MANUAL FOR EDITING AND TABULATION OF DATA FROM THE ITTO EXPERIMENTAL PLOTS
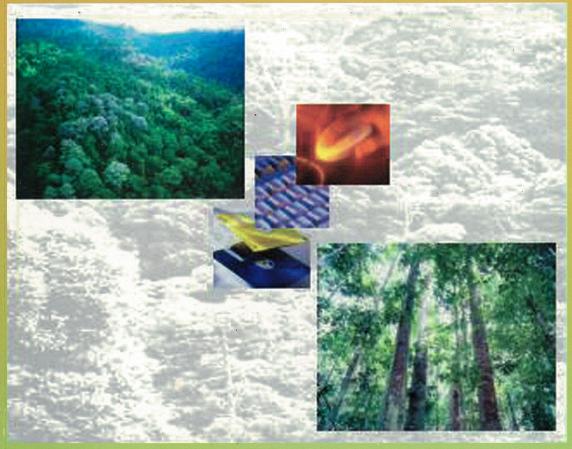
MANUAL FOR EDITING AND TABULATION OF DATA FROM THE ITTO EXPERIMENTAL PLOTS

Technical Report No. 2

ITTO/MAL/PD 24/93 Rev.2 (F)

FOREST MANAGEMENT OF NATURAL FOREST IN MALAYSIA

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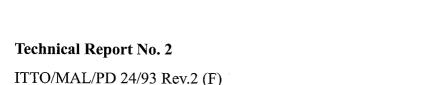Technical Report No. 2
ITTO/MAL/PD 24/93 Rev.2 (F)

Malaysian – ITTO Project on Forest Management of Natural Forest in Malaysia

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1. INTRODUCTION

This manual provides the instructions for using the computer processing programmes to edit, correct and tabulate the enumeration data collected in the four permanent plots established under the Joint Malaysia-ITTO Project PD 10/87 (F) "Forest Management of Natural Forest in Malaysia" and continued under Phase II, PD 24/93 Rev.2 (F). The four experimental areas are located in Sungei Lalang Forest Reserve in Selangor State; Lesong Forest Reserve in southern Pahang State; Kledang Saiong Forest Reserve in Perak State and Cherul Forest Reserve in southern Terengganu State.

The layout of the plots, the description of the treatments applied and the initial schedule of enumerations are given in two papers by the Forestry Department Headquarters: "Procedure for Establishment of Study Area in Virgin Forest" and "Procedure for Establishment of Study Area in Logged-over Forest" (Forest Department, 1993 a and b).

The instructions for the field enumerations are provided in Technical Report No. 1 "Manual for Enumerating the ITTO Experimental Plots" (Korsgaard, 2002a).

A previous version of this Manual for the data processing was issued in 1993 "A Manual for the Editing, Maintenance and Tabulation of Enumeration Data from the ITTO – Experimental Plots" (Korsgaard, 1993c). To supplement the Manual, a flow-chart for the computer processing was issued in 1995 (Korsgaard, 1995). As several of the computer programmes have been changed these earlier manuals are outdated.

During the first years of enumeration in 1990, 91, 92 and 93 the original set of instructions were used. These instructions were updated and enhanced in 1993. From the enumeration in 1994 and onwards the updated instructions have been used based on Technical Note No. 2 "Suggestion for the Enhancement of the Field Enumerations" (Korsgaard, 1993a). A reference to the original instructions and copies of the updated instructions are given in the "Final Project Report" for the first Phase (Forestry Department, 1994). The computer data files have been edited and follow the same layout and format, so the programmes can be used for both the old and new set of data. However, for the old data set some of the parameters were not scored as summarized below.

There is also a slight difference between the two sets of data from "Logging in Virgin Forest" and "Silvicultural Treatment of Logged over Forest". However from the year 2002 enumeration the instructions are the same.

1.1   Comparison between Old and New Data Sets

The wood quality group was introduced in these data sets in 1993 as part of the botanical identification and copied back into the older enumerations. From 1990 to 1993 the height was estimated as number of logs, with one log section being 5 meters. From 1994 onwards the clear bole height is measured/estimated in meters.

The correspondence between the different field cards of version 1 and 2 are given in Appendix D, page 96 in the Final Project Report for PD 10/87 (F) (Forestry Department, 1994)

The plot layout and system of enumeration was used under an FAO Project in Sarawak in 1976 (Hutchinson, 1982) and the corresponding system for data processing was originally developed by the consultant at the Forest Department in Sarawak under the same FAO Project during the period 1978 to 1982. (Korsgaard, 1982). The computer programmes were at that time developed in the programming language Business Basic. These programmes were converted into FORTRAN 77 by Sarawak Forest Officer Mr. Lai Kim Kuet during his studies at the Oxford Forestry Department in 1982. These converted programmes form the basis for the present set of programmes that have been continuously improved and updated.

Although the techniques of computer processing are in constant fast development, the programming language FORTRAN continues as an important language for constructing dedicated scientific programmes where high precision and flexibility is required.

It has been investigated if it would be an advantage to change the whole system into a Windows Based environment. Although it would be technically possible, the amount of time and programming work needed to maintain the same flexibility was deemed prohibitive within the budget and timeframe of the present ITTO Project. The Project has to be completed by the end of December, 2002.

Although the FORTRAN programmes require some training to use, they are efficient and flexible and provide the output needed for the analysis of the forest dynamics.

A flowchart outlining the sequence of the procedures and the linkages between programmes and files was given in a separate paper : Field Document 2.2 "Flowchart for Computer Processing of the ITTO Experimental Plots" (Korsgaard, 1995), *op. cit.*

Information/Parameter Measured/Scored	1990 to 1993	1990 to 1993	1994 to 2000	1994 to 2000	2002
	Logging in Virgin Forest	Silviculture in logged Forest	Logging in Virgin Forest	Silviculture in logged Forest	All Plots
Quadrat Stocked (STK)	No	No	Yes	Yes	Yes
Forest Class (FCL)	No	No	Yes	Yes	Yes
Treatment No. (TMT)	Yes	Yes	Yes	Yes	Yes
Block No. (BLK)	Yes	Yes	Yes	Yes	Yes
Quadrat No. (QDR)	Yes	Yes	Yes	Yes	Yes
Tree No. (NOS)	Yes	Yes	Yes	Yes	Yes
Tree Identity Class (SIC)	No	No	Yes	Yes	Yes
Wood Quality Group (WQG)	(No)	(No)	Yes	Yes	Yes
Botanical Code (BOT)	Yes	Yes	Yes	Yes	Yes
Diameter (DBHob)	Yes	Yes	Yes	Yes	Yes
Height (HG)	(Yes)	(Yes)	Yes	Yes	Yes
Log grade (LG)	Yes	Yes	Yes	Yes	Yes
Crop Tree Status (TS)	No	Yes	No	Yes	No
Crown Form (CF)	No	Yes	Yes	Yes	Yes
Crown Illumination (CI)	No	Yes	Yes	Yes	Yes
Stem Damage (SD)	Yes	No	Yes	Yes	Yes
Crown Damage (CD)	Yes	No	Yes	Yes	Yes
Woody Climbers (CL)	No	No	Yes	Yes	Yes

2. List of Programmes

This section lists the FORTRAN programmes in use in 2002 and documented in this technical report.

The programmes previously used for management of raw data from the 1990 to 1993 enumerations, using field card version 1, are documented in Korsgaard (1993c). All existing files are converted to the 1994 ITTO format.

Programme name	Function
Listing and Misc. Programmes	
ITCRTSRP.FOR	Create a small test file. Used in programme development.
ITLIST.FOR	Make a listing of any ASCII file, on screen, printer or data file.
ITLSFILE.FOR	Make a printed list of the data- file containing field enumerations.
ITLINO.FOR	Insert record number in data files.
File Editing programmes	
ITLSBLCK.FOR	Lists the treatment and block numbers and the number of Quadrats.
ITQDRNEW.FOR	Creates a small data file containing treatment no., block no. and number of Quadrats for use by ITQUCHCK.
ITQUCHCK.FOR	Check the correct sequence of Quadrats, check stocking and forest class codes and tree numbers.
ITEDIT.FOR	The main editing programme for record by record checking and error listing for field cards version 1 data from 1990 to 1993.
ITEDITV2.FOR	The main editing programme for record by record checking and error listing for field cards version 2 data from 1994 onwards.
Correction programmes	
ITINDEX.FOR	Create a key index to a data file. Used by ITCORR, ITGROWTH and ITGRORAT.
ITCORR.FOR	The main record by record error correction program.

ITMASCOR.FOR	Correct systematic errors or changes in a data file.
ITSPPDBH.FOR	Transfers botanical species codes and missing diameters from one enumeration to another.

Programmes for Production of Output Tables

ITFCLQNO.FOR	Produces table of Forest Classes.
ITSIC.FOR	Produces table of Tree Identity Classes.
ITTABSTD.FOR	Produces general and special stand tables by selected parameters (not by species).
ITTABWQS.FOR	Produces stand tables by species.
ITTABWLD.FOR	Produces stand tables for planted wildlings.
ITHEIGHT.FOR	Produces table of tree heights by diameter class.
ITSPSUM.FOR	Summary table of number of species found in selected data files.

Programmes for Growth and Yield

ITGROEDT.FOR	Used for growth edit checking of up to 5 different enumerations of the same plot for inconsistencies in the tree enumerations.
ITGROWTH.FOR	The main growth programme giving diameter increments, basal area increments and morality. It also produces an error list for growth editing.
ITGRORAT.FOR	Tabulates diameter increments by mean annual growth rates.
ITINGROW.FOR	Tabulates new recruits (ingrowth).
ITSELECT.FOR	Select variables to be written to a special data file for analysis by a statistical programme package.

Standtable Projections

(The manual for the stand table projection simulation model is given in Technical Report No. 3)

STANDPRO.FOR	The stand table projection simulation model.
CRCOMSIM.FOR	Creates a command file for running STANDPRO.

3. Computer Programme Instructions

This section suggests a standard setup for the processing system using the FORTRAN programmes running under the DOS operating system on a computer that normally runs under Microsoft WINDOWS.

It then gives the instructions for using the data processing programmes for editing of the data files and for the production of output tables such stand and stock tables and tables for diameter increment and mortality and the amount of new recruits.

Before the data is entered into the computer files, the field cards must be thoroughly checked manually according to the "Manual of Instructions for Enumerating the Permanent ITTO Experimental Plots" (Korsgaard, 1993b). The entry of the data from the checked field cards into the computer is best done by experienced staff from the Forestry Department.

If possible, it is advisable to have the data entry verified by entering the data twice by two independent keyboard operators. In this way the amount of data entry errors are minimized.

The layout of the data files must follow exactly the layout of the field cards. The first few programmes given below are used to check and edit the data files for errors before producing output tables for analysis.

3.1 Computer Setup for Data Processing

The following suggestion for the setup is based on the DOS operating system on a IBM compatible Personal Computer for the WINDOWS operating system.

The setup outlined below, for the FORTRAN programme development environment and production running, is suggested as the standard setup as presently implemented on the computers allocated to the ITTO Project at the Unit of Forest Management and Unit of Silviculture at the Forestry Department H.Q. in Kuala Lumpur.

3.1.1   Organization of Directories

It is recommended to organize the directory structure as follows :

```
C:\                  The root directory

 |
 |— FORT             The FORTRAN directory containing the subdirectories
 |
 |
        |___ BIN                Contains the FORTRAN compiler etc.
        |
        |___ LIB                Contains the FORTRAN complier libraries
        |
        |___ INCLUDE            Contains FORTRAN include files
        |
        |___ TMP                Contains temporary files during compilation
        |
        |___ ITPROG             Contains the user written FORTRAN pro
        |                       grammes source code (*.FOR), executable
        |                       programmes (*.EXE), support data files (*.DAT).
        |
        |___ LALANG             Contain the field enumeration data files for the four
        |     LESONG            experimental areas (trees/poles, (saplings, seedlings) and
        |—— KLEDANG             wildlings), and the decimal dates of enum eration used for
        |—— CHERUL              growth and mortality calculations
        |                       (??DATES.DAT).
        |
        |—(CHBLK02)             Additional subdirectories to contain raw data
        |                       files from the enumerations  block by block.
        |
        |                       Contains the Standtable Projection Simulation
        |——FSIM                 Model (STANDPRO) and the input data files for
        |                       the projections.
        |
        |___ etc.
```

3.1.2   Batch-files for Easy Processing

Using a number of small Batch-files (*.BAT) stored under the Root or FORT Directory (C:\ or C:\FORT:\) eases the starting of the FORTRAN processing session and the movements between directories under programme development and data analysis.

In order to get the FORTRAN compiling and processing system to work, the Batch-file STARTFOR.BAT must be run first as it redefines the Path and computer environment needed by FORTRAN. This Batch-file should be copied to the directory that appears when the DOS-Prompt is activated from WINDOWS.

The **STARTFOR.BAT** file contains these or similar statements:

```
@ECHO OFF
SET LIB=C:\FORT\LIB
SET TMP=C:\FORT\TMP
SET INCLUDE=C:\FORT\INCLUDE
PATH=%PATH%;C:\FORT:\;C:\FORT\BIN;C:\FORT\ITPROG;C:\
DOSKEY
CD\
CD C:\FORT
```

TREE

The other useful Batch-files are :

FORT.BAT :

```
@ECHO OFF
CD C:\FORT
```

ITPROG.BAT :

```
@ECHO OFF
CD C:\FORT\ITPROG
```

LALANG.BAT : (Similar for Lesong, Kledang and Cherul)

```
@ECHO OFF
CD C:\FORT\LALANG
```

FSIM.BAT :

```
@ECHO OFF
CLS
CD C:\FORT\FSIM
```

EXIT :   To return to the normal WINDOWS system.

3.1.3   How to get Started

Having started the computer and the peripherals, select the DOS Prompt from the Windows screen. The FORTRAN session for either programme development or data proccessions begins with running the STARTFOR.BAT batch file that redefine the environment for FORTRAN processing :

C:\>STARTFOR

To get to the data directory and start processing, run this batch file :

C:\FORT>**LALANG**   : Go to the data file directory.

or :

C:\FORT>**FSIM**   : For Standtable projections.

Then start the processing by running the relevant programme :

C:\FORT\LALANG>**ITTABSTD**   : To produce stand tables, etc.

To get to the FORTRAN programme directory to amend the programmes or to develop new ones or to update support data files:

C:\FORT>**ITPROG**

Having finished the processing either shut down the computer, or if some non-FORTRAN work is required type this command:

C:\FORT\CHERUL>**EXIT**   Exit DOS and return to WINDOWS.

3.2   *Preparations for Editing*

New enumeration data is normally entered from the field cards block by block. It is important to check the raw data before continuing. Check that the records are exactly 40 bytes in length and that there are no imbedded blanks or blank lines as this will cause problems during editing and processing. The WORDPAD program can be used to check the file. Hold down the 'shift' key while scrolling through the whole file, embedded blanks and blank lines and other funny things will show up clearly. Correct any errors before continuing.

When the raw data from the individual blocks have been checked successfully the blocks must be joined together to form the complete data file by treatment for continued processing. This is easily done by the DOS COPY command. For example Treatment 01 in Sungei Lalang consists of 4 blocks 3, 6, 21 and 28. The following command will merge the blocks to create the treatment file for trees/poles SLTMT01.921:

C:\FORT\LALANG>COPY SLBLK03.921 + SLBLK06.921 + SLBLK21.921
                + SLBLK28.921 SLTMT01.921

The file naming conventions are explained in Technical Report No. 1:

- First two letters: Location name,
        SL = Sungei Lalang,   LE = Lesong
        KS = Kledang Saiong,   CH = Cherul

- The next three letters are BLK = Block or TMT = Treatment

- The next two digits are either the block number or the treatment applied:

"Logging in Virgin Forest":

        01 =   CUT ALL > = 30 CM
        02 =   CUT ALL > = 45 CM
        03 =   CUT DIPT>=35/ NON-DIP.>=30 CM
        04 =   CUT DIPT>=50/ NON-DIP.>=45 CM
        05 =   CUT DIPT>=65/ NON-DIP.>=60 CM
        06 =   CUT DIPT>=75/ NON-DIP.>=70 CM
        07 =   CUT ALL>=30 CM/PLANT WILDLING
        08 =   NO LOGGING, VIRGIN CONTROL

"Silvicultural Treatment of Logged-over Forest":

11 =	CLIMBER CUTTING (CL)
12 =	GIRDLING + CLIMBER CUTTING (GCL)
13 =	GCL (+ ENRICHMENT PLANTING)
14 =	CUT ALL>=30 CM/PLANT WILDLING
15 =	CONTROL, LOGGED, NOT TREATED
16 =	ENRICHMENT PLANTING

- The '.' dot is needed as a separator.

- The next two digits is the year of enumeration: 92 for 1992, 00 for year 2000, 02 for year 2002 etc.

- The last digit is the contents of the file, trees/poles   = 1

                                                   wildlings   = 4

Before continuing, it is a good idea to check the combined treatment file for embedded blanks and blank lines once more using the WORDPAD program. When the file is checked OK, the editing process can begin.

3.3   *Programmes for Data Editing and Listing File by File*

3.3.1   ITCRTSRP.FOR

This programme is used to create a small test file from a main data file. This is useful for checking that the files, after data entry, are in the proper format and ready for editing.

A small test file is also useful during programme development when errors in the programme may damage the original data file.

Input: A main data file containing trees/poles or wildlings.

Commands:

CREATE A SMALL TESTFILE. FILENAME=

                Give the required filename.

HOW MANY LINES ?

                Give the number of lines needed, f. ex. 100.

Output :   A test file with filename beginning with TS

Copy the test file to the required directory where needed.

3.3.2 ITLIST.FOR

This programme is used to list data files on the screen as a printout on paper or to a new disk file. Use this programme to list a data file on the screen to check that the file is in good working order and that the record length is correct and that the parameters are in the right columns. In case of serious problems check with those who did the data entry and check that the instructions were followed.

The programme will list any ASCII (DOS) data file.

Input: Any ASCII data file.

Commands:

THIS PROGRAM LIST ASCII-FILES GIVE FILENAME :

> Give the filename.

GIVE TOTAL RECORD LENGTH :

> Give the record length of the data file if known. Else give the length as 76 so the output will fill the screen and count the record length from there.

GIVE LENGTH OF CODE NUMBER :

> Give the length of the code number if used. For the species list it is 5 digits. Else give 0 if a code number is not included.

GIVE SIZE OF DESCRIPTION :

> Give the number of bytes for the rest of the record. For the species list it is 61. Else give the size equal to the total record length.

LISTING ON SCREEN   = 1
LISTING ON PAPER   = 2
NEW DISKFILE   = 3

> Answer as appropriate.

> When the screen is full this command appears:

TO CONTINUE = 1 FINISH = 2

> Answer as appropriate.

> When a list to a new disk file is requested the filename

must be given :

GIVE NEW FILENAME :

Give the filename of a new file.
When the listing is finished this question appears :

ANOTHER LIST   = 1
ANOTHER FILE   = 2
FINISH   = 3

Answer as appropriate.

Output   : A list of the file on the screen or
a list of the file on the line printer or
a new disk file.

3.3.3   ITLSFILE.FOR

This programme is used to produce a hard copy listing of the data files on paper
(A4) for checking and safekeeping. It can also be useful during editing when
unexpected errors occur like when codes are keyed in the wrong columns.

This is the only programme that tabulates the quadrat information gathered
during the first years of enumeration 1990 to 1993. There is no checking on the
quadrat file, this must be done manually. Statistical programme packages can
then be used to make frequency distributions, means etc. of the information as
required. From the enumeration in year 2002 and onwards only the two file
types for trees/poles and for wildlings are maintained.
Input: An enumeration data file: Quadrats, trees/poles, saplings, seedlings
or wildlings.

Support data file:The species list, SPECIES.DAT

Commands:

THERE ARE 4 TYPES OF DATA FILES AND
3 TYPES OF QUADRAT FILES:

DATA FILE FOR TREES/POLES   = 1
DATA FILE FOR SAPLINGS   = 2
DATA FILE FOR SEEDLINGS   = 3
DATA FILE FOR PLANTED WILDLINGS   = 4

QUADRAT FILE FOR LOGGING IN VIRGIN FOREST= 5
QUADRAT FILE FOR SILV. TRMT. OF LOGGED FOREST = 6

Give the number corresponding to the type of file to be listed.

INPUT FILENAME FOR LISTING:

Give the file name.

Output: A printed list of every record in the file.

3.3.4   ITLINO.FOR

This programme inserts a consecutive record number in the first 5 bytes of each record in the main data files (trees/poles, saplings, seedlings or wildlings). This programme must be used to insert the record number before the start of editing.

When, during editing, records or blocks of records (like misplaced Quadrats, trees etc.) have been moved or deleted, remember to **renumber** the data file by running this program before continuing work on the data file.
Input: A main data file.

Command:

INPUT FILENAME: (FX: SLTMT05.921)

Give the filename.

Output: A renumbered main data file, filename unchanged.

Having made sure that the file is properly organized and that record numbers are inserted, the file is ready for the editing process.

The editing process consists of a number of steps to check errors of different kinds in the file. The procedure has been developed through "trial and error the hard way" since 1978 and has now proven very efficient to detect some very tricky errors usually overlooked by normal "one-pass" edit programmes.

It is important to do one step at a time and to ensure that all errors listed are properly checked against the field cards and corrected as required before proceeding to the next step.

3.3.5   ITLSBLCK.FOR

This is the very important first edit check.

The programme lists the number of Quadrats per block per treatment.

Check that the blocks are listed in the correct ascending order.

IMPORTANT: Any discrepancies in number of Quadrats must be checked, f. ex. by ITQUCHCK, and corrected before editing continues. Refer to Appendix III for a list of treatments and corresponding block numbers per research area.

Several types of errors have been found such as:

> The file has not being properly organized by treatment, by block and by quadrat in the right sequence;
> the columns are shifted in the middle of the file;
> the field crew forgot to fill in the code or used a wrong code; or
> typing errors during data entry.

Input: A main data file, trees/poles or wildlings.

Command:

INPUT FILENAME: (FX: SLTMT04.921)

> Give the filename

Output: A printed list giving treatment no., the block numbers and the number of Quadrats.

3.3.6   ITQDRNEW.FOR

This programme is used during initial editing after ITLSBLCK, when the number of Quadrats per block per treatment is correct. The programme creates a file containing the treatment no., block no. and quadrat no. in correct sorted sequence for use by the ITQUCHCK programme.

NOTE: This programme uses three filenames to contain the output. There are 3 options.

<div align="center">Filename</div>

- layout for trees/poles and wildlings   *******.QTR

- layout for saplings   *******.QSA

As this programme is used to create quadrat lists for several types of layouts, it is important to have a clear and correct idea of the layout and numbering system of the treatments, blocks and quadrats or planting lines before running the programme (See Appendix III and Technical Report No. 1). Use ITLIST or DOS EDIT to list the result to check that the numbers and their sequence are correct.

Input: There is no input file

Commands:

>>> I. ΓQ D R N E W <<<

THIS PROGRAM CREATES A TRMT-BLK-QDR/LINE -FILE

PLOT LAYOUT FOR TREES/POLES/WILDLINGS	= 1
LAYOUT FOR SAPLING SUBPLOTS	= 2
OR LAYOUT FOR SEEDLING SUBPLOTS	= 3:

Give number corresponding to the layout.

GIVE FILENAME FOR TREATMENT PLOT (NO EXTENSION)
        F. ex.: SLTMT01:

Give the filename.

HOW ARE THE QUADRATS ARRANGED?
CONSECUTIVELY (IN SQUARE PLOTS OR PLANT. LINES) = 1
 INDIVIDUALLY (LIKE SAPL. /SEEDL. SUBPLOTS)   = 2:

For trees/poles and for the plantation and enrichment planting plots the blocks contain either 25 Quadrats or 17 or 10 planting lines respectively.

The saplings and seedlings are enumerated in 9 central Quadrats and has the quadrat numbers from 26 to 34 and from 35 to 43 respectively.

Give the number (1 or 2) as required.

GIVE THE NUMBER OF QUADRATS/PLANT LINES:
TREE/POLES HAS 25 QUADRATS PER PLOT
PLANT LINES EITHER 17 OR 10 LINES:

Answer as appropriate.

- Section creating quadrat file for tree/poles and wildlings:

GIVE TREATMENT NO AND FIRST BLOCK NO
F. ex. SLTMT02: 2, 01

> Refer to Appendix III to find the block numbers per
> treatment and check with the output from ITLSBLCK.

ARE THERE MORE BLOCKS (Y/N)?
(YES, USUALLY MORE F. ex.: BLOCK= 02, 13, 21, ETC)

> Answer Y or N as required

GIVE NEXT BLOCK NUMBER:

> Give only one block number at a time.

- Section creating quadrat file for the sapling and seedling subplots:

GIVE THE FIRST AND LAST SUBPLOT NOS:
F. ex. SLTMT03 SAPL: 26, 34 OR SEEDL: 35, 43)

> Give the subplot quadrat numbers.

GIVE TREATMENT NO AND FIRST BLOCK NO
F. ex. SLTMT02: 2, 01

> Refer to Appendix III to find the block numbers per
> treatment and check with the output from ITLSBLCK.

ARE THERE MORE BLOCKS (Y/N)?
(YES, USUALLY MORE F. ex.: BLOCK= 02, 13, 21, ETC)

> Answer Y or N as required

GIVE NEXT BLOCK NUMBER:

> Give only one block number at a time.

Output: An internal disk file containing a correct list of treatment no., block
numbers and quadrat/plant line numbers.

YOUR TRMT/BLK/QDR FILE IS NAMED: (f. ex. SLTMT01.QTR)

DO YOU WISH TO CREATE ANOTHER QUAD. FILE (Y/N)

> To continue with another creation or stop.

3.3.7   ITQUCHCK.FOR

This programme is the very important next step in the editing process. The program checks that all Quadrats are present in the correct sorted sequence and that, within each quadrat, every tree number occur only once, and that empty Quadrats contain only one record with the correct stocking code. It is also checked that the Forest Class does not change in the middle of a quadrat.

The programme detects very tricky errors involving double tree numbers, duplicated records and cases where two forest classes are found in the same quadrat, which may - in fact - be due to incorrect quadrat numbering or field cards misplaced during data entry. These and other errors are very difficult to detect otherwise and they have previously given serious trouble when running the ITGROWTH program.

Input: A main data file, trees/poles, saplings or seedlings.

Command   :

INPUT FILENAME: (F. ex.: SLTMT01.921)

                Give filename as required.

Output: A printed list containing a list of all the Quadrats in the data file indicating errors if any and a list of missing Quadrats, and a list of all records in Quadrats where errors are found.

NOTE: It is very important that all errors are checked and corrected before editing continues, Rerun the ITQUCHCK programme until no more errors are listed, and a clean quadrat list is printed.

3.3.8   ITEDIT.FOR

The editing programme ITEDIT is used to check data from the earlier enumerations where field cards version 1 were used, *i.e.* the enumerations from 1990 to 93 inclusive. Run this program after the codes have been updated and the Quadrats have been checked. It will produce a list of illegal codes, codes not found and other inconsistencies in the file as well as warnings for unusual code numbers. Some errors listed must be corrected whereas other errors or inconsistencies cannot be corrected or are in fact OK or do no harm.

After correction, rerun the ITEDIT programme to check for remaining errors.

Input: A main data file, trees/poles, saplings, seedlings or wildlings.

