000·0	35,000·0	12,21,500	2,10,500
1966-67	14,33,700·0	51,300·0	15,59,400	3,07,600
1967-68	11,51,040·0	52,960·0	14,26,200	3,17,800
1968-69	14,14,500·0	45,500·0	20,01,500	2,73,500
1969-70	9,58,450·0	13,550·0	20,85,700	81,300
1970-71	7,93,620·0	4,380·0	14,70,700	26,300
1971-72	59,925·0	75·0	5,01,547	453
1972-73	2,15,185·0	815·0	16,90,110	14,890
1973-74	4,24,110·0	21,890·0	49,98,000	1,31,000
1974-75	3,71,730·0	270·0	45,22,375	1,625
1975-76	3,79,000·0	...	50,22,000	..
1976-77	1,10,750·0	1,33,250·0	50,88,500	7,99,500
1977-78	4,54,520·0	5,45,480·0	41,67,150	32,72,850

* It may be mentioned that outturn from the Reserved Forests and that from the U.S.F. mouzas have been shown in the above statement separately, for facility of comparison.

The fluctuations in the outturn figures say, 13,00,000·0 lakhs to 4,00,000·0 lakhs as shown above, has encouraged illicit and irregular felling-due to high demand for forest produce of the local people and the growing Industries around Chittagong Zone. This was particularly so due to imposition of embargo on felling just after liberation between 1972-73 to 1974-75.

PAST REVENUE EXPENDITURE

106. A statement of past financial result showing Revenue and Expenditure for Normal and Development is given below:

Statement Showing Financial Results of Chittagong Forcst Division for thc period from 1966-67 to 1977-78.

I. REVENUE

[In Taka]

Year	Timber	Fire Wood	Bamboo	Miscellaneous	Total
1966-67	14,42,114·25	33,170·97	2,21,532·23	1,70,040·86	18,66,858·31
1967-68	13,43,160·69	1,11,195·01	1,61,120·98	1,03,191·03	17,44,060·51
1968-69	17,64,710·03	93,822·24	1,72,640·68	2,44,991·36	22,75,264·67
1969-70	15,33,158·92	1,68,347·00	1,24,054·34	2,41,077·43	21,66,292·19
1970-71	10,20,276·67	84,779·09	1,11,797·43	2,10,464·69	14,27,317·88
1971-72	67,376·73	11,213·18	1,15,604·96	3,07,773·01	5,01,967·88
1972-73	5,22,936·99	18,411·11	1,80,698·24	10,04,479·66	17,26,278·00
1973-74	34,09,101·20	81,600·02	5,82,417·50	10,57,665·74	51,29,784·46
1974-75	27,56,725·53	6,18,051·60	4,02,307·58	6,46,905·51	45,23,990·22
1975-76	35,04,332·24	6,19,935·56	4,57,852·56	5,90,915·54	50,22,935·90
1976-77	43,84,267·14	4,06,136·22	2,96,118·37	8,01,942·14	58,88,463·87
1977-78	59,60,968·67	5,47,115·90	2,65,852·91	6,66,645·47	74,40,582·95

Statement showing financial results of Chittagong Forest Division for the period from 1966-67 to 1977-78.

II. EXPENDITURE

Year	E—Conservancy & Works								C—Establishment				Total
	Road		Buildings		Plantation		Others		Pay & Allowance		Others		
	Normal	Dev.	Normal	Dev.	Normal	Dev.	Normal	Dev.	Normal	Dev.	Normal	Dev.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1966-67	45,700	..	57,000	68,918	32,500	4,51,851	1,04,390	71,400	2,75,400	1,37,111	8,600	30 680	12,83,550
1967-68	49,000	..	58,300	3,47,490	35,500	6,70,480	51,700	50,882	2,75,993	1,79,153	8,046	27,000	17,53,544
1968-69	45,700	..	53,933	1,97,185	31,800	8,55,966	84,122	18,234	2,99,068	1,99,687	1,518	44,414	18,31,627
1969-70	44,700	..	53,500	30,341	35,000	1,48,244	48,000	..	3,10,112	2,21,892	9,138	22,856	8,93,783
1970-71	52,500	..	55,000	67,730	81,200	3,54,463	42,427	..	3,21,515	2,43,585	13,980	33,200	12,65,600
1971-72	35,280	..	56,300	11,785	68,324	47,351	33,767	2,794	3,88,262	2,75,771	17,424	21,044	9,58,602
1972-73	25,000	..	60,548	..	1,32,225	53,500	79,200	..	4,31,461	2,28,666	66,373	1,900	9,28,878
1973-74	19,000	..	43,500	11,500	2,65,000	5,30,358	96,280	..	6,16,288	1,99,900	57,141	20,600	18,59,567
1974-75	15,000	..	45,000	3,90,000	1,68,000	5,59,600	1,79,200	1,10,000	9,09,000	..	25,650	..	24,01,450
1975-76	17,000	..	1,00,000	11,26,400	2,19,300	8,30,400	3,21,147	1,96,741	10 81,000	11,200	25,405	12,575	39,41,158
1976-77	26,000	..	70,000	8,82,500	1,20,830	12,62,822	2,34,300	2,90,456	11,72,000	2,10,852	18,740	67,491	43,55,991
1977-78	38,500	..	1,17,600	4,65,000	2,21,250	13,80,000	2,34,600	5,25,444	14,06,900	3,94,604	57,930	44,450	48,86,278

Statement showing Revenue/Expenditure/Surplus/Deficit.

Year	Total Revenue.	Total Expenditure.	Surplus.	Deficit.
	Tk.	Tk.	Tk.	Tk.
1966-67	18,66,585·31	12,33,550·00	6,33,308·31	..
1967-68	17,44,060·51	17,53,544·00	..	9,483·49
1968-69	22,75,264·67	18,31,627·00	4,43,637·67	..
1969-70	21,66,292·19	8,93,783·00	12,72,509·19	..
1970-71	14,27,317·88	12,65,600·00	1,61,717·88	..
1971-72	5,01,967·88	9,58,602·00	..	4,56,634·12
1972-73	17,26,278·00	9,28,878·00	7,97,400·00	..
1973-74	51,29,784·46	18,59,567·00	32,70,217·46	..
1974-75	45,23,990·22	24,01,450·00	21,22,540·22	..
1975-76	50,22,935·90	39,41,168·00	10,81,767·90	..
1976-77	58,88,463·87	43,55,991·00	15,32,472·87	..
1977-78	74,40,592·95	48,36,278·00	26,04,314·95	..

CHAPTER VI

STATISTICS OF GROWTH AND YIELD

107. **Rates of Growth.**—Little is known regarding the rates of growth of indigenous species. It may be mentioned here that M/s. Forestal Forestry International Limited in their inventory reports for the forests of Chittagong Hill Tracts have given the increment date of some indigenous species. The date were derived from 2 sources:

(I) Ring counts made on the stumps of trees measured for volume studies.

(II) Measurements made of the increment during the last 20 years as taken from the increment borings made in selected standing trees in the sample plots.

The following Table shows the increment date based on Forestal's report:

Increment by species and by hardness groups

Species.	Hardness rating.	Number of measurement.	Mean periodic annual increment to diameter at B.H. in inches.
Bandarhola ..	Soft	5	0·276
Chundul ...	Do.	19	0·422
Gamar ...	Do.	8	0·384
Kadam ...	Do.	3	0·346
Narikel ...	Do.	33	0·344
Pitali ...	Do.	5	0·334
Mean for soft hard wood species		73	0·363

Species	Hardness rating.	Number of measurement.	Mean periodic annual increment to diameter at B.H. in inches.
Champa ..	Semi-hard	29	0·280
Chapalish ..	Do.	21	0·338
Chikrassi ..	Do.	10	0·312
Civit ..	Do.	102	0·296
Koroi ..	Do.	1	0·420
Pitraj ..	Do.	21	0·294
Toon ..	Do.	7	0·286
Uriam ..	Do.	21	0·294
Mean for semi-hard wood species		212	0·298
Batna ..	Hard	1	0·260
Chalmogra ..	Do.	12	0·292
Dhakijam ..	Do.	15	0.294
Garjan ..	Do.	108	0·284
Jarul ..	Do.	17	0·288
Kamdeb ..	Do.	11	0·274
Nageswar ..	Do.	5	0·172
Other jam ...	Do.	5	0·278
Tali ..	Do.	39	0·252
Mean for hardwood species		213	0·276
Miscellaneous ..		138	0·278
Overall ..		636	0·294

* Hardness ratings are based on the classification and results as reported in "Common Timbers of Pakistan" by Q. Ghani, 1962.

* The increment is based on growth during the twenty years immediately preceding the date of measurement.

† Data collected from FORESTAL'S REPORT.

Statement showing Increment of Garjan and Civit by Diometer Classes-8

D.E.H. Class.	Garjan		Civit	
	Number of measurements	Mean P.A.I. to D.E.H. (inches)	Number of measure-ment.	Mean P.A.I. to D.E.H. (inches)
8	8	0·321	4	0·232
12	16	0·213	10	0·258
16	16	0·254	5	0·334
20	10	0·231	11	0·262
24	9	0·298	16	0·272
28	12	0·332	14	0·286
32	11	0·309	12	0·318
36	10	0·274	6	0·358
40	2	0·225	8	0·331
44	4	0·337	7	0·319
48	1	0·360	5	0·306
52	4	0·417	1	0·350
56	3	0·343	2	0·380
60	2	0·285	1	0·410
Mean	108	0·284	102	0·296

* The increment is based on growth during the twenty years preceding the data of measurement.
* Data collected from FORESTAL'S REPORT.

The Increment data for some more indigenous species based on Forestal's Report and other available records are shown in Appendix IX.

No systematic study has so far been carriedout to ascertain the rates of growth of Garjan or other indigenous species during the last plan period except occasional collection of data on Volume-table or similar studies from the Mensuration/Inventory Division of the Forest Research Institute, Chittagong. In recent years a project has been taken up by the Forest Research Institute, Chittagong, under assistance from U.N.D.P./ F.A.O. to collect and compile data on rates of growth of indigenous species, and compilation of the same for the preparation of Volume-table. For this, the data already available at F.R.I. and in the Inventory

Reports have been freely used. Curves have been prepared by processing and compilation of the existing data regarding Garjan (Dipterocarpus turbinatus) and Teak (Tectona grandis) showing the relationship between dominant height or these species with Age-depending on Site-Index.

The annexed Curves as per Appendix IX prepared at the Forest Research Institute, Chittagong, as stated above, may serve as a Temporary Guide till detailed and systematic studies are completed for our indigenous species. The curves prepared are based on the studies made by M/s. M.V. Laurie and Bakshi Sant-Ram at the Forest Research Institute, Dehradun. The curves annexed above compare favourably with the quality class III of Indian Plantation Teak up to the age of 30 years in matters of growth and site quality. After 30 years of age the quality class drops to site-quality IV/V. However, it is necessary to carry out further studies to standardise the data obtained in this connection and compile dependable curves.

108. **Yield Tables**—Yield tables for any of the indigenous species could not be prepared so far. Yield and Stand tables for Plantation Teak are available in Indian Forest Records (new series Vol. 9, No. 4, pages 176—181—1964 by S.K. Seth) for Site-quality III & IV/V are useful and have been used from time to time. Yield and stand tables for Plantation Teak also available in Indian Forest Records (Vol. IV-A, No. 1, pages 46/47 by M.V. Laurie and Bakshi Sant-Ram).

Copies of the above tables are given in Appendix X.

It may be mentioned that about 47,471·82 acres of plantation has been raised so far in Chittagong Division since its inception with Teak as the principal species comprising on an average 60% to 70% of the total plantations. Ghani's plan placed most of the Bangladeshi plantation of Teak under site-quality II and the rest to site-quality III (Ghani's Working Plan 1950-51 to 1969-70, page 22) Baten's Working Plan also retained the same view (Baten's Working Plan Page 36. This view regarding the site quality of Plantation Teak of Chittagong appears to be applicable only to the plantations of specific areas such as those of Hazarikhil and Andharmanik and that also to small acreage of plantations. Recent enumeration of plantations of Chittagong Division (carried out during 1975-76 to 1978-79) has confirmed the above view. It has further been observed that the majority of Teak Plantations of Chittagong Division raised so far are comparable to site-quality III of Laurie and Sant-Ram's yield tables. The rest of the plantations are of still lower quality and vary between site-quality IV and IV/V of the said tables.

It may also be mentioned in this connection that some studies are being made at the Forest Research Institute, Chittagong, on yield tables and their applicability to our Plantation Teak under a guidance of foreign experts. Data collected from time to time by officials of Forest Research

Institute, Chittagong, on Plantation Teak as well as other available records including those of Indian Forest Records have been freely used for the purpose.

An Yield-table for Plantation Teak compiled at the Forest Research Institute is shown in Appendix XI.

A copy of Volume-table for Teak compiled at the Forest Research Institute, Chittagong, is also appended herewith, *vide* Appendix XIII.

It may be mentioned that the accuracy and applicability of the Volume and Yield-tables mentioned above are not beyond question since systematic studies in this connection are yet to be carried out. For the purpose of compilation of Yield-tables it is necessary to layout sample-plots properly in various places and arrange to record the observations for years together. Hence the Yield-tables, as mentioned above, may serve as a temporary-guide for yield calculation till we are in a position to compile Yield-tables applicable to our Plantation-Teak based on longer year's measurement records.

109. **Commercial Timber Out-turn Figures (Volume Table)**—It may be mentioned here that data available for compilation of Volume tables for indigenous species like Garjan, Chapalish, etc, are not adequate and in many instances are not dependable. The following out-turn figures available in Ghani's Working Plan have been worked out (during 1950-51) from data collected from a large number of trees felled and extracted by contractors in the Halda Valley area including the out-turn of both sound and defective trees:—Breast-height Girths and Volumes in C. Feet on quarter girth basis :

Class of Forest	Species.	Breast-height girths.							
		3′ to 3′-11″	4′ to 4′-11″	5′ to 5′-11″	6′ to 6′-11″	7′ to 7′-11″	8′ to 8′-11″	9′ to 9′-11″	10′ & over
Reserved Forest.	Garjan, Chapalish & Others.	20	30	40	50	70	90	100	130
		15	25	35	40	55	70	90	110
Protected Forest.	Garjan, Chapalish & Others.	..	..	35	50	65	80	100	120
		..	..	30	35	50	65	80	95

Similar figures collected at Barabakia and Taitong in Barabakia Range where the quality of Garjan is low, gave a figure which is about 30% below that given for Garjan from the Reserved Forests in the above table.

REVISED WORKING PLAN FOR THE FORESTS OF CHITTAGONG DIVISION

PART II

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED

PART II

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED

CHAPTER I

BASIS OF PROPOSALS

GENERAL OBJECTS OF MANAGEMENT AND TREATMENT REQUIRED TO SECURE THEM

110. **General Objects of Management**—The general objects of management may be summerised as follows :

(1) To provide and maintain progressive supply of forest produce required by the rural and urban population.

(2) To re-place the existing irregular, depleted and less productive forests by a man-made plantation forest with more valuable and productive species suited to the soil and the country's requirements.

(3) To afforest the existing barren, blank and encroached areas with suitable species with a view to increase the forest wealth.

(4) To ensure supply of raw materials to forest based industries and to supply rail road sleepers and constructional timber.

(5) To manage the forests on the basis of sustained yield.

(6) To maintain adequate forest cover to maintain the ecological balance and also to create natural environment for preservation and propagation of wild-life and also for introduction of new animal species.

(7) To keep sufficient forest cover to conserve moisture and to prevent denudation of the hills and erosion of the soil and silting up of the river beds.

(8) To provide grazing facilities for the local cattle population.

(9) To derive highest possible economic return out of the existing forests and to ensure maximum utilisation of the produce from these forests.

111. **Method of Treatment to be Adopted**—To achieve the objectives as stated above, the following measures are suggested :

(1) Method of re-generation will be clear-felling followed by artificial regeneration. The object is to replace the existing irregular and low-yielding forests with a man-made regular plantation forest with more valuable and high-yielding species based on the end use utilization concept. The denuded hills and barren areas will be planted with suitable fast-growing species.

(2) Areas which are easily accessible and which are nearer to the wood-based industries and are suitable for growing house-posts, bence posts, fire-wood and agricultural implements, will be put under fast-growing species under "Short Rotation Working Circle". Areas which are reasonably accessible will be put under "Medium Rotation" which suitable species to meet the requirement of wood-based industries such as Match Factories and Packing Box Factories etc. and in addition to supply fire-wood, electric transmission poles and agricultural implements etc. Comparatively inaccessible and far-flung areas will be put under "Long Rotation Working Circle" *i. e.* the balance area after allotment to Short and Meduim Rotations Working Circles shall be put under valuable hardwood species for quality timber to meet the requirement of various industries, rail road sleepers and constructional timbers. Approximately 67% of the total area will be converted into a normal forest in 60 years; 28% of the total area in 30 years and 5·6% of the total areas in 15 years under Long, Meduim and Short Rotation respectively.

(3) The existing plantations will be maintained and tended properly to ensure healthy growth.

(4) Attempts shall be made to improve grazing facilities but the areas under plantation will be closed to grazing till the plantation is fully established.

(5) No felling will be done in steep slopes and natural regeneration will be encouraged through Silvicultural operations in these areas.

(6) Bamboos will be worked on a 3 (three) year cutting-cycle and cutting rules for bamboos will be strictly enforced. Steps will be taken to encourage bamboo plantation in normal clear-felling coupes of medium and short rotation areas along with tree plantation at the time of seed years of bamboos to improve the depleted bamboo resource. Simultaneously thatch growing areas will be properly maintained by improvement of the existing Sunkholas.

(7) Adequate attention will be paid towards preservation of wild-life with emphasis on the rare or threatened species by enforcing strict game rules. Introduction of valuable wild-life from other areas will be encouraged.

The creation of different working circles is required to attain the above objectives.

WORKING CIRCLES

Their area and distribution and reasons for their constitution.

112. **Constitution of Working Circles** —In order to provide for the different methods of treatment described above (Para 111), the forests are divided into 4 (four) working circles. The following table shows the Working Circles, their distribution and reasons for their constitution :

Sl. No.	Working Circle.	Distribution.	Area in acres.	Reasons for constitution.	Methods of treatment.
1.	Short Rotation Working Circle.	This contains approx. 5·6% of the total area of forests of this division.	16,878·0	Easily accessible areas which are nearer to the wood based industries and from where quick growing species suitable for match wood, hard board, fire-wood, agricultural implements, house-posts etc., may be obtained economically.	Clear felling followed by artificial regeneration on a 15 years' rotation and also by afforestation of tree-less barren areas.
2.	Medium Rotation Working Circle.	This contains approx. 28% of the total area of forests of the division.	83,816·0	Reasonably accessible areas where fast growing speciess of economic value may be growr to feed the match-factories, packing box industries and supply fire-wood, agricultural implements & transmission poles, etc.	Clear-felling followed by artificial regeneration with suitable species on a rotation of 30 years and also by afforestation of denuded hills.
3.	Long Rotation Working Circle.	This contains approx. 67% of the total area of forest of this division.	2,00,472·20	All remote and inaccessible areas of the forests of the division have been put here to meet the requirement of various industries, sleepers and constructional timbers.	Clear-felling followed by artificial regeneration with suitable species on a rotation of 60 years.
4.	Bamboo Working Circle.	Over-lapping the reserved forests of long, short and medium rotation working circle.	Contains almost the entire area of 2,10,852·0 acres of Reserved Forest overlapping long and medium and short rotation working circle.	To provide and maintain regular and sufficient supply of bamboos to the local people.	Working on 3 (three) year felling circle basis.

113. **Map Showing Working Circles**—A map showing the apportionment of areas to different Working Circles has been enclosed as Appendix I.

BLOCKS AND COMPARTMENTS

Blocks and Compartments—In Ghani's Working Plan there were 84 cks for 2,06,324·0 acres of Reserved Forests which have been retained in this working plan. 57,069·0 acres of Protected Forests were allotted to the protected forests working circles and no blocks or compartments were designed for them in that plan. Subsequently an additional area of 4,528·0 acres of Reserved Forests, 10,251·48 acres of Protected Forests, 15,328·72 acres of Acquired Forests and 7,665·0 acres of Vested Forests have been taken up for management. Since the legal position of these forests except the Reserved Forests have not yet been finally settled and these are scattered all over the division, it is not practicable at this stage to constitute them into properly defined compartments. For the convenience of management these are, however, divided into 19 non-compact blocks—10 blocks for the Protected Forests, 6 blocks for the Acquired Forests and 3 blocks for the Vested Forests. The reasons for such distribution is that Protected Forests are distributed in 10 Ranges, Acquired Forests in 6 Ranges and Vested Forests in 3 Ranges.

A detailed description of each block has been included in Appendix II.

115. **Analysis and Valuation of the Crop**—Enumeration of the plantations of Chittagong Division has been carried out during the period 1976-77 to 1978-79. 10% enumerations have been carried out in plantations prior to 1965-66 and 20% enumerations has been carried out in the younger plantations raised between 1965-66 to 1977-78. Out of the total area of 30,01,166·20 acres 21,526·29 acres have been planted during the tenancy of Baten's Working Plan up to 1978 of the total area of plantation, the effective plantation is of 15,299·26 acres as found out in the enumeration survey of the plantations.. From the enumeration results the number of stems per acre, the percentage survival and the quality-class based on Teak of the planted stock have been found out in addition to the average height and diameter of the dominant trees. The enumeration results have given useful informations for evaluation of the plantation raised so far, in respect of quality and yield and would be useful guide for the selection of suitable species for our future plantations. This has also shown the extent of areas of totally failed plantations. The results of the enumerations of plantations have been tabulated and shown in Appendix-VIII. Enumeration of the high forest has not been carried out. This was not considered necessary, as the prescriptions of this plan are entirely on area basis. Besides, such enumeration surveys would be time-consuming and costly. The workable and un-workable areas of the Reserved Forests as adopted in the last plan have been retained.

116. **Calculation of Rotation**—The justification for fixing up the rotation is given under each working circle.

117. **Period of the Working Plan and the necessity for Intermediate Revision**—This plan has been prepared for a period of 10 years, *viz.*, 1978-79 to 1987-88. If necessary, revision or modification of this Working Plan may be made during the intermediary period, to accommodate changes, if any, in the prescriptions which should be re-cast and readjusted suitably to meet the requirements. At the end of this plan period, enumerations of the plantations should be carried out to evaluate the success or failures of the plantations raised and the quality of stocking achieved. Attempts should also be made to survey the boundaries of the Reserved Forests as far as possible.

CHAPTER II

WORKING PLAN FOR THE SHORT ROTATION WORKING CIRCLE

118. **General Constitution.**—The total area of this working circle is 16,878·0 acres, *i.e.*, about 5·6% of the total area of the forests of this division. The area allotted to this working circle is comparatively easily accessible and nearer to habitations and consumption centres. The area under this working circle is suitable for growing semi-hard wood species for supply of raw-material for hard-board, partical-board, match-wood factories located in or around Chittagong, house-posts, fence-posts, pan-bar-stakes, agricultural implements and fire-wood, etc., to be rural population.

This working circle has been divided into 8 felling series and 8 cutting sections.

The following table gives the distribution of the Short Rotation Working Circle by Ranges and felling series :

Sl. No.	Felling Series and Ranges.	Workable area (acres).	Unworkable area (acres).	Total area in acres.
1	Karerhat	1,923·50	..	1,923·50
2	Hathazari	2,025·00	...	2,025·00
3	Sitalpur	2,052·74	...	2,052·74
4	Baraiyardhala	994·00	..	994·00
5	Patiya	2,645·00	...	2,645·00
6	Kalipur	3,610·00	..	3,610·00
7	Madarsha	1,551·11	..	1,551·11
8	Rangunia	2,076·65	...	2,076·65
	Total ..	16,878·00	...	16,878·00

119. **Character of Vegetation.**—The forests of this working circle, in general, may be classified as tropical semi-evergreen type. The vegetation in most of the area under this working circle, however, is in a very depleted condition due to excessive felling and removal of forest cover, unrestricted grazing and incidences of fire. However, in some areas of the working circle specially towards the north, semi-evergreen type of vegetation still occurs with Dipterocarpus, Artocarpus, Syzygium, Schira, as the common general with different varieties of bamboos of which Melocanna being the pre-dominant type.

