224

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Forest Resources Management Project

Technical Assistance Component

Final Report: Forest Inventory of the Sundarbans Reserved Forest

(VOLUME 1)

J.A.V. REVILLA
Forest Inventory Specialist

ISHTIAQ UDDIN AHMAD, DCF (RIMS)
FIS Counterpart

and

MD. AKBAR HOSSAIN
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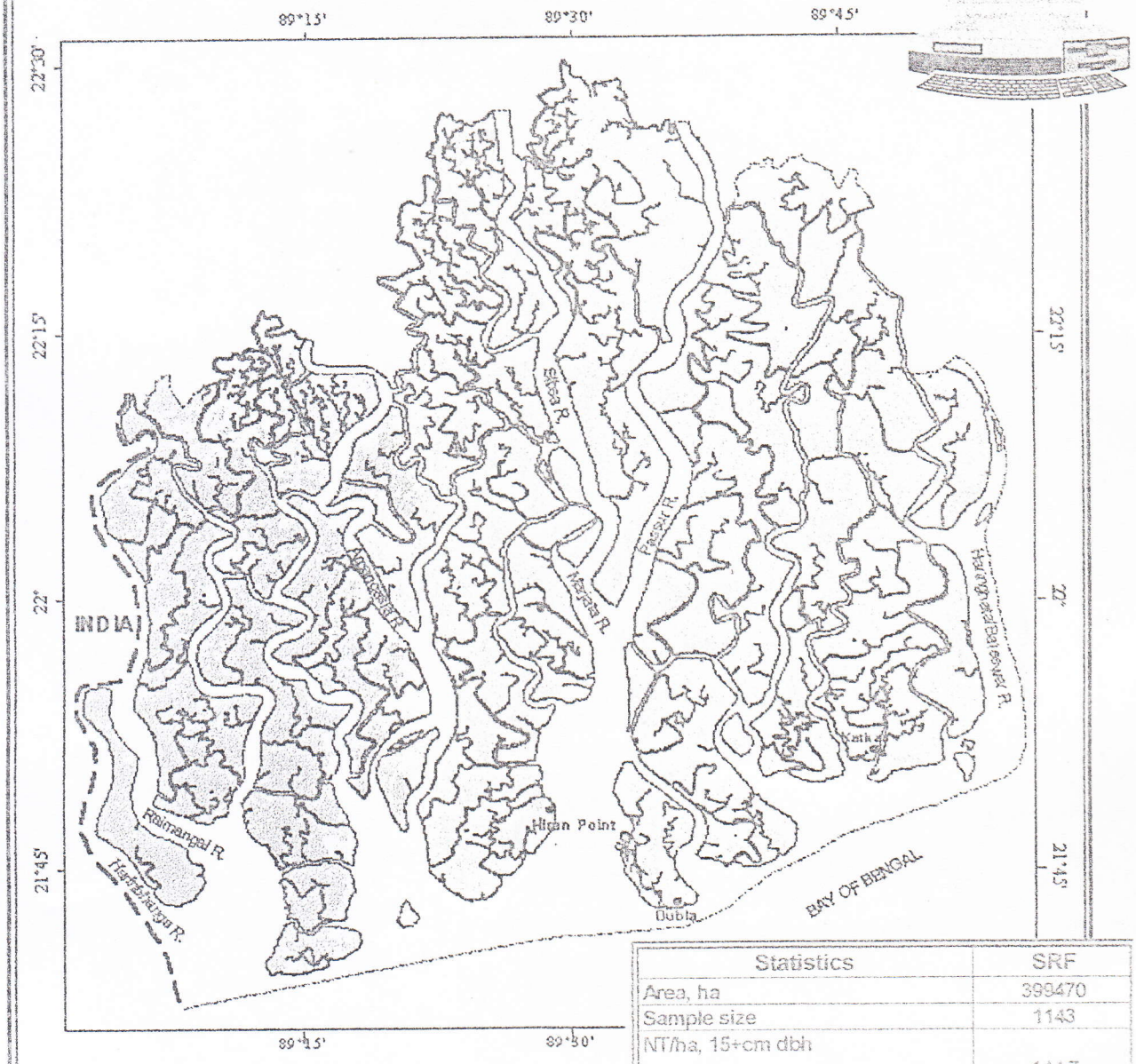
Table of Contents

Appendices

Sundarbans Reserved Forests
Major Forest Types



Statistics	SRF
Area, ha	399470
Sample size	1143
NT/ha, 15+cm dbh	144.7
BA/ha (sqm.), 15+cm dbh	5.38
Vol/ha (cum) 15+cm dbh	27.40
SE%	2.5
Seedlings/ha	33120
Saplings/ha	7469
Poles/ha	3285
Golpatta/ha	7955
Wt.Leaves/ha (tons)	14.60
Area of Golpatta, ha	7 797

0 10 20

Scale 1:600,000

Legend

- Sundri
- Gewa
- Goran
- Other tree vegetation
- Non_wood

- International boundary
- Reserved Forest boundary
- Land/water boundary

RIMS/GIS Unit, Forest Resources Management Project, Bangladesh Forest Department, Dhaka, February 1998

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Final Report: Forest Inventory of the Sundarbans Reserved Forest

J.A.V. REVILLA[1]
Forest Inventory Specialist, FRMP-TA

ISHTIAQ UDDIN AHMAD, DCF (RIMS)
FIS Counterpart

and

MD. AKBAR HOSSAIN
DFO-MPD (Khulna)

Conclusions and Recommendations

1. The FRMP forest inventory of the Sundarbans Reserved Forest (SRF) has generated the desired results as evidenced by the sampling errors of the tree volume and other estimates. The sampling error of the volume estimates varies from 2.5% to 2.7% (depending upon how the data are grouped/stratified) which is much lower than the target precision of not greater than 5% sampling error. The sampling errors at the stratum level are also within the designed targets of the forest inventory. The ENRS (Extended Natural Resources Survey) which independently collected, handled, entered and analyzed their own data had confirmed the results of the FRMP inventory. More convincingly, a validation re-survey of 56 plot clusters that were drawn at random with emphasis on the Gewa and Gewa Sundri forest types, showed a difference of less than one-half percent in the total volume of the 56 plot clusters when compared with the results of the regular enumeration (Table 15). The validation re-survey which was participated in by representatives of the DFO (Khulna) and KNM (Khulna Newsprint Mill) measured only three plots per cluster while the regular sampling enumerated five plots per cluster. Thus, it can be concluded that the statistics presented in this report are quite adequate for forest management planning purposes.

2. The tree resources of the SRF had decreased dramatically over the last 37 years from the FORESTAL inventory in 1959 to the ODA inventory in 1983 and the FRMP inventory in 1996. Estimates of the three inventories show that Sundri had decreased from 211 trees/ha in 1959 to 125 in 1983 and 106 in 1996 in the whole SRF based on 15-cm+ dbh trees, or about 50% over the 37-year period. In the case of Gewa, the number of trees/ha had decreased from 61 in 1959 to 35 in 1983 and only 20 in 1996, or a decrease of about 67% for the same period. In terms of all tree species, the decrease had been from 296 in 1959 to 180 in 1983 and 144 in 1996, or about 51% over the 37-year period. The picture is not as bad if the 10-

[1] All programming tasks were done by Delwar Hossain, Computer Programmer, FRMP-TA except the first prototype of DEVP which was programmed by A. Revilla.

cm+ dbh trees are considered. The decrease in number of Sundri trees/ha in the SRF in this case had been from 511 in 1959 to 296 in 1983 and 290 in 1996, or a decrease of about 43% over the 37-year period. The case of Gewa and all species is similar. Gewa decreased from 345 in 1959 to 224 in 1983 and 228 trees/ha in 1996, or a decrease of 34% over the same period. For all tree species, the decrease was from 952 in 1959 to 557 in 1983 and 561 trees/ha in 1996, or a decrease of about 41% for the 37-year period. From the standpoint of sustainable production of the two major species, the trend over the 37-year period is certainly a cause for alarm and has to be addressed immediately and effectively. This is a major challenge for the on-going forest management planning activity and implementation of said plan by the concerned authorities. From the standpoint of vegetative cover, 144 trees/ha (15-cm+ dbh) or 561 trees/ha (10-cm+ dbh) plus more than 2860 small poles/ha, 7500 saplings/ha and 33200 seedlings/ha do not yet present a grim deforestation picture, but obviously, the trend cannot be allowed to continue!?

It should be worth repeating here that the decrease in the number of trees in the SRF from 1959 to 1996, 51% if based on the 15-cm+ dbh trees or 41% if based on the 10-cm+ dbh trees, does not mean that 51% of the SRF forest is gone. It simply means that the tree density of the forest has been reduced to about half of what it used to be 37 years ago. It also means that if sustainable management of these forests requires increasing or maintaining the present density or even changing the stand structure of the forests, then these have to be addressed by the forest management system.

3. The fact remains that people, mostly from the less privileged segment of the country's population, some 1.2 million or more, depend upon the SRF resources for their livelihood, directly or indirectly. On the other hand, the forest resources had decreased dramatically over the years such that there is imminent danger of degrading the resources to a situation where the SRF would lose its capacity to provide desirable levels of goods and services. Before the SRF reaches that critical stage, it is imperative that the users, the managers and the people notably the leaders, provide the needed concerted efforts (political will, policies, strategies, programs, support systems, resources, ...) to manage and conserve the SRF resources so that they remain productive on a sustainable basis. This also requires the eradication of pervasive poverty as a minimum necessary condition, for, there can be no sustainable management/conservation of renewable resources under conditions of widespread poverty.

   The integrated forest management plan for the SRF is being prepared by FRMP. More projects to conserve the SRF resources including the generation of more livelihood opportunities for the people in the neighboring areas are being proposed for funding by international financing institutions. All these efforts have noble objectives and could help, but in the end, the conservation or degradation of the SRF resources will depend primarily upon the leaders and people of Bangladesh.!!!

   A **continuing resources change assessment system** (CRCAS) for the SRF is hereby strongly recommended. CRCAS must be designed, supported and implemented to provide timely (at least annually) resource change statistics for the

Forest Managers, the Leaders and people to respond effectively to any aggravating circumstances. The basic components of CRCAS have now been set in place by FRMP at the RIMS/GIS Wing of FD. What more are needed include: a) staff to operate and maintain the system, b) annual field check/enumeration/measurement of one-tenth to one-fifth of the one-minute grid plot clusters so that all plot clusters would have been re-visited/re-enumerated in five to 10 years, c) annual/biennial acquisition of appropriate satellite imageries covering portions (sensitive portions) of the SRF to detect resource changes, d) ground monitoring system to check areas identified on the satellite imagery to have unusual activities/changes, and e) RIMS/GIS personnel to conduct necessary studies including strategic studies to manage and conserve the SRF and other forest resources for the maximum benefit of the people of Bangladesh.

Scope and Objectives of the Forest Inventory Sub-Component of FRMP

The FRMP forest inventory sub-component covers eight Forest Divisions, namely: the Sundarbans Reserved Forest, Sylhet, Chittagong, Cox's Bazar, Noakhali C/A, Chittagong C/A, Patuakhali C/A and Bhola C/A Forest Divisions. As indicated in the sampling design specifications of these forest inventories, the objectives of the FRMP inventories are threefold. The primary objective is to generate information on the standing timber and other resources (bamboo, rattan, golpatta/nipa and medicinal plants) for integrated forest management planning purposes. The second objective is to provide abstract time-series data, whenever possible, for plantation yield modeling purposes. And, the third objective is to set up or at least provide a basis for setting up a system of "hidden" recurrent sample plots for continuous monitoring and assessment of change in the target forest areas.

Target Precision, Sample Size (No. of Plots) and Sample Plot Configuration

Target precision. - The FRMP forest inventories were designed to attain a precision of the estimates of not greater than 5% sampling error based on the total volume of trees/ha in each division, not more than 10 to 15% sampling error for each of the more important strata, and not more than 20% sampling error for the other strata. These precision levels are considered adequate for forest management planning purposes and they apply in all the forest divisions covered by FRMP, except the C/A divisions where it would be necessary to double the resources and time requirements of the field sampling work to attain a sampling error of 5% or less at the division level.

Sample size, n, for the Sundarbans. – Available information on the coefficient of variation of tree volume statistics in the Sundarbans Reserved Forest (SRF) suggested that it can be as low as 25% (FORESTAL, 1960) or as high as 100% (ODA, 1985). Considering that photo-interpretation and mapping of the SRF had not been started at the time the sampling design was being prepared, a stratified random sampling design was not feasible. As such, a systematic sample was resorted to and a one-minute grid sample was identified and shown to provide the required precision of estimates. The planned sample size and the number of plot clusters actually enumerated in each block are as follows.

Block	Estimated Area (ha)	1' Grid, n	Area (1995), ha	Actual No. of Plot Clusters
1	59186	188	60061	177
2	41188	131	41909	118
3	52395	167	51983	145
4	54840	174	55169	157
5A	28283	90	21081	55
5B	33900	108	40837	121
6	58401	186	57126	159
7	36210	115	36320	100
8	37229	118	34984	100
Total	401632	1277	399470	1132*

*** Sampling error of the volume/ha, all species, all blocks/compartments is 2.5%. 1193 plot clusters were enumerated but 61 were invalidated because they fell on water as per the GIS database. Eleven additional plot clusters of Keora and 31 plot clusters of Golpatta were measured in late 1997.**

Sample plot configuration. – The "sample plot" adopted for the FRMP forest inventories is a **cluster of five plots** where a "plot" is actually a set of sub-plots, one sub-plot each for seedlings (1-m radius), saplings (2-m radius), poles (5-m radius), trees (11-m radius), Golpatta seedlings (2-m radius) and Golpatta (5-m radius), in the case of the Sundarbans. The five plots in the plot cluster for tree species are spaced 50 meters apart (in SRF and C/A plantations) reckoned from the center plot along the cardinal directions. In the case of Golpatta, the plot cluster consists of three plots spaced 50 m apart following the Golpatta strips along the river banks.

The details of the sampling design specifications can be found in the first fielding report of the Forest Inventory Specialist (June 1995).

Field Sampling

A sample of the Field Data Enumeration Form for the SRF is given in Appendix 1. The field sampling procedures and instructions are contained in the second report of the FIS (July 1995). These procedures/instructions were refined during the training of the field sampling crews starting with the ACFs in October 1995. The codes for the plot and tree description variables and codes for trees and other species are shown in Appendices 2 and 3, respectively.

Field sampling started after the field crews had been trained in the respective Divisions in late 1995 except in the Coastal Divisions where the first sampling crews were fielded only during the 1996-97 season. All regular field enumeration activities were completed in May 1997. Field sampling activities were under the direct supervision of the respective DFO-WP.

Data Entry and Validation

Data entry and initial validation was scheduled to start after the field work season in May 1996. To meet this schedule, the Data Entry and Validation Program (DEVP) was designed starting in December 1995 and programming was scheduled in early

1996. The first prototype of DEVP was ready in May 1996 as scheduled. The structure and technical specifications of the dbf tables and DEVP are indicated in Appendix 4. The details are given in Annex 1 of the FIS' report for his second mission (May 1996).

While the field data were being prepared for entry into DEVP, further refinements were made on the program. Data entry and initial validation finally began in July 1996 and continued until this activity was completed for each of the eight Divisions, first, for Sylhet in mid-May 1997 followed by the Sundarbans in early August. All data entry and initial validation activities were completed by the Forest Divisions in September 1997. These activities were also under the direct supervision of the respective DFO-WP.

Tree Volume Equations Studies

In December 1995, initial arrangements were made with BFRI Researchers for them to assist in the improvement of existing tree volume equations for some plantation species, specifically those that were derived using data sets that did not include large trees which were not available at the time the data for the existing equations were collected. It was later agreed that the designated BFRI Researchers (Messrs. Md. Abdul Latif and Sukumar Das and crew) gather additional data particularly on bigger size trees of Akashmoni (*Acacia auriculiformis*), Mangium (*Acacia mangium*) and *Eucalyptus spp*. Data collection started in April 1996 and was completed in June 1996. Data entry and processing were done by the BFRI Researchers thereafter and specification of the tree volume equations for the three species was undertaken jointly with them in January 1997. The results of these studies are being used with existing equations of other species in the generation of tree statistics for the plantations in Sylhet, Chittagong and Cox's Bazar.

Another set of tree volume equations studies was also planned for the Sundarbans specifically for Sundri, Gewa, Keora, Baen, Kankra, Dhundul, Passur and Goran as well as weight equations for Goran and Golpatta. Data collection for these studies started after the field sampling activities and was completed in late October 1997. The data were then entered into appropriate files and the computer program to extract the information needed to derive the tree volume equations was written. These studies were finally completed in January 1998 and the results are given in Appendix 5. The new equations were found to be more efficient than the ODA equations (Appendix 11), hence, they were used to generate the final statistics of SRF. The IRMP equations for Sundri and Gewa which were used to generate the interim statistics for SRF, together with the ODA equations for other species, give only overbark volume.

Data Processing

The Field Data Processing Program (FDPP). - Design of FDPP started in early 1996 and the technical specifications, flow charts and algorithms were ready to guide the Programmer in encoding FDPP in May 1996. The draft of the details of the design and technical specifications are contained in Annex 2 of the FIS' report for his second

mission (May 1996). The final revisions/refinements are given in the revised version of the same document prepared and submitted in October 1997.

Programming started before July 1996 and individual modules were tested as soon as they were finished. Debugging and refinements continued to be made until the Sylhet and Sundarbans databases were received for final validation and processing.

Final data validation. – Final validation of the forest inventory databases took longer than expected because of high incidence of errors in data entry of plot cluster location coordinates in all cases. Identification of the stratum of each plot cluster as determined on the RIMS-GIS vegetative cover maps also had to wait for completion of digital mapping of the forest divisions. The maps for the Sundarbans were completed ahead of the other Divisions.

One thousand one hundred ninety-three (1193) plot clusters were enumerated in the SRF but 61 of these were found to fall on water (n/a areas) according to the GIS database. But, 11 additional Keora plot clusters were enumerated later to improve the precision of the Keora estimates. As such, 1143 plot clusters were analyzed to generate the various estimates. The estimates for the 61 invalid plots are also shown under **stratum** ***na***.

The main forest types, final strata and species/group. – The main forest types, final strata and species/group used to summarize the stand and stock tables and statistics are given below. The main forest types and strata are consistent with the classes identified in photo-interpretation which were mapped, digitized and stored in the RIMS-GIS database.

The **main forest types** are: Sundri, Sundri-Gewa, Sundri-Others, Gewa, Gewa-Goran, Gewa-Sundri, Goran/Goran-Gewa, Passur-Kankra-Baen and Keora. The hectarages of the main forest types are given in Table 1 by Block and in Table 2 by Compartment. Table 3 gives the areas of the Compartments and the Blocks.

The final **strata** used to generate the stand and stock tables and statistics for SRF are shown below. Both the stratum codes used in the analysis of the FI data and the RIMS-GIS database stratum codes are given. The RIMS-GIS database stratum codes were proposed/adopted after analysis of the FI data hence the need to show both codes.

Sundarbans: Strata and FI Stratum Code	Database Stratum Code (Proposed by RIMS/GISS)
Sundri (01)	
1 <70% cc, < 15m height class	11
2 <70% cc, > 15m height class	12
3 >70% cc, all height classes	13
Sundri Gewa (02)	
4 <70% cc, all height classes	21
5 >70% cc, all height classes	22
Sundri Passur/Sundri Passur Kankra (03, 04)	
6 all cc, all height classes	30

Gewa/Gewa Mathal (coppice) (05, 06) 7 <70% cc, all height classes 8 >70% cc, all height classes	40 (Note: These two strata were combined into one stratum.)
Gewa Goran (07) 9 <70% cc, all height classes 10 >70% cc, all height classes	50 (Note: These two strata were combined into one stratum.)
Gewa Sundri (08) 11 <70% cc, all height classes 12 >70% cc, <10m height class 13 >70% cc, >10m height class	61 62 (Note: 12 and 13 were combined.)
14 Goran (09) all cc, all height classes	70
Goran Gewa (10) 15 <70% cc, all height classes 16 >70% cc, all height classes	70 (Note: 14, 15 and 16 were combined.)
Passur Kankra/ Passur Kankra Baen/Baen (11, 12, 13) 17 all cc, all height classes	80
Keora (14) 18 all cc, all height classes	80 (Note: 17 and 18 were combined.)
Others (Grass and Bare Ground, Sandbar, Agriculture	90
Waterbody	00

Six **species/groups** are used to summarize the stand and stock tables and statistics for the Sundarbans. These are: **Sundri, Gewa, Keora, Baen, Goran** and **Others**.

Data processing. – As soon as the location coordinates of the plot clusters were corrected, their respective strata identified, the compartments validated, and the stratum areas were determined, processing of the SRF forest inventory data went into full swing. The data were analyzed not only by stratum (forest type/crown closure/height class) but also by block and compartment, and by forest type for valid reasons. While the results were expected to vary slightly (but not significantly), it is obviously desirable to analyze the data by compartment because forest regulation and scheduling of harvests and silvicultural operations are compartment-based, and by block as well as by forest type because previous inventories summarized their results by block and by forest type.

In addition to the usual stand and stock tables (per ha estimates) by dbh classes and species/groups and total estimates (forest statistics) for the whole SRF, additional information needed in forest management planning were also generated, e.g. NT, BA and Vol/ha of 12-cm+ and 17-cm+ dbh of Gewa and 20-cm, 21-cm and 22-cm+ dbh of Sundri as well as weight of Goran and Golpatta. The incidence of "top-dying" in Sundri was also quantified based on the number and volume of Sundri trees.

The Final Results

The timber statistics. – The statistics presented herein are the final results of the FRMP forest inventory of the SRF. The results of the forest inventory of the SRF are summarized in Tables 4 to 9 and Tables 12 to 15. The details of these results are given in the Appendices. Table 4 gives the summary of tree volumes by block, forest type

and species. Table 5 summarizes tree volumes (cu m/ha) by compartment and species. In addition, the volume and weight of Goran poles, the number of saplings and the weight of utilizable saplings are also shown. Table 5a provides the corresponding estimates for the whole SRF. Table 6 gives the sampling errors of the various estimates and the no. of plot clusters per compartment/stratum/forest type and block.

Table 7 shows the summary stand and stock tables (number, basal area and volume of trees and poles/ha as well as the number of seedlings and saplings/ha) for "all blocks all compartments" and "all blocks all forest types" scenarios. The corresponding totals for the whole SRF are given in Table 8. For example, Table 8 indicates that there are about 7.10 million cu.m. (V10) of Sundri 15-cm+ dbh in the whole Sundarbans under the "all blocks all compartments" scenario or 6.89 million cu m under the "all blocks all forest types" scenario. The slight difference in results stems from the way the data are grouped and analyzed.

The timber statistics in terms of volume of the whole tree, VTOT (stem or bole volume + crown volume; underbark in the case of wood materials down to 10-cm diameter, overbark for smaller materials) were also generated. The same thing was also done for non-merchantable volume, NMV. The details of the per hectare estimates for these types of volumes are given in the Annex (Volume 2), Tables 3 and 4. For example, for the whole SRF, VTOT is 36.06 cu.m./ha (SE%=2.4) and NMV is 8.59 cu.m./ha (SE%=2.0). As it turns out, the difference between VTOT and NMV is 27.47. On the other hand, the estimate for V10 is 26.20 cu.m./ha SE%=2.5) which is not statistically different from the difference of VTOT and NMV. Note that these three statistics were determined independently using different volume equations. This is another indicator of the high quality of the FRMP estimates.

Table 9 gives the precision (sampling errors) of various estimates: volumes of trees by species and number of poles, saplings and seedlings also by species. Tables 13 and 14 provide the estimates for the Golpatta resources in the SRF. In about 7800 ha of Golpatta strips along approximately 13000 km of rivers, there are about 113000 tons of utilizable leaves (green/split form) in the SRF.

Table 15 shows the comparison between the results of regular enumeration and validation sampling of the 56 plot clusters that were drawn at random for this purpose. Even if the validation sampling enumerated only three plots per cluster against five plots per cluster in regular enumeration, the estimated total volumes of the 56 plot clusters differ only by less than one-half percent when the two results are compared. This directly validates the findings of the FRMP forest inventory.

Regeneration statistics. – Based on the stratum statistics, there are some 3300 poles (2.5 – 14.5-cm dbh)/ha, SE%=1.3; 7400 saplings/ha, SE%=2.1; and 33700 seedlings/ha, SE%=2.7, all tree species, in the SRF. The corresponding estimates of Sundri regeneration are: about 1100 poles/ha (SE%=2.1); 2200 saplings/ha (SE%=3.1); and 20300 seedlings/ha (SE%=3.7). In the case of Gewa, there are some 1400 poles/ha SE%=2.3); 1400 saplings/ha (SE%=3.8); and 5800 seedlings/ha (SE%=4.7).

The Confidence Limits

Confidence limits of stratum mean. - The 95% confidence limits of the stratum mean, **xbar**, is given by the familiar expression:

xbar ± t*se

where: **t** is the t-value at 5% with degrees of freedom, **n*h*-1** (where n*h* is the sample size of stratum *h*) and **se** is the standard error of the stratum mean.

Confidence limits of the population mean. - The 95% confidence limits of the population mean, **xdbar**, in stratified sampling is more complicated than the usual procedure specifically in determining its effective degrees of freedom, **ne**.

xdbar ± t*sed

where: **t** is the t-value at 5% level with degrees of freedom **ne** and sed is the standard error of the population mean; **ne** is given by the following expression (From: Cochran).

$$ne = (\sum Gh*Sh\hat{}2)\hat{}2/\sum(Gh\hat{}2*Sh\hat{}4/(nh-1))$$

where: $Gh = Nh*(Nh-nh)/nh$,
$Sh\hat{}2$ is the sample variance of stratum *h*,
Nh is the size of stratum *h*,
nh is the sample size for stratum *h*, and
Nh and nh are in the same units, e.g. ha.

Table A8-1 in Appendix 8 shows the computation of the effective degrees of freedom, **ne**, for total volume all strata all species, Sundri all strata and Gewa all strata and the corresponding t-values at 95% confidence level. Table A8-2 gives **ne** for all compartments while Table A8-3 provides the **ne** values for all blocks. The corresponding t-statistics at 95% level are also indicated in each case.

The appropriate t-statistics as shown in these tables can be used to establish the confidence limits of the per ha or whole SRF estimates, e.g., the total volume (V10) of trees 15-cm+ dbh all species (in million cu m) in the SRF lies between (at 95% confidence level under the all blocks all compartments scenario): 10.95 – (.025*1.96*10.95) and 10.95 + (.025*1.96*10.95) or **10.41 million and 11.49 million cu m.** In per ha values, the corresponding 95% confidence limits are: 27.40 – 1.34 and 27.40 + 1.34 or about 26.06 and 28.74 cu m/ha.

Assessment of Change in the Forest Resources

Area of the SRF. - Table 10 summarizes the comparative areas of the major forest types in the FORESTAL inventory (1957), ODA inventory (1981) and the FRMP inventory (1995). It should be noted that the aerial photography for the FRMP was

undertaken and completed in 1995, that of the ODA inventory was completed in December 1981 and the FORESTAL photography was completed in January 1958.

Table 10 shows steady decrease in area of the Sundri forest type and Sundri-Gewa also decreased from 1981 to 1995. On the other hand, the area of Gewa and Gewa-Sundri forest types has increased over the years.

The total area of the SRF has not changed much over the years but the forest area has increased over the 38-year period.

Change in stocking. – Tables 11 and 11a show the comparative per hectare estimates of number and volume of trees, 15-cm+ dbh and 10-cm+ dbh, respectively, for the FORESTAL (1959), ODA (1983) and FRMP (1996) inventories. It should be noted that the dates of the three inventories vary slightly in Tables 10 and 11/11a because Table 10 considers the dates of the aerial photos while Tables 11 and 11a are based on the years of field sampling. It should also be noted that volume is not a reliable basis for comparing the results because the three inventories used different sets of tree volume tables/equations. Number of trees is therefore a more reliable basis for assessing change in stocking in the SRF.

Both Tables 11 and 11a provide comparative estimates of Sundri, Gewa and the other species combined and labeled as Others, by block and for the whole SRF. Estimates of the three inventories show that Sundri had decreased from 211 trees/ha in 1959 to 125 in 1983 and 106 in 1996 in the whole SRF based on 15-cm+ dbh trees, or about 50% over the 37-year period. In the case of Gewa, the number of trees/ha had decreased from 61 in 1959 to 35 in 1983 and only 20 in 1996, or a decrease of about 67% for the same period. In terms of all tree species, the decrease had been from 296 in 1959 to 180 in 1983 and 144 in 1996, or about 51% over the 37-year period.

As shown in Table 11a, the rate of decrease is not as bad if the 10-cm+ dbh trees are considered. The decrease in number of Sundri trees/ha in the SRF in this case had been from 511 in 1959 to 296 in 1983 and 290 in 1996, or a decrease of about 43% over the 37-year period. The case of Gewa is a little better. It decreased from 345 in 1959 to 224 in 1983 and to 228 trees/ha in 1996, or a decrease of 34% over the same period. For all tree species, the decrease was from 952 in 1959 to 557 in 1983 to 561 trees/ha in 1996, or a decrease of about 41% for the 37-year period.

Incidence of Sundri "Top-Dying"

Tables 12 and 12a summarize the incidence of "top-dying" in Sundri by salinity zone, compartment and forest type. Both tables show that the highest incidence of top-dying occurs in Compartments 33, 36, 37, 42 and 45. About 3.4% of all Sundri trees (about 2.7% by volume) in the Sundarbans suffer from "top-dying". It should be noted, however, that because of salvage cutting of "top-dying" Sundri trees over the years, these estimates would have some bias. The data do not show significant correlation between the incidence of Sundri "top-dying" and the existing data on salinity zone.

Area Estimate of Golpatta Strips along River Banks in the SRF

A simple low-cost survey that can be completed in not more than 25 crew-days was designed and conducted in the SRF to provide an estimate of the area of Golpatta strips along river banks in the SRF. The design considered six strata: the three salinity zones and two river width classes (<=30m and >30m) in each zone. Two hundred sampling places were distributed over the six strata and compartments based on the length of rivers in each stratum and compartment.

The data and stratum estimates are detailed in Appendix 9, Table A9. The Golpatta areas and their distribution among the compartments are given in Table 13. There are about **7797 ha** of Golpatta strips along the banks of almost 13,000 kilometers of rivers in the SRF.