Command:

INPUT FILENAME: EX. SLTMT03.921

Give filename.

There are two different types of plots, 'Logging in Virgin Forest' and 'Silvicultural Treatment of Logged-over Forest'. Since some of the parameters are scored differently in the two different sets of data, it is required to give the information as to which data set needs editing:

LOGGING OF VIRGIN FOREST   = 1
SILV. TRMT OF LOGGED OVER FOREST = 2:

Answer as appropriate.

Output: A printed list of all the records that need to be checked, with a message of the possible error. However, the actual error may not be the one flagged, but may lay elsewhere in the record. Check against the field cards from this and previous enumerations and use the imagination.

NOTE: If records/trees have been deleted or rearranged, remember to renumber the data file by running ITLINO before continuing work on the file.

3.3.9   ITEDITV2.FOR

The editing programme ITEDITV2 is used for the enumerations using field cards version 2, *i.e.* the enumeration from 1994 onwards. Run this program after the codes have been updated and the Quadrats have been checked. It will produce a list of illegal codes, codes not found and other inconsistencies in the file as well as warnings for unusual code numbers. Some errors listed must be corrected whereas other errors or inconsistencies cannot be corrected, do no harm or are in fact OK.

After correction, rerun the ITEDITV2 programme to check for remaining errors.

Input: A main data file, trees/poles, saplings, seedlings or wildlings.

Command:

INPUT FILENAME: EX. SLTMT03.941

Give filename.

There are two different types of plots, 'Logging in Virgin Forest' and 'Silvicultural Treatment of Logged-over Forest'. Since some of the parameters

are scored differently in the two different sets of data, it is required to give the information as to which data set needs editing.

NOTE: From the 2002 enumeration and onwards all plots are enumerated as for 'Logging in Virgin Forest'

LOGGING OF VIRGIN FOREST = 1
SILV. TRMT OF LOGGED OVER FOREST = 2:

Answer as appropriate 1 or 2 for enumerations from 1994 to 2000 and 1 for all enumerations from 2002 onwards.

Output: A printed list of all the records that need to be checked, with a message of the possible error. However, the actual error may not be the one flagged, but may lie elsewhere in the record. Check against the field cards, also from previous years, and use the imagination.

NOTE: If records/trees have been deleted or rearranged, remember to renumber the data file by running ITLINO before continuing work on the file.

NOTE: It might be necessary to change or update this programme if the instructions or the variables are changed for new enumerations.

3.4   Programmes for File Corrections

3.4.1   ITINDEX.FOR

This programme is used to create an index-file to a main data file containing, treatment no., block no., quadrat number and start record for each quadrat in a main data file. The index file XQ*****.*** is used by ITCORR, ITGROWTH and ITGRORAT.

NOTE: Before running this programme the file must be properly numbered by the ITLINO programme, as the index gives the start record of each quadrat in the file.

Input: A main data file.

Command   :

INPUT FILENAME: (EX: SLTMT03.921)

Give file name.

Output: An index file XQ... to a main data file, where ... is the remainder of the filename taken from the main data file.

3.4.2 ITCORR.FOR

This programme is used to make error corrections in the data files during editing. It will normally work on a record by record basis, but it is also possible to look for a treatment/ block/quadrat number or to list/print all records of a quadrat for checking.

Try the programme on a test file first to get acquainted with how it works as the programme replaces the erroneous records in the data file with the corrected record. For treatment/ block/ quadrat access mode the index file XQ --- to a data file is required, see program ITINDEX above.

Input: A main data file, trees/poles, saplings, seedlings or wildlings.

The corresponding index files XQ—-

Commands:

        OPTIONS:
            CORRECTION WORK   = 1
        DELETE MARKED RECORDS = 2

            For normal correction work select option = 1.
            To delete records already marked for deletion, select option = 2.

        GIVE FILENAME:

            Give filename

        GIVE ACCESS MODE:
        RECORD NUMBER   = 1
        OR TRMT/BLK/QUAD   = 2

        If the work only requires record by record correction select access mode = 1.

        However, if it is needed to list a whole quadrat to check forest classes or tree numbers etc. then select access mode = 2. When access mode = 2 is selected, the XQ — file must exist.

        Having selected mode of access the actions to be taken are requested:

            ACTION:
            FINISH   = 0, 0

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```
LIST RECORD            = LN, 1
CORRECTION             = LN, 2
SAME CORRECTION        = LN, 3
LIST QUADRAT           = 0, 4
PRINT QUADRAT          = 0, 5
MARK RECORD DELETE = LN, 5
GIVE: RECORD-NUMBER (LN), ACTION
```

For corrections select action: LN, 2
For example if record 5 needs to be corrected answer: 5, 2

The line is listed:

          00005143501010020111164300022514112l

GIVE: START-BYTE, END-BYTE, 'CORRECT-STRING'

For example to correct an error in species code, column 24 to 26:

          24, 26,'203'
          0000514350101002011116420302251411211

If the same correction is needed in other records for example the species code in record 14 has the same error as no. 5, then give:

          14, 3
          000141225010100502111643000102075221
          0001412250101005021116420301020752211

To delete records, the record is first marked delete by action: LN, 5:

The word DELETE is inserted in the record. When all records have been marked for deletion give action 0,0 to finish and then the following options are given :