120. **Analysis and Valuation of the Crop.**—Enumeration of the stock was not done for this plan as the prescriptions are on area basis However, classification of the forest areas as adopted in the previous working plan such as workable, un-workable areas of the Reserved Forests have been retained. The out-turn from the newly added areas of Protected and Acquired Forests is estimated to be nominal as these were heavily exploited in the past. The conditions of the existing plantations falling in this working circle is also not very satisfactory.

121. **Objects of Management.**—The principal objective of this working circle is to grow wood species of fast-growing type having high economic value in order to provide raw-material for the wood-based industries like hard-board, partical-board, match-wood factories and also to supply forest produce required by the rural people for agricultural implements, house-posts, fence-posts and fire-wood etc. Afforestation of the barren hillocks falling within the circle is also a major objective of this circle.

METHOD OF TREATMENT

122. **Silvicultural System.**—The Silvicultural system prescribed for this working circle is clear-felling followed by artificial regeneration. The first Periodic Block will be for 10 (ten) years and will constitute 11,252·00 acres of the working circle. The existing plantations up to 1978 will constitute Periodic Block II or Plantation Periodic Block and the rest will be Periodic Block III or un-allotted Periodic Block.

It is important that species best suited to a locality should be planted considering the capability of the soil. Special care should be taken towards the proper selection of species and only those species which are recommended under para 134 should be planted. Care should be taken at every stage of raising nursery or plantation and the subsequent tending operations as recommended under appropriate paras so that the plantations to be raised in future are successful.

123. **Calculation of Rotation** —Principal species like Gamar, Eucalyptus and Kadam attains dia-meters of 9·5″, 10·4″, 5·1″ respectively and average heights of 40′, 65′ 60′ respectively at 15 years. Hence the species raised under this rotation would be suitable for house-posts, fire-wood and raw-materials for match-wood and hard-board, etc., and the rotation has, therefore, been fixed at 15 years considering that the plantation raised can be commercially exploited at the end of the rotation and to convert the existing inferior type of forests with poor stocking into a regular soft-hard wood forest of industrial species in 15 years.

124. **Division into felling series and cutting section**—Depending on the availability, seeds, nursery stock and local demand of the existing forest produce, each Range will have a felling series and each Beat, wherever possible will have a cutting section.

125. **Division into Periodic Block**—The total area of this working circle comprising of 16,878·00 acres is divided into 3 (three) Periodic Blocks such as Periodic Block I, Periodic Block II and Periodic Block III. Out of 16,878·00 acres of workable area of this working circle 11,252·00 acres including Reserved Protected and Acquired Forests have been allotted to Periodic Block I. This Periodic Block also includes areas of plantation of cast plan which have totally failed to the 4,714·24 acres for replanting during this plan period. Area of the existing plantations of this circle up to 1978 consisting of 2,454·75 acres has been allotted to Periodic Block II and the rest of the area comprising 3,171·25 acres has been allotted to Periodic Block III.

126. **Allotment to Periodic Blocks.**—The following table shows the distributions of areas to different Periodic Blocks :

PERIODIC BLOCK I.

SHORT ROTATION WORKING CIRCLE

ALLOTMENT TO PERIODIC BLOCKS

Range and felling series.	Cutting Section.	Block and compartment.	Workable area in acres.	Un-workable area in acres.	Total area in acres.	Remarks.
1. Kaerhat ..	Hinguli	Hinguli	1,600·00	..	1,600·00	
	Total of the felling series	..	1,600·00	..	1,600·00	
2. Hathazari	Hathazari	Hathazari	900·76	..	900·76	
	Total of the felling series	..	900·76	..	900·76	

Range and felling series	Cutting Section	Block and compartment	Workable area in acres.	Un-workable area in acres.	Total area in acres.	Remarks.
3. Sitalpur ..	Sitalpur	Kumira-RF/PF Sitalpur-VF	1,259·50	..	1,259·50	Failed plantation area to taken up for replanting.
	Total of the felling series ..		1,259·50	..	1,259·50	
4. Baraiyadhala	Sitakund	Sitakund	815·50	..	815·50	
	Total of the felling series ..		815·50	..	815·50	
5. Patiya ..	Barguni	Hashimpur 41-Elahabad	1,848·00 52·00	..	1,900·00	Including failed plantation.
	Total of the felling series ..		1,900·00	..	1,900·00	
6. Kalipur ..	Kalipur	Kalipur A. F. Kalipur P. F.	950·00 1,400·00	..	2,350·00	Failed area taken up for replanting.
	Total of the felling series ..		2,350·00	..	2,350·00	
7. Madarsha	Madarsha	Kalipur P. F.	1,312·00	..	1,312·00	Ditto.
	Total of the felling series ..		1,312·00	..	1,312·00	
8. Rangunia..	Cheringa	Jungle South Nischintapur Rangunia P. F	16·00 1,098·24	..	1,114·24	
	Total of the felling series ..		1,114·24	..	1,114·24	
	Grand Total of the Periodic Block I		11,252·00	..	11,252·00	

PERIODIC BLOCK II
SHORT ROTATION OF WORKING CIRCLE
PLANTATION PERIODIC BLOCK

Range and felling series.	Cutting section.	Block and compartment.	Area in acres.	Remarks.
1. Karerhat	Hinguli	Hinguli	160·00	
	Total of the felling series		160·00	
2. Hathazari ..	Hathazari	Hathazari ..	118·50	
	Total of the felling series		118·50	
3. Sitalpur	Sitalpur	Kumira ..	400·00	
	Total of the felling series		400·00	
4. Patiya	Barguni	Hashimpur ..	157·00	
	Total of the felling series		157·00	
5. Kalipur	Kalipur	Kalipur A. F. ..	400·00	
		Kalipur P.F. ..	460·00	
	Total of the felling series		860·00	
6. Rangunia	Choringa	Jungle South Nischintapur ..	443·50	
		Rangunia P. F. ..	315·75	
	Total of the felling series		759·25	
	Grand Total of the Periodic Block II ..		2,452·75	

PERIODIC BLOCK III
UNALLOTTED PERIODIC BLOCK

Range of felling series.	Cutting section.	Block and compartment.	Workable area in acres.	Un-workable area in acres.	Total area in acres.	Remarks.
1. Karerhat ..	Hinguli	Hinguli	163·50	..	163·50	
	Total of the felling series ..		163·50	..	163·50	
2. Hathazari	Hathazari	Hathazari	1,005·74	..	1,005·74	
	Total of the felling series ..		1,005·74	..	1,005·74	
3. Sitalpur ..	Sitalpur	Kumira-P.F./R.F. Sitalpur V.F.	393·24	..	393·24	
	Total of the felling series ..		393·24	..	393·24	
4. Baraiyadhala	Sitakund	Sitakund	178·50	..	178·50	
	Total of the felling series ..		178·50	..	178·50	
5. Patiya ..	Barguni	41-Elahabad	588·00	..	588·00	
	Total of the felling series ..		588·00	..	588·00	
6. Kalipur ..	Kalipur	Kalipur P.F.	100·00	..	100·00	
		Kalipur	300·00	..	300·00	
	Total of the Felling series		400·00	..	400·00	
7. Madarsha	Madarsha	Kalipur P. F.	239·11	..	239·11	
	Total of the felling series ..		239·11	..	239·11	
8. Rangunia..	Charinga	Rangunia P. F.	203·16	..	203·16	
	Total of the felling series ..		203·16	..	203·16	
Grand Total of the Periodic Block III ..			3,171·25	..	3,171·25	

127. **Regulation of Yield :**

$$\text{Yield} = \frac{\text{Total workable area}}{\text{Rotation in years}} = \frac{16,878 \cdot 00}{15} = 1,125 \cdot 20 \text{ acres.}$$

For the purpose of yield calculation only the workable area is taken into consideration. The yield as shown above is the sustained yield for the working circle and is expected to be taken out every year without affecting the forests adversely. Hence the prescribed annual yield is equal to 1,125·20 acres.

Accordingly, the allotments to various Periodic Blocks have been shown in separate statements in the foregoing pages.

128. **Yield from Periodic Block** I—Annually one-tenth of the workable area from 1978-79 in each felling series will be worked for regeneration. Thus the yield from Periodic Block I comes to :—

$$Y = \frac{A}{10} \text{ i.e. } = \frac{11,252 \cdot 00}{10} = 1,125 \cdot 20 \text{ acres.}$$

Where Y=Annually yield from Periodic Block I

A=Workable area in Periodic Block I and working period is=10 years.

The following Table gives the Annual Yield from Periodic Block I

Range and felling series.	Cutting section Ptn. Centre.	Block and compartment	Workable area	Annual Yield	Remarks.
1. Kaierhat ..	Hinguli	Hinguli	1600·00	160·00	
2. Hathazair ..	Hathazari	Hathazari	900·76	90·076	
3. Sitalpur ..	Sitalpur	Kumira-R.F. Kumira-P.F. Sitalpur-V.F.	1259·50	125·95	During 1978-79 one-tenth from each block & then Kumira block will be completed first from 1979-80. Failed Ptn. area taken up.
4. Baraiyadhala..	Sitakund	Sitakund	815·50	81·55	
5. Patiya ..	Barguni	Hashimpur 41-Elahabad	1848·00 52·00	190·00	During 1978-79 one-tenth from each block and then Hashimpur block will be completed first from 1979-80. Failed Ptn. area taken up.
6. Kalipur ..	Kalipur	Kalipur A.F. Kalipur-P.F.	950·00 1400 00	235·00	During 1978-79 one-tenth from each block & then Kalipur block will be completed first from 1979-80. Failed Ptn. area taken up.
7. Madarsha ..	Madarsha	Kalipur-P.F.	1312·00	131·20	Failed Ptn. area taken up.
8. Rangunia ..	Cheringa	Jungle south Nischintapur Rangunia-P.F.	16·00 1098·24	111·424	During 1978-79 one-tenth from each block & then Nischintapur block will be completed first from 1979-80. Total failed area of Ptn. taken up for replanting.
Total of all the felling series :			11,252·00	1,125·20	

METHOD OF TREATING UNALLOTTED AREA

129. **Yield from Periodic Block II**—Most of the trees in the existing plantations under this working circle are immature and no appreciable yield can be expected from the thinning. Necessary cultural operations will be carried out. Any out-turn from these operations will be added to the total out-turn of this Working Circle.

130. **Yield from Periodic Block III**—This includes all other un-felled and un-worked area. No yield is prescribed from this Periodic Block. Only silvicultural operation will be carried out. Any out-turn from these silvicultural operations will be added to the total yield of the working circle.

131. **Method of executing felling**—The general rules to be followed are as detailed below :

(1) A felling plan should be prepared in conformity with the prescriptions laid down in paragraph 122 of this plan. This should be done at least one year ahead of the commencement of actual felling operations.

(2) The annual coupes should be selected on the maps and laid down on the ground by compass and plane table survey. Under no circumstances the annual felling area should exceed the limit laid down in paragraph 127.

(3) All marchantable trees should be measured, marked and recorded in diameter or girth classes. These works should be undertaken immediately after preparation of the felling plan and should be completed about a year ahead of the commencement of the actual felling operations.

(4) Annual coupes should be worked from October/November and cleared of all merchantable forest produce by 15th February at the latest.

(5) Subsidiary operations including collection of debris, burning of coupes, stacking and making thalies, etc., should be completed by March of the year.

(6) No clear-felling should be done on steep or precipitious ground. Areas so left but which have been included in the workable areas are to be counted against the yield.

(7) Fund and labour supply should be ensured before executing the clear-felling operations.

(8) If Taungya labour is employed then on an average one acre should be allotted to each house for clear-felling and planting. This area may be increased according to the working hands in the family.

(9) A natural forest belt of 2 chain width if existing should be kept along the boundary of the forest and along the main road or railway line passing through the forests.

132. **Sequence of felling to be made**—The area to be regenerated during the next 10 years should be taken up systematically from one side of the area for clear felling and unless one block/compartment is completed, the next one should not be taken up. Coupe boundaries should be straight as far as possible, and run North-South or East-West wherever practicable.

133. **Selection Felling**—No felling is prescribed from the unallotted Periodic Block. The removal of dead top broken and uprooted trees may be felled and removed at the discretion of the Divisional Forest Officer.

134. **Method of check in the field of the prescribed annual yield is being removed correctly**—In order to check whether the prescribed area has been clear-felled and planted up, the Territorial Divisional Forest Officer shall arrange to survey the annual coupe are immediately after the plantation is raised. Any deviation found may be incorporated in the prescribed control form. Any deviation from the working plan prescriptions may be carried over and adjusted with the subsequent year's programme.

SUBSIDIARY REGULATIONS

135. **Selection of Species**—The selection of species to be grown in this working circle will largely depend on the site capability and on the demand of the species for the end uses for which the area is devoted.

The following species are prescribed for this working circle :

135 A. **Choice of Species :**

Location.	Species for reforestation	Species for afforestation.
For Ridges ..	Gamar, Minjiri, Koroi, Ipil Ipil.	Minjiri, Koroi, Gamar, Ipil Ipil.
For Slopes ..	Kadam, E. Cytriodora, Pynkado, Gamar, Minjiri, Koroi, A. Moluceama, Ipil Ipil.	Minjiri, E. Cytriodora, Gamar, Koroi, Ipil Ipil.
For high flats. ..	Pynkado, E. cytriodora, Kadam, A. Molu ceana Ipil Ipil.	Minjiri, Gamar, Koroi, Ipil Ipil.
For low flat ..	Kadam, Pitali, Kanjal	Kadam, Pitali, Kanjal.

PLANTATION TECHNIQUE AND NURSERY PRACTICE

136. **Selection of mother tree for seed collection**—The origin of seed is extremely important. It is, therefore, necessary to select the right quality mother-trees for seed collection. Clean long bole, round shape, uniform crown, free from diseases and defects, etc., are some of the general characteristics of a good mother-tree for producing quality timber. Throughout the Plantation Zone, it is necessary to have adequate number of desired mother-trees selected, marked and preserved preferably Beatwise. A register should be maintained specieswise for all important indigenous mother trees. The markings and a serial number should be re-newed once in every three years. Seeds should never be collected under contract system. In this connection, "The Forest Nursery and Plantation Manual" by Mr. M. R. Choudhury may be referred to.

137. **Nursery Practice**—The details of nursery establishment and layout, preparation of the nursery beds and other details may be seen in the "Forest Nursery and Plantation Manual", *vide* pages 2—5 which is now available with all executive forest staff.

Almost all the species recommended for this working circle should be raised in polythene bags. Gamar may be planted directly in the forest.

It may be mentioned that the technique of raising seedlings in poly-bags has been found to be the best method for raising most of the non-Teak species from the point of view of percentage germination, survival, growth and economy in the quantity of seeds used etc. Hence, this method is getting priority over the nurseries in site. The poly bag method, therefore, should be encouraged and large-scale nursery practice with polybags should be adopted with non.Teak species. The height of the seedlings should be not less than 12″ when put to plantation. This will help planting of Teak and non-Teak species in one operation if the sowing in polybags is organized in time.

138. **Plantation Technique**—The details of planting out in the forest are given in paras 9.1 to 9.7, pages 33 to 37 of "The Forest Nursery and Plantation Manual" by Mr. M. R. Choudhury, which has been supplied to forest staff of all divisions, as such these are not repeated here. The programme of annual plantations should be drawn up properly by the D.F.O. in consultation with R. O. and B. O. incharge. A copy of this programme should be sent to G. F., R. O. and B. O. concerned and financing is arranged accordingly.

The main object of raising plantation will be to get the best mixture of species prescribed for the working circle depending on the site factors. It is, therefore, necessary to allocate the duties and responsibilities of the staff who would be connected with the raising of the plantation as their

collective efforts will determine the success or failure of the plantation both in respect of the quality of the crop and stocking in the area. The plantation plan of each area will be ready at least one year before the plantation season so that the staff responsible for supervising the actual planting know what is to be planted and where. For this purpose a rough contour map showing the ridges, valley and slopes will be prepared by the Beat Officer. The Range Officer will check the contour map and draw the plan of the plantation showing the location of species or mixture of species and obtain the approval of the Divisional Forest Officer. This map in due course will form a part of the plantation journal. The species to be planted should preferably be a mixture of light demanders and shade bearers. Nurse crops like Arhar (caganus indicus) and Bogamedulla should be used to improve the soil especially in the barren and denuded hills. The nurse crops should be kept at least for a year to improve the site and make it suitable for planting.

The question of spacing in poly bag planting should be duly considered. For the fast growing species to be raised in poly bags, the spacing may be $9' \times 9'$ and in other cases, the spacing may be $6' \times 6'$.

139. **Calendar of Operations**—For raising successful plantations the exact time when an operation is to be carried out, is as important as the operation itself. For convenience and guidence of the staff, a "Calendar of Operations" is prescribed and given under para 191 which should be followed strictly.

CARE TO PLANTATIONS PRIOR TO ESTABLISHMENT

140. **Weeding and Cleaning .**—The details are given in para 192.

These should be followed strictly :

(i) **Age at which the Plantations are considered to be established**—The instructions given under para 192(i) should be followed.

(ii) **Control of Weeds**—The instructions given under para 192(ii) should be followed.

(iii) **Manual Weedings**—The instructions given under para 192(iii) should be followed.

(iv) **Time and Intensity of Weedings**—The instructions given under para 192(iv) should be followed.

(a) **First year of Plantation**—The instructions given under para 192 (iv) (a) should be followed.

(b) **Second Year of Plantation**—The instructions given under para 192 (iv) (b) should be followed.

(c) **Third Year of Plantation**—The instructions given under para 192 (v) should be followed.

(d) **Fourth Year of the Plantation**—The instructions given under para 192 (vii) should be followed.

(v) **Double Stem Cuttings**—The instruction given under para 192 (v) should be followed.

(vi) **Vacancy Filling**—The instructions given under para 192 (vi) should be followed.

141. **Climber Cutting in Plantations**—The instructions given under para 192 (viii) should be followed.

142. **Thinning in Plantations**—The instructions given under para 193 should be followed.

143. **Survey of Plantations and the Clear-felling Coupes**—All clear-felling coupes should be surveyed after the felling has been completed and plotted correctly on the 4″= 1 mile maps. After the planting operation in the following winter, the plantation area is again surveyed and the location of species shown. This map will be a part of the plantation journal.

CHAPTER III

WORKING PLAN FOR THE MEDIUM ROTATION WORKING CIRCLE

GENERAL CONSTITUTION OF THE WORKING CIRCLE AND CHARACTER OF VEGETATION

144. **General Constitution**—The total area of this working circle is 88,816·0 acres, *i.e.*, about 28% of the total area of this Division. The area allotted to this working circle is comparatively easily accessible and is suitable for raising quick-growing semi-hard wood species. This working circle has been divided into 11 (eleven) felling series and 20 (twenty) cutting sections for supply of forest produce to the neighbouring population and the adjoining wood-based industries.

The following table gives the distribution of the Medium Rotation Working Circle by Ranges and felling series :

Sl. No.	Felling series and Ranges.	Workable area in acres.	Un-workable area (acres)	Total area in acres.
1	Karerhat	5,893·80	326·00	6,219·80
2	Baraiyadhala	5,929·20	125·00	6,054·20
3	Naryanhat	11,884·00	35·00	11,919·00
4	Hathazari	13,159·70	432·00	13,591·70
5	Rangunia	7,806·35	48·00	7,854·35
6	Patiya	9,327·00	57·00	9,384·00
7	Chunati (Nursery Range) ..	6,370·56	632·00	7,002·56
8	Padua	5,295·09	101·00	5,396·09
9	Duhazari	2,271·30	..	2,271·30
10	Jaldi	5,854·00	82·00	5,936·00
11	Barabakia	7,960·00	227·00	8,187·00
	Total ..	81,751·00	2,065·00	83,816·00

145. **Character of the Vegetation**—The forests of this circle, in general, may be classified as Tropical semi-evergreen and Tropical wet-evergreen types as mentioned under Para 31 of Chapter II, Part I. The vegetation types are, however, not distinct and are often intermingled and merged into one another. The overall impression is of a Tropical semi-evergreen forest. The vegetation under this working circle, however, is in a very deteriorated condition due to over-cutting, un-restricted grazing and incidences of fire. The characteristic feature of the forest vegetation is the frequent occurrence of different species of Dipterocarpus, Syzygium, Bambuss and Imperata. The other naturally occurring general are Artocarpus, Hopes, Steroulia, Amoora, Swintonia, Anthocephalus, and Michelia, etc.

The quality and stocking of the forests of this working circle are not very good. Up to 1978 14,828.54 acres of plantation have been raised in this working circle with Teak, Garjan and other species.

146. **Analysis and valuation of the Crop**—Enumeration of the high forest was not done for this plan as the prescriptions are on area basis. The classification of the forest areas as adopted in the previous plan such as workable and un-workable areas of the reserved forests have been retained. The out-turn from the newly added areas of acquired forests, vested forests and protected forests is estimated to be nominal as these were repeatedly cut in the past. The condition of the existing plantations is also not very satisfactory.

147. **Objects of Management**—The principal objective of this working circle is to grow semi-hard wood species of fast growing type to provide regular supply to ply-wood factories, packing-box industries etc. and to provide a progressive supply of forest produce required by the Local people for agricultural implements, house posts and fire-wood. Afforestation of the barren hillocks falling within the circle is also a major objective of this circle.

148. **Silvicultural System**—The Silvicultural system prescribed for this working circle is Clear-felling followed by artificial regeneration with a view to converting the existing irregular forests into a regular one. The first periodic Block will be for 10 years and will constitute 27,250·0 acres of the working circle. In the current year's coupe where natural regeneration are found in sizeable areas should be kept and nursed up. The existing plantations up to 1978 have been constituted into a Plantation Periodic Block and the rest into an Unallotted Periodic Block. It is important that species best suited to a locality should be planted considering the ecological factors.

149. **Calculation of Rotation**—The principal species selected such as Garjan, Pynkado, Chapalish, and Koroi attain an average minimum diameter growth of 8·5", 15·0", 10.1", and 12.6", respectively. The species selected should, therefore, be suitable for supply of agricultural implements, transmission poles, packing boxes and fire-wood at the age of 30 years and hence the rotation has been fixed accordingly.

150. **Division into felling series and cutting sections**—Depending on the availability of labour, seeds, nursery stock and local demand of the existing forest produce, each Range will have a felling series and each Beat where regeneration is possible, will have a cutting section.

151. **Division into Periodic Blocks**—The area of this working circle is divided into 3 Periodic Bl cks, such as, Periodic Block I, Periodic Block II and Periodic Bl ck III. Out of 81,751·00 acres of workable area of this circle as mentioned in para 144 27,250·0 acres including compact protected forests, vested forests and acquired forests have been allotted to Periodic Block I. This Periodic Bl ck also includes failed plantation of 475·00 acres of last plan period for replanting during the plan period. Area of the existing plantations of this circle up to 1978 has been allotted to Periodic Block II and the rest of the area has been allotted to Periodic Block III.