Estimate of Golpatta Resources in the SRF

A separate set of 31 Golpatta plot clusters were enumerated to provide a basis for estimating the Golpatta resources in the SRF. The information extracted from these plot clusters are given in Table 14. The results of the analysis show that on the average, there are about 5770 mature Golpatta, 2180 immature stems and 650 seedlings per hectare of Golpatta stands along the river banks. The mature stems have about 18900 leaves/ha about 9490 of which are considered utilizable. The utilizable leaves have an average length of 3.3 m and are estimated to weigh about 14.6 tons/ha in green/split form. The sampling error of the estimate on the number of mature Golpatta/ha is 7.8%, that of the number of leaves/ha is 8.5%, that of the number of utilizables leaves is 9.8% and that of the tonnage of utilizable leaves is 11.2%.

javr/12february98

List of Tables

Table 1. Areas of Main Forest Types by Block (ha)

Block	Sundri	Sundri Gewa	Sundri Others	Gewa	Gewa Goran	Gewa Sundri	GoGoGe	PKBKe	Sub-total	%	Others	Total
1	17,704.9	21,121.3	14.5	1,361.9	0.0	18,368.2	0.0	1,490.2	60,061.0	15.0	1,514.6	61,575.6
2	9,744.8	11,586.4	806.3	3,192.9	1,185.7	14,753.6	256.9	382.1	41,908.7	10.5	151.1	42,059.8
3	1,077.0	22,292.5	10.5	10,440.8	653.2	13,932.2	44.7	3,532.5	51,983.4	13.0	3,597.3	55,580.7
4	23,691.2	19,104.1	7,726.4	39.3	0.0	2,379.8	0.0	2,228.7	55,169.5	13.8	637.6	55,807.1
5A	57.4	320.5	207.1	769.1	4,238.6	10,039.0	3,864.0	1,585.4	21,081.1	5.3	452.5	21,533.6
5B	19,275.7	13,921.2	270.5	818.3	1,620.6	2,512.8	1,521.6	896.3	40,837.0	10.2	337.8	41,174.8
6	3,439.4	17,626.7	488.0	3,041.6	11,913.1	13,352.7	5,745.2	1,519.5	57,126.2	14.3	2,521.8	59,648.0
7	0.0	0.0	0.0	1,444.5	11,740.3	103.9	22,595.4	436.2	36,320.3	9.1	766.0	37,086.3
8	1.5	0.0	32.4	411.5	3,252.3	261.2	30,778.9	246.1	34,983.9	8.8	1,783.7	36,767.6
Total	74,991.9	105,972.7	9,555.7	21,519.9	34,603.8	75,703.4	64,806.7	12,317.0	399,471.1	100.0	11,762.4	411,233.5
%	18.2	25.8	2.3	5.2	8.4	18.4	15.8	3.0	97.1		2.9	100.0

Table 2. Areas of Main Forest Types by Compartment (ha)

Comp't No.	Sundri	Sundri Gewa	Sundri Others	Gewa	Gewa Goran	Gewa Sundri	Goran/ GoGe	P-K-B-Ke	Sub-total	%	Others	Total
1-Pr WS	1,291.6	3,357.8	0.0	901.9	0.0	3,521.7	0.0	820.2	**9,893.2**	2.48	895.1	10,788.3
2-Pr WS	552.0	2,080.8	0.0	405.0	0.0	2,444.0	0.0	50.4	**5,532.2**	1.38	26.7	5,558.9
3	813.9	2,060.7	12.0	93.1	0.0	2,801.7	0.0	0.0	**5,781.4**	1.45	0.0	5,781.4
4-EWS	388.8	3,260.1	0.0	440.0	29.9	2,312.4	0.0	84.7	**6,515.9**	1.63	7.0	6,522.9
5-EWS	0.0	1,586.1	0.0	368.6	0.0	2,967.9	0.0	118.1	**5,040.7**	1.26	121.1	5,161.8
6-EWS	0.0	3,238.2	0.0	1,117.5	0.0	1,929.6	0.0	772.2	**7,057.5**	1.77	882.3	7,939.8
7-EWS(p)	9.1	5,319.5	0.0	2,365.9	107.2	2,190.7	0.0	874.2	**10,866.6**	2.72	636.1	11,502.7
8	667.7	5,295.5	0.0	3,830.1	258.0	2,571.2	0.0	589.6	**13,212.1**	3.31	594.8	13,806.9
9	973.6	4,332.9	88.3	2,347.3	1,114.6	3,793.1	256.9	191.4	**13,098.1**	3.28	131.6	13,229.7
10	2,219.4	1,583.1	457.7	330.0	5.6	1,433.7	0.0	14.3	**6,043.8**	1.51	5.8	6,049.6
11	907.6	1,889.3	248.3	276.8	65.5	2,204.2	0.0	68.6	**5,660.3**	1.42	0.8	5,661.1
12A	850.4	101.2	0.0	43.4	0.0	1,098.6	0.0	47.1	**2,140.7**	0.54	1.8	2,142.5
12B	957.9	1,002.1	0.0	97.4	0.0	1,541.8	0.0	16.9	**3,616.1**	0.91	4.1	3,620.2
13	1,904.9	2,203.3	0.0	17.1	0.0	1,395.9	0.0	35.1	**5,556.3**	1.39	3.1	5,559.4
14	1,995.6	437.7	0.0	26.4	0.0	1,826.2	0.0	20.2	**4,306.1**	1.08	0.0	4,306.1
15	3,022.0	617.1	0.0	4.9	0.0	1,880.5	0.0	43.8	**5,568.3**	1.39	7.0	5,575.3
16	3,935.0	1,988.0	0.0	65.0	0.0	293.8	0.0	0.0	**6,281.8**	1.57	0.0	6,281.8
17	2,781.2	2,444.5	6.2	710.7	0.0	1,110.4	0.0	492.6	**7,545.6**	1.89	147.7	7,693.3
18	749.4	6,173.5	73.5	649.4	960.9	3,046.4	38.5	189.0	**11,880.6**	2.97	796.7	12,677.3
19	2,690.0	2,797.8	409.7	249.3	446.9	1,069.1	35.0	66.9	**7,764.7**	1.94	171.0	7,935.7
20	5,409.3	2,004.0	0.0	0.0	0.0	397.1	0.0	37.4	**7,847.8**	1.96	58.5	7,906.3
21	2,343.4	1,027.5	14.5	0.0	0.0	1,224.9	0.0	14.3	**4,624.6**	1.16	22.6	4,647.2
22	2,676.7	790.4	0.0	0.0	0.0	1,308.4	0.0	42.3	**4,817.8**	1.21	14.9	4,832.7
23	1,699.2	1,011.0	0.0	0.0	0.0	1,109.1	0.0	1.5	**3,820.8**	0.96	1.3	3,822.1
24	1,682.2	2,134.0	0.0	0.0	0.0	1,342.2	0.0	116.4	**5,274.8**	1.32	57.6	5,332.4
25	192.5	2,674.7	0.0	11.5	0.0	1,496.8	0.0	55.2	**4,430.7**	1.11	153.3	4,584.0
26	1,887.8	626.3	0.0	0.0	0.0	1,301.8	0.0	8.4	**3,824.3**	0.96	2.2	3,826.5
27	307.6	2,791.5	0.0	0.0	0.0	607.5	0.0	229.3	**3,935.9**	0.99	141.6	4,077.5

Table 2 ... p. 2/2

Comp't No.	Sundri	Sundri Gewa	Sundri Others	Gewa	Gewa Goran	Gewa Sundri	Goran/ GoGe	P-K-B-Ke	Sub-total	%	Others	Total
28	1,171.4	1,986.3	0.0	0.0	0.0	0.0	0.0	96.9	3,254.6	0.81	196.2	3,450.8
29	2,505.4	1,481.3	16.4	0.0	0.0	341.0	0.0	62.3	4,406.4	1.10	20.5	4,426.9
30	3,322.9	961.4	568.0	0.0	0.0	0.0	0.0	88.9	4,941.2	1.24	291.0	5,232.2
31	5,358.1	841.9	129.9	0.0	0.0	0.0	0.0	44.6	6,374.5	1.60	68.4	6,442.9
32	1,010.0	517.9	3,814.1	0.0	0.0	38.2	0.0	143.1	5,523.3	1.38	22.6	5,545.9
33	2,515.7	2,156.1	446.3	0.0	0.0	85.2	0.0	127.1	5,330.4	1.33	4.0	5,334.4
34	2,705.0	1,955.2	0.0	0.0	0.0	103.6	0.0	19.3	4,783.1	1.20	2.0	4,785.1
35	153.4	2,393.4	1,560.0	0.0	0.0	898.8	0.0	1,420.7	6,426.3	1.61	153.2	6,579.5
36	1,070.0	4,400.4	1,191.7	14.8	0.0	336.7	0.0	147.0	7,160.6	1.79	64.1	7,224.7
37	2,627.9	2,766.5	264.3	16.5	0.0	83.9	0.0	16.8	5,775.9	1.45	29.7	5,805.6
38	4,418.1	1,716.0	0.0	4.9	0.0	178.2	0.0	13.9	6,331.1	1.58	19.3	6,350.4
39	3,043.3	2,574.2	0.0	24.5	0.0	489.2	0.0	19.4	6,150.6	1.54	1.0	6,151.6
40	2,007.4	1,822.3	0.0	0.0	0.0	87.1	0.0	156.3	4,073.1	1.02	10.8	4,083.9
41	104.2	3,002.2	0.0	21.2	1,620.6	449.4	1,521.6	335.6	7,054.8	1.77	82.6	7,137.4
42	0.0	1,789.0	0.0	483.9	1,516.5	2,641.7	587.2	14.2	7,032.5	1.76	135.4	7,167.9
43-SWS	0.0	3,419.0	0.0	216.5	2,407.8	2,774.8	754.6	803.3	10,376.0	2.60	772.2	11,148.2
44-SWS	0.0	3,239.1	0.0	843.9	1,803.8	2,021.2	145.8	331.0	8,384.8	2.10	561.3	8,946.1
45	11.4	3,593.1	10.5	2,318.7	258.1	1,960.4	44.7	1,093.7	9,290.6	2.33	1,356.0	10,646.6
46	9.7	52.5	207.1	422.1	830.4	7,359.3	643.3	1,235.1	10,759.5	2.69	371.5	11,131.0
47	47.7	268.0	0.0	347.0	3,406.2	2,679.7	3,220.7	350.3	10,321.6	2.58	81.0	10,402.6
48	0.0	0.0	0.0	143.9	2,963.1	52.5	4,773.3	113.6	8,046.4	2.01	15.6	8,062.0
49-WWS(p)	0.0	0.0	0.0	485.9	3,882.4	0.0	6,973.9	29.2	11,371.4	2.85	176.9	11,548.3
50A	0.0	0.0	0.0	0.0	797.8	0.0	907.3	150.5	1,855.6	0.46	45.6	1,901.2
50B	0.0	0.0	0.0	520.9	2,050.7	51.4	2,906.5	133.5	5,663.0	1.42	377.0	6,040.0
51A	0.0	0.0	0.0	109.3	456.4	0.0	2,864.3	0.0	3,430.0	0.86	30.0	3,460.0
51B-WWS	0.0	0.0	0.0	184.5	1,589.9	0.0	4,170.1	9.4	5,953.9	1.49	120.9	6,074.8
52	0.0	208.3	4.8	598.6	4,777.2	1,799.5	4,184.1	115.1	11,687.6	2.93	85.2	11,772.8
53 -WWS	0.0	0.0	0.0	191.9	972.8	0.0	6,837.0	33.4	8,035.1	2.01	222.8	8,257.9
54 -WWS	1.5	0.0	32.4	198.5	1,233.5	261.2	9,661.5	140.9	11,529.5	2.89	941.7	12,471.2
55 -WWS	0.0	0.0	0.0	21.1	1,046.0	0.0	14,280.4	71.8	15,419.3	3.86	619.2	16,038.5
Total	74,991.9	105,972.7	9,555.7	21,519.9	34,603.8	75,703.4	64,806.7	12,317.0	399,471.1	100.00	11,762.4	410,443.8
%	18.2	25.8	2.3	5.2	8.4	18.4	15.8	3.0	97.1		2.9	99.8

Table 3. Areas of the Blocks and Compartments (1995)

Block	Compartment	Total Area (hectares)	Area (hectares), All Strata excl. Others
1	1	10788.3	9893.2
	2	5558.9	5532.2
	13	5559.4	5556.3
	14	4306.1	4306.1
	21	4647.2	4624.6
	22	4832.7	4817.8
	23	3822.1	3820.8
	24	5332.4	5274.8
	25	4584.0	4430.7
	26	3826.5	3824.3
	27	4077.5	3935.9
	28	4240.5	4044.3
Sub-total		**61575.6**	**60061.0**
2	3	5781.4	5781.4
	9	13229.7	13098.1
	10	6049.6	6043.8
	11	5661.1	5660.3
	12A	2142.5	2140.7
	12B	3620.2	3616.1
	15	5575.3	5568.3
Sub-total		**42059.8**	**41908.7**
3	4	6522.9	6515.9
	5	5161.8	5040.7
	6	7939.8	7057.5
	7	11502.7	10866.6
	8	13806.9	13212.1
	45	10646.6	9290.6
Sub-total		**55580.7**	**51983.4**
4	29	4426.9	4406.4
	30	5232.2	4941.2
	31	6442.9	6374.5
	32	5545.9	5523.3
	33	5334.4	5330.4
	34	4785.1	4783.1
	35	6579.5	6426.3
	36	7224.7	7160.6
	39	6151.6	6150.6
	40	4083.9	4073.1
Sub-total		**55807.1**	**55169.5**
5A	46	11131.0	10759.5
	47	10402.6	10321.6
Sub-total		**21533.6**	**21081.1**

Table 3 ... p. 2/2

Block	Compartment	Total Area (hectares)	Area (hectares), All Strata excl. Others
5B	16	6281.8	6281.8
	17	7693.3	7545.6
	20	7906.3	7847.8
	37	5805.6	5775.9
	38	6350.4	6331.1
	41	7137.4	7054.8
Sub-total		**41174.8**	**40837.0**
6	18	12677.3	11880.6
	19	7935.7	7764.7
	42	7167.9	7032.5
	43	11148.2	10376.0
	44	8946.1	8384.8
	52	11772.8	11687.6
Sub-total		**59648.0**	**57126.2**
7	48	8062.0	8046.4
	49	11548.3	11371.4
	50A	1901.2	1855.6
	50B	6040.0	5663.0
	51A	3460.0	3430.0
	51B	6074.8	5953.9
Sub-total		**37086.3**	**36320.3**
8	53	8257.9	8035.1
	54	12471.2	11529.5
	55	16038.5	15419.3
Sub-total		**36767.6**	**34983.9**
Total		**411233.5**	**399471.1**

Note: In the FORESTAL inventory (1958-1959), Blocks 5A and 5B made up Block 5, and, there were no A and B compartments in 12, 50 and 51.

Table 4. Summary of Tree Volumes (V10, cu m/ha) by Block by Forest Type and Species/Group, 15-cm+ dbh

		Main Forest Types										All
Block	Species	Sundri	Su Gewa	Su Others	Gewa	Ge Goran	Ge Sundri	Goran	Go Gewa	PKB	Keora	Types
1	Sundri	53.86	34.11	--	14.93	--	35.34	--	--	--	6.84	38.22
	Gewa	2.13	2.60	--	4.13	--	2.14	--	--	--	1.71	2.27
	Keora	--	2.64	--	22.55	--	--	--	--	--	33.41	2.17
	Baen	2.25	0.85	--	5.34	--	2.03	--	--	--	4.73	1.77
	Others	1.39	1.07	--	0.57	--	1.39	--	--	--	1.33	1.23
	Sub-total	59.63	41.27	--	47.52	--	40.91	--	--	--	48.01	45.65
2	Sundri	35.11	27.19	23.99	19.43	0.43	21.12	--	--	--	--	24.98
	Gewa	1.38	0.97	0.18	0.94	0.15	1.58	--	--	--	--	1.22
	Keora	--	0.04	--	--	0.22	--	--	--	--	132.80	1.22
	Baen	2.4	1.95	3.45	--	0.50	0.04	--	--	--	--	1.19
	Others	2.65	1.18	6.19	1.30	0.15	0.83	--	--	--	1.13	1.46
	Sub-total	41.54	31.33	33.81	21.68	1.45	23.57	--	--	--	133.9	30.07
3	Sundri	24.61	18.04	--	9.07	8.33	15.11	--	--	1.54	--	13.30
	Gewa	2.11	2.08	--	3.20	3.48	2.18	--	--	0.66	0.28	2.08
	Keora	--	2.32	--	8.16	5.41	--	--	--	--	23.96	4.01
	Baen	--	0.12	--	0.48	1.93	0.13	--	--	29.66	0.30	0.25
	Others	1.77	1.31	--	0.57	0.28	0.69	--	--	--	3.02	1.03
	Sub-total	28.49	23.86	--	21.48	19.43	18.11	--	--	31.85	27.56	20.68
4	Sundri	35.39	28.99	19.82	--	--	12.97	--	--	8.54	--	28.52
	Gewa	3.28	1.98	0.43	--	--	2.16	--	--	0.30	--	2.23
	Keora	--	0.76	2.17	--	--	--	--	--	--	33.11	0.83
	Baen	4.77	8.57	7.73	--	--	7.06	--	--	25.72	--	7.14
	Others	4.96	6.81	26.76	--	--	11.35	--	--	13.34	--	9.05
	Sub-total	48.40	47.10	56.93	--	--	33.53	--	--	47.90	33.11	47.77
5A	Sundri	--	0.81	--	0.92	0.03	0.15	--	0.25	0.46	--	0.16
	Gewa	--	0.38	--	0.79	1.12	0.65	--	0.72	1.22	--	0.77
	Keora	--	--	--	--	1.82	--	--	0.52	--	9.23	0.49
	Baen	--	--	--	8.34	2.76	7.18	0.82	2.95	10.49	--	5.44
	Others	--	6.16	--	6.48	6.55	5.77	--	3.52	25.9	--	6.73
	Sub-total	--	7.37	--	16.54	12.28	13.75	0.82	7.96	38.07	9.23	13.59

Table 4 ... p. 2/2.

		Main Forest Types										All Types
Block	Species	Sundri	Su Gewa	Su Others	Gewa	Ge Goran	Ge Sundri	Goran	Go Gewa	PKB	Keora	
5B	Sundri	29.24	16.57	--	7.93	0.74	8.99	0.74	--	--	0.91	20.05
	Gewa	1.73	2.57	--	1.50	0.19	1.45	2.62	--	--	78.9	1.92
	Keora	0.70	0.78	--	--	--	--	0.14	--	--	--	1.65
	Baen	4.96	2.51	--	--	--	2.44	1.42	--	--	7.03	3.47
	Others	6.91	5.6	--	0.75	7.43	5.04	1.30	--	--	38.96	6.31
	Sub-total	43.55	28.03	--	10.18	8.36	17.92	6.23	--	--	125.80	33.40
6	Sundri	29.22	13.69	44.84	5.63	1.94	7.39	--	0.47	--	--	8.47
	Gewa	1.54	3.86	--	1.35	2.51	2.94	--	0.92	0.91	0.32	2.55
	Keora	--	0.17	--	--	0.71	1.94	45.27	2.20	11.58	24.37	1.83
	Baen	--	--	--	1.15	0.08	0.42	--	0.16	19.49	3.07	0.29
	Others	3.24	1.41	1.62	0.46	1.28	1.32	--	1.28	--	--	1.30
	Sub-total	34.01	19.14	46.45	8.58	6.53	14.01	45.27	5.02	31.98	27.76	14.44
7	Sundri	--	--	--	--	0.04	--	0.59	0.10	--	0.32	0.10
	Gewa	--	--	--	2.35	1.84	--	1.21	2.55	--	0.21	2.16
	Keora	--	--	--	--	0.13	--	--	0.24	--	46.22	0.58
	Baen	--	--	--	0.51	0.58	--	--	0.38	--	3.63	0.45
	Others	--	--	--	0.70	2.97	--	0.55	1.81	--	0.22	2.00
	Sub-total	--	--	--	3.57	5.55	--	2.35	5.07	--	50.60	5.28
8	Sundri	--	--	--	--	0.44	--	0.04	0.64	--	--	0.49
	Gewa	--	--	--	--	2.52	--	1.82	2.27	--	--	2.05
	Keora	--	--	--	--	--	--	2.25	0.48	--	--	0.66
	Baen	--	--	--	--	--	--	0.01	0.53	--	--	0.37
	Others	--	--	--	--	0.77	--	0.76	0.72	--	--	0.68
	Sub-total	--	--	--	--	3.73	--	4.89	4.64	--	--	4.25
All	Sundri											**17.24**
Blocks	Gewa											**2.03**
	Keora											**1.73**
	Baen											**2.14**
	Others											**3.11**
	Total											**26.20**

Table 5. Summary of Tree Volumes, V10, (in cum/ha) by Compartment and Species, 15-cm+ dbh
(Volume and weight (kg/ha) of Goran poles and no. of saplings/ha are also given.)

Compartment	Sundri	Gewa	Keora	Baen	Others	All Species	Goran Poles (Vol.)	Goran Poles (Weight)	Goran Saplings	Wt. Utilizable Goran Saplings
1-Pr WS	32.50	2.30	4.81	1.61	1.85	43.07	0.09	100.5	678	323.8
2-Pr WS	32.03	3.11	6.66	2.28	0.34	44.44	0.11	114.5	479	228.8
3	40.77	1.23	--	3.77	1.78	47.55	0.42	421.1	885	422.7
4-EWS	28.98	1.99	--	0.10	2.76	33.83	0.08	93.2	1070	511.0
5-EWS	20.77	2.85	--	1.83	1.58	27.02	0.18	183.2	878	419.3
6-EWS	13.92	6.41	9.07	0.17	1.15	30.72	0.32	346.2	2017	963.3
7-EWS(p)	10.70	0.95	1.00	0.49	1.67	14.82	0.55	607.2	3533	1687.4
8	14.14	1.12	6.02	0.15	0.54	21.98	1.22	1433.6	6050	2889.5
9	8.92	0.80	5.23	0.04	0.38	15.37	1.33	1533.5	6433	3072.4
10	33.06	1.47	--	1.05	4.21	39.79	0.64	748.1	1592	760.3
11	19.83	0.89	4.94	0.17	1.00	26.83	0.45	500.0	1263	603.2
12A	36.72	0.60	--	--	1.94	39.27	0.28	364.4	1138	543.5
12B	15.55	2.17	--	0.13	0.73	18.59	0.30	314.3	2069	988.2
13	57.59	0.50	4.60	0.44	0.95	64.07	0.06	60.1	507	242.1
14	46.56	1.79	--	3.14	2.47	53.96	0.16	171.5	849	405.5
15	48.30	1.85	--	4.03	1.63	55.81	0.12	122.5	569	271.8
16	27.56	1.10	--	0.48	1.08	30.22	0.54	564.0	1011	482.9
17	18.08	2.00	10.80	1.05	6.24	38.17	0.37	412.6	1461	697.8
18	14.49	1.05	1.00	0.44	0.98	17.97	0.91	1019.4	4847	2314.9
19	22.78	1.48	1.98	0.05	2.77	29.05	0.73	827.2	3899	1862.2
20	26.78	1.11	1.35	4.40	5.94	39.58	0.28	310.7	1458	696.3
21	40.51	2.94	--	0.75	1.58	45.78	0.01	8.8	0	0.0
22	64.84	1.90	--	2.21	1.89	70.84	0.08	82.4	46	22.0
23	64.70	1.20	--	0.72	0.68	67.30	0.07	78.7	555	265.1
24	33.80	3.01	--	2.98	1.77	41.56	0.14	151.9	902	430.8
25	29.82	3.00	--	4.86	1.12	38.80	0.02	23.1	66	31.5
26	35.56	3.91	--	1.58	0.73	41.77	--	--	0	0.0
27	20.49	1.81	0.30	1.78	1.24	25.63	0.47	501.2	378	180.5
28	23.50	2.96	5.58	--	0.22	32.25	0.00	4.1	0	0.0
29	44.32	2.29	0.50	0.88	0.52	48.50	--	--	19	9.1
30	37.05	1.96	--	3.18	4.82	47.01	--	--	11	5.3
31	37.40	5.56	--	5.42	4.02	52.40	0.02	15.3	0	0.0
32	21.66	0.59	--	4.08	24.35	50.67	0.02	15.7	0	0.0
33	39.59	1.16	--	4.20	13.62	58.81	--	--	0	0.0
34	33.55	0.73	3.29	0.29	1.10	38.97	0.27	275.6	168	80.2
35	9.14	0.44	3.88	17.32	11.80	42.58	--	--	0	0.0
36	23.23	3.12	1.68	12.24	17.22	57.48	0.06	60.7	172	82.1
37	22.92	5.77	--	8.06	15.54	52.29	0.09	95.9	418	199.6
38	20.03	1.44	0.85	2.37	5.35	30.04	0.14	160.2	1100	525.4
39	28.75	2.73	--	4.04	1.49	37.01	0.03	32.9	515	246.0
40	18.94	2.57	3.60	16.49	6.69	48.29	--	--	0	0.0

Table 5 ... p. 2/2

Compartment	Sundri	Gewa	Keora	Baen	Others	All Species	Goran Poles (Vol.)	Goran Poles (Weight)	Goran Saplings	Wt. Utilizable Goran Saplings
41	1.56	1.55	1.11	5.72	7.61	17.56	1.76	1927.6	5100	2435.8
42	1.02	0.87	--	0.16	1.70	3.76	1.91	2156.9	6989	3337.9
43-SWS	5.28	4.26	5.00	1.35	0.98	16.87	2.10	2297.2	5574	2662.1
44-SWS	7.55	8.90	1.70	--	1.53	19.68	2.84	3064.6	3577	1708.4
45	6.33	1.80	7.53	0.37	0.06	16.10	1.26	1471.3	5085	2428.6
46	0.17	0.64	1.35	5.94	7.68	15.78	1.30	1364.0	2682	1280.9
47	0.16	0.93	0.27	3.65	4.52	9.53	1.77	1930.0	4787	2286.3
48	0.21	0.87	0.70	0.34	2.20	4.33	3.65	4090.5	7382	3525.6
49-WWS(p)	0.07	1.51	--	0.05	0.73	2.35	2.05	2249.9	8151	3892.9
50A	0.24	2.60	34.67	--	0.88	38.38	1.26	1489.2	4974	2375.6
50B	--	3.64	--	3.01	6.11	12.75	2.42	2614.7	3885	1855.5
51A	0.18	6.32	--	--	1.33	7.82	2.20	2402.1	6811	3252.9
51B-WWS	--	1.67	--	--	1.31	2.99	2.42	2592.0	4326	2066.1
52	0.78	1.15	0.30	0.04	0.83	3.10	2.08	2275.3	6733	3215.7
53 -WWS	0.44	2.81	--	--	0.85	4.10	5.24	5698.4	9201	4394.4
54 -WWS	1.21	2.57	1.97	1.13	0.61	7.49	9.17	9761.3	9616	4592.6
55 -WWS	--	1.59	--	--	0.76	2.36	2.42	2663.9	7523	3593.0
All Compart.	17.76	2.12	2.09	2.21	3.22	27.40	1.26	1381.7	3329	1589.9

Table 5a. Summary of Tree Volumes, V10, (in cum) by Compartment and Species, 15-cm+ dbh
(Volume and weight (in tons) of Goran, 2.5-cm+ dbh, and no. of saplings are also given)

Compartme	Area (ha)	Sundri	Gewa	Keora	Baen	Others	All Species	Goran Poles (Vol.)	Goran Poles (Wt. In tons)	Goran Saplings million stems	Goran Saplings million tons
1-Pr WS	9,893.2	321529	22754	47586	15928	18302	426100	890	994	6.708	3.204
2-Pr WS	5,532.2	177196	17205	36844	12613	1881	245851	609	633	2.650	1.266
3	5,781.4	235708	7111	--	21796	10291	274906	2428	2435	5.117	2.444
4-EWS	6,515.9	188831	12967	--	652	17984	220433	521	607	6.972	3.330
5-EWS	5,040.7	104695	14366	--	9224	7964	136200	907	923	4.426	2.114
6-EWS	7,057.5	98240	45239	64012	1200	8116	216806	2258	2443	14.235	6.799
7-EWS(p)	10,866.6	116273	10323	10867	5325	18147	161043	5977	6598	38.392	18.336
8	13,212.1	186819	14798	79537	1982	7135	290402	16119	18941	79.933	38.176
9	13,098.1	116835	10478	68503	524	4977	201318	17420	20086	84.260	40.243
10	6,043.8	199808	8884	--	6346	25444	240483	3868	4521	9.622	4.595
11	5,660.3	112244	5038	27962	962	5660	151866	2547	2830	7.149	3.414
12A	2,140.7	78607	1284	--	--	4153	84065	599	780	2.436	1.163
12B	3,616.1	56230	7847	--	470	2640	67223	1085	1137	7.482	3.573
13	5,556.3	319987	2778	25559	2445	5278	355992	333	334	2.817	1.345
14	4,306.1	200492	7708	--	13521	10636	232357	689	738	3.656	1.746
15	5,568.3	268949	10301	--	22440	9076	310767	668	682	3.168	1.513
16	6,281.8	173126	6910	--	3015	6784	189836	3392	3543	6.351	3.033
17	7,545.6	136424	15091	81492	7923	47085	288016	2792	3113	11.024	5.265
18	11,880.6	172150	12475	11881	5227	11643	213494	10811	12111	57.585	27.503
19	7,764.7	176880	11492	15374	388	21508	225565	5668	6423	30.275	14.459
20	7,847.8	210164	8711	10595	34530	46616	310616	2197	2438	11.442	5.465
21	4,624.6	187343	13596	--	3468	7307	211714	46	41	0.000	0.000
22	4,817.8	312386	9154	--	10647	9106	341293	385	397	0.222	0.106
23	3,820.8	247206	4585	--	2751	2598	257140	267	301	2.121	1.013
24	5,274.8	178288	15877	--	15719	9336	219221	738	801	4.758	2.272
25	4,430.7	132123	13292	--	21533	4962	171911	89	102	0.292	0.140
26	3,824.3	135992	14953	--	6042	2792	159741	--	--	--	--
27	3,935.9	80647	7124	1181	7006	4881	100877	1850	1973	1.488	0.711
28	4,044.3	95041	11971	22567	--	890	130429	0	17	0.000	0.000

Table 5 ... p. 2/2

Compartme	Area (ha)	Sundri	Gewa	Keora	Baen	Others	All Species	Goran Poles (Vol.)	Goran Poles (Weight)	Goran Saplings million stems	Goran Saplings million tons
29	4,406.4	195292	10091	2203	3878	2291	213710	--	--	0.084	0.040
30	4,941.2	183071	9685	--	15713	23817	232286	--	--	0.054	0.026
31	6,374.5	238406	35442	--	34550	25625	334024	127	98	0.000	0.000
32	5,523.3	119635	3259	--	22535	134492	279866	110	87	0.000	0.000
33	5,330.4	211031	6183	--	22388	72600	313481	--	--	--	--
34	4,783.1	160473	3492	15736	1387	5261	186397	1291	1318	0.804	0.384
35	6,426.3	58736	2828	24934	111304	75830	273632	--	--	--	--
36	7,160.6	166341	22341	12030	87646	123306	411591	430	435	1.232	0.588
37	5,775.9	132384	33327	--	46554	89757	302022	520	554	2.414	1.153
38	6,331.1	126812	9117	5381	15005	33871	190186	886	1014	6.964	3.326
39	6,150.6	176830	16791	--	24848	9164	227634	185	202	3.168	1.513
40	4,073.1	77145	10468	14663	67165	27249	196690	--	--	--	--
41	7,054.8	11005	10935	7831	40353	53687	123882	12416	13599	35.979	17.184
42	7,032.5	7173	6118	--	1125	11955	26442	13432	15168	49.150	23.474
43-SWS	10,376.0	54785	44202	51880	14008	10168	175043	21790	23836	57.836	27.622
44-SWS	8,384.8	63305	74625	14254	--	12829	165013	23813	25696	29.992	14.324
45	9,290.6	58809	16723	69958	3438	557	149579	11706	13669	47.243	22.563
46	10,759.5	1829	6886	14525	63911	82633	169785	13987	14676	28.857	13.782
47	10,321.6	1651	9599	2787	37674	46654	98365	18269	19921	49.409	23.598
48	8,046.4	1690	7000	5632	2736	17702	34841	29369	32914	59.399	28.369
49-WWS(p)	11,371.4	796	17171	--	569	8301	26723	23311	25585	92.688	44.268
50A	1,855.6	445	4825	64334	--	1633	71218	2338	2763	9.230	4.408
50B	5,663.0	--	20613	--	17046	34601	72203	13704	14807	22.001	10.508
51A	3,430.0	617	21678	--	--	4562	26823	7546	8239	23.362	11.158
51B-WWS	5,953.9	--	9943	--	--	7800	17802	14408	15433	25.757	12.301
52	11,687.6	9116	13441	3506	468	9701	36232	24310	26593	78.693	37.584
53 -WWS	8,035.1	3535	22579	--	--	6830	32944	42104	45787	73.931	35.309
54 -WWS	11,529.5	13951	29631	22713	13028	7033	86356	105726	112543	110.868	52.950
55 -WWS	15,419.3	--	24517	--	--	11719	36390	37315	41075	115.999	55.401
All Compar	399,471.1	7094607	846879	834895	882831	1286297	10945508	503334	551949	1329.839	635.131

Table 6. No. of Plot Clusters per Compartment, Stratum, Major Forest Type and Block and Sampling Errors Based on Volume, V10, (15-cm dbh and bigger trees)

Block by Compartment			Stratum			Forest Type		
Cmpt. No.	No. of PC	SE%	Strat. No.	No.PCs	SE%	For. Type	No. of PCs	SE%
1-Pr WS	28	9.9	11	28	12.7	Sundri	223	4.4
2-Pr WS	20	20.8	12	38	8.8	Sun Gewa	317	4.6
3	17	26.0	13	157	5.3	Sun Others	25	6.8
4-EWS	17	15.8	21	113	8.6	Gewa/GM	55	20.3
5-EWS	17	14.3	22	204	5.8	Ge Goran	106	13.3
6-EWS	20	24.7	30	25	8.4	Ge Sundri	199	7.1
7-EWS(p)	29	12.1	40	55	19.6	Goran	21	38.3
8	38	20.3	50	106	15.3	Gor Gewa	161	9.4
9	37	34.4	61	68	14.4	PK-PKB-B	7	18.7
10	18	13.7	62	131	7.8	Keora	29	18.5
11	15	30.4	70	182	10.7	All Types	1143	2.7
12A	6	21.1	80(PKB)	7	15.8			
12B	13	14.0	80(Keora)	29	18.5			
13	19	16.3	All Strata	1143	2.7	Block by Compartment		
14	12	16.9				Block No.	No. of PCs	SE%
15	13	9.9				1	179	4.9
16	19	20.0				2	119	9.0
17	22	25.3	Block by Compartment			3	147	8.5
18	36	15.2	Cmpt. No.	No.PCs	SE%	4	160	4.0
19	21	16.9	39	20	16.9	5A	56	13.7
20	26	14.8	40	9	19.4	5B	121	7.9
21	12	13.1	41	18	22.5	6	160	7.8
22	13	15.1	42	20	26.4	7	101	19.1
23	11	20.0	43-SWS	28	15.4	8	100	16.4
24	15	16.9	44-SWS	22	18.6	All Blocks	1143	2.5
25	12	19.7	45	26	28.1			
26	12	19.1	46	27	19.2			
27	14	21.2	47	29	17.5			
28	11	13.7	48	26	22.8			
29	14	18.0	49-WWS(	32	12.7			
30	14	16.0	50A	4	47.5			
31	22	10.0	50B	14	42.9			
32	15	11.1	51A	10	30.9			
33	14	9	51B-WWS	15	25.3			
34	13	14.1	52	33	18.4			
35	18	14.5	53 -WWS	24	22.3			
36	21	6.7	54 -WWS	35	27.3			
37	16	13.4	55 -WWS	41	17.4			
38	20	15.5	All Comp.	1143	2.5			
(cont'd in next columns)								

Table 7. Summary Stand and Stock Tables (number, basal area and volume of trees and poles/ha; number of seedlings and saplings/ha): All Blocks All Compartments and All Blocks All Forest Types

(4 pages taken from the detailed Stand and Stock Tables)