```
          CHANGE MODE OF ACCESS   = 1
          ANOTHER OPTION          = 2
          ANOTHER FILE            = 3
          END OF SESSION          = 4
```

          Select ANOTHER OPTION = 2 and select
          DELETE MARKED RECORDS = 2

The file is read through and the records **not** marked delete are transferred to a new file. When that is done use DOS to delete the original file and then rename the new file to the original filename. Then rerun the ITLINO and ITINDEX programmes.

When ACCESS MODE : TRMT/BLK/QUAD = 2 is selected, it is possible to list or print a whole quadrat to check for errors affecting other records in the quadrat, like errors in Forest Class, by selecting

ACTION:
LIST QUADRAT = 0, 4 or PRINT QUADRAT = 0, 5

The commands 0, 4 or 0, 5 will result in this question

GIVE TRMT, BLK, QUAD NUMBER:

For ex. to list quadrat 14 in block 3 of treatment 1 give:

1,3,14

The quadrat is listed or printed:

00346142301030140111175101010165054111
00347142301030140211171718020262104222
00348142301030140311189102018565065211
00349153201030140411170000012208321 <— error in FCL
00350142301030140511175101010182084312
00351142301030140641390012010000000000
00352142301030140741390012010000000000

ANOTHER QUADRAT = 1, CORRECTIVE ACTION = 2

Answer 1 to list another quadrat or 2 if there are errors to be corrected or to finish, the list of ACTIONS will appear.

To finish the error correction session give ACTION:

FINISH = 0, 0

The answer 0, 0 will make the commands given under delete record above appear. Select:

END OF SESSION = 4

Output : A main data file, hopefully with less error inside than when the session was started.

3.4.3 ITCHCKLN.FOR

This programme is used to find trees that correspond to certain requirements and lists them on the screen for checking. It can be useful to make this listing before attempting to correct systematic errors using ITMASCOR, see below.

Input: A main data file.

Commands:

FIRST CHECK, GIVE:
START BYTE, END BYTE, 'CHECK STRING'

> Answer f. ex. 20, 22, '134' that is: look for all occurrences of Stem Identity Class '134' (cut stumps).

SECOND CHECK, GIVE:
START BYTE, END BYTE, 'CHECK STRING'

> Answer f. ex. 32, 33, '00' that is: bole height is 0 m.

FOR SECOND CHECK, GIVE RELATION
.LT. = 1, .EQ. = 2, .GT. = 3:

> Answer f. ex. 3.

> Output: In this example, the programme will list, on the screen, all occurrences of cut stumps having bole height of more than 0 meters, i.e. for cut stumps bole heights are not measured, but if so, there is most likely an error in the Stem Identity Class.

The programme is mainly used during editing.

3.4.4   ITMASCOR.FOR

This programme is used when a unique code has to be changed to another code throughout a file or in one whole Quadrat or for a certain type of stem identity class etc. This can be particularly useful for species codes, forest classes and other systematic errors.

When in doubt run the ITCHCKLN programme (see above) to check that only those codes that require change are listed.

Input: A main data file.

Command:

THIS PROGRAMME IS USED TO MAKE MASSIVE CORRECTIONS TO A DATA FILE ACCORDING TO TWO CHECKS. (MAX STRING IS 10 BYTES)
THE FIRST CHECK IS RELATIONAL (LT, EQ OR GT)
THE SECOND CHECK IS THE REPLACEMENT WITH THE NEW

Classes. The programme checks for incorrect Forest Classes and change of Forest Class in the middle of a quadrat.

The programme is used once per data file immediately before the file is finally edited and released for production running. (The same for ITSIC.FOR)

NOTE: The Forest Class is not scored in the earliest enumerations. Forest Class is scored from the 1994 enumerations and onwards. Forest Class is not scored for planting lines of wildlings.

Input: A main data file for trees/poles, seedling and saplings, but **not** for planted wildlings where the Forest Class is not scored *i.e.* = '000'

NOTE: FOREST CLASSES ONLY SCORED FROM 1994 ONWARDS

Commands:

INPUT FILENAME: (FX. SLTMT01.941)

        Give the filename.

WHICH BLOCK?
ALL BLOCKS = 0
OR BLOCK NO:

        Answer as appropriate.

For statistical analysis, it is sometimes required to get the variation within the area in which case each block needs to be listed separately.

In cases where the Forest Class has been incorrectly scored for one or more Quadrats, the following message appears:

THERE ARE xx ERRORS
DO YOU WISH TO PRINT THE FCL TABLE   = 1
OR FIRST CORRECT THE ERRORS   = 2

Normally it is advisable to correct the errors and then rerun the programme.

Output: If there are errors, a list of the error(s) is printed, following which a table is printed giving a summary of the Forest Classes.

3.5.2   ITSIC.FOR

This programme counts the number of stems for each Stem Identity Class and makes a list of every class encountered. The programme also checks for illegal

Stem Identity Classes.

As for ITFCLQNO, this programme is run immediately before the editing is finished.

Input: A main data file.

Commands:

INPUT FILENAME FX: SLTMT06.921

        Give the file name.

Output: A list of the tree/stem identity classes (SIC) and their percentage distribution and description. Illegal stem identity classes are indicated in the list and they should be corrected before continuing.

The two types of output tables for Forest Classes and Stem Identity Classes are useful in providing an overview of what the files contain and for guiding detailed studies of Forest Classes and Tree Identity Classes later on.

3.5.3   ITTABSTD.FOR

This is the main standard programme for tabulating the stand and stock tables for trees and poles according to various parameters.

In order to ease the interactive dialogue defining the table output, it is possible to keep the commands in a small file called FCOMSTD.DAT. Use DOS EDIT or any other editor to update. An example is given in Appendix II.

Input: A main data file, trees/poles only. Support data files: A species list for ex. SPECIES.DAT, if needed. The commands file FCOMSTD.DAT, if needed. FORRESV.DAT: The file containing the plot location names. TABTREA.DAT: The file containing the treatments.

If an error message appears that the file cannot be found, check that you are in the correct data directory, i.e. you cannot ask for a Lesong data file while in the LALANG directory. The support data files are kept in directory ITPROG. Check that the files are there and that the PATH is correct if not run 'STARTFOR'.

Commands:

COMMANDS FROM KEYBOARD = 5
OR FROM FILE FCOMSTD.DAT   = 4

        Answer as appropriate.

When using FCOMSTD.DAT for the first time, it is advisable to produce one table first to check that the output is as requested.

INPUT FILENAME: F. ex. SLTMT02.921

Give the file name.

Then follows the dialogue defining the stand table to be produced:

MAX. NUMBER OF BLOCKS (BLOCK)   = 4
FOREST CLASSES (FCL)   = 10
STEM IDENTITY CLASSES (SIC)   = 10.

FOR MEAN/SUMMARY OF ALL CLASSES ANSWER: 0

GIVE THE NUMBER OF: BLOCK, FCL, SIC
EX: 0, 0, 1

When 0.0.0 is selected the table will contain the combined average for all blocks, all Forest Classes and all Stem Identity Classes.

When 1 or another number is selected the table will contain the average of only those blocks or classes specified below.

In the example (0, 0, 1) all blocks and all Forest Classes are included but only one Stem Identity Class will be included.

If block number is requested:

GIVE THE BLOCK NUMBERS: F. ex. 2, 3, 4

In this example the table will be the average of blocks 2, 3 and 4.

If the Forest Class is selected, it is possible to get a table for a combination of individual Forest Classes (maximum is 10) or a number of Main Forest Classes:

USE INDIVIDUAL FCL"S LIKE 432,434,532,533, ETC   = 1
OR USE MAIN FCL"S LIKE 100,200,300, ETC   = 2:

Answer as appropriate, then:

GIVE THE FOREST CLASS CODES (MAX= AVERAGE OF 10)
F. ex. 100,200,300 OR 432, 434, 532, 533:

Give the codes.

If the Stem Identity class is selected:

GIVE THE STEM IDENTITY CODES (MAX= AVERAGE OF 10)
F. EX.: 111 OR 114,124,134,144

If, as an example SIC = 111 is selected, the table will contain information on living standing complete trees only.

The diameter class interval and the minimum diameter is selected as needed. There are 11 diameter classes in the output table.

GIVE THE LOWEST DIAMETER, & CLASS INTERVAL IN MM.
F. EX.: 100, 50 OR 150,150

If the answer is 100,100 the minimum diameter is 10 cm and the diameter class interval is 10 cm, and consequently the upper diameter class is 110 + cm.

For the analysis of the various parameters measured, it is possible to get special output where one parameter takes the rows (horizontally) of the table and another parameter is output page by page. The diameter classes are always fixed at 11 columns.

CHOOSE TWO OF THE FOLLOWING - HORIZONTAL AND PAGE
VARIABLE

LOG QUALITY	= 1
CROP TREE STATUS	= 2
CROWN FORM	= 3
CROWN DOMINANCE	= 4
STEM DAMAGE	= 5
CROWN DAMAGE	= 6
EFFECT OF CLIMBERS	= 7
WOOD QUALITY	= 8
VARIABLE NOT USED	= 9

Answer f. ex.: 8, 9

For normal table output the Wood Quality Group is selected by row = 8

While the page variable is not used = 9

If, for example, the table should show the correlation between crown dominance and crown form the following options are given:

3, 4

That will give one page for each crown dominance class (= 4) while the rows on each page contain the crown form classes (=3).

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The codes for which output is wanted is given next in two steps, first give how many code numbers and then the actual codes to be included:

GIVE THE NUMBER OF CLASSES FOR EACH VARIABLE SELECTED

In the first example it will be:

8, 0

i.e. one row for each of eight wood quality groups, and nothing for the pages.

In the second example it will be:

4, 5

i.e. one row for each of four crown form classes and five pages, one page for each of five crown dominance classes.

Then the actual codes are given:

GIVE THE CODES FOR HORIZONTAL VARIABLE

F. ex.: 1, 2, 3, 4, 5, 6, 7, 8

Or: 1,2,3,4

And similarly:

GIVE THE CODES FOR PAGE VARIABLE

F. ex.: 1, 2, 3, 4, 5

ANY SPECIES CHECK REQUIRED?
(NO CHECK = 0, SPECIES.DAT = 1, OTHER LIST = 2)

It is possible, for special investigations, to provide a list of species (genera) for which an output table is needed, it may f. ex. be the occurrence of fruit bearing trees for wild-life or the list of preferred species (list 'A') of the regeneration sampling list from 1974 (Wyatt-Smith, 1979). In these cases the list is made up using an editor programme and the filename for that species list supplied.

GIVE SPECIES LIST FILENAME:

For normal running, when all species are needed, no checks are required. Selecting the full species list (SPECIES.DAT) gives an additional check on the validity of the species codes in the file.

It is possible to produce the output table for either:

a) Number of stems and basal area per ha or
b) Volume in m³ per ha and the number of stems included in the volume calculations.

TABLES FOR:
NUMBER OF STEMS AND BASAL AREA   = 1
 - " -   AND VOLUME   = 2

If output is selected for volume, there are two volume functions applied. The first function is based on quadratic diameter at breast height (DBHob) alone and is used when heights have not been measured. The second function is based on both diameter and height and is taken from the FAO/ Forest Department's National Forest Inventory of 1971/72 for the average volume in logged over forest. When a tree height is missing the first function is automatically applied.

For the enumerations done from 1990 to 1993, using version 1 of the field card, the number of logs are scored. Each log section is 5 meters in length. The number of logs is converted to meters before applying the second equation. If the number of logs is less than 2, the first function is used, as 1 log is scored for small trees even if the clear bole is less than 5 meters.

SELECT VOLUME FUNCTION:
BASED ONLY ON DIAMETER (HEIGHTS NOT MEASURED)
                                                    : 1
BASED ON BOTH DIAM AND HEIGHT (HEIGHT IS MEASURED: M)   : 2
BASED ON BOTH DIAM AND NUMBER OF LOGS (1 LOG = 5M)   : 3:

The table is then processed.

Output: The stand table giving number of trees per hectare is printed out, but it is possible to suppress the printing of the basal area table.

PRINT THE TABLES OF BASAL AREA/VOLUME? (Y/N)

Answer as needed.

In most cases, the computer will request for where to deliver the output:

File name missing or blank – please enter file name
UNIT 3?

UNIT 'No.', f. ex. 3, is the logical output file. If the answer is PRN, the output will be spooled directly to the printer. It is also possible

to give another file name such as PRT.TXT or LE0192.OUT. This file can then be read and edited/formatted for output or inclusion into a document by any text editor.

To continue to produce tables from different files using the same c o m - mands, in order to save time, it is possible to select option 1 which produces another table using exactly the same layout.

        ANOTHER FILE   = 1
             FINISH   = 2:

3.5.4   ITTABWQS.FOR

This is the programme for tabulating trees per "Species Code" (Vernacular Name) using the standard species list SPECIES.DAT or any special species list.

The interactive dialogue is similar to that of ITTABSTD, except that for the tables output the rows (horizontally) are always taken by the WoodQ u a l i t y Groups/ Species name.

The use of the page option is not possible and the table will contain the combined average of the codes specified. F. ex if Log Grades 1 and 2 are requested the output will be the combined average of the two Log Grades.

Input: A main data file, trees/poles only.

Support data files: A species list f. ex. SPECIES.DAT or another species list

        The commands file   FCOMWQS.DAT, if needed.
                                  FORRESV.DAT: The file containing
                                  the plot location names
                                  TABTREA.DAT: The file containing
                                  the treatments

Commands:

COMMANDS FROM KEYBOARD = 5
OR FROM FILE FCOMWQS.DAT   = 4

        Then the data filename is requested:

INPUT FILENAME: (F. ex. SLTMT01.921)

Then comes the interactive session defining the stand table to be produced:

MAX. NUMBER OF BLOCKS (BLOCK)   = 4

FOREST CLASSES (FCL)   = 10
STEM IDENTITY CLASSES (SIC)   = 10.

MEAN/SUMMARY OF ALL CLASSES   = 0

HOW MANY: BLOCK'S, FCL"S, SIC"S
EX: 0, 0, 1:

> When 0 is selected the table will contain the combined average for all blocks or all Forest Classes or all Stem Identity Classes.

> When 1 or another number is selected the table will contain the average of only those blocks or classes specified below.

> In this example (0, 0, 1) all blocks and all Forest Classes are included but only one Stem Identity Class will be included.

> If block number is requested:

> GIVE THE BLOCK NUMBERS: F. ex. 2, 3, 4

F. ex. answer 3, 12 and the table will contain the average of the two blocks requested
    If Forest Class is selected it is possible to get a table for a combination of individual Forest Classes (maximum is 10) or a number of Main Forest Classes:

USE INDIVIDUAL FCL"S LIKE 432, 434, 532, 533, ETC.   = 1
OR USE MAIN FCL"S LIKE 100, 200, 300, ETC   = 2

> Answer as appropriate, then:

GIVE THE FOREST CLASS CODES (MAX = AVERAGE OF 10)

> Give the codes.

> If the Stem Identity class is selected:

GIVE THE STEM IDENTITY CODES (MAX = AVERAGE OF   10)

> If, as an example SIC = 111 is selected, the table will contain information on living standing complete trees only.

> The diameter class interval and the minimum diameter is selected as needed. There are 11 diameter classes in the output table.

GIVE THE LOWEST DIAMETER, & CLASS INTERVAL IN MM.

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If the answer is 100,100 the minimum diameter is 10 cm and the diameter class interval is 10 cm, and consequently the upper diameter class is 110 + cm.

WOOD QUALITY/ SPECIES TAKE THE ROWS/PAGES.
IF A VARIABLE IS SELECTED, THE TABLE WILL CONTAIN THE MEAN/SUMMARY OF THE CODES GIVEN.
I.E. NO PAGE BY PAGE OUTPUT LIKE IN ITTABSTD.

SELECT ONE OF THE FOLLOWING VARIABLES
LOG QUALITY   = 1
CROP TREE STATUS   = 2
CROWN FORM   = 3
CROWN DOMINANCE   = 4
STEM DAMAGE   = 5
CROWN DAMAGE   = 6
EFFECT OF CLIMBERS = 7
NO SELECTION   = 9

Answer f. ex.: 9

I.e. no variable is selected and the output will be the combined average of all.

If for example the table should give the distribution of commercial species having the good Log Qualities 1 and 2 the following is given:

1

The code for which output is wanted is given next:

GIVE THE NUMBER OF CLASSES FOR:
WOOD QUALITY GROUPS AND THE VARIABLE SELECTED

In the first example it will be:

8, 0

i.e. one row for each wood quality group, and no selection.

In the second example it will be:

5, 2

There are five commercial wood quality groups and two good log grades.

Then the actual codes are given:

GIVE THE CODES FOR WOOD QUALITY GROUPS

F. ex.: 1,2,3,4,5,6,7,8   or: 1,2,3,4,5

And similarly:

GIVE THE CODES FOR SELECTED VARIABLE

F. ex.: 1, 2

GIVE SPECIES CHECK
(SPECIES.DAT = 1, OTHER LIST = 2)

It is possible for special investigations to provide a list of species (genera) for which an output table is needed, it may f. ex. be the occurrence of fruit bearing trees for wild-life or the list of preferred species from the regeneration sampling list 'A'. In this case the list is made up using an editor programme and the filename for that species list supplied. For normal running when all species are needed the standard species list (SPECIES.DAT) is selected.

Select if output should give local or Latin names

LOCAL NAME = 1, SCIENTIFIC NAME: 2:

As for ITTABSTD, it is possible to tabulate the volume per species.

TABLES FOR:
NUMBER OF STEMS AND BASAL AREA   = 1
- " -   AND VOLUME   = 2

Answer as needed.

If output is requested for volume, the volume function to be used is selected as explained under ITTABSTD above.

SELECT VOLUME FUNCTION:
BASED ONLY ON DIAMETER (HEIGHTS NOT MEASURED)   : 1
BASED ON BOTH DIAM AND HEIGHT (HEIGHT IS
MEASURED: M)   : 2
BASED ON BOTH DIAM AND NUMBER OF LOGS (1 LOG = 5M)   : 3

The table is then processed.

Output: The stand table giving number of trees per hectare by species (Vernacular name) is printed out. It is possible to suppress the printing of the basal area table.

DO YOU WISH TO PRINT THE BASAL AREA (Y/N)

Refer to the comments under ITTABSTD.FOR

3.5.5   ITTABWLD.FOR

This programme is used to produce output tables for saplings, seedlings and planted wildlings. The interactive dialogue is similar to that of ITTABWQS above. The option by species is included in the programme.

Input: A main data file, Saplings, Seedlings or planted Wildlings.
Support data files: A species list f. ex. SPECIES.DAT or another species list if needed.

> The commands file FCOMWLD.DAT, if needed.
> FORRESV.DAT: The file containing the plot location names.
> TABTREA.DAT: The file containing the treatments.
>
> Commands   :
>
> COMMANDS FROM KEYBOARD = 5
> OR FROM FILE FCOMWLD.DAT   = 4

In the cases where a number of tables are needed using the same pattern of output, it is an advantage to create the command file FCOMWLD.DAT, using a text editor, to contain the commands.

> Then the data filename is requested:
>
> INPUT FILENAME: E.G. SLTMT07.924

Then comes the interactive session defining the stand table to be produced:

> MAX. NO. OF BLOCKS (BLOCK) = 4,
> FOREST CLASS (FCL)   = 10
> STEM IDENTITY CLASS (SIC)   = 10
>
> HOW MANY: BLOCK'S, FCL''S, SIC''S
> 0 = MEAN/SUMMARY OF ALL, EX: 0, 0, 1

When 0 is selected the table will contain the combined average for all blocks or all Forest Classes or all Stem Identity Classes.

When 1 or another number is selected the table will contain the average of only those blocks or classes specified below.

In the example (0, 0, 1) all blocks and all Forest Classes are included but only one Stem Identity Class will be included.

> If block number is requested:

GIVE: BLOCK NUMBERS
F. ex. 15, 16 OR 7, 10, 13

Example: 15, 16

In this example the table will be the average of the two blocks: 15 and 16.

If the Forest Class is selected, it is possible to get a table for a combination of individual Forest Classes (maximum is 10) (NOTE: in the case of wildlings planted in lines, the Forest Class is not scored)):

GIVE THE FOREST CLASS CODES (MAX= AVERAGE OF 10)

Give the codes.

If the Stem Identity class is selected:

GIVE THE STEM IDENTITY CODES (MAX= AVERAGE OF 10)
Ex. 211 (SAPL. COMPL.), 311 (SEEDL. /SMALL WILDL.) ETC. 111 (SUCCESSFUL WILDLINGS WITH DIAM > 50 MM)

If, as an example SIC = 311 is selected, the table will contain information on living standing complete small wildlings only.

CHOOSE TWO PARAMETERS ONE BY ROW AND ONE BY PAGE

VIGOUR	= 1
CROWN FORM	= 2
CROWN ILLUMINATION	= 3
SITE CONDITION	= 4
EFFECT OF CLIMBERS	= 5
THE WOOD QUALITY GROUPS	= 6
PARAMETER NOT USED	= 7:

For example, to include all species by Wood Quality Group:

6, 7

GIVE THE NUMBER OF CLASSES FOR EACH PARAMETER: (EX: 2, 3; OR IF NO PARAMETER BY PAGE EX 2, 0)

Then the actual codes are given:

GIVE THE CODES FOR PARAMETER BY ROW

F. ex.: 1, 2

Column 37: Crown Illumination/Dominance (CI)

The Crown Illumination/Dominance is recorded for all living, standing trees (SIC = 111, 112) $\geq$ 15.0 cm DBH.

The Crown Illumination/Dominance describes the amount of sunlight received by the crown and the crown's competitive status. It is one of the significant factors affecting the growth of the tree.

When estimating the influence of neighbouring vegetation, disregard dead and broken trees, but do assess the shade given by palms and bamboo.

There are five Crown Illumination/Dominance classes :

Code No.	Crown Illumination/Dominance	Description
1:	Emergent/Dominant	Full light reaches the sides of the crown at an angle of at least 45 degrees from the vertical.
2:	Full Overhead Light/Co-dominant	Upper part of crown fully exposed to overhead light, but sides of crown do not receive full light due to competition from other co-dominant crowns.
3:	Some Overhead Light/Dominated	Part of the crown is exposed to vertical light, but part is shaded from dominant crowns above.
4:	Only Sidelight/Dominated	No part of the crown is exposed to vertical light due to dominant crowns above, but part of the crown receives sidelight.
5:	No Direct Light/Suppressed	The crown is suppressed and receives only light filtered through the crowns of other trees and other vegetation.

Refer to Figure No. 7 for examples of Crown Illumination/ Dominance.

Select if output should give local or Latin names

LOCAL NAMES = 1, SCIENTIFIC NAMES = 2
The subplot sizes used in this programme are:
For sapling subplots   = 0.0025 ha
For seedling subplots   = 0.0004 ha
For plantation plots (17 plant lines) = (1/17) = 0.0588 ha
For enrichment planting plots (10 plant lines) = 0.1 ha

Output: A stand table by diameter or height class giving number of saplings, seedlings, small wildlings or successful wildlings per hectare.

3.5.6   ITHEIGHT.FOR

This programme produces a table of commercial bole heights or number of logs per diameter class per Wood Quality Group for either all log qualities or log quality 1 or 2. It also gives the number of trees for which bole height or number of logs is scored.

Input: A main data file, trees only

Commands:

GIVE THE LOWEST DIAMETER CLASS, AND CLASS INTERVAL (IN MM)
F.EX. 150,100

> Normally use 10 cm diameter classes starting from 15 cm as commercial height is only measured/estimated for trees with DBHob of 15 cm or larger:

> 150,100

GIVE FILENAME:

> Give the file name of a tree-file.

ALL LOG GRADES   : 1
OR ONLY LOG GRADES 1 AND 2   : 2

The commercial log grades are 1 and 2.

> In the earlier enumerations using version 1 of the field card, the number of commercial logs were estimated. In field card version 2 used from 1994, the commercial clear bole height

Column 38: Stem Damage (SD)

The Stem Damage is recorded for all living, standing trees (SIC = 111 or 112) $\geq$ 15.0 cm DBH.

Only recent, fresh damage is recorded, old damage that has turned to rot is scored under the Log Grade, broken trees are recorded through the Tree Identity Class (SIC = 112 or 113).

There are 4 classes :

Code No.	Description
1:	**No Damage** to the Stem.
2:	**Slight Bark Damage** of less than 1 meter in extent.
3:	**Medium Bark Damage** either 2 damages of less than 1 meter or 1 damage of from 1 to 3 meters in extent.
4:	**Heavy Bark Damage** either 3 damages of less than 1 meter or 2 damages of from 1 to 3 meters or 1 meter damage of more than 3 meters in extent.

Column 39: Crown Damage (CD)

The Crown Damage is recorded for all living, standing trees (SIC = 111 or 112) $\geq$ 15.0 cm DBH.

Only recent, fresh Crown Damage is recorded, old damage is recorded through the Crown Form Class. Broken trees, where most of the crown is broken off, are recorded through the Tree Identity Class (SIC = 112 or 113).

There are 5 classes :

Code No.	Description
1:	**Less than 5% damage** to the crown.
2:	**From 5% to less than 25 % damage** to the crown.
3:	**From 25% to less than 50 % damage** to the crown.
4:	**From 50% to less than 75 % damage** to the crown.

5:        **From 75 % to less than 100 % damage** to the crown. If 100 % of the crown is damaged consider it as at broken stem of SIC 112 or 113.

Column 40: Impeding Wines and Climbers (CL)

The Impeding Wines and Climbers are recorded for all living, standing trees (SIC = 111 or 112) $\geq$ 5.0 cm DBHob i.e. also for poles.

The purpose of this classification is to assess the way in which impeders such as woody climbers and wines invade the different forest types and to see how logging and silvicultural treatment effect the occurrence of impeders. The effect of rattan is scored under this classification whether the rattan is commercial or not.

The classification is as follows:

Code No.   **Description**

1:        **Impeders not Present**
          No climbers or wines on the tree.

2:        **Impeders Present but not Affecting the Tree**
          Climbers and or wines are present, but they do not hinder or restrict the normal growth and development of the tree and its crown.

3:        **Impeders Restricting the Growth**
          The normal growth and development of the tree is restricted by impeders growing on the trunk or competing for light in the crown. However, the continued life of the tree is not yet affected.

4:        **Impeders Seriously Affecting the Growth**
          It left unchecked, the impeders are likely to be seriously deforming or even killing the tree. Branches are already dead in the crown or the trunk has already been deformed.

5:        **Impeders Recently Cut and Dead**
          A few may still be living, but as long as they no longer harm the tree, use this code to indicate a successful treatment by climber cutting.

6:        **Impeders Recently Cut but Treatment not Successful**
          Remaining climbers whether living or dead, still restrict the growth of the tree.

USE LOCAL NAMES: 1, LATIN NAMES: 2

Answer as appropriate.

LIST ALL SPECIES : 1
OR GIVE RANGE   : 2

Answer 1 to print the full list or 2 for a subset within a given range.

GIVE RANGE OF NUMBER OF TREES PER HECTARE
(MIN, MAX) EX: 10,100 OR 2, 5:

Give the range required. F. ex. 10, 100 will cause a list to be printed for all the species containing 10 trees or more per hectare as an average of all plots. The range applies to the total column, not the individual locations. If '2, 5' is given only those species containing from 2 up to 5 trees per ha (incl.) are printed.

Output   : A printed list according to the specifications given.

NOTE: For tree/pole files, the per ha figure is calculated correctly. Poles (from = 5.0 cm to < 15 cm DBHob) are only enumerated in the 9 central Quadrats. The area factor per pole is thus 25/9, which is incorporated in the programme calculations.

3.6   Programmes for Growth Editing and Growth and Yield Output Tables

In addition to the stand table programmes listed above, the package also includes programmes to calculate growth, mortality and the amount of new recruits (ingrowths) from permanent plots enumerated at different points in time.

The package includes a special growth edit programme used in detecting inconsistencies between two or more enumerations of the same plot.

3.6.1   ITGROEDT.FOR

This programme is used to compare the same tree enumerated in different years. From 2 and up to 5 enumerations of the same plot can be compared simultaneously. The following items are checked:

-        Whether the tree is found or not. If the tree is not found in a subsequent enumeration it may be because the tree is dead or because of an error.

-    If the tree is not found in a previous enumeration it may be because it is a new recruit or an error.

-    A special summary of new recruits per vernacular name can be requested.

-    The species code number is checked, no changes are accepted.

-    The Stem Identity Class Code is checked, unlikely changes are listed.

This programme has proved very useful for final editing of a new enumeration of a plot before attempting to run the Growth program. The list of new recruits produced by a special section of this program has also proved very useful.

GROWTH EDITING / LISTING OF INCOMPATIBLE TREES

CHECK: WQG/SPECIES CODE
IMPROVEMENT IN SIC
NEW RECRUITS AND TREES NOT FOUND.

GIVE FILENAME FOR BASEYEAR: F. ex. SLTMT02.921

Give the filename, then

NUMBER OF YEARS TO BE CHECKED: (INCL. BASEYEAR)
MIN 2, MAX 5 ENUMERATIONS

Give the number of years (enumerations)

GIVE ENUMERATION YEAR(S), (NOT BASEYEAR)
        EX. 91, 93: OR 96, 98, 00

Give the years, except for the base-year that has already been given. The years can be in any order, they are sorted internally in the correct order by the programme.

The species list is used to check the validity of the species codes. Species not found are listed as errors. For the printout either local or scientific names can be used:

VERNACULAR NAMES = 1, SCIENTIFIC NAMES = 2

When the base year is not the first year, new recruits can be listed individually tree by tree or a summary per species can be requested. For large files it is suggested just to make the summary. Serious errors

and warnings are always listed.

SUMMARY OF NEW RECRUITS   = 1
LIST ALL NEW RECRUITS   = 2

     Normally answer 1

NOTE: The summary of new recruits gives the actual number, not the per ha per year figure. There is no area correction for poles. The number of new recruits is thus a mixture of new recruits over the 5 cm pole DBH boundary and the 15 cm tree DBH boundary. For a correct calculation of the number of new recruits per ha per year use the programme ITINGROW.

In later years, dead trees are not re-measured and therefore the list of trees not found can be very long. However, for two subsequent enumerations, one or two years apart, the check for trees not found can be very useful to ensure that all trees are included in the files.

     EXCLUDE TREES NOT FOUND FROM LIST   = 1
     LIST ALL TREES NOT FOUND   = 2

The output may contain real errors that must be corrected before continuing. But there may also be cases where a broken tree recovers its crown which is listed as SIC improvement from 112 to 111, this has to be accepted. However, if a dead tree suddenly becomes alive it must be checked, like if SIC changes from 132 to 111.

When a summary of new recruits is requested the error list will include new recruits with a diameter over 20.0 cm. However many fast growing species will grow more than 5 cm in 2 years. This check will catch trees that suddenly appear with an unlikely large diameter.

In several cases a tree dies (SIC=131) and then disappears and suddenly re-appears alive. This is often caused by wrong tree numbering where a new recruit is wrongly given the number of a dead tree. These type of errors must be checked and corrected.

It is important that all suspected errors are checked against the field cards. If a wrong tree number has been encountered, maintain the latest tree number since this tree still stands in the forest having this number on the tag and painted. The old tree number is changed in the old file(s) by adding 200 to the number, in which case the tree receives a new unique number, although only in the computer. Remember to re-arrange the tree number in the correct sequence and re-number the file using ITLINO.

When all errors have been corrected, output tables of growth, mortality, and new recruits can be produced using the different growth programmes with the minimum of error.

3.6.2   ITGROWTH.FOR

This is the main growth programme used to calculate the mean annual diameter increment or the basal area increment and the mean annual mortality percentage. The calculations are based on two enumerations of the same sample plot, the base-year and the growth-year. The options and the layout are similar to the ITTABSTD programme. The diameter and basal area growth is calculated from the diameter difference between the two enumerations of the same tree divided by the number of years using the decimal dates.

The mean annual mortality percent is calculated based on how many of the trees that are accepted in the base year that are also found and accepted in the growth year. Trees that are not found in the growth year are considered as dead. The mortality is then calculated as the difference between the number of trees found and accepted in the growth year as a percentage of the number of trees accepted in the base year. The percentage is divided by the number of years between base and growth year to give the arithmetic mean annual mortality percentage. It is possible to select two different mortality rates, commercial, and biological:

The commercial mortality include, in the mortality figure, all trees that change SIC, like broken, and fallen trees, even if the trees are still alive. In most cases these trees, where the crown is broken of even if they survive, will develop hart rot and, from a commercial point of view, they have no value.

The biological mortality include only trees that are actually dead or that are not to be found and therefore considered dead. Trees that are broken or fallen, but still alive are considered living.

Input: A main data file, trees/poles only, as base year. A subsequent
          enumeration of the same plot as growth year.
          Support data files: A species list f. ex. SPECIES.DAT or a special
          species list when output per species is requested.

          : The index files to the growth year f. ex.
            XQTMT01.941

          : The file containing the forest location names   FORRESV.DAT.

          : The file containing the treatments: TABTREA.DAT

          : The file ??DATES.DAT containing decimal dates of enumeration.

: The command files FCOMGRO.DAT if needed.

Commands:

COMMANDS FROM KEYBOARD   = 5
OR FROM FILE FCOMGRO.DAT   = 4

Select as appropriate. For producing several tables of the same layout, it saves time to use the file FCOMGRO.DAT to contain the commands. Use a text editor to update.

GIVE FILENAME FOR BASE YEAR: EX. LETMT01.901

After giving the filename for the base-year, then the growth year of the subsequent enumeration of the same plot is given: (only the year like '94' is typed)
GIVE GROWTH YEAR: EX. 92 OR 00 (YEAR 2000 ETC.)

The index file to the growth year is then read, if the file does not exist an error message occurs:

INDEX FILE MISSING: RUN ITINDEX ON FILE:
LETMT01.941

The decimal dates for base year and growth year are kept in the file ??DATES.DAT in the ITPROG directory. The two positions ?? stands for the two first letters of the data file name: f. ex. for the Sungei Lalang plot, the dates are kept and updated in SLDATES.DAT
If the file is not found an error message occurs:

FILE WITH DECIMAL DATES: LEDATES.DAT NOT FOUND
CREATE AND TRY AGAIN!

The ??DATES.DAT file may exist but if the file does not contains the dates for both the base year and the growth year an error message occur:

DECIMAL DATES FOR ONE OR BOTH

OF THESE FILES NOT FOUND:

LETMT02.901 OR LETMT02.941 CHECK AND UPDATE:
LEDATES.DAT

The following dialogue is similar to ITTABSTD and is just repeated here as a reminder without comments.

MAX. NO. OF BLOCKS (BLOCK)   = 4
FOREST CLASS (FCL)   =10
STEM IDENTITY CLASS (SIC)   =10
FOR MEAN/SUMMARY OF ALL CLASSES ANSWER: 0
GIVE THE NUMBER OF BLOCK'S, FCL'S, SIC'S
F. ex. 0,0,1 :

GIVE THE BLOCK NUMBERS, F. ex. 4,10
GIVE THE FOREST CLASS CODES (MAX = 10)

GIVE THE STEM IDENTITY CODES (MAX=10)

GIVE THE LOWEST DIAMETER CLASS, AND CLASS
INTERVAL (IN MM.)

The growth and mortality can be tabulated for all species or for a subset of the species as required.

ANY SPECIES CHECK REQUIRED ?
(NO CHECK = 0, SPECIES.DAT = 1, OTHER LIST = 2)

If no species list is given the tables will be by wood Quality Group, and the page option can be used.

If a species check is required using another species list, give the species list filename.

GIVE SPECIES LIST FILENAME:

Select vernacular or scientific names for output:

LOCAL NAME = 1, SCIENTIFIC NAME =2

CHOOSE TWO OF THE FOLLOWING - HORIZONTAL AND
PAGE VARIABLE
LOG GRADE   = 1
CROP TREE STATUS   = 2
CROWN FORM   = 3
CROWN DOMINANCE   = 4
STEM DAMAGE   = 5
CROWN DAMAGE   = 6
EFFECT OF CLIMBERS   = 7
WOOD QUALITY (WQG)   = 8
NO PAGE VARIABLE   = 9

If the output is requested by species only one Wood Quality Group can be

requested per run due to array size limitations.

> OUTPUT IS PER SPECIES, WOOD QUALITY BY PAGE NOT
> POSSIBLE
> GIVE THE NO OF CLASSES FOR EACH VARIABLE SE-
> LECTED
> GIVE THE CODES FOR HORIZONTAL VARIABLE
> GIVE THE CODES FOR PAGE VARIABLE

As a check for unlikely growth rates, maximum and minimum annual growth rates are given. Trees are listed when the mean annual increment falls outside the range.

> GIVE MAX. AND MIN. GROWTH PER YEAR IN MM.

Normally a maximum growth of 50 mm and a minimum (negative) growth of -10 mm should be OK.

> TABLES FOR COMMERCIAL MORTALITY   = 1
> OR FOR BIOLOGICAL MORTALITY   = 2

> answer as requested.

> TABLES FOR DIAMETER INCREMENT   = 1
> OR TABLES FOR BASAL AREA INCREMENT = 2

In one run, either diameter increment or basal area increment is produced.

A list of suspected errors is produced that will contain: trees where the species code has changed or is incorrect; trees where the mean annual increment is outside the range given; and, optionally, trees that are not found in the growth year. This is useful when a new enumeration is tried for the first time.

> LIST TREES NOT FOUND   = 1
> OR EXCLUDE FROM EDIT LIST   = 0

The errors should be listed on the printer for checking the first time a new set of files is used. After the errors have been checked and corrected, the error list, if any, can be listed on the screen.

> EDIT LIST ON PRINTER: LP = 2
> OR ON SCREEN   : LP = 6:

Output: A growth error list (optional) and a table giving the diameter increments and mortality rates.

Note: in cases where errors are listed and subsequently checked and corrected, it is advisable to re-do the stand tables, since the corrections may have changed

the species group and diameter class distribution.

3.6.3   ITGRORAT.FOR

The growth rate is calculated as the mean annual diameter increment for a given time period. Where the ITGROWTH programme calculates the mean growth rate by species group and diameter class, it is often of interest to tabulate how many trees grow at which growth rate and their size class distribution. It is of particular interest to know the proportion of trees that grow at very slow rates or not at all (quiescence). Similarly, it is of interest to see if certain trees grow at sustained high rates.

This program tabulates diameter increments by growth rate. There are 10 growth rates : (Mean annual increment per year in millimeters.)

> < 0 (negative growth)
> = 0 (no growth)
> 0 < 2
> 2 < 4
> 4 < 6
> 6 < 8
> 8 < 10
> 10 < 12
> 12 < (highest growth)

The dialogue needed to define the table output is similar to that of ITGROWTH. However, the growth rates always take the rows. The horizontal variable is converted to a selection variable, *i.e.* the table will be a summary of the codes specified. The individual page by page output is possible for all variables including by species. But be aware that, by selecting species as page variable, the output can be very lengthy although only one Wood Quality Group is allowed per run.

CHOOSE TWO OF THE FOLLOWING - SELECTION AND PAGE VARIABLE (Ex 9, 8)

> LOG GRADE   = 1
> CROP TREE STATUS   = 2
> CROWN FORM   = 3
> CROWN DOMINANCE   = 4
> STEM DAMAGE   = 5
> CROWN DAMAGE   = 6
> EFFECT OF CLIMBERS   = 7
> WOOD QUALITY (WQG)   = 8
> NO SELECTION VAR   = 9
> NO PAGE VARIABLE   = 10

If no page variable is selected (f. ex. 8,9) the output will contain the summary

of the codes requested. If both 'No Selection Var' and 'No Page Variable' is selected (9,10), the table includes all trees.

The rest of the dialogue is similar to that of ITGROWTH.

3.6.4   ITINGROW.FOR

This programme is used to tabulate the number of new recruits. The base year is a later enumeration of the same research plot and the 'ingrowth' year is an earlier enumeration. A new recruit (ingrowth) is defined as a tree that is found above the specified minimum diameter limit in the base year, but below that diameter or not found in a previous enumeration, the 'ingrowth' year.

NOTE: the base year is a later enumeration and the 'ingrowth'-year is an earlier enumeration, i.e. the opposite of ITGROWTH and ITGRORAT.

The dialogue is similar to that of ITGROWTH.

The minimum diameter is the diameter limit over which a new recruit or ingrowth is defined. The diameter class interval should be set quite narrow, 20 or 10 mm, to follow closely how the new recruits develop over the diameter classes.
When the minimum diameter is selected below 15 cm DBHob, only the 9 central Quadrats in each block, where trees are measured from 5.0 cm and above, are included to avoid definition problems. The area factor to convert to per hectare is 9/25 or 0.36.

3.6.5   ITSELECT.FOR

This programme prepares the data from the permanent research plots in a form that can be read by statistical analysis programme packages and other commercial software. This programme is useful, as the other programmes only tabulates the data without giving any statistical information.

The output is a blank (' ') separated, fixed format data file in ASCII.

The programme will combine data from up to five enumerations of the same permanent sample plot. The variables to be included are selected through a dialogue in a similar way as for the ITGROEDT and ITGROWTH programmes. A documentation of which variables were selected and included in the ASCII file is printed out for reference.

It is advisable to plan carefully the type of analysis to be conducted and to reduce the number of variables to be included in order to keep the output file to a manageable size.

Commands:

GIVE FILENAME FOR BASE YEAR: F. EX. SLTMT01.921
OR SLTMT01.001 (YEAR 2000 ETC.)

The base year is the first year of the growth period to be analyzed.

NUMBER OF YEARS TO BE INCLUDED
MIN.: 1, MAX.: 4 LATER ENUMERATIONS
　　　　　　　Give how many years (files) to use for the output.

GIVE ENUMERATION YEAR(S), (NOT BASEYEAR)
EX. 93,94 OR 94,96,00:

The years can be given in any sequence, they are sorted internally.

The decimal dates are needed for the printed documentation; they are not
part of the output ASCII file. They are taken from the file —DATES.DAT
where — are the two first letters identifying the area like SL = Sungei Lalang.

In order to limit the output volume, it is possible to exclude trees that die or
cannot be found in a later enumeration.

EXCLUDE BIOLOGICALLY DEAD TREES
AND TREES NOT FOUND FROM THE OUTPUT LIST　　　= 1
　　　　　　　　　　　　　　INCLUDE ALL TREES　= 2

The following selection procedure follows closely the standard and is not
repeated here, see ITGROWTH. No selection means that everything is
included.

MAX. NO. OF BLOCKS (BLOCK)　　　= 4
FOREST CLASS (FCL)　　　　　　　=10
STEM IDENTITY CLASS (SIC)　　　=10
NO SELECTION FOR CLASS ANSWER: 0

GIVE THE NUMBER OF BLCK,FCL,SIC
F. ex. 0,4,1 :

The minimum and maximum diameter define the diameter range of the trees
in the base year that are written to the output file. Trees having diameters
(DBHob) outside the range given are not included: (Giving a large maximum
diameter means that there is in fact no upper limit i.e. all sizes included.)

GIVE THE MINIMUM AND MAXIMUM DIAMETER (IN MM.)
Ex: 200,4000 OR 50,150 :

Answer as appropriate.

As the statistical analysis will often be done at species level it is possible to create a small file containing only the species codes needed, no local or scientific name is required, only the 5 digit Wood Quality Group, Family, and Genera code number.

First give the Wood Quality Group.

GIVE THE NO OF WOOD QUALITY GROUPS

 F. ex. 2.

 GIVE THE WOOD QUALITY CODES

 F. ex. 1, 2

SELECTION OF CERTAIN SPECIES
FROM A SPECIAL FILE   = 1
ALL OR NO SPECIES SELECTION = 0

The actual variables to be written to the output file are then requested, first for the base year, then for the growth years.

The variables for the growth years need not be the same as for the base year, but the variables will be the same for all growth years if more than one growth year is selected.

 GIVE VARIABLES FOR STATISTICAL OUTPUT FOR
 BASEYEAR
 EXCLUDE = 0 , INCLUDE = 1 :

  FOREST CLASS
  TRMT
  BLOCK
  STEM IDENTITY CLASS
  WOOD QUALITY GROUP
  FAMILY
  GENERA
  DIAMETER DBHob
  COMMERCIAL HEIGHT
  LOG QUALITY
  CROP TREE STATUS

CROWN FORM
CROWN DOMINANCE
STEM DAMAGE
CROWN DAMAGE
WINES/ CLIMBERS

For the growth years, TRMT, BLOCK, WQG., FAMILY, and GENERA cannot be selected for output.
GIVE VARIABLES FOR STATISTICAL OUTPUT FOR GROWTH YEARS

EXCLUDE = 0 , INCLUDE = 1 :

FOREST CLASS
STEM IDENTITY CLASS
DIAMETER DBHob
COMMERCIAL HEIGHT
LOG QUALITY
CROP TREE STATUS
CROWN FORM
CROWN DOMINANCE
STEM DAMAGE
CROWN DAMAGE
WINES/ CLIMBERS

As it is easy to make errors in the selection it is possible to do the selection all over again :

DO YOU WISH TO MAKE CHANGES = 1, ACCEPT = 2

Finally the filename for the output file is requested, select a meaningful name, a filename that already exist cannot be used.

GIVE FILENAME FOR OUTPUT Ex : STATTxx.DAT

The output file is then assembled, and a report printed giving information as to what the output file contains. The number of records is given:

NUMBER OF RECORDS SELECTED FROM BASEYEAR = xxx
OF WHICH yyy WERE OUTPUT AND zz EXCLUDED

NUMBER OF VARIABLES vv

3.7.   *The Standtable Projection Simulation Model*

3.7.1   STANDPRO.FOR

The Standtable Projection Simulation Model is deterministic model. It uses a stand table by species group by diameter class and the associated diameter increment and mortality figures to project the stand by growth simulation in order to estimate the development of the forest and the likely production. New recruits can be added and the forest can in principle be projected in perpetuity. It is possible to simulate logging operations and the associated damage as well as simulate silvicultural treatments such as liberation thinning.

The model can be used to simulate the development of a uniform stand such as enrichment planting or plantation establishment. The projections will provide useful information on likely developments of the forest under different management regimes. It is possible make pessimistic and optimistic projections as a range within which the likely development will occur

The Model is documented in Technical Report No. 3 "Manual for the Standtable Projection Simulation Model", (Korsgaard, 2002b) complete with instructions on how to prepare the input data and to perform different types of projections.

3.7.2   CRCOMSIM.FOR

In order to rerun the same simulation on different input files representing different forest types, logging intensities or silvicultural treatments, it is useful to create a command file containing the dialogue that defines the projection and output.

The Programme CRCOMSIM contains the same dialogue as STANDPRO and all the answers are placed in a small file FCOMSIM.DAT.

When running STANDPRO, this file can be used to create the same type of projection for different stand tables representing different forests.

4. SUPPORT DATA FILES

4.1 FDAFCL.DAT

Contains the Forest Class Codes and the descriptions.

4.2 ITSICTXT.DAT :

Contains the Stem Identity Class codes and the descriptions for trees/poles.

4.3 ITSICTX2.DAT :

Same as above for saplings, seedlings and wildlings.

4.4 SPECIES.DAT :

Contains the Wood Quality Group/Botanical code numbers and the vernacular and scientific names used for data processing for the ITTO Study in Peninsular Malaysia.

4.5 The Wood Quality Groups

In Appendix I, examples are given of the various types of printed output produced by the programmes. In the examples, reference is often given to Group 1, Group 2, etc. The Groups referred to are the Wood Quality Groups. All species are grouped into eight Wood Quality Groups mainly according to the marketability of the timber.

Dipterocarps: (All are commercial)

1)   Dipterocarps of the Meranti group

2)   Dipterocarps, Non-Meranti

Non-Dipterocarps, commercial:

3)   Fully marketable, light hard woods (LHW)

4)   " - " - , medium hard woods (MHW)

5)   " - " - , heavy hard woods (HHW)

Other species non or partly commercial:
6)   Other woods, partially marketable

7)   Other woods, non-commercial and unidentified

8)   Light demanding pioneer species

4.6   FCOM???.DAT:

Files containing the commands needed to run a table's programme. It saves time and errors when the same type of output is needed from several data files.

??? refer to:

STD   The standard stand table programme ITTABSTD.FOR.

WQS   The stand table programme giving stand tables by wood quality and species group ITTABWQS.FOR.

WLD   The stand table programme used for planted wildlings ITTABWLD.FOR.

GRO   The growth and mortality programme ITGROWTH.FOR.

SIM   The stand table projection simulation model STANDPRO as created by the dialogue programme CRCOMSIM.FOR.

4.7   FORRESV.DAT:

File contains the list of the forest reserves where the plots are located.

4.8   TABTREA.DAT:

File contains the list of treatments applied in the different experimental plots.

4.9   ??DATES.DAT:

Files containing the decimal dates for the enumeration of the experimental plots. In some cases the year of the filename may not correspond to the year of the enumeration, when the enumeration was extended over the new year. F. ex. KSTMT11.901 has the decimal date of 91.08.

4.10 ITSPSUM.DAT:

File containing the list of filenames and the associated enumerated area in hectares for use by the ITSPSUM programme.

5. REFERENCES

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APPENDIX I. EXAMPLES OF PRINTED OUTPUT

I.1 ITLIST

Example of Part of a Tree/Pole Data File List.