151. (A). **Allotment to periodic Blocks**—The following table shows the distribution of areas to different periodic blocks :

ALLOTMENT TO PERIODIC BLOCKS

PERIODIC BLOCK I

MEDIUM ROTATION WORKING CIRCLE

Range of felling series	Cutting section Ptn. Centre	Block and compartment.	Work-able area in acres.	Un-workable area.	Total area in acres.	Remarks.
1. Karerhat ..	Zorargonj	Zorargonj	1,600·00	..	1,600·00	Including 240·0 acres totally failed ptn.
	Karerhat	Koila South	1,000·00	..	1,700·00	
		Heakon	700·00			
	Total of the felling series		3,300·00		3,300·00	
2. Narayanhat ..	Balukhali	Hasnabad	1,000·00	..	3,000·00	
	Balukhali	N.F./V.F.	2,000·00			
	Dhurung	NF/PF	500·00	..	1,200·00	
		West Kanchannagar	700·00			
	Total of the felling series		4,200·00	..	4,200·00	
3. Hathazari ..	Sarta	Gopalghata	1,500·00	..	3,200·00	
		Khiram	700·00			
		Moghkata	1,000·00			
	Subonchari	Subonchari	1,700·00	..	1,700·00	Including 1400 acres area of totally failed ptn.
	Mondakini	Udalia	800·00	..	1,600·00	
		Mongaichari	800·00			
	Total of the felling series		6,500·00	..	6,500·00	
4. Baraiyadhala ..	Gobania	Ragunathpur	600·00	..	1,000·00	
		Gobania	400·00			
	Total of the felling series		1,000·00	..	1,000·00	

PERIODIC BLOCK I—*Concld.*

Range and felling series.	Cutting section.	Block and compartment	Workable area in acres.	Un-workable area.	Total area in acres.	Remarks.
5. Patiya ..	Sreemai	Silchari	1,500·00	..	1,500·00	
	Bargani	Sonaichari	800·00	..	800·00	
	Patiya	Patiya A.F.	1,000·00	..	1,000·00 acres	Including 75 failed ptn.
	Total of felling series ..		3,300·00	..	3,300·00	
6. Pladua ..	Barduara	Sarasia	500·00	..	900·00	
		Mohalia	400·00			
	Dalu	Farenga	700·00	..	700·00	
	Naricha	Naricha	400·00	..	400·00	
	Total of the felling series ..		2,000·00	..	2,000·00	
7. Chunati ..	Chunati	Chunati	950·00	..	1,600·00	
		Goyalmara	650·00			
	Barahatia	Chutta hatia	300·00	..	600·00	
		Bara hatia	300·00			
	Total of the felling series ..		2,200·00	..	2,200·00	
8. Duhazari ..	Dhupachari	Dhupachari	340·00	..	640·00	
		Baitarani	300·00			
	Total of the felling series ..		640·00	..	640·00	
9. Rangunia ..	Rangunia	Rangunia P.F.	2,110·00	..	2,110·00	
	Tota of the felling series ..		2,110·00	..	2,110·00	
10. Jaldi ..	Jaldi	Jaldi-P.F.	500·00	..	1,000·00	
		Napura	500·00			
	Total of the felling series ..		1,000·00	..	1,000·00	
11. Barabakia ..	Barabakia	Taitong	200·00	..	1,000·00	
		Barabakia	600·00			
		Paharchanda	200·00			
	Total of the felling series ..		1,000·00	..	1,000·00	
Grand Total of Periodic Block-I ..			27,250·00	..	27,250·00	

PERIODIC BLOCK II

MEDIUM ROTATION WORKING CIRCLE

(Plantation raised existing up to 1978)

Range and felling series	Cutting section	Block and compartment	Area (Acres)	Remarks
1. Karerhat	Zorargonj	Zorargonj	630·80	
	Karerhat	Koila south Heakon	233·50	
	Hinguli	Hinguli	229·50	
	Total of the felling series ..		1,093·80	
2. Narayanhat	Balukhali	Hashnabad	219·98	
	Dhurung	N.F./P.F.	590·00	
	Total of the felling series ..		809·98	
3. Hathazari	Subanchari	Subanchari	1,077·00	
	Mondakini	Udalia	515·50	
	Sarta	Khiram	823·20	
	Hathazari	Hathazari	587·00	
	Total of the felling series ..		3,002·70	
4. Baraiyadhala	Gobania	Gobania	740·90	
		Raghunathpur	62·20	
	Total of the felling series ..		803·10	
5. Padua	Barduara	Mohalia	1,052·00	
	Dalua	Farenga	452·00	
	Total of the felling series ..		1,504·00	
6. Chunati	Chunati	Chunati	642.00	
	Harbang	Coyalmara	862.56	
	Barahatia	Barahatia	170.00	
	Total of the felling series ..		1,674.56	

PERIODIC BLOCK-II—*Concld*

Range and felling series	Cutting section	Block and compartment	Area in acres.	Remarks.
7. Dohazari	Dhopachari	Dhopachari	389.30	
		Baitarani	355.00	
	Total of the felling series ..		744.30	
8. Jaldi	Jaldi	Jaldi-P.F.	754.00	
		Napura	200.00	
	Total of the felling series ..		954·00	
9. Barabakia	Barabakia	Taitong	982·00	
		Barabakia	529·00	
		Paharchanda	822·00	
	Total of the felling series ..		2,333·00	
10. Patiya	Sreemai	Silchari	100·00	
	Patiya	Patiya-A.F.	41·00	
	Barguni	Hashimpur	186·00	
	Total of the felling series ..		327·00	
11. Rangunia	Rangunia	Rangunia-R.F.	1,258.85	
		South Nichintapur	323.25	
	Total of the felling series ..		1,582.10	
Grand Total of the Periodic Block-II ..			14,828.54	

PERIODIC BLOCK III

UN-ALLOTTED PERIODIC BLOCK

MEDIUM ROTATION WORKING CIRCLE

Range and felling series.	Cutting section.	Block and compartment.	Workable area in acres.	Un-workable area.	Total area in acres.	Remarks.
1	2	3	4	5	6	7
1. Karerhat ..	Zorargonj ..	Zorargonj ..	900.00	163.00	1,063.00	
	Karerhat ..	Koila South	300.00	..	300.00	
		Heakon ..	300.00	..	300.00	
		Hinguli ..	..	163.00	153.00	
	Total of the felling series ..		1,500.00	326.00	1,826.00	
2. Narayanhat ..	Balukhali ..	Hashnabad	2,084.02	35.00	2,119.02	
		N.F./V.F. ..	2,505.00	..	2,505.00	
	Dhurung ..	N.F./P.F. ..	1,000.00	..	1,000.00	
		West Kanchannagar.	1,285.00	..	1,285.00	
	Total of the felling series ..		6,874.02	35.00	6,909.02	
3. Hathazari ..	Sarta ..	Gopalghata	384.00	..	384.00	
		Moghkarta	256.00	224.00	480.00	
		Khiram ..	200.00	..	200.00	
	Subanchari	Subanchari	409.00	..	409.00	
	Mondakini	Udalia ..	1,000.00	44.00	1,044.00	
	Hathazari ..	Hathazari ..	..	133.00	133.00	
	Total of the felling series ..		3,657.00	432.00	4,089.00	
4. Baraiyadhala ..	Gobanlira ..	Raghurathpur	2,500.00	95.00	2,595.00	
		Gobania ..	1,626.10	30.00	1,656.10	
	Total of the felling series ..		4,126.10	125.00	4,251·10	

PERIODIC BLOCK III—*Contd.*

Range and felling series.	Cutting section.	Block and compartment.	Workable area in acres.	Un-workable area.	Total area in acres.	Remarks.
1	2	3	4	5	6	7
5. Patiya ..	Sreemai ..	Silchari ..	2,000.00	..	2,000.00	
	Barguni ..	Hashimpur	..	57.00	57.00	
		Sonaichari ..	700.00	..	700.00	
	Patiya ..	Patiya A.F.	3,000.00	..	3,000.00	
	Total of the felling series ..		5,700.00	57.00	5,757.00	
6. Padua	Barduara ..	Sarasia ..	500·00	21·00	521·00	
		Mohalia ..	320·00	..	320·00	
	Dalu ..	Farenga ..	500·00	80·00	580·00	
	Narisha ..	Narisha ..	471·09	..	471·09	
	Total of the felling series ..		1,791·09	101·00	1,892·09	
7. Chunati ..	Chunati ..	Chunati ..	396·00	101·00	497·00	
	Harbang ..	Goyalmara	500·00	249·00	749·00	
	Barahatia ..	Chuttahatia	500·00	206·00	706·00	
		Barahatia ..	1,100·00	76·00	1,176·00	
	Total of the felling series ..		2,496·00	632·00	3,128·00	
8. Dohazari ..	Dhupachari	Dhupachari	500·00	..	500·00	
	Cherangghata	Baitarani ..	387·00	..	387·00	
	Total of the felling series ..		887·00	..	887·00	

PERIODIC BLOCK III—*Concld.*

Range and felling series.	Cutting section.	Block and compartment.	Workable area in acres.	Un-workable area.	Total area in acres.	Remarks.
1	2	3	4	5	6	7
9. Rangunia ..	Rangunia ..	Rangunia P.F.	4,000·00	..	4,000·00	
		South Nichintapur.	114·25	48·00	162·25	
	Total of the felling series ..		4,114.25	48·00	4,162.25	
10. Jaldi ..	Jaldi ..	Jaldi P.F. ..	2,500·00	..	2,500·00	
		Napura ..	1,400·00	82·00	1,482·00	
	Total of the felling series ..		3,900·00	82·00	3,982·00	
11. Barabakia ..	Barabakia ..	Taitong ..	2,726·00	139·00	2,865·00	
		Barabakia ..	1,753·00	88·00	1,841·00	
		Paharchanda	148·00	..	148·00	
	Total of the felling series ..		4,627·00	227·00	4,854·00	
	Grand Total of the Periodic Block-III. ..		39,672·46	2,065·00	41,737·46	

MEDIUM ROTATION WORKING CIRCLE

152. **Regulation of the Yield**—Only the workable area has been taken into consideration for the purpose of yield calculation.

Total workable area under this Working Circle = 81,751·00 acres.

$$\therefore \text{Sustained Yield} = \frac{81,751 \cdot 00}{30} = 2,725 \cdot 33, \text{ Say} = 2,725 \cdot 00 \text{ acres.}$$

Thus the annual yield prescribed would be 2,725·00 acres approximately.

152 (A). **Yield from Periodic Block I :**

$$Y = \frac{A}{10} = \frac{27,250 \cdot 00}{10} = 2,725 \cdot 00$$

Where Y = Annual yield from Periodic Block I.
A = Workable area in Periodic Block I.
and Working period is = 10 years.

The following table gives the Annual Yield from :

PERIODIC BLOCK I.

Range and felling series.	Cutting section	Block and compartment.	Workable area in acres.	Annual yield.	Ramarks.
1	2	3	4	5	6
1. Karerhat ..	Zorarganj ..	Zorarganj ..	1,600·00	160·00	During 1978-79 one-tenth from each block and then Liola south block will be completed first from 1979-80.
	Karerhat ..	Koila south	1,00·00	170·00	
		Heakon ..	700·00		
2. Narayanhat..	Balukhali ..	Hasnabad ..	1,000·00	300·00	During 1978-79 one-tenth from each block and then Hasnabad block will be completed first from 1979-80.
		N.F./V.F. ..	2,000·00		
	Dhurung ..	N.F./P.F. ..	500·00	120·00	During 1978-79 one-tenth from each block and then NF/PF block will be completed first from 1979-80.
		West Kanchannagar.	700·00		
3. Hathazari ..	Sarta ..	Gopalghata	1,500·00	320·00	During 1978-79 one-tenth from each block and then Gopalghata block will be completed first from 1979-80.
		Khiram ..	700·00		
		Moghkata ..	1,000·00		
	Subanchari	Subanchari	1,700·00	170·00	..
	Mondakini	Udalia ..	800·00	160·00	During 1978-79 one-tenth from each block and then Udalia block will be completed first from 1979-80.
		Monaichari	800·00		

PERIODIC BLOCK I—*concld.*

Range and felling series.	Cutting section	Block and compartment.	Workable area in acres.	Annual yield.	Remarks.
1	2	3	4	5	6
4. Baraiyadhala	Gobania ..	Raghunathpur	600·00	100·00	During 1978-79 one-tenth from each block and then Raghunathpur block will be completed first from 1979-80.
		Gobania ..	400·00		
5. Patiya ..	Sreemai ..	Silchari ..	1,500·00	150·00	..
	Barguni ..	Sonaichari ..	800·00	80·00	..
	Patiya ..	Patiya A.F.	1,000·00	100·00	..
6. Padua ..	Barduara ..	Sarasia ..	500·00	90·00	During 1978-79 one-tenth from each block and then Sarasia block will be completed first from 1979-80.
		Mohalia ..	400·00		
	Dalu ..	Farenga ..	700·00	70·00	..
	Naricha ..	Naricha ..	400·00	40·00	..
7. Chunati ..	Chunati ..	Chunati ..	950·00	160·00	During 1978-79 one-tenth from each block and then Chunati block will be completed first from 1979-80.
		Goyalmara	650·00		
	Barahatia ..	Chutahatia	300·00	60·00	During 1978-79 one-tenth from each block and then Chutahatia block will be completed first from 1979-80.
		Barahatia ..	300·00		
8. Dohazari ..	Dhupachari	Dhupachari	340·00	64·00	During 1978-79 one-tenth from each block and then Dhupachari block will be completed first from 1979-80.
		Baitarani ..	300·00		
9. Rangunia ..	Rangunia ..	Ranguhai P.F.	2,110·00	211·00	..
10. Jaldi ..	Jaldi ..	Jaldi P.F. ..	500·00	100·00	During 1978-79 one-tenth from each block and then Jaldi block will be completed first from 1979-80.
		Napura ..	500·00		
11. Barabakia ..	Barabakia ..	Toitong ..	200·00	100·00	During 1978-79 one-tenth from each block and then Toitong block will become completed first from 1979-80.
		Barabakia ..	600·00		
		Paharchanda	200·00		
		Total of the all felling serie.	27,250·00	2,725·00	

153. **Yield from Periodic Block II**—Most of the trees in the existing plantations under this working circle are immature and no appreciable yield can be expected from the thinnings. Necessary cultural operations will, however, be carried out and out-turn from these operations will be added to the total out-turn of this working circle.

154. **Yield from Periodic Block III**—This includes all other un-felled and un-worked area. No yield is prescribed from this periodic block. Required Silvicultural operations will be carried out and any out-turn from these Silvicultural operation will be added to the total yield of the working circle.

METHOD OF EXECUTING FELLINGS

155. **Method of Executing Felling**—The following general rules should be followed :

(1) A felling plan should be prepared in conformity with the prescription laid down in paragraph 147 of this plan. This should be done at least one year ahead of the commencement of actual felling operations. Collection of seeds and preparation of nursery for raising plantations over this area should be started along with this.

(2) The annual coupes should be selected on the maps and laid down on the ground by compass and plane-table survey. Under no circumstances the annual felling area should exceed the maximum limit laid down in paragraph 151(A).

(3) All merchantable trees should be measured, marked and recorded in diameter or girth classes. These works should be undertaken immediately after preparation of the felling plan and should be completed well ahead of the commencement of the actual felling operation.

(4) Annual coupes should be cleared of all forest produce by 15th February every year.

(5) Other subsidiary operations including collection of debries, burning of coupes, statking an making thalies, etc., should be completed by March of that year.

(6) No clear-felling should be done on steep or precipitious slopes. Areas so left but which have beeen included in the workable areas are to be counted against the yield.

(7) Fund and labour supply should be ensured before executing the clear-felling operations.

(8) If Taungya labour is employed then on an average one acre should be allotted to each house for clear-felling and planting. This area may be increased according to the working hands in the family.

156. **Sequence of felling to be made**—The area to be regenerated during the next 10 years should be taken up systematically from one side of the area for clear-felling and unless on block/compartment is finished, the next one in sequence should not be taken up. Coupe boundaries should be straight as far as possible, and run North-South or East-West whenever possible. It is suggested that a scheme for exploitation should be drawn up for each cutting section with indication of alignments of roads and paths.

157. **Selection Felling**—No felling prescribed from the un-allotted Periodic Block. The removal of dead and otherwise fallen trees may be removed at the discretion of the Divisional Forest Officer.

158. **Method of check in the field if the prescribed annual yield is being removed correctly**—In order to check whether the prescribed area has been clear-felled and planted up, the Territorial Divisional Forest Officer shall arrange to survey the annual coupe area immediately after the plantation is raised. Any deviation found may be incorporated in the prescribed control form. Any deviation from the working plans may be carried over and adjusted with the subsequent year's programme.

SUBSIDIARY REGULATIONS

159. **Choice of species:**

Location.	Species for reforestation.	Species for afforestation.
For ridges ..	Garjan, Dhakijam, Chapalish	Dhakijam, Minjiri, Chapalish.
For slopes ..	Teak (for site quality III and above), Pynkado, Garjan, Dhakijam, Kadam, Koroi, Toon, Chapalish and A. lebbek.	Pynkado, Dhakijam, Garjan, Koroi, Chapalish and A. lebbek.
For high flats ..	Kadam, Pynkado, Garjan, Dhakijam, Toon, Capalish and A. lebbek.	Dhakijam, Koroi, Garjan, Toon, Chapalish and A. lebbek.
For low flats ..	Kadam, Pitali, Kanjal.	Kadam, Pitali, Kanjal.

PLANTATION TECHNIQUE AND NURSERY PRACTICE

160. **Selection of mother tree for seed collection**—The details are given in para 136 of this working plan, which should be followed along with the chart for seed-collection.

161. **Nursery practice**—The details given in para 137 should be followed.

162. **Plantation technique**—This has been described in details in para 138, which should be followed.

163. **Calendar of operations**—Details along with the calendar of operations under para 191 available should be followed.

164. **Weeding and cleaning**—This has been described in details with recommendations for future in para 192 should be followed.

165. **Climber cutting**—Details given under para 192(vii) should be followed.

166. **Thinning in plantations**—The details along with thinning practice for recommended species are given under para 193.

167. **Survey of plantation**—All clear-felled coupes must be surveyed as soon as possible and maps should be prepared on the 16″=1 mile scale for the plantation file. The coupes should also be plotted on the 4″=1 mile scale maps, *i.e.*, the working maps of ranges and maps in the Felling Series Register and Block History Registers.

The best time for the survey is the first cold weather after felling when the areas occupied by the different species of mixture are distinguishable and yet the plants are not too high to obstruct the sight vane of the plane table. Range Officer-in-charge will carry out the survey and at least 5 per cent of this should be checked by a gazetted officer.

168. **Readjustment of the area in Periodic Block**—As mentioned earlier small patches of un-workable areas should be included in the yield. When, however, the un-workable area in any particular coupe happened to be of considerable extent (above 10 per cent of the coupe areas), the area of the coupe should be proportionately increased to give the required acreage for plantation. This will necessitate readjustment of the area in Periodic Block I towards the end of the period of ten years by taking over some areas from the un-allotted blocks.

CHAPTER IV

WORKING PLAN FOR THE LONG ROTATION WORKING CIRCLE

GENERAL CONSTITUTION OF THE WORKING CIRCLE AND CHARACTER OF VEGETATION

169. **General Constitution**—The total area of this working circle is 2,00,472·20 acres. This working circle comprises Reserved Forests compact blocks of Protected Forests and Acquired Forests where the soil is deep and fertile, the area is comparatively in-accessible and far away from the principal markets for forest produce and the wood-based industries. This area is suitable for growing long-rotation species like Garjan, Chapalish, Dhaki-jam, Teak and other valuable timber species which take longer period to mature. The working circle has been divided into several felling series and cutting sections in order to provide regular supply of forest produce to neighbouring population, the wood-based industries and for raising plantations throughout the circle. The following table gives the distribution of the Long Rotation Working Circle by Ranges and felling series The working circle has been divided into 14 felling series and 23 cutting sections.

A detail statement of the blocks and compartments comprising this circle as well as their allotment to periodic blocks is given in paragraph 176A:

Sl. No.	Felling series and ranges.	Workable area in acres.	Unworkable in acres.	Total area in acres.
1	Karerhat	21,308·70	2,719·00	24,027·70
2	Baraiyadhala	19,111·80	296·00	19,407·80
3	Narayanhat	31,598·18	498.00	32,096.18
4	Hathazari	20,587·81	66·00	20,653·81
5	Rangunia	19,459·00	117·00	19,576·00
6	Patiya	19,097·00	45·00	19,142·00
7	Dohazari	7,376·70	166·00	7,542·70
8	Padua	18,934·91	112·00	19,046·91
9	Chunati	8,567·44	94·00	8,661·44
10	Jaldi	12,987·00	180·00	13,167·00
11	Kalipur	5,912·34	..	5,912·34
12	Sitalpur	6,633·00	..	6,633·00
13	Madarsha	1,014·32	..	1,014·32
14	Olinagar	3,348·00	243.00	3,591·00
	Total ..	1,95,936·20	4,536·00	2,00,472·20

170. Character of Vegetation—The Forests of Chittagong Division as described in Chapter II of Part I, are of Tropical semi-evergreen and Tropical wet-evergreen type. The outstanding feature of the forests vegetation is the frequent occurrence of different species of the genera Dipterocarpus, Querous and Syzygium. The other naturally occurring tree-species are Artocarpus-chaplasha, Hopea-odorata, Swontonia floribunda, Amoora-ruhitoka and Starculia alata etc. The quality and the stocking in the Reserved Forests, except in some areas, are good but the stocking in the Protected and the Acquired Forests is very poor and some of these areas are without any tree growth.

There are 24,566·19 acres of plantations of Teak, Jarul, Dhakijam Garjan, etc. and other miscellaneous hard-wood species. The overlall condition of these plantations is far from being satisfactory except in specific areas.

171. Analysis and Valuation of the Crop—Enumeration of the high-forest was not done for this plan as the preseription are on area basis. However, the classification of the forest areas as adopted in the last plan such as workable and un-workable areas of Reserved Forests have been retained. The outturn from the newly added areas of Protected and Acquired Forests is estimated to be nominal as these were subjected to repeated cutting in the past.

172. Objects of Management—The objective of this working circle is to produce quality timbers like Teak, Garjan, Chapalish, Dhakijam, etc., by converting the existing irregular forests into a regular one and to provide a progressive supply of forest produce to various wood-based industries like furniture and cabinet-making plants, boat building industries, industrial ply-wood, etc., in addition to supplying timber for Railway Wagon, Sleeper, bodies of Trucks and Buses and for constructional purposes, in addition to meeting the needs of the rural people for agricultural implements. The other objective of management of this working circle is to afforest the denuded and barren areas with suitable species.

METHOD OF TREATMENT

173. Silvicultural System—The system prescribed is clear-felling followed by artificial regeneration with a view to converting the existing irregular forests into a regular one. The first periodic block will be of 10 years and will constitute 32,660·00 acres of workable area of the working circle. The existing plantations up to 1978 have been constituted into a plantation periodic block, *i. e.*, Periodic Block II and the rest into an unallotted Periodic Block, *i. e.*, Periodic Block III. It is

important that species best suited to a locality is planted considering all the ecological factors. It is recommended that no species should be planted up in pure patches bigger than 50 acres. Wherever possible plantation of about 500 acres should be separated by a natural belt of forest about 1 chain in width.

174. Calculation of Rotation—The principal species selected under this working circle include Teak, Dhakijam, Garjan, Toon, Jarul, etc. These species attain an average minimum diameter growth at breast height of 20″ (quality II) and 17″(quality III), 16″, 17″, 17·2″ respectively at 60 years. The height growth attain by the abovementioned species at 60 years is 85′ (quality II, 70′ in quality III), 65′, 80′, 71·50′ respectively. The rotation has been fixed at 60 years on the basis of above growth data. These species when grown on a 60 years rotation would be suitable for supply of construction timber raw-materials for various wood-based industries and rail road sleepers.

175. Division into Felling Series and Cutting Sections—Depending on the availability of labour, seeds nursery facilities and local demand of the existing forest produce, each range will have a felling series and each beat where regeneration is possible, will have a cutting section.

176. Division into Periodic Blocks—The areas of this circle is divided into 3 periodic blocks such as Periodic Block I, Periodic Block II, Periodic Block III. Out of 1,95,936·20 acres of workable areas of this working circle as mentioned in paragraph 169, only 32,660·00 acres including the compact Protected Forests have been allotted to Periodic Block I, which is for 10 years. This Periodic Block also includes 425·10 acres of totally failed plantation of the last plan period for replanting. Area of the existing plantations of this circle up to 1978 comprising 24,566·19 acres has been allotted to Periodic Block II and the rest comprising 1,43,246·01 acres has been allotted to Periodic Block III.