Mangrove Forest : ALL BLOCKS, ALL COMPARTMENTS

Total No. of plot clusters : 1143

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	56.84	1.31	5.85	33.42	1.24	6.45	10.63	0.59	3.36	3.46	0.28	1.75
Gewa	16.39	0.36	1.41	2.96	0.11	0.48	0.60	0.03	0.17	0.16	0.01	0.06
Keora	1.73	0.04	0.18	1.04	0.04	0.21	0.58	0.03	0.19	0.79	0.07	0.44
Baen	0.54	0.01	0.05	0.62	0.02	0.10	0.41	0.02	0.12	0.48	0.05	0.23
Other TS	3.28	0.08	0.29	3.55	0.14	0.62	2.54	0.14	0.70	2.14	0.19	1.01
TOTAL	78.78	1.80	7.78	41.59	1.55	7.86	14.76	0.83	4.53	7.03	0.60	3.49

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	0.24	0.03	0.22	0.05	0.01	0.06	0.03	0.02	0.09	104.7	3.49	17.76	3.0
Gewa	0.00	0.00	0.00	-	-	-	-	-	-	20.11	0.51	2.12	4.5
Keora	0.51	0.08	0.50	0.16	0.04	0.26	0.09	0.04	0.31	4.90	0.34	2.09	17.9
Baen	0.36	0.06	0.29	0.16	0.04	0.24	0.39	0.18	1.18	2.96	0.38	2.21	9.4
Other TS	0.36	0.05	0.28	0.11	0.03	0.14	0.08	0.04	0.17	12.06	0.66	3.22	6.1
TOTAL	1.47	0.22	1.29	0.48	0.11	0.70	0.59	0.28	1.75	144.7	5.38	27.40	2.5

angrove Forest : All BLOCKS, ALL COMPARTMENTS

Total No. of plot clusters : 1143

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	19645.58	2.9	2167.32	2.8
Gewa	5881.75	4.5	1485.83	3.7
Keora	89.75	34.8	15.87	36.6
Baen	82.80	59.3	5.07	30.2
Goran	5842.83	4.6	3328.64	3.4
Other TS	1577.69	8.6	466.46	5.7
TOTAL	33120.40	2.2	7469.19	2.0

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	418.88	525.71	185.76	1.967900	5.683190	1130.35	1.967900	5.683190	1.9
Gewa	537.54	704.84	208.03	2.114700	7.491040	1450.41	2.114700	7.491040	2.2
Keora	1.79	7.49	7.33	0.079100	0.308270	16.61	0.079100	0.308270	36.3
Baen	2.05	5.45	2.92	0.033800	0.093370	10.42	0.033800	0.093370	27.3
Goran	486.45	24.86	1.76	0.018500	0.080780	513.08	0.018500	0.080780	3.4
Other TS	97.87	55.46	11.06	0.118900	0.212540	164.39	0.118900	0.212540	5.0
TOTAL	1544.6	1323.8	416.85	4.332700	13.869190	3285.25	4.332700	13.869190	1.2

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.9612	1089.389	0.2664	259.6099	0.0799	75.1967	1.3075	1424.195

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha

Mangrove Forest : ALL BLOCKS, ALL FOREST TYPES

Total No. of plot clusters : 1204

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	55.46	1.28	5.72	32.19	1.20	6.22	10.28	0.57	3.25	3.35	0.27	1.69
Gewa	15.63	0.34	1.35	2.80	0.10	0.46	0.58	0.03	0.16	0.15	0.01	0.06
Keora	1.09	0.03	0.11	0.75	0.03	0.15	0.43	0.02	0.15	0.62	0.06	0.35
Baen	0.57	0.01	0.05	0.63	0.02	0.10	0.40	0.02	0.11	0.46	0.04	0.22
Other TS	3.31	0.08	0.30	3.51	0.13	0.61	2.50	0.14	0.69	2.09	0.18	0.98
TOTAL	76.06	1.74	7.53	39.88	1.48	7.54	14.20	0.79	4.36	6.67	0.57	3.30

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	0.23	0.03	0.21	0.04	0.01	0.06	0.03	0.02	0.09	101.6	3.38	17.24	3.1
Gewa	0.00	0.00	0.00	-	-	-	-	-	-	19.17	0.49	2.03	5.0
Keora	0.40	0.06	0.41	0.13	0.03	0.21	0.08	0.04	0.29	3.49	0.26	1.67	16.3
Baen	0.35	0.05	0.28	0.15	0.03	0.23	0.38	0.18	1.15	2.94	0.37	2.14	9.9
Other TS	0.35	0.05	0.27	0.10	0.02	0.12	0.08	0.03	0.15	11.93	0.65	3.11	6.1
TOTAL	1.33	0.20	1.17	0.43	0.10	0.62	0.57	0.27	1.67	139.1	5.15	26.20	2.5

Mangrove Forest : All BLOCKS, ALL FOREST TYPES

Total No. of plot clusters : 1204

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	20105.52	3.3	2190.85	2.9
Gewa	5914.46	4.5	1513.41	3.7
Keora	53.42	33.1	12.34	42.3
Baen	93.03	64.1	4.58	28.7
Goran	6131.83	4.7	3489.78	3.5
Other TS	1645.55	9.2	474.64	5.9
TOTAL	33943.82	2.4	7685.60	2.1

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	429.82	543.95	192.82	2.04	5.90	1166.60	2.04	5.90	2.0
Gewa	550.24	720.99	212.16	2.16	7.63	1483.38	2.16	7.63	2.1
Keora	1.37	4.77	4.05	0.04	0.17	10.19	0.04	0.17	28.4
Baen	1.81	5.46	3.27	0.04	0.11	10.54	0.04	0.11	31.8
Goran	504.90	25.68	1.75	0.02	0.08	532.32	0.02	0.08	3.8
Other TS	100.47	58.35	11.86	0.13	0.23	170.68	0.13	0.23	5.0
TOTAL	1588.6	1359.2	425.90	4.42	14.12	3373.71	4.42	14.12	1.2

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
1.00	1129.36	0.27	266.73	0.08	74.93	1.3497	1471.016

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha

Table 8

Forest Statistics Tables (total number, total basal area and total volume of trees and poles; total number of seedlings and saplings in the SRF); All Blocks All Compartments

Mangrove Forest : All BLOCKS, ALL COMPARTMENTS

Total Area : 399471.10 Ha

Trees by Diameter Class

Species Group	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	22705540	524510	2336850	13348970	496200	2575210	4246110	236580	1340430	1384010	113690	697390
Gewa	6547790	142130	562990	1181650	42610	191900	240480	13240	66850	63260	5380	25580
Keora	692000	15840	72920	414970	15770	83640	231860	13150	76030	315340	28710	175980
Baen	215930	5040	19300	248230	9440	40480	162880	9320	45970	191990	18010	90880
Other TS	1309220	31040	117710	1418280	54510	248500	1014680	57310	280290	854810	74990	403500
TOTAL	31470480	718560	3109770	16612110	618520	3139730	5896000	329600	1809560	2809420	240770	1393320

Trees by Diameter Class

Species Group	50-60			60-70			70+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	95090	13130	86880	18560	3970	23800	10480	6500	35950	41808760	1394570	7096500	3.0
Gewa	1740	240	740	-	-	-	-	-	-	8034920	203600	848060	4.5
Keora	202580	30370	199220	63510	14500	104670	36940	15910	123910	1957200	134240	836370	17.9
Baen	144470	22420	116580	64700	14490	96710	156190	73240	471170	1184400	151940	881090	9.4
Other TS	141890	20670	112170	44840	10130	55200	33610	14870	67400	4817320	263520	1284760	6.1
TOTAL	585770	86820	515590	191600	43080	280380	237230	110520	698420	57802590	2147870	10946780	2.5

angrove Forest : ALL BLOCKS, ALL COMPARTMENTS

Total Area : 399471.10 Ha

Species group	Seedlings		Saplings	
	No. stems	S.E%	No. stems	S.E%
Sundri	7847843130	2.9	865780150	2.8
Gewa	2349588180	4.5	593546500	3.7
Keora	35851570	34.8	6340530	36.6
Baen	33075050	59.3	2023800	30.2
Goran	2334041850	4.6	1329696880	3.4
Other TS	630241160	8.6	186338690	5.7
TOTAL	13230640900	2.2	2983726740	2.0

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No. stems	No. stems	No. stems	BA	Vol	No. stems	BA	Vol	S.E%
Sundri	167331970	210005070	74205390	786120	.2E+7	451542440	786120	2270270	1.9
Gewa	214732490	281563290	83101330	844760	.2E+7	579397120	844760	2992450	2.2
Keora	717010	2990840	2926730	31600	123150	6634580	31600	123150	36.3
Baen	817400	2178400	1165420	13500	37300	4161210	13500	37300	27.3
Goran	194324280	9932370	702390	7390	32270	204959030	7390	32270	3.4
Other TS	39097120	22153350	4418670	47500	84900	65669130	47500	84900	5.0
TOTAL	617020270	528823520	166519890	.1E+7	.5E+7	.131E+10	1730790	5540340	1.2

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
383970	.435E+9	106420	.103E+9	31920	30038910	522310	.568E+9

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm , Weight is in kilograms/ha, S.E.% is Sampling error.

Table 9. Precision (Sampling Errors in %) of Various Estimates for Whole SRF

Reference	Block by Compartment	By Stratum	Block by Forest Type
1. Tree Volume, V10, (15-cm+ dbh trees)			
1.1 All Species	2.5	2.7	2.5
1.2 Sundri	3.0	3.3	3.1
1.3 Gewa	4.5	5.0	5.0
1.4 Keora	17.9	16.4	16.3
1.4 Baen	9.4	9.6	9.9
1.5 Other Species	6.1	6.3	6.1
2. Poles (Based on no. of stems/ha)			
2.1 All Species	1.2	1.3	1.3
2.2 Sundri	2	2.1	2
2.3 Gewa	2.3	2.3	2.2
2.4 Keora	34	28.9	28.2
2.5 Goran	3.4	4.2	3.9
2.6 Baen	26.7	23.6	31
2.7 Other Species	5.1	5.5	5.1
3. Saplings (Based on no. of stems/ha)			
3.1 All Species	2.0	2.1	2.1
3.2 Sundri	2.8	3.1	2.9
3.3 Gewa	3.7	3.8	3.7
3.4 Keora	36.6	34.4	42.3
3.5 Goran	3.4	3.6	3.5
3.6 Baen	30.1	30.7	28.7
3.7 Other Species	5.7	6.0	5.9
4. Seedlings(Based on no. of stems/ha)			
4.1 All Species	2.2	2.7	2.4
4.2 Sundri	2.9	3.7	3.3
4.3 Gewa	4.5	4.7	4.5
4.4 Keora	34.8	31.4	33.1
4.5 Goran	4.6	4.8	4.7
4.6 Baen	59.3	54.7	64.1
4.7 Other Species	8.6	9.0	9.2

Table 10. Comparative Areas of the Forest Types (FRMP, 1995; ODA, 1981; FORESTAL, 1957)

	1995	1995	1981	1981	1957	1957
Forest Type	Area (ha)	%	Area (ha)	%	Area (ha)	%
Sundri	74,992	18.2	82,845	20.0	98,551	24.2
Sundri Gewa	105,967	25.8	123,247	29.8	92,319	22.7
Sundri Passur	2,413	0.6	2,214	0.5	29,752	7.3
Sundri Passur Kankra	7,143	1.7	6,799	1.6	(included	above)
Gewa	19,909	4.8	18,556	4.5	12,557	3.1
Gewa Mathal	1,611	0.4	836	0.2	(included	above)
Gewa Sundri	75,704	18.4	59,973	14.5	58,897	14.5
Gewa Goran	34,604	8.4	37,593	9.1	32,196	7.9
Goran	8,269	2.0	8,706	2.1	2,910	0.7
Goran Gewa	56,536	13.7	57,597	13.9	42,115	10.3
Passur Kankra	284	0.1	940	0.2	947	0.2
Passur Kankra Baen	2,516	0.6	1,614	0.4	(included	above)
Baen	1,230	0.3	828	0.2	(included	above)
Keora	8,287	2.0	3,509	0.8	8,854	2.2
Sub-total	**399,465**	**97.1**	**405,257**	**97.8**	**379,098**	**93.1**
Others	-	-	-	-	28,032	6.9
Tree Plantation	217	0.1	351	0.1	(included	above)
Grass; Bare Ground	6,931	1.7	4,614	1.1	(included	above)
Sandbar	4,614	1.1	4,024	1.0	(included	above)
Agriculture	-	-	16	0.0	(included	above)
Total	**411,227**	**100.0**	**414,259**	**100.0**	**407,130**	**100.0**

Sources: Runkel, M. and I.U. Ahmad. 1997. Sundarbans reserved forests: area, distribution and status of forest types from 1985 to 1995. (FRMP Document). 15p

FORESTAL. 1960. Forest inventory 1958-1959 Sundarbans forests. Volume I (Report and appendices). 28p.++

Note: Aerial photography for FRMP was undertaken/completed in 1995, that of the ODA inventory was completed in December, 1981 and the FORESTAL photography was completed in January 1958. Aerial photography of these three major inventories of the Sundarbans are, therefore, about 14 and 24 years apart, respectively.

Table 11. Comparative Per Hectare Estimates of No. of Trees and Volumes of Trees 15-cm dbh and bigger
(FRMP, 1995-97; ODA, 1981, 1983-84; FORESTAL, 1958-59)

Block	Years	undri			Gewa			Others			All Species		
		NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
1	1996	208	7.5	39.8	21	0.6	2.4	13	0.9	5.4	243	8.9	47.5
	1983	230	--	39.1	73	--	6.4	10	--	4.0	313	--	49.5
	1959	417	--	80.4	79	--	7.6	10	--	3.4	506	--	91.3
2	1996	166	5.2	25.5	12	0.3	1.2	12	0.9	5	190	6.4	31.8
	1983	189	--	27.0	32	--	2.3	7	--	3.2	228	--	32.5
	1959	278	--	36.8	77	--	6.8	13	--	3.4	368	--	47.0
3	1996	104	3.0	14.5	19	0.5	2.2	15	0.9	5.9	138	4.4	22.6
	1983	110	--	12.7	44	--	3.1	13	--	4.5	167	--	20.3
	1959	151	--	16.9	97	--	7.8	7	--	4.8	254	--	29.5
4	1996	142	5.5	28.8	19	0.5	2.2	48	3.4	17.5	209	9.4	48.4
	1983	216	--	43.5	16	--	1.6	63	--	16.9	295	--	62.0
	1959	358	--	72.4	36	--	4.2	95	--	16.3	489	--	92.9
5	1959	166	--	23.1	58	--	4.5	30	--	7.8	253	--	35.4
5A	1996	1	0.0	0.2	8	0.2	0.8	29	1.3	6.1	38	2.5	12.7
	1983	11	--	1.2	9	--	0.6	29	--	13.6	50	--	15.4
5B	1996	129	4.0	19.3	19	0.5	2.1	26	2.1	13	174	6.5	34.4
	1983	224	--	29.1	7	--	0.5	22	--	8.5	253	--	38.5
6	1996	63	1.7	8.5	26	0.6	2.8	12	0.7	3.4	100	3.1	14.7
	1983	73	--	8.0	33	--	2.4	4	--	4.2	110	--	14.6
	1959	92	--	8.4	45	--	3.0	4	--	3.6	142	--	15.0
7	1996	1	0.0	0.1	23	0.5	2.2	15	0.9	4.5	41	1.5	6.9
	1983	1	--	0.0	37	--	2.4	8	--	6.7	46	--	9.1
	1959	1	--	0.1	37	--	1.8	9	--	2.4	48	--	4.3
8	1996	4	0.1	0.5	29	0.7	2.2	7	0.4	1.8	40	1.2	4.4
	1983	2	--	0.2	44	--	3.0	5	--	3.6	51	--	6.8
	1959	4	--	0.3	51	--	2.5	2	--	1.5	57	--	4.3
All Blocks	1996	106	3.5	17.8	20	0.5	2.1	20	1.3	7.5	144	5.4	27.4
	1983	125	--	19.9	35	--	2.7	20	--	7.1	180	--	29.7
	1959	211	--	33.6	61	--	5.0	24	--	5.9	296	--	44.5

Notes: 1. No basal area (BA) estimates in FORESTAL and ODA inventories except for selected forest types.
2. NT -- No. of trees per ha
3. BA -- Basal area in sq.m. per ha
4. Vol -- Volume of trees up to 10-cm dia, underbark, in cu.m./ha

Table 11a. Comparative No. of Trees/ha Estimates: FRMP (1996), ODA (1983), FORESTAL (1959);
10-cm dbh and bigger trees

Block	Year	Sundri	%Sundri	Gewa	%Gewa	Others	%Others	All Species
1	1996	482	68.6	191	27.2	30	4.3	703
	1983	485	60.5	279	34.8	38	4.7	802
	1959	769	56.3	267	19.5	330	24.1	1367
2	1996	500	72.0	173	24.9	21	3.0	694
	1983	452	65.3	220	31.8	20	2.9	692
	1959	638	63.5	346	34.5	20	2.0	1004
3	1996	353	58.1	223	36.7	32	5.3	608
	1983	341	49.3	322	46.6	28	4.1	691
	1959	455	46.4	504	51.4	21	2.1	980
4	1996	317	55.0	157	27.3	102	17.7	576
	1983	365	61.4	126	21.2	103	17.3	594
	1959	661	69.4	112	11.8	185	19.4	953
5	1959	545	59.0	334	36.2	44	4.8	923
5A	1996	55	15.9	249	71.8	43	12.4	347
	1983	67	23.0	184	63.2	40	13.7	291
5B	1996	342	57.1	225	37.6	32	5.3	599
	1983	491	78.2	102	16.2	35	5.6	628
6	1996	235	43.8	271	50.6	30	5.6	536
	1983	231	51.4	197	43.9	21	4.7	449
	1959	495	55.5	387	43.4	10	1.1	892
7	1996	6	1.6	305	81.8	62	16.6	373
	1983	16	4.8	294	88.3	23	6.9	333
	1959	28	5.2	496	92.0	14	2.6	539
8	1996	40	10.3	319	81.8	31	7.9	390
	1983	29	9.4	268	86.5	13	4.2	310
	1959	54	9.8	484	88.0	12	2.2	550
All Blocks	1996	290	51.8	228	40.7	42	7.5	560
	1983	296	53.1	224	40.2	37	6.6	557
	1959	511	53.7	345	36.2	97	10.2	952

Note: FORESTAL did not provide volume estimates for 4" dbh and smaller trees.
Different tree volume equations were used in the three inventories,
hence the use of number of trees.

Table 12. Incidence of Top-Dying (% Number of Sundri Trees)

			FOREST TYPE								All
Zone	Comp	Sundri	Su/Gewa	Su/Others	Gewa	Ge/Goran	Ge/Sun	Goran	PKaBKe	na	Types
3	01	0.69	0.58	b	b	b	0.00	b	0.00	b	0.46
3	02	0.80	0.95	b	0.00	b	0.65	b	b	b	0.81
3	03	5.00	1.83	b	b	b	0.00	b	b	b	1.40
3	10	0.00	b	b	b	b	b	b	b	b	0.00
3	11	0.00	0.00	0.00	b	b	1.65	b	b	b	0.74
3	12A	0.00	b	b	b	b	0.00	b	b	b	0.00
3	12B	0.00	0.00	b	0.00	b	0.00	b	b	b	0.00
3	13	1.80	1.74	b	b	b	1.66	b	b	0.00	1.67
3	14	0.49	0.00	b	b	b	1.39	b	b	b	0.55
3	15	0.00	b	b	b	b	0.00	b	b	0.00	0.00
3	16	1.49	1.19	b	b	b	0.00	b	b	b	1.36
3	21	0.85	0.00	b	b	b	0.00	b	b	0.86	0.47
3	22	3.18	b	b	b	b	4.33	b	b	b	3.60
3	23	1.23	0.00	b	b	b	1.23	b	b	b	1.03
3	24	0.00	2.46	b	b	b	1.83	b	b	2.08	1.32
3	25	b	2.16	b	b	b	4.00	b	b	b	2.90
3	26	0.92	6.09	b	b	b	0.00	b	b	b	2.56
3	27	0.00	3.96	b	b	b	1.54	b	0.00	4.76	1.93
3	28	0.00	0.93	b	b	b	7.23	b	b	0.00	2.64
3	29	2.45	2.13	b	b	b	b	b	b	b	2.28
3	30	1.97	0.00	b	b	b	b	b	b	4.17	2.00
3	31	5.59	0.00	b	b	b	b	b	b	0.00	4.49
3	32	4.65	0.00	5.35	b	b	b	b	b	0.00	5.07
3	33	14.92	15.44	8.62	b	b	b	b	b	11.36	14.07
3	34	7.83	8.24	b	b	b	0.00	b	b	b	7.05
3	35	b	2.11	0.00	b	b	0.00	b	0.00	1.89	1.48
3	36	15.74	12.94	0.00	b	b	0.00	b	b	0.00	12.10
3	37	20.81	15.87	b	b	b	b	b	b	b	18.89
3	38	5.15	1.60	b	b	b	0.00	b	b	b	4.06
3	39	1.79	0.26	b	b	b	0.00	b	b	4.55	1.02
3	40	4.76	9.64	b	b	b	b	b	b	23.15	12.84
3	sub-total	3.63	3.41	4.39	0.00	b	1.50	b	0.00	5.37	3.26
2	01	b	1.40	b	0.00	b	0.00	b	0.00	0.00	0.76
2	03	b	2.94	b	b	b	b	b	b	b	2.94
2	04	0.00	1.20	b	2.44	b	0.00	b	b	b	1.26
2	05	b	1.20	b	0.00	b	0.44	b	0.00	b	0.73
2	06	b	0.83	b	0.00	b	0.00	b	b	b	0.61
2	07	0.00	1.14	b	0.00	0.00	0.00	b	b	b	0.63
2	08	2.02	4.86	b	8.11	b	8.57	b	b	b	5.17
2	09	0.00	2.20	b	0.00	0.00	0.87	b	b	b	1.26
2	10	0.63	6.74	0.00	0.88	b	1.41	b	b	0.00	1.49

Table 12 ... p. 2/2

		FOREST TYPE									All
Zone	Comp	Sundri	Su/Gewa	Su/Others	Gewa	Ge/Goran	Ge/Sun	Goran	PKaBKe	na	Types
2	11	0.00	2.56	b	b	b	0.00	b	b	b	0.64
2	12A	0.00	b	b	b	b	0.00	b	b	b	0.00
2	15	0.00	b	b	b	b	b	b	b	b	0.00
2	16	0.00	0.00	b	0.00	b	0.00	b	b	0.00	0.00
2	17	1.56	4.28	b	0.00	b	10.00	b	b	b	2.82
2	18	0.00	7.67	b	7.14	6.67	13.33	b	b	b	8.50
2	19	13.30	5.63	0.00	b	66.67	3.95	b	b	7.69	8.14
2	20	3.81	4.00	b	b	b	b	b	b	b	3.83
2	37	b	0.00	b	b	b	40.00	b	b	b	12.50
2	38	0.00	0.00	b	b	b	b	b	b	b	0.00
2	41	b	5.71	b	b	0.00	0.00	37.50	b	b	10.87
2	42	b	0.00	b	b	7.14	38.10	b	b	b	24.32
2	43	b	4.03	b	b	0.00	7.69	b	b	b	4.26
2	44	b	2.13	b	b	0.00	6.25	b	b	b	2.82
2	45	b	16.28	b	0.00	6.25	9.24	b	b	b	10.40
2	52	b	b	b	b	0.00	0.00	b	b	b	0.00
2	Sub-total	3.07	3.76	0.00	1.91	4.35	4.53	37.50	0.00	2.06	3.56
1	43	b	0.00	b	b	17.65	0.00	0.00	b	0.00	6.25
1	46	b	b	b	b	0.00	16.67	b	0.00	b	12.50
1	47	b	0.00	b	b	b	b	0.00	b	b	0.00
1	48	b	b	b	b	0.00	b	0.00	b	b	0.00
1	49	b	b	b	b	b	b	0.00	b	b	0.00
1	50A	b	b	b	b	b	b	b	0.00	100.00	33.33
1	51A	b	b	b	b	b	b	0.00	b	b	0.00
1	52	b	b	b	b	0.00	0.00	0.00	b	b	0.00
1	53	b	b	b	b	0.00	b	14.29	b	0.00	8.00
1	54	b	b	b	b	0.00	b	3.45	b	b	3.39
1	Sub-tot	b	0.00	b	b	5.77	5.56	4.21	0.00	16.67	4.76
All Compartm		3.48	3.56	3.52	1.83	4.74	2.63	6.60	0.00	5.06	3.38

Notes:
1. na -- Plot cluster coordinate fell on non-forest type per GIS database.
2. A b means that there was no Sundri recorded under this forest type in the compartment.
3. Zone 3 - Fresh water ; Zone 2 - Moderately salt water; Zone 1 - Salt water

Table 12a. Incidence of Sundri Top-Dying (%Volume)

Zone	Compart	Sundri	Su/Gewa	Su/Oth	Gewa	Ge/Gor	Ge/Sund	Goran	PKaBKe	na	All Types
3	1	0.31	0.21	b	b	b	0.00	b	0.00	b	0.18
3	2	0.36	2.45	b	0.00	b	0.50	b	b	b	1.43
3	3	6.11	1.34	b	b	b	0.00	b	b	b	1.22
3	10	0.00	b	b	b	b	b	b	b	b	0.00
3	11	0.00	0.00	0.00	b	b	1.50	b	b	b	0.85
3	12A	0.00	b	b	b	b	0.00	b	b	b	0.00
3	12B	0.00	0.00	b	0.00	b	0.00	b	b	b	0.00
3	13	2.00	2.01	b	b	b	0.99	b	b	0.00	1.65
3	14	0.34	0.00	b	b	b	0.00	b	b	b	0.26
3	15	0.00	b	b	b	b	0.00	b	b	0.00	0.00
3	16	1.55	0.57	b	b	b	0.00	b	b	b	1.19
3	21	1.11	0.00	b	b	b	0.00	b	b	0.90	0.54
3	22	3.19	b	b	b	b	3.69	b	b	b	3.34
3	23	0.92	0.00	b	b	b	0.76	b	b	b	0.72
3	24	0.00	0.75	b	b	b	1.14	b	b	2.52	0.71
3	25	b	2.14	b	b	b	4.57	b	b	b	3.23
3	26	0.49	4.96	b	b	b	0.00	b	b	b	1.73
3	27	0.00	4.62	b	b	b	1.30	b	0.00	0.00	1.72
3	28	0.00	0.00	b	b	b	2.47	b	b	0.00	0.74
3	29	2.43	1.64	b	b	b	b	b	b	b	2.06
3	30	0.91	0.00	b	b	b	b	b	b	2.83	1.09
3	31	5.21	0.00	b	b	b	b	b	b	0.00	4.31
3	32	6.12	0.00	0.42	b	b	b	b	b	0.00	1.20
3	33	4.23	15.20	8.75	b	b	b	b	b	0.00	7.94
3	34	0.00	5.50	b	b	b	0.00	b	b	b	2.62
3	35	b	1.38	0.00	b	b	0.00	b	0.00	7.61	2.47
3	36	16.29	14.86	0.00	b	b	0.00	b	b	0.00	13.71
3	37	18.13	12.28	b	b	b	b	b	b	b	15.96
3	38	3.89	0.92	b	b	b	0.00	b	b	b	3.00
3	39	1.75	0.25	b	b	b	0.00	b	b	5.30	1.05
3	40	6.51	8.36	b	b	b	b	b	b	21.36	12.68
3	Sub-total	2.79	3.19	1.77	0.00	b	1.13	b	0.00	4.10	2.63
2	1	b	1.40	b	0.00	b	0.00	b	0.00	0.00	0.85
2	3	b	2.99	b	b	b	b	b	b	b	2.99
2	4	0.00	0.66	b	2.71	b	0.00	b	b	b	0.94
2	5	b	0.98	b	0.00	b	0.00	b	0.00	b	0.41
2	6	b	0.00	b	0.00	b	0.00	b	b	b	0.00
2	7	0.00	1.17	b	0.00	0.00	0.00	b	b	b	0.63
2	8	1.22	4.02	b	6.90	b	7.85	b	b	b	4.19
2	9	0.00	2.30	b	0.00	0.00	0.90	b	b	b	1.40
2	10	0.28	6.24	0.00	0.68	b	1.10	b	b	0.00	1.13
2	11	0.00	1.99	b	b	b	0.00	b	b	b	0.76
2	12A	0.00	b	b	b	b	0.00	b	b	b	0.00

Table 12 ... p. 2/2

Zone	Compart	Sundri	Su/Gewa	Su/Oth	Gewa	Ge/Gor	Ge/Sund	Goran	PKaBKe	na	All Types
2	15	0.00	b	b	b	b	b	b	b	b	0.00
2	16	0.00	0.00	b	0.00	b	0.00	b	b	0.00	0.00
2	17	0.68	3.43	b	0.00	b	13.76	b	b	b	2.03
2	18	0.00	5.48	b	6.43	5.94	12.28	b	b	b	6.84
2	19	10.23	5.24	0.00	b	58.06	3.53	b	b	4.60	6.43
2	20	3.12	4.01	b	b	b	b	b	b	b	3.21
2	37	b	0.00	b	b	b	57.14	b	b	b	14.29
2	38	0.00	0.00	b	b	b	b	b	b	b	0.00
2	41	b	5.60	b	b	0.00	0.00	40.00	b	b	9.71
2	42	b	0.00	b	b	0.00	34.80	b	b	b	19.46
2	43	b	4.11	b	b	0.00	1.28	b	b	b	3.69
2	44	b	0.71	b	b	0.00	5.03	b	b	b	1.66
2	45	b	20.11	b	0.00	4.83	7.01	b	b	b	9.97
2	52	b	b	b	b	0.00	0.00	b	b	b	0.00
2	Sub-total	2.34	3.07	0.00	1.48	2.61	3.60	40.00	0.00	1.38	2.81
1	43	b	0.00	b	b	5.56	0.00	0.00	b	0.00	1.35
1	46	b	b	b	b	0.00	8.70	b	0.00	b	6.32
1	47	b	0.00	b	b	b	b	0.00	b	b	0.00
1	48	b	b	b	b	0.00	b	0.00	b	b	0.00
1	49	b	b	b	b	b	b	0.00	b	b	0.00
1	50A	b	b	b	b	b	b	b	0.00	100.00	21.88
1	51A	b	b	b	b	b	b	0.00	b	b	0.00
1	52	b	b	b	b	0.00	0.00	0.00	b	b	0.00
1	53	b	b	b	b	0.00	b	11.97	b	0.00	6.83
1	54	b	b	b	b	0.00	b	3.28	b	b	3.25
1	Sub-total	b	0.00	b	b	1.42	2.39	3.27	0.00	7.61	2.57
All Compartme		2.70	3.14	1.51	1.40	2.32	1.93	5.39	0.00	3.87	2.69

Notes:
1. na -- Plot cluster coordinate fell on non-forest type per GIS database.
2. A **b** means that there was no Sundri recorded under this forest type in the compartment.
3. Zone 3 - Fresh water ; Zone 2 - Moderately salt water; Zone 1 - Salt water

Table 13. Area and Distribution of Golpatta Strips Along the River Banks of the SRF
(and weight of utilizable leaves, in split/harvested form, in tons)

		River Length, m		Area (ha), Golpatta Strips		Total Area	Wt. Util.L.
Zone	Compartment	<=30m Wide	>30m Wide	<=30m Wide	>30m Wide	ha	(tons)
3	1	96945	38656	66.11649	24.35328	90.47	1321
	2	76701	26568	52.31008	16.73784	69.05	1009
	3	68673	26070	46.83499	16.42410	63.26	924
	4	146	1374	0.09957	0.86562	0.97	14
	10	5515	4334	3.76123	2.73042	6.49	95
	11	52004	14426	35.46673	9.08838	44.56	651
	12A	15110	10015	10.30502	6.30945	16.61	243
	12B	50584	12688	34.49829	7.99344	42.49	621
	13	67819	32414	46.25256	20.42082	66.67	974
	14	61222	27641	41.75340	17.41383	59.17	864
	15	76461	28738	52.14640	18.10494	70.25	1026
	16	64490	20338	43.98218	12.81294	56.80	830
	17	0	2856	0.00000	1.79928	1.80	26
	21	59964	27828	40.89545	17.53164	58.43	853
	22	70626	38580	48.16693	24.30540	72.47	1059
	23	58696	19756	40.03067	12.44628	52.48	766
	24	70405	36973	48.01621	23.29299	71.31	1042
	25	36458	24290	24.86436	15.30270	40.17	587
	26	58082	25223	39.61192	15.89049	55.50	811
	27	40924	24153	27.91017	15.21639	43.13	630
	28	45366	16182	30.93961	10.19466	41.13	601
	29	56532	19605	38.55482	12.35115	50.91	744
	30	79533	19331	54.24151	12.17853	66.42	970
	31	68832	32687	46.94342	20.59281	67.54	986
	32	101894	51139	69.49171	32.21757	101.71	1486
	33	134348	55001	91.62534	34.65063	126.28	1844
	34	109384	43545	74.59989	27.43335	102.03	1490
	35	110147	73408	75.12025	46.24704	121.37	1773
	36	145651	85999	99.33398	54.17937	153.51	2242
	37	158290	48128	107.95378	30.32064	138.27	2020
	38	116982	40286	79.78172	25.38018	105.16	1536
	39	122821	39321	83.76392	24.77223	108.54	1585
	40	76280	31353	52.02296	19.75239	71.78	1048
	41	155	396	0.10571	0.24948	0.36	5
2	1	36289	24078	31.135962	18.202968	49.34	721
	3	10568	5226	9.06734	3.95086	13.02	190
	4	148471	42759	127.38812	32.32580	159.71	2333
	5	62342	25664	53.48944	19.40198	72.89	1065
	6	154691	60592	132.72488	45.80755	178.53	2608
	7	320853	104791	275.29187	79.22200	354.51	5178
	8	415009	98024	356.07772	74.10614	430.18	6283
	9	298861	71581	256.42274	54.11524	310.54	4536
	10	105344	36665	90.38515	27.71874	118.10	1725
	11	64571	23456	55.40192	17.73274	73.13	1068
	12A	9642	3642	8.27284	2.75335	11.03	161
	15	9073	5527	7.78463	4.17841	11.96	175
	16	48230	18234	41.38134	13.78490	55.17	806