```
PROGRAM ITLIST          DATE : 20/08/2002
LISTING OF KSTMT11.961    PAGE :  1

0000111161102001    00111166801046107222311
0000211161102001    00211173501069306322131
0000311161102001    00311189840018808122111
0000411161102001    00411173501016304222221
0000511161102001    00511184602016404122211
0000611161102001    00611184602018206122211
0000711131102002    00111179999028004222211
0000811131102002    00211205010500151111111
0000911131102002    00314379999016400000000
0001011131102002    00411165701019710222211
0001111131102002    00511176701049615121111
0001211131102002    00611133801023310221111
0001311131102002    00711143609027710222111
0001411131102002    00811189840026406122111
0001511131102002    00914378670017900000000
0001611131102002    01011164901028420121111
0001711131102002    01111184601023904221111
0001811131102002    01211184601021406121211
0001911131102002    01311179999020022222111
0002012131102003    00111121401018710121211
0002112131102003    00211166801029009122111
0002212131102003    00311189840030806122211
0002312131102003    00411176401032009122211
0002412131102003    00511166201019308021211
0002512131102003    00611189840024808122211
0002612131102003    00711164801023509122211
0002712131102003    00811135801018007122311
0002812131102003    00911133801027511122111
0002912131102003    01011189840021909122211
0003012131102003    01111167501046811121111
0003112131102003    01213365601067100000000
0003212131102003    01314379999029500000000
    .
    .
        PAGE : 51
    .
    .
0277311111115024    01111165001017106122311
0277411111115024    01211135801015706123211
0277512111115025    00111173501021007121211
```

59

```
0277712111115025    0031117650103440912211111
0277812111115025    0041117868502800522321122
0277912111115025    0051117350101700412331111
0278012111115025    0061114360903120812121122
0278112111115025    0071111021402610711121111
0278212111115025    0081117350103131212211111
0278312111115025    0091116620102210922231122
0278412111115025    0101116680104601122211111
0278512111115025    0111116480103541312121111
0278612111115025    0121437999901950000000000
```

I.2 ITLSFILE

Example of a Small Part of a List of a Complete Tree/Pole Data File for Hard Copy Storage.

```
PROGRAM IFLSFILE. JOINT ITTO/MALAYSIA PROJECT                    PAGE :     1

                       *** LISTING OF TREES/POLES ***
FILENAME = KSTMT11.961 DATE : 20-08-2002

REC=RECNO, S=STOCKED, FCL=FOREST CLASS, T=TRMT, B=BLOCK, Q=QUADRAT,
TN=TREE NO, SIC=STEM IDENT.CLASS WQS=WQ/SPEC., DBH=DIAM. BREAST HT.(MM),
STH=STEM HGT(M)
LG=LOGGRADE, STA=STATUS, CFD=CROWN FORM & DOM., DAM=LOG & CROWN DAMAGE,
CL=CLIMBERS.

                  10              20                        30              40
      12345 6 789 01 23 456 789 012 34567                  8901 23  4   5  67  89 0
      REC S FCL  T  B   Q  TN SIC  WQS         SPECIES      DBH STH LG STA CFD DAM W

      QUADRAT NUMBER :    1
          1 1 116 11   2    1    1 111 66801 Petaling         461   7  2    2  23  11 2
          2 1 116 11   2    1    2 111 73501 Kelat            693   6  3    2  21  31 2
          3 1 116 11   2    1    3 111 89840 Nipis Kulit      188   8  1    2  21  11 1
          4 1 116 11   2    1    4 111 73501 Kelat            163   4  2    2  22  21 1
          5 1 116 11   2    1    5 111 84602 Kubin, Mahang gajah  164   4  1    2  22  11 1
          6 1 116 11   2    1    6 111 84602 Kubin, Mahang gajah  182   6  1    2  22  11 1

      QUADRAT NUMBER :    2
          7 1 113 11   2    2    1 111 79999 Lain-lain        280   4  2    2  22  11 1
          8 1 113 11   2    2    2 111 20501 Mersawa          500  15  1    1  11  11 1
          9 1 113 11   2    2    3 143 79999 Lain-lain        164   0  0    0  00  00 0
         10 1 113 11   2    2    4 111 65701 Minyak berok     197  10  2    2  22  11 1
         11 1 113 11   2    2    5 111 76701 Petai            496  15  1    2  11  11 1
         12 1 113 11   2    2    6 111 33801 Kembang semangkok  233  10  2    2  11  11 1
         13 1 113 11   2    2    7 111 43609 Temponek, Keledang tempone  277  10  2    2  21  11 1
         14 1 113 11   2    2    8 111 89840 Nipis Kulit      264   6  1    2  21  11 1
         15 1 113 11   2    2    9 143 78670 Tulang daing     179   0  0    0  00  00 0
         16 1 113 11   2    2   10 111 64901 Melunak          284  20  1    2  11  11 1
         17 1 113 11   2    2   11 111 84601 Mahang, Mersepat  239   4  2    2  11  11 1
         18 1 113 11   2    2   12 111 84601 Mahang, Mersepat  214   6  1    2  12  11 1
         19 1 113 11   2    2   13 111 79999 Lain-lain        200  22  2    2  21  11 1

      QUADRAT NUMBER :    3
         20 1 213 11   2    3    1 111 21401 Resak            187  10  1    2  12  11 1
         21 1 213 11   2    3    2 111 66801 Petaling         290   9  1    2  21  11 1
       .
       .
       .
       .
          PAGE :    57

                  10              20                        30              40
      12345 6 789 01 23 456 789 012 34567                  8901 23  4   5  67  89 0
       REC S FCL  T  B   Q  TN SIC  WQS         SPECIES      DBH STH LG STA CFD DAM W

       2772 1 111 11 15   24   10 111 10214 Meranti tembaga   221   8  2    1  21  11 1
       2773 1 111 11 15   24   11 111 65001 Mempening         171   6  1    2  23  11 1
       2774 1 111 11 15   24   12 111 35801 Nyatoh            157   6  1    2  32  11 1

      QUADRAT NUMBER :   25
       2775 1 211 11 15   25    1 111 73501 Kelat            210   7  1    2  12  11 1
       2776 1 211 11 15   25    2 111 33801 Kembang semangkok  459  15  1    2  11  11 1
       2777 1 211 11 15   25    3 111 76501 Perah ikan       344   9  1    2  21  11 1
       2778 1 211 11 15   25    4 111 78685 Tempinis         280   5  2    2  32  11 2
       2779 1 211 11 15   25    5 111 73501 Kelat            170   4  1    2  33  11 1
       2780 1 211 11 15   25    6 111 43609 Temponek, Keledang tempone  312   8  1    2  12  11 2
       2781 1 211 11 15   25    7 111 10214 Meranti tembaga   261   7  1    1  12  11 1
       2782 1 211 11 15   25    8 111 73501 Kelat            313  12  1    2  21  11 1
       2783 1 211 11 15   25    9 111 66201 Penarahan        221   9  2    2  23  11 2
       2784 1 211 11 15   25   10 111 66801 Petaling         460  11  2    2  21  11 1
       2785 1 211 11 15   25   11 111 64801 Medang, M. pepijat  354  13  1    2  12  11 1
       2786 1 211 11 15   25   12 143 79999 Lain-lain        195   0  0    0  00  00 0

      TOTAL NO OF RECORDS LISTED = 2786
```

I.3   ITLSBLCK

Example of a Correct List of Treatment, Block and Quadrat Numbers.

```
PROGRAM ITLSBLCK

        DATE : 20/ 8/2002

THIS PROGRAM TABULATES THE NUMBER OF QUADRATS FOR EACH BLOCK
PER TREATMENT
CHECK CAREFULLY FOR ANY MISSING QUADRATS OR OTHER ERRORS  IN
THE FILE.

  LISTING OF NUMBER OF QUADRATS PER BLOCK IN FILE : KSTMT11.001
          TREATMENT BLOCK     NUMBER OF QUADRATS


              11     02          25
              11     07          25
              11     08          25
              11     15          25


TOTAL :          4               100
```

I.4   ITQUCHCK

Example of Part of a Clean Quadrat Check List.

```
PROGRAM ITQUCHCK                                     DATE : 20/08/2002
ITTO/MALAYSIA JOINT PROJECT *** QUADRATS CHECK *** FOR   KSTMT11.001

   TREAT BLOK  QDR   FCL TREES/Q  START-L  Q-CNT  TRNO-ERR FCL/STK-ERR

    11    02   001   121    6          1      1       0           0
    11    02   002   121   13          7      2       0           0
    11    02   003   121   16         20      3       0           0
    11    02   004   121   19         36      4       0           0
    11    02   005   121   21         55      5       0           0
    11    02   006   121   10         76      6       0           0
    11    02   007   121   38         86      7       0           0
    11    02   008   121   46        124      8       0           0
    11    02   009   121   60        170
    11    02   010
    .
    .                            9       2082     85       0           0
    11    15   011   121    9       2091     86       0           0
    11    15   012   121   66       2100     87       0           0
    11    15   013   121   33       2166     88       0           0
    11    15   014   121   30       2199     89       0           0
    11    15   015   121    7       2229     90       0           0
    11    15   016   121    8       2236     91       0           0
    11    15   017   121   37       2244     92       0           0
    11    15   018   121   38       2281     93       0           0
    11    15   019   121   49       2319     94       0           0
    11    15   020   121   14       2368     95       0           0
    11    15   021   121    6       2382     96       0           0
    11    15   022   121   11       2388     97       0           0
    11    15   023   121    6       2399     98       0           0
    11    15   024   121   12       2405     99       0           0
    11    15   025   121   12       2417    100       0           0

     TOTAL NO. OF LINES (TREES + EMPTY QUADS.) :    2428
```

I.7   ITFCLQNO

Example of Errors in the Forest Classes.

```
QUADRAT NO. 0508001 FOREST CLASS: 139 MAX. DIAM.=0489 PLEASE CHECK!

QUADRAT NO. 0508012 FOREST CLASS: 229 MAX. DIAM.=0275 PLEASE CHECK!

QUADRAT NO. 0508020 FOREST CLASS: 237 MAX. DIAM.=0248 PLEASE CHECK!

QUADRAT NO. 0510006 FOREST CLASS: 611 MAX. DIAM.=0170 PLEASE CHECK!

QUADRAT NO. 0510011 FOREST CLASS: 219 MAX. DIAM.=0291 PLEASE CHECK!

QUADRAT NO. 0510018 FOREST CLASS: 315 MAX. DIAM.=0163 PL

QUADRAT NO. 0510020 FOREST CLASS: 619 MA

QUADRAT NO. 051002
    .
```

Example of a summary tabulation of Forest Classes.

PROGRAM ITFCLQNO (ITTO/MAL/PD/24/93 Rev.2 (F))

DATE OF PRODUCTION: 19/ 8/2002
THIS PROGRAM TABULATES THE NUMBER & PERCENTAGE OF QUADRATS
FOR EACH FOREST CLASS FOUND IN THE RESEARCH PLOTS
ALL BLOCKS
NUMBER OF QUADRATS PER FOREST CLASS FROM FILE :LETMT05.981

```
FOREST  NO. OF  PERCENT
CLASS   QUADRT

MAIN FCL:  100        —— MATURE FOREST, TREE(S) >= 500MM (SIC = 111, LOGGR. 1 OR 2)
           117    1    1.0   MATURE FOREST, FULLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
           119    5    5.0   MATURE FOREST, FULLY SHADED, LOGGING TRACK, LANDING, POOL
           121   13   13.0   MATURE FOREST, PARTLY SHADED, GOOD SITE
           122    1    1.0   MATURE FOREST, PARTLY SHADED, CLIMBERS AND ROTAN
           127    1    1.0   MATURE FOREST, PARTLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
           128    9    9.0   MATURE FOREST, PARTLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
           129    4    4.0   MATURE FOREST, PARTLY SHADED, LOGGING TRACK, LANDING, POOL
           131    4    4.0   MATURE FOREST, FULL SUNLIGHT, GOOD SITE
           132    3    3.0   MATURE FOREST, FULL SUNLIGHT, CLIMBERS AND ROTAN
           137    1    1.0   MATURE FOREST, FULL SUNLIGHT, FALLEN TREES, CROWNS OR DEBRIS
           138    1    1.0   MATURE FOREST, FULL SUNLIGHT, STREAM, SWAMP, ROCKS, POOR SITE
           139    1    1.0   MATURE FOREST, FULL SUNLIGHT, LOGGING TRACK, LANDING, POOL
                 ——   ——
     SUBTOTAL    44   44.0

MAIN FCL:  200        —— IMMATURE FOREST, TREE(S) 300 MM TO 500 MM, (SIC=111, LOGGR. 1 OR 2)
           211    3    3.0   IMMATURE FOREST, FULLY SHADED, GOOD SITE
           217    2    2.0   IMMATURE FOREST, FULLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
           218    4    4.0   IMMATURE FOREST, FULLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
           219    2    2.0   IMMATURE FOREST, FULLY SHADED, LOGGING TRACK, LANDING, POOL
           221    8    8.0   IMMATURE FOREST, PARTLY SHADED, GOOD SITE
           222    4    4.0   IMMATURE FOREST, PARTLY SHADED, CLIMBERS AND ROTAN
           224    1    1.0   IMMATURE FOREST, PARTLY SHADED, BAMBOO
           227    1    1.0   IMMATURE FOREST, PARTLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
           228    4    4.0   IMMATURE FOREST, PARTLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
           229    3    3.0   IMMATURE FOREST, PARTLY SHADED, LOGGING TRACK, LANDING, POOL
           231    2    2.0   IMMATURE FOREST, FULL SUNLIGHT, GOOD SITE
           234    1    1.0   IMMATURE FOREST, FULL SUNLIGHT, BAMBOO
           235    1    1.0   IMMATURE FOREST, FULL SUNLIGHT, BANANA OR GINGER
```

```
237   2   2.0   IMMATURE FOREST, FULL SUNLIGHT, FALLEN TREES, CROWNS OR DEBRIS
238   4   4.0   IMMATURE FOREST, FULL SUNLIGHT, STREAM, SWAMP, ROCKS, POOR SITE
239   1   1.0   IMMATURE FOREST, FULL SUNLIGHT, LOGGING TRACK, LANDING, POOL
      ——      ——
SUBTOTAL   43   43.0

MAIN FCL :   300          ——— IMMATURE FOREST, TREE(S) 300 MM TO 500 MM, DOMINANCE OF PIONEERS
      311   1   1.0   IMMATURE FOREST, PIONEERS, FULLY SHADED, GOOD SITE
      315   1   1.0   IMMATURE FOREST, PIONEERS, FULLY SHADED, BANANA OR GINGER
      319   1   1.0   IMMATURE FOREST, PIONEERS, FULLY SHADED, LOGGING TRACK, LANDING, POOL
      321   1   1.0   IMMATURE FOREST, PIONEERS, PARTLY SHA
      325   1   1.0   IMMATURE FORE
      328
       .
       .
       .
```

NUMBER OF QUADRATS PER FOREST CLASS FROM FILE :LETMT05.981

```
FOREST   NO. OF   PERCENT
CLASS    QUADRT

      1    34   34.0   GOOD SITE
      2     8    8.0   CLIMBERS AND ROTAN
      4     2    2.0   BAMBOO
      5     4    4.0   BANANA OR GINGER
      7     8    8.0   FALLEN TREES, CROWNS OR DEBRIS
      8    23   23.0   STREAM, SWAMP, ROCKS, POOR SITE
      9    21   21.0   LOGGING TRACK, LANDING, POOL
    ====  ====  ====

TOTAL    7   100   100.0
```

I.8   ITSIC

Example of a list of Tree (Stem) Identity Classes.

```
PROGRAM ITSIC
        DATE OF PRODUCTION : 20/08/2002

 SUMMARY OF STEM IDENTITY CLASSES FROM FILE : LETMT05.941

       SIC CODE   NO. OF STEMS    PERCENT
       ─────      ───────         ────

         000           0             —      (EMPTY QUADRATS)
         111        1595           78.6     TREE ALIVE- STANDING- COMPLETE TRUNK
         112          52            2.6     TREE ALIVE- STANDING- BROKEN STEM
         113          48            2.4     TREE ALIVE- STANDING- BROKEN STUMP
         114           4             .2     CUT STUMP- STANDING- ALIVE
         115           3             .1     TREE ALIVE- STANDING- POISON GIRDLED
         119          13             .6     TREE ALIVE- STANDING- NOT FOUND
         121          14             .7     TREE ALIVE- FALLEN- COMPLETE TRUNK
         123           2             .1     TREE ALIVE- FALLEN- BROKEN STUMP
         131          90            4.4     TREE DEAD- STANDING- COMPLETE TRUNK
         132          29            1.4     TREE DEAD- STANDING- BROKEN STEM
         133          61            3.0     TREE DEAD- STANDING- BROKEN STUMP
         134          70            3.5     CUT STUMP- STANDING- DEAD
         135          12             .6     TREE DEAD- STANDING- POISON GIRDLED
         141          21            1.0     TREE DEAD- FALLEN- COMPLETE TRUNK
         142           8             .4     TREE DEAD- FALLEN- BROKEN STEM
        ─143          ─6            ─.3     TREE DEAD- FALLEN- BROKEN STUMP


TOTAL:   17          2028           99.9
```

I.9 ITTABSTD

Example of a Stand Table, Number of Trees.

PROGRAM ITTABSTD   **** S T A N D T A B L E ****   DATE : 23/08/2002
FORESTRY DEPARTMENT H.Q. /ITTO, KUALA LUMPUR

KSTMT15.021 ENUMERATED: 2002, KLEDANG SAIONG F.R. PERAK, TRMT. 15 : CONTROL, LOGGED, NOT TREATED
  BLOCK   = ALL BLOCKS
  FOREST CLASS   = ALL CLASSES
  STEM IDENTITY CLASS = 111
  ++*+*+*+*+*+*+*+*+*+*++*+*+*+*+*+*+ T A B L E   1 *+*+*++*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+
  SPECIES LIST   : NO CHECKS MADE
  PAGE VARIABLE NOT USED   NO. OF QUADRATS : 100, AREA : 4.00 HA.

MEAN NUMBER OF TREES PER HECTARE
DIAMETER CLASSES IN CENTIMETRES

	10.0 -14.9	15.0 -19.9	20.0 -24.9	25.0 -29.9	30.0 -34.9	35.0 -39.9	40.0 -44.9	45.0 -49.9	50.0 -54.9	55.0 -59.9	60.0 +	TOTAL	PER- CENT
WOOD QUALITY													
GROUP 1	14.58	3.50	2.25	2.25	2.25	1.25	.25	1.50	.75		1.00	29.58	8.41
GROUP 2	6.25	3.25	3.75	2.00	1.50	.50	2.00		1.50	.50	2.50	23.75	6.75
GROUP 3	34.72	8.50	6.75	4.75	2.25	3.00	1.00	1.25	1.00	.75	.50	64.47	18.33
GROUP 4	1.39	.75	1.00	1.00	.25		.75	.25				5.39	1.53
GROUP 5		.25	.50	.25		.25			.50	1.00		2.75	.78
GROUP 6	30.56	12.25	6.75	6.50	3.50	5.00	2.50	2.50	.75	1.25	1.25	72.81	20.70
GROUP 7	55.56	12.00	12.25	7.75	5.50	2.50	2.50	1.50	.75	.75	1.25	102.31	29.08
GROUP 8	22.22	12.75	6.50	6.50	2.00	.50	.25					50.72	14.42
TOTAL PER HA.	165.28	53.25	39.75	31.00	17.25	13.00	9.25	7.00	4.75	3.75	7.50	351.78	100.00
PER CENT	46.98	15.14	11.30	8.81	4.90	3.70	2.63	1.99	1.35	1.07	2.13		100.00
TOTAL ALL PLOTS	238.	213.	159.	124.	69.	52.	37.	28.	19.	15.	30.	984.	

++***+*+*+*+*+*+*+*+***+*+*+*+*+*+*+*+*+***+*+*+*+*+*+*+*+***+*+*+*+*+*+*+*+***+*+*+*+*+*+*+*+***+*+*+*

Example of a Stand Table, Basal Area.

KSTMT15.021 ENUMERATED: 2002, KLEDANG SAIONG F.R. PERAK,   TRMT. 15 : CONTROL, LOGGED, NOT TREATED
BLOCK   = ALL BLOCKS
FOREST CLASS   = ALL CLASSES
STEM IDENTITY CLASS = 111
*+ T A B L E   2 *+
SPECIES LIST   : NO CHECKS MADE
PAGE VARIABLE NOT USED   NO. OF QUADRATS : 100, AREA : 4.00 HA.

MEAN BASAL AREA PER HECTARE (SQUARE METRES)
DIAMETER CLASSES IN CENTIMETRES

	10.0 -14.9	15.0 -19.9	20.0 -24.9	25.0 -29.9	30.0 -34.9	35.0 -39.9	40.0 -44.9	45.0 -49.9	50.0 -54.9	55.0 -59.9	60.0 +	TOTAL	PER- CENT
WOOD QUALITY													
GROUP 1	.16	.08	.09	.13	.19	.13	.04	.26	.16		1.02	2.27	12.53
GROUP 2	.07	.08	.14	.12	.13	.06	.28		.32	.14	1.56	2.89	15.98
GROUP 3	.39	.20	.26	.28	.18	.33	.14	.21	.21	.19	.14	2.54	14.03
GROUP 4	.02	.02	.03	.05	.02		.11	.04				.30	1.65
GROUP 5		.01	.02	.02		.03				.13	.44	.63	3.51
GROUP 6	.35	.29	.28	.38	.30	.54	.34	.43	.16	.32	.39	3.78	20.88
GROUP 7	.67	.28	.46	.47	.45	.28	.36	.27	.16	.20	.66	4.26	23.52
GROUP 8	.26	.31	.25	.37	.15	.05	.04					1.43	7.90
TOTAL PER HA.	1.91	1.27	1.53	1.82	1.42	1.42	1.30	1.21	1.02	.98	4.22	18.10	100.00
PER CENT	10.54	7.04	8.48	10.04	7.83	7.83	7.20	6.70	5.62	5.42	23.30	100.00	

+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+**+*+*+*+*+*+*+*+*+*+*+*+**+*+*+*+*+*+*+*+*+*+*+*+**+*+*+*+*+*+*+*+*+*+*+*+*+*+*

Example of a Stand Table, Volume.

PROGRAM ITTABSTD   **** S T A N D T A B L E ****   DATE : 23/08/2002
FORESTRY DEPARTMENT H.Q. /ITTO, KUALA LUMPUR

KSTMT15.021 ENUMERATED: 2002, KLEDANG SAIONG F.R. PERAK,   TRMT. 15 : CONTROL, LOGGED, NOT TREATED
BLOCK   = ALL BLOCKS
FOREST CLASS   = ALL CLASSES
STEM IDENTITY CLASS = 111
 *+ T A B L E   2 *+
 SPECIES LIST   : NO CHECKS MADE
 PAGE VARIABLE NOT USED   NO. OF QUADRATS : 100, AREA : 4.00 HA.

MEAN VOLUME PER HECTARE (CUBIC METRES)
DIAMETER CLASSES IN CENTIMETRES

	30.0 -39.9	40.0 -49.9	50.0 -59.9	60.0 -69.9	70.0 -79.9	80.0 -89.9	90.0 -99.9	100.0 -109.9	110.0 -119.9	120.0 -129.9	130.0 +	TOTAL	PER-CENT
WOOD QUALITY													
GROUP 1	2.50	2.74	1.57	1.58	1.11						9.55	19.06	29.26
GROUP 2	1.40	2.44	4.41	2.36	2.35	2.90		2.60	3.30		4.08	25.84	39.67
GROUP 3	4.06	3.10	3.90	1.43								12.49	19.18
GROUP 4	.17	1.38										1.55	2.38
GROUP 5	.20		1.25	.85	2.52	1.37						6.19	9.50
TOTAL PER HA.	8.34	9.66	11.12	6.23	5.98	4.26		2.60	3.30		13.63	65.12	100.00
PER CENT	12.80	14.84	17.07	9.57	9.18	6.55		4.00	5.06		20.93	100.00	

VOL. FUNCT. BASED ON DIAMETER ONLY

+*+*+*+*+*+***+*+*+*+*+*+*+*+*+**+*+*+*+*+*+*+*+*+*+***+*+*+*+*+*+*+*+*+*+*+*+*+*+***+*+*+*+*+*+*+*+*+**+*+*+*+*+*+*+*+*+***+*+*

I.10 ITTABWQS

Example of a standtable given number of trees per hectare by species.

LETMT08.021 ENUMERATED: 1902, LESONG F.R., PAHANG   TRMT. 08 : NO LOGGING, VIRGIN CONTROL
BLOCK   = ALL BLOCKS
FOREST CLASS   = ALL CLASSES
STEM IDENTITY CLASS = 111
+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+** WOOD QUALITY GROUP : 1 *+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+
SPECIES LIST   : CHECK ON SPECIES.
NO SELECTION   NO. OF QUADRATS: 100, AREA : 4.00 HA.

MEAN NUMBER OF TREES PER HECTARE
DIAMETER CLASSES IN CENTIMETRES

SPECIES CODE	10.0 -14.9	15.0 -19.9	20.0 -24.9	25.0 -29.9	30.0 -34.9	35.0 -39.9	40.0 -44.9	45.0 -49.9	50.0 -54.9	55.0 -59.9	60.0 +	TOTAL	PER-CENT
1 103 Shorea pauciflora					.25						.50	.75	2.65
1 105 Shorea sinkawang		.50		.25	.2					.25		1.25	4.42
1 206 Shorea ovalis	.69	.75	.75	.25	.25	.25	.50	.25	.25		.50	4.44	15.72
1 208 Shorea lepidota	.69	.50	.25	.50	.25		.25	1.00	.25	.25	1.75	5.69	20.14
1 212 Shorea parvifolia		.50	.25		.25	.25			.75	.75	1.25	4.00	14.15
1 214 Shorea leprosula	.69	.50	.75	1.25	.50	.50	1.25	.25	.75	.50	1.25	8.19	28.98
1 216 Shorea macroptera			.25	.25	.25							.75	2.65
1 308 Shorea bracteolata				.25								.25	.88
1 401 Shorea spp. (Yellow)	.69	.25	.50									1.00	2.44 8.64
1 402 Shorea longisperma											.25	.25	.88
1 404 Shorea dolichocarpa											.25	.25	.88
TOTAL PER HA.	2.78	3.25	2.75	3.00	1.50	1.00	2.00	1.50	2.25	1.50	6.75	28.28	
PER CENT	9.82	11.49	9.72	10.61	5.30	3.54	7.07	5.30	7.96	5.30	23.87	100.00	100.00

+*+

I.11 ITTABWLD

Example of a Stand Table for Wildlings, both small (SIC=311) and successful (SIC=111), giving height

```
PROGRAM ITTABWLD            **** S T A N D T A B L E ****
                              - W I L D L I N G S
JOINT MALAYSIA - ITTO PROJECT                          DATE : 26/08/2002
KSTMT14.024 ENUMERATED: 2002  KLEDANG SAIONG F.R. PERAK   TREATMENT : 14 = CUT ALL>=30 CM + PLANT
WILDLING
  BLOCK    = ALL BLOCKS
  FOREST CLASS      = ALL CLASSES
  STEM IDENTITY CLASS   = 111 311
```
+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+ WOOD QUALITY GROUP : 1 *+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+
```
  SPECIES LIST    : SPECIES.DAT
  NUMBER OF SUBPLOTS/PLANT LINES : 68 ENUMERATED AREA : 4.0000 HA.
```

MEAN NUMBER OF STEMS PER HECTARE
HEIGHT CLASSES IN METRES

SPECIES CODE	.0 -.9	1.0 -1.9	2.0 -2.9	3.0 -3.9	4.0 -4.9	5.0 -5.9	6.0 -6.9	7.0 -7.9	8.0 -8.9	9.0 -9.9	10.0 +	TOTAL	PER-CENT
1 212 Meranti sarang punai	5.25	2.50	3.25	3.50	5.75	4.50	7.25	3.75	2.75	.75	.50	39.75	30.29
1 214 Meranti tembaga	7.25	7.50	4.75	6.25	4.50	11.00	13.25	12.25	9.00	4.00	3.75	83.50	63.62
1 216 Meranti melantai		.25	.50	1.00	2.50	.25	1.25	1.25	.25			7.25	5.52
1 401 Meranti Kuning/Damar Hitam	.50				.25							.75	.57
TOTAL PER HA.	13.00	10.25	8.50	10.75	13.00	15.75	21.75	17.25	12.00	4.75	4.25	131.25	100.00
PER CENT	9.90	7.81	6.48	8.19	9.90	12.00	16.57	13.14	9.14	3.62	3.24	99.99	

+*

TOTAL NUMBER OF PLANTS IN ALL PLOTS/LINES: 525

Example of a Stand Table for successful Wildlings giving diameter.