176 (A). Allotment to Periodic Blocks—The following table shows the distribution of areas to periodic blocks :

LONG ROTATION WORKING CIRCLE

PERIODIC BLOCK I

PRESCRIBED ANNUAL YIELD

Range and felling series.	Cutting section.	Block and compartment.	Workable area.	Total area in acres	Remarks.
1. Karerhat ..	Karerhat	Koila South	2,000·00	3,100·00	Including 65·60 acres totally failed ptn.
		Lakshmichari	1,100·00		
	Andarmanik	Nalua	2'000·00	2'000·00	
	Koila	Koila (North)	3,000·00	3,500·00	
		Heakon	500·00		
	Total of the felling series ..		8,600·00	8,600·00	
2. Baraiyadhala ..	Gobania	Kunderhat	1,200·00	1,200·00	
	Baraiyadhala	Baraiyadhala	800·00	800·00	
	Total of the felling series ..		2'000·00	2,000·00	
3. Narayanhat ..	Balukhali	Chandpur	3,000·00	4,300·00	
		Idilpur	1,300·00		
	Narayanhat	Kaiyapukia	1,000·00	1,000·00	
	Dantmara	Dantmara	1,300·00	1,300·00	
	Dhurung	East Kanchan-nagara.	1,000·00	2,500·00	
		N.F./P. F.	1,500·00		
	Total of the felling series ..		9,100·00	9,100·00	
4. Hathazari ..	Sarta	Khiram	400·00	400·00	
	Ichamati	Thandachari	900·00	900·00	
	Total of the felling series		1,300·00	1,300·00	
5. Sitalpur ..		Barabakunda ..	500·00	500·00	Including 3.50 acres failed ptn.
	Total of the felling series		500·00	500·00	

PERIODIC BLOCK I—*Contd.*

Range and felling series.	Cutting section.	Block and compartment.	Workable area.	Total area in acres.	Remarks.
6. Rangunia ..	Cheringa	Cheringa	650·00	650·00	
	Dudpukuria	Dudpukuria	800·00	800·00	
	Total of the felling series ..		1,450·00	1,450·00	
7. Dohazari ..	Lalutia	Lalutia	450·00	450·00	
	Dhupachari	Dhupachari	2,400·00	2,400·00	
	Total of the felling series ..		2,850·00	2,850·00	
8. Patiya ..	Bhandaljuri	Bhandaljuri	1,200·00	1,200·00	
	Total of the felling series		1,200·00	1,200·00	
9. Padua ..	Tankawati	Tankawati	1,000·00	1,000·00	
	Padua	Satikania PF.	1,000·00	1,350·00	
		Hangar A. F.	350·00		
	Total of the felling series ..		2,350·00	2,350·00	
10. Chaunati ..	Harbang	Harbang	1,000·00	1,000·00	
	Satgarh	Satgarh	810.00	810·00	
	Total of the felling series —		1,000.00	1,000·00	
11. Jaldi ..	Jaldi	Bailchari	300.00	1,000·00	
		Jaldi R. F.	700.00		
	Total of the felling series ..		1,000.00	1,000·00	
12. Olinagar ..	Olinagar	Feni	500.00	500·00	
	Total of the felling series ..		500.00	500·00	
	Total of the felling series ..		32,660.00	32,660·00	
	Grand total of Periodic Block I ..			32,660·00	

LONG ROTATION WORKING CIRCLE

PERIODIC BLOCK I

(B) MINIMUM PERMISSIBLE YIELD

Range and felling series.	Cutting section.	Block and compartment.	Workable area.	Other unworkable area.	Total acrea.	Remarks.
1. Karerhat ..	Karerhat	Koila (South)	1,000·00	..		Including 65·63 acres failed ptn.
		Lakshmichari	550·00	..	1,550·00	
	Andarmanik	Nalua	1,000·00	..	1,000·00	
	Koila	Koila North	1,500·00	..		
		Heakon	250·00	..	1,750·00	
	Total of the felling series ..		4,300.00	..	4,300·00	
2. Baraiyadhala ..	Gobania	Kundarhat	600·00	..	600·00	
	Baraiyadhala	Baraiyadhala	400·00	..	400 00	
	Total of the felling series ..		1,000·00	..	1,000·00	
3. Narayanhat ..	Balukhali	Chandpur ..	1,500·00	..		
		Idilpur	650·00	..	2,150·00	
	Narayanhat	Daiyapukia	500·00	..	500·00	
	Dantmara	Dantmara	650·00	..	650·00	
		East Kanchan-nagar	500·00			
		N. F./P. F.	750·00	..	1,250·00	
	Total of the felling series		4,550·00	..	4,550·00	
4. Hathazari ..	Sarta	Khiram ..	200·00	..	200·00	
	Ichamati	Thandachari	450·00	..	450·00	
	Total of the felling series		650·00	..	650·00	
5. Sitalpur ..	Sitalpur	Barabakunder	250·00	..	250·00	
	Total of the felling series ..		250·00	..	250·00	
6. Rangunia ..	Cheringa	Cheringa ..	325·00	..	325·00	
	Dudpukuria	Dudpukuria	400·00	..	400·00	
	Total of the felling series		725·00	..	725·00	

PERIODIC BLOCK I—*Concld.*

Range and felling series	Cutting section	Block and compartment	Workable area	Other unworkable area	Total area.	Remarks.
7. Dohazari ..	Lalutia	Lalutia	225·00	..	225·00	
	Dhupachari	Dhupachari	1,200·00	..	1,200·00	
	Total of the felling series		.. 1,425·00	..	1,425·00	
8. Patiya ..	Bhandaljuri	Bhandaljuri	600·00	..	600·00	
	Total of the felling series		.. 600·00	..	600·00	
9. Padua ..	Tankawati	Tankawati	500·00	..	500·00	
	Padua	Satkania P. F.	500·00	..	675·00	
		Hangor A. F.	175·00	..		
	Total of the felling series		.. 1,175·00	..	1,175·00	
10. Chunati ..	Harbang	Harbang	500·00	..	500·00	
	Satgarh	Satgarh	405·00	..	405·00	
	Total of the felling series		.. 905·00	..	905·00	
11. Jaldi ..	Jaldi	Bailchari	150·00	..	500·00	
		Jaldi R. F.	350·00	..		
	Total of the felling series		.. 500·00	..	500·00	
12. Olinagar ..	Olinagar	Feni	250·00	..	250·00	
	Total of the felling series		.. 250·00	..	250·00	
	Grand Total of all felling series		.. 16,330·00	acres.		

PERIODIC BLOCK II

LONG ROTATION WORKING CIRCLE

PLANTATION PERIODIC BLOCK

Range and felling series.	Cutting section.	Block and compartment.	Area in acres.	Remarks.
1	2	3	4	5
1. Karerhat ..	Karerhat ..	.. Lakshmichari ..	4,273·05	
	Andharmanik	.. Nalua	886·50	
		Panua	31·40	
	Koila ..	.. Nischinta (1a) ..	30·00	
		Total of the felling series ..	5,220·95	
2. Baraiyadhala =	Baraiyadhala	.. Baraiyadhala ..	120·00	
	Gobania ..	.. Kunderhat	1·00	
	Hazarikhil ..	.. Harwalchari ..	30·00	
		R.S./P.F.	730·00	
		Hazarikhil	1,562·60	
		Rangapani	139·00	
		Total of the felling series ..	2,582·60	
3. Narayanhat ..	Dantmara ..	.. Dantmara	310·00	
		Nischinta (1b) ..	630·00	
	Balukhali ..	.. Tarakon	206·99	
	Dhurung ..	.. East Kanchannagar ..	243·50	
		Total of the felling series ..	1,390·99	
4. Hathazari	Ichamati ..	.. Thandachari ..	624·10	
		Total of the felling series ..	624·10	
5. Sitalpur	Sitalpur ..	.. Barbakunda ..	75·00	
		Kumira R.F./P.F. ..	3,400·00	
		Sitalpur V.F. ..		
		Total of the felling series ..	3,475·00	
6. Rangunia	Cheringa ..	.. Cheringa	464·20	
	Khurusia ..	.. Sukbilash ..	116·20	
		Total of the felling series ..	580·40	

Range and felling series.	Cutting section.	Block and compartment.	Area in acres.	Remarks.
1	2	3	4	5
7. Patiya ..	.. Bhandaljuri	.. Dumuria ..	.. 250·00	
		Bhandaljuri	.. 569·00	
	Sreemai ..	.. Sreemai ..	.. 121·00	
		Total of the felling series	.. 940·00	
8. Dohazari ..	.. Lalutia ..	.. Lalutia ..	.. 1,685·00	
	Dhopachari	.. Chiringghata	.. 1,462·60	
		Sangoo ..	.. 824·00	
		Total of the felling series	.. 3,971·60	
9. Padua ..	.. Barduara ..	.. Purangar ..	.. 201·00	
	Tankawati ..	.. Tankawati ..	.. 368·80	
	Padua ..	.. Satkania P.F.	.. 270·00	
		Hangor A.F.	.. 468·00	
		Total of the felling series	.. 1,307.80	
10. Chunati ..	.. Satgor ..	.. Satgarh ..	.. 740·00	
	Harbang ..	.. Harbang ..	.. 405·00	
		Baraitali ..	.. 50.00	
		Tetiakata ..	.. 30·00	
		Total of the felling series	.. 1,235·00	
11. Jaldi ..	.. Jaldi ..	.. Bailchari ..	.. 372·50	
		Jaldi R.F. ..	.. 60·00	
	Puichari ..	.. Puichari ..	.. 619·50	
		Total of the felling series	.. 1,052·00	
12. Kalipur ..	.. Kalipur ..	.. Kalipur P.F.	.. 2,100·00	
		Total of the felling series	.. 2,100·00	
13. Olinagar	.. Olinagar ..	.. Feni ..	.. 85·75	
		Total of the felling series	.. 85·75	
		Total of the all felling series	.. 24,566·19	

PERIODIC BLOCK III

(A) PRESCRIBED ANNUAL YIELD

UN-ALLOTTED PERIODIC BLOCK

Range and felling series.	Cutting section.	Block and compartment.	Workable area.	Un-workable area.	Total area.	Ramarks.
1	2	3	4	5	6	7
1. Olinagar ..	Olinagar ..	Feni ..	2,762·25	243·00	3,005·25	
	Total of the felling series ..		2,762·25	243·00	3,005·25	
2. Karerhat ..	Karerhat ..	Lakshmichari	54·95	125·00	179·95	
	Andarmanik ..	Nalua ..	344·50	863·00	1,207·50	
	Karerhat ..	Hinguli ..	30·00	..	30·00	
	Zorargonj ..	Zorargonj ..	488·20	..	488·20	
	Andarmanik ..	Panua	1,691·60	1,363·00	3,054·60	Leased to B.F.I.D.C.
	Koila ..	Koila (North)	712·00	268·00	980·00	
	Heakon ..	Heakon ..	440·00	..	440·00	
	Dantmara ..	Nischinta (la)	1,970·00	100·00	2,070·00	Leased to B.F.I.D.C.
	Koila ..	Koila (South)	1,756·50	..	1,756·50	
	Total of the felling series ..		7,487·75	2,719·00	10,206·75	
3. Baraiyadhala ..	Baraiyadhala ..	Baraiyadhala (la)	708·00	14·00	722·00	
	Gobania ..	Raghunathpur	714·80	..	714·80	
		Gobania ..	30·00	..	30·00	
		Kundarhat ..	1,629·00	30·00	1,659·00	
		Wahidpur ..	2,704·00	40.00	2,744·00	
	Sitakund ..	Chandranath ..	1,868·00	50·00	1,918·00	
		Sitakund ..	400·00	52·00	542·00	
	Hazarikhil ..	Harwalchari ..	3,273·00	..	3,273·00	Earmarked for Game Sanctuary.
		Hazarikhil ..	674·40	110·00	784·40	
		Rangapani ..	1,395·00	..	1,395·00	
	Baraiyadhala	R.S./P.F. ..	1,133·00	..	1,133·00	
	Total of the felling series ..		14,529·20	296·00	14,825·20	

PERIODIC BLOCK III—*Contd.*

Range and felling series.	Cutting section.	Block and compartment.	Workable area.	Un-workable area.	Total area.	Remarks.
1	2	3	4	5	6	7
4. Narayanhat ..	Dantmara ..	Dantmara ..	570·00	344·00	914·00	
		Nischinta(lb) ..	1,874·50	..	1,874 50	Leased to B.F.I. D.C.
	Balukhali ..	Tarekon ..	4,238·01	35·00	4,273·01	Earmarked for Oil palm plantation.
		Chandpur ..	240·00	..	240·00	
		Idilpur ..	2,808·00	..	2,808·00	
		Badurkhil ..	2,844·00	..	2,844·00	
	Narayanhat ..	Kaiyapukia ..	479·00	39·00	518·00	
	Dhurung ..	East Kanchannagar.	552·50	80·00	632·50	
	Narayanhat ..	Paschim Bijpur A.F.	769·18	..	769·18	
		Jungle Kaiyapukia.	664·00	..	664·00	
		N.F./P.F. ..	6,068·00	..	6,068·00	
	Total of the felling series ..		21,107·19	498·00	21,605·19	
5. Hathazari ..	Subanchari ..	Baramasia ..	2,232·00	..	2,232·00	
	Mondakini ..	Udalia ..	757·50	..	757·50	
	Hathazari ..	Hathazari ..	100·00	..	100·00	
	Sarta ..	Khiram ..	264·80	..	264·80	
	Ichamati ..	Thandachari ..	61·90	66·00	127·90	
	Dabua ..	Brindapura A.F.	171·60	..	171·60	
	Hathazari ..	S.F./P.F. ..	13,786·91	..	13,786·91	
	Ichamati ..	Ghagra ..	1,289·00	..	1,289·00	Earmarked for Forest College.
	Total of the felling series ..		18,663·71	66·00	14,729·71	
6. Sitalpur ..	Sitalpur ..	Barabkunda ..	1,328·00	..	1,328·00	
		Sitalpur V.F. / Kumira P.F.	1,000·00	..	1,000·00	
		Chittagong Town P.F.	330·00	..	330·00	
	Total of the felling series ..		2,658·00	..	2,658·00	

PERIODIC BLOCK III—*Contd.*

Range and felling series.	Cutting section.	Block and compartment.	Workable area.	Unworkable area.	Total area.	Remarks.
1	2	3	4	5	6	7
7. Rangunia ..	Cheringa ..	Kodala ..	703.00	70.00	703.00	
	Pomara ..	Tripurasundri	2,702.00	12.00	2,714.00	-
	Cheringa ..	Sibchari ..	2,200.00	..	2,200.00	
	Khurusia ..	Sukbilash ..	1,095.80	35.00	1,130.80	Earmarked for Game sanctuary.
		Khurusia ..	2,249.00	..	2,249.00	
	Dudpukuria ..	Dudpukuria ..	1,249.00	..	1,249.00	
	Rangunia ..	Rangunia P.F.	6,790.00	..	6,790.00	
		Rangunia V.F.	431.00	..	431.00	
	Total of the felling series ..		17,428.60	117.00	17,545.60	
8. Doharzari ..	Lalutia ..	Lalutia ..	52.00	..	52.00	
	Sangoo ..	Cheringghata	37.40	61.00	98.40	
		Sangoo ..	315.00	105.00	456.00	
	Dhupachari ..	Dhupachari ..	114.70	..	114.70	
	Total of the felling series ..		555.10	166.00	721.10	
9. Patiya ..	Bhandaljuri ..	Dumuria ..	1,887.00	..	1,887.00	
		Bhandaljuri ..	620.00	45.00	665.00	
	Sreemai ..	Sreemai ..	2,847.00	..	2,847.00	
		75—Sreemai ..	886.00	..	886.00	
	Barguni ..	Silchari ..	916.00	..	916.00	
		Sonaichari ..	880.00	..	880.00	
		41—Elahabad	2,000.00	..	2,000.00	
		Mongla ..	3,657.00	..	3,657.00	
	Patiya ..	Patiya P.F. ..	522.00	..	522.00	
		Patiya A.F. ..	2,742.00	..	2,742.00	
	Total of the felling series ..		16,957.00	45.00	17,002.00	

PERIODIC BLOCK III—*Contd.*

Range and felling series.	Cutting section.	Block and compartment.	Workable area.	Unworkable area.	Total area.	Remarks.
1	2	3	4	5	6	7
10. Padua ..	Barduara ..	Purangarh ..	482·00	77·00	559·00	
	Padua ..	Sarasia ..	411·00	..	411·00	
		Charamba ..	945·00	..	945·00	
	Tankawati ..	Tandawati ..	352·20	35·00	387·20	
	Padua ..	Satkania P.F.	9,588·00	..	9,588·00	
		Hangar A.F.	1,878·00	..	1,878·00	
		Narisha ..	523·91	..	523·91	
	Dalu ..	Farenga ..	1,097·00	..	1,097·00	
	Total of the felling series ..		15,277·11	112·00	15,389·11	
11. Chunati ..	Barahatia ..	Chutahatia ..	336·00	..	336·00	
		Barahatia ..	410·00	..	410·00	
	Chunati ..	Chunati ..	1,000·00	..	1,000·00	
	Satgarh ..	Satgarh ..	190·00	94·00	284·00	
	Harbang ..	Harbang ..	560·00	..	560·00	
		Baraitali ..	527·00	..	527·00	
		Goyalmara ..	1,323·44	..	1,323·44	
		Teliakata ..	1,176·00	..	1,176·00	
	Total of the felling series ..		5,522·44	94·00	5,616·44	
12. Jaldi ..	Jaldi ..	Bailchari ..	387·50	70·00	457·50	
		Jaldi R. F. ..	2,049·00	28·00	2,077·00	
	Puichari ..	Chambal ..	2,539·00	32·00	2,571·00	
		Napura ..	1,793·00	..	1,793·00	
		Puichari ..	2,676·50	50·00	2,726·50	
	Jaldi ..	Jaldi P.F. ..	1,490·00	..	1,490·00	
	Total of the felling series ..		10,935·00	180·00	11,115·00	

PERIODIC BLOCK III—*Contd.*

Range and felling series.	Cutting section.	Block and compartment.	Workable area.	Unworkable area.	Total area.	Remarks.
1	2	3	4	5	6	7
13. Kalipur ..	Kalipur ..	Kalipur A.F. ..	516·77	..	516·77	
		Kalipur P. F. ..	3,295·57	..	3,295·57	
	Total of the felling series ..		3,812·34	..	3,812·34	
14. Madarsha ..	Madarsha ..	Kalipur P.F. ..	1,014·32	..	1,014·32	
	Total of the felling series ..		1,014·32	..	1,014·32	
[GRAND TOTAL OF PERIODIC BLOCK III ..			1,38,710·01	4,536·00	1,43,246·01	

PERIODIC BLOCK III

UN-ALLOTTED PERIODIC BLOCK

(B) MINIMUM PERMISSIBLE YIELD

Range and felling series.	Cutting section.	Block and comparment.	Workable area.	Unworkable area.	Total area.	Remarks.
1	2	3	4	5	6	7
1. Olinagar ..	Olinagar ..	Feni ..	3,012·25	243·00	3,255·25	
	Total of the felling series ..		3,012·25	243·00	3,255·25	
2. Karerhat ..	Karerhat ..	Lakshmichari ..	604·95	125·00	729·95	
	Andarmanik ..	Nalua ..	1,344·50	863·00	2,207·50	
	Karerhat ..	Hinguli ..	30·00	..	30·00	
	Zorargonj ..	Zorargonj ..	488·20	..	488·20	
	Andarmanik ..	Panua ..	1,691·60	1,363·00	3,054·60	Leased to B.F.I.D.C.
	Koila ..	Koila (North)	2,212·00	268·00	2,480·00	
	Heakon ..	Heakon ..	690·00	..	690·00	
	Dantmara ..	Nischinta(la) ..	1,970·00	100·00	2,070·00	Leased to B.F.I.D.C.
	Koila ..	Koila (South)	2,756·50	..	2,756·50	
	Total of the felling series ..		11,787·75	2,719·00	14,506·75	
3. Baraiyadhala ..	Baraiyadhala ..	Baraiyadhala ..	1,108·00	14·00	1,122·00	
	Gobania .	Raghunathpur	714·80	..	714·80	
		Kundarhat ..	2,229·00	30·00	2,249·00	
		Wahidpur ..	2,704·00	40·00	2,744·00	
	Sitakund ..	Chandranath ..	1,668·00	50·00	1,718·00	
		Sitakund ..	400·00	52·00	452·00	
	Hazarikhil ..	Harwalchari ..	3,273·00	..	3,273·00	Earmarked for Game sanctuary.
		Hazarikhil ..	674·40	110·00	784·40	
		Rangapani ..	1,395·00	..	1,395·00	
	Baraiyadhala ..	R.S./P.F. ..	1,133·00	..	1,133·00	
	Total of the felling series ..		15,529·20	296·00	15,825·20	

PERIODIC BLOCK III—*Contd.*

Range and felling series.	Cutting section.	Block and compartment.	Workable area.	Unworkable area.	Total area.	Remarks.
1	2	3	4	5	6	7
4. Narayanhat ..	Dantmara ..	Dantmara ..	1,220·00	344·00	1,564·00	
		Nischinta(lb) ..	11.874·50	..	1,874·50	Leased to B.F.I.D.C.
	Balukhali ..	Tarakon ..	4,238·01	35·00	4,273·01	Earmarked for Oil palm plantation.
		Chandpur ..	1,740·00	..	1.740·00	
		Idilpur ..	3,458·00	..	3,458·00	
		Badurkhil ..	2,844·00	..	2,844·00	
	Narayanhat ..	Kaiyapokia ..	979·00	39·00	1,018·00	
	Dhurung ..	E. Kanchannagar	1,052·50	80·00	1,132·50	
	Narayanhat ..	Paschimbujpur A.F.	769·18	..	769·18	
	Jungle ..	Kaiyapukia ..	664·00	..	664·00	
		N.F./P.F. ..	6,818·00	..	6,818·00	
	Total of the felling series ..		25,657·19	498·00	26,155·19	
5. Hathazari ..	Subanchari ..	Baramasia ..	2,232·00	..	2,232·00	
	Mondakjni ..	Udalia ..	757·50	..	757·50	
	Hathazari ..	Hathazari ..	100·00	..	100·00	
	Sarta ..	Khiram ..	464·80	..	464·80	
	Ichamati ..	Thandachari ..	511·90	66·00	577·90	
	Dabua ..	Brindapur A.F.	171·60	..	171·60	
	Hathazari ..	S.F./P.F. ..	13,786·91	..	13,786·91	
	Ichamati ..	Ghagra ..	1,289·00	..	1,289·00	Earmarked for Forest College.
	Total of the felling series ..		19,313·71	66·00	19,379·71	
6. Sitalpur ..	Sitalpur ..	Barabkunda ..	1,578·00	..	1,578·00	
		Sitalpur V.F. Kumira PF/RF	1,000·00	..	1,000·00	
		Chittagong Town P.F.	330·00	..	330·00	
	Total of the felling series ..		2,908·00	..	2,908·00	

PERIODIC BLOCK III—*Contd.*

Range and felling series.	Cutting section.	Block and compartment.	Workable area.	Unworkable area.	Total area.	Remarks.
1	2	3	4	5	6	7
7. Rangunia ..	Cheringa ..	Kodala —	703·00	..	703·00	
		Cheringa ..	333·80	70·00	403·80	
	Pomora ..	Tripurasundri	2,702·00	12·00	2,714·00	
	Cheringa ..	Sibchari ..	2,200·00	..	2,200·00	
	Khurusia ..	Sukbilash ..	1,095·80	35·00	1,130·80	Earmarked for Game and sanctuary.
		Khurusia ..	2,249·00	..	2,249·00	
	Dudpukuria ..	Dudpukuria ..	1,649·00	..	1,649·00	
	Rangunia ..	Rangunia P.F.	6,790·00	..	6,790·00	
		Rangunia V.F.	431·00	..	431·00	
	Total of the felling series ..		18,153·60	117·00	18,270·60	
8. Dohazari ..	Lalutia ..	Lalutia ..	277·00	..	277·00	
	Sangoo ..	Cheringghata	37·40	61·00	98·40	
		Sango ..	351·00	105·00	456·00	
	Dhupachari ..	Dhupachari ..	1,314·70	..	1,314·70	
	Total of the felling series ..		1,980·10	166·00	2,146·10	
9. Patiya ..	Bhandaljuri ..	Dumuria ..	1,887·00	..	1,887·00	
		Bhandaljuri ..	1,220·00	45·00	1,265·00	
	Sreemai ..	Sreemai ..	2,847·00	..	2,847·00	
		75—Sreemai ..	886·00	..	886·00	
		Silchari ..	916·00	..	916·00	
	Barguni ..	Sonaichari ..	880·00	..	880·00	
		41—Elahabad	2,000·00	..	2,000·00	
		Mongla ..	3,657 ·00	..	3,657·00	
	Patiya ..	Patiya P.F. ..	522·00	..	522·00	
		Patiya A.F. ..	2,742·00	..	2,742·00	
	Total of the felling series ..		17,557·00	45·00	17,602·00	
10. Padua ..	Barduara ..	Purangarh ..	482·00	77·00	559·00	
	Padua ..	Sarasia ..	411·00	..	411·00	
		Charamba ..	945·00	..	945·00	
	Tankawati ..	Tankawati ..	852·20	35·00	887·20	