	17	137519	44827	117.99130	33.88921	151.88	2218
	18	380196	104924	326.20817	79.32254	405.53	5923
	19	241169	58607	206.92300	44.30689	251.23	3669
	20	190719	53197	163.63690	40.21693	203.85	2977
	37	22854	13302	19.60873	10.05631	29.67	433
	38	58225	18298	49.95705	13.83329	63.79	932
	41	206341	53503	177.04058	40.44827	217.49	3177
	42	253003	47522	217.07657	35.92663	253.00	3695
	43	196160	32067	168.30528	24.24265	192.55	2812
	44	288612	65684	247.62910	49.65710	297.29	4342
	45	345968	89977	296.84054	68.02261	364.86	5329
	46	0	522	0.00000	0.39463	0.39	6
	52	103178	20310	88.52672	15.35436	103.88	1517
1	43	183584	42341	55.80954	7.13869	62.95	919
	44	10365	4061	3.15096	0.68468	3.84	56
	46	319690	134154	97.18576	22.61836	119.80	1750
	47	330140	83765	100.36256	14.12278	114.49	1672
	48	190830	60507	58.01232	10.20148	68.21	996
	49	312628	82491	95.03891	13.90798	108.95	1591
	50A	62020	14185	18.65408	2.39159	21.25	310
	50B	174962	48795	53.18845	8.22684	61.42	897
	51A	127363	26582	38.71835	4.48173	43.20	631
	51B	196689	41503	59.79346	6.99741	66.79	976
	52	290523	80670	88.31899	13.60096	101.92	1489
	53	313041	55895	95.16446	9.42390	104.59	1528
	54	468219	84495	142.33858	14.24586	156.58	2287
	55	447995	98816	136.19048	16.66038	152.85	2233
	Total	9892977	2980541	6174.19608	1623.23502	7797.43	113888

Total area = 7797.43 ha

Table 14. Nipa Estimates, per ha values

PC No.	No. of Seedlings	No. of M1 Nipa	No. of M2 Nipa	No.Leaves M1 Nipa	No. Leaves M2 Nipa	No. Utilizable Leaves, M2	Ave. Length Util.Leaf, m	Wt.Util.L. kg/ha
1	3448	1358	12308	2716	40744	21603	3.4	35955
2	1592	3523	6196	6791	13963	6875	4.5	18222
3	0	255	4202	467	10356	5687	3.9	11840
4	6101	424	9337	891	29709	12435	3.2	18046
5	531	891	9592	2037	32425	17825	3.9	37901
6	1857	0	5178	0	18801	8361	3.2	12059
7	1592	255	4414	764	16425	9677	2.8	11120
8	2122	552	5263	1655	20160	11332	3.6	20672
9	0	7555	8064	21178	31322	15194	2.7	15437
10	0	1231	6621	2716	21093	12435	3.3	19372
11	531	4669	1952	8531	5942	2462	3.2	3660
12	0	7257	9295	13709	29751	14218	2.6	13561
13	0	5687	764	8361	1995	849	3.0	1066
14	531	2165	3183	3820	9931	3989	3.6	7384
15	0	4966	3735	9592	12011	4881	2.1	2358
16	0	1188	7300	2334	26823	12350	3.5	21324
17	0	594	5814	1316	19778	8658	2.6	8258
18	0	806	5857	1443	17698	8149	3.1	11391
19	0	976	5814	2292	19396	7979	3.9	16682
20	1326	4753	6578	9549	21051	9252	4.5	24193
21	531	2716	4159	4881	11884	6112	2.8	6643
22	0	1401	2886	1655	7173	3989	2.9	4726
23	0	594	7724	1401	24828	16595	2.8	18628
24	0	255	8870	552	30133	19311	3.2	28710
25	0	2207	3226	7597	9125	5560	3.0	7081
26	0	2546	6578	6154	22961	14600	2.9	17297
27	0	849	4287	2292	13836	5390	2.9	6290
28	0	1316	5857	3438	20711	9210	3.6	17128
29	0	1825	5263	3735	16340	5857	2.8	6575
30	0	976	5687	2589	20457	10143	4.0	21928
31	0	3862	2971	8658	9167	3310	4.0	7274
Sum	20160	67651	178975	143112	585986	294287	102	452780
Mean	650.3	2182.3	5773.4	4616.5	18902.8	9493.1	3.3	14605.8
Varia	1730139	4383032	6294135	21239428	80102825	26728661	0.33	83187232
SEm	236.24	376.02	450.60	827.73	1607.47	928.56	0.10	1638.13
SE%	36.3	17.2	7.8	17.9	8.5	9.8	3.2	11.2

Note: There was only one plot cluster (N0. 17) sampled in Zone 1 (salt water zone). There were 11 plot clusters in Zone 2 and 19 in Zone 3.

Table 15. Comparison of Results Between Original and Validation Data

BASED ON ORIGINAL PLOT CLUSTER DATA								BASED ON VALIDATION DATA			
LODE	LOMI	LADE	LAMI	PCN	NOTREES	BA	VOL10	PCN	NOTREES	BA	VOL10
89	06	22	04	0003	63.14	2.99	8.60	0003	35.08	0.68	3.59
89	13	22	05	0038	26.31	0.70	3.69	0038	26.31	0.79	4.20
89	29	22	07	0065	36.83	0.88	3.66	0065	17.54	0.42	2.11
89	16	22	07	0075	52.61	2.87	13.25	0075	61.38	2.74	16.98
89	12	22	08	0093	15.78	0.85	4.62	0093	43.84	1.57	9.68
89	07	22	09	0125	31.57	0.83	4.00	0125	43.84	1.18	5.78
89	06	22	10	0127	32.88	1.04	4.66	0127	35.08	1.17	6.41
89	10	22	10	0131	19.73	0.59	2.80	0131	26.31	0.68	3.60
89	15	22	11	0159	89.44	8.06	34.45	0159	96.46	10.34	32.63
89	09	22	12	0169	57.87	5.16	20.59	0169	52.61	2.27	10.06
89	14	22	12	0173	63.14	7.69	30.84	0173	52.61	3.31	16.14
89	14	22	14	0198	52.61	9.18	36.73	0198	78.92	7.71	31.53
89	31	22	14	0206	138.11	8.13	33.46	0206	152.92	5.71	27.28
89	30	22	16	0220	357.77	11.64	56.13	0220	394.6	12.81	59.95
89	24	22	19	0242	178.89	10.85	64.21	0242	157.84	5.45	30.66
89	21	22	20	0245	111.80	4.15	19.36	0245	114	4.05	21.41
89	21	22	22	0263	242.02	14.38	63.25	0263	87.69	5.27	25.49
89	43	22	04	0320	163.10	4.88	21.60	0320	136.76	7.21	33.05
89	41	22	05	0337	236.76	6.69	32.34	0337	254.3	7.32	35.49
89	41	22	06	0351	336.73	11.84	60.89	0351	289.37	8.87	46.04
89	35	22	07	0379	10.52	0.25	1.37	0379	8.77	0.17	0.92
89	46	22	09	0408	124.96	4.85	30.84	0408	105.23	4.00	24.84
89	36	22	09	0415	268.33	9.61	49.13	0415	298.14	10.29	51.32
89	35	22	10	0421	331.47	12.65	63.68	0421	359.53	14.39	71.92
89	47	22	10	0430	149.07	4.25	22.77	0430	149.07	4.19	22.80
89	52	22	10	0435	178.89	4.72	24.42	0435	184.15	5.35	27.93
89	51	22	11	0437	173.62	5.40	36.82	0437	122.76	3.15	17.89
89	42	22	12	0445	486.68	14.81	91.47	0445	464.75	14.63	95.53
89	40	22	13	0479	368.29	12.66	65.45	0479	412.14	18.34	95.58
89	41	22	14	0492	431.43	17.03	107.44	0492	438.45	18.99	117.66
89	39	22	17	0534	210.45	7.15	40.44	0534	385.83	13.18	87.13
89	41	22	18	0549	231.50	8.97	50.04	0549	219.22	7.96	42.72
89	45	22	18	0553	184.15	7.02	33.04	0553	184.15	7.03	33.69
89	44	22	19	0556	184.15	5.71	28.23	0556	192.92	7.05	34.95
89	41	22	21	0584	210.45	6.71	40.95	0584	263.07	7.70	37.28
89	43	22	24	0624	138.11	5.62	27.24	0624	114	3.27	16.41
89	21	21	50	0743	8.77	0.19	1.04	0743	26.31	0.57	2.21
89	07	21	53	0792	26.31	0.63	3.32	0792	43.84	1.20	6.35
89	14	21	54	0802	31.57	0.93	4.51	0802	52.61	1.32	6.96
89	21	21	56	0840	36.83	0.90	4.44	0840	52.61	1.35	6.07
89	30	21	56	0848	47.35	1.09	6.01	0848	210.45	6.19	32.30
89	16	21	58	0872	10.52	0.26	1.36	0872	8.77	0.23	1.22
89	16	21	59	0896	36.83	3.31	7.81	0896	43.84	0.97	5.14
89	07	21	59	0903	47.35	1.56	8.45	0903	26.31	0.67	3.55
89	12	22	01	0935	15.78	0.31	1.65	0935	52.61	1.08	5.72
89	23	22	03	0964	15.78	0.34	1.65	0964	43.84	0.91	3.98
89	36	21	47	0990	5.26	0.10	0.46	0990	8.77	0.16	0.80
89	35	21	49	1003	157.84	6.04	34.33	1003	8.77	0.15	0.61
89	44	21	51	1022	36.83	1.41	6.37	1022	26.31	0.51	2.29
89	52	21	53	1055	19.73	0.65	3.47	1055	26.31	0.88	4.40

89	45	21	57	1106	147.32	4.28	21.16	1106	192.92	5.75	29.43
89	35	21	58	1125	15.78	0.38	1.86	1125	35.08	0.76	3.91
89	47	21	59	1136	478.78	14.91	102.08	1136	543.67	17.74	123.57
89	47	22	00	1143	21.05	0.42	1.74	1143	8.77	0.20	1.05
89	49	22	02	1174	273.59	11.30	86.54	1174	333.22	14.64	111.58
89	35	22	03	1190	363.03	14.26	84.41	1190	359.53	12.79	71.07
					7785.49	304.05	1615.11		8164.18	297.36	1622.90
							% difference:		4.86	-2.20	0.48

LODE	LOMI	LADE	LAMI	PCN	NOTREES	BA	VOL10	PCN	NOTREES	BA	VOL10

LODE -- Degrees, Longitude
LOMI -- Minutes, Longitude
LADE -- Degrees, Latitude
LAMI -- Minutes, Latitude
PCN -- Plot Cluster Number

NOTREES -- No. of trees/ha
BA -- Basal area in sqm/ha
VOL10 -- Tree volume in cum/ha
down to 10-cm dia, underbark

Appendix 1. Field Data Enumeration Form

BANGLADESH FRMP FOREST INVENTORY

3. ENUMERATION, MANGROVE FOREST AND COASTAL PLANTATIONS

PLOT CLUSTER NUMBER	LONGITUDE	LATITUDE	PLOT NUMBER	CONTROL	RECORD TYPE	LOCATION: DIVISION	RANGE	BEAT	BLOCK	COMPARTMENT	LAND USE	FOREST TYPE	STAND CONDITION	YEAR LOGGED OR PLANTED	NUMBER OF RECORDS: TREES/POLES	SEEDLINGS	SAPLINGS	NIPA	NIPA SEEDLINGS	CREW NUMBER	DAY	MONTH	YEAR
					1																		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

2 5 1 3 4

ENUMERATOR: _____

CHECKER: _____

SHEET: _____ OF: _____

		r = 1m SEEDLINGS HT < 1.5 m			r = 2m SAPLINGS HT > 1.5 m OR DBH < 2.5 cm			r = 2 m NIPA SEEDLINGS HT. < 1.5 m		r = 5 m NIPA PLANTS					READINGS FOR HEIGHT, NEWS NIPA			REPRESENTATIVE LEAF, N-E-W-S NIPA			r = 5m POLES DBH = 2.5 - 14.5 cm				r = 11m TREES DBH/DAB = 15.0 + cm			READINGS FOR BOLE & TREE HEIGHTS								
RECORD TYPE	CONSEC NUMBER	SPECIES	SPECIES CODE	NO. OF STEMS	SPECIES	SPECIES CODE	NO. OF STEMS	RECORD TYPE	SPECIES CODE	NO. OF STEMS	MATURITY	TOTAL NO. OF LEAVES	NO. OF UTILIZABLE LEAVES	HARVEST STATUS, CUT OR UNCUT	FLOWER(1), OR 0, FRUIT(2), OR 0	HEIGHT OF N-E-W-S NIPA	HORIZONTAL DISTANCE	PERCENT TO BASE	PERCENT TO TOP	LENGTH OF LEAF	TOTAL NUMBER OF LEAFLETS	NO. OF UTILIZABLE LEAFLETS	RECORD TYPE	CONSEC NUMBER	SPECIES	SPECIES CODE	DBH 0.1 cm	SPECIES	SPECIES CODE	DBH OR DAB 0.1 cm	BUTTRESS HEIGHT	DAMAGE	GRADE	INFESTATION	BOLE HEIGHT	TREE HEIGHT	HORIZONTAL DISTANCE	HEIGHT OF BASE	PERCENT TO BASE	PERCENT TO CROWN POINT	PERCENT TO TOP
10	11		12	13		12	14	10	12	13	14	15	16	17	18	19				20	21	22	10	11		12	13		12	13	14	15	16	17	18	19					
4	1							6															5																	
4	2							6															5																	
4	3							6															5																	
4	4							6															5																	
4	5							6															5																	
4	6							6															5																	
4	7							6															5																	
4	8							5															5																	
4	9							6															5																	
4	10							6															5																	
4	11							6															5																	
4	12							6															5																	
4	13							6															5																	
4	14							6															5																	
4	15							6															5																	
4	16							6															5																	
4	17							6															5																	
4	18							6															5																	
4	19							6															5																	
4	20							6															5																	
4	21							6															5																	
4	22							6															5																	
4	23																																							
4	24							6															5																	
4	25							6															5																	

Appendix 2. Plot and Tree Description Codes

PLOT/TREE DESCRIPTION CODES
(Mangrove Forest and Coastal Plantations)

Land use category

1 Tidal forest

2 Coastal forest

3 Natural hill forest

4 Forest plantation

5 Bush/shrubland

6 Fruit/other trees

7 Agriculture

8 No vegetation

9 Settlement

10 Others

Forest type

1 Mangrove forest

2 Nipa forest

3 Coastal forest

6 Forest plantation

Stand Condition:

Mangrove forest

1 Harvested, less than 5 years ago

2 Harvested, 5 or more years ago

Nipa forest

1 Newly harvested

2 Harvested, more than one year ago

3 Cleared

Forest plantations

1 Well-stocked (at least 50% crown cover or of original stocking)

2 Poorly stocked (< 50% crown cover or of original stocking)

3 Failure

4 Destroyed by fire

5 Eroded

6 Encroached

7 Handed over to Revenue Department

Damage

0 No damage

1 Slight damage, tree will survive

2 Heavy damage, tree will die

3 Uprooted

4 Felled

5 Broken

6 Dead

Infestation

0 No infestation

1 Insect infestation

2 Climbed by rattan

3 Slightly infested with climbers

4 Severely infested with climbers

5 Infested with mistletoe (Loranthus sp.)

6 "Top dying" (die-back)

7 Others

Tree grade

1 Straight and clean without damage, circular cross-section, apparently sound

2 Similar to 1 but up to half of surface is knotty or cross-section is irregular, or with slight sweep

3 Twisted and knotty, or with other defects which reduce usable volume by up to 25%, such as rot, burn, physical damage, forks or bends

4 Very knotty and bent, or with defects which reduce usable volume by up to 25 to 50%

5 Reject, with such defects that only less than 50% of volume is usable

Appendix 3 Species Codes

Forest Species: Sundarbans and Coastal Divisions

	Vernacular Name	Botanical Name	Code Name	Code No.	Commercial Group/Class
Trees:					
1.	Amur	*Amoora cucullata*	AU	201	5
2.	Babul	*Acacia nilotica*	BB	202	5
3.	Baen	*Avicennia officinalis*	BA	203	5
4.	Ban jam	*Eugenia fruticosa*	BJ	204	5
5.	Batla/Batul	*Excoecaria indica*	BL	205	5
6.	Bhaela/Baral	*Intsia bijuga*	BE	206	5
7.	Bhola	*Hibiscus tiliaceus*	BO	207	5
8.	Bon Lichu	*Lepisanthes rubiginosa*	BC	208	5
9.	Bon Notoy	*Mallotus repandus*	BY	209	5
10.	Choyla/Ora/Soyla	*Sonneratia caseolaris*	CY	210	5
11.	Dhundul	*Xylocarpus granatum*	DN	211	5
12.	Doyal	*Mucuna gigantea*	DY	212	5
13.	Gab	*Diospyros peregrina*	GB	213	5
14.	Garjan/Jhanna	*Rhizophora mucronata*	JN	214	5
15.	Gewa	*Excoecaria agallocha*	GW	215	3
16.	Goran	*Ceriops decandra*	GN	216	5
17.	Jhanna/Garjan	*Rhizophora mucronata*	JN	214	5
18.	Jhao	*Tamarix indica*	JA	217	5
19.	Jir	*Ficus sp.*	JI	218	5
20.	Kankra	*Bruguiera gymnorhiza*	KA	219	5
21.	Karanj/Karanja	*Pongamia pinnata*	KR	220	5
22.	Keora	*Sonneratia apetala*	KE	221	4
23.	Khalisha/Khalshi/ Khulsha	*Aegiceras corniculatum*	KC	222	5
24.	Kirpa/Kripa	*Lumnitzera racemosa*	KP	223	5
25.	Ora/Choyla/Soyla	*Sonneratia caseolaris*	CY	210	5
26.	Passur	*Xylocarpus mekongensis*	PS	224	5
27.	Sadda Baen/ White Baen	*Avicennia alba*	SB	225	5
28.	Shingra	*Cynometra ramiflora*	SG	226	5
29.	Sitka/Sitki	*Clerodendrum inerme*	SK	227	5
30.	Sundri	*Heritiera fomes*	SU	228	3
31.	Sundri Lota	*Brownlowia tersa*	SL	229	5
32.	White Baen/ Sadda Baen	*Avicennia alba*	SB	225	5
33.	Miscellaneous/Unknown species		UM	299	5

Legend:

1 - Special Class
2 - Class A
3 - Class B
4 - Class C
5 - Class D

1.	Golpatta	*Nypa fruticans*	GP	290

Appendix 4. Structure of Data Entry Table

Table A4

Table A4. **Structure of Data Entry Table** (with DEVP and final validation criteria) **for the Sundarbans and Coastal Plantations: Enumeration Form 3**

No	Field Name	Variable Name	Type	Width	Dec'l Pt.	Technical Specifications DEVP	Final
1	Data form	CFORM	C	1	0	=1, 2 or 3	=3
2	Plot cluster number	CPCN	C	4	0	=001 to 1300	=001 to 1300
3	Longitude: degrees	CLONGDEG	C	2	0	=88 to 93	See Table A2-4
4	Lon: minutes	CLONGMIN	C	2	0	=0 to 59	=0 to 59
5	Lon: seconds	CLONGSEC	C	2	0	=0 to 59	=0,10,20,30,40,50
6	Latitude: degrees	CLATDEG	C	2	0	=20 to 27	See Table A2-4
7	Lat: minutes	CLATMIN	C	2	0	=0 to 59	=0 to 59
8	Lat: seconds	CLATSEC	C	2	0	=0 to 59	=0,10,20,30,40,50
9	Plot No.	CPLOTNO	C	2	0	=1 to 5	=1,2,3,4 or 5
10	Control	CCONTROL	C	1	0	=0 or 1	=0 or 1
11	Record type1	CRECTYPE1	C	1	0	=1 to 6	=1
12	Division	CDIVISION	C	2	0	=1 to 30	See Table A2-5
13	Range	CRANGE	C	2	0	=1 to 50	See Table A2-5
14	Beat	CBEAT	C	2	0	=1 to 99	See Table A2-5
15	Block	CBLOCK	C	3	0	=1 to 500	=1 to 55
16	Compartment	CCOMPART	C	3	0	=1 to 500	=1 to 55
17	Land use category	CLUSEC	C	1	0	=1 to 9	=1,2,4,5,6,7,8 or 9
18	Forest type	CFOTY	C	1	0	=1 to 6	=1, 2, 3 or 6
19	Stand condition	CSTCO	C	1	0	=1 or 2	=1, 2, 3 or 4
20	Year logged/ planted	CYRLOP	C	2	0	=70 to 97	=70 to 97
21	No. of records (NR): trees/poles	CNORETP	C	2	0	= 0 to 50	= 0 to 50
22	NR:seedlings	CNRSEED	C	2	0	=0 to 30	=0 to 30
23	NR: saplings	CNRSAP	C	2	0	=0 to 20	=0 to 20
24	NR: nipa	CNRNIPA	C	2	0	=0 to 15	=0 to 15
25	NR: nipa seedlings	CNRNIPAS	C	1	0	=1	1
26	Crew number	CCREWNUM	C	2	0	=0 to 30	=0 to 30
27	Date: day	CDAY	C	2	0	=1 to 31	=1 to 31
28	Date: month	CMONTH	C	2	0	=1 to 12	=1 to 12
29	Date: year	CYEAR	C	2	0	=95 to 98	=95 to 98

30	Invalid subplot (IS): seedlings	CISSE	C	1	0	=0	=0 or 1
31	IS: saplings	CISSA	C	1	0	=0	=0 or 1
32	IS: nipa seedlings	CISNISE	C	1	0	=0	=0 or 1
33	IS: nipa	CISNIPA	C	1	0	=0	=0 or 1
34	IS: poles	CISPOLES	C	1	0	=0	=0 or 1
35	IS: trees	CISTREES	C	1	0	=0	=0 or 1
36	Record type2	CRECTYPE2	C	1	0	=1 to 6	=4
37	Consecutive number 1	CONSNUM1	C	2	0	=1 to 50	=1 to 50
38	Species code: seedlings	CSCSEED	C	3	0	=100 to 299	=201 to 299
39	No. of stems: seedlings	CNSSEED	C	2	0	=0 to 20	=0 to 20
40	SC: saplings	CSCSAP	C	3	0	=100 to 299	=201 to 299
41	NS: saplings	CNSSAP	C	2	0	=0 to 20	=0 to 20
42	Record type: nipa	CRTNIPA	C	1	0	=6	=6
43	SC: nipa	CSCNIPA	C	3	0	=290	=290
44	NS: nipa seedlings	CNSNIPAS	C	2	0	=0 to 15	=0 to 15
45	Maturity: nipa	CMATURITY	C	1	0	=1 for M1 =2 for M2	=1 for M1 =2 for M2
46	No. of leaves	CTNOLEAV	C	1	0	=1 to 9	=1 to 9
47	No. of utilza-ble leaves	CNUTLEAV	C	1	0	=1 to 9	=1 to 9
48	Harvest status	CHARSTA	C	1	0	=1 for U =2 for C	=1 for U =2 for C
49	Flower/fruit	CFLFR	C	1	0	=0, 1 or 2	=1 (flower), =2 (fruit), =0, otherwise
50	Height of NEWS nipa	CHTNIPA	N	4	1	=3.0 to 14.0	=3.0 to 14.0
51	Horizontal distance 1	CHORDIS1	N	4	1	=5.0 to 14.0	=5.0 to 14.0
52	Percent to base	CPCTB1	C	2	0	=0 or (+ or -) 1 to 15%	=0 or (+ or -) 1 to 15%
53	Percent to top	CPCTTOP1	C	3	0	=20 to 120%	=20 to 120%
54	Length of leaf	CLENLEAF	N	4	1	=2.5 to 12.0	=2.5 to 12.0

55	Total no. of leaflets	CTNOLLET	C	3	0	=25 to 120	=25 to 120
56	No. of util. leaflets	CNUTLLET	C	3	0	=15 to 110	=15 to 110
57	Record type3	CRECTYPE3	C	1	0	=2, 3 or 5	=5
58	Consecutive number 2	CCONSNUM2	C	2	0	=1 to 50	=1 to 50
59	SC: poles	CSCPOLES	C	3	0	=100 to 299	=201 to 299
60	DBH: poles	CDBHPOLES	N	4	1	=2.5 to 19.5	=2.5 to 14.5
61	SC: trees	CSCTREES	C	3	0	=100 to 299	=201 to 299
62	DBH/DAB	CDBHTREES	N	5	1	=14.6 to 120.0	=14.6 to 120.0
63	Buttress height	CHTBUT	N	3	1	=1.1 to 8.0	=1.1 to 8.0
64	Damage	CDAMAGE	C	1	0	=0 to 6	=0 to 6
65	Grade	CGRADE	C	1	0	=1 to 5	=1 to 5
66	Infestation	CINFEST	C	1	0	=0 to 6	=0 to 6
67	Bole height	CBOLEHT	N	4	1	=0.5 to 40.0	=0.5 to 40.0
68	Tree height	CTREEHT	N	4	1	=4.0 to 50.0	=4.0 to 50.0
69	Hor. distance	CHORDIS2	N	4	1	=5.0 to 40.0	=5.0 to 40.0
70	Height of base	CHTBASE	N	3	1	=0.0 to 3.0	=0.0 to 3.0
71	Percent to base	CPCTB2	C	3	0	=0 or (+ or -) 1 to 30%	=0 or (+ or -) 1 to 30%
72	Percent to crown point	CPCTCP	C	3	0	=0 or (= or -) 1 to 150%	=0 or (+ or -) 1 to 150%
73	Percent to top	CPCTTOP2	C	3	0	=0 or (+ or -) 1 to 150%	=0 or (+ or -) 1 to 150%

C - Character

N - Numeric

Appendix 5

The FRMP Tree Volume Equations for the Sundarbans (Including Weight Equations for Goran and Golpatta

Appendix 5. The FRMP Tree Volume Equations for the Sundarbans (Including Weight Equations for Goran and Golpatta)

Notes: The regression modeling procedures used to derive the following equations involved eliminating the heteroscedasticity (heterogeneous variance) problem in the data sets. It should be noted that the presence of heteroscedasticity in each of the data sets violates one of the basic assumptions of regression models. Tree volume equations derived by regression procedures with very high coefficient of determination can give very inefficient estimates if heteroscedasticity is not corrected in the data.

The following tree volume equations give better volume estimates than the ones used in the ODA forest inventory of the Sundarbans. The details of the comparisons are given in Appendix 11 (SRF FI Report).

In the following equations, **V10E** is the equation or estimated tree volume, including branches that are at least 2 m long, down to 10-cm diameter underbark; **VTOTE** is the total tree volume including bole volume and branch volume of wood that are at least 2 m long, down to 10-cm diameter underbark, and non-merchantable crown/branch volume, overbark; **BVCRE** is the bole volume, underbark, up to the crown point; and **VNME** is the non-merchantable volume, overbark. In all cases, **V10E = 0** if DBH is less than 10 cm.

Species/Code	FRMP Equations
Sundri (*Heritiera fomes*) 228	V10E = -0.02363 + 0.00001800*D2H + 0.0002210*D2 VTOTE = 0.008298 + 0.00001529*D2H +0.0003505*D2 BVCRE = -0.0044196 +0.00001364*D2H + 0.0002378*D2 VNME = VTOTE – V10E
Gewa (*Excoecaria agallocha*) 215	V10E = 0.00003149*D2H VTOTE = 0.00003797*D2H BVCRE = 0.00003070*D2H VNME = -0.005021 + 0.0001890*DH
Keora (*Sonneratia apetala*) 221	V10E = -0.0083256 +0.00003824*D2H 0.0001201*D2 VTOTE = 0.00003848*D2H BVCRE = 0.000002284*D2H + 0.0001526*DH VNME = 0.03426 + 0.000002895*D2H
Baen (*Avicennia officinalis*) 203	V10E = 0.00003704*D2H – 0.002267*H VTOTE = 0.0002572*D2 + 0.00002387*D2H BVCRE = 0.0057935 + 0.00002695*D2H VNME = VTOTE – V10E
Kankra (*Bruguiera gymnorhiza*) 219	V10E = - 0.01971 + 0.00003729*D2H VTOTE = 0.00004555*D2H BVCRE = 0.00006299VTOTE*VTOTE VNME = VTOTE – V10E
Passur (*Xylocarpus mekongensis*) 224	V10E = -0.01806 + 0.0001358*D2 + 0.00002695*D2H VTOTE = 0.0002887*D2 + 0.0002752*D2H BVCRE = 0.00002939*D2H VNME = VTOTE – V10E

Dhundul (*Xylocarpus granatum*) 211	V10E = -0.008143 + 0.00003819*D2H VTOTE = 0.00009118*D2H – 0.000004678*D2H2 BVCRE = 0.007231 + 0.00002885*D2H VNME = VTOTE – V10E
Goran (*Ceriops decandra*) 216	VOL = 0.001429 – 0.001111*D + 0.0004294*D2 WT = 1.337 – 0.8816*D + 0.3876*D2
Golpatta (*Nypa fruticans*) 290	ULME = -1.0802 + 1.4524*LM – 0.1081*LM^2 WT = -1.4555 + 1.1953*ULME Alternatively, WT = -1.3734 + 0.8882*LM

Legend: D2 = DBH^2, where DBH is in cm.
H = total tree height in m.
D2H = D2*H
D2H2 = D2*H^2
Volumes are all in cu. m.
WT = weight in kg.
LM = length of leaf in m.
ULME = length of utilized/split leaf in m. as estimated by the equation

Note: For quick estimation of the non-merchantable volume of stands (not individual trees), the following percentages of the total volume may be used: Sundri – 8.6%; Gewa – 4.0%; Keora – 10.2%; Baen – 18.3%; Kankra – 10.5%; Passur – 14.6%; and Dhundul – 14.5%.

Appendix 6

Detailed Stand and Stock Tables (No. of Poles and Trees/ha, BA/ha, Vol/ha and No. of Seedlings and Saplings/ha) – By Stratum

Appendix 6

Detailed Stand and Stock Tables (No. of Poles and Trees/ha, BA/ha, Vol/ha and No. of Seedlings and Saplings/ha) – By Stratum

Stand and Stock Tables by Species Group, stratum and Forest Division :
NT (No. of Trees/ha), BA (Basal Area in sqm/ha), Vol(Volume in cu m/ha)

Date: 01/27/1998

Division : Sundarbans (16)

Species Group : 1. Sundri 2. Gewa 3. Keora 4. Baen 5. Goran 6. Other TS

Mangrove forest : Stratum na (Others)

No. of plot clusters : 61

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	37.61	0.86	3.70	28.99	1.08	5.31	8.06	0.45	2.38	1.96	0.16	0.87
Gewa	20.24	0.45	1.67	3.28	0.12	0.53	0.93	0.05	0.23	0.52	0.04	0.16
Keora	0.95	0.03	0.10	1.29	0.05	0.26	1.68	0.10	0.51	4.10	0.38	2.30
Baen	1.84	0.04	0.15	2.36	0.09	0.38	1.60	0.09	0.39	1.06	0.09	0.51
Other TS	5.18	0.12	0.49	3.56	0.14	0.66	3.87	0.23	1.08	2.56	0.22	1.17
TOTAL	65.82	1.50	6.11	39.48	1.47	7.14	16.14	0.90	4.68	10.20	0.90	5.00

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	0.55	0.08	0.58	0.14	0.03	0.14	-	-	-	77.30	2.66	12.98	18.7
Gewa	0.09	0.01	0.08	-	-	-	-	-	-	25.06	0.66	2.66	17.1
Keora	1.81	0.27	1.80	0.60	0.14	0.99	0.50	0.29	1.53	10.93	1.25	7.49	44.5
Baen	0.42	0.07	0.49	0.52	0.12	0.79	0.68	0.33	1.92	8.48	0.84	4.73	35.4
Other TS	0.45	0.06	0.33	0.50	0.11	0.53	0.35	0.18	-	16.45	1.05	4.26	26.9
TOTAL	3.31	0.49	3.28	1.76	0.40	2.45	1.52	0.80	3.45	138.2	6.46	32.11	14.1

NOTE : NT - No. of trees
BA - Basal area in sqm/ha
Vol - Volume in cu m/ha
S.E. - Sampling Error
TS - Tree species
N.A. - Not available

Stand Tables by Species, Stratum and Division for Seedlings, Saplings and poles (No. of stems/ha) .