```
PROGRAM ITTABWLD              **** S T A N D T A B L E ****
                              - W I L D L I N G S
JOINT MALAYSIA - ITTO PROJECT                    DATE : 23/08/2002
KSTMT14.024 ENUMERATED: 2002  KLEDANG SAIONG F.R. PERAK,   TREATMENT : 14 = CUT ALL>=30 CM + PLANT
WILDLING
 BLOCK    = ALL BLOCKS
 FOREST CLASS        = ALL CLASSES
 STEM IDENTITY CLASS   = 111
+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+ WOOD QUALITY GROUP :  1 *+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+
 SPECIES LIST     : SPECIES.DAT
 NUMBER OF SUBPLOTS/PLANT LINES : 68 ENUMERATED AREA : 4.0000 HA.
```

MEAN NUMBER OF STEMS PER HECTARE
DIAMETER CLASSES IN CENTIMETRES

	5.0 -7.4	7.5 -9.9	10.0 -12.4	12.5 -14.9	15.0 -17.4	17.5 -19.9	20.0 -22.4	22.5 -24.9	25.0 -27.4	27.5 -29.9	30.0 +	TOTAL	PER-CENT
SPECIES CODE													
1 212													
Shorea parvifolia	4.5	9.2	5.0	3.5	1.2	.2						23.7	29.4
1 214													
Shorea leprosula	19.2	15.0	11.2	5.0	2.0	.2	.2					53.0	65.7
1 216													
Shorea macroptera	2.0	.5	.5	.2	.2							3.5	4.3
1 401													
Shorea spp. (Yellow)	.2		.2									.5	.6
TOTAL PER HA.	26.0	24.7	17.0	8.7	3.5	.5	.2					80.7	100.0
PER CENT	32.2	30.6	21.1	10.8	4.3	.6	.3					99.9	

```
+*+*++*+*+*+*+*+*+*+*++*+*+*+*+*+*+*+*+*++*+*+*+*+*+*+*+*+*+*++*+*+*+*+*+*+*+*++*+*+*+*+*+*++*+*+*+*+*+
```

TOTAL NUMBER OF PLANTS IN ALL PLOTS/LINES: 323

I.12 ITHEIGHT

Example of a Table of Tree Heights

PROGRAM : ITHEIGHT   DATE : 20: 8:2002
FORESTRY DEPARTMENT HQ, ITTO, KUALA LUMPUR

RESEARCH PLOT : KSTMT11.961   STEM HEIGHTS BY DIAMETER CLASS

STEM IDENTITY CLASS = 111
ALL LOG GRADES INCLUDED
COMMERCIAL LOG HEIGHT TO CROWN POINT IN METERS
10-CM DIAMETER CLASSES

WOOD QUALITY	15.0 24.9	25.0 34.9	35.0 44.9	45.0 54.9	55.0 64.9	65.0 74.9	75.0 84.9	85.0 94.9	95.0 104.9	105.0 114.9	115.0 124.9	125.0 +	AVERAGE HEIGHT TOTAL NO OF TREES
GROUP 1	9.2	11.1	13.1	13.3	14.7	17.0	.0	.0	.0	.0	.0	22.0	11.6
NO OF TREES :	26	20	15	4	6	3	0	0	0	0	0	1	75
GROUP 2	8.1	10.6	12.5	15.0	14.7	.0	.0	.0	.0	.0	.0	.0	9.8
NO OF TREES :	54	24	8	7	3	0	0	0	0	0	0	0	96
GROUP 3	7.6	10.4	12.7	13.9	15.9	20.0	.0	.0	.0	.0	.0	.0	9.7
NO OF TREES :	95	43	23	12	7	1	0	0	0	0	0	0	181
GROUP 4	8.7	11.3	11.0	14.5	18.3	.0	.0	.0	.0	.0	.0	.0	11.2
NO OF TREES :	14	7	2	4	3	0	0	0	0	0	0	0	30
GROUP 5	8.3	12.5	11.3	15.0	13.3	.0	.0	.0	.0	.0	.0	.0	11.3
NO OF TREES :	4	2	3	1	3	0	0	0	0	0	0	0	13
GROUP 6	8.1	9.8	13.5	12.1	15.8	15.3	10.0	.0	.0	.0	.0	.0	9.8
NO OF TREES :	122	61	25	23	8	3	1	0	0	0	0	0	243
GROUP 7	7.3	9.2	11.6	11.9	13.2	13.3	10.0	.0	.0	.0	.0	.0	8.5
NO OF TREES :	219	87	33	24	5	3	1	0	0	0	0	0	372
GROUP 8	7.1	8.1	10.6	.0	15.0	25.0	17.0	.0	.0	.0	.0	.0	7.6
NO OF TREES :	153	32	9	0	1	1	1	0	0	0	0	0	197
AVERAGE HEIGHT	7.6	9.7	12.3	12.8	15.1	16.5	12.3	.0	.0	.0	.0	22.0	9.2
TOTAL NO OF TREES:	687	276	118	75	36	11	3	0	0	0	0	1	1207

I.13 ITSPSUM

Part of the file ITSPSUM.DAT containing file names and enumerated area for the species summary.

```
'LETMT01.921' , 4.0
'LETMT02.921' , 4.0
'LETMT03.921' , 4.0
'LETMT04.921' , 4.0
'LETMT05.921' , 4.0
'LETMT06.921' , 4.0
'LETMT08.921' , 4.0
'LETMT01.931' , 4.0
'LETMT02.931' , 4.0
'LETMT03.931' , 4.0
'LETMT04.931' , 4.0
'LETMT05.931' , 4.0
'LETMT06.931
'LETM
.
.
```

Example of part of the Species Summary List.

```
PROGRAM ITSPSUM                                    DATE : 23/08/2002
SUMMARY OF THE OCCURANCE OF SPECIES (GENERA) FOR SELECTED FOREST AREAS
        FOREST / TRMT   :    LETMT01 LETMT01 LETMT01 LETMT08
        ENUMERATED YEAR:        .901    .921    .021    .021
        AREA (HA):    16.00     4.00    4.00    4.00    4.00
        SPECIES      TOTAL
  1    103 Meranti nemesu
                      .36     .00     .00     .00    1.44
  1    105 Meranti sengkawang merah
                     1.97    1.19    1.89    2.14    2.64
  1    206 Meranti kepong
                     2.37    1.44     .50    1.00    6.53
  1    208 Meranti langgong
                     3.06    1.64    1.64    2.58    6.39
  1    211 Meranti rambai daun
                      .53     .25     .94     .94     .00
  1    212 Meranti sarang punai
                     1.88     .25     .25    1.64    5.39
  1    214 Meranti tembaga
                     5.83    1.94    2.39    9.39    9.58
  1    216 Meranti melantai
                      .86     .50
  1    308 Meranti pa'
           .

           .
  2    701 Gerutu
                      .41     .69     .69     .25     .00
  2    703 Gerutu   pasir
                      .13     .25     .25     .00     .00
  2    801 Keruing (Berminyak)
                     1.81     .69    1.39    2.08    3.08
  2    802 Keruing bulu
                      .06     .00     .00     .25     .00
  2    803 Keruing gombang
                     4.16    1.19    3.97    3.83    7.64
           .
       913 Keruing kipas
                      .25     .00     .00     .00    1.00
  2   1101 Balau
```

```
                        .24      .00      .00      .00      .94
2    1111 Balau membatu
                        .36      .00      .00      .00     1.44
.
.
8    9840 Nipis Kulit
                      11.76     8.36     8.86     6.03    23.78
8    9845 Sial menahun
                       1.29      .25     1.19     1.64     2.08
8    9850 Tinjau Belukar
                       3.81     1.44     2.83     2.33     8.64
8    9855 Ubah
                       8.38      .69     2.78    29.81      .25

NOT FOUND          .00      .00      .00      .00     9.33

TOT SPEC.      134.00    77.00    88.00   106.00   112.00
```

I.14 ITGROEDT

Example of Growth Edit Error List 'Forward' Check.

```
PROGRAM ITGROEDT     FORESTRY DEPARTMENT H.Q., JOINT MALAYSIA - ITTO PROJECT
                              *** LIST OF INCOMPATIBLE TREES ***

 RESEARCH PLOT : LETMT03              20/ 8/2002         PAGE :  1
 BASEYEAR = -90

   STEM ID. CLASS (SIC) IN BASEYEAR = 111 (LIVING - STANDING - COMPLETE)
   WQ = WOOD QUALITY GROUP/SPECIES CODE, TR = TREE NO., L = RECORD NO., D = DIAM (MM)

 (BASEYEAR INFO)              BASE YEAR
 QUADRAT TR.NO. SPECIES CODE     -90            -94            -98            -00

  305  3    16  6 6201      DIAM : 283                   7 9225 D: 165  7 9225 D: 165
 Penarahan                  TR: 16 L:  33                TR: 16 L:  25  TR: 16 L:  30

  305  6    15  7 9260      DIAM : 188                   7 9999 D: 286  7 9999 D: 292
 Tampoi, Rambai h., Setambun TR: 15 L:  72               TR: 15 L:  47  TR: 15 L:  53

  305  8    23  6 5601      DIAM : 182                   1  216 D: 203  TREE NOT FOUND
 Merpauh                    TR: 23 L: 132                TR: 23 L: 106

  305  9     2  7 3501      DIAM : 225                   8 8001 D: 233  8 8001 D: 233
 Kelat                      TR:  2 L: 149                TR:  2 L: 124  TR:  2 L: 127

  305 18    11  3 3802      DIAM :  63                   3 3801 D: 150  3 3801 D: 155
 Kembang semangkok bulat    TR: 11 L: 303                TR: 11 L: 343  TR: 11 L: 355

  305 18    14  6 6201      DIAM :  90                   7 3501 D: 120  7 3501 D: 126
 Penarahan                  TR: 14 L: 306                TR: 14 L: 345  TR: 14 L: 357

  305 21     1  7 3501      DIAM : 190                                  7 8670 D: 242
 Kelat                      TR:  1 L: 347                               TR:  1 L: 425

  305 21     4  3 5101      DIAM : 254                                  7 3501 D: 305
 Mempisang                  TR:  4 L: 350                               TR:  4 L: 427

  305 24    11  6 2201      DIAM : 218                   6 6201 D: 218  TREE NOT FOUND
 Dedali                     TR: 11 L: 384                TR: 11 L: 428

  305 24    13  6 5601      DIAM : 200                   1  216 D: 235  1  216 D: 253
 Merpauh                    TR: 13 L: 386                TR: 13 L: 429  TR: 13 L: 459

  318  2    10  7 9285      DIAM : 219                   6 4901 D: 247  6 4901 D: 257
 SP. CODE NOT FOUND         TR: 10 L: 423                TR: 10 L: 459  TR: 10 L: 489

  318  6     7  3 3201      DIAM : 221                   7 3501 D: 274  7 3501 D: 280
 Kedondong                  TR:  7 L: 444                TR:  7 L: 478  TR:  7 L: 507

 RESEARCH PLOT : LETMT03                          PAGE :    2

  318  6     9  7 3501      DIAM : 161                   2  803 D: 215  2  803 D: 215
 Kelat                      TR:  9 L: 446                TR:  9 L: 480  TR:  9 L: 509

  318  8    23  3 5101      DIAM :  68                   8 9855 D: 112  8 9855 D: 145
 Mempisang                  TR: 23 L: 485                TR: 23 L: 537  TR: 23 L: 554
 .                                                                            .
 .

   TOTAL NUMBER OF RECORDS IN BASEYEAR =   1361
    OF WHICH     66 WERE INCOMPATIBLE,
    INCL.      370 TREES NOT FOUND
```

Example of Part of a Growth Edit Error List 'Backwards' Check.

```
PROGRAM ITGROEDT      FORESTRY DEPARTMENT H.Q., JOINT MALAYSIA - ITTO PROJECT
                                  *** LIST OF INCOMPATIBLE TREES ***

RESEARCH PLOT : LETMT02              20/ 8/2002          PAGE :  1
BASEYEAR =  -00

 STEM ID. CLASS (SIC) IN BASEYEAR = 111 (LIVING - STANDING - COMPLETE)
 WQ = WOOD QUALITY GROUP/SPECIES CODE, TR = TREE NO., L = RECORD NO., D = DIAM (MM)

(BASEYEAR INFO)                                                  BASE YEAR
QUADRAT TR.NO. SPECIES CODE      -92            -94            -98        -00

202  1    16  6 4801      NEW RECRUIT    NEW RECRUIT    NEW RECRUIT    DIAM : 214
Medang, M. pepijat                                                     TR: 16 L:  12

202  4     8  8 8001      NEW RECRUIT    NEW RECRUIT    NEW RECRUIT    DIAM : 275
Sesendok                                                              TR:  8 L:  28

202  4     9  6 4801      NEW RECRUIT    NEW RECRUIT    NEW RECRUIT    DIAM : 221
Medang, M. pepijat                                                     TR:  9 L:  29

202  4    10  3 3201      NEW RECRUIT    NEW RECRUIT    NEW RECRUIT    DIAM : 227
Kedondong                                                             TR: 10 L:  30

202  5     6  1  206      1  216 D: 230  1  216 D: 241                 DIAM : 259
Meranti kepong            TR:  6 L:  39  TR:  6 L:  42                 TR:  6 L:  33

202  5     7  3 5101      1  216 D: 181  1  216 D: 171  NEW RECRUIT    DIAM : 173
Mempisang                 TR:  7 L:  40  TR:  7 L:  43                 TR:  7 L:  34

202  5    10  8 9840      NEW RECRUIT    NEW RECRUIT    NEW RECRUIT    DIAM : 214
Nipis Kulit                                                           TR: 10 L:  37

202  5    13  6 4801      NEW RECRUIT    NEW RECRUIT    NEW RECRUIT    DIAM : 228
Medang, M. pepijat                                                     TR: 13 L:  40

202  5    14  8 8001      NEW RECRUIT    NEW RECRUIT    NEW RECRUIT    DIAM : 220
Sesendok                                                              TR: 14 L:  41

202  6    11  3 5101                     6 3101 D: 184                 DIAM : 217
Mempisang                                TR: 11 L:  56                 TR: 11 L:  50

202  7     1  7 3501                     SIC112 WQ73501                DIAM : 219
Kelat                                    TR:  1 L:  57                 TR:  1 L:  54

202  7     3  6 4801      7 3501 D: 350  7 3501 D: 387  7 3501 D: 391  DIAM : 517
Medang, M. pepijat        TR:  3 L:  56  TR:  3 L:  59  TR:  3 L:  39  TR:  3 L:  55

202  7    21  1  212      7 9999 D:  72  7 9245 D:  92  7 9245 D: 102  DIAM : 198
Meranti sarang punai      TR: 21 L:  74  TR: 21 L:  77  TR: 21 L:  51  TR: 21 L:  62

213 17    25  7 3501      NEW RECRUIT    7 9999 D:
 .
 .
 .

 TOTAL NUMBER OF RECORDS IN BASEYEAR =    1406
  OF WHICH    353 WERE INCOMPATIBLE,
  INCL.        0 TREES NOT FOUND
```

79

Example of Part of Summary of New Recruits.

```
RESEARCH PLOT : LETMT02                    PAGE :   21

 LIST OF NEW RECRUITS BY SPECIES IN BASEYEAR : LETMT02.001
  ACTUAL NUMBER  >5CM / >15CM  BETWEEN 2000 AND SINCE :

WQ SPCODE                                   1992        1994        1998
 1   206  Meranti kepong                      1           1           0
 1   212  Meranti sarang punai                1           1           0
 1   214  Meranti tembaga                     4           2           2
 1   216  Meranti melantai                    1           1           1
 3  3201  Kedondong                          19          12          10
 3  5101  Mempisang                          12          11           9
 3  5801  Nyatoh                              2           2           1
 3  8501  Terentang                           1           0           0
 4  8101  Simpoh                              3           1           0
 4  9110  Membuloh                            3           2           1
 5  3401  Kekatong                            1           1           0
 6  2201  Dedali                              1           0           0
 6  3101  Kayu arang, Meribut, Tuba buah      2           0           1
 6  4801  Medang, M. pepijat                 27          20          15
 6  4901  Melunak…
.
 7  3501  Kelat                              46          41          32
 7  8615  Karas                               1           1           0
 7  8635  Putat                               2           1           2
 7  8645  Melembu                             9           4           0
 7  8650  Bekak, Telur Belangkas              3           2           0
 7  9215  Bebusuk, Busok busok, Jahar         1           1           0
 7  9245  Pagar anak, Inggir burong           2           1           0
 7  9250  Pepauh                              5           3           1
 7  9265  Rukam, Melokam                      1           0           0
 7  9999  Lain-lain                           1           0           0
 8  1501  Ara, A. kelepong                   18           9           5
 8  3701  Kelempayan                         53          21          11
 8  4301  Leban                               3           3           1
 8  4401  Ludai                              24          11           0
 8  4601  Mahang, Mersepat                   50          29          19
 8  4602  Kubin, Mahang gajah                10           3           1
 8  8001  Sesendok                           25          20          11
 8  9802  Balik angin                        13           7           0
 8  9805  Berembang bukit                     1           1           1
 8  9815  Hampas tebu                         1           1           1
 8  9820  Hujan panas                         5           5           3
 8  9825  Kenidai, Kernam                     1           1           0
 8  9830  Mengkirai, Menarong                 5           0           0
 8  9840  Nipis Kulit                         7           6           6
 8  9845  Sial menahun                        1           1           1
 8  9855  Ubah                               21          15           9
 NUMBER OF GENERA/SPECIES :                 46          35          23

RESEARCH PLOT : LETMT02                       PAGE :   22

SUMMARY OF NEW RECRUITS BY WOOD QUALITY GROUP

   WOOD QUALITY             1992        1994        1998
         GROUP 1              7           5           3
         GROUP 2              0           0           0
         GROUP 3             34          25          20
         GROUP 4              6           3           1
         GROUP 5              1           1           0
         GROUP 6             37          21          16
         GROUP 7             72          54          35
         GROUP 8            238         133          69

 TOTAL ALL W.Q. GROUPS =    395         242         144
```

I.15 ITGROWTH

Example of Part of a Growth Error List as Produced by ITGROWTH.

PROGRAM : ITGROWTH
**** LISTING OF ERRORS ****   DATE : 20/08/2002

RESEARCH PLOT : KSTMT   TREATMENT : 11   CLIMBER CUTTING
BASE YEAR = 1991.04   GROWTH YEAR = 1996.79

TMT	BLK	QUAD	TNO	SPECIES	DIAM	SIC	LINE	DIFF	COMMENTS
11	2	2	10	64901	37.1	111	00014	-1.51	GROWTH RATE TOO SMALL ! NO GROWTH, BUT LIVING
11	2	2	10	64901	28.4	111	00016		
11	2	4	9	35801	27.5	111	00039	7.37	GROWTH RATE TOO BIG ! NO GROWTH, BUT LIVING
11	2	4	9	35801	69.9	111	00044		
.									
.									
11	7	21	2	74701	48.4	111	01125	-1.04	GROWTH RATE TOO SMALL ! NO GROWTH, BUT LIVING
11	7	21	2	74701	42.4	111	01343		
11	8	8	7	73501	52.0	111	01297	5.36	GROWTH RATE TOO BIG ! NO GROWTH, BUT LIVING
11	8	8	7	73501	82.8	111	01562		
11	8	8	43	73501	21.6	111	01333	.00	SPECIES CODE CHANGE! TREE INCLUDED
11	8	8	43	35801	25.0	111	01598		
11	8	11	6	73501	48.3	111	01423	-3.08	GROWTH RATE TOO SMALL ! NO GROWTH, BUT LIVING
11	8	11	6	73501	30.6	111	01709		
11	8	24	16	78670	31.2	111	01781	.00	TREE NOT FOUND, TREATED AS DEAD
11	15	5	6	65601	50.1	111	01836	-7.84	GROWTH RATE TOO SMALL ! NO GROWTH, BUT LIVING
11	15	5	6	65601	5.0	111	02228		

IFLAG ERROR COUNT
1= 1 TREES NOT FOUND
2= 5 GROWTH TOO BIG
3= 17 GROWTH TOO SMALL
4= 1 SPECIES CHANGE
5= 0 SPECIES NOT FOUND

Example of a Standard Increment and Mortality Table.

```
PROGRAMME : ITGROWTH
NUMBER OF TREES EXCLUDED              =  0
NO. OF TREES WITH NO GROWTH RATE, BUT LIVING =  22
```

```
   BLOCK    = ALL BLOCKS
   FOREST CLASS        = ALL CLASSES
   STEM IDENTITY CLASS  = 111
   MINIMUM GROWTH       = -10, MAXIMUM GROWTH =  50 MM/YEAR
*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*  T A B L E   1  *+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+
   SPECIES LIST        : NO CHECKS MADE                    NO. OF QUADRATS : 100,  AREA : 4.00 HA.
   VARIABLE NOT USED   :
```

MEAN ANNUAL DIAMETER INCREMENT IN CENTIMETRES
DIAMETER CLASSES IN CENTIMETRES

WOOD QUALITY	15.0 -19.9	20.0 -24.9	25.0 -29.9	30.0 -34.9	35.0 -39.9	40.0 -44.9	45.0 -49.9	50.0 -54.9	55.0 -59.9	60.0 -64.9	65.0 +	AVER- AGE
1	.48	.92	.88	1.04	.90		1.25	.92	1.51	.82		.90
LIVING TREES PER HA.	2.25	3.00	2.25	1.25	1.75		.75	1.00	.75	.50		13.50
DEAD, FALLEN OR BROKEN					.25							.25
MEAN ANNUAL MORTALITY PCT.					2.17							.32
2		.39	.37	.52	.42	.98	.98	.61	.97			.52
LIVING TREES PER HA.		9.50	1.50	4.00	1.00	2.00	1.00	1.25	.25			20.50
DEAD, FALLEN OR BROKEN			.25	.25	.50					.25		1.25
MEAN ANNUAL MORTALITY PCT.			2.48	1.02	5.80					17.39		1.00
3		.40	.65	.54	.62	.41	.45	.58	1.11	.38		.54
LIVING TREES PER HA.		11.50	8.50	5.25	3.25	2.50	1.50	1.75	1.50	.75		36.50
DEAD, FALLEN OR BROKEN			1.25	1.75		1.00	1.00		.25	.25		5.50
MEAN ANNUAL MORTALITY PCT.			1.71	2.97		4.09	4.97		2.48	4.35		2.28
4		.49	1.11	.63	.67		.77	.88	.84	.57		.76
LIVING TREES PER HA.		1.25	1.75	.75	.50	.25	.75	.50	.50	.25		6.50
DEAD, FALLEN OR BROKEN					.25							.25
MEAN ANNUAL MORTALITY PCT.					5.80							.64
5		.69	.82	.92	.66		1.30	1.48				.74
LIVING TREES PER HA.		1.25	.75	.50	.75	.75	.25	.50				4.75
DEAD, FALLEN OR BROKEN						.25						.25
MEAN ANNUAL MORTALITY PCT.						4.35						.87
6	.46	.52	.49	.72	.52	.42	.78	.73	.33	.93	.69	.54
LIVING TREES PER HA.	14.75	10.25	6.75	4.00	2.50	3.75	2.25	2.00	.50	1.25	.50	48.50
DEAD, FALLEN OR BROKEN	.75	1.25		.25		1.00	.25	.25	.25		.25	4.25
MEAN ANNUAL MORTALITY PCT.	.84	1.89		1.02		3.66	1.74	1.93	5.80		5.80	1.40
7		.41	.51	.41	.56	.66	.77	.36	-.34	1.71	.64	.49
LIVING TREES PER HA.		29.50	16.50	8.75	7.50	3.25	5.00	2.75	.50	1.00	.50	75.25
DEAD, FALLEN OR BROKEN		5.00	3.50	2.25	2.00	.25	.25	.25	.25	.25	.25	14.25

MEAN ANNUAL MORTALITY PCT.   2.52 3.04 3.56 3.66 1.24   .83 1.45 5.80   5.80 17.39 2.77

1   PAGE : 2

8   .47   .39   .18   .26   .14   .14   1.60   1.34   .40
LIVING TREES PER HA.   8.25 4.50 3.25 1.25 1.25   .25   .25   .50 19.50
DEAD,FALLEN OR BROKEN   .25   .25   .50
MEAN ANNUAL MORTALITY PCT .   .92   2.90   .43

TOTAL : AVERAGE PER HA.   .43   .57   .49   .61   .61   .59   .64   .84 1.14   .84   .89   .54
L IVING TREES PER HA.   78.25 46.75 31.50 18.75 14.25 13.00 9.25 6.00 3.75 1.75 1.75 225.00
DEAD,FALLEN OR BROKEN   7.00 7.00 2.50 4.25 1.50 1.50   .50   .75   .50   .25   .75 26.50
MEAN ANNUAL MORTALITY PCT. 1.43 2.26 1.28 3.21 1.66 1.80   .89 1.93 2.05 2.17 5.22   1.83
+*+

I.16 ITINGROW

Example of a Table of the Size Class Disrtibution of New Recruits ('Ingrowth').

```
PROGRAM ITINGROW                        **** I N - G R O W T H ****
FORESTRY DEPT. H.Q., JOINT ITTO/MALAYSIA PROJECT        DATE 20/08/2002            PAGE :  1

KSTMT11.961  BASE YEAR     1996.79 KLEDANG SAIONG F.R. PERAK      TRMT = 11 : CLIMBER CUTTING
KSTMT11.901  IN-GROWTH YEAR  1991.04 IN-GROWTH PERIOD =  5.75 YEARS

  BLOCK    = ALL BLOCKS
  FOREST CLASS      = ALL CLASSES
  STEM IDENTITY CLASS  = 111
*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+  T A B L E   1 *+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*
  SPECIES LIST      : NO CHECKS MADE
  PAGE VARIABLE NOT USED                             NO. OF QUADRATS : 100,  AREA :  4.00 HA.
```

TOTAL NO. OF NEW RECRUITS FROM 90 TO 96
DIAMETER CLASSES IN CENTIMETRES, AVERAGE PER HA

WOOD QUALITY	15.0-19.9	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0+	MEAN ANNUAL INGROWTH
1	1.75	1.00	.25									.52
2	3.25	.25										.61
3	7.75	1.25	.25							.25		1.65
4	1.00											.17
5	1.25											.22
6	10.00	2.25								.25		2.17
7	15.75	1.25	1.00	.50		.25						3.26
8	21.00	5.25	2.25	.25								5.00
AVERAGE PER HA.	61.75	11.25	3.50	1.00		.25				.50		13.61

```
*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*
```

I.17 ITGRORAT

Example of Growth Rate error list.