PERIODIC BLOCK III—*Concld.*

Range and felling series.	Cutting section.	Block and compartment.	Workable area.	Unworkable area.	Total area.	Remarks.
1	2	3	4	5	6	7
	Padua ..	Satkania P.F.	10,088·00	..	10,088·00	
		Hangar A.F.	2,053·00	..	2,053·00	
		Narisha ..	523·91	..	523·91	
	Dalu ..	Farenga ..	1,097·00	..	1,097·00	
	Total of the felling series ..		16,452·11	112·00	16,564·11	
11. Chunati ..	Barahatia ..	Chutahatia ..	336·00	..	336·00	
		Barahatia ..	410·00	..	410·00	
	Chunatia ..	Chunatia ..	1,000·00	..	1,000·00	
	Satgarh ..	Satgarh ..	595·00	94·00	689·00	
	Harbang ..	Harbang ..	1,060·00	..	1,060·00	
		Baraitali ..	527·00	..	527·00	
		Goyalmara ..	1,323·44	..	1,323·44	
		Teliakata ..	1,176·00	..	1,176·00	
	Total of the felling series ..		6,427·44	94·00	6,527·44	
12. Jaldi ..	Jaldi ..	Bailchari ..	537·50	70·00	607·50	
		Jaldi R.F. ..	2,399·00	28·00	2,427·00	
	Puichari ..	Chambal ..	2,539·00	32·00	2,571·00	
		Napura ..	1,793·00	..	1,793·00	
		Puichari ..	2,676·50	50·00	2,726·50	
	Jaldi ..	Jaldi P.F. ..	1,490·00	..	1,490·00	
	Total of the felling series ..		11,435·00	180·00	11,615·00	
13. Kalipur ..	Kalipur ..	Kalipur A.F.	516·77	..	516·77	
		Kalipur P.F.	3,295·57	..	3,295·57	
	Total of the felling series ..		3,812·34	..	3,812·34	
14. Madarsha ..	Madarsha ..	Kalipur P.F.	1,014·32	..	1,014·32	
	Total of the felling series ..		1,014·32	..	1,014·32	
	Grand Total of Periodic Block III ..		1,55,040·01	4,536·00	1,59,576·01	

REGULATION OF YIELD

(A) AS PER ANNUAL YIELD PRESCRIBED

177. **Annual Yield from Periodic Block-I**—Annually one-tenth of the workable area from 1978-79 onwards from eacph felling series will be worked for Regeneration. Thus the Annual Yield from Periodic Block-I comes to :

$$Y = \frac{A}{10} = \frac{32,660 \cdot 00}{10} = 3,260 \cdot 00 \text{ acres.}$$

Where Y = Annual Yield from Periodic Block-I.

A = Workable area in Periodic Block-I.
and working plan period = 10 years.

The following table gives the annual yield from Periodic Block-I:

Range and felling series.	Cutting section.	Block and compartment.	Workable area.	Annual yield.	Remarks.
1	2	3	4	5	6
1. Karerhat ..	Karerhat ..	Lakshmichari	1,100.00	310.00	From 1978-79 1/10th from each block and then Lakshmichari block will be completed first from 1979-80.
		Koila (South)	2,000.00		
	Andarmanik ..	Nalua ..	2,000.00	200.00	..
	Koila ..	Koila (North)	3,000.00	350.00	From 1978-79 1/10th from each block and then Koila (N) block will be completed first from 1979-80.
		Heakon ..	500.00		
2. Baraiyadhala ..	Gobania ..	Kundarhat ..	1,200.00	120.00	..
	Bararyadhvla ..	Bararyadhala ..	800.00	800.00	..
3. Narayanhat ..	Balukhali ..	Chandpur ..	3,000.00	430.00	From 1978-79 1/10th from each block and then Chandpur bloc will be completed first from 1979-80.
		Idilpur ..	1,300·00		
	Narayanhat ..	Kaiyapukia ..	1,000.00	100.00	..
	Dantmara ..	Dantmara ..	1,300.00	130.00	..
	Dhurung East	Kanchannagar	1,000.00	250.00	From 1978-79 1/10th from each block and then E. Kanchannagat. block will be completed first from 1979-80
		N.F./P.F. ..	1,500.00		

Range and felling series.	Cutting section.	Block and compartment.	Workable area.	Annual yield.	Remarks.
1	2	3	4	5	6
4. Hathazari ..	Sarta ..	Khiram ..	400·00	40·00	...
	Ichamati ..	Thandachari ..	900·00	90·00	..
5. Sitalpur ..	Sitalpur ..	Barabkunda ..	500·00	50·00	..
6. Rangunia ..	Cheringa ..	Cheringa ..	650·00	65·00	..
	Dudpukuria ..	Dudpukuria ..	800·00	80·00	..
7. Dohazari ..	Lalutia ..	Lalutia ..	450·00	45·00	..
	Dhupachari ..	Dhopachari ..	2.400·00	240·00	—
8. Patiya ..	Bhandaljuri ..	Bhandaljuri ..	1,200·00	120·00	..
9. Padua	Tandawat ..	Tandawati ..	1,000·00	100·00	...
	Padua ..	Satkania P.F.	1,000·00	135·00	From 1978-79 1/10th from each block and then Satkania block will be completed first from 1979-80.
		Hangar ..	350·00		
10. Chunati ..	Harbang ..	Harbang ..	1,000·00	100·00	..
	Satgarh ..	Satgarh ..	810·00	81·00	—
11. Jaldi —	Jald ..	Bailchari ..	300·00	100·00	From 1978-79 1/10th from each block and then Bailchari block will be completed first from 1979-80.
		Jaldi R.F. ..	700·00		
12. Olinagar —	Olinagar ..	Feni ..	500·00	50·00	...
		Total ..	3,266·00 acres.		

REGULATION OF YIELD

ANNUAL YIELD FROM PERIODIC BLOCK I

(B) AS PER MINIMUM PERMISSIBLE YIELD

Annually one-tenth of the workable area from 1978-79 onwards from each felling series will be worked for regeneration.

Thus the yield from Periodic Block I comes to:

$$Y = \frac{A}{10} = \frac{16,330 \cdot 00}{310} = 1,633 \cdot 00 \text{ acres.}$$

Where Y = Annual Yield from Periodic Block I

A = Workable area in Periodic Block I and Working Plan Period = 10 years.

The following table gives the Annual Yield from Periodic Block I :

Range and felling series.	Cutting section.	Block and compartment.	Workable area.	Annual yield.	Remarks.
1	2	3	4	5	6
1. Karerhat ..	Karerhat ..	Koila (South)	1,000·00	155·00	From 1978-79 1/10th from each block and then Koila (S) block will be completed first from 1979-80.
		Lakshmichari	550·00		
	Koila ..	Koila (North)	1,500·00	175·00	From 1978-79 1/10th from each block and then Koila (S) block will be completed first from 1979-80.
		Heakon ..	250·00		
2. Baraiyadhala ..	Baraiyadhala ..	Baraiyadhala ..	400·00	40·00	...
		Kunderhat ..	600·00	60·00	..
3. Narayanhat ..	Balukhali ..	Chandpus ..	1,500.00	215·00	From 1978-79 1/10th from each block and then Chandpur block will be completed first from 1979-80.
		Idilpurs ..	650·00		
	Narayanhat ..	Kaiyapukja ..	500·00	50·00	..
	Dantmara ..	Dantmara ..	650·00	65·00	..
		East Kanchannagar.	500·00	125·00	From 1978-79 1/10th from each block and then E. Kanchannagar block will be completed first from 1979-80.
		G.F./P.F. ..	750·00		

PERIODIC BLOCK III—*Concld.*

Range and felling series.	Cutting section.	Block and compartment.	Workable area.	Annual yield.	Remarks.
1	2	3	4	5	6
4. Hathazar ..	Sarta ..	Khiram ..	200·00	20·00	..
	Ichamati ..	Thandachari ..	450·00	45·00	..
5. Sitalpur ..	Sitalpur ..	Barabakunda	250·00	25·00	..
6. Rangunia ..	Cheringa ..	Cheringa ..	325·00	32·00	..
	Dudpukuria ..	Dudpukuria ..	400·00	40·00	..
7. Dohazari ..	Lalutia ..	Lalutia ..	225·00	22·00	..
	Dhupachari ..	Dhupachari ..	1,200·00	120·00	..
8. Patiya ..	Bhandaljuri ..	Bhandaljuri ..	600·00	60·00	..
9. Padua ..	Tankawati ..	Tankawati ..	500·00	50·00	..
	Padua ..	Satkania P.F.	500·00	67·00	From 1978-79 1/10th from each block and then Satkania block will be completed first from 1979-80.
		Hangar A.F.	175·00		
10. Chunati ..	Harbang ..	Harbang ..	500·00	50·00	..
	Satgarh ..	Satgarh ..	405·00	40·50	..
11. Jaldi ..	Jaldi ..	Bailchari ..	150·00	50·00	From 1978-79 1/10th from each block and then Bailchari block will be completed first from 1979-80.
		Jald R.F. ..	350·00		
12. Olinagar ..	Olinagar ..	Feni ..	250·00	25·00	..
	Grand Total of the felling series ..		16,330·00	1,633·00	

REGULATION OF YIELD

178. **Regulation of Yield**—The ultimate goal of management is to liquidate the existing irregular forests and replace it with an artificially regenerated forest of more valuable species within the rotation period. The can only be achieved by a cutting system based on area control. Regulation by the method of volume-control in such a variable forest results in the cutting of un-equal areas and fails to attain an even distribution of age-classes in the succeeding rotation. The regulation of yield will, therefore, be entirely on area basis. Only the workable area is to be considered for yield calculation.....

Since, total workable area under this Working Circle=1,95,936·20 acres and Rotation fixed at 60 years.

$$\therefore \text{Sustained Annual Yield} = \frac{1,95,936 \cdot 20}{60} = 3,266 \cdot 00 \text{ acres.}$$

(or Prescribed Annual Yield) 3,266·00 acres.

179. **Flexibility in Yield Calculation**—Though the Annual Yield is prescribed on the principle of sustained yield, yet it is possible that the limit fixed may be higher than the optimum capability of the Chittagong Forest Division in respect of manpower or fund for a year or some years, in such circumstances the minimum permissible yield will be shown in under "B" of the statement under para. 176-A.

Minimum limit prescribed is approximately 50% of the sustained Annual Yield of 3,266·00 acres.

METHOD OF TREATING UN-ALLOTTED AREAS

180. **Yield from Periodic Block II**—This includes all existing plantations raised up to 1978. No appreciable yield is expected from this Periodic Block. Only cultural operations will be carried out and any out-turn from these cultural operations will be added to the total out-turn of this working circle.

181. **Yield from Periodic Block III**—This included all other unfelled an un-worked area. No yield is prescribed from this Periodic Block. The healthy grow h of existing vegetation should be ensured. This will be done by the Territorial Divisional Forest Officer in consultation with the Divisional Forest Officer, Silvicultural Research Division. Any out-turn from such Silvicultural operations will be added to the total yield of the working circle.

182. **Method of executing felling**—For clear-felling the general rules will be as given in para 155. These rules should be strictly followed.

183. **Sequence of felling to be made**—This has been discussed in para 156.

184. **Selection felling**—This details are given in para 157.

185. **Method of check in the field if the prescribed is being removed correctly**—The details are given in para 158 which showed be followed.

186. **Choice of species:**

Location.	Species for reforestation.	Species for afforestation.
For ridges ..	Garjan, Chapalish ..	Garjan, Chapalish.
For slopes ..	Teak (for site quality II and above), Chapalish, Champaful, Chikrassi, Garjan, Toon, Civit, Uriam and Pynkado.	Garjan, Chapelis, Toon, Telsur, Pyakado, Koroi, Civit, Uriam, A. Albizzia lebbek.
For high flats ..	Mahogany, Chapalish, Chamaful, Chikrassi, Garjan, Toon, Civit, Uriam, Telsur, Pynkado.	Garjan, Chapalish, Toon Telsure, Oivit, Uriam. Pynkado, Koroi, A. lebbek.
For low flats ..	Jurul, Kanjal	Jarul, Kanjal.

PLANTATION TECHNIQUE AND NURSERY PRACTICE

187. **Selection of mother-tree for seed collection**—This has been described in details under para 135.

188. **Nursery practice**—The details have been discussed under para 137. Besides, "Nursery establishment and layout" may be seen in the "Forest Nursery and Plantation Manual" by Mr. M. R. Chowdhury (pages 2—5).

189. **Plantation technique**—Details have been discussed under para 138. The instructions laid therein should be followed and the Calendar of operations given under para 191 should be studied thoroughly.

Besides, the following important points should be remembered.

In selection of sites for different species prescribed under long rotation the general principle is to put Teak on the slopes. Jarul and Kanjal should be put in low-laying areas and Garjan and Chapalish along the ridges. Dhakijam is suited to almost every site. Other miscellaneous species should be planted according to their suitability to various sites. Gamar should not be grown as a pure crop because of its susceptibility to Loranthus attack. Chapalish should be avoided in areas frequented by wild elephants.

190. **Plantation technique for some recommended species:** (a) **Teak**—It grows well on deep, fertile and well-drained sandy loam and does best on the slopes. Teak stumps of size 6″—8″ root and 1″ shoot from one year old seedlings should be planted in thalies on a spacing of 6′×′6.

(b) **Jarul**—It grows well on low swampy ground. Stumps of one year old seedlings from previous years nursery should be planted on a spacing of 4′×4′.

(c) **Garjan**—It grows well on sandy loam soil on ridges and slopes of hills preferably on north-eastern aspects. Seeds should be notched in head-up, lines 1′—6″ wide, lines being 6′ apart. There should be 2 or 3 rows of seeds in each line, the rows being 5″ apart and seeds 3″ apart in the rows. Polybags seedling should be one year old and planted on a spacing of 9′×9′.

(d) **Dhakijam**—It grows well on all types of soil from the dry ridges down to alluvial deposits on the lower slopes. Fruits should be sown whole without any treatment in thalies with 6′×6′ spacing. Polybag seedlings should be one year old and planted on a spacing of 9′×9′.

(e) **Gamar**—It grows well on well drained sandy loam soil preferably on southern and south-western aspect. Pure Gamar plantations are succeptible to loranthus attack. Alternate line mixtures of Gamar with Garjan or Dhakijam appears to be a solution. Seeds be sown in thalies 6′ apart, 3 to 4 seeds per thalies sown after collection. Polybag method is not recommended for this species.

(f) **Chapalish**—It grows well on well drained soil and does best on more exposed south and est aspectas. But it should not be grown in areas frequented by elephants. The seeds should be sown in thalies 6′×6′ spacing 4 to 6 seeds should be sown per thaly. If polybag method is applied, seedlings should be grown one year ahead and planted on a spacing of 9′×′9.

(g) **Eucalyptus**—Grows in all types of soil. But growth is better in deep loamy soil. Seedling can be transplanted from nursery stock with ball of earth or from Polybags in rows. Distance between seedling to seedlings should be 12′ and should be sown in pits 2′×2′×2′ filled with manure. Care should be taken to see that water does not stagnate below the planted seedlings.

(h) **Minjiri**—Grows better in plain and high-flat land. Fruits should be collected in February and March and dried for collection of seeds, can be sown direct in thalies or in lines. Germination takes place within 15—20 days of sowing, weeding and watering should be done whenever necessary. Polybag method is recommended.

(i) **Telsur**—Grows better in flat lands adjoining hilly rivers. Seeds is to be collected in the month of June from trees. Seeds are to be sown in lines or thalies 3″ apart like Garjan. After sowing seeds timely weeding is necessary. Polybag method is recommended.

(j) **Kadam**—Grows well in flat lands, barren areas with sufficient rainfall in sandy loam soil, sometimes grows in red lateritic hilly areas. Fruits are collected in October-November. Fruits are to be stored, allowed to rot and seeds are taken out by hand. Seeds are very small and are likely to be missed, unless manupulated with care. Soil working should be done th roughly and nursery should be raised on high-land with adequate provision for fertilizer. Care should also be taken to keep the seeds away from pats which eatup the seeds. Germination takes place within 1½ months. The Nursery bed sown with Kadam seeds should be covered with shades. After the seedling sown 3 leaves these are pricked out into polybags and kept in shade. After one month polybag seedlings are transplanted.

(k) **Chatian**—Grows well in low hilly areas and plane lands. Fruits are collected in December/January and dried for collection of seeds. Care is to be taken so that seed are not blown away by wind action. Nursery raised in February/March. Seeds are sown in April in nursery bed or in polybags. Germination takes place within 7 days. Nursery beds should be covered after the seeds are sown. Seedlings may be transplanted after one or two months.

(l) **Ipil-ipil**—Valuable for fire-wood and for making pulp, leaves used as cattle-feed. Seeds are soaked for one night and placed in polybags. Germination takes place within 10 days and is completed within 20 days. The growth rate of this spp is very high. 15″ high seedling is available in 4 months in polybags. In November, seedlings should be planted in lines 4′ apart in 2′×2′×2′ pits filled with cow-dung manure.

(m) **Pitali**—Grows well in low-flat lands. Fruits are collected in and are allowed to rot or are beaten to take out seeds. Seeds are sown direct in Nursery bed properly laid out with manure. Germination takes place in 15—20 days.

( ) **Cashew-Nut**—Grows well in hilly areas or in valleys on dry soil. Seeds are sown direct in Polybags in May-June. For each seed one Polybag should be used.

(o) **Mahogony**—Grows well in deep and fertile soil, sandy loam and red latoritic soil where water does not stagnate, is also suitable for this species. It does not grow under shades. Can be sown direct or can be transplanted. Seeds are sown in thalies 1′ in diameter. Seedlings raised in Nursery beds or in Polybags can be transplanted at 12′ internals. Watering or irrigation is not required since the seedlings are raised in Rainy season, *i.e.*, June-July.

(p) **Champa (Champaful)**—Champa cannot stand water stagnation, so this is to be raised on high lands. Deep fertile and loamy soil is suitable for raising this species.

Seedlings raised in Nursery-beds can be transplanted with ball of earth or bet'er still, seedlings raised in polybags can be transplanted 15 apart lines. Pits 2′ × 2′ × 2′ should be dug and required quantity of manure added and these should be kept ready at least 15 days before sowing. Seeds should be sown at the advent of rains.

(٦) **Koroi**—Grows better in hilly areas. Seeds are to be collected in April-May. Seeds should be sown direct in thalies 6″—9″ deep of 1′ dia.

(r) **Other miscellaneous**—Boilam, Toom and other miscellaneous species should be sown direct in thalies with 6′ × 6′ spacing or in line 6′ apart. It may be mentioned that all speciesexcept Teak, Jarul and Gamar may be raised in Polybags and transplanted successfully. It was the practice in the past to grow these as well as most of the other species in nurseries in situ. The importance of raising seedlings as far as possible in polybags can hardly be over emphasized. For successful raising of nurseries and plantations extensive use of polybags is a must.

191. **Calendar of Operations:**

Month	Activity
July	1. Collection of seeds.
	2. Weeding in permanent and central nurseries.
	3. Applications of insectcides in plantations and nurseries
	4. Planning of nursery crop.
	5. Vacancy filling in the plantation of the year with Polybag seedlings.
August	1. Collection of seeds.
	2. Weeding permanent and central nurseries.
	3. Fixing shade over beds for shade bearing species in permanent and central nurseries.
	4. Application of insecticides in plantation and nurseries.
	5. First cleaning in the plantation of the year.
	6. Second cleaning in one and two years old plantations.
September	1. Ploughing of area for new beds in permanent and central nurseries.
	2. Hoeing and weeding in permanent and central nurseries.
	3. Second cleaning in the plantation of the year.
October	1. Dressing, trimming, earthing and hoeing of planted beds in permanent and central nurseries.
	2. Application of fertilizer followed by irrigation in planted beds in permanent and central nurseries.
	3. Final cleaning in plantation of the year.
	4. Preparation of plantation journals.

Month	Activity
November ..	1. Collection of seeds and storing.
	2. Ploughing of area for new beds in permanent and central nurseries.
	3. Survey and preparation to stock map of the plantation of the year mainly with the purpose of determining vacancies.
December ..	1. Collection of seeds and storing.
	2. Irrugation in planted beds in permanent and central-nurseries.
	3. Finalization of plantation journals and control forms.
January ..	1. Collection of seeds.
	2. Ploughing of area for new beds in permanent and central nurseries.
	3. Manupulation of nursed crop accordi$_{ng}$ to requirement in plantation of the year.
	4. Collection of stakes from the coupe area.
	5. Clear-felling in coupe area to be started.
February ..	1. Collection of seeds.
	2. Application of fertilizer followed by irrigation in planted beds in permanent and central nurseries.
	3. Jungle cutting in areas to be planted in June of the year including cleaning of fire lines all round the coupe.
	4. First cleaning in one and two years old plantations.

Month	Activity
March ..	1. Collection of seeds.
	2. Hoeing and earth working in planted beds in permanent and central nurseries.
	3. Ploughing of area for new beds in permanent and central nurseries.
	4. Making beds in temporary nursery.
	5. Daily watering in germination beds in permanent and central nurseries with necessary shades.
	6. Burning of coupe and removal of clear-felling stocks to be started.
April ..	1. Collection of seeds.
	2. Making nursery beds in permanent and central nurseries.
	3. Daily watering in germination beds in permanent and central nurseries with necessary shades.
	4. Irrigation in planted beds in permanent and central nurseries.
	5. Application of fertilizer in thalies in one and two years old plantations.
	6. Preparation of rough contour map and plantation plan for species to be planted in June.
	7. Collection of debries of and reburnings.
	8. Staking and preparation of thalies.
May ..	1. Collection of seeds.
	2. Pretreatment of Teak seed and sowing of Jarul and Teak seeds in the temporary nursery beds.
	3. Daily watering in germination beds in permanent and central nurseries with nursery shade.
	4. Application of insecticide in plantation and nurseries.
	5. Staking and preparation of thalies.
	6. Making inspection paths of easy gradient.

Month	Activity.
June ..	1. Collection of seeds.
	2. Pricking seedling and transplanting from germination beds to permanent beds in permanent nursery.
	3. Application of insecticide in plantations and nurseries.
	4. Planting of nursed and main crop.
	5. Vacancy filling in last and previous years plantations preferably with Polybag seedlings.

192. **Care to plantations prior to establishment weeding and cleaning**—In young plantations weeding and cleaning are most important until the plantations are established.

(i) **Age at which the plantations are considered to be established:**

For most of the species recommended for planting in Bangladesh, the plantations are considered to be established after four growing seasons, *i.e.*, by the 5th year of plantations. Extreme care should be taken during these four years in order to establish a successful plantation.

It may be mentioned that most of the species recommended for planting under this working circle are of soft-hard wood variety. These species can not stand suppresion to the slightest degree. As such weeding and cleaning should be done timely and properly. Care should be taken so that the young seedlings are not too much exposed to the direct sun and over-head shades should also be avoided.