Division : Sundarbans (16) Date : 02/08/1998

Species Group : 1. Sundri 2. Gewa 3. Keora 4. Baen 5. Goran 6. Other TS

Mangrove forest : Stratum na (Others)

No. of plot clusters : 61

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	17688.05	19.9	1892.26	19.4
Gewa	5078.21	16.0	1421.75	16.4
Keora	10.44	100.0	10.44	100.0
Baen	-	-	-	-
Goran	6661.07	21.5	2768.92	16.7
Other TS	1603.74	35.4	590.75	28.0
TOTAL	31041.51	12.3	6684.12	9.3

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	336.30	339.67	98.87	1.07	3.14	774.84	1.07	3.14	12.9
Gewa	506.48	721.79	248.88	2.54	9.01	1477.15	2.54	9.01	10.6
Keora	-	4.59	1.36	0.01	0.05	5.95	0.01	0.05	47.9
Baen	5.22	7.10	3.27	0.03	0.08	15.59	0.03	0.08	81.2
Goran	514.00	43.10	2.30	0.03	0.12	559.40	0.03	0.12	23.0
Other TS	74.87	60.15	13.57	0.14	0.26	148.58	0.14	0.26	22.9
TOTAL	1436.9	1176.4	368.25	3.82	12.66	2981.51	3.82	12.66	7.1

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
1.12	1247.57	0.47	456.95	0.12	113.54	1.71	1818.06

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm , Weight is in kilograms/ha, S.E.% is Sampling error

'Mangrove forest : Stratum 1 (Sundri, <70% cc, <15m height class)

No. of plot clusters : 28

Trees by Diameter Class

Species Group	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	70.18	1.62	7.28	44.66	1.66	8.78	10.82	0.61	3.39	4.23	0.35	2.17
Gewa	15.82	0.33	1.41	1.97	0.07	0.30	1.13	0.06	0.32	-	-	-
Keora	0.23	0.01	0.03	0.23	0.01	0.07	0.23	0.01	0.08	-	-	-
Baen	0.23	0.00	0.02	0.19	0.01	0.02	-	-	-	0.50	0.05	0.19
Other TS	5.10	0.12	0.53	7.74	0.30	1.53	3.23	0.18	1.01	5.42	0.47	2.78
TOTAL	91.57	2.09	9.26	54.79	2.05	10.69	15.41	0.86	4.80	10.15	0.87	5.14

Trees by Diameter Class

Species Group	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	0.19	0.03	0.13	-	-	-	0.19	0.20	0.99	130.3	4.47	22.75	15.5
Gewa	-	-	-	-	-	-	-	-	-	18.92	0.46	2.03	24.0
Keora	0.23	0.03	0.24	-	-	-	0.23	0.10	0.92	1.17	0.16	1.33	94.7
Baen	1.44	0.23	1.13	0.31	0.06	0.41	0.42	0.15	0.95	3.10	0.50	2.71	41.5
Other TS	0.92	0.14	1.01	0.55	0.12	0.62	0.23	0.11	0.53	23.19	1.43	8.00	30.7
TOTAL	2.79	0.43	2.51	0.86	0.18	1.03	1.08	0.56	3.39	176.6	7.02	36.82	12.7

Mangrove forest : Stratum 1 (Sundri, <70% cc, <15m height class)

No. of plot clusters : 28

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	14168.67	25.5	1755.93	20.2
Gewa	5574.25	31.9	979.09	22.1
Baen	113.68	100.0	22.74	100.0
Goran	4018.69	34.1	2154.29	33.0
Other TS	2175.13	26.3	891.47	20.2
TOTAL	26050.42	20.2	5803.52	17.0

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	391.91	528.63	189.93	2.00	5.75	1110.46	2.00	5.7	12.1
Gewa	372.58	501.12	119.82	1.26	4.48	993.52	1.26	4.4	20.5
Baen	3.64	6.59	3.64	0.04	0.11	13.87	0.04	0.1	60.9
Goran	290.12	2.05	3.18	0.03	0.12	295.35	0.03	0.1	38.8
Other TS	170.98	80.87	12.28	0.14	0.31	264.13	0.14	0.3	22.0
TOTAL	1229.2	1119.3	328.85	3.47	10.76	2677.33	3.46	10.7	9.1

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.51	593.19	0.03	28.29	0.12	108.38	0.66	729.85

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha, S.E.% is Sampling error

Mangrove forest : Stratum 2 (Sundri, <70% cc, >15m height class)

No. of plot clusters : 38

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	77.55	1.85	8.53	61.66	2.30	11.91	22.85	1.30	7.21	8.41	0.70	4.60
Gewa	17.12	0.38	1.65	3.60	0.13	0.56	1.06	0.06	0.33	0.14	0.01	0.07
Baen	0.69	0.02	0.08	0.42	0.02	0.08	0.69	0.04	0.19	0.28	0.02	0.14
Other TS	4.28	0.10	0.38	4.51	0.18	0.80	5.22	0.30	1.53	4.85	0.43	2.49
TOTAL	99.64	2.35	10.64	70.19	2.63	13.35	29.81	1.69	9.26	13.67	1.17	7.30

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	2.01	0.28	1.91	0.28	0.06	0.43	-	-	-	172.7	6.48	34.59	9.2
Gewa	-	-	-	-	-	-	-	-	-	21.92	0.58	2.61	16.4
Baen	0.55	0.09	0.54	0.31	0.07	0.49	1.27	0.56	3.64	4.21	0.82	5.17	35.5
Other TS	0.69	0.10	0.65	-	-	-	-	-	-	19.55	1.11	5.85	24.7
TOTAL	3.25	0.47	3.09	0.59	0.12	0.93	1.27	0.56	3.64	218.4	8.99	48.22	8.8

Mangrove forest : Stratum 2 (Sundri, <70% cc, >15m height class)

No. of plot clusters : 38

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	14297.51	22.6	2514.73	21.1
Gewa	3198.48	28.7	924.57	18.0
Baen	-	-	4.19	100.0
Goran	631.04	55.9	203.83	61.4
Other TS	2168.15	23.0	953.19	25.2
TOTAL	20295.18	19.1	4600.51	15.3

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	378.63	427.94	192.67	2.07	6.03	999.23	2.07	6.03	8.8
Gewa	336.52	466.80	171.89	1.81	6.46	975.21	1.81	6.46	15.2
Baen	0.67	1.34	-	-	-	2.01	-	-	73.7
Goran	24.13	6.70	-	-	-	30.83	-	-	67.3
Other TS	136.21	63.33	30.77	0.36	0.74	230.31	0.36	0.74	20.0
TOTAL	876.16	966.11	395.33	4.24	13.23	2237.59	4.24	13.23	6.7

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.06	61.53	0.08	74.18	-	-	0.13	135.70

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha, S.E.% is Sampling error

Mangrove forest : Stratum 3 (Sundri, >70% cc, all height classes)

No. of plot clusters : 157

Trees by Diameter Class

Species Group	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	111.8	2.62	11.51	75.51	2.82	14.58	27.89	1.55	8.91	10.92	0.90	5.58
Gewa	14.84	0.33	1.28	3.17	0.11	0.54	1.04	0.06	0.29	0.33	0.03	0.15
Baen	0.17	0.00	0.02	0.48	0.02	0.09	0.45	0.03	0.13	0.80	0.08	0.39
Other TS	3.50	0.08	0.30	4.04	0.15	0.72	3.03	0.17	0.78	2.10	0.19	0.97
TOTAL	130.3	3.03	13.11	83.20	3.11	15.93	32.41	1.81	10.11	14.15	1.19	7.09

Trees by Diameter Class

Species Group	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	0.78	0.11	0.73	0.18	0.04	0.24	0.06	0.04	0.21	227.2	8.07	41.76	6.2
Gewa	-	-	-	-	-	-	-	-	-	19.38	0.53	2.26	14.3
Baen	0.68	0.11	0.57	0.23	0.06	0.33	0.59	0.29	1.84	3.39	0.58	3.37	22.6
Other TS	0.13	0.02	0.06	0.03	0.01	0.04	0.03	0.01	0.10	12.87	0.63	2.96	13.9
TOTAL	1.59	0.23	1.36	0.45	0.10	0.61	0.68	0.34	2.15	262.8	9.82	50.36	5.3

Mangrove forest : Stratum 3 (Sundri, >70% cc, all height classes)

No. of plot clusters : 157

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	35216.72	7.5	3700.63	6.6
Gewa	7645.23	14.6	1213.61	10.6
Keora	4.05	100.1	1.27	99.8
Baen	28.38	54.9	2.03	70.4
Goran	1158.02	23.2	476.12	21.2
Other TS	2187.97	11.9	680.05	9.5
TOTAL	46240.37	6.8	6073.71	5.4

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	579.71	734.20	294.03	3.12	9.01	1607.94	3.12	9.01	4.2
Gewa	400.43	508.69	131.46	1.34	4.73	1040.58	1.34	4.73	7.4
Keora	-	0.16	-	-	-	0.16	-	-	101.4
Baen	0.32	2.43	1.30	0.02	0.04	4.06	0.02	0.04	56.5
Goran	83.57	3.69	0.16	-	0.01	87.43	-	0.01	29.0
Other TS	129.61	79.84	15.30	0.16	0.28	224.76	0.16	0.28	9.7
TOTAL	1193.6	1329.0	442.25	4.64	14.06	2964.93	4.63	14.06	3.5

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.17	190.97	0.04	38.08	0.01	4.96	0.22	234.02

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha, S.E.% is Sampling error

Mangrove forest : Stratum 4 (Sundri Gewa, <70% cc, all height classes)

No. of plot clusters : 113

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	59.32	1.36	6.01	33.41	1.25	6.49	10.79	0.61	3.55	3.29	0.27	1.75
Gewa	13.56	0.30	1.24	3.67	0.14	0.65	0.63	0.03	0.21	0.14	0.01	0.06
Keora	0.28	0.01	0.02	0.36	0.01	0.05	0.22	0.01	0.06	0.17	0.02	0.11
Baen	0.96	0.02	0.07	1.14	0.04	0.17	0.64	0.04	0.16	0.63	0.06	0.28
Other TS	4.09	0.09	0.34	3.94	0.15	0.67	2.74	0.15	0.77	3.03	0.27	1.42
TOTAL	78.21	1.78	7.68	42.51	1.59	8.04	15.02	0.85	4.75	7.26	0.62	3.62

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	%E
Sundri	0.05	0.01	0.04	-	-	-	0.05	0.02	0.11	106.9	3.51	17.95	11.0
Gewa	-	-	-	-	-	-	-	-	-	18.00	0.48	2.16	16.8
Keora	0.22	0.03	0.17	-	-	-	0.05	0.01	0.12	1.29	0.09	0.53	53.7
Baen	0.38	0.06	0.34	0.19	0.04	0.28	0.83	0.41	3.07	4.77	0.67	4.37	25.7
Other TS	0.43	0.06	0.28	0.19	0.04	0.25	0.20	0.08	0.21	14.60	0.85	3.95	17.3
TOTAL	1.07	0.16	0.83	0.37	0.08	0.52	1.13	0.53	3.52	145.6	5.60	28.96	8.6

Mangrove forest : Stratum 4 (Sundri Gewa, <70% cc, all height classes)

No. of plot clusters : 113

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	17277.58	12.1	2275.60	9.7
Gewa	3478.43	18.5	1114.09	11.8
Keora	90.14	100.0	32.39	91.7
Baen	67.61	92.0	8.45	84.8
Goran	3544.15	20.4	2577.95	16.4
Other TS	1823.02	27.2	649.07	16.6
TOTAL	27280.93	10.0	6657.55	7.5

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	
Sundri	447.16	580.19	220.62	2.38	7.00	1247.98	2.38	7.00	5.7
Gewa	540.93	705.42	175.03	1.79	6.36	1421.37	1.79	6.36	5.0
Keora	0.90	1.58	1.80	0.02	0.07	4.28	0.02	0.07	44.9
Baen	2.63	4.43	2.08	0.02	0.07	9.15	0.02	0.07	16.4
Goran	249.76	10.71	0.68	0.01	0.03	358.15	0.01	0.03	13.9
Other TS	125.00	66.09	14.95	0.16	0.26	206.03	0.16	0.26	15.6
TOTAL	1463.4	1368.4	415.16	4.38	13.79	3246.96	4.38	13.79	5.6

Details for Goran :

2.5-5		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.66	258.57	0.12	120.81	0.03	29.47	1.81	808.85

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha, S.E.% is Sampling error

Mangrove forest : Stratum 5 (Sundri Gewa, >70% cc, all height classes)

No. of plot clusters : 204

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	92.03	2.13	9.53	51.41	1.91	9.94	14.20	0.78	4.46	3.50	0.28	1.71
Gewa	17.86	0.39	1.63	3.87	0.14	0.64	0.60	0.03	0.17	0.15	0.01	0.05
Keora	0.86	0.02	0.12	0.79	0.03	0.18	0.43	0.03	0.18	0.41	0.03	0.23
Baen	0.17	0.00	0.02	0.23	0.01	0.03	0.19	0.01	0.05	0.33	0.03	0.15
Other TS	2.34	0.06	0.18	2.31	0.09	0.36	1.79	0.10	0.50	1.14	0.10	0.52
TOTAL	113.3	2.60	11.47	58.61	2.17	11.16	17.20	0.96	5.36	5.53	0.46	2.66

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	0.21	0.03	0.20	0.03	0.00	0.02	-	-	-	161.4	5.14	25.85	6.0
Gewa	0.03	0.00	0.01	-	-	-	-	-	-	22.51	0.58	2.51	10.1
Keora	0.14	0.02	0.18	0.03	0.01	0.05	0.23	0.10	0.82	2.89	0.24	1.76	55.5
Baen	0.26	0.04	0.21	0.06	0.01	0.10	0.21	0.10	0.52	1.46	0.20	1.08	30.4
Other TS	0.16	0.03	0.20	0.05	0.01	0.09	0.13	0.06	0.43	7.92	0.45	2.28	19.4
TOTAL	0.80	0.12	0.79	0.16	0.03	0.26	0.57	0.26	1.77	196.1	6.61	33.49	5.8

Mangrove forest : Stratum 5 (Sundri Gewa, >70% cc, all height classes)

No. of plot clusters : 204

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	27805.74	6.7	2999.45	6.6
Gewa	4832.41	12.0	1144.26	9.1
Keora	46.81	100.0	5.85	100.0
Baen	12.48	100.0	5.20	59.3
Goran	3261.14	17.2	1641.43	13.3
Other TS	1980.87	13.0	457.64	14.2
TOTAL	37939.45	5.6	6253.83	5.5

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	598.79	714.56	272.52	2.90	8.43	1585.88	2.90	8.43	3.7
Gewa	475.89	624.37	187.20	1.92	6.80	1287.47	1.92	6.80	5.5
Keora	0.91	2.47	1.65	0.02	0.07	5.02	0.02	0.07	87.2
Baen	0.37	0.75	0.33	-	0.02	1.46	-	0.02	61.1
Goran	174.61	5.80	1.28	0.02	0.07	181.69	0.02	0.07	13.2
Other TS	90.99	42.21	6.52	0.07	0.09	139.73	0.07	0.09	10.2
TOTAL	1341.6	1390.2	469.50	4.93	15.47	3201.25	4.93	15.47	2.7

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.31	366.13	0.07	66.32	0.07	61.97	0.45	494.42

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha, S.E.% is Sampling error

Mangrove forest : Stratum 6 (Sundri Passur/Sundri Passur Kankra)

No. of plot clusters : 25

Trees by Diameter Class

Species Group	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	45.23	1.10	4.81	38.30	1.41	6.96	21.12	1.19	6.25	6.93	0.58	3.15
Gewa	4.12	0.10	0.37	0.21	0.01	0.02	-	-	-	-	-	-
Keora	0.21	0.00	0.01	0.21	0.01	0.02	0.84	0.05	0.25	0.42	0.04	0.23
Baen	2.53	0.06	0.23	4.14	0.15	0.62	2.53	0.14	0.84	1.54	0.13	0.75
Other TS	19.17	0.47	1.94	30.76	1.18	5.71	24.54	1.36	6.92	16.42	1.40	7.36
TOTAL	71.26	1.73	7.35	73.62	2.76	13.34	49.02	2.74	14.26	25.31	2.16	11.49

Trees by Diameter Class

Species Group	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	0.21	0.03	0.16	-	-	-	-	-	-	111.8	4.30	21.32	12.3
Gewa	-	-	-	-	-	-	-	-	-	4.33	0.10	0.39	29.8
Keora	0.63	0.08	0.54	0.21	0.04	0.25	0.21	0.07	0.52	2.74	0.30	1.83	56.3
Baen	0.56	0.09	0.35	1.05	0.24	1.61	0.89	0.39	2.50	13.24	1.21	6.91	27.0
Other TS	1.47	0.21	1.11	0.21	0.05	0.26	-	-	-	92.56	1.67	23.29	13.3
TOTAL	2.88	0.41	2.15	1.47	0.33	2.12	1.10	0.46	3.02	224.7	10.58	53.73	8.4

angrove forest : Stratum 6 (Sundri Passur/Sundri Passur Kankra)

. of plot clusters : 25

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	22075.99	11.8	3488.70	15.9
Gewa	2489.20	44.1	448.29	24.6
Baen	-	-	10.61	100.0
Goran	195.23	80.3	220.70	70.1
Other TS	1525.77	25.5	640.87	25.2
TOTAL	26286.19	12.3	4809.17	12.0

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	408.46	467.20	162.30	1.74	5.07	1037.96	1.74	5.07	14.6
Gewa	168.84	200.92	59.25	0.61	2.15	429.01	0.61	2.15	21.0
Baen	7.81	26.15	15.96	0.19	0.54	49.91	0.19	0.54	44.7
Goran	9.17	-	-	-	-	9.17	-	-	100.0
Other TS	322.31	308.56	57.38	0.61	1.44	688.25	0.61	1.44	28.4
TOTAL	916.59	1002.8	294.89	3.15	9.20	2214.29	3.15	9.20	8.0

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.02	23.96	-	-	-	-	0.02	23.96

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha, S.E.% is Sampling error

Mangrove forest : Stratum 7/8 (Gewa/Gewa Mathal, all cc, all height classes)

No. of plot clusters : 55

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	35.53	0.81	3.65	19.13	0.71	3.77	4.38	0.25	1.42	0.29	0.02	0.13
Gewa	13.44	0.30	1.31	3.08	0.11	0.55	1.40	0.08	0.44	0.48	0.04	0.19
Keora	0.60	0.01	0.05	0.72	0.03	0.13	0.41	0.02	0.15	2.13	0.20	1.27
Baen	0.29	0.01	0.03	1.05	0.04	0.20	0.29	0.02	0.07	0.48	0.04	0.20
Other TS	1.24	0.03	0.11	1.33	0.05	0.22	0.92	0.05	0.22	0.57	0.05	0.24
TOTAL	51.10	1.16	5.15	25.31	0.94	4.88	7.40	0.42	2.31	3.95	0.36	2.04

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	-	-	-	-	-	-	0.10	0.04	0.24	59.42	1.83	9.22	24.3
Gewa	-	-	-	-	-	-	-	-	-	18.40	0.53	2.50	30.5
Keora	1.87	0.29	2.28	0.84	0.20	1.57	0.12	0.04	0.36	6.67	0.81	5.82	53.3
Baen	0.10	0.01	0.07	0.19	0.05	0.39	0.10	0.03	0.17	2.49	0.20	1.13	47.5
Other TS	0.12	0.02	0.08	-	-	-	-	-	-	4.19	0.20	0.87	33.0
TOTAL	2.08	0.32	2.44	1.03	0.24	1.96	0.31	0.11	0.77	91.17	3.55	19.54	19.6

Mangrove forest : Stratum 7/8 (Gewa/Gewa Mathal, all cc, all height classes)

No. of plot clusters : 55

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	15080.27	14.4	1552.74	14.9
Gewa	7242.08	15.9	2080.84	12.8
Baen	-	-	-	-
Goran	8803.74	14.3	5622.31	12.9
Other TS	1444.94	40.9	452.63	35.9
TOTAL	32571.03	8.0	9708.52	9.3

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	411.45	515.13	155.84	1.63	4.68	1082.42	1.63	4.68	13.2
Gewa	958.72	1181.7	287.18	2.83	9.96	2427.63	2.83	9.96	8.6
Baen	1.70	0.46	3.24	0.04	0.11	5.40	0.04	0.11	78.5
Goran	524.35	15.36	2.32	0.02	0.10	542.02	0.02	0.10	15.4
Other TS	108.07	43.79	5.09	0.05	0.07	156.96	0.05	0.07	32.1
TOTAL	2004.3	1756.5	453.67	4.57	14.93	4214.44	4.57	14.93	6.2

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.92	1076.26	0.19	186.99	0.10	95.58	1.21	1358.83

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm , Weight is in kilograms/ha, S.E.% is Sampling error

Mangrove forest : Stratum 9/10 (Gewa Goran, all cc, all height classes)

No. of plot clusters : 106

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	7.88	0.17	0.73	2.27	0.08	0.40	0.08	0.00	0.02	-	-	-
Gewa	17.68	0.38	1.48	2.49	0.09	0.38	0.58	0.03	0.15	0.11	0.01	0.04
Keora	1.61	0.04	0.10	1.17	0.04	0.18	0.32	0.02	0.08	0.38	0.03	0.16
Baen	0.99	0.02	0.10	0.25	0.01	0.04	0.17	0.01	0.04	0.17	0.01	0.06
Other TS	2.22	0.05	0.19	2.58	0.10	0.46	1.43	0.08	0.32	1.46	0.13	0.75
TOTAL	30.38	0.66	2.59	8.76	0.32	1.46	2.58	0.14	0.63	2.13	0.18	1.00

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	-	-	-	-	-	-	-	-	-	10.22	0.26	1.15	28.8
Gewa	-	-	-	-	-	-	-	-	-	20.87	0.51	2.05	15.0
Keora	-	-	-	-	-	-	0.05	0.04	0.26	3.53	0.17	0.78	54.6
Baen	0.25	0.04	0.18	0.05	0.01	0.07	0.10	0.03	0.18	1.99	0.14	0.67	46.0
Other TS	0.66	0.09	0.59	0.15	0.04	0.16	0.05	0.02	0.03	8.55	0.51	2.50	30.4
TOTAL	0.91	0.13	0.77	0.20	0.05	0.23	0.20	0.09	0.47	45.15	1.58	7.15	15.3

Mangrove forest : Stratum 9/10 (Gewa Goran, all cc, all height classes)

No. of plot clusters : 106

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	3802.23	25.7	860.34	18.1
Gewa	6103.98	12.2	2448.15	13.9
Keora	-	-	-	-
Baen	42.04	73.9	9.38	100.0
Goran	10146.94	10.5	6915.65	7.6
Other TS	686.17	36.7	311.43	28.7
TOTAL	20781.36	8.5	10544.95	6.8

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	199.94	258.14	57.38	0.58	1.60	515.45	0.58	1.60	12.2
Gewa	773.56	942.91	297.82	3.02	10.71	2014.29	3.02	10.71	6.9
Keora	1.20	7.21	4.00	0.04	0.15	12.41	0.04	0.15	87.9
Baen	4.62	10.75	3.66	0.04	0.11	19.04	0.04	0.11	70.9
Goran	920.41	36.78	3.06	0.03	0.14	960.25	0.03	0.14	7.3
Other TS	58.44	41.46	6.23	0.06	0.11	106.13	0.06	0.11	19.1
TOTAL	1958.2	1297.3	372.15	3.77	12.82	3627.56	3.78	12.82	4.4

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
1.82	2058.47	0.42	409.71	0.14	127.76	2.37	2595.94

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha, S.E.% is Sampling error

Mangrove forest : Stratum 11 (Gewa Sundri, <70% cc, all height classes)

No. of plot clusters : 68

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	33.01	0.73	3.15	12.42	0.46	2.26	3.66	0.20	1.06	2.01	0.17	0.93
Gewa	12.57	0.28	1.18	1.47	0.05	0.25	0.23	0.01	0.04	0.08	0.01	0.01
Keora	-	-	-	-	-	-	-	-	-	0.15	0.02	0.04
Baen	0.39	0.01	0.03	0.46	0.02	0.07	0.70	0.04	0.17	0.85	0.08	0.42
Other TS	2.72	0.06	0.23	2.57	0.10	0.41	2.50	0.14	0.64	2.53	0.22	1.11
TOTAL	48.69	1.08	4.58	16.92	0.62	2.99	7.08	0.39	1.91	5.62	0.50	2.52

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	-	-	-	0.08	0.02	0.09	-	-	-	51.18	1.57	7.48	23.6
Gewa	-	-	-	-	-	-	-	-	-	14.35	0.35	1.48	25.6
Keora	0.23	0.04	0.24	-	-	-	0.08	0.02	0.25	0.46	0.08	0.53	100.0
Baen	0.41	0.07	0.33	0.08	0.02	0.09	0.54	0.24	1.57	3.42	0.47	2.67	38.2
Other TS	0.56	0.08	0.38	0.15	0.04	0.20	-	-	-	11.03	0.64	2.98	19.1
TOTAL	1.20	0.18	0.94	0.31	0.07	0.38	0.62	0.27	1.82	80.44	3.11	15.13	14.4

Manjrove forest : Stratum 11 (Gewa Sundri, <70% cc, all height classes)

No. of plot clusters : 68

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	11481.85	24.8	1289.63	17.1
Gewa	4480.55	16.2	1760.08	13.0
Keora	9.36	100.0	-	-
Baen	777.06	91.7	-	-
Goran	7881.34	19.1	3854.27	14.6
Other TS	1593.90	42.5	319.87	35.0
TOTAL	26224.06	13.5	7223.85	9.7

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	380.23	524.34	137.38	1.41	3.95	1041.95	1.41	3.95	10.5
Gewa	664.37	788.11	224.76	2.23	7.86	1677.23	2.23	7.86	6.1
Keora	-	-	-	-	-	-	-	-	-
Baen	-	0.75	0.75	0.01	0.02	1.50	0.01	0.02	78.6
Goran	426.92	21.47	2.43	0.03	0.12	450.82	0.03	0.12	12.9
Other TS	59.55	31.86	5.71	0.07	0.11	97.12	0.07	0.11	19.2
TOTAL	1531.1	1366.5	371.03	3.75	12.05	3268.62	3.74	12.05	4.3

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.80	913.06	0.23	223.56	0.12	106.97	1.14	1243.60

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha, S.E.% is Sampling error

Mangrove forest : Stratum 12/13 (Gewa Sundri, >70+ cc, all height classes)

No. of plot clusters : 131

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	85.64	1.95	8.91	43.11	1.59	8.48	12.27	0.68	3.88	3.93	0.32	1.94
Gewa	15.85	0.35	1.46	3.56	0.13	0.61	0.51	0.03	0.14	0.08	0.01	0.04
Keora	0.08	0.00	0.01	0.16	0.01	0.04	0.32	0.02	0.12	0.12	0.01	0.08
Baen	0.08	0.00	0.01	0.21	0.01	0.04	0.34	0.02	0.11	0.21	0.02	0.13
Other TS	1.79	0.04	0.16	2.27	0.08	0.36	1.29	0.07	0.37	1.07	0.09	0.44
TOTAL	103.4	2.34	10.55	49.31	1.82	9.53	14.73	0.82	4.62	5.41	0.45	2.62

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	0.26	0.03	0.22	0.04	0.01	0.04	0.05	0.03	0.17	145.3	4.61	23.64	9.0
Gewa	-	-	-	-	-	-	-	-	-	20.00	0.51	2.24	15.1
Keora	0.04	0.01	0.06	-	-	-	-	-	-	0.72	0.04	0.32	30.0
Baen	0.34	0.05	0.22	0.16	0.03	0.28	0.08	0.05	0.37	1.43	0.19	1.16	42.2
Other TS	0.16	0.03	0.06	0.04	0.01	0.05	0.05	0.03	0.09	6.67	0.37	1.53	20.5
TOTAL	0.80	0.12	0.56	0.24	0.05	0.38	0.18	0.11	0.63	174.1	5.72	28.89	7.8

Mangrove forest : Stratum 12/13 (Gewa Sundri, >70% cc, all height classes)

No. of plot clusters : 131

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	40886.47	8.0	3426.81	6.2
Gewa	6967.63	12.4	1232.75	9.2
Keora	-	-	2.43	100.0
Baen	44.95	87.4	-	-
Goran	4419.92	17.1	1990.06	12.5
Other TS	1670.13	18.6	516.35	15.5
TOTAL	53989.10	6.4	7168.40	4.4

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	659.06	832.20	325.75	3.47	10.07	1817.01	3.47	10.07	4.1
Gewa	498.71	691.70	205.96	2.03	7.18	1396.37	2.03	7.18	5.9
Keora	0.58	1.94	1.56	0.01	0.05	4.08	0.01	0.05	100.1
Baen	-	-	0.58	0.01	0.02	0.58	0.01	0.02	74.7
Goran	206.18	8.73	0.83	0.01	0.04	215.74	0.01	0.04	14.1
Other TS	97.23	44.18	5.39	0.05	0.04	146.80	0.05	0.04	14.0
TOTAL	1461.8	1578.8	540.07	5.58	17.40	3580.59	5.59	17.40	2.7

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.39	444.50	0.10	96.80	0.04	38.95	0.53	580.25

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm , Weight is in kilograms/ha, S.E.% is Sampling error

Mangrove forest : Stratum 14/15/16 (Goran/Goran Gewa, all cc, all height classes)

No. of plot clusters : 182

Trees by Diameter Class

Species Group	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	2.11	0.05	0.18	0.73	0.03	0.13	0.14	0.01	0.04	0.06	0.00	0.02
Gewa	22.40	0.47	1.68	2.52	0.09	0.34	0.26	0.01	0.05	0.12	0.01	0.04
Keora	0.84	0.02	0.06	0.46	0.02	0.07	0.28	0.02	0.09	0.37	0.03	0.21
Baen	0.24	0.01	0.02	0.24	0.01	0.03	0.14	0.01	0.03	0.14	0.01	0.06
Other TS	2.67	0.06	0.23	1.96	0.08	0.34	0.76	0.04	0.18	0.48	0.04	0.23
TOTAL	28.26	0.61	2.16	5.90	0.22	0.92	1.59	0.09	0.39	1.16	0.11	0.56

Trees by Diameter Class

Species Group	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	-	-	-	-	-	-	-	-	-	3.04	0.09	0.37	50.7
Gewa	-	-	-	-	-	-	-	-	-	25.29	0.59	2.10	10.2
Keora	0.26	0.04	0.23	0.09	0.02	0.12	0.04	0.02	0.08	2.32	0.17	0.85	40.3
Baen	0.03	0.00	0.02	0.06	0.01	0.06	0.14	0.07	0.37	1.00	0.12	0.59	38.9
Other TS	0.21	0.03	0.09	0.12	0.03	0.08	0.12	0.04	0.14	6.30	0.32	1.29	14.1
TOTAL	0.50	0.08	0.33	0.26	0.06	0.26	0.30	0.13	0.60	37.96	1.28	5.21	10.7

Mangrove forest : Stratum 14/15/16 (Goran/Goran Gewa, all cc, all height classes)

No. of plot clusters : 182

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	1633.53	35.9	302.86	21.7
Gewa	6387.52	10.3	1899.54	8.4
Keora	-	-	4.37	100.1
Baen	3.50	99.9	3.50	60.9
Goran	13119.58	8.2	7463.72	5.5
Other TS	890.52	69.6	158.72	38.3
TOTAL	22034.65	8.2	9832.71	4.8

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	134.78	186.45	28.64	0.28	0.74	349.87	0.28	0.74	13.7
Gewa	558.26	804.41	285.75	2.96	10.51	1648.42	2.96	10.51	4.1
Keora	1.26	6.72	4.76	0.05	0.22	12.73	0.05	0.22	94.6
Baen	2.10	2.94	0.91	0.01	0.03	5.95	0.01	0.03	45.4
Goran	1471.4	96.55	4.44	0.05	0.20	1572.36	0.05	0.20	6.9
Other TS	50.51	25.05	7.65	0.08	0.15	83.21	0.08	0.15	15.8
TOTAL	2218.3	1122.1	332.15	3.43	11.85	3672.54	3.43	11.84	3.6

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
3.02	3396.68	0.98	961.66	0.20	184.55	4.21	4542.89

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha, S.E.% is Sampling error

Mangrove forest : Stratum 17 (Passur/Passur Kankra Baen/Baen)

No. of plot clusters : 7

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	10.15	0.24	1.36	7.52	0.28	1.25	5.26	0.29	1.39	-	-	-
Gewa	8.46	0.17	0.70	-	-	-	-	-	-	-	-	-
Keora	-	-	-	2.25	0.08	0.52	1.50	0.08	0.73	0.75	0.06	0.40
Baen	6.01	0.14	0.49	11.65	0.44	1.91	6.01	0.35	1.82	6.58	0.54	3.06
Other TS	24.80	0.61	2.38	14.28	0.54	2.51	10.52	0.62	2.93	10.52	0.92	4.70
TOTAL	49.42	1.17	4.94	35.70	1.34	6.20	23.30	1.35	6.88	17.85	1.52	8.16

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	-	-	-	-	-	-	-	-	-	22.92	0.81	4.01	50.9
Gewa	-	-	-	-	-	-	-	-	-	8.46	0.17	0.70	29.3
Keora	-	-	-	-	-	-	-	-	-	4.51	0.23	1.65	100.0
Baen	1.50	0.22	1.06	1.50	0.35	2.04	3.95	2.07	10.65	37.21	4.12	21.04	30.3
Other TS	0.75	0.11	0.60	-	-	-	-	-	-	60.88	2.79	13.12	45.7
TOTAL	2.25	0.33	1.66	1.50	0.35	2.04	3.95	2.07	10.65	134.0	8.12	40.52	15.8