```
PROGRAM : ITGRORAT
**** LISTING OF ERRORS ****      DATE : 20/08/2002

  RESEARCH PLOT : KSTMT      TREATMENT : 11     CLIMBER CUTTING
    BASE YEAR = 1991.04      GROWTH YEAR = 1996.79

  TMT BLK QUAD TNO   SPECIES   DIAM    SIC   LINE    DIFF     COMMENTS

  11   8    8   43    73501   21.6    111   01333    .00     SPECIES CODE ERROR,
TREE INCLUDED
  11   8    8   43    35801   25.0    111   01598

  11   8   24   16    78670   31.2    111   01781    .00     TREE NOT FOUND,
TREATED AS DEAD

  IFLAG ERROR COUNT :
  1=   0
  2=   1
  3=   1
```

Example of part of a Growth Rate table output.

```
PROGRAMME : ITGRORAT      NUMBER OF TREES EXCLUDED =   0
FORESTRY DEPARTMENT H.Q. / ITTO        **** G R O W T H - R A T E S ****   DATE 20/08/2002   PAGE :  2
KSTMT11.901  BASE YEAR      1991.04  KLEDANG SAIONG F.R. PERAK          TRMT : 11   CLIMBER CUTTING
KSTMT11.961  GROWTH YEAR 1996.79  GROWTH PERIOD = 5.75 YEARS
```

```
  BLOCK    = ALL BLOCKS
  FOREST CLASS      = ALL CLASSES
  STEM IDENTITY CLASS   = 111
*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+ T A B L E   1  *+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+
  SPECIES LIST       : NO CHECKS MADE                 NO. OF QUADRATS : 100  AREA : 4.00 HA
  SELECTION OF VARIABLES : NO SELECTION VAR.
  WOOD QUALITY      : 1
```

MEAN ANNUAL DIAMETER INCREMENT IN CENTIMETRES
DIAMETER CLASSES IN CENTIMETRES

GROWTH RATES MM	15.0 -19.9	20.0 -24.9	25.0 -29.9	30.0 -34.9	35.0 -39.9	40.0 -44.9	45.0 -49.9	50.0 -54.9	55.0 -59.9	60.0 -64.9	65.0 +	AVER-AGE	PER-CENT
< 0	-.57											-.57	
LIVING TREES PER HA.	.25											.25	1.85
= 0													
LIVING TREES PER HA.													
0 < 2	.17								.19	.16		.17	
LIVING TREES PER HA.	.50								.25	.25		1.00	7.41
2 < 4		.29	.37	.37	.33							.32	
LIVING TREES PER HA.		.75	.25	.25	.50							1.75	12.96
4 < 6	.46	.50	.52		.52							.50	
LIVING TREES PER HA.	.75	.50	.75		.25							2.25	16.67
6 < 8	.71	.70	.70	.75			.75	.72				.72	
LIVING TREES PER HA.	.25	.50	.25	.25			.25	.50				2.00	14.81
8 < 10		.85	.86	.90								.87	
LIVING TREES PER HA.		.25	.75	.25								1.25	9.26
10 < 12	1.04	1.17		1.04	1.12		1.06	1.12				1.10	
LIVING TREES PER HA.	.25	.25		.25	.75		.25	.50				2.25	16.67
12 <	1.41	1.90	2.68	2.16	1.77		1.93		2.17		1.48	1.95	
LIVING TREES PER HA.	.25	.75	.25	.25	.25		.25		.50		.25	2.75	20.37
AVERAGE GROWTH RATE :	.48	.92	.88	1.04	.90		1.25	.92	1.51		.82	.90	
LIVING TREES PER HA.	2.25	3.00	2.25	1.25	1.75		.75	1.00	.75		.50	13.50	100.00
DEAD,FALLEN OR BROKEN					.25							.25	
MEAN ANNUAL MORTALITY PCT.					2.17							.32	

```
  *+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*
  .
  .
```

Similar tables for the other Wood Quality Groups

Summary table.

 KSTMT11.901 BASE YEAR   1991.04 KLEDANG SAIONG F.R. PERAK   TRMT : 11   CLIMBER CUTTING
 KSTMT11.961 GROWTH YEAR 1996.79 GROWTH PERIOD = 5.75 YEARS

  BLOCK   = ALL BLOCKS
  FOREST CLASS   = ALL CLASSES
  STEM IDENTITY CLASS = 111
++ T A B L E 9 ++
  SPECIES LIST   : NO CHECKS MADE   NO. OF QUADRATS : 100 AREA : 4.00 HA
  SELECTION OF VARIABLES : NO SELECTION VAR.
  WOOD QUALITY   : 1, 2, 3, 4, 5, 6, 7, 8

MEAN ANNUAL DIAMETER INCREMENT IN CENTIMETRES
DIAMETER CLASSES IN CENTIMETRES

GROWTH RATES MM	15.0 -19.9	20.0 -24.9	25.0 -29.9	30.0 -34.9	35.0 -39.9	40.0 -44.9	45.0 -49.9	50.0 -54.9	55.0 -59.9	60.0 -64.9	65.0 +	AVER- AGE	PER- CENT
< 0	-.61	-1.33	-1.93	-.28	-2.47	-.55	-1.91	-3.13				-1.44	
LIVING TREES PER HA.	2.50	1.75	1.75	.25	1.00	1.50	1.50	.75				11.00	4.89
= 0													
LIVING TREES PER HA.				.50	.25							.75	.33
0 < 2	.12	.13	.11	.14	.10	.11	.19	.08	.12	.13	.16	.12	
LIVING TREES PER HA.	20.25	9.25	4.50	3.50	3.00	3.00	.25	1.00	.50	.75	.25	46.25	20.56
2 < 4	.30	.31	.31	.32	.31	.32	.24	.35	.34	.23		.31	
LIVING TREES PER HA.	21.50	11.25	9.50	5.00	2.25	2.00	1.75	.25	.75	.25		54.50	24.22
4 < 6	.49	.51	.49	.50	.52	.49	.48	.42	.43		.57	.50	
LIVING TREES PER HA.	15.25	8.25	5.50	3.25	2.25	1.75	1.50	.25	.25		.50	38.75	17.22
6 < 8	.69	.69	.69	.69	.71	.67	.70	.75	.63		.80	.69	
LIVING TREES PER HA.	9.00	6.25	4.50	2.50	1.75	1.25	1.50	.75	.50		.50	28.50	12.67
8 < 10	.88	.87	.87	.89	.88	.89	.90	.87	.97			.88	
LIVING TREES PER HA.	3.50	4.25	2.00	1.50	1.00	1.50	.25	.25	.25			14.50	6.44
10 < 12	1.07	1.06	1.05	1.12	1.10	1.03	1.08	1.12		1.10		1.08	
LIVING TREES PER HA.	2.75	2.00	1.00	1.00	1.75	.25	1.50	.75		.25		11.25	5.00
12 <	2.01	2.58	2.37	2.45	1.98	2.02	1.84	2.43	3.14	2.10	1.68	2.31	
LIVING TREES PER HA.	3.50	3.75	2.25	1.50	1.25	1.75	1.00	2.00	1.50	.50	.50	19.50	8.67
AVERAGE GROWTH RATE :	.44	.56	.44	.61	.44	.54	.33	.74	1.52	.84	.89	.51	
LIVING TREES PER HA.	78.25	46.75	31.50	18.75	14.25	13.00	9.25	6.00	3.75	1.75	1.75	225.00	100.00
DEAD,FALLEN OR BROKEN	7.00	7.00	2.50	4.25	1.50	1.50	.50	.75	.50	.25	.75	26.50	
MEAN ANNUAL MORTALITY PCT.	1.43	2.26	1.28	3.21	1.66	1.80	.89	1.93	2.05	2.17	5.22	1.83	

+

I.18 ITSELECT

Example of documentation of output for statistical analysis.

```
JOINT ITTO/MALAYSIA PROJECT   **** I T S E L E C T ****   DATE 22/08/2002

BASE YEAR : LETMT01.901  ENUMERATED : 1990 DECIMAL DATE : 90.65


NUMBER OF RECORDS SELECTED FROM BASEYEAR =     27
  OF WHICH     22 WERE OUTPUT AND     5 EXCLUDED
     BLOCK      = ALL BLOCKS
     FOREST CLASS          = ALL CLASSES
     STEM IDENTITY CLASS   = 111
     MINIMUM DIAMETER      =  150
     MAXIMUM DIAMETER      = 4000
     WOOD QUALITY GROUP    =  1, 2
     SPECIES LIST          : ALL SPECIES

THE FOLLOVING VARIABLES HAVE BEEN INCLUDED FOR BASEYEAR :

  STEM IDENTITY CLASS
  WOOD QUALITY GROUP
  FAMILY
  GENERA
  DIAMETER DBHob
  LOG QUALITY

THE FOLLOWING VARIABLES HAVE BEEN INCLUDED FOR
  GROWTH YEAR ENUMERATED : 1996 DECIMAL DATE =96.71

  STEM IDENTITY CLASS
  DIAMETER DBHob
  LOG QUALITY

THE FOLLOWING VARIABLES HAVE BEEN INCLUDED FOR
  GROWTH YEAR ENUMERATED : 2002 DECIMAL DATE = 2.21

  STEM IDENTITY CLASS
  DIAMETER DBHob
  LOG QUALITY

NUMBER OF RECORDS SELECTED FOR OUTPUT =    22
  NUMBER OF VARIABLES = 12

  OUTPUT FILE = ITSELEC2.TXT

*** END OF LIST ***
```

Example of Output File for Statistical Analysis

111	2	14	1	258	2	111	318	1	111	385	1
111	2	14	1	275	2	111	300	1	111	322	1
111	2	7	3	294	2	113	305	0	112	295	2
111	2	8	3	198	2	111	235	1	111	241	1
111	1	4	1	214	2	111	287	1	111	337	1
111	1	4	1	297	2	111	374	1	111	480	1
111	1	1	5	214	2	111	321	1	111	370	1
111	1	2	14	296	2	111	405	2	111	453	2
111	2	9	11	205	3	111	252	2	111	303	1
111	1	2	11	212	2	111	366	2	111	478	1
111	2	12	1	290	1	111	402	1	111	443	1
111	2	14	1	168	2	111	189	2	111	201	2
111	2	12	1	180	3	111	180	0	111	270	1
111	2	8	3	168	2	111	175	2	111	174	1
111	1	2	14	220	2	111	262	1	112	259	2
111	1	2	12	168	2	111	213	1	111	264	1
111	1	2	6	286	2	111	353	1	111	416	1
111	1	2	8	196	2	111	242	1	111	270	1
111	1	2	6	150	2	111	192	1	111	192	2
111	1	2	16	163	2	111	179	2	111	191	2
111	1	2	14	231	2	111	315	1	111	332	1
111	1	1	5	261	2	111	350	1	111	417	1

APPENDIX II SUPPORT DATA FILES.

The Support Data Files contain different lists such as Forest Classes, Stem Identity Classes, Species codes etc. that are used by the programmes during edit checking and for output tables.

In order to ease the documentation some of the lists exist in two versions :

- A version to be used for computer processing with the file name extension of ....DAT

- A version to be used by WORD for documentation with the file name extension of ....DOC

When changes or additions are made, remember to update both versions.

II.1 FDAFCL.DAT

The List of Forest Classes contains all possible combinations some of which may not be encountered.

```
100 MATURE FOREST, TREE(S) >= 500MM (SIC = 111, LOGGR. 1 OR 2)

111 MATURE FOREST, FULLY SHADED, GOOD SITE
112 MATURE FOREST, FULLY SHADED, CLIMBERS AND ROTAN
113 MATURE FOREST, FULLY SHADED, PALMS
114 MATURE FOREST, FULLY SHADED, BAMBOO
115 MATURE FOREST, FULLY SHADED, BANANA OR GINGER
116 MATURE FOREST, FULLY SHADED, FERNS OR LALANG
117 MATURE FOREST, FULLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
118 MATURE FOREST, FULLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
119 MATURE FOREST, FULLY SHADED, LOGGING TRACK, LANDING, POOL
121 MATURE FOREST, PARTLY SHADED, GOOD SITE
122 MATURE FOREST, PARTLY SHADED, CLIMBERS AND ROTAN
123 MATURE FOREST, PARTLY SHADED, PALMS
124 MATURE FOREST, PARTLY SHADED, BAMBOO
125 MATURE FOREST, PARTLY SHADED, BANANA OR GINGER
126 MATURE FOREST, PARTLY SHADED, FERNS OR LALANG
127 MATURE FOREST, PARTLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
128 MATURE FOREST, PARTLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
129 MATURE FOREST, PARTLY SHADED, LOGGING TRACK, LANDING, POOL
131 MATURE FOREST, FULL SUNLIGHT, GOOD SITE
132 MATURE FOREST, FULL SUNLIGHT, CLIMBERS AND ROTAN
133 MATURE FOREST, FULL SUNLIGHT, PALMS
134 MATURE FOREST, FULL SUNLIGHT, BAMBOO
135 MATURE FOREST, FULL SUNLIGHT, BANANA OR GINGER
136 MATURE FOREST, FULL SUNLIGHT, FERNS OR LALANG
137 MATURE FOREST, FULL SUNLIGHT, FALLEN TREES, CROWNS OR DEBRIS
138 MATURE FOREST, FULL SUNLIGHT, STREAM, SWAMP, ROCKS, POOR SITE
139 MATURE FOREST, FULL SUNLIGHT, LOGGING TRACK, LANDING, POOL

200 IMMATURE FOREST, TREE(S) 300 MM TO 500 MM, (SIC=111, LOGGR. 1 OR 2)

211 IMMATURE FOREST, FULLY SHADED, GOOD SITE
212 IMMATURE FOREST, FULLY SHADED, CLIMBERS AND ROTAN
213 IMMATURE FOREST, FULLY SHADED, PALMS
```

```
214 IMMATURE FOREST, FULLY SHADED, BAMBOO
215 IMMATURE FOREST, FULLY SHADED, BANANA OR GINGER
216 IMMATURE FOREST, FULLY SHADED, FERNS OR LALANG
217 IMMATURE FOREST, FULLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
218 IMMATURE FOREST, FULLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
219 IMMATURE FOREST, FULLY SHADED, LOGGING TRACK, LANDING, POOL
221 IMMATURE FOREST, PARTLY SHADED, GOOD SITE
222 IMMATURE FOREST, PARTLY SHADED, CLIMBERS AND ROTAN
223 IMMATURE FOREST, PARTLY SHADED, PALMS
224 IMMATURE FOREST, PARTLY SHADED, BAMBOO
225 IMMATURE FOREST, PARTLY SHADED, BANANA OR GINGER
226 IMMATURE FOREST, PARTLY SHADED, FERNS OR LALANG
227 IMMATURE FOREST, PARTLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
228 IMMATURE FOREST, PARTLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
229 IMMATURE FOREST, PARTLY SHADED, LOGGING TRACK, LANDING, POOL
231 IMMATURE FOREST, FULL SUNLIGHT, GOOD SITE
232 IMMATURE FOREST, FULL SUNLIGHT, CLIMBERS AND ROTAN
233 IMMATURE FOREST, FULL SUNLIGHT, PALMS
234 IMMATURE FOREST, FULL SUNLIGHT, BAMBOO
235 IMMATURE FOREST, FULL SUNLIGHT, BANANA OR GINGER
236 IMMATURE FOREST, FULL SUNLIGHT, FERNS OR LALANG
237 IMMATURE FOREST, FULL SUNLIGHT, FALLEN TREES, CROWNS OR DEBRIS
238 IMMATURE FOREST, FULL SUNLIGHT, STREAM, SWAMP, ROCKS, POOR SITE
239 IMMATURE FOREST, FULL SUNLIGHT, LOGGING TRACK, LANDING, POOL

300 IMMATURE FOREST, TREE(S) 300 MM TO 500 MM, DOMINANCE OF PIONEERS

311 IMMATURE FOREST, PIONEERS, FULLY SHADED, GOOD SITE
312 IMMATURE FOREST, PIONEERS, FULLY SHADED, CLIMBERS AND ROTAN
313 IMMATURE FOREST, PIONEERS, FULLY SHADED, PALMS
314 IMMATURE FOREST, PIONEERS, FULLY SHADED, BAMBOO
315 IMMATURE FOREST, PIONEERS, FULLY SHADED, BANANA OR GINGER
316 IMMATURE FOREST, PIONEERS, FULLY SHADED, FERNS OR LALANG
317 IMMATURE FOREST, PIONEERS, FULLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
318 IMMATURE FOREST, PIONEERS, FULLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
319 IMMATURE FOREST, PIONEERS, FULLY SHADED, LOGGING TRACK, LANDING, POOL
321 IMMATURE FOREST, PIONEERS, PARTLY SHADED, GOOD SITE
322 IMMATURE FOREST, PIONEERS, PARTLY SHADED, CLIMBERS AND ROTAN
323 IMMATURE FOREST, PIONEERS, PARTLY SHADED, PALMS
324 IMMATURE FOREST, PIONEERS, PARTLY SHADED, BAMBOO
325 IMMATURE FOREST, PIONEERS, PARTLY SHADED, BANANA OR GINGER
326 IMMATURE FOREST, PIONEERS, PARTLY SHADED, FERNS OR LALANG
327 IMMATURE FOREST, PIONEERS, PARTLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
328 IMMATURE FOREST, PIONEERS, PARTLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
329 IMMATURE FOREST, PIONEERS, PARTLY SHADED, LOGGING TRACK, LANDING, POOL
331 IMMATURE FOREST, PIONEERS, FULL SUNLIGHT, GOOD SITE
332 IMMATURE FOREST, PIONEERS, FULL SUNLIGHT, CLIMBERS AND ROTAN
333 IMMATURE FOREST, PIONEERS, FULL SUNLIGHT, PALMS
334 IMMATURE FOREST, PIONEERS, FULL SUNLIGHT, BAMBOO
335 IMMATURE FOREST, PIONEERS, FULL SUNLIGHT, BANANA OR GINGER
336 IMMATURE FOREST, PIONEERS, FULL SUNLIGHT, FERNS OR LALANG
337 IMMATURE FOREST, PIONEERS, FULL SUNLIGHT, FALLEN TREES, CROWNS OR DEBRIS
338 IMMATURE FOREST, PIONEERS, FULL SUNLIGHT, STREAM, SWAMP, ROCKS, POOR SITE
339 IMMATURE FOREST, PIONEERS, FULL SUNLIGHT, LOGGING TRACK, LANDING, POOL

400 REGENERATING F.,TREES 150 MM TO 300 MM (SIC = 111, LOGGR. 1 OR 2)

411 REGENERATING F., FULLY SHADED, GOOD SITE
412 REGENERATING F., FULLY SHADED, CLIMBERS AND ROTAN
413 REGENERATING F., FULLY SHADED, PALMS
414 REGENERATING F., FULLY SHADED, BAMBOO
415 REGENERATING F., FULLY SHADED, BANANA OR GINGER
416 REGENERATING F., FULLY SHADED, FERNS OR LALANG
417 REGENERATING F., FULLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
418 REGENERATING F., FULLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
419 REGENERATING F., FULLY SHADED, LOGGING TRACK, LANDING, POOL
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421 REGENERATING F., PARTLY SHADED, GOOD SITE
422 REGENERATING F., PARTLY SHADED, CLIMBERS AND ROTAN
423 REGENERATING F., PARTLY SHADED, PALMS
424 REGENERATING F., PARTLY SHADED, BAMBOO
425 REGENERATING F., PARTLY SHADED, BANANA OR GINGER
426 REGENERATING F., PARTLY SHADED, FERNS OR LALANG
427 REGENERATING F., PARTLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
428 REGENERATING F., PARTLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
429 REGENERATING F., PARTLY SHADED, LOGGING TRACK, LANDING, POOL
431 REGENERATING F., FULL SUNLIGHT, GOOD SITE
432 REGENERATING F., FULL SUNLIGHT, CLIMBERS AND ROTAN
433 REGENERATING F., FULL SUNLIGHT, PALMS
434 REGENERATING F., FULL SUNLIGHT, BAMBOO
435 REGENERATING F., FULL SUNLIGHT, BANANA OR GINGER
436 REGENERATING F., FULL SUNLIGHT, FERNS OR LALANG
437 REGENERATING F., FULL SUNLIGHT, FALLEN TREES, CROWNS OR DEBRIS
438 REGENERATING F., FULL SUNLIGHT, STREAM, SWAMP, ROCKS, POOR SITE
439 REGENERATING F., FULL SUNLIGHT, LOGGING TRACK, LANDING, POOL

500 REGENERATING F., TREES 150 MM TO 300 MM, DOMINANCE OF PIONEERS

511 REGENERATING F., PIONEERS, FULLY SHADED, GOOD SITE
512 REGENERATING F., PIONEERS, FULLY SHADED, CLIMBERS AND ROTAN
513 REGENERATING F., PIONEERS, FULLY SHADED, PALMS
514 REGENERATING F., PIONEERS, FULLY SHADED, BAMBOO
515 REGENERATING F., PIONEERS, FULLY SHADED, BANANA OR GINGER
516 REGENERATING F., PIONEERS, FULLY SHADED, FERNS OR LALANG
517 REGENERATING F., PIONEERS, FULLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
518 REGENERATING F., PIONEERS, FULLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
519 REGENERATING F., PIONEERS, FULLY SHADED, LOGGING TRACK, LANDING, POOL
521 REGENERATING F., PIONEERS, PARTLY SHADED, GOOD SITE
522 REGENERATING F., PIONEERS, PARTLY SHADED, CLIMBERS AND ROTAN
523 REGENERATING F., PIONEERS, PARTLY SHADED, PALMS
524 REGENERATING F., PIONEERS, PARTLY SHADED, BAMBOO
525 REGENERATING F., PIONEERS, PARTLY SHADED, BANANA OR GINGER
526 REGENERATING F., PIONEERS, PARTLY SHADED, FERNS OR LALANG
527 REGENERATING F., PIONEERS, PARTLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
528 REGENERATING F., PIONEERS, PARTLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
529 REGENERATING F., PIONEERS, PARTLY SHADED, LOGGING TRACK, LANDING, POOL
531 REGENERATING F., PIONEERS, FULL SUNLIGHT, GOOD SITE
532 REGENERATING F., PIONEERS, FULL SUNLIGHT, CLIMBERS AND ROTAN
533 REGENERATING F., PIONEERS, FULL SUNLIGHT, PALMS
534 REGENERATING F., PIONEERS, FULL SUNLIGHT, BAMBOO
535 REGENERATING F., PIONEERS, FULL SUNLIGHT, BANANA OR GINGER
536 REGENERATING F., PIONEERS, FULL SUNLIGHT, FERNS OR LALANG
537 REGENERATING F., PIONEERS, FULL SUNLIGHT, FALLEN TREES, CROWNS OR DEBRIS
538 REGENERATING F., PIONEERS, FULL SUNLIGHT, STREAM, SWAMP, ROCKS, POOR SITE
539 REGENERATING F., PIONEERS, FULL SUNLIGHT, LOGGING TRACK, LANDING, POOL

600 TEMP.OPEN SPACE, FEW OR NO TREES OVER 150 MM DBH (SIC = 111)

611 TEMP OPEN SPACE, FULLY SHADED, GOOD SITE
612 TEMP OPEN SPACE, FULLY SHADED, CLIMBERS AND ROTAN
613 TEMP OPEN SPACE, FULLY SHADED, PALMS
614 TEMP OPEN SPACE, FULLY SHADED, BAMBOO
615 TEMP OPEN SPACE, FULLY SHADED, BANANA OR GINGER
616 TEMP OPEN SPACE, FULLY SHADED, FERNS OR LALANG
617 TEMP OPEN SPACE, FULLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
618 TEMP OPEN SPACE, FULLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
619 TEMP OPEN SPACE, FULLY SHADED, LOGGING TRACK, LANDING, POOL
621 TEMP OPEN SPACE, PARTLY SHADED, GOOD SITE
622 TEMP OPEN SPACE, PARTLY SHADED, CLIMBERS AND ROTAN
623 TEMP OPEN SPACE, PARTLY SHADED, PALMS
624 TEMP OPEN SPACE, PARTLY SHADED, BAMBOO
625 TEMP OPEN SPACE, PARTLY SHADED, BANANA OR GINGER
626 TEMP OPEN SPACE, PARTLY SHADED, FERNS OR LALANG
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627 TEMP OPEN SPACE, PARTLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
628 TEMP OPEN SPACE, PARTLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
629 TEMP OPEN SPACE, PARTLY SHADED, LOGGING TRACK, LANDING, POOL
631 TEMP OPEN SPACE, FULL SUNLIGHT, GOOD SITE
632 TEMP OPEN SPACE, FULL SUNLIGHT, CLIMBERS AND ROTAN
633 TEMP OPEN SPACE, FULL SUNLIGHT, PALMS
634 TEMP OPEN SPACE, FULL SUNLIGHT, BAMBOO
635 TEMP OPEN SPACE, FULL SUNLIGHT, BANANA OR GINGER
636 TEMP OPEN SPACE, FULL SUNLIGHT, FERNS OR LALANG
637 TEMP OPEN SPACE, FULL SUNLIGHT, FALLEN TREES, CROWNS OR DEBRIS
638 TEMP OPEN SPACE, FULL SUNLIGHT, STREAM, SWAMP, ROCKS, POOR SITE
639 TEMP OPEN SPACE, FULL SUNLIGHT, LOGGING TRACK, LANDING, POOL

700 TEMP OPEN SPACE, FEW ON NO TREES OVER 150 MM, DOMINANCE OF PIONEERS

711 TEMP OPEN SPACE, PIONEERS, FULLY SHADED, GOOD SITE
712 TEMP OPEN SPACE, PIONEERS, FULLY SHADED, CLIMBERS AND ROTAN
713 TEMP OPEN SPACE, PIONEERS, FULLY SHADED, PALMS
714 TEMP OPEN SPACE, PIONEERS, FULLY SHADED, BAMBOO
715 TEMP OPEN SPACE, PIONEERS, FULLY SHADED, BANANA OR GINGER
716 TEMP OPEN SPACE, PIONEERS, FULLY SHADED, FERNS OR LALANG
717 TEMP OPEN SPACE, PIONEERS, FULLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
718 TEMP OPEN SPACE, PIONEERS, FULLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
719 TEMP OPEN SPACE, PIONEERS, FULLY SHADED, LOGGING TRACK, LANDING, POOL
721 TEMP OPEN SPACE, PIONEERS, PARTLY SHADED, GOOD SITE
722 TEMP OPEN SPACE, PIONEERS, PARTLY SHADED, CLIMBERS AND ROTAN
723 TEMP OPEN SPACE, PIONEERS, PARTLY SHADED, PALMS
724 TEMP OPEN SPACE, PIONEERS, PARTLY SHADED, BAMBOO
725 TEMP OPEN SPACE, PIONEERS, PARTLY SHADED, BANANA OR GINGER
726 TEMP OPEN SPACE, PIONEERS, PARTLY SHADED, FERNS OR LALANG
727 TEMP OPEN SPACE, PIONEERS, PARTLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
728 TEMP OPEN SPACE, PIONEERS, PARTLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
729 TEMP OPEN SPACE, PIONEERS, PARTLY SHADED, LOGGING TRACK, LANDING, POOL
731 TEMP OPEN SPACE, PIONEERS, FULL SUNLIGHT, GOOD SITE
732 TEMP OPEN SPACE, PIONEERS, FULL SUNLIGHT, CLIMBERS AND ROTAN
733 TEMP OPEN SPACE, PIONEERS, FULL SUNLIGHT, PALMS
734 TEMP OPEN SPACE, PIONEERS, FULL SUNLIGHT, BAMBOO
735 TEMP OPEN SPACE, PIONEERS, FULL SUNLIGHT, BANANA OR GINGER
736 TEMP OPEN SPACE, PIONEERS, FULL SUNLIGHT, FERNS OR LALANG
737 TEMP OPEN SPACE, PIONEERS, FULL SUNLIGHT, FALLEN TREES, CROWNS OR DEBRIS
738 TEMP OPEN SPACE, PIONEERS, FULL SUNLIGHT, STREAM, SWAMP, ROCKS, POOR SITE
739 TEMP OPEN SPACE, PIONEERS, FULL SUNLIGHT, LOGGING TRACK, LANDING, POOL