(ii) **Control of weeds:**

In tropical climate, weed is the biggest enemy of the plants, because the weeds have more vigorous growth than the seedlings which are planted and if proper weeding programme is not taken up, the plants will be suffocated and stunted. Comparatively less care is required for Teak than other species which are tried in the plantations.

(iii) **Manual weeding:**

In Bangladesh where labour is cheap and plentiful, no mechanical weeding is recommended. The weeding should consist of cutting the weeds up to the ground level and should be done several times before the plantations are established.

(iv) **Time and intensity of weeding:**

Timely weeding, as already stated, is very important for the growth and establishment of a successful plantation. This operation should be carried out up to the 4th year of the plantation. The time-schedule for an ideal weeding programme should be as follows:

(a) **First year of the plantation**—Rain's weeding should be carried-out during July to August. The Autumn weeding should be carried out from September to October. The Winter weeding should be a patch weeding around the plants and carried out during November-December. The Summer weeding is carried out between May to June.

(b) **Second year of the plantation**—The Rain's weeding is carried out between July to August. The Autumn weeding is carried out between September to October. Summer weeding is carried out between May to June.

(v) **Double stem cutting:**

During the second or third year of the plantation the double stem cutting operation should be carried out for fast growing species and in the 4th or 5th year in the case of slow growing species. The best stem should be retained and the inferrior once should be cut back.

(vi) **Vacancy filling:**

Normally 100 per cent success can not be achieved in the planting effort in the first year. It should be a routine arrangement to carry out vacancy filling in the areas where the seedlings have failed. It is strongly recommended to use only Polybags seedlings for vacancy filling. The seedling should be raised in tall Polybags 12" x 6" and should be about one year old. The vacancy filling operation should be carried out during June and July. Vacancy filling in previous year's plantation should be also carried out, *i.e.* vacancy filling should be carried out up to second year of establishment of plantations.

(vii) **Climber-cutting in plantations:**

Climber-cutting will be done at the time of weeding and thinning or whenever necessary. The crop in unallotted areas does not call for any regular scheme for climber-cutting. Any climber in valuable trees may be cut whenever noticed.

193. **Thinning in Plantation**—It may be mentioned in this connection that thinning in the plantation of Chittagong Forest Division has not been carried out properly in the past. As such, the plantations of Chittagong Forest Division show over-stocking due to lack of thinning. Recent enumerations of these plantations have shown that approximately 16% of all the plantations raised so far in this Division is grossly over-stocked, the extent of over-stocking varies from 150% to 200% or more.

The necessity of timely thinning in these plantations with the required intensity can hardly be over-emphasized. Since many of the older plantations have not been thinning attempts may be made to draw up a separately development schemes in near furture for thinning in older plantations of Chittagong Forest Division. However, the existing plantations included in Periodic Block-II in this working Circle should be thinned as per programme laid down in the plan. It should be noted that species prescribed in Short Rotation Working Circle are fast-growing industrial species with a rotation of 15 years. Hence, only first and second thinnings shall be carried out in this Working Circle up to tenth growing seasons. It should be specially noted that all thinning operations to be carried out in future should be done departmentally. Under no circumstances contractors or private agencies should be allowed to work in this connection inside the forest.

The accompanying Statement prepared and reproduced below on the basis of the "Notes on Thinning in Plantations" by Mr. C. K. Homfray, may serve as a useful guide for thinning in some of the species recommended for various Working Circles and as such has been given at the end of the para. Since thinning practice is not standardized for many of the other species recommended for this as well as other working circles. Thinnings should be carried out as per general instructions given under para 193. Besides, a Thinning Chart for next 10 years, *i.e.* during currency of this Working Plan has been given in XXIII. This should be strictly followed.

Any deviations from this thinning programme should be mentioned in the deviation statement of the control forms.

Statement Showing the Recommended

Species.	1st thinning			2nd thinning		
	Age in year	Number of dominent stem per acres after thinning.	Average height of dominent stem in feet.	Age in years	Number of dominent stem per acres after thinning.	Average height of dominent stem in feet.
1. Gamar (Gunlina arborea). ..	3 4–5	550 350–275	28 34–42	10	160	3
2. Kanjal (Bishofia javanica) ..	5	800	27	10	320	46
3. Teak Teetona Grandic) ..	5	470	34	10	240	60
4. Champa (Michelia champaca). ..	5	400	30	10	220	53
5. Jarol (Lager tromia Spp.)	8	760	42	13	385	59
6. Chikrasi (Chikrasia Tabularias)	5	420	32	10	205	56
7. Toon (Cedrela toona).	5	360	34	10	200	63

SOURCE—C. M. Hornfray—

3rd thinning			4th thinning			Remarks
Age in years	Nunber of dominent stem per acres after thinning	Average height of dominent stem in feet	Age in years	Number of dominent stem per acres after thinning	Average height of dominent stem in feet.	
15	110	77	20	90	85	All thinning should be heavy "D" grade.
15	185	60	20	155	70	1st thinning should be light "B-C" grade, 2nd thinning "C-D" grade, 3rd thining "D" grade.
15	160	80	20	125	97	All thinning should be heavy "D" grade, Further thinnings may be carried out in this species at interval of 5 years.
15	150	71	20	120	81	1st thinning should be fairly heavy "C-D" grade. 2nd and subsequent thinning should be heavier "D" grade.
20	175	77	..	..	..	1st thinning should be height "B" grade, 2nd thinning "C-D" grade. 3rd thinning heavy"D" grade.
15	145	71	20	115	83	1st thinning should be comperatively light "C" grade, 2nd thinning should be "C-D" grade, 3rd thinning should be heavy "D" grade.
15	140	82	20	100	98	1st thinning should be comperatively light "C" grade, 2nd thinning should be "C-D" grade, 3rd thinning should be heavy "D" grade.

"Notes: Thinning in Plantations"

However, the following general rules should be observed for thinning in plantations:

(i) Existing plantation included in periodic Block-II may be thinned as per programme laid down in the plan.

(ii) Plantations raised during the currency of this plan, *i.e.* 1979 onwards, will, in general, be subject to thinnings as per programme given below and at the ages indicated. The ages at which thinnings is to be done, is subject to alternations, if any, to be made by the territorial Divisional Forest Officer, in consulation with Divisional Forest Officer, Silvicultural Research Division:

Mahogany, Garjan, Koroi, Jam etc. & other miscellaneous Spp. Fast-growing species.	1st thinning ..	After 5th annual growing season.
	2nd thinning ..	After 10th annual growing season.
	3rd thinning ..	After 15th annual growing season.
	4th thinning ..	After 20th annual growing season.
Miscellaneous slow-growing species.	1st thinning ..	After 10th annual growing season.
	2nd thinning ..	After 20th annual growing season.
	3rd thinning ..	After 30th annual growing season.

In addition to the above the following rules regarding thinning in plantations should be followed:

(iii) In general the first thinning will be a mechanical thinning and the aim should be to space out the trees to give room for the development of the crowns of the remaining trees. The second thinning will be fairly heavy "D" grade. This should be sufficiently heavy to allow the conopy to close up in about two-thirds of the period between thinning. This is necessary to give light to the bamboos which lie supressed, so as to enable them to shoot up. The third thinning should be very heavy "D" grade as trees have by then attained a good thimber height and the object now is to get an increased diameter increment. The intensity of the subsequent thinning should be on the requirement of the crop.

(iv) Thinning should be done when the plants are in full foliage.

(v) All teak trees marked for thinnings must be girdled and kept standing at least one year before the trees are felled for extraction and marketing.

(vi) All thinnings in plantations 20 years old and above must be done by an officer not below the rank of a Forest Ranger. Thinning in younger plantations may be done by trained subordinate staff after a demonstration thinning marking by the Range Officer as described below.

(vii) Half an acre of normally stocked area in each year of plantation to be thinned will be demarcated by thinning officer with four conner posts. The number of trees to be removed by the proposed intensity of thinning and the number left after thinning in this half acre will be counted and entered into the plantation journal along with the average girth and height of the dominent trees after thinning. These statistics and the position of such plots in a sketch map will accompany the marking list to the Divisional Forest Officer for onward transmission to the Silvicultural Research Division each year.

(viii) During July every year the territorial Range Officer will inspect the older plantation and chalk out a programme of thinning for the year in conformity with the working plan prescription. Some percentage, specially areas due for 3rd thinning and above, should be checked physically by the Divisional Forest Officer before the commencement of the actual thinning operation.

A Thinning Chart for 10 years from 1978-79 onwards for thinning of plantations is given in Appendix-XXIII.

194. **Survey of Plantation**—All clear-felled coupes must be surveyed as soon as possible and maps should be prepared on the 16″=1 miles scale for the plantation files. The coupes should also be plotted on the 4″=1 mile scale maps, *i.e.* the working maps of ranges and maps in the Fellings Series Register and Block History Registers.

The best times for the survey is the first cold weather after felling when the areas Occupied by the different species of mixture are distinguishable and yet the plants are not too high to obstruct the sight vane of the plane-table. Range Officer-in-Charge will carry out the survey and at least 5% of this should be checked by a Gazetted officer.

195. **Reajustment of Area in Periodic Block-I**—As mentioned earlier small patches of unworkable areas should be included in the Yield. When, however, the un-workable area in any particular coupe happens to be of considerable extent (about 10% of the coupe area), of the coupe should be proprtionately increased to give the required acreage for plantation. This will necessitate readjustment of the area in Periocdic Block-I towards the end of the period of ten years, by taking over some area from the unallotted blocks.

CHAPTER V

WORKING PLAN FOR BAMBOO (OVERLAPPING) WORKING CIRCLE

196. **General Constitution**—This working circle extend over the entire area of 2,10,852.00 acres of Reserved forests even though bamboos have depleted in the accessible areas of Reserved forests of the Division and as such overlaps the Long, Medium and Short Rotation Working Circles of the Division. Occurrence of babmoo in the protected, Vested, Acquired Forest of this Division is negligible and would not be economical to put these bamboo forests under this working circle. Efforts will be made to improve the depleted bamboo areas of the Reserve forests.

197. **Character of the Vegetation**—In this Division bamboo occurs mostly as under-growth of the Tropical wet-evergreen and Tropical semi-evergreen type of forests. There are areas practically without large or valuable trees but densely stocked with bamboos. The commonest species bamboo in this Division in Muli (Melocanna bambusoides) which occurs in pure form or in association with other species of bamboos. Next to Muli is Mitenga (Bambusa tulda) which is the second best-known species. other common species of bamboos are Kaliserri (Oxytenanthers auriculata), Daloo (Teinostachyum dulloa) and Orah (Dendrocalamus longispattus) the supply of these bamboos is limited. Regeneration of bamboos in this Division is rather poor and the overall condition of the bamboos in this Division is anything but satisfactory.

198. **Analysis and Valuation of the crop**—No enumeration has been carried out. The condition of the crop is so poor at present that perhaps not more than 10% of the total area in this working circle is under cover of pure bamboo forests.

199. **Object of Management**—The object of management will be to provide and maintain sufficient and regular supply of bamboos to meet the demands of the people of the adjoining area and also to meet the requirements of the urban people.

METHOD OF TREATMENT

200. **Exploitation of Bamboo**—To provide and maintain regular supply of bamboos with the above objective, it is necessary to put restrictions on the indiscriminate cutting of bamboos. Method of issue of permits, restriction on number of permits and number of bamboos in each permit will be worked out by C.F. E.C. Issue according to local conditions in the division or in any particular coupe. C. F. E. C. will issue standing order to D.F.O in this regard.

(a) Silvicultural System :

Selection felling followed by natural regeneration will be the system prescribed for bamboo working. In cach felling, only the mature culms will be cut and removed leaving behind sufficient number of mature bamboos to ensure vigour of the rhizomes and natural regeneration.

(b) Cutting Cycle and yield:

Considering the necessity of putiing restrictions on the cutting of bamboos, a cutting cycle of 3 (three) years is prescribed from 1978-79 onwards for all bamboos. The yield will be by area and control by annual coupes.

(c) Method of disposal of bamboo coupes:

In the past and during the last plan period bamboo coupes were sold on auction. This has resulted in serious damage to bamboo crop because when auctioned, the purchaser's main interest was to extract as many number of bamboos as possible without any regard to the bamboo cutting rules. In many cases immature bamboos, even current year's culm, was also not spared.

It is, therefore, recommended that bamboo coupes be disposed of by permit system.

201. **Annual Coupes**—For convenience of management, bamboo coupes having well-demarcated boundaries by principal streams will be formed. The Divisional Forest Officer may, however, with the previous permissing Conservator of Forests close any particular area to all babmoo extraction for any period for helping regeneration.

202. The following table gives a list of the bamboo coupes and arrangement for bamboo working on three years rotation:

Name of the Range.	Controlling Beat Office.	Range serial No. of the Coupe.	Description of the Coupe.	Sequence of felling (years of working).
1	2	3	4	5
1 Karerhat	Karerhat	I	Koila stream and Feni river left bank from Koila-mukh to Olinagar.	
	,,	II	Stream from Olinagar to North of Lakshmichari stream.	
	,,	III	Lakshmichari stream	
	Hinguli	IV	Hinguli Khal	
	,,	V	Sonaichari	
	,,	VI	Katachari	
	,,	VII	Reni river left bank from Rangapani to Koilamukh excluding Koilachars.	
2. Baraiyadhala	Gobania	I	Mithachari	
	,,	II	Gobania Khal	
	,,	III	Kayachari	
	,,	IV	Punachari	
	Baraiyadhala	V	Babuchari	
	,,	VI	Kamaldaha Khal	
	,,	VII	Baraiyadhala Khal	
	Sitakund	VIII	Khals in Sitakund block	
	,,	IX	Guliarkhali Khal	
	,,	X	Guptakhali Khal (Northern branch)	
	Hazarikhil	XI	Fatikchari Khal	
	,,	XII	Harwalchari (excluding Kalapani & Rangapani charas and Balukhali Khal).	
	,,	XIII	Balukhali Khal (including Kalapani and Rangapani charas).	
3. Sitalpur	Kumira	I	Jaliapara khal	
	,,	II	Chota Kumira Khal	
	,,	III	Barakumira Khal	
	,,	IV	Mankuria Chara	

Name of the Range.	Controlling Beat Office.	Range serial No. of the Coupe.	Description of the Coupe.	Sequence of felling (years of working).
1	2	3	4	5
4. Narayanhat	Dantmara	I	Daichara (excluding Kanchana and Tarakhon Khals).	
	,,	II	Kanchana and Tarakhon Khals	
	Balukhali	III	The khal between Hasnabad and Chandpur blocks.	
	,,	IV	Khal between chandpur and Idilipur blocks	
	,,	V	Baramasia Khal (the khal meeting the Halda river near Mirzahat).	
	Narayanhat	VI	Kaiyapukia block (all khals to Halda)	
	Dhurung	VII	All khals from Kanchannagar blocks falling into Kalapani khal (e.g., Kumarichara, Chaikanchara etc.).	
	,,	VIII	Khals from Kanchannagar blocks falling into Daluchara.	
	,,	IX	Khals from Kanchannagar blocks falling into Dhurung river (excepting Kalapani chara and its side streams).	
5. Hathazari	Hathazari	I	Mondari Khal	
	,,	II	Kumari Khal	
	Mandakini	III	Sonaichari	
	,,	IV	Monaichari	
	,,	V	Mandakini Khal	
	Sobhanchari	VI	Sobhanchari Khal	
	,,	VII	Baramasia Khal	
	Sarta	VIII	All khals from Mogkata and Gopalghata blocks falling into the right bank of Sarta Khal.	
	,,	IX	All khals from Khiram block falling into the left bank of Sarta Khal.	
	Ichamati	X	Khals from Thandachari block falling into the right bank of Ichamati Khal.	
	,,	XI	Khals from Chagra block falling into the left bank of Ichamati Khal.	

Name of the Range.	Controlling Beat Office.	Range serial No. of the Coupe.	Description of the Coupe.	Sequence of felling years of working.
1	2	3	4	5
6. Rangunia	Kodala	I	Khals from Nischinta blocks falling into the left bank of Ichamati Khal.	
	,,	II	Khals from Kodala block	
	Khurusia	III	Small streams from Sukbilash block falling into right bank of Sylock Khal.	
	,,	IV	All streams from Khigachari (included) to Kumeria chara (excluded) falling into left bank of Sylock Khal.	
	,,	V	Khurusia chara	
	Chiringa	VI	Chiringa Khal	
7. Patiya	Bhandaljuri	I	Dumaria chara	
	,,	II	Bhandaljuri chara	
	Srimai	III	Srimani Khal (including Silachara)	
	,,	IV	Kharan Khal	
	,,	V	Sonaichara	
	,,	VI	Gulachara	
	Barguni	VII	Barguni Khal	
	,,	VIII	Honachara	
	Dhopachari	IX	Dhopachari	
	,,	X	Chemi Khal	
8. Dohazari	Lalutia	I	Lalutia chara	
	,,	II	Heichari and smaller streams from Chiringghata block and doandachari.	
9. Padua	Barduara	I	Swalak chara	
	,,	II	Mahalia Khal falling into Mohalia beel	
	,,	III	Aral Khal including Ukhar Khal	
	Padua	IV	Dhoiya Jhiri (open every year to bamboos from Chittagong Hill Tracts and smaller streams from Sararia block falling into Hangar Khal.	
	Tankawati	V	Jangchara	
	,,	VI	Tandawati Khal (open every year to bamboo from Hill Tracts) including Kanalia chara.	

Name of the Range.	Controlling Beat Office.	Range serial No. of the Coupe.	Description of the Coupe.	Sequence of felling years of working.
1	2	3	4	5
	Dalu	VII	Saria khal (open every year to bamboo from Chittagong Hill Tracts).	
	Farenga	VIII	Farengachara, Chambi chara and other streams from Farenga block falling into Dalu Khal.	
	,,	IX	Chandachara	
10. Chunati (Nursery Range)	Chunatia	I	Satgarchara	
	,,	II	Hatiachara and its stream	
	,,	III	Folichara	
	Barahatia	IV	Chakfiranichara	
	,,	V	Bodorachara	
	,,	VI	Sonakanichara	
	,,	VII	Madarshachara	
	Harbang	VIII	Kinakata Khal and all streams from Gayalmara, Teliakata and Paharchanda blocks, i.e. streams to the right bank of Harbang Khal.	
	,,	IX	Harbang Khal and streams in Harbang block	
	,,	X	Streams in Baraitali block falling into Bariatali Khal.	
11. Jaldi	Jaldi	I	Silkipchara	
	,,	II	Chambalchara (including Aimyong chara)	
	Puichari	III	Naporachara (including Him chara)	
	,,	IV	Puichari	
	,,	V	Bartalichara	
	,,	VI	The stream north of Sonaichari village	
12. Barabakia	Barabakia	I	Jadu Khal (near Barabakia forest office)	
	,,	II	Jaralchari	

203. Cutting Rules for Bamboo—The rules below will apply to cutting of bamboos in all annual coupes when worked on a three years' cutting cycle. The following rules are, therefore, prescribed which should be carefully observed in extracting bamboos :

(1) No new culm of the previous rains will be cut.

(2) In addition to the new culm some of the older culms will have to be retained both for mechanical support and protection to the young shoots.

(3) Culms may not be cut less than 6 inches and more than one feet above the ground except in very congested culms where cutting should be done at the lowest possible point.

(4) Tearing or splitting the base of the clumps while cutting should not be permitted.

(5) No portion of the cut bamboo may be left in the clump.

(6) Doga or culms of the previous rains may only be cut in a selective way when required for tying bamboo bundles. Malformed Doga should be preferred for cutting for this purpose.

(7) Digging or extraction of rhizomes will not be permitted.

(8) From any young clump no culms should be cut until they attained full size.

(9) No bamboo shoot in plantation less than 10 years old may be cut for commercial purpose.

(10) Except for the purpose of rafting timbers no extraction of bamboos will be allowed during the period between 1st June and 1st September when the growth in new shoots take place. The felling in the coupe of a particular year will start from 2nd September and will continue in the coupe up to 31st May of the following year for the convenience of work and better supervision.

(11) When gregarious flowering takes place in case of any particular species of bamboos over considerable areas the Divisional Forest Officer may with the previous permission of the Conservator of Forests keep them open for extraction of all bamboos of that species after the mature seeds have fallen on the ground.

204. **Underplanting of Bamboos**—When bamboo seeds are available, wholesale underplanting of bamboos should be taken up in all the current year's plantation areas of long, medium and short rotation working circles where bamboos are not available from natural regeneration. This should be done under special programme during the seed years.

In compearances of long, medium and short rotation working circles all efforts should be made to encourage growth of bamboos through careful Silvicultural operations.

If the experiment for easy availability of bamboo planting stock from culture in F.R.I. is successful, the underplanting areas may be extended in every year's annual coupe of long, medium, and short rotation working circles where bamboos are not available naturally.

"A note on Bamboos" supplying valuable information regarding bamboos has been given in Appendix-XXII.

205. **Miscellaneous Regulations**—Extraction of small-timber fire-wood and minor forest produce by the local people is allowed throughout the forests of this Division, wherever possible, under certain terms and conditions. It may be mentioned that extractions of small-timber is restricted to the use of commercially unimportant species such as D/class species (*vide* schedule in Appendix-VII.) and extraction of fire-wood is also restricted to dry fire-wood only. The rates, terms and conditions of the various types of permits which can be obtained for the extraction of small-timber fire-wood and minor produce are given in the current schedule of rates, *vide* Appendix-VII.

206. **Small Timber**—Saplings, poles and other small-timbers, such as ploughpieces, crooks for boats, rice-pounder parts, etc. may be sold on permits to be obtained from the Divisional Forest Officer's concerned, from any parts of the forests except plantations. It is, however, suggested that the sale of such small-timber should be encouraged from the unworked portion of Periodic Block-I, specially of the long rotation working circle. Sale of these timbers from the other blocks will be prohibited.

207. **Dry fire-wood**—Only dry fire-wood may be removed from any parts of the forests on the strength of monthly fuel permits or general permits. The use of cutting implements for this purpose is forbidden. Under no circumstances removal of green fire-wood be allowed.

208. **Sungrass (Imperata cylindrica)**—The importance of sungrass in the rural economy of Bangladesh can hardly be over-emphasized. There are 13·7 million kutcha houses in Bangladesh, of which 8·9 million, *i.e.* about 65% of the total, are with sungrass-roofing.

Sungrass, an indispensable raw-material for roofing to the village population, occurs in varying proportions. Though accurate survey of the Sunkhola areas has not been undertaken so far, a rough assessment shows the following distribution of the Sunkholas in the Reserved and the Protected Forests in the Chittagong Forest Division :

Distribution of Sunkhola area (Abstract)

Range.	Approximate area in acres.
1. Karerhat	105·00
2. Baraiyadhala	2,405·00
3. Sitalpur	1,000·00
4. Narayanhat	500·00
5. Chunati	610·00
6. Patiya	80·00
7. Hathazari	125·00
Total for the Division ..	4,825·00

It may be mentioned that it was shown as 3,935·00 acres in the previous working plan. Subsequent checking of records has confirmed area to be 4,825·00 acres. The details of the Sunkhola lots with corrected area has been shown in Appendix-XXI.

It may be mentioned that survey of the Sunkhola areas falling within the vested and the Acquired Forests has not been done either. It is, therefore, suggested that an accurate survey of the areas of Sunkholas in the Forests of Chittagong Division be undertaken as soon as possible for estimating the outturn of Sungrass from these areas and for scientific management.

It may also be mentioned that in this Working Plan the Sunkhola areas have been excluded from Periodic Block-I and included in Periodic Block-III areas of long rotation working circle—as to allow tending, maintenance and disposal of sungrass in a scientific way.

209. **Tending of Sunkholas**—Considering the importance of Sungrass as a that hinge material and the role it plays in the rural economy of our country, the following tending operations should be carried out in the Sunkhola area, with the objects of improvement of this vital resource in general and to increase the quality and yield of sungrass in particular :

(1) Thorough weeding with the required frequency and intensity should be done in the Sunkh la areas whenever necessary by cutting and up-rooting the undesirable shrubs.

(2) Control burning should be carried out to eliminate competing weeds.

(3) Wherever necessary, Urea fertilizer should be used to promote growth and development of sungrass.