Mangrove forest : Stratum 17 (Passur/Passur Kankra Baen/Baen)

No. of plot clusters : 7

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	16302.12	48.1	1921.24	36.2
Gewa	4001.64	32.3	1415.35	48.9
Keora	363.79	100.0	113.68	100.0
Baen	181.89	100.0	90.95	100.0
Goran	886.73	50.1	1983.76	61.5
Other TS	1205.04	64.4	500.20	43.0
TOTAL	22941.21	36.1	6025.18	33.2

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	144.61	226.46	22.74	0.20	0.45	393.80	0.20	0.45	25.6
Gewa	362.88	617.53	158.25	1.57	5.56	1138.65	1.57	5.56	41.8
Keora	-	7.28	14.55	0.18	0.75	21.83	0.18	0.75	100.0
Baen	3.64	40.02	43.66	0.50	1.37	87.31	0.50	1.37	61.0
Goran	182.80	7.28	-	-	-	190.08	-	-	62.3
Other TS	166.44	426.54	127.33	1.26	3.17	720.31	1.26	3.17	44.0
TOTAL	860.37	1325.1	366.53	3.71	11.31	2551.99	3.71	11.31	19.9

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.35	393.69	0.13	123.61	-	-	0.48	517.30

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm , Weight is in kilograms/ha, S.E.% is Sampling error

Mangrove forest : Stratum 18 (Keora)

No. of plot clusters : 29

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	6.21	0.14	0.61	1.72	0.07	0.31	0.45	0.03	0.13	0.45	0.03	0.17
Gewa	8.83	0.18	0.29	0.91	0.03	0.12	0.36	0.02	0.04	0.18	0.02	0.08
Keora	45.79	1.04	5.03	22.32	0.84	4.67	11.57	0.66	3.59	7.63	1.61	9.88
Baen	3.39	0.08	0.34	1.94	0.07	0.32	0.36	0.02	0.12	0.91	0.10	0.53
Other TS	2.63	0.07	0.55	1.45	0.06	0.37	1.95	0.11	0.92	2.77	0.25	1.99
TOTAL	66.86	1.51	6.81	28.33	1.07	5.79	14.70	0.83	4.80	21.94	2.00	12.67

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	-	-	-	-	-	-	-	-	-	8.84	0.27	1.21	71.5
Gewa	-	-	-	-	-	-	-	-	-	10.28	0.24	0.53	55.7
Keora	10.89	1.60	10.06	3.57	0.81	5.76	0.67	0.28	2.56	112.4	6.83	41.56	20.3
Baen	0.54	0.09	0.57	-	-	-	0.18	0.06	0.45	7.32	0.42	2.33	44.8
Other TS	0.63	0.09	0.74	0.41	0.08	0.71	-	-	-	9.84	0.66	5.30	61.9
TOTAL	12.06	1.78	11.37	3.98	0.89	6.47	0.85	0.34	3.02	148.7	8.43	50.93	18.5

Mangrove forest : Stratum 18 (Keora)

No. of plot clusters : 29

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	14309.40	44.3	1231.63	38.9
Gewa	5912.55	23.6	1723.28	23.0
Keora	2663.58	37.4	380.51	46.7
Baen	234.16	71.7	16.46	100.0
Goran	4478.32	34.5	2040.21	36.7
Other TS	2678.21	37.9	419.39	41.2
TOTAL	30276.22	23.1	5811.48	16.3

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	94.76	99.45	28.90	0.29	0.82	223.11	0.29	0.82	41.9
Gewa	440.59	598.58	104.57	1.02	3.61	1143.73	1.02	3.61	22.7
Keora	46.83	169.48	188.50	2.03	7.85	404.81	2.03	7.85	39.9
Baen	18.73	74.71	37.10	0.42	1.15	130.55	0.42	1.15	64.2
Goran	213.38	6.15	-	-	-	219.53	-	-	57.1
Other TS	72.37	26.34	7.68	0.09	0.19	106.40	0.09	0.19	39.3
TOTAL	886.66	974.71	366.75	3.85	13.62	2228.13	3.86	13.62	14.1

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.42	477.59	0.06	61.65	-	-	0.48	539.25

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha, S.E.% is Sampling error

Mangrove Forest : All strata

Total No. of plot clusters : 1143

Trees by Diameter Class

Species Group	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	57.88	1.34	5.97	33.82	1.26	6.54	10.80	0.60	3.41	3.55	0.29	1.79
Gewa	16.31	0.35	1.41	2.96	0.11	0.48	0.62	0.03	0.17	0.16	0.01	0.07
Keora	1.45	0.03	0.15	0.90	0.03	0.18	0.51	0.03	0.13	0.70	0.06	0.38
Baen	0.53	0.01	0.05	0.65	0.02	0.11	0.44	0.03	0.13	0.50	0.05	0.34
Other TS	3.35	0.08	0.30	3.59	0.14	0.63	2.55	0.14	0.70	2.11	0.19	0.90
TOTAL	79.52	1.82	7.87	41.93	1.56	7.94	14.91	0.83	4.59	7.03	0.60	3.48

Trees by Diameter Class

Species Group	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	0.25	0.03	0.23	0.05	0.01	0.06	0.03	0.02	0.10	106.4	3.55	18.10	3.3
Gewa	0.00	0.00	0.00	-	-	-	-	-	-	20.05	0.51	2.13	5.0
Keora	0.45	0.07	0.46	0.14	0.03	0.24	0.09	0.04	0.31	4.26	0.30	1.90	16.4
Baen	0.36	0.06	0.29	0.17	0.04	0.25	0.38	0.18	1.15	3.04	0.38	2.20	9.6
Other TS	0.34	0.05	0.26	0.10	0.02	0.13	0.08	0.04	0.16	12.12	0.65	3.17	6.3
TOTAL	1.41	0.21	1.24	0.46	0.10	0.67	0.58	0.27	1.72	145.8	5.40	27.50	2.7

Simple random sample mean : 27.62
Variance of mean : 0.88
Simple random sample sampling error : 3.17

Mangrove Forest : All strata

Total No. of plot clusters : 1143

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	20358.22	3.7	2205.50	3.1
Gewa	5852.70	4.7	1469.95	3.8
Keora	76.33	31.4	14.20	34.4
Baen	75.16	54.7	5.52	30.7
Goran	5780.35	4.8	3303.63	3.6
Other TS	1619.20	9.0	473.28	6.0
TOTAL	33761.96	2.7	7472.08	2.1

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	426.84	536.88	190.97	2.02	5.84	1154.68	2.02	5.84	2.0
Gewa	534.44	702.73	207.13	2.10	7.45	1444.29	2.10	7.45	2.2
Keora	1.60	6.16	5.84	0.06	0.24	13.59	0.06	0.24	30.3
Baen	1.90	5.11	2.86	0.03	0.09	9.86	0.03	0.09	23.8
Goran	485.33	24.98	1.74	0.02	0.08	512.05	0.02	0.08	4.2
Other TS	99.06	57.78	11.69	0.12	0.23	168.53	0.12	0.23	5.4
TOTAL	1549.2	1333.6	420.22	4.37	13.94	3303.01	4.37	13.94	1.3

Simple random sample sampling errors of Seedlings, Saplings and Poles are :
2.85, 2.23 and 1.32

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.96	1086.53	0.27	260.12	0.08	74.13	1.30	1420.77

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha

Appendix 7

Detailed Stand and Stock Tables (No. of Poles and Trees/ha, BA/ha, Vol/ha and No. of Seedlings and Saplings/ha) – By Block by Forest Type

Mangrove Forest : ALL BLOCKS, ALL FOREST TYPES

Total No. of plot clusters : 1204

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	55.46	1.28	5.72	32.19	1.20	6.22	10.28	0.57	3.25	3.35	0.27	1.69
Gewa	15.63	0.34	1.35	2.80	0.10	0.46	0.58	0.03	0.16	0.15	0.01	0.06
Keora	1.09	0.03	0.11	0.75	0.03	0.15	0.43	0.02	0.15	0.62	0.06	0.35
Baen	0.57	0.01	0.05	0.63	0.02	0.10	0.40	0.02	0.11	0.46	0.04	0.22
Other TS	3.31	0.08	0.30	3.51	0.13	0.61	2.50	0.14	0.69	2.09	0.18	0.98
TOTAL	76.06	1.74	7.53	39.88	1.48	7.54	14.20	0.79	4.36	6.67	0.57	3.30

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	0.23	0.03	0.21	0.04	0.01	0.06	0.03	0.02	0.09	101.6	3.38	17.24	3.1
Gewa	0.00	0.00	0.00	-	-	-	-	-	-	19.17	0.49	2.03	5.0
Keora	0.40	0.06	0.41	0.13	0.03	0.21	0.08	0.04	0.29	3.49	0.26	1.67	16.3
Baen	0.35	0.05	0.28	0.15	0.03	0.23	0.38	0.18	1.15	2.94	0.37	2.14	9.9
Other TS	0.35	0.05	0.27	0.10	0.02	0.12	0.08	0.03	0.15	11.93	0.65	3.11	6.1
TOTAL	1.33	0.20	1.17	0.43	0.10	0.62	0.57	0.27	1.67	139.1	5.15	26.20	2.5

Mangrove Forest : All BLOCKS, ALL FOREST TYPES

Total No. of plot clusters : 1204

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	20105.52	3.3	2190.85	2.9
Gewa	5914.46	4.5	1513.41	3.7
Keora	53.42	33.1	12.34	42.3
Baen	93.03	64.1	4.58	28.7
Goran	6131.83	4.7	3489.78	3.5
Other TS	1645.55	9.2	474.64	5.9
TOTAL	33943.82	2.4	7685.60	2.1

Species group	Poles by Diameter Class (in cm)								
	2.5-5	5-10	10-15			Total			
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	429.82	543.95	192.82	2.04	5.90	1166.60	2.04	5.90	2.0
Gewa	550.24	720.99	212.16	2.16	7.63	1483.38	2.16	7.63	2.1
Keora	1.37	4.77	4.05	0.04	0.17	10.19	0.04	0.17	28.4
Baen	1.81	5.46	3.27	0.04	0.11	10.54	0.04	0.11	31.8
Goran	504.90	25.68	1.75	0.02	0.08	532.32	0.02	0.08	3.8
Other TS	100.47	58.35	11.86	0.13	0.23	170.68	0.13	0.23	5.0
TOTAL	1588.6	1359.2	425.90	4.42	14.12	3373.71	4.42	14.12	1.2

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
1.00	1129.36	0.27	266.73	0.08	74.93	1.3497	1471.016

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha

Mangrove Forest : All forest types of block 1

Total No. of plot clusters : 190

Species Group	Trees by Diameter Class: 15-20 NT	15-20 BA	15-20 Vol	20-25 NT	20-25 BA	20-25 Vol	25-30 NT	25-30 BA	25-30 Vol	30-40 NT	30-40 BA	30-40 Vol
Sundri	97.28	2.27	10.42	67.38	2.52	13.47	26.18	1.46	8.51	9.68	0.79	4.90
Gewa	15.47	0.34	1.36	3.62	0.13	0.64	0.71	0.04	0.20	0.16	0.01	0.08
Keora	1.85	0.04	0.21	1.09	0.04	0.21	0.14	0.01	0.05	0.18	0.01	0.10
Baen	0.27	0.01	0.02	0.41	0.02	0.06	0.38	0.02	0.12	0.47	0.05	0.29
Other TS	2.31	0.05	0.17	1.88	0.07	0.27	1.20	0.07	0.31	0.96	0.08	0.42
TOTAL	117.2	2.71	12.18	74.37	2.78	14.65	28.61	1.60	9.21	11.45	0.95	5.78

Species Group	Trees by Diameter Class: 40-50 NT	40-50 BA	40-50 Vol	50-60 NT	50-60 BA	50-60 Vol	60+ NT	60+ BA	60+ Vol	Total NT	Total BA	Total Vol	S.E%
Sundri	0.48	0.06	0.39	0.18	0.04	0.23	0.08	0.05	0.30	201.3	7.20	38.22	5.7
Gewa	-	-	-	-	-	-	-	-	-	19.96	0.52	2.27	11.4
Keora	0.37	0.05	0.42	0.12	0.03	0.26	0.17	0.08	0.92	3.91	0.27	2.17	40.8
Baen	0.22	0.03	0.20	0.19	0.04	0.35	0.20	0.11	0.73	2.14	0.28	1.77	26.2
Other TS	0.14	0.02	0.01	0.03	0.01	0.04	-	-	-	6.52	0.30	1.23	13.7
TOTAL	1.20	0.17	1.02	0.51	0.12	0.87	0.45	0.24	1.94	233.8	8.56	45.65	5.1

Simple random sample sampling error : 5.60

Mangrove Forest B/ : All forest types Total No. of plot clusters : 190

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	48936.19	6.0	4527.44	5.4
Gewa	7009.96	13.2	1113.93	9.7
Keora	77.65	78.7	19.99	95.0
Baen	44.49	89.9	6.02	78.7
Goran	771.27	21.5	416.74	22.2
Other TS	2893.73	13.4	887.53	9.9
TOTAL	59733.30	5.4	6971.63	4.3

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	701.14	721.74	278.74	3.03	9.00	1701.62	3.03	9.00	4.0
Gewa	355.92	515.73	167.34	1.71	6.06	1039.00	1.71	6.06	5.4
Keora	3.74	5.52	3.99	0.04	0.15	13.25	0.04	0.15	52.1
Baen	1.22	2.12	0.68	0.01	0.03	4.02	0.01	0.03	57.4
Goran	39.08	1.59	0.17	-	0.01	40.83	-	0.01	32.6
Other TS	167.06	78.34	11.29	0.11	0.07	256.69	0.11	0.07	9.2
TOTAL	1268.2	1325.0	462.21	4.91	15.31	3055.41	4.91	15.31	2.8

Simple random sample sampling errors of Seedlings, Saplings and Poles are :
5.74, 4.69 and 3.33

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.08	87.08	0.02	16.24	0.01	5.73	0.10	109.06

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha

Mangrove Forest : All forest types of block 2

Total No. of plot clusters : 122

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	92.34	2.15	9.34	52.87	1.94	9.93	12.56	0.70	4.02	2.96	0.24	1.51
Gewa	9.48	0.21	0.83	1.51	0.06	0.25	0.32	0.02	0.08	0.16	0.01	0.06
Keora	0.73	0.02	0.08	0.20	0.01	0.04	0.05	0.00	0.01	0.42	0.04	0.20
Baen	0.28	0.01	0.02	0.04	0.00	0.01	0.17	0.01	0.04	0.13	0.01	0.05
Other TS	1.76	0.04	0.16	2.51	0.10	0.41	1.51	0.08	0.41	1.17	0.11	0.46
TOTAL	104.6	2.43	10.43	57.12	2.10	10.63	14.60	0.81	4.57	4.84	0.41	2.29

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	0.18	0.03	0.18	-	-	-	-	-	-	160.9	5.05	24.98	10.2
Gewa	-	-	-	-	-	-	-	-	-	11.48	0.30	1.22	14.4
Keora	0.58	0.09	0.48	0.20	0.05	0.32	0.04	0.01	0.10	2.21	0.22	1.22	43.6
Baen	0.19	0.03	0.19	0.13	0.03	0.23	0.25	0.09	0.65	1.19	0.18	1.19	41.5
Other TS	0.04	0.01	0.02	-	-	-	-	-	-	6.98	0.33	1.46	18.2
TOTAL	0.98	0.15	0.87	0.33	0.08	0.55	0.29	0.11	0.74	182.8	6.08	30.07	9.5

Simple random sample sampling error : 10.09

Mangrove Forest : All forest types Total No. of plot clusters : 122

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	39923.52	6.5	3517.20	5.8
Gewa	9167.52	11.9	1925.41	11.2
Keora	4.84	100.0	13.30	100.0
Baen	-	-	-	-
Goran	6182.68	14.6	3024.11	13.1
Other TS	1992.49	23.5	493.93	19.7
TOTAL	57271.05	5.2	8973.94	5.8

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	599.93	900.44	333.01	3.45	9.74	1833.38	3.45	9.74	3.8
Gewa	503.25	714.46	164.00	1.55	5.42	1381.72	1.55	5.42	7.8
Keora	0.77	2.13	1.11	0.01	0.03	4.02	0.01	0.03	92.8
Baen	-	0.15	0.15	0.00	0.00	0.29	0.00	0.00	100.1
Goran	331.64	7.27	2.11	0.03	0.10	341.02	0.03	0.10	14.3
Other TS	100.49	44.27	4.59	0.05	0.04	149.35	0.05	0.04	17.5
TOTAL	1536.1	1668.7	504.97	5.08	15.33	3709.77	5.08	15.33	3.4

Simple random sample sampling errors of Seedlings, Saplings and Poles are :
5.58, 6.54 and 3.63

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.57	663.43	0.11	103.45	0.10	95.03	0.77	861.91

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha

Mangrove Forest : All forest types of block 3

Total No. of plot clusters : 149

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	66.19	1.48	6.65	23.59	0.87	4.58	5.06	0.27	1.53	0.86	0.07	0.40
Gewa	13.75	0.30	1.27	2.94	0.11	0.50	0.82	0.05	0.25	0.13	0.01	0.06
Keora	1.82	0.04	0.21	1.63	0.06	0.33	0.84	0.05	0.32	1.88	0.17	1.16
Baen	0.16	0.00	0.02	0.47	0.02	0.09	0.13	0.01	0.03	0.19	0.02	0.09
Other TS	1.65	0.04	0.12	1.38	0.05	0.22	0.72	0.04	0.19	0.19	0.02	0.12
TOTAL	83.57	1.86	8.27	30.01	1.11	5.72	7.57	0.42	2.31	3.25	0.29	1.83

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	0.06	0.01	0.05	-	-	-	0.04	0.01	0.09	95.79	2.72	13.30	8.8
Gewa	-	-	-	-	-	-	-	-	-	17.65	0.46	2.08	18.4
Keora	0.98	0.15	1.17	0.38	0.09	0.62	0.07	0.02	0.21	7.60	0.59	4.01	37.4
Baen	-	-	-	-	-	-	0.01	0.00	0.03	0.97	0.05	0.25	34.0
Other TS	0.13	0.02	0.15	0.07	0.02	0.11	0.06	0.02	0.13	4.20	0.21	1.03	24.0
TOTAL	1.16	0.18	1.36	0.46	0.10	0.74	0.18	0.06	0.45	126.2	4.03	20.68	9.1

Simple random sample sampling error : 8.79

Mangrove Forest : All forest types of Block 3

Total No. of plot clusters : 149

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	24170.09	8.1	2227.51	6.6
Gewa	6121.99	10.8	1537.06	9.7
Keora	142.18	72.3	37.56	75.7
Baen	28.78	73.9	8.52	59.5
Goran	7046.26	13.9	3683.02	9.6
Other TS	1044.41	23.6	248.84	14.8
TOTAL	38553.70	5.7	7742.52	6.3

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	550.97	667.38	252.52	2.68	7.75	1470.87	2.68	7.75	4.8
Gewa	654.94	797.38	209.66	2.11	7.44	1661.97	2.11	7.44	5.8
Keora	1.90	10.19	6.51	0.07	0.27	18.60	0.07	0.27	44.7
Baen	2.81	3.75	2.14	0.02	0.06	8.69	0.02	0.06	57.1
Goran	350.79	8.05	1.24	0.02	0.06	360.08	0.02	0.06	11.4
Other TS	70.92	30.35	5.76	0.06	0.09	107.03	0.06	0.09	17.2
TOTAL	1632.3	1517.1	477.83	4.95	15.67	3627.23	4.95	15.67	3.2

Simple random sample sampling errors of Seedlings, Saplings and Poles are :
5.66, 6.35 and 3.57

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.59	698.86	0.11	107.06	0.06	58.87	0.76	864.79

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha

Mangrove Forest : All forest types of block 4

Total No. of plot clusters : 174

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	54.95	1.31	5.70	52.07	1.96	9.93	22.76	1.28	7.06	9.06	0.75	4.62
Gewa	14.17	0.31	1.25	3.37	0.12	0.53	1.05	0.06	0.30	0.33	0.03	0.16
Keora	0.71	0.02	0.05	0.34	0.01	0.05	0.59	0.03	0.16	0.36	0.03	0.14
Baen	1.64	0.04	0.14	2.69	0.10	0.43	1.41	0.08	0.41	1.44	0.13	0.67
Other TS	8.64	0.21	0.82	10.48	0.40	1.88	8.33	0.47	2.28	6.58	0.58	3.07
TOTAL	80.12	1.88	7.95	68.95	2.60	12.81	34.13	1.92	10.20	17.77	1.52	8.66

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	0.90	0.13	0.87	0.06	0.01	0.10	0.06	0.05	0.24	139.9	5.49	28.52	5.9
Gewa	-	-	-	-	-	-	-	-	-	18.92	0.52	2.23	13.0
Keora	0.12	0.02	0.10	0.03	0.01	0.04	0.16	0.06	0.30	2.31	0.18	0.83	31.9
Baen	1.32	0.21	1.06	0.61	0.14	0.89	1.17	0.59	3.54	10.28	1.28	7.14	15.2
Other TS	0.70	0.10	0.58	0.21	0.04	0.27	0.06	0.04	0.15	35.02	1.84	9.05	8.8
TOTAL	3.04	0.45	2.62	0.92	0.20	1.29	1.46	0.74	4.23	206.4	9.32	47.77	4.2

Simple random sample sampling error : 4.69

Mangrove Forest : All forest types of Block 4

Total No. of plot clusters : 174

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	20679.85	7.2	2954.82	6.5
Gewa	4206.32	16.2	748.30	10.3
Keora	116.88	24.5	5.65	39.8
Baen	65.25	43.8	11.40	47.0
Goran	303.05	44.0	103.70	49.8
Other TS	2344.79	10.2	817.75	9.6
TOTAL	27716.13	6.6	4641.62	5.3

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	480.74	575.99	174.78	1.84	5.28	1231.52	1.84	5.28	5.0
Gewa	306.63	464.42	139.40	1.43	5.07	910.45	1.43	5.07	8.1
Keora	0.94	1.26	3.60	0.04	0.14	5.80	0.04	0.14	42.3
Baen	3.49	10.88	7.14	0.09	0.24	21.51	0.09	0.24	23.4
Goran	6.33	1.26	0.15	-	0.01	7.73	-	0.01	58.4
Other TS	172.72	162.47	43.20	0.46	1.07	378.39	0.46	1.07	10.8
TOTAL	970.85	1216.3	368.26	3.85	11.80	2555.39	3.85	11.80	3.5

Simple random sample sampling errors of Seedlings, Saplings and Poles are :
6.94, 5.77 and 4.23

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.01	15.30	0.02	15.90	0.00	5.29	0.03	36.49

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha

Mangrove Forest : All forest types of block 5A

Total No. of plot clusters : 59

Species Group	Trees by Diameter Class											
	15-20			20-25			25-30			30-40		
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol
Sundri	1.15	0.03	0.12	0.19	0.01	0.03	0.04	0.00	0.01	-	-	-
Gewa	6.92	0.15	0.56	0.85	0.03	0.11	0.07	0.00	0.02	0.27	0.02	0.08
Keora	0.29	0.01	0.02	-	-	-	-	-	-	0.09	0.01	0.03
Baen	0.81	0.02	0.06	1.44	0.05	0.22	1.08	0.06	0.28	1.27	0.12	0.57
Other TS	4.86	0.12	0.41	5.83	0.22	1.01	5.16	0.29	1.39	5.83	0.52	2.72
TOTAL	14.03	0.32	1.17	8.31	0.31	1.37	6.35	0.36	1.70	7.46	0.68	3.39

Species Group	Trees by Diameter Class												
	40-50			50-60			60+			Total			
	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	NT	BA	Vol	S.E%
Sundri	-	-	-	-	-	-	-	-	-	1.38	0.04	0.16	33.6
Gewa	-	-	-	-	-	-	-	-	-	8.12	0.21	0.77	13.4
Keora	0.09	0.02	0.09	-	-	-	0.07	0.06	0.36	0.55	0.09	0.49	74.7
Baen	1.12	0.17	0.89	0.19	0.04	0.24	1.10	0.49	3.19	7.01	0.96	5.44	30.2
Other TS	1.20	0.17	0.91	0.14	0.03	0.16	0.07	0.03	0.13	23.10	1.38	6.73	24.2
TOTAL	2.42	0.36	1.88	0.33	0.07	0.40	1.24	0.58	3.68	40.15	2.68	13.59	13.2

Simple random sample sampling error : 14.14

Mangrove Forest : All forest types of Block 5A

Total No. of plot clusters : 59

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	1805.21	26.4	637.84	22.6
Gewa	3254.71	17.3	1255.31	15.6
Keora	50.52	28.6	-	-
Baen	1318.12	83.2	-	-
Goran	4511.75	15.6	3353.13	12.1
Other TS	1520.45	63.1	360.75	23.8
TOTAL	12460.75	19.1	5607.03	8.4

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	350.30	402.44	50.53	0.48	1.25	803.27	0.48	1.25	12.9
Gewa	622.06	751.76	233.45	2.33	8.23	1607.27	2.33	8.23	8.3
Keora	0.10	0.83	0.52	0.01	0.02	1.44	0.01	0.02	N.A.
Baen	2.82	3.72	2.77	0.03	0.08	9.31	0.03	0.08	23.1
Goran	462.09	29.74	3.01	0.03	0.16	494.83	0.03	0.16	11.8
Other TS	104.81	44.57	4.87	0.06	0.16	154.25	0.06	0.16	19.5
TOTAL	1542.2	1233.0	295.15	2.94	9.89	3070.37	2.94	9.89	5.9

Simple random sample sampling errors of Seedlings, Saplings and Poles are : 16.48, 10.03 and 6.43

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.95	1064.34	0.39	374.38	0.16	146.41	1.50	1585.13

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm , Weight is in kilograms/ha

Mangrove Forest : All forest types of block 5B

Total No. of plot clusters : 124

Species Group	Trees by Diameter Class 15-20 NT	15-20 BA	15-20 Vol	20-25 NT	20-25 BA	20-25 Vol	25-30 NT	25-30 BA	25-30 Vol	30-40 NT	30-40 BA	30-40 Vol
Sundri	81.69	1.89	8.39	41.56	1.54	7.92	9.04	0.50	2.77	1.76	0.15	0.83
Gewa	15.93	0.34	1.48	1.64	0.06	0.30	0.37	0.02	0.11	0.11	0.01	0.02
Keora	0.49	0.01	0.07	0.58	0.02	0.13	0.34	0.02	0.14	0.76	0.07	0.54
Baen	0.34	0.01	0.04	0.09	0.00	0.02	0.25	0.01	0.07	0.49	0.05	0.21
Other TS	3.87	0.09	0.44	4.71	0.19	0.96	3.70	0.21	1.20	4.27	0.37	2.17
TOTAL	102.3	2.34	10.41	48.59	1.81	9.32	13.69	0.76	4.29	7.39	0.64	3.77

Species Group	Trees by Diameter Class 40-50 NT	40-50 BA	40-50 Vol	50-60 NT	50-60 BA	50-60 Vol	60+ NT	60+ BA	60+ Vol	Total NT	Total BA	Total Vol	Total S.E%
Sundri	0.09	0.01	0.09	0.05	0.01	0.05	-	-	-	134.2	4.09	20.05	7.1
Gewa	0.04	0.01	0.02	-	-	-	-	-	-	18.08	0.44	1.92	10.7
Keora	0.36	0.05	0.40	0.05	0.01	0.09	0.08	0.03	0.29	2.67	0.22	1.65	34.6
Baen	0.49	0.07	0.32	0.14	0.03	0.18	0.83	0.39	2.63	2.63	0.57	3.47	23.9
Other TS	0.53	0.08	0.55	0.32	0.08	0.43	0.18	0.09	0.57	17.58	1.10	6.31	14.7
TOTAL	1.51	0.22	1.37	0.55	0.13	0.75	1.09	0.51	3.49	175.1	6.42	33.40	6.5

Simple random sample sampling error : 8.23

Mangrove Forest : All forest types of Block 5B

Total No. of plot clusters : 124

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	9857.63	14.1	1352.26	13.4
Gewa	2917.29	15.6	896.48	11.3
Keora	-	-	2.41	100.1
Baen	4.35	100.0	2.60	71.0
Goran	3774.82	19.4	1950.48	17.1
Other TS	1967.91	17.2	607.02	18.9
TOTAL	18522.00	9.7	4811.24	8.4

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	318.08	481.27	217.16	2.32	6.76	1016.51	2.32	6.76	5.9
Gewa	580.34	723.17	194.39	2.02	7.18	1497.90	2.02	7.18	7.2
Keora	-	0.19	0.62	0.01	0.02	0.82	0.01	0.02	70.8
Baen	0.39	0.57	0.11	0.00	0.00	1.07	0.00	0.00	50.5
Goran	224.27	9.10	0.65	0.00	0.03	234.02	0.00	0.03	11.4
Other TS	113.37	46.66	4.02	0.04	0.05	164.05	0.04	0.05	11.4
TOTAL	1236.4	1261.0	416.96	4.39	14.04	2914.36	4.39	14.04	3.4

Simple random sample sampling errors of Seedlings, Saplings and Poles are :
9.88, 8.12 and 3.81

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
0.45	503.37	0.08	74.91	0.03	25.07	0.55	603.35

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha

Mangrove Forest : All forest types of block 6

Total No. of plot clusters : 166

Species Group	Trees by Diameter Class: 15-20 NT	15-20 BA	15-20 Vol	20-25 NT	20-25 BA	20-25 Vol	25-30 NT	25-30 BA	25-30 Vol	30-40 NT	30-40 BA	30-40 Vol
Sundri	44.98	1.01	4.56	14.89	0.54	2.82	2.61	0.14	0.80	0.46	0.04	0.22
Gewa	18.34	0.40	1.66	4.09	0.15	0.69	0.64	0.03	0.18	0.04	0.00	0.02
Keora	1.08	0.03	0.10	1.12	0.04	0.23	0.91	0.05	0.34	0.91	0.08	0.52
Baen	0.55	0.01	0.05	0.13	0.00	0.02	0.18	0.01	0.04	0.22	0.02	0.09
Other TS	1.98	0.05	0.16	2.05	0.08	0.34	0.88	0.05	0.21	0.54	0.05	0.20
TOTAL	66.94	1.50	6.52	22.28	0.81	4.10	5.22	0.29	1.58	2.18	0.19	1.05

Species Group	Trees by Diameter Class: 40-50 NT	40-50 BA	40-50 Vol	50-60 NT	50-60 BA	50-60 Vol	60+ NT	60+ BA	60+ Vol	Total NT	Total BA	Total Vol	Total S.E%
Sundri	0.04	0.00	0.03	0.03	0.01	0.03	-	-	-	63.01	1.74	8.47	10.6
Gewa	-	-	-	-	-	-	-	-	-	23.11	0.59	2.55	13.5
Keora	0.40	0.06	0.39	0.09	0.02	0.16	0.03	0.01	0.10	4.54	0.29	1.83	28.3
Baen	0.04	0.01	0.02	0.01	0.00	0.01	0.03	0.01	0.06	1.17	0.07	0.29	44.3
Other TS	0.23	0.03	0.17	-	-	-	0.17	0.07	0.23	5.85	0.32	1.30	20.0
TOTAL	0.71	0.11	0.61	0.13	0.03	0.20	0.23	0.09	0.38	97.68	3.00	14.44	8.0

Simple random sample sampling error : 9.09

Mangrove Forest : All forest types of Block 6

Total No. of plot clusters : 166

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	4711.63	14.4	1134.14	12.3
Gewa	5626.91	8.9	2191.49	9.1
Keora	4.74	-	1.48	-
Baen	2.37	-	1.19	-
Goran	8622.55	9.4	5414.97	7.6
Other TS	471.96	29.0	126.85	40.7
TOTAL	19440.16	6.3	8870.13	5.7

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	302.80	456.02	175.22	1.86	5.40	934.04	1.86	5.40	6.2
Gewa	811.02	879.80	237.94	2.44	8.64	1928.76	2.44	8.64	5.2
Keora	0.45	2.84	2.53	0.03	0.09	5.82	0.03	0.09	57.9
Baen	1.10	12.02	8.33	0.10	0.29	21.44	0.10	0.29	91.3
Goran	686.56	27.88	2.65	0.03	0.12	717.09	0.03	0.12	6.2
Other TS	26.83	14.56	4.20	0.05	0.08	45.58	0.05	0.08	18.2
TOTAL	1828.8	1393.1	430.86	4.50	14.62	3652.73	4.50	14.62	3.1

Simple random sample sampling errors of Seedlings, Saplings and Poles are :
6.66, 5.91 and 3.73

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
1.35	1530.33	0.30	292.73	0.12	112.04	1.77	1935.09

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha

Mangrove Forest : All forest types of block 7

Total No. of plot clusters : 110

Species Group	Trees by Diameter Class: 15-20 NT	15-20 BA	15-20 Vol	20-25 NT	20-25 BA	20-25 Vol	25-30 NT	25-30 BA	25-30 Vol	30-40 NT	30-40 BA	30-40 Vol
Sundri	0.59	0.01	0.06	0.06	0.00	0.01	-	-	-	0.07	0.01	0.03
Gewa	19.95	0.43	1.70	2.29	0.08	0.35	0.20	0.01	0.06	0.10	0.01	0.05
Keora	0.66	0.01	0.10	0.45	0.02	0.11	0.27	0.02	0.07	0.11	0.01	0.05
Baen	1.03	0.02	0.10	0.33	0.01	0.06	0.10	0.01	0.03	0.08	0.01	0.03
Other TS	3.09	0.07	0.27	2.04	0.08	0.40	1.46	0.08	0.39	1.00	0.09	0.49
TOTAL	25.33	0.55	2.23	5.17	0.19	0.93	2.03	0.11	0.55	1.36	0.12	0.64