800 TEMP OPEN SPACE, HUMAN ACTIVITY, LOGGING DEBRIS, BURNING

811 TEMP OPEN, HUMAN ACTIVITY, FULLY SHADED, GOOD SITE
812 TEMP OPEN, HUMAN ACTIVITY, FULLY SHADED, CLIMBERS AND ROTAN
813 TEMP OPEN, HUMAN ACTIVITY, FULLY SHADED, PALMS
814 TEMP OPEN, HUMAN ACTIVITY, FULLY SHADED, BAMBOO
815 TEMP OPEN, HUMAN ACTIVITY, FULLY SHADED, BANANA OR GINGER
816 TEMP OPEN, HUMAN ACTIVITY, FULLY SHADED, FERNS OR LALANG
817 TEMP OPEN, HUMAN ACTIVITY, FULLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
818 TEMP OPEN, HUMAN ACTIVITY, FULLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
819 TEMP OPEN, HUMAN ACTIVITY, FULLY SHADED, LOGGING TRACK, LANDING, POOL
821 TEMP OPEN, HUMAN ACTIVITY, PARTLY SHADED, GOOD SITE
822 TEMP OPEN, HUMAN ACTIVITY, PARTLY SHADED, CLIMBERS AND ROTAN
823 TEMP OPEN, HUMAN ACTIVITY, PARTLY SHADED, PALMS
824 TEMP OPEN, HUMAN ACTIVITY, PARTLY SHADED, BAMBOO
825 TEMP OPEN, HUMAN ACTIVITY, PARTLY SHADED, BANANA OR GINGER
826 TEMP OPEN, HUMAN ACTIVITY, PARTLY SHADED, FERNS OR LALANG
827 TEMP OPEN, HUMAN ACTIVITY, PARTLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
828 TEMP OPEN, HUMAN ACTIVITY, PARTLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
829 TEMP OPEN, HUMAN ACTIVITY, PARTLY SHADED, LOGGING TRACK, LANDING, POOL
831 TEMP OPEN, HUMAN ACTIVITY, FULL SUNLIGHT, GOOD SITE
832 TEMP OPEN, HUMAN ACTIVITY, FULL SUNLIGHT, CLIMBERS AND ROTAN
833 TEMP OPEN, HUMAN ACTIVITY, FULL SUNLIGHT, PALMS

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834 TEMP OPEN, HUMAN ACTIVITY, FULL SUNLIGHT, BAMBOO
835 TEMP OPEN, HUMAN ACTIVITY, FULL SUNLIGHT, BANANA OR GINGER
836 TEMP OPEN, HUMAN ACTIVITY, FULL SUNLIGHT, FERNS OR LALANG
837 TEMP OPEN, HUMAN ACTIVITY, FULL SUNLIGHT, FALLEN TREES, CROWNS OR DEBRIS
838 TEMP OPEN, HUMAN ACTIVITY, FULL SUNLIGHT, STREAM, SWAMP, ROCKS, POOR SITE
839 TEMP OPEN, HUMAN ACTIVITY, FULL SUNLIGHT, LOGGING TRACK, LANDING, POOL

900 LONG TERM OPEN SPACE, UNPRODUCTIVE

912 LONG TERM OPEN SPACE, FULLY SHADED, CLIMBERS AND ROTAN
913 LONG TERM OPEN SPACE, FULLY SHADED, PALMS
914 LONG TERM OPEN SPACE, FULLY SHADED, BAMBOO
915 LONG TERM OPEN SPACE, FULLY SHADED, BANANA OR GINGER
916 LONG TERM OPEN SPACE, FULLY SHADED, FERNS OR LALANG
917 LONG TERM OPEN SPACE, FULLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
918 LONG TERM OPEN SPACE, FULLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
919 LONG TERM OPEN SPACE, FULLY SHADED, LOGGING TRACK, LANDING, POOL
922 LONG TERM OPEN SPACE, PARTLY SHADED, CLIMBERS AND ROTAN
923 LONG TERM OPEN SPACE, PARTLY SHADED, PALMS
924 LONG TERM OPEN SPACE, PARTLY SHADED, BAMBOO
925 LONG TERM OPEN SPACE, PARTLY SHADED, BANANA OR GINGER
926 LONG TERM OPEN SPACE, PARTLY SHADED, FERNS OR LALANG
927 LONG TERM OPEN SPACE, PARTLY SHADED, FALLEN TREES, CROWNS OR DEBRIS
928 LONG TERM OPEN SPACE, PARTLY SHADED, STREAM, SWAMP, ROCKS, POOR SITE
929 LONG TERM OPEN SPACE, PARTLY SHADED, LOGGING TRACK, LANDING, POOL
932 LONG TERM OPEN SPACE, FULL SUNLIGHT, CLIMBERS AND ROTAN
933 LONG TERM OPEN SPACE, FULL SUNLIGHT, PALMS
934 LONG TERM OPEN SPACE, FULL SUNLIGHT, BAMBOO
935 LONG TERM OPEN SPACE, FULL SUNLIGHT, BANANA OR GINGER
936 LONG TERM OPEN SPACE, FULL SUNLIGHT, FERNS OR LALANG
937 LONG TERM OPEN SPACE, FULL SUNLIGHT, FALLEN TREES, CROWNS OR DEBRIS
938 LONG TERM OPEN SPACE, FULL SUNLIGHT, STREAM, SWAMP, ROCKS, POOR SITE
939 LONG TERM OPEN SPACE, FULL SUNLIGHT, LOGGING TRACK, LANDING, POOL

110 MATURE FOREST, GOOD SITE
120 MATURE FOREST, CLIMBERS AND ROTAN
130 MATURE FOREST, PALMS
140 MATURE FOREST, BAMBOO
150 MATURE FOREST, BANANA OR GINGER
160 MATURE FOREST, FERNS OR LALANG
170 MATURE FOREST, FALLEN TREES, CROWNS OR DEBRIS
180 MATURE FOREST, STREAM, SWAMP, ROCKS, POOR SITE
190 MATURE FOREST, LOGGING TRACK, LANDING, POOL

210 IMMATURE FOREST, GOOD SITE
220 IMMATURE FOREST, CLIMBERS AND ROTAN
230 IMMATURE FOREST, PALMS
240 IMMATURE FOREST, BAMBOO
250 IMMATURE FOREST, BANANA OR GINGER
260 IMMATURE FOREST, FERNS OR LALANG
270 IMMATURE FOREST, FALLEN TREES, CROWNS OR DEBRIS
280 IMMATURE FOREST, STREAM, SWAMP, ROCKS, POOR SITE
290 IMMATURE FOREST, LOGGING TRACK, LANDING, POOL

310 IMMATURE FOREST, PIONEERS, GOOD SITE
320 IMMATURE FOREST, PIONEERS, CLIMBERS AND ROTAN
330 IMMATURE FOREST, PIONEERS, PALMS
340 IMMATURE FOREST, PIONEERS, BAMBOO
350 IMMATURE FOREST, PIONEERS, BANANA OR GINGER
360 IMMATURE FOREST, PIONEERS, FERNS OR LALANG
370 IMMATURE FOREST, PIONEERS, FALLEN TREES, CROWNS OR DEBRIS
380 IMMATURE FOREST, PIONEERS, STREAM, SWAMP, ROCKS, POOR SITE
390 IMMATURE FOREST, PIONEERS, LOGGING TRACK, LANDING, POOL

410 REGENERATING F., GOOD SITE
420 REGENERATING F., CLIMBERS AND ROTAN
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430 REGENERATING F., PALMS
440 REGENERATING F., BAMBOO
450 REGENERATING F., BANANA OR GINGER
460 REGENERATING F., FERNS OR LALANG
470 REGENERATING F., FALLEN TREES, CROWNS OR DEBRIS
480 REGENERATING F., STREAM, SWAMP, ROCKS, POOR SITE
490 REGENERATING F., LOGGING TRACK, LANDING, POOL

510 REGENERATING F., PIONEERS, GOOD SITE
520 REGENERATING F., PIONEERS, CLIMBERS AND ROTAN
530 REGENERATING F., PIONEERS, PALMS
540 REGENERATING F., PIONEERS, BAMBOO
550 REGENERATING F., PIONEERS, BANANA OR GINGER
560 REGENERATING F., PIONEERS, FERNS OR LALANG
570 REGENERATING F., PIONEERS, FALLEN TREES, CROWNS OR DEBRIS
580 REGENERATING F., PIONEERS, STREAM, SWAMP, ROCKS, POOR SITE
590 REGENERATING F., PIONEERS, LOGGING TRACK, LANDING, POOL

610 TEMP OPEN SPACE, GOOD SITE
620 TEMP OPEN SPACE, CLIMBERS AND ROTAN
630 TEMP OPEN SPACE, PALMS
640 TEMP OPEN SPACE, BAMBOO
650 TEMP OPEN SPACE, BANANA OR GINGER
660 TEMP OPEN SPACE, FERNS OR LALANG
670 TEMP OPEN SPACE, FALLEN TREES, CROWNS OR DEBRIS
680 TEMP OPEN SPACE, STREAM, SWAMP, ROCKS, POOR SITE
690 TEMP OPEN SPACE, LOGGING TRACK, LANDING, POOL

710 TEMP OPEN SPACE, PIONEERS, GOOD SITE
720 TEMP OPEN SPACE, PIONEERS, CLIMBERS AND ROTAN
730 TEMP OPEN SPACE, PIONEERS, PALMS
740 TEMP OPEN SPACE, PIONEERS, BAMBOO
750 TEMP OPEN SPACE, PIONEERS, BANANA OR GINGER
760 TEMP OPEN SPACE, PIONEERS, FERNS OR LALANG
770 TEMP OPEN SPACE, PIONEERS, FALLEN TREES, CROWNS OR DEBRIS
780 TEMP OPEN SPACE, PIONEERS, STREAM, SWAMP, ROCKS, POOR SITE
790 TEMP OPEN SPACE, PIONEERS, LOGGING TRACK, LANDING, POOL

810 TEMP OPEN, HUMAN ACTIVITY, GOOD SITE
820 TEMP OPEN, HUMAN ACTIVITY, CLIMBERS AND ROTAN
830 TEMP OPEN, HUMAN ACTIVITY, PALMS
840 TEMP OPEN, HUMAN ACTIVITY, BAMBOO
850 TEMP OPEN, HUMAN ACTIVITY, BANANA OR GINGER
860 TEMP OPEN, HUMAN ACTIVITY, FERNS OR LALANG
870 TEMP OPEN, HUMAN ACTIVITY, FALLEN TREES, CROWNS OR DEBRIS
880 TEMP OPEN, HUMAN ACTIVITY, STREAM, SWAMP, ROCKS, POOR SITE
890 TEMP OPEN, HUMAN ACTIVITY, LOGGING TRACK, LANDING, POOL

920 LONG TERM OPEN SPACE, CLIMBERS AND ROTAN
930 LONG TERM OPEN SPACE, PALMS
940 LONG TERM OPEN SPACE, BAMBOO
950 LONG TERM OPEN SPACE, BANANA OR GINGER
960 LONG TERM OPEN SPACE, FERNS OR LALANG
970 LONG TERM OPEN SPACE, FALLEN TREES, CROWNS OR DEBRIS
980 LONG TERM OPEN SPACE, STREAM, SWAMP, ROCKS, POOR SITE
990 LONG TERM OPEN SPACE, LOGGING TRACK, LANDING, POOL

001 GOOD SITE
002 CLIMBERS AND ROTAN
003 PALMS
004 BAMBOO
005 BANANA OR GINGER
006 FERNS OR LALANG
007 FALLEN TREES, CROWNS OR DEBRIS
008 STREAM, SWAMP, ROCKS, POOR SITE
009 LOGGING TRACK, LANDING, POOL
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II.2 ITSICTXT.DAT

ITTO Stem Identity Classes (SIC) for Trees/Poles.

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111TREE ALIVE- STANDING- COMPLETE TRUNK
112TREE ALIVE- STANDING- BROKEN STEM
113TREE ALIVE- STANDING- BROKEN STUMP
114CUT STUMP- STANDING- ALIVE
115TREE ALIVE- STANDING- POISON GIRDLED
119TREE ALIVE- STANDING- NOT FOUND

121TREE ALIVE- FALLEN- COMPLETE TRUNK
122TREE ALIVE- FALLEN- BROKEN STEM
123TREE ALIVE- FALLEN- BROKEN STUMP
124CUT STUMP- FALLEN- ALIVE
125TREE ALIVE- FALLEN- POISON GIRDLED
129TREE ALIVE- FALLEN- NOT FOUND

131TREE DEAD- STANDING- COMPLETE TRUNK
132TREE DEAD- STANDING- BROKEN STEM
133TREE DEAD- STANDING- BROKEN STUMP
134CUT STUMP- STANDING- DEAD
135TREE DEAD- STANDING- POISON GIRDLED
139TREE DEAD- STANDING- NOT FOUND

141TREE DEAD- FALLEN- COMPLETE TRUNK
142TREE DEAD- FALLEN- BROKEN STEM
143TREE DEAD- FALLEN- BROKEN STUMP
144CUT STUMP- FALLEN- DEAD
145TREE DEAD- FALLEN- POISON GIRDLED
149TREE DEAD- FALLEN- NOT FOUND

411PALM ALIVE- STANDING- SINGLE TRUNK
412PALM ALIVE- STANDING- CLUMP/CLUSTER
413PALM ALIVE- STANDING- STEMLESS
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II.3   ITSICTX2.DAT

ITTO Stem Identity Classes (SIC) for Seedlings, Saplings and Wildlings.

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111 SUCCESSFUL WILDL. LIVING-COMPLETE
112 SUCCESSFUL WILDL. LIVING-BROKEN
113 SUCCESSFUL WILDL. LIVING-BROKEN STEM
121 SUCCESSFUL WILDL. LIVING-FALLEN
131 SUCCESSFUL WILDL. DEAD
139 SUCCESSFUL WILDL. DEAD NOT FOUND

211 SAPLING-STANDING LIVING-COMPLETE TRUNK
212 SAPLING-STANDING LIVING-BROKEN STEM
214 SAPLING-STANDING LIVING-CUT STUMP
216 SAPLING-GROWN TO POLE OR TREE SIZE
219 SAPLING-NOT FOUND
221 SAPLING-FALLEN LIVING-COMPLETE TRUNK
222 SAPLING-FALLEN LIVING-BROKEN STEM
224 SAPLING-FALLEN LIVING-CUT STUMP
231 SAPLING-DEAD-STANDING
232 SAPLING-DEAD-BROKEN STEM
234 SAPLING-DEAD CUT STUMP
241 SAPLING-DEAD-FALLEN

311 SEEDL/WILDL.-STANDING LIVING-COMPLETE
312 SEEDL/WILDL.-STANDING LIVING-BROKEN
314 SEEDL/WILDL.-STANDING LIVING-CUT
318 SEEDL/WILDL.-NOT PLANTED
319 SEEDL/WILDL.-NOT FOUND
322 SEEDL/WILDL.-FALLEN LIVING
331 SEEDL/WILDLING-DEAD
339 SEEDL/WILDLING-DEAD NOT FOUND

511 MEDIUM PALM- LIVING- SINGLE STEM
512 MEDIUM PALM- LIVING- CLUMP/CLUSTER
513 MEDIUM PALM- LIVING- STEMLESS
611 SMALL PALM- LIVING- SINGLE STEM
612 SMALL PALM- LIVING- CLUMP/CLUSTER
613 SMALL PALM- LIVING- STEMLESS
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II.4 SPECIES.DAT

The species list is sorted by Wood Quality Group and by species code number. It contains or
entry per code no. giving the accepted vernacular name or names and the corresponding scientif
name.

ITTO SPECIES LIST, May, 2002

Wood Quality Group No. 1: Dipterocarps - Meranti

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10101 Meranti Merah Tua            Shorea spp. (Dark red)
10102 Meranti bukit                Shorea platyclados
10103 Meranti nemesu               Shorea pauciflora
10104 Meranti sengkawang bulu      Shorea sinkawang
10105 Meranti sengkawang merah     Shorea sinkawang
10106 Meranti seraya               Shorea curtisii
10107 Meranti seraya daun besar    Shorea curtisii
10201 Meranti Merah/Merah Muda     Shorea spp. (Red/light red)
10202 Meranti bakau                Shorea uliginosa
10203 Meranti batu                 Shorea dasyphylla
10204 Meranti bunga                Shorea teysmanniana
10205 Meranti daun besar           Shorea hemsleyana
10206 Meranti kepong               Shorea ovalis
10207 Meranti kepong hantu         Shorea macrantha
10208 Meranti langgong             Shorea lepidota
10209 Meranti paya                 Shorea platycarpa
10210 Meranti pepijat              Shorea johorensis
10211 Meranti rambai daun          Shorea acuminata
10212 Meranti sarang punai         Shorea parvifolia
10213 Meranti sarang punai bukit   Shorea ovata
10214 Meranti tembaga              Shorea leprosula
10215 Meranti tengkawang ayer      Shorea palembanica
10216 Meranti melantai             Shorea macroptera
10301 Meranti Putih                Shorea spp. (White)
10302 Meranti belang               Shorea resinosa
10303 Meranti bumbong              Shorea dealbata
10304 Meranti jerit                Shorea henryana
10305 Meranti lapis                Shorea lamellata
10306 Meranti laut                 Shorea gratissima
10307 Meranti mengkai              Shorea bentongensis
10308 Meranti pa' ang              Shorea bracteolata
10309 Meranti pipit                Shorea assamica
10310 Meranti temak                Shorea hypochra
10311 Meranti temak nipis          Shorea roxburghii
10401 Meranti Kuning/Damar Hitam   Shorea spp. (Yellow)
10402 Damar hitam bulu             Shorea longisperma
10403 Damar hitam gajah            Shorea gibbosa
10404 Damar hitam katup            Shorea dolichocarpa
10405 Damar hitam kelim            Shorea blumutensis
10406 Damar hitam pipit            Shorea multiflora
10407 Damar hitam sengkawang putih Shorea maxima
10408 Damar hitam siput            Shorea faguetiana
10409 Damar hitam siput besar      Shorea kuantanensis
10410 Damar hitam siput jantan     Shorea hopeifolia
10411 Damar hitam telepok          Shorea peltata
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Wood Quality Group No. 2: Dipterocarps – Non-Meranti

20501	Mersawa	Anisoptera spp.
20502	Mersawa durian	Anisoptera laevis
20503	Mersawa gajah	Anisoptera scaphula
20504	Mersawa kesat	Anisoptera costata
20505	Mersawa kuning	Anisoptera curtisii
20506	Mersawa merah	Anisoptera megistocarpa
20507	Mersawa paya	Anisoptera marginata
20601	Merawan	Hopea spp. (Merawan)
20602	Merawan batu	Hopea beccariana
20603	Merawan bunga	Hopea pubescens
20604	Merawan daun bulat	Hopea latifolia
20605	Merawan gunong	Hopea montana
20606	Merawan jangkang	Hopea nervosa
20607	Merawan jantan	Hopea griffithii
20608	Merawan jeruai	Hopea lanceolata
20609	Merawan kelabu	Hopea cescens
20610	Merawan mata kucing beludu	Hopea myrtifolia
20611	Merawan mata kucing bukit	Hopea cellata
20612	Merawan mata kucing hitam	Hopea dryobalanoides
20613	Merawan mata kucing merah	Hopea ferruginea
20614	Merawan mata kucing pipit	Hopea johorensis
20615	Merawan meranti	Hopea sulcata
20616	Merawan palit	Hopea dyeri
20617	Merawan penak	Hopea mengarawan
20618	Merawan siput	Hopea sangal
20619	Merawan siput jantan	Hopea odorata
20620	Merawan ungu	Hopea bracteata
20701	Gerutu	Parashorea spp.
20702	Gerutu gerutu	Parashorea stellata
20703	Gerutu pasir	Parashorea densiflora
20704	Gerutu pasir daun besar	Parashorea globosa
20801	Keruing (Berminyak)	Dipterocarpus spp. (oily)
20802	Keruing bulu	Dipterocarpus baudii
20803	Keruing gombang	Dipterocarpus cornutus
20804	Keruing gondol	Dipterocarpus kerrii
20805	Keruing kertas	Dipterocarpus chartaceus
20806	Keruing merah	Dipterocarpus verrucosus
20807	Keruing sol	Dipterocarpus lowii
20808	Keruing ternek	Dipterocarpus palembanicus
20809	Keruing etoi	Dipterocarpus dyeri
20810	Keruing mempelas	Dipterocarpus crinitus
20901	Keruing (Tidak Berminyak)	Dipterocarpus spp. (non-oily)
20902	Keruing baran	Dipterocarpus eurynchus
20903	Keruing beledu	Dipterocarpus obtusifolius
20904	Keruing belimbing	Dipterocarpus grandiflorus
20905	Keruing bukit	Dipterocarpus costatus
20906	Keruing cogan	Dipterocarpus rigidus
20907	Keruing gasing	Dipterocarpus caudatus
20908	Keruing gombang merah	Dipterocarpus kunstleri
20909	Keruing gunong	Dipterocarpus retusus
20910	Keruing kelabu	Dipterocarpus pseudofagineus
20911	Keruing kerut	Dipterocarpus sublamellatus
20912	Keruing kesat	Dipterocarpus gracilis
20913	Keruing kipas	Dipterocarpus costulatus
20914	Keruing latek	Dipterocarpus apterus
20915	Keruing mengkai	Dipterocarpus rotundifolius
20916	Keruing neram	Dipterocarpus oblongifolius
20917	Keruing padi	Dipterocarpus semivestitus
20918	Keruing paya	Dipterocarpus coriaceus
20919	Keruing perak	Dipterocarpus perakensis
20920	Keruing pipit	Dipterocarpus fagineus
20921	Keruing ropol	Dipterocarpus hasseltii
20922	Keruing sarawak	Dipterocarpus sarawakensis

20923	Keruing sendok	Dipterocarpus concavus
21001	Kapur	Dryobalanops aromatica
21002	Keladan	Dryobalanops oblongifolia
21101	Balau	Shorea spp. (Balau group)
21102	Balau bukit	Shorea foxworthyi
21103	Balau gajah	Shorea submontana
21104	Balau gunong	Shorea astylosa
21105	Balau hitam	Shorea atrinervosa
21106	Balau kumus	Shorea laevis
21107	Balau kumus hitam	Shorea maxwelliana
21108	Balau kuning	Shorea falcifera
21109	Balau laut	Shorea glauca
21110	Balau laut merah	Shorea kunstleri
21111	Balau membatu	Shorea guiso
21112	Balau membatu jantan	Shorea ochrophloia
21113	Balau merah	Shorea collina
21114	Balau pasir	Shorea materialis
21115	Balau putih	Shorea lumutensis
21116	Balau sengkawang ayer	Shorea sumatrana
21117	Balau sengkawang darat	Shorea scrobiculata
21118	Balau tembaga	Shorea exelliptica
21201	Chengal	Neobalanocarpus heimii
21301	Giam	Hopea nutans (Giam)
21302	Giam bayan	Hopea pachycarpa
21303	Giam hantu	Hopea coriacea
21304	Giam jantan	Hopea semicuneata
21305	Giam kanching	Hopea subalata
21306	Giam lintah bukit	Hopea helferi
21307	Giam malut	Hopea ferrea
21308	Giam melukut	Hopea apiculata
21309	Giam palong	Hopea pierre
21310	Giam rambai	Hopea polyalthioides
21401	Resak	Cotylelobium spp. & Vatica spp
21402	Resak bukit	Cotylelobium malayanum
21403	Resak tempurong	Cotylelobium melanoxylon
21404	Resak buah kana	Vatica ridleyana
21405	Resak daun panjang	Vatica nitens
21406	Resak daun runcing	Vatica cuspidata
21407	Resak degong	Vatica havilandii
21408	Resak gajah	Vatica sp. 'A'
21409	Resak gunong	Vatica heteroptera
21410	Resak julong	Vatica mangachapoi
21411	Resak kecil	Vatica pallida
21412	Resak keluang	Vatica belia
21413	Resak langgong	Vatica scortechinii
21414	Resak laru	Vatica pauciflora
21415	Resak laut	Vatica cinerea
21416	Resak letop	Vatica venulosa
21417	Resak lidi	Vatica maingayi
21418	Resak mempening	Vatica stapfiana
21419	Resak padi	Vatica flavida
21420	Resak paya	Vatica lobata
21421	Resak pipit	Vatica lowii
21422	Resak putih	Vatica perakensis
21423	Resak ranting kesat	Vatica odorata

Wood Quality Group No. 3: Non-Dipterocarps – Commercial, Light Hardwood

31701	Bengang	Neesia spp.
31901	Bintangor	Calophyllum spp.
31902	Bintangor batu	Calophyllum inophylloide
31903	Bintangor bukit	Calophyllum symingtonianum
31904	Bintangor bunga	Calophyllum curtisii