(4) A schedule of operations should be prepared for the above-mentioned improvement measures by the Divisional Forest Officer in consultation with the local staff.

(5) No Sunkhola lots should be destroyed or planted up with anything other than sungrass.

210. **Method of Disposal**—The large Sunkhola lots should be disposed off by annual auction. Disposal of Sunkhola lots on auction for a period of three years, as prevalent in the past, should be discontinued. The method of disposal by annual auction is likely to fetch sustain revenue in addition to offering greater scope for effective control over the extraction and removal of sungrass from the Sunkholas.

To avoid giving monopoly of extraction of Sungrass to auction purchasers or solvant parties, special provision should be kept for issuing general permits by Range staff concerned for removal of sungrass, from specified areas to be earmarked in every Range wherever Sunkhola occur to the people of adjoining areas so as to meet their requirements of thatch grass.

211. **Tapping of Garjan Oil**—Tapping of Garjan trees for extraction of Garjan oil is totally prohibited except in the following cases:

(1) All trees marked for felling in the clear-felling coupes may be tapped for Garjon oil with special permission from the Divisional Forest Officer, irrespective of girth classes.

(2) Trees marked for felling, if any, from time to time for any other special purpose such as for the purpose of export or supply to some agencies in bulk quantities, may be tapped after marking with special permission from the Divisional Forest Officer.

212. **Miscellaneous Minor Forest Produce**—The entire forest area of the Division is open for extraction of minor forest produce according to the terms and conditions laid down in the schedule of rates (*vide* Appendix No. VII.)

The important product generally extracted are cane, quruspata, pitali pata, etc. Ashok-barks, Chaulmugra seeds and myrobolans are collected in considerable quantities.

Stores which come under the category of minor forest produce has become rather important in recent years as a construction material in view of the growing demand for use in road making, retaining walls, protective embankment against errosion of river banks, etc.

The stone available in the quarries of the northern hilly areas of the Division are disposed off in annual auction as stone-lots. This practice should be continued.

213. **Control and Preservation of Wildlife**—In the past Chittagong Forest Division was quite rich in its wildlife wealth. Due to indiscreminate shooting, poaching large-scale trapping and above all, by the invation of human being into the natural havitat of wildlife and the consequent destruction of virgin forests areas for cultivations, etc., most of the valuable wildlife have been disturbed, driven away from the area or destroyed, reducing their number considerably.

It may be mentioned that wild-elephants were abundant in the forests of Chittagong Division before liberation of the country. There elephants used to be a menaco to the agricultural crops particularly paddy field located inside the forest area under the ownership of forest villagers or of the people of adjoining area. In the harvesting season elephants used to come to such paddy fields in large numbers and destroyed the paddy almost entirely. In the process of movement of these elephants in large hards considerble damage was occasionally done to life and property. Human casualties were also common in such areas.

The abundance of wild-elephants were noticed in the forest of Karerhat and Narayanhat Ranges bordering Tippera district. They were also found in large numbers in the forests of Chunati, Jaldi and Barabkia Ranges. They are still found in some of these areas as also in Khurusia area of Rangunia Range.

However, it is to be admitted that wild-elephant population, one of the most valuable of our wildlife resource, has gone down over the period of years due to capturing by Khedda operations, killing by poachers for ivory or destruction of their natural habitat.

It is recommended that this valuable wildlife be given complete protection for a period of at least 10 years more. Khedda operation or Mela-shiker should be totally prohibited during this period. However if there is any instance of "roughe-elephant" and killing of human being, special permission for killing of such roughe-elephant may be issued by the Chief Game Warden, Bangladesh.

In spite of the destruction of wildlife, the existing Fauna still available in the forests of Chittagong Division will cover a long-list, if enumeration is done. Sambers, Barking deer, Wild-bear Wild-dog (Ramkutta), Wild-goat, Monkeys of different species, Apes and Langer, Bear, Squirrel, Wild-cats, Civit-cats, Leopard and Tiger are few of the long list of valuable wildlife still available in the forests of Chittagong Division though the number varies from a few to smaller herds.

As regards the wild-bird population, the situation is still satisfactory. The list of wild-birds would be rather long. A few important once are Green-pigeon, Imperial-pigeon, Red-jungle fowl, Pheasants, Partridge, Doves of several species etc.

A list of important Mammals and Birds have been given in Appendix No. XVI.

214. **Management and Preservation of Wildlife**—It may be mentioned here that wildlife conservation measures are yet to be developed in this Division. At the moment a combined scheme under the name "Wildlife management and Game reserve" sponsored by the Conservator of Forests, Wildlife Circle, is under execution in this Division. Under this scheme three wildlife sanctuaries are intended to be created at (1) Hazarikhil Block (area 2347·00 acres), (2) Rangapani Block (area 1534·00 acres) and (3) Harwalchari Block (area 3303·0 acres) *i.e.*, a total area of 7184·00 acres—all under Baraiyadhala Range. It may be mentioned that wildlife available in this area was given protection even before initiation of the abovementioned scheme.

The above blocks are also retained under wildlife conservation area in the present working plan. In addition to the above three blocks it is proposed to include the following two blocks of Rangunia Range for the propose of creation of "Wildlife Sanctuary" in future under Article 23 of President's Order No. 23 of 1975 :

(4) Khurusha Block (area 2249·00 acres)

Thus a total of 10,680·00 acres have been set aside for wildlife conservation in Chittagong Forest Division. This area has been excluded from Periodic Block I, and included under Periodic Block III of Long Rotaton Working Circle.

The main activities in the blocks mentioned above will be confined to (a) survey and demercation of the Sanctuary and Reserve, (b) population census of animal and birds, (c) development of wildlife habitat, (d) introduction of plants and proy animals, and (e) development of public relations and awareness regarding the positive value of wildlife.

It is recommended that a separate working circle should be created in near future during the revision of this working plan, in view of the necessity of preservation, management and propagation of the dwindling wildlife resource of this Division, specially regarding some species threatened with extinction.

Introduction of animals from other areas :

Attempts should be made to introduce suitable wild-animals from other Forest Divisions such as Chittagong Hill Tracts and Sundarbans into the Forests of Chittagong Division, for the enrichment of the existing wildlife resource.

215. **Development of Recreation Facilities**—There is no arrangement for enjoyment, rest or recreation within the forest of Chittagong Division for weary town-dwellers or for the people of the adjoining arreas, except occasional visits to some of the forest Rest Houses by few people as and when these are available. The existing facilities available in the forest Rest Houses are also limited.

It is, therefore, suggested that a scheme may be drawn up for Chittagong Forest Division for the creation of some picnic spots and recreation centre for the people at suitable places, preferably in well communicated and accessible areas. Such recreation centre will not only improve the enjoyment and relaxation facilities of the people, but also earn goodwill and publicity for the Forest Department, in addition to earning some revenue.

216. **Grazing**—Lack of sufficient grazing or pasture land for the cattle of the forest villagers as well as of the people of the adjoining areas, is a problem which needs due considerations. Provision should, therefore, be made to allow grazing in the forests of this Division.

For this, the whole area of the forests of this Division will remain open to grazing by the cattle of the local people throughout the year subject to the following conditions. The Divisional Forest Officer may, by special order, close any or all the areas to grazing for specified period in :

(1) Any area of yong plantations.

(2) Any Sunkhola area.

For the purpose of keeping effective control over indiscriminate grazing and to enforce the above rules permits should be used by the Range and Beat staff wherever necessary, under the terms and conditions laid down in the revised schedule of rates (*vide* Appendix No. VII).

It may be mentioned that grazing is not harmful in plantations already established, *i. e.*, beyond the age of 5 years.

217. **Felling of Timber for Departmental use**—Whenever timbers are required for departmental constructions in any area within the Forest Division, arrangement should be made to collect the required quantity of timbers preferably from the annual coupes of the year.

It happens that there is no coupes near the construction site or that the required timber is not available in any coupe of that year, the Divisional Forest Officer may issue special order for felling in any part of the Forest Division to meet such an exigency. Marking should be done on the basis of selection system for the purpose.

218. **Fire Protection**—In recent years accidental or incendiary fires have turned out to be a serious problem (as already mentioned, *vide* para 42). The young plantations particularly in the northern forest subdivision (Baraiyadhala, Karerhat, Narayanhat, etc.) are facing fire-hazard almost every year. The damage due to fire is considerable. The intensity of damage is found to be more in species other than Teak, such as Garjan, Dhakijam, Gamar, etc., instances are known where plantations raised in some centres with the species like Garjan and Dhakijam have been almost entirely burnt due to accidental fire, when seedlings were 2 to 5 years old. Even after a serious burning Teak is found to recover well but not the other species.

Fire-incidences are also known in the other parts of the Division.

Hence, adequate arrangements should be made specially in the plantations centre for fire protection.

The following measures are suggested for fire-protection.

(1) Fire lines should be cut in the plantation area, wherever necessary, by the local staff as usual.

(2) Arrangements for fire-fighting should be kept in every Range or Beat where plantations exists, if necessary with the help of additional staff to be provided specially for the purpose.

(3) In every plantation centre at least 1 to 2 fire watchers shall be provided in addition to the sanctioned staff. The fire watchers thus provided would preferably be trained in fire fighting, by mutual arrangement with the Bangladesh fire-service authorities. A total of approximately 100 to 120 numbers of fire-watchers would be required for the purpose for the whole Division (as already included in the list of additional staff, *vide* Appendix XX). In case the fire-watchers proposed cannot be maintained for the whole year necessary sanction for maintenance of these fire-watchers may be obtained from the competent authority for maintatining them for a period of 3 to 4 months from January to April every year, *i. e.*, during the fire season.

(4) Fire-fighting equipments and trained fire-fighting squad should be developed and maintained, in due course, for all valuable areas.

219. **Roads and other lines of Export**—At present Chittagong Forest Division has good roads and paths for inspection and extraction of forest produce. The existing roads and paths should be maintained and efforts should be made to improve them.

220. **Improvement of Water-ways**—Little attention has hitherto been paid to the clearing of the parts of the streams within the Reserve Forests area which are suitable for floating bamboos. Such portion of the streams should be cleared periodically either by cutting or burning and all debris including fallen trees and stumps should be removed. The construction of dams should be encourged but all dams built for holding up water should be removed before the beginning of the rains. Such dams may be used for extraction of logs and sown timber by floating from areas which are otherwise inaccessible.

221. **Improvement of Water Supply**—Non-availabiltity of pure drinking water is a problem to the staff of this Division. However, tube-wells have been provided in most of the Range or Beat offices during the last plan period. It is proposed to have more tube-wells during the currency of this plan so as to cover all the Beats in remote areas. This is extremely necessary from the hygienic point of view and necessary fund for the purpose may be arranged for providing the required number of tube-wells during the currency of this working plan.

222. **Possible Development of Forest Industries**—Chittagong forests are rich in various reeds and grasses. A Pulp and Paper mill may be established to utilize these produce. Some more Hardboard and Plywood factories may be established to utilize the available raw materials.

223. **Buildings**—During the previous plan period there were 12Ranges in th s Division. For convenience of management the areas of the 12 Ranges have been divdied into 18 Ranges under this Working Plan thus 6 new Ranges have been created. Buildings for these 6 Ranges have to be constructed wherever necessary during the period of this working plan. The existing buildings should be maintained and improved.

224. **Maintenance of Boundaries**—The boundaries of the forests of Chittagong Division are very vast and difficult to maintain. A system of carefully located permanent survey points or "Forest Bench marks" has been introduced on the northern boundary of the Division. These bench-marks consist of ferro-concrete pillars, very carefully placed at convenient points for starting a boundary check survey. A full-fledged survey range is created for this work and work should be completed immediately. The entire boundary should be checked up by Chain survey at least once during this plan period. Action should be taken for recovery of any Govt. land under encroachment. Boundary pillars should be fixed at convenient places. Annually one-fifth of the Range boundary should be surveyed. A statement showing length of boundary surveyed in each range should be submitted to the Conservator of Forests, Eastern Circle.

225. **Survey of Plantations**—All clear-felling coupes must be surveyed as soon as possible. The areas covered by different species for mixtures of spp. should be surveyed in details. Maps should be prepared on 16 inches=1 mile for the Plantations Journals. The coupes should also be plotted on the 4″ inches=1 mile scale maps. Boundary maps should be prepared on 4″ inches=1 mile scale.

226. **Survey and Maintenance of Maps**—The boundary of the protected forests, vested forests and acquired forests are not well-demarcated and it is proposed that a thorough survey of these forests should be carried out and maps prepared. For Ghani's Plan a set of 1 inch=1 mile index maps and a set of 4″=1 mile "Aerial Survey" maps (with the boundaries brought up to-date according to the latest notifications) have been prepared. All these maps should be maintained properly.

227. **Inspection paths and plantations boards**—(1) Inspection paths should be maintained preferable all round the boundary of each annual pllantation. A narrow track should be kept diagonally through all plantations. All paths in a cutting section should be linked together so as to form a complete chain and must be kept passable.

(2) Boards bearing the calendar year in which the plantation was raised must be fixed at all corners and wherever inspection paths cut the boundary lines. Each board must be so fixed as to face the observer when he faces the plantation to which it refers. Arrows and other signs should not be used.

228. **Forest villages**—Since now-a-days, most of the plantations are raised by hired daily labours, on cash payment basis, it is proposed that fresh requirement of permanent forest villagers and establishment of new forest villages be totally prohibited during the currency of this plan. Since during the past the forest villagers have been found to indulge in illicit felling of timber and other producs and most of them are guilty of encroachent on adjoining Reserve forest areas beyond the limit fixed for allotment of cultivable lands to these villagers. The existing forset villagers should not be allowed to expand their individual occupation of land at the cost of the forest land. A list of forest villages in the control Form D (B. D. Form 1744) of the Working plan Manual will be maintained.

Appendix XV shows forest villages and number of villagers as per available records.

229. **Experimental work and research**—In the past no experiments on the growth rate of the principal indigenous species were carried out in this Division. Experiments are also necessary to asertain the best way of artificially regenerating the miscellaneous soft-hand-wood species and other valuable indigenous species.

It is proposed that experimental plots should be laid out in different places to study the growth rates of different species under regeneration and all other allied fields of studies. It is further proposed that spp. of tropical pines such as Finus oocorpa and P. caribeae etc. should be given experimental trial in the future palp-wood plantations for these long fibre pulp-wood spp. Methods of combating assamlata in plantation and afforestation of barren hillocks with suitable fast-growing Industrial species should also be investigated. Considerable damage is done to Simul plantations by porcupines and other rodents. It is proposed that an investigation to be carried out by the Forest Protection Division of F. R. I., Chittagong, to find out suitable means to combat this menace. Forest Research Institute should also investigate to find out the best use of several inferior species of trees now left out in the coupes but found in large number in our forests for better utilization of our forest wealth.

230. **Introduction of exotic species**—Exprimental plantation of oil-palm (Elasis guineses) was started under Silv. Research Division at Modhupur in May, 1966. In 1978-79 this spp. is being tried in several

entres under Silv. Research Division. It may be mentioned that recently experimental plantation of oil-palm (Elasis guineses) has been started in Chittagong Forest Division as well in Tarakhon Centre of (North Fatikchari) in Narayanhat Range over 29·0 acres to start with, with the seeds imported from Malayasia and that of our own plantations at Dabua Centre, Rauzan. This Centre is going to be a ful-fledged Range in due course with the object of raising 3,000·0 acres of oil, palm plantation considering the all round utility of these species and the excellent growth and fruiting that it has already shown in our plantations elsewhere.

It may also be mentioned here that experimental plantations of several varieties of Eucalyptus (already isolated in F. R. I., Chittagong) and a few species of Pines may now be tried in plantation conditions.

231. **Need of local flora**—There is no flora of the Chittagong area. Books which are most useful for the study of Chittagong flora are Prain's Bengal Plants. Kruz's Forest Flora for Burma, Brandi's Indian Trees and flora of Assam. Heining prepared his "List of Chittagong Plants" about 60 years ago. His list is fairly complete, but gives no description or keys by which plants may be identified, It is now proposed that a flora for the forests of Chittagong region be compiled as early as possible. It is also desirable that a revised edition of "List of Chittagong Plants" of Heining be published including records of such species which were omitted by Heining, with simple keys to aid in the identification of the principal species. It may be mentioned here that Mr. M. A. K. Khali's "Name changes in some plants of East Pakistan" (Bangladesh) is fairely usful Glossary for the Study of Chittagong Flora.

ESTABLISHMENT AND LABOUR (FOR EXECUTION OF THE PLAN PRESCRIPTIONS)

232. **Establishment**—The present sanctioned strength of the staff of Chittagong Division (as shown below) is not adequate to meet the present-day requirement. Due to the creation of 6 (six) new Ranges in the Division. With very little increase over the sonctioned strength of existing staff, it has become essential to provide sufficient additional staff at various levels. A statement showing the detailed list of staff supervisory, subordinate executive and ministerial staff required for successful execution of the prescriptions laid down in this Working Plan has been given in Appendix XX.

It may be mentioned that the list of the proposed staff also includes the required number of fire watchers specially provided for combating fire in plantations which is a regular feature during dry season. The requirement of supervisory and executive staff for the newly created Oil-palm Palntation Centre at Tarakon in Narayanhat Range has also been included in the proposed list of staff, *vide* Appendix No. XX.

The following statement shows the existing and proposed staff of Chittagong Division for facility of comparison :

I. Supervisory Executive and Clerical Staff of Chittagong Forest Division.

	Rank.	Existing as on 30-6-1979	Proposed additional staff.	Total.
1.	Divisional Forest Officer (Deputy Conservator of Forests).	1	..	1
2.	Additional Divisional Forest Officer, (Deputy Conservator of Forests).	..	2	2
3.	Subdivisional Forest Officer ..	2	1	3
4.	Assistant Conservator of Forests	3	4	7
5.	Senior Forest Ranger ..	1	11	12
6.	Forest Ranger	20	8	28
7.	Deputy Ranger	36	64	100
8.	Forester	63	117	180
9.	Head Assistant	1	..	1
10.	Accountant	..	1	1
11.	L. D. Assistant	18	7	25
12.	U. D. Assistant	..	5	5
13.	Jeep Driver	5	2	7
14.	Truck Driver	1	1	2
15.	Speed Boat Driver	..	2	2
16.	Pump Driver	..	1	1
17.	Tractor Driver	..	1	1
18.	Tractor Helper	..	1	1
19.	Mechanic	..	1	1
	Total ..	151	229	380

II. Forest Guards and Miscellaneous Subordinate Staff of the Division.

Rank.	Existing on 30-6-1979.	Proposed additional staff.	Total.
B. F.	151	229	380
20. Forest Guards	195	285	480
21. Office Peons/Dakwala/Ardertus ..	9	7	16
22. Range Orderly	18	4	22
23. Bungalow Chawkider	24	1	25
24. Boatman	9	1	10
25. Office Chawkider/Night Guard ..	1	..	1
26. Darwans	2	..	2
27. Patrol Guards	2	6	8
28. Fire Watcher (seaonal 3-6 months)	2	105	107
29. Mahut	3	..	3
30. Grass Cutter	3	..	3
31. Plantation Mali	38	62	100
32. Garden Mali	4	..	4
Total ..	461	700	1,164
Grand Total of the staff of Chittagong Division.	1,161		

As mentioned, the details of the proposed staff at every level, has been show in Appendix XX.

In this connection it may be mentioned that for effective supervision and control over the activities of subordinate executive staff and for frequent movement in the remote areas of the forest, it is proposed that the Headquarters of Subdivisional Forest Officer (North) and Subdivisional Forest Officer (South) be shifted as soon as possible to Mirersarai P. S. and Patiya Subdivision respectively of the civil district. Simultaneously the Headquarter of the Assistant Conservator of Forest attached to Divisional Officer should be shifted to Nazirhat for better Supervision and control over the surrounding area. Accommodation and other facilities for the A. G. F. already exists in Nazirhat. The staff required for the office of the Subdivisional Forest Officers and Assistant Conservator of Forest have also been provided and shown in Appendix XX.

It may be mentioned here that the selection of the site for Headquarters of Subdivisional Forest Officer of Chittagong Forest Division, as suggested above, has been made in conformity with the latest development in the Civil Administration for Chittagong District *i. e.* the Headquarter of Sadar (South) Subdivision (Civil) has already been shifted to Patiya and has started functioning. Similarly, all development activities including construction of several new offices and residential buildings of various Directorates are in progress at Mirersarai, obviously with the intension of shifting the Headquarter of Sadar (North) Subdivision (Civil) in future.

It is also proposed that an Assistant Conservator of Forest with attached staff shall be posted to the newly created Oil-palm Plantation Centre at Tarakon which will be treated as a full-fledged Range in due course, considering the importants of Oil-palm cultivation in the country.

233. **Labour**—Now-a-days most of the plantations and nursery works are done with hired labour on cash payment. The forest villagers wherever available can be used for raising plantations under Taungya system or Agro forestry practices. In both this cases the villagers are given subsidy in the form of cash or in kind.

The forest villagers are useful for providing labour particularly in inaccessible areas where plantations are raised or other forestry operations performed. Besides supplying labour for the Taungya system or Agro-forestry parctices, these villagers also contribute to the labour force required for Silvicultural operations like tending and thinning and for construction of roads and buildings.

It may, however, be mentioned that recruitment of new forest villagers of establishment of new forest village should be discouraged as far as possible, since the villagers have been found to indulge in encroachment in Reserve Forests and also in illicit felling of forest produce. Since most of the works are to be done on cash payment and the rates are also as per with the existing labour rates for similar works in the District, availability of labour should not be a problem for future forestry works, except in specific seasons or in specific localities.

Appendix XV shows the forest villagers and the number of villagers as per available records.

CHAPTER VIII

FINANCIAL FORECAST AND COST OF THE PLAN

FINANCIAL FORECAST

234. **Revenue**—Since the yield from different Working Circles is regulated entirely on area basis, it is impracticable to estimate the outturn of timber, bamboos and fuel-wood which furnished the largest portion of annual revenue. However, the following figures show the average revenue of the Division based on the actual of last five years from 1973-74 to 1977-78.

REVENUE

Statement Showing Financial Forecast

	1973-74	1974-75	1975-76	1976-77	1977-78	Total for 5 years
	Tk.	Tk.	Tk.	Tk.	Tk.	Tk.
1. Timber ..	34,06,471·00	27,20,679·46	28,15,205·34	31,94,102·14	59,32,573·67	1,80,69,031·61
2. Fire-wood ..	81,600·00	6,18,051·60	4,69,935·56	4,06,136·22	5,47,115·90	21,22,839·28
3. Bamboo ..	5,82,418·00	4,02,307·58	4,57,852·56	2,96,118·37	2,65,852·91	20,04,549·42
4. Others ..	10,59,296·00	7,82,951·58	12,79,942·44	19,92,107·14	6,95,040·47	58,09,336·63
Total ..	51,29,785·00	45,23,990·22	50,22,935·90	58,88,463·87	74,40,582·95	2,80,05,757·94

Grand Total Revenue of the Division for 5 years (1973-74 to 1977-78) = Tk. 2,80,05,757·94

235. **Expenditure**—The average expenditure of the Division based on the actual of last five years from 1973-74 to 1977-78 is given below:

EXPENDITURE

(I) B—Conservancy and Works:

	1973-74	1974-75	1975-76	1976-77	1977-78	Total
	Tk.	Tk.	Tk.	Tk.	Tk.	Tk.
1. Roads ..	19,000·00	15,000·00	17,000·00	26,000·00	38,500·00	1,15,500·00
2. Buildings ..	43,500·00	45,000·00	1,00,000·00	70,000·00	1,17,600·00	3,76,100·00
3. Plantation ..	2,65,000·00	2,03,000·00	1,39,300·00	1,20,830·00	2,21,250·00	9,49,380·00
4. Others ..	96,281·00	1,34,196·33	4,01,150·00	2,36,305·00	2,34,600·00	11,12,532·33
Total ..	4,23,781·00	4,07,196·33	6,57,450.00	4,53,135·00	6,11,950·00	25,53,512·33

Total .. B—Conservancy = Tk. 25,53,512·33.