Species Group	Trees by Diameter Class: 40-50 NT	40-50 BA	40-50 Vol	50-60 NT	50-60 BA	50-60 Vol	60+ NT	60+ BA	60+ Vol	Total NT	Total BA	Total Vol	S.E%
Sundri	-	-	-	-	-	-	-	-	-	0.72	0.02	0.10	50.4
Gewa	-	-	-	-	-	-	-	-	-	22.54	0.53	2.16	14.3
Keora	0.25	0.04	0.18	0.05	0.01	0.07	-	-	-	1.79	0.11	0.58	41.5
Baen	0.02	0.00	0.02	0.05	0.01	0.06	0.10	0.03	0.16	1.72	0.09	0.45	51.3
Other TS	0.52	0.08	0.36	0.07	0.02	-	0.12	0.04	0.10	8.30	0.46	2.00	37.3
TOTAL	0.79	0.12	0.56	0.17	0.04	0.13	0.22	0.08	0.25	35.07	1.21	5.28	18.0

Simple random sample sampling error : 20.15

Mangrove Forest : All forest types of Block 7

Total No. of plot clusters : 110

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	159.99	51.6	89.06	41.2
Gewa	4017.92	13.1	1477.12	14.3
Keora	15.12	100.0	7.09	100.0
Baen	12.88	70.9	1.50	100.1
Goran	10157.98	10.8	6587.91	6.9
Other TS	325.77	37.9	274.56	37.7
TOTAL	14689.67	8.8	8437.24	6.6

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	46.86	66.37	6.47	0.06	0.17	119.70	0.06	0.17	20.8
Gewa	479.61	778.50	282.70	2.89	10.25	1540.82	2.89	10.25	5.0
Keora	0.38	6.04	7.55	0.08	0.34	13.96	0.08	0.34	93.9
Baen	2.68	8.55	4.56	0.05	0.14	15.78	0.05	0.14	82.7
Goran	1035.2	38.07	1.93	0.02	0.09	1075.21	0.02	0.09	7.6
Other TS	52.12	35.02	6.46	0.07	0.09	93.60	0.07	0.09	21.3
TOTAL	1616.9	932.53	309.67	3.18	11.09	2859.06	3.18	11.09	3.4

Simple random sample sampling errors of Seedlings, Saplings and Poles are : 9.06, 7.34 and 4.57

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
2.05	2318.77	0.43	417.68	0.09	84.10	2.57	2820.55

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm , Weight is in kilograms/ha

Mangrove Forest : All forest types of block 8

Total No. of plot clusters : 110

Species Group	Trees by Diameter Class 15-20 NT	15-20 BA	15-20 Vol	20-25 NT	20-25 BA	20-25 Vol	25-30 NT	25-30 BA	25-30 Vol	30-40 NT	30-40 BA	30-40 Vol
Sundri	2.60	0.06	0.21	1.16	0.04	0.20	0.25	0.01	0.06	0.05	0.00	0.02
Gewa	24.02	0.51	1.65	2.69	0.10	0.31	0.43	0.02	0.07	0.10	0.01	0.02
Keora	1.29	0.03	0.07	0.44	0.02	0.06	0.25	0.01	0.06	0.25	0.02	0.09
Baen	0.05	0.00	0.00	-	-	-	-	-	-	-	-	-
Other TS	1.98	0.04	0.15	1.15	0.04	0.16	0.45	0.02	0.08	0.10	0.01	0.04
TOTAL	29.94	0.64	2.09	5.44	0.20	0.73	1.37	0.08	0.27	0.50	0.05	0.18

Species Group	Trees by Diameter Class 40-50 NT	40-50 BA	40-50 Vol	50-60 NT	50-60 BA	50-60 Vol	60+ NT	60+ BA	60+ Vol	Total NT	Total BA	Total Vol	Total S.E%
Sundri	-	-	-	-	-	-	-	-	-	4.05	0.12	0.49	64.6
Gewa	-	-	-	-	-	-	-	-	-	27.24	0.64	2.05	12.2
Keora	0.15	0.02	0.12	0.10	0.03	0.12	0.06	0.03	0.14	2.55	0.16	0.66	58.3
Baen	-	-	-	-	-	-	0.10	0.06	0.37	0.15	0.07	0.37	70.1
Other TS	0.15	0.02	0.05	0.14	0.03	0.13	0.05	0.01	0.06	4.01	0.19	0.68	26.4
TOTAL	0.30	0.05	0.16	0.24	0.06	0.26	0.21	0.11	0.56	38.00	1.17	4.25	17.6

Simple random sample sampling error : 17.62

Mangrove Forest : All forest types of Block 8

Total No. of plot clusters : 110

Species group	Seedlings		Saplings	
	No./ha	S.E%	No./ha	S.E%
Sundri	2989.60	35.9	527.52	23.8
Gewa	8039.06	12.7	2131.15	10.1
Keora	-	-	7.80	100.0
Baen	-	-	3.12	100.0
Goran	16040.90	10.1	8455.54	7.1
Other TS	1426.72	77.8	114.29	59.7
TOTAL	28496.28	10.0	11239.41	6.0

Species group	Poles by Diameter Class (in cm)					Total			
	2.5-5	5-10	10-15						
	No./ha	No./ha	No./ha	BA/ha	Vol/ha	No./ha	BA/ha	Vol/ha	S.E%
Sundri	146.97	206.63	36.65	0.36	0.93	390.24	0.36	0.93	17.4
Gewa	537.23	779.40	283.06	2.94	10.44	1599.69	2.94	10.44	5.5
Keora	2.25	11.49	8.01	0.09	0.37	21.75	0.09	0.37	98.8
Baen	1.53	2.50	0.25	-	0.00	4.28	-	0.00	78.1
Goran	1821.1	142.71	5.44	0.05	0.23	1969.28	0.05	0.23	8.5
Other TS	43.01	22.41	9.73	0.11	0.21	75.15	0.11	0.21	25.4
TOTAL	2552.1	1165.1	343.14	3.55	12.18	4060.38	3.55	12.18	5.0

Simple random sample sampling errors of Seedlings, Saplings and Poles are :
10.43, 6.64 and 5.91

Details for Goran :

2.5-5.0		5.0-10		10-15		Total	
Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
3.82	4277.26	1.40	1367.05	0.23	218.33	5.46	5862.63

NOTE: Volume is volume overbark, in cu m/ha upto merchantable top >= 1 cm ,
Weight is in kilograms/ha

Appendix 8. Computation of Degrees of Freedom

a. Table A8-1

b. Table A8-2

c. Table A8-3

Table A8-1. Computation of Degrees of Freedom for Confidence Limits of the Estimates (By Stratum)

	Area	No.PCs			Total Volume: All strata, all species				Sundri: All Strata			
Stratum	(ha)	n	N=ha/.038	Gh	SV(mean)	SV	Gh*SV	G^2SV^2/(n-1)	SV(mean)	SV	Gh*SV	G^2SV^2/(n-1)
1	9720.2	28	255795	2336563755	24.2087	677.8436	1.58382E+12	9.29074E+22	15.1886	425.2808	9.93696E+11	3.65715E+22
2	12676	38	333579	2927953635	20.4325	776.435	2.27337E+12	1.39681E+23	12.5895	478.401	1.40074E+12	5.30287E+22
3	52595.7	157	1384097	12200689312	8.5623	1344.281	1.64012E+13	1.72435E+24	8.3245	1306.947	1.59456E+13	1.6299E+24
4	36189.3	113	952350	8025335460	6.7244	759.8572	6.09811E+12	3.32026E+23	5.0492	570.5596	4.57893E+12	1.87202E+23
5	69783.4	204	1836405	16529459137	3.9726	810.4104	1.33956E+13	8.83957E+23	3.1018	632.7672	1.04593E+13	5.38901E+23
6	9555.7	25	251466	2529150265	16.7369	418.4225	1.05825E+12	4.66625E+22	7.8308	195.77	4.95132E+11	1.02148E+22
7-8	21519.9	55	566313	5830535374	20.412	1122.66	6.54571E+12	7.9345E+23	7.5105	413.0775	2.40846E+12	1.0742E+23
9-10	34603.8	106	910626	7822110949	0.9739	103.2334	8.07503E+11	6.21011E+21	0.14	14.84	1.1608E+11	1.28329E+20
11	22335.4	68	587774	5079969636	4.9977	339.8436	1.7264E+12	4.44842E+22	3.6619	249.0092	1.26496E+12	2.38824E+22
12-13	53368	131	1404421	15055072625	6.2514	818.9334	1.23291E+13	1.16928E+24	5.8706	769.0486	1.15781E+13	1.03117E+24
14-16	64806.7	182	1705439	15979194552	0.423	76.986	1.23017E+12	8.36093E+21	0.0368	6.6976	1.07022E+11	6.32805E+19
17-18	12317	25	324132	4202127087	82.4639	2061.598	8.66309E+12	3.12705E+24	1.447	36.175	1.52012E+11	9.62818E+20
Total	399471.1	1132	10512397				7.21123E+13	8.36842E+24	0.448	507.136	4.95001E+13	3.61944E+24
							ne=	621			ne=	677
								t(.05) = 1.96				t(.05) = 1.96

Table A8-1.. p.2/2

		No.PCs			Total Volume: All strata, all species				Gewa: All Strata			
Stratum	Area (ha)	n	N=ha	Gh	SV(mean)	SV	Gh*SV	G^2SV^2/(n-1)	SV(mean)	SV	Gh*SV	G^2SV^2/(n-1)
1	9720.2	28	9720	3364647	24.2087	677.8436	2280704591	1.92652E+17	0.253	7.084	23835160.98	2.10413E+13
2	12676	38	12676	4215771	20.4325	776.435	3273271952	2.89576E+17	0.22	8.36	35243843.36	3.3571E+13
3	52595.7	157	52596	17567198	8.5623	1344.281	23615252659	3.57487E+18	0.1564	24.5548	431359040.9	1.19276E+15
4	36189.3	113	36189	11553770	6.7244	759.8572	8779215548	6.88166E+17	0.1442	16.2946	188264065.5	3.16459E+14
5	69783.4	204	69783	23801407	3.9726	810.4104	19288908061	1.83282E+18	0.0905	18.462	439421582.7	9.51189E+14
6	9555.7	25	9556	3642900	16.7369	418.4225	1524271492	9.68085E+16	0.0268	0.67	2440743.268	2.48218E+11
7-8	21519.9	55	21520	8398591	20.412	1122.66	9428762101	1.64633E+18	0.695	38.225	321036138.5	1.9086E+15
9-10	34603.8	106	34604	11261839	0.9739	103.2334	1162597967	1.28727E+16	0.1547	16.3982	184673894.1	3.24804E+14
11	22335.4	68	22335	7313989	4.9977	339.8436	2485612522	9.2213E+16	0.231	15.708	114888147.1	1.97004E+14
12-13	53368	131	53368	21688185	6.2514	818.9334	17761178963	2.42661E+18	0.1486	19.4666	422195219.3	1.37114E+15
14-16	64806.7	182	64807	23011613	0.423	76.986	1771572030	1.73396E+16	0.0918	16.7076	384468823.5	8.16665E+14
17-18	12317	25	12317	6056023	82.4639	2061.598	12485080970	6.49489E+18	0.2703	6.7575	40923572.45	6.97808E+13
Total	399471.1	1132	399471				1.03856E+11	1.73651E+19	0.0163		2588750232	7.20326E+15
							ne=	621			ne=	930
								t(.05) = 1.96				t(.05) = 1.96

Note: The effective Degrees of Freedom, ne, for stratified sampling is given by the following expression:

ne = [SUM(Gh*SVh]^2/SUM[Gh^2*SVh^2/(nh-1)]

where: Gh = Nh*(Nh-nh)/nh
Nh = stratum population size, e.g. area of stratum h
nh = stratum sample size, e.g. no. of plot clusters in stratum h
SVh = stratum sample variance
SUM is the summation operator

Table A8-2. Degrees of Freedom, All Compartments

Compartm	Area (ha)	No.PCs n	N	Gh	SV(mean)	SV	Gh*SV	G^2SV^2/(n-1)
1-Pr WS	9,893.2	28	9,893	3485657	19.62421	549.4778	1915291281	1.36E+17
2-Pr WS	5,532.2	20	5,532	1524730	58.33758	1166.752	1778980809	1.67E+17
13	5,556.3	18	5,556	1709581	166.5897	2998.614	5126374003	1.55E+18
14	4,306.1	12	4,306	1540902	109.0834	1309	2017041077	3.70E+17
21	4,624.6	12	4,625	1777619	37.55764	450.6916	801158087.6	5.84E+16
22	4,817.8	13	4,818	1780659	133.3491	1733.538	3086840395	7.94E+17
23	3,820.8	11	3,821	1323317	231.4313	2545.744	3368825304	1.13E+18
24	5,274.8	15	5,275	1849626	61.31682	919.7523	1701197933	2.07E+17
25	4,430.7	12	4,431	1631495	47.09436	565.1323	922010224.2	7.73E+16
26	3,824.3	12	3,824	1214948	75.28911	903.4693	1097668397	1.10E+17
27	3,935.9	14	3,936	1102586	37.25127	521.5178	575018267.1	2.54E+16
28	4,044.3	10	4,044	1631592	15.508	155.08	253027284.3	7.11E+15
3	5,781.4	17	5,781	1960371	183.0891	3112.515	6101683543	2.33E+18
9	13,098.1	36	13,098	4752464	5.441411	195.8908	930963870.1	2.48E+16
10	6,043.8	18	6,044	2023263	36.86543	663.5777	1342592081	1.06E+17
11	5,660.3	15	5,660	2130273	146.3179	2194.769	4675456369	1.56E+18
12A	2,140.7	6	2,141	761625.4	78.32509	469.9505	357926244.7	2.56E+16
12B	3,616.1	13	3,616	1002244	8.030252	104.3933	104627512.5	9.12E+14
15	5,568.3	13	5,568	2379506	36.30893	472.016	1123164967	1.05E+17
4-EWS	6,515.9	17	6,516	2490952	35.79714	608.5514	1515872302	1.44E+17
5-EWS	5,040.7	17	5,041	1489586	18.97103	322.5075	480402707.8	1.44E+16
6-EWS	7,057.5	20	7,058	2483358	85.42889	1708.578	4243010202	9.48E+17
7-EWS(p)	10,866.6	29	10,867	4060961	6.639555	192.5471	781926220.7	2.18E+16
8	13,212.1	36	13,212	4835665	22.11143	796.0114	3849244823	4.23E+17
45	9,290.6	26	9,291	3310527	28.17706	732.6035	2425303453	2.35E+17
29	4,406.4	14	4,406	1382477	106.4388	1490.143	2060087253	3.26E+17
30	4,941.2	14	4,941	1739020	74.39014	1041.462	1811123313	2.52E+17
31	6,374.5	22	6,375	1840637	32.7518	720.5396	1326251770	8.38E+16
32	5,523.3	15	5,523	2028266	25.97292	389.5937	790199844.2	4.46E+16
33	5,330.4	14	5,330	2024181	33.94862	475.2807	962054407	7.12E+16
34	4,783.1	12	4,783	1901721	44.52543	534.3051	1016099082	9.39E+16
35	6,426.3	17	6,426	2422829	35.08183	596.391	1444953202	1.30E+17
36	7,160.6	20	7,161	2556549	10.76785	215.357	550570683.4	1.60E+16
39	6,150.6	20	6,151	1885343	43.97148	879.4297	1658026996	1.45E+17
40	4,073.1	9	4,073	1839276	87.80715	790.2643	1453514346	2.64E+17
46	10,759.5	26	10,760	4441811	7.360918	191.3839	850091070.8	2.89E+16
47	10,321.6	29	10,322	3663314	1.993301	57.80574	211760561.9	1.60E+15
16	6,281.8	19	6,282	2070614	40.61567	771.6977	1597887775	1.42E+17
17	7,545.6	22	7,546	2580458	70.56021	1552.325	4005708500	7.64E+17

Table A8-2 ... p.2/2

Compartm	Area (ha)	n	N	Gh	SV(mean)	SV	Gh*SV	G^2SV^2/(n-1)
20	7,847.8	26	7,848	2360920	36.97546	961.3618	2269698455	2.06E+17
37	5,775.9	16	5,776	2079288	48.43908	775.0253	1611500653	1.73E+17
38	6,331.1	20	6,331	1997810	18.70719	374.1439	747468491.6	2.94E+16
41	7,054.8	18	7,055	2757955	11.64358	209.5844	578024517.2	1.97E+16
18	11,880.6	36	11,881	3908915	10.35667	372.84	1457399961	6.07E+16
19	7,764.7	21	7,765	2863215	31.56899	662.9489	1898164862	1.80E+17
42	7,032.5	20	7,033	2465770	1.077221	21.54442	53123589.26	1.49E+14
43-SWS	10,376.0	27	10,376	3977082	5.216709	140.8512	560176631	1.21E+16
44-SWS	8,384.8	22	8,385	3187291	24.15243	531.3535	1693578392	1.37E+17
52	11,687.6	33	11,688	4127706	0.329985	10.88952	44948733.97	6.31E+13
48	8,046.4	26	8,046	2482129	1.72644	44.88744	111416405.7	4.97E+14
49-WWS(p	11,371.4	32	11,371	4029527	0.249049	7.969554	32113528.71	3.33E+13
50A	1,855.6	3	1,856	1145895	128.7764	386.3293	442692699.8	9.80E+16
50B	5,663.0	14	5,663	2285021	11.70185	163.8259	374345640.7	1.08E+16
51A	3,430.0	10	3,430	1173060	6.980036	69.80036	81880006.31	7.45E+14
51B-WWS	5,953.9	15	5,954	2357308	0.734848	11.02272	25983941.5	4.82E+13
53 -WWS	8,035.1	24	8,035	2682083	2.315714	55.57714	149062499.6	9.66E+14
54 -WWS	11,529.5	35	11,530	3786453	5.890151	206.1553	780597138.8	1.79E+16
55 -WWS	15,419.3	41	15,419	5783479	0.20694	8.484531	49070100.69	6.02E+13
	399,471.1	1132	399,475				83275182410	1.39E+19
							ne=	500
								t(.05) = 1.96

Table A8-3. Computation of Degrees of Freedom for Confidence Limits of the Estimates (Block by Compartment)

			No.PCs								
Block	Compart	Area (ha)	n	N	Gh	SV(mean)	SV	Gh*SV	G^2SV^2/(n-1)	ne	t(.05)
1	1-Pr WS	9,893.2	28	9,893	3485657	19.624208	549.4778	1915291281	1.35864E+17		
	2-Pr WS	5,532.2	20	5,532	1524730	58.337582	1166.752	1778980809	1.66567E+17		
	13	5,556.3	18	5,556	1709581	166.58969	2998.614	5126374003	1.54587E+18		
	14	4,306.1	12	4,306	1540902	109.08335	1309	2017041077	3.6986E+17		
	21	4,624.6	12	4,625	1777619	37.557636	450.6916	801158087.6	5.83504E+16		
	22	4,817.8	13	4,818	1780659	133.3491	1733.538	3086840395	7.94049E+17		
	23	3,820.8	11	3,821	1323317	231.43125	2545.744	3368825304	1.1349E+18		
	24	5,274.8	15	5,275	1849626	61.316819	919.7523	1701197933	2.0672E+17		
	25	4,430.7	12	4,431	1631495	47.094357	565.1323	922010224.2	7.72821E+16		
	26	3,824.3	12	3,824	1214948	75.289106	903.4693	1097668397	1.09534E+17		
	27	3,935.9	14	3,936	1102586	37.251269	521.5178	575018267.1	2.54343E+16		
	28	4,044.3	10	4,044	1631592	15.508	155.08	253027284.3	7.11365E+15		
Sub-total			177					22643433062	4.63154E+18	111	1.98
2	3	5,781.4	17	5,781	1960371	183.08913	3112.515	6101683543	2.32691E+18		
	9	13,098.1	36	13,098	4752464	5.4414109	195.8908	930963870.1	2.47627E+16		
	10	6,043.8	18	6,044	2023263	36.865428	663.5777	1342592081	1.06033E+17		
	11	5,660.3	15	5,660	2130273	146.31792	2194.769	4675456369	1.56142E+18		
	12A	2,140.7	6	2,141	761625.4	78.325087	469.9505	357926244.7	2.56222E+16		
	12B	3,616.1	13	3,616	1002244	8.0302516	104.3933	104627512.5	9.12243E+14		
	15	5,568.3	13	5,568	2379506	36.308926	472.016	1123164967	1.05125E+17		
Sub-total			118					14636414588	4.15078E+18	52	2.01
3	4-EWS	6,515.9	17	6,516	2490952	35.797142	608.5514	1515872302	1.43617E+17		
	5-EWS	5,040.7	17	5,041	1489586	18.971029	322.5075	480402707.8	1.44242E+16		
	6-EWS	7,057.5	20	7,058	2483358	85.428894	1708.578	4243010202	9.47533E+17		
	7-EWS(p)	10,866.6	29	10,867	4060961	6.6395551	192.5471	781926220.7	2.1836E+16		
	8	13,212.1	36	13,212	4835665	22.111428	796.0114	3849244823	4.23334E+17		
	45	9,290.6	26	9,291	3310527	28.177058	732.6035	2425303453	2.35284E+17		
Sub-total			145					13295759708	1.78603E+18	99	1.99

Table A8-3 ... p. 2/3

Block	Compart	Area (ha)	No.PCs n	N	Gh	SV(mean)	SV	Gh*SV	G^2SV^2/(n-1)	ne	t(.05)
4	29	4,406.4	14	4,406	1382477	106.43876	1490.143	2060087253	3.26458E+17		
	30	4,941.2	14	4,941	1739020	74.390144	1041.462	1811123313	2.52321E+17		
	31	6,374.5	22	6,375	1840637	32.7518	720.5396	1326251770	8.37592E+16		
	32	5,523.3	15	5,523	2028266	25.972917	389.5937	790199844.2	4.46011E+16		
	33	5,330.4	14	5,330	2024181	33.948625	475.2807	962054407	7.11961E+16		
	34	4,783.1	12	4,783	1901721	44.525426	534.3051	1016099082	9.38598E+16		
	35	6,426.3	17	6,426	2422829	35.081826	596.391	1444953202	1.30493E+17		
	36	7,160.6	20	7,161	2556549	10.767849	215.357	550570683.4	1.59541E+16		
	39	6,150.6	20	6,151	1885343	43.971485	879.4297	1658026996	1.44687E+17		
	40	4,073.1	9	4,073	1839276	87.807147	790.2643	1453514346	2.64088E+17		
Sub-total			157					13072880896	1.42742E+18	120	1.98
5A	46	10,759.5	26	10,760	4441811	7.3609184	191.3839	850091070.8	2.89062E+16		
	47	10,321.6	29	10,322	3663314	1.9933014	57.80574	211760561.9	1.60152E+15		
Sub-total			369					27207613425	2.88534E+18	257	1.96
5B	16	6,281.8	19	6,282	2070614	40.61567	771.6977	1597887775	1.41847E+17		
	17	7,545.6	22	7,546	2580458	70.56021	1552.325	4005708500	7.64081E+17		
	20	7,847.8	26	7,848	2360920	36.975455	961.3618	2269698455	2.06061E+17		
	37	5,775.9	16	5,776	2079288	48.439079	775.0253	1611500653	1.73129E+17		
	38	6,331.1	20	6,331	1997810	18.707194	374.1439	747468491.6	2.94057E+16		
	41	7,054.8	18	7,055	2757956	11.643575	209.5844	578024517.2	1.96537E+16		
Sub-total			121					10810288392	1.33418E+18	88	1.99

Table A8-3 ... p.3/3

Block	Compart	Area (ha)	No.PCs n	N	Gh	SV(mean)	SV	Gh*SV	G^2SV^2/(n-1)	ne	t(.05)
6	18	11,880.6	36	11,881	3908915	10.356666	372.84	1457399961	6.06861E+16		
	19	7,764.7	21	7,765	2863215	31.568993	662.9489	1898164862	1.80151E+17		
	42	7,032.5	20	7,033	2465770	1.077221	21.54442	53123589.26	1.48532E+14		
	43-SWS	10,376.0	27	10,376	3977082	5.2167093	140.8512	560176631	1.20691E+16		
	44-SWS	8,384.8	22	8,385	3187291	24.152433	531.3535	1693578392	1.36581E+17		
	52	11,687.6	33	11,688	4127706	0.3299854	10.88952	44948733.97	6.31371E+13		
Sub-total			159					5707392170	3.897E+17	84	1.99
7	48	8,046.4	26	8,046	2482129	1.72644	44.88744	111416405.7	4.96545E+14		
	49-WWS(	11,371.4	32	11,371	4029527	0.2490486	7.969554	32113528.71	3.32671E+13		
	50A	1,855.6	3	1,856	1145895	128.77642	386.3293	442692699.8	9.79884E+16		
	50B	5,663.0	14	5,663	2285021	11.701853	163.8259	374345640.7	1.07796E+16		
	51A	3,430.0	10	3,430	1173060	6.9800357	69.80036	81880006.31	7.44926E+14		
	51B-WWS	5,953.9	15	5,954	2357308	0.7348479	11.02272	25983941.5	4.82261E+13		
Sub-total			100					1068432223	1.10091E+17	10	2.23
8	53 -WWS	8,035.1	24	8,035	2682083	2.3157142	55.57714	149062499.6	9.66071E+14		
	54 -WWS	11,529.5	35	11,530	3786453	5.8901506	206.1553	780597138.8	1.79215E+16		
	55 -WWS	15,419.3	41	15,419	5783479	0.2069398	8.484531	49070100.69	6.01969E+13		
Sub-total			100					978729739.1	1.89478E+16	51	2.01
Total		399,471	1132	399,471							

Appendix 9. Estimation of Area of Golpatta Strips Along the Rivers of the SRF: Table A9

Table A9. Estimation of Area of Golpatta Strips Along the River Banks of the SRF

			Upstream Data				Downstream Data				River Width Class		Golp Strip	Width	Golpatta Strip		<=30m Width Class		>30m Width Class	
Zone	Comp	SP No.	Length	W1	W2	W3	Length	W1	W2	W3	<=30m	>30m	length (m)	GolpSt	Area in ha	Area^2	Area, ha	Area^2	Area, ha	Area^2
3	1	1	425	9	11	13	375	8	5	9	1	0	800	9.17	0.7336	0.53817	0.7336	0.538169	0	0
3	1	2	410	12	8	10	120	6	2	3	1	0	530	6.83	0.36199	0.13104	0.36199	0.131037	0	0
3	1	3	320	10	7	9	110	5	2	4	0	1	430	6.17	0.26531	0.07039	0	0	0.26531	0.07039
3	11	4	480	9	12	11	450	12	7	14	1	0	930	10.83	1.00719	1.01443	1.00719	1.014432	0	0
3	12b	5	120	3	5	2	82	4	6	2	1	0	202	3.67	0.074134	0.0055	0.07413	0.005496	0	0
3	13	6	395	11	9	6	450	7	9	11	1	0	845	8.83	0.746135	0.55672	0.74614	0.556717	0	0
3	13	7	0	0	0	0	0	0	0	0	0	1	0							
3	14	8	500	5	7	6	490	6	9	7	1	0	990	6.67	0.66033	0.43604	0.66033	0.436036	0	0
3	14	9	78	7	5	9	95	5	7	9	0	1	173	7	0.1211	0.01467	0	0	0.1211	0.01467
3	15	10	300	10	12	14	290	6	5	8	1	0	590	9.17	0.54103	0.29271	0.54103	0.292713	0	0
3	15	11	170	9	11	13	185	8	12	14	1	0	355	11.17	0.396535	0.15724	0.39654	0.15724	0	0
3	15	12	125	8	10	12	130	6	5	9	0	1	255	8.33	0.212415	0.04512	0	0	0.21242	0.04512
3	16	13	95	7	9	11	56	4	2	8	1	0	151	6.83	0.103133	0.01064	0.10313	0.010636	0	0
3	2	14	60	3	2	1	45	3	4	2	1	0	105	2.5	0.02625	0.00069	0.02625	0.000689	0	0
3	2	15	415	4	3	5	225	9	7	6	1	0	640	5.67	0.36288	0.13168	0.36288	0.131682	0	0
3	2	16	240	6	4	3	180	2	3	5	0	1	420	3.83	0.16086	0.02588	0	0	0.16086	0.02588
3	21	17	65	5	9	8	75	9	7	8	1	0	140	7.67	0.10738	0.01153	0.10738	0.01153	0	0
3	21	18	55	5	7	6	49	7	5	4	0	1	104	5.67	0.058968	0.00348	0	0	0.05897	0.00348
3	22	19	225	8	12	11	210	9	7	8	1	0	435	9.17	0.398895	0.15912	0.3989	0.159117	0	0
3	22	20	125	7	9	11	200	9	6	8	0	1	325	8.33	0.270725	0.07329	0	0	0.27073	0.07329
3	23	21	210	6	2	4	160	2	8	3	1	0	370	4.17	0.15429	0.02381	0.15429	0.023805	0	0
3	24	22	180	7	9	11	125	3	5	7	1	0	305	7	0.2135	0.04558	0.2135	0.045582	0	0
3	24	23	415	7	9	8	395	8	5	9	0	1	810	7.67	0.62127	0.38598	0	0	0.62127	0.38598
3	25	24	150	7	5	6	480	4	7	9	1	0	630	6.33	0.39879	0.15903	0.39879	0.159033	0	0
3	26	25	500	9	11	8	500	10	12	11	1	0	1000	10.17	1.017	1.03429	1.017	1.034289	0	0
3	26	26	420	7	3	8	380	2	3	5	0	1	800	4.67	0.3736	0.13958	0	0	0.3736	0.13958
3	27	27	0	0	0	0	0	0	0	0	1	0	0							
3	28	28	0	0	0	0	0	0	0	0	1	0	0							
3	29	29	225	7	9	10	210	6	8	10	1	0	435	8.33	0.362355	0.1313	0.36236	0.131301	0	0
3	3	30	430	10	8	7	495	10	12	11	1	0	925	9.67	0.894475	0.80009	0.89448	0.800086	0	0
3	3	31	500	12	10	6	500	12	11	15	0	1	1000	11	1.1	1.21	0	0	1.1	1.21
3	30	32	120	7	9	10	115	6	4	9	1	0	235	7.5	0.17625	0.03106	0.17625	0.031064	0	0

3	30	33	95	6	8	9	115	7	9	11	1	0	210	8.33	0.17493	0.0306	0.17493	0.030601	0	0
3	31	34	120	7	9	10	79	5	7	6	1	0	199	7.33	0.145867	0.02128	0.14587	0.021277	0	0
3	31	35	97	2	4	7	70	3	5	7	0	1	167	4.67	0.077989	0.00608	0	0	0.07799	0.00608
3	32	36	120	10	12	8	90	11	9	7	1	0	210	9.5	0.1995	0.0398	0.1995	0.0398	0	0
3	32	37	38	2	5	7	45	2	1	5	1	0	83	3.67	0.030461	0.00093	0.03046	0.000928	0	0
3	32	38	150	5	8	6	65	2	1	4	0	1	215	4.33	0.093095	0.00867	0	0	0.0931	0.00867
3	33	39	274	3	10	15	55	10	5	12	1	0	329	9.17	0.301693	0.09102	0.30169	0.091019	0	0
3	33	40	160	2	4	8	72	2	1	5	1	0	232	3.67	0.085144	0.00725	0.08514	0.00725	0	0
3	33	41	45	1	5	7	75	2	1	6	1	0	120	3.67	0.04404	0.00194	0.04404	0.00194	0	0
3	33	42	190	4	9	10	500	7	9	11	0	1	690	8.33	0.57477	0.33036	0	0	0.57477	0.33036
3	34	43	40	3	2	7	150	7	6	10	1	0	190	5.83	0.11077	0.01227	0.11077	0.01227	0	0
3	34	44	310	8	5	10	290	9	7	11	1	0	600	8.33	0.4998	0.2498	0.4998	0.2498	0	0
3	34	45	260	3	7	10	300	7	5	12	1	0	560	7.33	0.41048	0.16849	0.41048	0.168494	0	0
3	34	46	60	2	4	6	70	2	1	5	0	1	130	3.33	0.04329	0.00187	0	0	0.04329	0.00187
3	35	47	0	0	0	0	0	0	0	0	1	0	0							
3	35	48	180	3	4	6	70	6	3	8	1	0	250	5	0.125	0.01563	0.125	0.015625	0	0
3	35	49	300	7	5	3	290	3	8	7	0	1	590	5.5	0.3245	0.1053	0	0	0.3245	0.1053
3	35	50	310	8	5	6	210	3	2	1	0	1	520	4.17	0.21684	0.04702	0	0	0.21684	0.04702
3	36	51	60	4	3	6	300	6	6	8	1	0	360	5.5	0.198	0.0392	0.198	0.039204	0	0
3	36	52	55	5	4	4	45	2	3	2	1	0	100	3.33	0.0333	0.00111	0.0333	0.001109	0	0
3	36	53	450	20	6	12	80	5	3	2	1	0	530	8	0.424	0.17978	0.424	0.179776	0	0
3	36	54	200	5	7	6	40	2	3	2	0	1	240	4.17	0.10008	0.01002	0	0	0.10008	0.01002
3	36	55	110	12	5	3	500	9	12	10	0	1	610	8.5	0.5185	0.26884	0	0	0.5185	0.26884
3	37	56	310	8	10	6	150	8	3	2	1	0	460	6.17	0.28382	0.08055	0.28382	0.080554	0	0
3	37	57	210	5	7	3	140	5	3	2	1	0	350	4.17	0.14595	0.0213	0.14595	0.021301	0	0
3	37	58	320	8	5	10	360	15	10	5	1	0	680	8.83	0.60044	0.36053	0.60044	0.360528	0	0
3	37	59	360	10	7	12	155	5	3	10	0	1	515	7.83	0.403245	0.16261	0	0	0.40325	0.16261
3	38	60	80	11	5	2	40	3	3	6	1	0	120	5	0.06	0.0036	0.06	0.0036	0	0
3	38	61	480	10	12	9	60	3	5	5	1	0	540	7.33	0.39582	0.15667	0.39582	0.156673	0	0
3	38	62	0	0	0	0	0	0	0	0	1	0	0							
3	38	63	450	10	11	7	370	6	8	9	0	1	820	8.5	0.697	0.48581	0	0	0.697	0.48581
3	39	64	175	3	8	10	125	4	2	6	1	0	300	5.5	0.165	0.02723	0.165	0.027225	0	0
3	39	65	210	4	6	9	200	3	2	4	1	0	410	4.67	0.19147	0.03666	0.19147	0.036661	0	0
3	39	66	220	7	9	12	225	10	5	12	1	0	445	9.17	0.408065	0.16652	0.40807	0.166517	0	0
3	39	67	0	0	0	0	0	0	0	0	0	1	0							
3	40	68	210	6	4	4	60	3	2	5	1	0	270	4	0.108	0.01166	0.108	0.011664	0	0