31905	Bintangor bunut	Calophyllum macrocarpum
31906	Bintangor daun karat	Calophyllum rubiginosum
31907	Bintangor daun panjang	Calophyllum incrassatum
31908	Bintangor gambut	Calophyllum retusum
31909	Bintangor gasing	Calophyllum pulcherrimum
31910	Bintangor gunong daun besar	Calophyllum coriaceum
31911	Bintangor gunong daun kecil	Calophyllum cuneatum
31912	Bintangor jangkang	Calophyllum sclerophyllum3
31913	Bintangor kelim	Calophyllum scriblitifolium
31914	Bintangor kuning	Calophyllum floribundum
31915	Bintangor laut	Calophyllum inophyllum
31916	Bintangor lekok	Calophyllum depressinervosum
31917	Bintangor lilin	Calophyllum wallichianum
31918	Bintangor merah	Calophyllum canum
31919	Bintangor putih	Calophyllum alboramulum
32101	Damar minyak	Agathis borneensis
32301	Durian, D. hantu	Durio spp.
32302	Durian batang	Durio malaccensis
32303	Durian beludu	Durio oxleyanus
32304	Durian bujor	Durio singaporensis
32305	Durian daun	Durio lowianus
32306	Durian daun besar	Durio macrophyllus
32307	Durian daun tajam	Durio pinangianus
32308	Durian ijau laut	Durio wyatt-smithii
32309	Durian kampong	Durio zibethinus
32310	Durian merah	Durio graveolens
32311	Durian paya	Durio carinatus
32312	Durian tupai	Durio griffithii
32401	Ekor	Dacrydium spp.
32501	Geronggang	Cratoxylum spp.
32502	Geronggang derum	Cratoxylum formosum
32503	Geronggang derum bukit	Cratoxylum maingayi
32504	Geronggang derum seluncor	Cratoxylum cochinchinense
32505	Geronggang geronggang	Cratoxylum arborescens
32601	Jangkang, Banitan	Xylopia spp.
32602	Jangkang bukit	Xylopia ferruginea
32603	Jangkang paya	Xylopia fusca
32801	Jelutong	Dyera costulata
33201	Kedondong	Family of burseraceae
33202	Kedondong bulan	Canarium littorale
33203	Kedondong bulan bulu	Canarium littorale tomentosum
33204	Kedondong gergaji	Canarium littorale forma
33205	Kedondong kemasul	Canarium apertum
33206	Kedondong keruing	Canarium megalanthum
33207	Kedondong putih	Canarium littorale forma
33208	Kedondong senggeh	Canarium pseudosumatranum
33209	Kedondong kerut	Dacryodes rostrata
33210	Kedondong matahari	Dacryodes rugosa
33211	Kedondong mempelas	Dacryodes laxa
33212	Kedondong serong	Dacryodes puberula
33213	Kedondong kerantai	Santiria spp.
33214	Kedondong kerantai bulu	Santiria tomentosa
33215	Kedondong kerantai licin	Santiria laevigata
33216	Kedondong sengkuang	Scutinanthe brunnea
33217	Kedondong kijai	Triomma malaccensis
33801	Kembang semangkok	Scaphium spp.
33802	Kembang semangkok bulat	Scaphium linearicarpum
33803	Kembang semangkok jantong	Scaphium macropodum
34101	Keredas	Pithecellobium bubalinum
34102	Kungkur	Pithecellobium splendens
34501	Machang	Mangifera spp.
34502	Lanjut	Mangifera lagenifera
34503	Machang machang	Mangifera longipes
34504	Mangga	Mangifera indica
34505	Rawa	Mangifera microphylla

35101	Mempisang	Annonaceae spp.
35801	Nyatoh	Family of sapotaceae
35802	Nyatoh ketiau	Ganua motleyana
35803	Nyatoh gunong	Palaquium reginamontium
35804	Nyatoh jambak	Palaquium hexandrum
35805	Nyatoh kabu	Palaquium xanthochymum
35806	Nyatoh mayang	Palaquium sukoei
35807	Nyatoh pipit	Palaquium microphyllum
35808	Nyatoh putih	Palaquium obovatum
35809	Nyatoh semaram	Palaquium semaram
35810	Nyatoh sidang	Palaquium rostratum
35811	Nyatoh surin	Palaquium impressinervium
35812	Nyatoh taban merah, Taban	Palaquium gutta
35813	Nyatoh taban putih	Palaquium oxleyanum
35814	Nyatoh tembaga	Palaquium maingayi
35815	Nyatoh tembaga kuning	Palaquium hispidum
35816	Nyatoh durian	Payena maingayi
35817	Nyatoh ekor	Payena lanceolata
35818	Nyatoh sundek	Payena obscura
35819	Nyatoh nangka kuning	Pouteria malaccensis
35820	Nyatoh nangka merah	Planchonella maingayi
36001	Pelong	Pentaspadon spp.
36002	Pelong beludu	Pentaspadon velutinus
36003	Pelong licin	Pentaspadon motleyi
36901	Podo	Podocarpus spp.
36902	Podo bukit	Podocarpus neriifolius
36903	Podo cucor atap	Podocarpus imbricatus
36904	Podo kebal musang	Podocarpus motleyi
36905	Podo kebal musang gunong	Podocarpus wallichianus
36906	Podo laut	Podocarpus polystachy
37201	Punggai, Durian punggai	Ceolostegia griffithii
37202	Punggai daun besar	Ceolostegia borneensis
37401	Ramin	Gonystylus spp.
37402	Ramin dara elok	Gonystylus affinis
37403	Ramin daun tebal	Gonystylus brunnescens
37404	Ramin melawis	Gonystylus bancanus
37405	Ramin pinang muda	Gonystylus confusus
37406	Ramin pipit	Gonystylus maingayi
37901	Sepetir	Sindora spp.
37902	Sepetir beludu besar	Sindora velutina
37903	Sepetir daun nipis	Sindora echinocalyx
37904	Sepetir daun tebal	Sindora wallichii
37905	Sepetir licin	Sindora coriacea
37906	Sepetir mempelas	Sindora siamensis
38501	Terentang	Campnosperma spp.
38502	Terentang daun besar	Campnosperma auriculatum
38503	Terentang daun kecil	Campnosperma squamatum
38504	Terentang simpoh	Campnosperma coriaceum

Wood Quality Group No. 4: Non-Dipterocarps – Commercial, Medium Hardwood

43601	Keledang	Artocarpus spp.
43602	Keledang babi	Artocarpus anisophyllus
43603	Keledang bangkong, Bakong	Artocarpus integer silvestris
43604	Keledang keledang	Artocarpus lanceifolius
43605	Keledang tampang	Artocarpus nitidus
43606	Keledang tampang bulu	Artocarpus dadah
43607	Keledang tampang gajah	Artocarpus fulvicortex
43608	Keledang tampang hitam	Artocarpus gomezianus
43609	Temponek, Keledang temponek	Artocarpus rigidus
43610	Miku	Artocarpus lowii
43611	Nangka	Artocarpus heterophyllus

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43612 Pudu                          Artocarpus kemando
43614 Sukun                         Artocarpus communis
43901 Kempas                        Koompassia malaccensis
43902 Tualang                       Koompassia excelsa
45201 Mengkulang                    Heritiera spp.

45202 Mengkulang jari               Heritiera javanica
45203 Mengkulang jari bulu          Heritiera sumatrana
45204 Mengkulang siku keluang       Heritiera simplicifolia
47101 Punah                         Tetramerista glabra
48101 Simpoh                        Dillenia spp.
48102 Simpoh ayer                   Dillenia suffruticosa
48103 Simpoh beludu                 Dillenia ovata
48104 Simpoh daun merah             Dillenia grandifolia
48105 Simpoh gajah                  Dillenia reticulata
48106 Simpoh padang                 Dillenia obovata
48107 Simpoh paya                   Dillenia pulchella
48108 Simpoh putih                  Dillenia albiflos
48109 Simpoh ungu                   Dillenia excelsa
48660 Meransi                       Carallia spp.
49101 Delek                         Anisophyllea spp.
49105 Mata keli                     Gynotroches spp.
49110 Membuloh                      Pellacalyx spp.
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Wood Quality Group No. 5: Non-Dipterocarps – Commercial, Heavy Hardwood

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52001 Bitis                         Palaquium spp.
52002 Bitis bitis                   Palaquium spp.
52003 Bitis bukit                   Palaquium stellatum
52004 Bitis paya                    Palaquium ridleyi
53401 Kekatong                      Cynometra spp.
53402 Kekatong kekatong             Cynometra malaccensis
53403 Kekatong laut                 Cynometra iripa
54001 Keranji                       Dialium spp.
54002 Keranji bulu                  Dialium kingii
54003 Keranji kuning besar          Dialium platysepalum
54004 Keranji kuning kecil          Dialium wallichii
54005 Keranji paya                  Dialium patens
54006 Keranji tebal besar           Dialium laurinum
54007 Keranji tebal kecil           Dialium maingayi
54008 Keranji tunggal               Dialium procerum
55501 Merbau                        Intsia palembanica
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Wood Quality Group No. 6: Non-Dipterocarps – Partly Commercial

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61801 Berangan                      Castanopsis spp.
62201 Dedali                        Strombosia javanica
62202 Kamap                         Strombosia maingayi
63001 Kasai                         Pometia spp.
63002 Kasai daun besar              Pometia pinnata
63003 Kasai daun kecil              Pometia pinnata alnifolia
63004 Kasai daun licin              Pometia ridleyi
63101 Kayu arang, Meribut, Tuba buahDiospyros spp.
63613 Cempedak                      Artocarpus interger
64201 Kulim                         Scorodocarpus borneensis
64801 Medang, M. pepijat            Family of Lauraceae
64802 Medang payong                 Actinodaphne maingayi
64803 Medang kemangi                Cinnamomum porrectum
64804 Medang teja                   Cinnamomum javanicum
64901 Melunak                       Pentace spp.
64902 Melunak bukit                 Pentace curtisii
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64903 Melunak pusat beludu      Pentace triptera
65001 Mempening                 Lithocarpus spp.
65401 Merbatu                   Family of Atuna
65402 Merbatu pipit             Parinari costata
65601 Merpauh                   Swintonia spp.
65602 Merpauh daun runcing      Swintonia penangiana
65603 Merpauh daun tebal        Swintonia spicifera
65604 Merpauh periang, Pauh p.  Swintonia schwenkii
65701 Minyak berok              Xanthophyllum spp.
65901 Pauh kijang               Irvingia malayana
66201 Penarahan                 Family of Myristicaceae
66301 Penarahan arang           Myristica cinnamomea
66302 Penarahan arang ayer      Myristica elliptica
66303 Penarahan arang bukit     Myristica maingayi
66304 Penarahan arang gambut    Myristica lowiana
66801 Petaling                  Ochanostachys amentacea
67501 Rengas                    Family of Anacardiaceae
67502 Rengas ayer               Gluta elegans
67503 Rengas kerbau jalang      Gluta aptera
67701 Sentang                   Azadirachta excelsa
68301 Tembusu                   Fagraea spp.
68302 Tembusu hutan             Fagraea gigantea
68303 Tembusu padang            Fagraea fragrans
68401 Terap                     Family of Moraceae
68402 Terap hitam               Artocarpus scortechinii
68403 Terap nasi                Artocarpus elasticus
68404 Ipoh                      Antiaris toxicaria
69305 Cenderai, Dedamak         Grewia spp.
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Wood Quality Group No. 7: Non-Dipterocarps – Non-Commercial

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71601 Ara berteh               Parartocarpus spp.
71602 Ara berteh bukit         Parartocarpus bracteatus
71603 Ara berteh paya          Parartocarpus venenosus
72701 Jelawai                  Terminalia spp.
72702 Jelawai jaha             Terminalia subspathulata
72703 Jelawai ketapang         Terminalia catappa
72704 Jelawai mempelam babi    Terminalia phellocarpa
72705 Jelawai mentalun         Terminalia calamansanai
72901 Kasah, Kangsar           Pterygota horsfieldii
73301 Kekabu hutan             Bombax valetonii
73501 Kelat                    Eugenia spp.
73502 Kelat gelam              Eugenia cerina
73503 Kelat jambu laut         Eugenia grandis
73504 Kelat merah              Eugenia chorantha
73505 Kelat paya               Eugenia papillosa
74103 Jering                   Pithecellobium jeringa
74701 Mata ulat                Kokoona spp.
75101 Antoi                    Cyathocalyx spp.
75301 Mengkun                  Tetrameles nudifelora
76101 Penaga                   Mesua ferrea
76401 Perah                    Elateriospermum tapos
76501 Perah ikan               Pimeleodendron griffithianum
76601 Perupok                  Lophopetalum spp.
76701 Petai                    Parkia spp.
76702 Petai kerayong           Parkia javanica
76703 Petai meranti            Parkia singularis
76704 Petai petai              Parkia speciosa
77301 Rambutan                 Sapindaceae spp.
77302 Rambutan hutan           Nephelium lappaceum
77303 Lotong, Sanggol lotong   Nephelium spp.
77304 Redan                    Nephelium glabrum
77305 Pulasan                  Nephelium spp.
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77306 Rambutan pacat, Kikir buntal    Xerospermum spp.
77504 Rengas padi                     Melanochyla auriculata
77601 Sengkuang                       Dracontomelon dao
77801 Sentul                          Sandoricum koetjape
78201 Surian                          Cedrela/Toona spp.
78202 Surian batu                     Chukrassia tabularis
78203 Surian bawang                   Cedrela serrata
78204 Surian wangi                    Cedrela sureni
78605 Bayur                           Pterospermum spp.
78610 Chempaka                        Aromadendron elegans

78615 Karas                           Aquilaria malaccensis
78620 Kelumpang                       Sterculia spp.
78625 Sepul                           Parishia spp.
78630 Mertas                          Ctenolophon parvifolius
78635 Putat                           Barringtonia spp.
78640 Sena                            Pterocarpus indicus
78645 Melembu                         Scaphium javanicum
78650 Bekak, Telur Belangkas          Aglaia (Amoora) spp.
78655 Manggis, M. hutan, Kandis       Garcinia spp.
78665 Samak, Kelat samak              Theaceae spp.
78666 Samak pulut                     Gordonia concen.
78670 Tulang daing                    Millettia atropurpurea
78675 Pelawan                         Tristania spp.
78680 Setumpul                        Hydnocarpus spp.
78685 Tempinis                        Streblus spp.
79201 Gelugor, Asam gelugor           Garcinia spp.
79205 Asam pupoi                      Sarcotheca spp.
79210 Bayor bukit                     Schoutenia spp.
79215 Bebusuk, Busok busok, Jahar     Cassia spp.
79220 Langsat, L. hutan, Duku h.      Lansium spp.
79225 Gapis                           Saraka spp.
79230 Jelutong bedak                  Tabernaemontana spp.
79235 Meraga                          Pertusadina spp.
79240 Otak udang                      Buchanania spp.
79245 Pagar anak, Inggir burong       Ixonantes spp.
79250 Pepauh                          Iuodia spp.
79260 Tampoi, Rambai h., Setambun     Baccaurea spp.
79265 Rukam, Melokam                  Flacourtia spp.
79270 Saga, S. daun bulat             Adenanthera
79275 Sendudok                        Astronia spp.
79280 Tapak itik                      Euodia spp.

79999 Lain-lain                       Misc. non-commercial spp.
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Wood Quality Group No. 8: Light Demanding Pioneer Species, Mainly Non-commercial

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81501 Ara, A. kelepong                Ficus spp.
83701 Kelempayan                      Anthocephalus chinensis
84301 Leban                           Vitex spp.
84401 Ludai                           Sapium baccatum
84601 Mahang, Mersepat                Macaranga spp.
84602 Kubin, Mahang gajah             Macaranga gigantea
84603 Mahang merah                    Macaranga triloba
84604 Mahang putih                    Macaranga hypoleuca
87001 Pulai                           Alstonia spp.
87002 Pulai basong                    Alstonia spatulata
87003 Pulai penipu bukit              Alstonia macrophylla
87004 Pulai penipu paya               Alstonia angustifolia
87005 Pulai pulai                     Alstonia angustiloba
88001 Sesendok                        Endospermum malaccense
89802 Balik angin                     Mallotus spp.
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89805	Berembang bukit	Duabanga spp.
89810	Gambir, G. hutan	Maesa spp.
89815	Hampas tebu	Gironniera spp.
89820	Hujan panas	Breynia spp.
89825	Kenidai, Kernam	Bridellia spp.
89830	Mengkirai, Menarong	Trema spp.
89835	Mendong	Eleocarpus spp.
89840	Nipis Kulit	Memecylon spp.
89845	Sial menahun	Pternandra spp.
89850	Tinjau Belukar	Porterandia spp.
89855	Ubah	Glochidion spp.

II.5   FCOMSTD.DAT

This example of FCOMSTD.DAT will yield a stand table containing the volumes of all species with Stem Identity Class = 111, diameter DBHob of 30 cm and above in 5 cm diameter classes using the volume function for trees based on diameter only, there is no check against the species list.

FCOMSTD.DAT: Description

0,0,1	: all blocks, all FCL's, one SIC
111	: SIC = 111
300,50	: min DBH = 30.0 cm, diameter class interval = 5.0 cm
8,9	: Wood Quality Group by row, no page variable
8,0	: All eight Wood Quality Groups by row, no parameter by page
1,2,3,4,5,6,7,8	: The individual Wood Quality codes
0	: No species check
2	: Table containing volumes
1	: Use volume function based on diameter only

The command files are kept in directory \FORT\ITPROG\

II.6   FORRESV.DAT

List of the Forest Reserves (F.R.) used for the ITTO experimental plots.

> **SL** SUNGEI LALANG F.R., SELANGOR
> **LE** LESONG F.R., PAHANG
> **CH** CHERUL F.R., TERENGGANU
> **KS** KLEDANG SAIONG F.R. PERAK

II.7   TABTREA.DAT

List of the experimental cutting limits and silvicultural treatments used in the ITTO experimenta plots and the number assigned.

> 01 CUT ALL > = 30 CM
> 02 CUT ALL > = 45 CM
> 03 CUT DIPT>=35/ NON-DIP.>=30 CM
> 04 CUT DIPT>=50/ NON-DIP.>=45 CM
> 05 CUT DIPT>=65/ NON-DIP.>=60 CM
> 06 CUT DIPT>=75/ NON-DIP.>=70 CM
> 07 CUT ALL>=30 CM/PLANT WILDLING
> 08 NO LOGGING, VIRGIN CONTROL
> 11 CLIMBER CUTTING (CL)
> 12 GIRDLING + CLIMBER CUTTING (GCL)
> 13 GCL (+ ENRICHMENT PLANTING)
> 14 CUT ALL>=30 CM/PLANT WILDLING
> 15 CONTROL, LOGGED, NOT TREATED
> 16 ENRICHMENT PLANTING

II.8 Decimal Dates

Since the areas are not enumerated at exactly the same month at each enumeration event, the use of a decimal date, rather than just the year, gives a more accurate growth estimation, particularly when using short time intervals. In some cases the enumeration was started at the end of one year and finished at the beginning of the following year. F.ex. KSTMT15.901 has decimal date 91.17.

The lists will be expanded as required when new enumerations are added.

LEDATES.DAT

Decimal Dates for Lesong Forest Reserve

```
LETMT01.901  90.65
LETMT01.911  91.81
LETMT01.921  92.79
LETMT01.931  93.79
LETMT01.941  94.96
LETMT01.961  96.71
LETMT01.981  98.71
LETMT01.001  00.79
LETMT01.021  02.21
LETMT02.901  90.67
LETMT02.911  91.83
LETMT02.921  92.79
LETMT02.931  93.90
LETMT02.941  94.96
LETMT02.961  96.71
LETMT02.981  98.71
LETMT02.001  00.79
LETMT02.021  02.21
LETMT03.901  90.69
LETMT03.911  91.85
LETMT03.921  92.79
LETMT03.931  93.85
LETMT03.941  94.96
LETMT03.961  96.71
LETMT03.981  98.71
LETMT03.001  00.79
LETMT03.021  02.21
LETMT04.901  90.67
LETMT04.911  91.85
LETMT04.921  92.79
LETMT04.931  93.81
LETMT04.941  94.96
LETMT04.961  96.71
LETMT04.981  98.71
LETMT04.001  00.79
LETMT04.021  02.21
LETMT05.901  90.67
LETMT05.911  91.81
LETMT05.921  92.79
LETMT05.931  93.81
LETMT05.941  94.96
LETMT05.961  96.71
LETMT05.981  98.71
LETMT05.001  00.79
LETMT05.021  02.21
```

```
LETMT06.901 90.67
LETMT06.911 91.85
LETMT06.921 92.79
LETMT06.931 93.85
LETMT06.941 94.96
LETMT06.961 96.71
LETMT06.981 98.71
LETMT06.001 00.79
LETMT06.021 02.21
LETMT07.904 90.58
LETMT07.914 91.85
LETMT07.924 92.79
LETMT07.934 93.96
LETMT07.944 94.96
LETMT07.964 96.69
LETMT07.984 98.46
LETMT07.004 00.38
LETMT07.024 02.21
LETMT08.901 90.73
LETMT08.911 91.79
LETMT08.921 92.79
LETMT08.931 93.96
LETMT08.941 94.96
LETMT08.961 96.71
LETMT08.981 98.71
LETMT08.001 00.79
LETMT08.021 02.21
```

SLDATES.DAT

Decimal Dates for Sungei Lalang Forest Reserve

```
SLTMT01.921 92.04
SLTMT01.931 93.10
SLTMT01.941 94.19
SLTMT01.951 95.29
SLTMT01.961 96.40
SLTMT01.981 98.38
SLTMT01.001 00.38
SLTMT01.021 02.46
SLTMT02.921 92.08
SLTMT02.931 93.06
SLTMT02.941 94.17
SLTMT02.951 95.29
SLTMT02.961 96.40
SLTMT02.981 98.38
SLTMT02.001 00.38
SLTMT02.021 02.40
SLTMT03.921 92.04
SLTMT03.931 93.06
SLTMT03.941 94.21
SLTMT03.951 95.29
SLTMT03.961 96.42
SLTMT03.981 98.38
SLTMT03.001 00.38
SLTMT03.021 02.40
SLTMT04.921 92.08
SLTMT04.931 93.08
SLTMT04.941 94.21
SLTMT04.951 95.33
SLTMT04.961 96.44
SLTMT04.981 98.38
```

```
SLTMT04.001 00.38
SLTMT04.021 02.46
SLTMT05.921 92.06
SLTMT05.931 93.10
SLTMT05.941 94.21
SLTMT05.951 95.29

SLTMT05.961 96.40
SLTMT05.981 98.38
SLTMT05.001 00.38
SLTMT05.021 02.42
SLTMT06.921 92.08
SLTMT06.931 93.13
SLTMT06.941 94.19
SLTMT06.951 95.33
SLTMT06.961 96.38
SLTMT06.981 98.38
SLTMT06.001 00.38
SLTMT06.021 02.44
SLTMT07.924 91.88
SLTMT07.934 93.04
SLTMT07.944 94.29
SLTMT07.954 95.46
SLTMT07.964 96.38
SLTMT07.984 98.38
SLTMT07.004 00.38
SLTMT07.024 02.54
SLTMT08.921 92.08
SLTMT08.931 93.08
SLTMT08.941 94.23
SLTMT08.951 95.33
SLTMT08.961 96.40
SLTMT08.981 98.38
SLTMT08.001 00.38
SLTMT08.021 02.42
```

KSDATES.DAT

Decimal Dates of Enumeration for Kledang Saiong Forest Reserve

```
KSTMT11.901 91.04
KSTMT11.911 91.96
KSTMT11.921 92.79
KSTMT11.931 93.77
KSTMT11.941 94.69
KSTMT11.961 96.79
KSTMT11.981 98.71
KSTMT11.001 00.90
KSTMT11.021 02.29
KSTMT12.901 90.94
KSTMT12.911 91.94
KSTMT12.921 92.85
KSTMT12.931 93.79
KSTMT12.941 94.77
KSTMT12.961 96.79
KSTMT12.981 98.88
KSTMT12.001 00.92
KSTMT12.021 02.29
KSTMT13.901 91.13
KSTMT13.911 91.96
KSTMT13.921 92.85
KSTMT13.931 93.75
KSTMT13.941 94.71
```

```
KSTMT13.961 96.79
KSTMT13.981 98.73
KSTMT13.001 00.90
KSTMT13.021 02.29
KSTMT15.901 91.17
KSTMT15.911 91.96
KSTMT15.921 92.85
KSTMT15.931 93.81

KSTMT15.941 94.75
KSTMT15.961 96.79
KSTMT15.981 98.83
KSTMT15.001 00.94
KSTMT15.021 02.29
```

CHDATES.DAT

Decimal Dates of Enumeration for Cherul Forest Reserve

```
CHTMT11.911 91.44
CHTMT11.921 92.79
CHTMT11.931 93.79
CHTMT11.941 94.69
CHTMT11.951 95.77
CHTMT11.961 96.60
CHTMT11.981 98.77
CHTMT11.001 00.77
CHTMT11.021 02.38
CHTMT12.911 91.34
CHTMT12.921 92.79
CHTMT12.931 93.81
CHTMT12.941 94.71
CHTMT12.951 95.75
CHTMT12.961 96.65
CHTMT12.981 98.75
CHTMT12.001 00.81
CHTMT12.021 02.38
CHTMT13.911 91.61
CHTMT13.921 92.13
CHTMT13.931 93.81
CHTMT13.941 94.69
CHTMT13.951 95.75
CHTMT13.961 96.54
CHTMT13.981 98.73
CHTMT13.001 00.77
CHTMT13.021 02.38
CHTMT14.914 91.54
CHTMT14.924 92.29
CHTMT14.934 93.52
CHTMT14.944 94.50
CHTMT14.954 95.54
CHTMT14.964 96.50
CHTMT14.984 98.63
CHTMT14.004 00.79
CHTMT14.024 02.38
CHTMT15.911 91.54
CHTMT15.921 92.15
CHTMT15.931 93.79
CHTMT15.941 94.67
CHTMT15.951 95.77
CHTMT15.961 96.60
CHTMT15.981 98.73
CHTMT15.001 00.79
```

```
CHTMT15.021 02.38
CHTMT16.914 91.63
CHTMT16.924 92.13
CHTMT16.934 93.71
CHTMT16.944 94.54
CHTMT16.954 95.63
CHTMT16.964 96.54
CHTMT16.984 98.71
CHTMT16.004 00.81
CHTMT16.024 02.38
```

II.9   ITSPSUM.DAT

Example of the file containing filenames and the corresponding enumerated area in hectares.

'SLTMT01.921', 4.0
'SLTMT02.921', 4.0
'SLTMT03.921', 4.0
'SLTMT04.921', 4.0
'SLTMT05.921', 4.0
'SLTMT06.921', 4.0
'SLTMT08.921', 4.0

To be expanded as required.

APPENDIX III LIST OF TREATMENTS AND BLOCK NUM-BERS

III.1   Logging intensity and plantation establishment in a virgin forest. (Dipt = the botanical tree family Dipterocarpaceae)

Treatment	Block Numbers	
	Lesong F.R.	Sungei Lalang F.R.
1) Cut all > 30 cm DBH	03,17,26,31	03,06,21,28
2) Cut all > 45 cm DBH	02,07,13,29	01,07,25,29
3) Cut Dipt > 35 cm DBH Non-Dipt > 30 cm DBH	05,18,21,27	02,05,24,26
4) Cut Dipt > 50 cm DBH Non-Dipt > 45 cm DBH	04,19,30,32	12,19,22,27
5) Cut Dipt > 65 cm DBH Non-Dipt > 60 cm DBH	08,10,24,14	04,08,18,31
6) Cut Dipt > 75 cm DBH Non-Dipt > 70 cm DBH	01,20,25,28	10,11,20,32
7) Cut all > 30 cm DBH Plantation of Wildlings	15,16,22,23	13,14,15,23
8) Virgin, no cutting Control	06,09,11,12	09,16,17,30

III.2   Silvicultural treatments and plantation establishment in a logged-over forest.

Treatment	Block Numbers	
	Kledang Saiong F.R.	Cherul F.R.
11) Climber Cutting (CL)	02,07,08,15	01,12,16,20
12) Girdling + CL (GCL)	01,12,13,16	08,11,15,18
13) GCL(+Enrichment Planting)	03,05,09,19	07,10,13,19
14) Cut all > 30 cm DBH Plantation of Wildlings	04,11,14,17	02,03,04,06
15) Logged-over, no Treatment Control	06,10,18,20	05,09,14,17
16) Enrichment Planting Planted wildlings (in treatment 13)	03,05,09,19	07,10,13,19