(II) C—Establishment :

	1973-74	1974-75	1975-76	1976-77	1977-78	Total
	Tk.	Tk.	Tk.	Tk.	Tk.	Tk.
1. Pay and allowances	7,07,760·00	9,09,872·00	10,85,779·00	11,72,002·00	14,05,470·00	52,80,883·00
2. Others ..	38,749·00	25,650·00	20,624·00	18,742·00	58,041·00	1,61,836·00
Total ..	7,46,509·00	9,35,522·00	11,06,403·00	11,90,744·00	14,63,511·00	54,42,719·00

Total .. C—Establishment = Tk. 54,42,719·00.

(III) Development :

1. Roads ..	..	..	..	..	..	..
2. Buildings ..	11,500·00	3,90,000·00	11,26,400·00	8,32,500·00	6,44,500·00	30,04,900·00
3. Plantation ..	5,32,850·00	5,59,600·00	8,03,540·00	14,01,178·00	15 02,050·00	47,99,218·00
4. Others ..	..	1,10,000·00	1,96,752·00	2,02,000·00	2,43,900·00	7,52,652·00
5. Pay etc. ..	2,00,851·00	..	11,209·00	2,15,019·00	3,95,234·00	8,22,313·00
6. Others ..	19,000·00	..	12,575·00	63,127·00	43,750·00	1,38,452·00
Total	7,64,201·00	10,59,600·00	21,50,476·00	27,13,824·00	28,29,434·00	95,17,535·00

Grand Total expenditure of the Development = Tk. 1,75,13,769·33

This, Total Revenue for 5 years (Actuals) for the period 1973-74 to 1977-78		Taka 2,80,05,757·94
and Total expenditure 5 years (Actuals)	.. ..	Taka 1,75,13,769·33
	Hence the Surplus ..	Taka 1,04,91,988·61

From the above figures based on the actuals of last 5 years, it is expected that the estimated surplus may around Tk. 1,00,00,000·00 in next five years from 1978-79 to 1982-83. There may be variations in the figures for surplus depending on exigencies but it is expected that there would be no deficit under any circumstances particularly with improvement of working facilities including placement of additional staff and augmentation of grants under various heads.

236. **Cost of the Plan**—For the preparation of this Working Plan, enumeration of plantations of Chittagong Forest Division since inception was carried out in representative samples of 10%—20%. The work was started in 1976-77 and has been completed in 1978-79. The total expenditure comes to 43,849·47 Taka for field work. For collection of data, verification and checking of records of various Ranges and Beats, preparation of maps, statements and apportionment of areas to various working circles and regular and frequent discussion with the field staff, intensive tourings had to be undertaken by the Divisional Forest Officer and other executive staff of the Division throughout the whole year. The total expenses covered by payment of pay, T.A., D.A. etc. comes to 1,04,871·18 Taka.

Expenditure commenced from November, 1976 to June, 1979.

	Pay, etc.		Total.	Enumeration.	Other.	Total.	Grand Total.	Remarks.
	Pay	T.A.						
Divisional Forest Officer	40,523·54	13,490·53	54,014·21	..	..	..		
Driver	13,206·50	3,053·96	16,260·46	..	..	..		
Forest Ranger ..	12,890·90	7,272·63	20,163·53	..	..	..		
Deputy Ranger ..	3,718·02	2,296·84	6,014·86	..	..	..		
Overseer ..	..	..	..	2,070·00	..	2,070·00		
Works	..	..	..	40,968·96	810·50	41,779·46		
Total ..	77,301·11	27,570·07	1,04,871·18	43,038·96	810·50	43,849·46		

ABSTRACT

Pay etc. ..	77,301·11
T. A. etc. ..	27,570·07
Enumeration ..	43,849·46

Total expenditure = Tk. 1,48,720·64

= 049·38/58

Total area of the Division = Tk. 3,01,166·20

Expenditure per acre = Tk. 0·4938

Say Tk. 0·49

CHAPTER IX

CONTROL AND MAINTENANCE OF RECORDS

237. **Maps and Records**—The following books and maps should be maintained in order that all necessary and useful information may be easily available:

(1) Atlas of the Division, (2) Coupe Maps, (3) Block Histories, (4) Road Register, (5) Building Register, (6) Plantation journal including Thinning Records, (7) Control Forms.

238. (1) **Atlas of the Division**—A set of maps of the Division, 4 inches=1 mile, will be kept in the Divisional Office. In these maps will be entered all new reservations, exclusions, temporary base, etc., together with boundary pillars of forest bench marks, roads and buildings as they occur.

239. (2) **Coupe Maps**—Annual coupes shall be marked on block maps on a scale of 4 inches=1 mile. This applies to clear felling, selection felling, other fellings and climber cuttings.

240. (3) **Block Histories**—Standard forms 1, 2, 3, and 4 of Appendix III of the Working Plan Manual, 1959, should be used for Block Histories and should be written up annually.

241. (4) **Road Register**—The register will contain—

(i) a classified list of all roads, paths and lines with their serial number, name, if any, and length.

(ii) map showing the roads, paths and lines.

)or each road separately:

(a) Bridges and culverts, if any, with their serial number and span.

(b) Cost and date of original construction.

(c) Cost and date of repair with sufficient details.

(d) Additions and diversions with length, date and cost.

(e) Any other useful information not mentioned above.

242. (5) **Building Register**—Building should be numbered and informations supplied for each building under the following heads:

(i) Number, situation and short description with ground plan.

(ii) Cost and date of construction.

(iii) Cost and date of repairs with sufficient details.

(iv) Additions and alterations with date and cost.

(v) Any other useful informations not mentioned above.

243. (6) **Plantation Journal**—Plantation Journal of plantations raised under this plan should be properly maintained. For this purpose prescriptions made in paragraphs 127, 128, 152, 152 (A) and 176 (A) together with Calender of operations as per para 191 of this plan should be strictly followed. Under these detailed prescriptions a rough contour map and species to be raised is required to be prepared by April each year. Further the journals will include all the informations required as per form Nos. 11 to 16 of Appendix III of the Working Plan Manual, 1959.

244. (7) **Control Forms**—The control forms should be prepared in prescribed forms A, A-1, B and C given in Appendix III of the Working Plan Manual, 1959. The Range and Divisional Office will maintain these forms in bound books. Copies of these forms in loose sheets will be submitted to the Divisional Forest Officer, Working Plans Division, by December each year for checking together with the deviation statement in form No. 10 of the Appendix III of the Working Plan Manual, 1959. The deviation statement prior to submission to Divisional Forest Officer, Working Plan Division, should receive the approval of the Conservator of Forests, Eastern Circle.

245. **Prescriptions subject to control**—List of prescriptions subject to control are as follows:

(1) **Short Rotation Working Circle:**

(i) The yield paragraph 127 and in Form A.

(ii) Area planted, paragraph 143 and in Form C.

(iii) Climber cutting in plantations, paragraph 192 and in Form B.

(iv) Thinning in plantations paragraph 193 and in Form B.

(2) **Medium Rotation Working Circle:**

(i) The yield paragraph 152 and in Form A.

(ii) Area planted paragraph 168 and in Form C.

(iii) Climber cutting in plantations paragraph 192 and in Form B.

(3) **Long Rotation Working Circle:**

(i) The yield paragraphs 177, 178 and in Form A.

(ii) Area planted paragraph 194 and in Form C.

(iii) Climber cutting paragraph 192 and in Form B.

(iv) Thinning in plantations paragraph 193 and in Form B.

(4) **Bamboo Overlapping Working Circle:**

(i) Sequence of felling paragraph 202 and in Form A.

(5) **Miscellaneous Regulations:**

(i) Maintenance of boundaries paragraph 224 and in Form C.

246. **Certificate**—A certificate to the effect that records and maps named in items (1) to (7) in the paragraphs from 237 to 244 have been written up-to-date shall be furnished annually with the control forms.

CHAPTER X

SUMMARY OF PRESCRIPTIONS

247. **Summary of Prescriptions—**

(1) SHORT ROTATION WORKING CIRCLE:

(a) **Silvicultural System**—Clear-felling by artificial regeneration based on a conversion period of 15 years in the prescribed system for the circle (Paragraph 122).

(b) **Division into felling series and cutting section**—Eight felling series and 8 cutting sections are prescribed (Paragraph 124).

(c) **Allotment to Periodic Block**—11,252·00 acres area of this Working Circle is included in the Periodic Block I, the existing plantations up to 1978, *i.e.*, 2,454·75 acres have been allotted to Periodic Block II the rest 3,171·25 acres in the unallotted Periodic Block (Praragraph 126).

(d) **Regulation of Yield**—This has been described under Paragraph 127.

(e) **Yield from Periodic Block**—Annually one-tenth of the workeable area in each felling series, *i.e.*, 1,125·20 acres will be clear-felled (Peragraph 128).

(f) **Yield from the unallotted Periodic Block I**—No Yield is presribed from unallotted Periodic Block, *i.e.*, Periodic Block III (Paragraph 130).

(g) **Method of executing the felling**—The clear-felling coupes will be marked well ahead exploitation of all commercial forest produce should be completed by February every year. A regular plantation plan must be prepared well ahead. No clear-felling should be made on very steep precipitious ground. Adequate arrangement for labour must be kept ready (Paragraph 131).

(h) **Sequence of fellings in the Periodic Block I**—The area to be regenerated during the next 10 years, *i.e.*, 1978-79 to 1988-89 should be taken up systematically from one side of the area of clear-felling (Paragraph 132).

(i) **Removed of dead and fallen trees from unallotted area**—The removed of dead and otherwise fallen trees in left to the discretion of the Divisional Forest Officer (Paragraph 133).

(j) **Choise of species**—The species to be selected for raising plantations are shown on priority basis :

Location	Species for reforestation.	Species for afforestation.
(i) Suggested species for ridges.	Gamar, Minjiri, Koroi, Ipil ipil.	Minjiri, Koroi Gamar Ipil ipil.
(ii) Suggested species for slopes.	Kadam, E. Citriodora, Pynkodo, Gamar, Minjiri, Koroi, A. Molucanna, Ponyal, Ipil ipil.	Minjiri, E. Citriodora, Gamar, Koroi, Ipil ipil.
(iii) Suggested species for flates.	Pynkado, E. Citriodora Kadam, A. Molucanna, Ipil ipil.	Minjiri, Gamar, Koroi, Ipil ipil.
(iv) Suggested species for low flat.	Kadam, Pitali, Kanjal	Kadam, Pitali, Kanjal.

(*vide* Paragraph 135).

(k) **Plantation technique and nursery practice**—The importance of following the correct technique and presurvey of the plot for assessing the requirements of nursery stock, has been stressed (Paragraphs 137 and 138).

(l) **Cultural operations**—Weeding and clearing climber cutting and thinning in plantations are prescribed (Paragraphs 192 and 193).

(2) MEDIUM ROTATION WORKING CIRCLE:

(a) **Silvicultural system**—Clear-felling followed by artificial regeneration based on a conversion period of 30 years is prescribed system for this circle (Paragraph 148).

(b) **Division into felling series and cutting section**—11 (Eleven) felling series and 20 cutting sections are prescribed (Paragraph 150).

(c) **Allotment to Periodic Blook**—27,250·00 acres area of this circle is included in the Periodic Bloock I, the existing plantations up to 1978, *i.e.*, 14,828·54 acres have been allotted to Periodic Blook II, the rest 41,737·46 in the unallotted periodic block (Paragraph 151-A).

(d) **Regulation of Yield**—This has been described under Paragraph 152.

(e) **Yield from Periodic Block** I—Annually one-tenth of the workable area each felling series will be clear-felled (Paragraph 152-A).

(f) **Yield from the unallotted Periodic Block**—No yield is prescribed from unallotted Periodic Block, *i.e.*, Periodic Block III (Paragraph 154).

(g) **Method of executing the fellings**—The clear-felling coupes will be marked well ahead. Exploitation of all commercial forest produce should be completed by February every year. A regular plantation plan must be prepared well ahead. No clear-felling should be made on very steep precipitious ground. Adequate arrangement for labour must be kept ready (Paragraph 155).

(h) **Sequence of fellings in the Periodic Block** I—The area to be regenerated during the next 10 years, *i.e.*, 1978-79 to 1988-89 taken up systematically from one side of the area for clear-felling (Paragraph 156).

(i) **Removal of dead and fallen trees from unallotted area**—The removal of dead and otherwise fallen trees is left to the discretion of the Divisional Forest Officer (Paragraph 157).

(j) **Choice of species**—The species to be selected for raising plantations are shown on priority basis:

Location.	Species for reforestation.	Species for afforestation.
(i) For ridges ..	Garjan, Dhakijam, Chapalish.	Dhakijam Minjiri, Chapalish.
(ii) For slopes ..	Teak (for site quality III and above) Pynkado, Garjan Dhakijam, Kadam, Koroi, Toon, Chapalish and A. lebbek.	Pynkado, Dhakijam, Garjan, Koroi, Chapalish and A. lebbek.
(iii) For high flats ..	Kadam, Pynkado, Garjan, Dhakijam, Toon, Chapalish and A. lebbek.	Dhakijam, Koroi, Garjan, Toon, Chaplish and A. lebbek.
(iv) For low flats ..	Kadam, Pitali, Kanjal	Kadam, Pitali, Kanjal.

(*vide* Paragraph 159).

(k) **Plantation technique and nursery practice**—The importance of the following the correct technique presurvey of the plot for assessing the requirements of nursery stock has been stressed (Paragraphs 137 and 138).

(l) **Cultural operations**—Weeding and clearing, climber cutting and thinning in plantation are prescribed (Paragraphs 192 and 193).

(3) LONG ROTATION WORKING CIRCLE:

(a) **Silvicultural system**—The Sivicultural system will be clear-felling followed by artificial regeneration based on conversion period of 60 years (Paragraph 173).

(b) **Division into felling series and cutting section**—14 felling series and 23 cutting sections are prescribed (Paragraph 175).

(c) **Allotment to Periodic Blocks:** (i) *Prescribed yield.*—32,660·00 acres area of the working circle is included in the Periodic Block I, the existing plantations up to 1978—24,566·19 acres in the plantations Periodic Block and the remaining 143,246·01 acres area in the unallotted Periodic Block (Paragraph 176-A). There is provision for minimum permissible yield, in case prescribed yield is not removed under unavoidable circumstances:

(ii) *Minimum permissible yield*—16,330·00 acres of the workable area of this working circle is included in the Periodic Block I, the existing plantation up to 1978—24,566·19 acres in the plantations Periodic Block and the remaining 1,59,576·01 acres area in the unallotted Periodic Block (Paragraph 176-A).

(d) **Regulation of Yield**—This has been described under Paragraph 178.

(e) **Yield from Periodic Block I**—The yield is prescribed by area, one-tenth of the workable area or 3,266·00 acres to be cleared-felled annually (Paragraph 177).

(f) **Yield from unallotted Periodic Blocks**—No yield is prescribed the unallotted Periodic Block (Paragraph 181).

(g) **Method of executing the felling in the Periodic Block**—The clear felling coupe will be marked well ahead. Exploitation of all commercial forest produce should be completed by February every year. Regular plantation plan must be prepared well ahead. No clear-felling should be made on every steep precipitious grounds and areas so left are to be counted against the yield. Adequate labour should be kept ready before the starting of the plantation (Paragraph 155).

(h) **Sequence of felling in the Periodic Block I**—The area to be regenerated during the next 10 years should be taken up systematically from one side of the area for clear-felling (Paragraph 156).

(i) **Removal of dead and fallen trees from unallotted area**—The removal of dead and otherwise fallen trees is left to the discretion of the Divisional Forest Officer (Paragraph 157).

(j) **Choise of species**—The species to be selected for raising plantation are shown on priority basis:

Location.	Species for reforestation.	Species for afforestation.
(i) For ridges ..	Garjan, Chapalish ..	Garjan, Chapalish
(ii) For slopes ..	Teak (for site quality II and above), Chapalish, Champaful, Chikrassi, Garjan, Toow Civit, Uriam, Telsur, Pynkado.	Garjan, Chapalish, Toon, Telsur, Civit, Uriam, Pynkado, Koroi A. lebbek.
(iii) For high flats ..	Mehogany, Chapalish, Champaful, Chikrassi, Garjan, Toon, Civit, Uriam, Telsur, Pynkado.	Garjan, Chapalish, Toor Telsur, Civit, Uriam, Pynkado, Koroi, A. lebbek.
(iv) For low flats ..	Jarul, Kanjal ..	Jarul, Kanjal.

(*vide* Paragraph 186).

(k) **Plantation technique and nursery practice**—The importance of the following the correct technique and presurvey of the plot for assessing the requirement for nursery stock has been stressed (Paragraphs 188, 189 and 190).

(l) **Cultural operations**—Weeding, clearing, climber cutting and thinning are prescribed (Paragraphs 192 and 193).

(m) **Survey of the Periodic Block I and clear-coupes**—Demarcation of the Periodic Block I and survey of clear-felling coupes are prescribed (Paragraph 194).

03.10.18

(4) BAMBOO (OVERLAPPING WORKING CIRCLE):

(a) **Exploitation of bamboo**—A cutting cycle of three years is prescribed for all bamboos from 1978-79 [Paragraph 200(b)].

(b) **Sequence of felling**—A detailed list showing the sequence of felling is prescribed (Paragraph 202).

(c) **Cutting rules**--Eleven cutting rules have been prescribed (Paragraph 203).

(d) Under planting of bamboos, an important Prescription—(*vide* Paragraph 204).

(5) MISCELLANEOUS REGULATIONS:

(a) Extraction of small timber, firewood, sungrass, garjon oil, etc. have been prescribed (Paragraphs 205 to 211).

(b) Tending and maintenance of Sunkhola, *vide* Paragraph 209.

(c) Control and preservation of wild-life management of wild-life, grazing and fire protection have been prescribed (Paragraphs 213, 214, 216 and 218).

(d) Roads, water ways and water supply have been prescribed (Paragraphs 219 to 221).

(6) ESTABLISHMENT AND LABOUR:

(a) **Establishment**—A list of staff required, executive, clerical and menial is given (Paragraph 232).

(b) **Labour**—This has been described under Paragraph 233.

(7) FINANCIAL FORECAST AND COST OF THE PLAN:

(a) Financial forecast estimate of revenue, expenditure and surplus are given (Paragraphs 234 and 235).

(b) **Cost of the Plan**—Cost of the plan is given (Paragraph 236).

(8) CONTROL AND MAINTENANCE OF RECORDS:

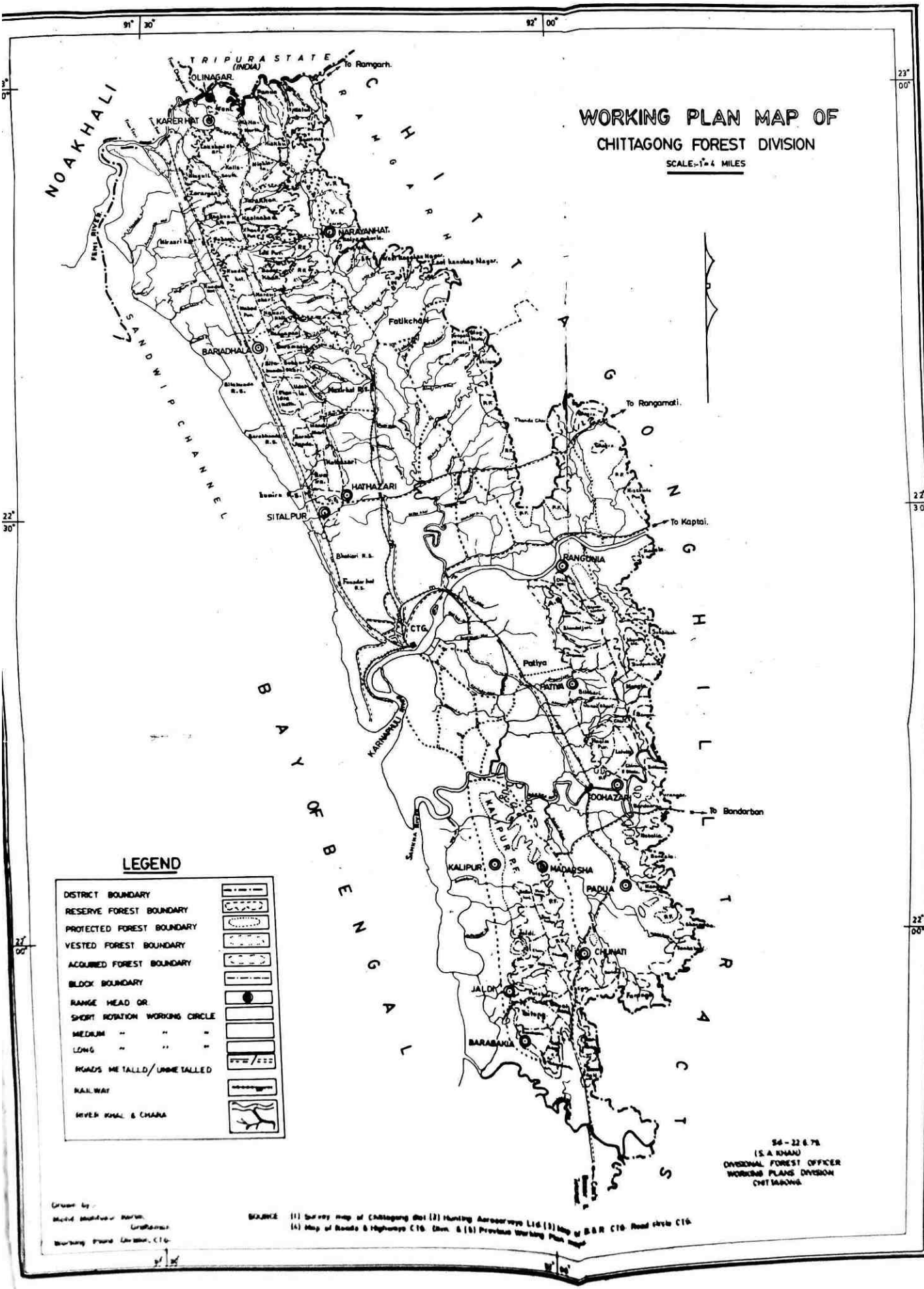
(a) A list of books and maps to be written up and maintained is given (Paragraphs 237 to 243).

(b) Control form should be annually compiled and submitted for checking (Paragraph 244).

(c) A list of prescriptions subject to control is given (Paragraph 245).

(d) Divisional Forest Officer is to furnish certificate annually that maps and books have written up (Paragraph 246).

BGP—81/82-7628B—500 Books


WORKING PLAN MAP OF
CHITTAGONG FOREST DIVISION
SCALE:- 1" = 4 MILES
TRIPURA STATE (INDIA)
To Ramgarh.
OLINAGAR
KARER HAT
NOAKHALI
FENI RIVER
SANDWIP CHANNEL
NARAYANHAT
Fatikchari
BARIADHALA
To Rangamati.
HATHAZARI
SITALPUR
To Kaptai.
RANGUNIA
CTG.
Patiya
PATIYA
KARNAPULI R.
DOHAZARI
To Bandarban
KALIPUR
MADARSHA
PADUA
CHUNATI
JALDI
BARABAKIA
BAY OF BENGAL
CHITTAGONG HILL TRACTS
LEGEND
DISTRICT BOUNDARY
RESERVE FOREST BOUNDARY
PROTECTED FOREST BOUNDARY
VESTED FOREST BOUNDARY
ACQUIRED FOREST BOUNDARY
BLOCK BOUNDARY
RANGE HEAD QR.
SHORT ROTATION WORKING CIRCLE
MEDIUM " " "
LONG " " "
ROADS METALLED/UNMETALLED
RAILWAY
RIVER KHAL & CHARA
SOURCE (1) Survey map of Chittagong dist (2) Hunting Aerosurveys Ltd (3) Map of B&R CTG. Road circle CTG. (4) Map of Roads & Highways CTG. Divn. & (5) Previous Working Plans maps
S6 - 22.6.78
(S. A. KHAN)
DIVISIONAL FOREST OFFICER
WORKING PLANS DIVISION
CHITTAGONG