3	40	69	500	15	12	12	470	10	8	12	1	0	970	11.5	1.1155	1.24434	1.1155	1.24434	0	0
3	40	70	70	3	9	2	120	3	5	2	0	1	190	4	0.076	0.00578	0	0	0.076	0.00578
			14972				13163				48	22	28135	432.4	21.30275	12.0395	14.9932	8.638811	6.30956	3.40073
													Means/variances=		0.332855	0.00123	0.34075	0.001866	0.31548	0.00371
														Standard errors =		0.03503		0.043193		0.06092

			Upstream Data				Downstream Data				River Width Class		Golp Strip	Width	Golpatta Strip		<=30m Width Class		>30m Width Class	
Zone	Comp	SP No.	Length	W1	W2	W3	Length	W1	W2	W3	<=30m	>30m	length (m)	GolpSt	Area in ha	Area^2	Area, ha	Area^2	Area, ha	Area^2
2	1	71	320	6	8	5	490	12	10	11	1	0	810	8.67	0.70227	0.49318	0.70227	0.493183	0	0
2	1	72	0	0	0	0	0	0	0	0	0	1	0							
2	10	73	110	3	7	10	90	4	3	10	1	0	200	6.17	0.1234	0.01523	0.1234	0.015228	0	0
2	10	74	350	9	7	10	300	9	7	10	0	1	650	8.67	0.56355	0.31759	0	0	0.56355	0.31759
2	11	75	395	7	8	10	495	10	8	12	1	0	890	9.17	0.81613	0.66607	0.81613	0.666068	0	0
2	11	76.1	200	4	8	6	190	7	4	8	1	0	390	6.17	0.24063	0.0579	0.24063	0.057903	0	0
2	12A	77	390	7	4	10	290	18	15	8	1	0	680	10.33	0.70244	0.49342	0.70244	0.493422	0	0
2	16	78	115	6	10	8	100	7	9	11	1	0	215	8.5	0.18275	0.0334	0.18275	0.033398	0	0
2	17	79	350	7	9	12	270	6	3	10	1	0	620	7.83	0.48546	0.23567	0.48546	0.235671	0	0
2	17	80	90	2	3	5	48	2	1	3	1	0	138	2.67	0.036846	0.00136	0.03685	0.001358	0	0
2	17	81	215	3	7	8	150	3	2	4	0	1	365	4.5	0.16425	0.02698	0	0	0.16425	0.02698
2	18	82	350	7	9	12	300	6	8	10	1	0	650	8.67	0.56355	0.31759	0.56355	0.317589	0	0
2	18	83	0	0	0	0	0	0	0	0	1	0	0							
2	18	84	0	0	0	0	0	0	0	0	1	0	0							
2	18	85	360	6	5	6	250	6	4	7	0	1	610	5.67	0.34587	0.11963	0	0	0.34587	0.11963
2	18	86	260	7	6	9	180	5	7	9	0	1	440	7.17	0.31548	0.09953	0	0	0.31548	0.09953
2	19	87	270	7	5	5	390	4	6	3	1	0	660	5	0.33	0.1089	0.33	0.1089	0	0
2	19	88	250	5	5	7	200	6	5	3	1	0	450	5.17	0.23265	0.05413	0.23265	0.054126	0	0
2	19	89	360	5	5	7	250	8	3	5	1	0	610	5.5	0.3355	0.11256	0.3355	0.11256	0	0
2	19	90	500	7	7	8	380	10	7	9	0	1	880	8	0.704	0.49562	0	0	0.704	0.49562
2	20	91	470	8	10	11	350	10	7	9	1	0	820	9.17	0.75194	0.56541	0.75194	0.565414	0	0
2	20	92	430	9	8	10	460	11	10	9	1	0	890	9.5	0.8455	0.71487	0.8455	0.71487	0	0
2	20	93	500	9	8	6	500	8	10	7	1	0	1000	8	0.8	0.64	0.8	0.64	0	0
2	20	94	450	14	15	17	480	12	13	15	0	1	930	14.33	1.33269	1.77606	0	0	1.33269	1.77606
2	37	95	320	12	8	5	360	10	7	12	1	0	680	9	0.612	0.37454	0.612	0.374544	0	0
2	38	96	450	16	20	8	400	12	15	18	1	0	850	14.83	1.26055	1.58899	1.26055	1.588986	0	0
2	4	97	215	8	10	12	260	9	7	10	1	0	475	9.33	0.443175	0.1964	0.44318	0.196404	0	0

2	4	98	190	8	10	15	125	6	5	12	1	0	315	9.33	0.293895	0.08637	0.2939	0.086374	0	0
2	4	99	120	7	9	12	115	7	8	13	0	1	235	9.33	0.219255	0.04807	0	0	0.21926	0.04807
2	41	100	240	6	5	3	115	5	4	5	1	0	355	4.67	0.165785	0.02748	0.16579	0.027485	0	0
2	41	101	220	5	5	3	60	3	5	2	1	0	280	3.83	0.10724	0.0115	0.10724	0.0115	0	0
2	41	102	90	7	11	5	250	5	7	3	1	0	340	6.33	0.21522	0.04632	0.21522	0.04632	0	0
2	41	103	0	0	0	0	0	0	0	0	0	1	0							
2	42	104	125	5	3	6	200	7	4	5	1	0	325	5	0.1625	0.02641	0.1625	0.026406	0	0
2	42	105	450	7	8	9	500	8	7	10	1	0	950	8.17	0.77615	0.60241	0.77615	0.602409	0	0
2	42	106	500	8	6	8	500	6	6	7	1	0	1000	6.83	0.683	0.46649	0.683	0.466489	0	0
2	42	107	95	3	4	3	250	3	10	10	0	1	345	5.5	0.18975	0.03601	0	0	0.18975	0.03601
2	43	108	150	4	5	5	210	4	6	5	1	0	360	4.83	0.17388	0.03023	0.17388	0.030234	0	0
2	43	109	370	10	8	10	400	12	10	13	1	0	770	10.5	0.8085	0.65367	0.8085	0.653672	0	0
2	43	110	360	5	8	4	280	5	5	7	1	0	640	5.67	0.36288	0.13168	0.36288	0.131682	0	0
2	43	111	40	7	5	3	160	3	5	6	0	1	200	4.83	0.0966	0.00933	0	0	0.0966	0.00933
2	44	112	400	5	6	4	150	3	4	6	1	0	550	4.67	0.25685	0.06597	0.25685	0.065972	0	0
2	44	113	390	7	5	6	260	5	6	3	1	0	650	5.33	0.34645	0.12003	0.34645	0.120028	0	0
2	44	114	450	5	7	8	350	9	6	4	1	0	800	6.5	0.52	0.2704	0.52	0.2704	0	0
2	44	115	70	15	5	4	210	40	50	30	0	1	280	24	0.672	0.45158	0	0	0.672	0.45158
2	45	116	300	6	9	12	275	5	3	9	1	0	575	7.33	0.421475	0.17764	0.42148	0.177641	0	0
2	45	117	210	5	9	11	75	7	3	9	1	0	285	7.33	0.208905	0.04364	0.20891	0.043641	0	0
2	45	118	125	4	7	10	110	5	3	6	1	0	235	5.83	0.137005	0.01877	0.13701	0.01877	0	0
2	45	119	45	2	3	4	35	1	5	8	0	1	80	3.83	0.03064	0.00094	0	0	0.03064	0.00094
2	45	120	275	7	9	11	310	6	4	12	0	1	585	8.17	0.477945	0.22843	0	0	0.47795	0.22843
2	5	121	295	8	10	12	260	8	10	7	1	0	555	9.17	0.508935	0.25901	0.50894	0.259015	0	0
2	52	122.1	150	3	2	3	90	3	2	2	1	0	240	2.5	0.06	0.0036	0.06	0.0036	0	0
2	6	123	275	9	12	10	219	8	5	12	1	0	494	9.33	0.460902	0.21243	0.4609	0.212431	0	0
2	6	124	360	10	7	12	315	9	10	11	1	0	675	9.83	0.663525	0.44027	0.66353	0.440265	0	0
2	6	125	79	5	2	7	85	6	5	7	0	1	164	5.33	0.087412	0.00764	0	0	0.08741	0.00764
2	7	126	140	4	8	6	180	3	9	7	1	0	320	6.17	0.19744	0.03898	0.19744	0.038983	0	0
2	7	127	490	10	8	11	500	12	10	14	1	0	990	10.83	1.07217	1.14955	1.07217	1.149549	0	0
2	7	128	145	10	8	6	128	12	7	9	1	0	273	8.67	0.236691	0.05602	0.23669	0.056023	0	0
2	7	129	0	0	0	0	0	0	0	0	0	1	0							
2	7	130	120	6	3	5	190	4	10	7	0	1	310	5.83	0.18073	0.03266	0	0	0.18073	0.03266
2	8	131	180	2	12	8	75	9	14	6	1	0	255	8.5	0.21675	0.04698	0.21675	0.046981	0	0
2	8	132	250	6	9	10	200	4	3	7	1	0	450	6.5	0.2925	0.08556	0.2925	0.085556	0	0
2	8	133	150	5	6	9	190	5	7	9	1	0	340	6.83	0.23222	0.05393	0.23222	0.053926	0	0

2	8	134	50	3	5	9	75	5	3	8	1	0	125	5.5	0.06875	0.00473	0.06875	0.004727	0	0
2	8	135	86	4	6	8	110	5	8	10	0	1	196	6.83	0.133868	0.01792	0	0	0.13387	0.01792
2	8	136	400	6	9	11	350	5	3	9	0	1	750	7.17	0.53775	0.28918	0	0	0.53775	0.28918
2	9	137	58	8	4	2	320	4	2	7	1	0	378	4.5	0.1701	0.02893	0.1701	0.028934	0	0
2	9	138	310	5	8	10	290	4	7	11	1	0	600	7.5	0.45	0.2025	0.45	0.2025	0	0
2	9	139	320	14	12	4	410	13	16	12	1	0	730	11.83	0.86359	0.74579	0.86359	0.745788	0	0
			16793				16110				50	19	32903	482.7	26.64989	16.7341	20.5981	12.77692	6.05179	3.95716
													Means/variances=		0.416405	0.0014	0.42913	0.001745	0.37824	0.00695
														Standard errors =		0.03739		0.041779		0.08337

			Upstream Data				Downstream Data				River Width Class		Golp Strip	Width	Golpatta Strip		<=30m Width Class		>30m Width Class	
Zone	Comp	SP No.	Length	W1	W2	W3	Length	W1	W2	W3	<=30m	>30m	length (m)	GolpSt	Area in ha	Area^2	Area, ha	Area^2	Area, ha	Area^2
1	9	140	360	13	5	15	210	16	10	9	0	1	570	11.33	0.64581	0.41707	0	0	0.64581	0.41707
1	43	141	350	5	6	4	300	6	4	6	1	0	650	5.17	0.33605	0.11293	0.33605	0.11293	0	0
1	43	142	280	4	6	3	90	5	3	4	1	0	370	4.17	0.15429	0.02381	0.15429	0.023805	0	0
1	43	143	0	0	0	0	0	0	0	0	0	1	0							
1	46	144	350	6	7	4	400	4	5	6	1	0	750	5.33	0.39975	0.1598	0.39975	0.1598	0	0
1	46	145	0	0	0	0	0	0	0	0	1	0	0							
1	46	146	0	0	0	0	0	0	0	0	1	0	0							
1	46	147	250	4	8	5	400	5	8	7	1	0	650	6.17	0.40105	0.16084	0.40105	0.160841	0	0
1	46	148	0	0	0	0	210	4	8	7	0	1	210	3.17	0.06657	0.00443	0	0	0.06657	0.00443
1	46	149	0	0	0	0	0	0	0	0	0	1	0							
1	46	150	10	3	4	3	0	0	0	0	0	1	10	1.67	0.00167	2.79E-06	0	0	0.00167	2.79E-06
1	47	151	0	0	0	0	0	0	0	0	1	0	0							
1	47	152	0	0	0	0	0	0	0	0	1	0	0							
1	47	153	0	0	0	0	0	0	0	0	1	0	0							
1	47	154	0	0	0	0	0	0	0	0	1	0	0							
1	47	155	0	0	0	0	0	0	0	0	0	1	0							
1	47	156	0	0	0	0	0	0	0	0	0	1	0							
1	48	157	400	9	7	5	300	6	5	5	1	0	700	6.17	0.4319	0.18654	0.4319	0.186538	0	0
1	48	158	10	4	3	3	80	5	3	2	1	0	90	3.33	0.02997	0.0009	0.02997	0.000898	0	0
1	48	159	200	5	6	4	270	5	4	4	1	0	470	4.67	0.21949	0.04818	0.21949	0.048176	0	0
1	48	160	0	0	0	0	0	0	0	0	0	1	0							
1	48	161	0	0	0	0	20	3	2	2	0	1	20	1.17	0.00234	5.48E-06	0	0	0.00234	5.48E-06
1	49	162	0	0	0	0	0	0	0	0	1	0	0							

1	49	163	15	2	1	2	70	2	2	3	1	0	85	2	0.017	0.00029	0.017	0.000289	0	0
1	49	164	0	0	0	0	0	0	0	0	1	0	0							
1	49	66	20	5	2	2	35	3	2	3	0	1	55	2.83	0.015565	0.00024	0	0	0.01557	0.00024
1	49	166	55	2	2	2	60	2	3	1	0	1	115	2	0.023	0.00053	0	0	0.023	0.00053
1	50A	167	0	0	0	0	0	0	0	0	1	0	0							
1	50B	168	0	0	0	0	0	0	0	0	1	0	0							
1	50B	169	0	0	0	0	0	0	0	0	1	0	0							
1	50B	170	25	4	3	4	155	3	3	2	0	1	180	3.17	0.05706	0.00326	0	0	0.05706	0.00326
1	51A	171	350	4	5	4	400	4	5	5	1	0	750	4.5	0.3375	0.11391	0.3375	0.113906	0	0
1	51A	172	50	3	4	2	200	3	3	2	1	0	250	2.83	0.07075	0.00501	0.07075	0.005006	0	0
1	51B	173	100	3	2	3	80	1	2	2	1	0	180	2.17	0.03906	0.00153	0.03906	0.001526	0	0
1	51B	174	60	3	2	2	0	0	0	0	1	0	60	1.17	0.00702	4.93E-05	0.00702	4.93E-05	0	0
1	51B	175	70	3	2	1	85	2	4	2	1	0	155	2.33	0.036115	0.0013	0.03612	0.001304	0	0
1	51B	176	110	3	2	2	50	2	3	4	0	1	160	2.67	0.04272	0.00182	0	0	0.04272	0.00182
1	52	177	60	3	4	2	105	4	3	3	1	0	165	3.17	0.052305	0.00274	0.05231	0.002736	0	0
1	52	178	0	0	0	0	0	0	0	0	1	0	0							
1	52	179	0	0	0	0	0	0	0	0	1	0	0							
1	52	180	40	2	3	2	45	2	3	3	0	1	85	2.5	0.02125	0.00045	0	0	0.02125	0.00045
1	52	181.1	0	0	0	0	350	5	4	3	0	1	350	2	0.07	0.0049	0	0	0.07	0.0049
1	53	182	250	3	4	4	280	5	4	3	1	0	530	3.83	0.20299	0.0412	0.20299	0.041205	0	0
1	53	183	70	5	3	3	115	3	4	3	1	0	185	3.5	0.06475	0.00419	0.06475	0.004193	0	0
1	53	184	0	0	0	0	0	0	0	0	1	0	0							
1	53	185	0	0	0	0	0	0	0	0	1	0	0							
1	53	186	40	3	4	3	0	0	0	0	0	1	40	1.67	0.00668	4.46E-05	0	0	0.00668	4.46E-05
1	53	187	50	2	3	3	40	3	2	6	0	1	90	3.17	0.02853	0.00081	0	0	0.02853	0.00081
1	54	188.1	160	3	4	3	45	3	2	3	1	0	205	3	0.0615	0.00378	0.0615	0.003782	0	0
1	54	189	0	0	0	0	0	0	0	0	1	0	0							
1	54	190	0	0	0	0	0	0	0	0	1	0	0							
1	54	191	0	0	0	0	0	0	0	0	1	0	0							
1	54	192	0	0	0	0	0	0	0	0	1	0	0							
1	54	193	200	5	4	5	55	6	4	3	0	1	255	4.5	0.11475	0.01317			0.11475	0.01317
1	54	194	0	0	0	0	0	0	0	0	0	1	0							
1	55	195	80	3	2	3	0	0	0	0	1	0	80	1.33	0.01064	0.00011	0.01064	0.000113		
1	55	196	0	0	0	0	0	0	0	0	1	0	0							
1	55	197	0	0	0	0	0	0	0	0	1	0	0							
1	55	198	25	2	2	1	40	3	2	2	1	0	65	2	0.013	0.00017	0.013	0.000169		

1	55	199	0	0	0	0	0	0	0	0	0	1	0							
1	55	200	0	0	0	0	0	0	0	0	0	1	0							
			4040				4490				40	21	8530	108.7	3.981075	1.31401	2.88513	0.867266	1.09595	0.44674
													Means/variances=		0.124409	0.00083	0.15185	0.001255	0.0843	0.00227
														Standard errors =		0.02873		0.035424		0.04766

Appendix 10. Volume/Weight Equations Used to Generate the Interim Forest Statistics for the SRF

Appendix 10. Tree Volume Equations Used to Generate the Interim Forest Statistics for SRF: IRMP for Sundri and Gewa; FRMP Volume/Weight Equations for Goran and Golpatta; and ODA for the Other Species

1.	Sundri (*Heritiera fomes*)	228	$V_{10} = 0.00006083*D^{1.9631}*H^{0.8270}$; $V_{10} = 0$ if $D<10$ H = Tree height in m
2.	Gewa (*Excoecaria agallocha*)	215	$V_{10} = 0.0004218*D^2 - 0.002032 - 0.2506/D$ $V_{10} = 0$ if $D<10$ H = Tree height in m
3.	Keora (*Sonneratia apetala*)	221	If $D \leq 72$, $\ln V_{10ub} = -15.9104+5.1158\ln D-0.0707D$; otherwise, $V_{10ub} = 2.407$
4.	Passur (*Xylocarpus mekongensis*) and Dhundal (*Xylocarpus granatum*)	224 211	If $H \geq 10.7$ or $D<12$, $\ln V_{10ub} = -10.3302+3.0802\ln D-0.03026D$ If $H<10.7$ and a) $10 \leq D<12$, $V_{10ub}=0.040$ b) $12 \leq D \leq 17.5$, $V_{10ub}=0.070$ c) $17.6 \leq D \leq 22.5$, $V_{10ub}=0.153$ d) $22.6 \leq D \leq 27.5$, $V_{10ub}=0.289$ e) $D>27.5$, $V_{10ub}=0.436$
5.	Kankra (*Bruguiera gymorhiza*)	219	If $H \geq 10.7$, $\ln V_{10ub} = -6.6346+1.4818\ln D+0.02088D$ If $H<10.7$, $\ln V_{10ub} = -7.4828+1.7169\ln D+0.01095D$
6.	Baen (*Avicennia officinalis*) and Jir (*Ficus sp.*)	203 218	If $H \geq 15.2$, $\ln V_{10ub} = -9.4214+2.6101\ln D-0.01155D$ If $10.7 \leq H \geq 10.7$, $\ln V_{10ub} = -10.2624+2.9134\ln D-0.02254D$ If $H<10.7$, $\ln V_{10ub} = -10.275+2.8358\ln D-0.01932D$
7.	Goran (*Ceriops decandra*)	216	$V_1 = 0.001429 - 0.001111*D + 0.0004294*d^2$ $Wt(kg) = 1.337 - 0.8816*D + 0.3876*D^2$
8.	Misc. tree species	299	If $D \leq 59$, $\ln V_{10ub} = -10.8153+3.2840\ln D-0.05561D$; otherwise, $V_{10ub} = 0.494$
9.	Golpatta (*Nypa fruticans*)	290	$UL\ (m) = -1.0802 + 1.4524*LL - 0.10811*LL^2$ $Wt(kg) = -1.4555 + 1.1953*ULE$; where: UL is utilizable length, LL is length of leaf and ULE is estimated UL given by the regression equation.

Note: H is stand height class in the above equations unless specified otherwise.

Crownwood volume (CRVOL):			
10.	Sundri (*Heritiera fomes*)	228	If H≥10.7, $lnCRVOL_{5ub}$=-5.8992+0.8007lnD If H<10.7, $lnCRVOL_{5ub}$=-3.4196-5.7605/D
11.	Gewa (*Excoecaria agallocha*)	215	$lnCRVOL_{5ub}$ =-4.1205-4.2572/D
12.	Keora (*Sonneatia apetala*)	221	If H≥10.7, $lnCRVOL_{5ub}$=-7.0462+1.2163lnD; Otherwise, $CRVOL_{5ub}$=0.0

Appendix 11. Comparative Effiency Between the FRMP and ODA Tree Volume Equations

Appendix 11. Comparative Efficiency of Tree Volume Equations

Table A11. Comparative Efficiency of Tree Volume Equations (Sundri)

DBH	THT	STVCR	STV10	BRV10	BRVNM	V10	VTOT	V10 (ODA)	dev^2	V10 (FRMP)	dev^2
36.0	19.6	0.732	0.732	0.196	0.166	0.928	1.094	0.683	0.060	0.720	0.043
31.5	13.3	0.394	0.394	0.076	0.043	0.470	0.513	0.562	0.009	0.433	0.001
26.7	19.2	0.437	0.437	0.066	0.042	0.503	0.545	0.395	0.012	0.380	0.015
33.8	20.5	0.425	0.425	0.174	0.321	0.599	0.919	0.630	0.001	0.650	0.003
17.9	10.3	0.130	0.130	0.041	0.018	0.172	0.189	0.111	0.004	0.107	0.004
30.8	20.3	0.581	0.581	0.055	0.119	0.636	0.754	0.540	0.009	0.533	0.011
21.0	15.8	0.172	0.172	0.107	0.118	0.279	0.397	0.196	0.007	0.199	0.006
29.8	16.8	0.308	0.308	0.144	0.221	0.452	0.673	0.506	0.003	0.441	0.000
33.0	18.5	0.553	0.553	0.161	0.125	0.714	0.839	0.608	0.011	0.580	0.018
22.5	12.8	0.147	0.147	0.050	0.000	0.197	0.197	0.245	0.002	0.205	0.000
24.8	15.3	0.326	0.326	0.070	0.000	0.395	0.395	0.325	0.005	0.282	0.013
30.8	20.8	0.549	0.549	0.123	0.054	0.673	0.726	0.540	0.018	0.541	0.017
18.3	13.1	0.125	0.114	0.010	0.000	0.124	0.135	0.121	0.000	0.129	0.000
16.4	13.7	0.107	0.093	0.006	0.000	0.098	0.113	0.079	0.000	0.102	0.000
11.2	9.5	0.048	0.012	0.005	0.000	0.017	0.053	0.015	0.000	0.026	0.000
30.4	13.6	0.384	0.384	0.059	0.008	0.443	0.451	0.526	0.007	0.407	0.001
19.0	13.6	0.129	0.129	0.014	0.000	0.143	0.143	0.139	0.000	0.145	0.000
12.6	9.5	0.056	0.015	0.006	0.000	0.021	0.062	0.026	0.000	0.039	0.000
10.4	11.7	0.048	0.012	0.013	0.000	0.024	0.060	0.010	0.000	0.023	0.000
7.2	7.8	0.014	0.000	0.000	0.000	0.000	0.014	0.002	0.000	-0.005	0.000
12.2	9.5	0.084	0.068	0.012	0.000	0.080	0.096	0.022	0.003	0.035	0.002
11.1	8.7	0.043	0.016	0.001	0.000	0.017	0.043	0.014	0.000	0.023	0.000
7.8	10.6	0.056	0.018	0.027	0.000	0.045	0.083	0.002	0.002	0.001	0.002
18.8	13.8	0.124	0.124	0.029	0.000	0.152	0.152	0.133	0.000	0.142	0.000
17.8	11.7	0.087	0.066	0.029	0.000	0.095	0.116	0.109	0.000	0.113	0.000
15.6	13.9	0.101	0.101	0.011	0.000	0.112	0.112	0.065	0.002	0.091	0.000
8.1	9.9	0.023	0.000	0.002	0.000	0.002	0.025	0.003	0.000	0.003	0.000
14.9	10.9	0.086	0.081	0.011	0.000	0.091	0.097	0.054	0.001	0.069	0.000
13.3	9.6	0.064	0.048	0.011	0.000	0.059	0.075	0.033	0.001	0.046	0.000
9.4	8.7	0.028	0.002	0.007	0.000	0.009	0.034	0.006	0.000	0.010	0.000
16.4	11.9	0.103	0.093	0.010	0.000	0.103	0.113	0.079	0.001	0.093	0.000
11.8	10.8	0.057	0.029	0.003	0.000	0.032	0.060	0.019	0.000	0.034	0.000
10.0	11.9	0.104	0.104	0.020	0.000	0.125	0.125	0.009	0.014	0.020	0.011
15.0	12.4	0.080	0.057	0.026	0.000	0.083	0.106	0.055	0.001	0.076	0.000
9.8	9.9	0.029	0.008	0.006	0.000	0.014	0.034	0.008	0.000	0.015	0.000
7.4	11.0	0.017	0.000	0.004	0.000	0.004	0.020	0.002	0.000	-0.001	0.000
10.0	9.8	0.035	0.005	0.011	0.000	0.016	0.046	0.009	0.000	0.016	0.000
11.1	12.5	0.048	0.026	0.006	0.000	0.032	0.055	0.014	0.000	0.031	0.000
15.6	13.9	0.121	0.116	0.016	0.000	0.133	0.138	0.065	0.005	0.091	0.002
12.5	10.5	0.056	0.037	0.009	0.000	0.046	0.065	0.025	0.000	0.040	0.000
15.3	13.0	0.091	0.072	0.011	0.000	0.083	0.101	0.060	0.001	0.083	0.000
9.4	7.5	0.024	0.004	0.012	0.000	0.016	0.036	0.006	0.000	0.008	0.000
11.3	9.6	0.049	0.033	0.011	0.000	0.045	0.060	0.016	0.001	0.027	0.000
8.9	5.8	0.006	0.000	0.000	0.000	0.000	0.006	0.005	0.000	0.002	0.000
6.8	7.0	0.012	0.000	0.000	0.000	0.000	0.012	0.001	0.000	-0.008	0.000
10.9	8.5	0.036	0.022	0.010	0.000	0.032	0.046	0.013	0.000	0.021	0.000
14.4	9.1	0.058	0.051	0.014	0.000	0.064	0.072	0.046	0.000	0.056	0.000
11.8	7.5	0.035	0.018	0.005	0.000	0.023	0.039	0.019	0.000	0.026	0.000
9.9	9.1	0.027	0.005	0.005	0.000	0.009	0.031	0.008	0.000	0.014	0.000
12.1	7.4	0.044	0.028	0.005	0.000	0.033	0.049	0.021	0.000	0.028	0.000
15.9	9.0	0.086	0.080	0.012	0.000	0.092	0.098	0.070	0.001	0.073	0.000
24.4	15.6	0.276	0.276	0.031	0.000	0.308	0.308	0.311	0.000	0.275	0.001

19.1	13.4	0.203	0.203	0.017	0.000	0.220	0.220	0.141	0.006	0.145	0.006
17.0	11.7	0.069	0.054	0.031	0.000	0.085	0.100	0.091	0.000	0.101	0.000
9.8	7.9	0.024	0.002	0.015	0.000	0.016	0.039	0.008	0.000	0.011	0.000
8.2	9.1	0.017	0.000	0.003	0.000	0.003	0.020	0.003	0.000	0.002	0.000
10.0	10.1	0.031	0.002	0.001	0.000	0.002	0.032	0.009	0.000	0.017	0.000
16.5	10.2	0.100	0.097	0.021	0.000	0.118	0.121	0.081	0.001	0.087	0.001
10.0	9.5	0.035	0.026	0.016	0.000	0.042	0.051	0.009	0.001	0.016	0.001
20.0	11.0	0.112	0.106	0.033	0.000	0.139	0.145	0.166	0.001	0.144	0.000
13.0	11.2	0.056	0.031	0.013	0.000	0.044	0.070	0.030	0.000	0.048	0.000
10.8	10.5	0.043	0.003	0.000	0.000	0.004	0.043	0.013	0.000	0.024	0.000
22.9	18.2	0.320	0.320	0.064	0.000	0.384	0.384	0.258	0.016	0.264	0.014
16.9	13.0	0.098	0.079	0.007	0.000	0.087	0.105	0.089	0.000	0.106	0.000
19.4	13.6	0.098	0.098	0.062	0.000	0.161	0.161	0.149	0.000	0.152	0.000
12.9	12.3	0.084	0.084	0.073	0.018	0.157	0.175	0.029	0.017	0.050	0.011
14.5	12.5	0.080	0.080	0.025	0.000	0.105	0.105	0.048	0.003	0.070	0.001
11.5	11.4	0.048	0.014	0.014	0.000	0.028	0.061	0.017	0.000	0.033	0.000
18.7	13.4	0.098	0.098	0.068	0.037	0.166	0.203	0.131	0.001	0.138	0.001
9.4	8.8	0.037	0.001	0.000	0.000	0.001	0.037	0.006	0.000	0.010	0.000
19.0	13.0	0.132	0.118	0.043	0.000	0.161	0.175	0.139	0.000	0.141	0.000
25.0	17.8	0.294	0.294	0.090	0.017	0.383	0.400	0.333	0.003	0.315	0.005
11.9	11.6	0.047	0.023	0.008	0.000	0.031	0.055	0.020	0.000	0.037	0.000
15.5	11.4	0.111	0.109	0.052	0.000	0.161	0.162	0.063	0.010	0.079	0.007
27.8	15.8	0.318	0.318	0.086	0.053	0.404	0.457	0.435	0.001	0.367	0.001
35.5	18.5	0.647	0.647	0.054	0.035	0.701	0.736	0.672	0.001	0.675	0.001
31.0	16.3	0.491	0.491	0.042	0.017	0.533	0.550	0.546	0.000	0.471	0.004
30.5	14.9	0.394	0.394	0.076	0.000	0.470	0.470	0.530	0.004	0.431	0.001
30.8	16.1	0.373	0.373	0.079	0.026	0.452	0.478	0.540	0.008	0.461	0.000
24.3	16.1	0.204	0.199	0.038	0.000	0.238	0.242	0.307	0.005	0.278	0.002
28.2	14.1	0.276	0.276	0.120	0.017	0.396	0.414	0.449	0.003	0.354	0.002
35.7	17.3	0.558	0.558	0.080	0.008	0.639	0.647	0.677	0.001	0.655	0.000
33.3	16.1	0.432	0.432	0.045	0.016	0.477	0.492	0.616	0.020	0.543	0.004
27.3	14.9	0.325	0.325	0.084	0.017	0.409	0.426	0.417	0.000	0.341	0.005
24.0	12.9	0.264	0.264	0.074	0.043	0.337	0.380	0.297	0.002	0.237	0.010
34.0	20.1	0.572	0.572	0.197	0.121	0.769	0.891	0.635	0.018	0.650	0.014
33.1	24.1	0.528	0.503	0.094	0.024	0.596	0.646	0.611	0.000	0.694	0.009
34.7	18.1	0.618	0.589	0.083	0.128	0.671	0.828	0.653	0.000	0.635	0.001
38.0	24.9	0.753	0.753	0.168	0.281	0.920	1.202	0.721	0.040	0.943	0.001
38.0	26.1	0.822	0.822	0.042	0.034	0.864	0.898	0.721	0.021	0.974	0.012
35.8	24.1	0.711	0.711	0.070	0.073	0.781	0.855	0.679	0.010	0.816	0.001
35.4	23.1	0.753	0.753	0.028	0.070	0.781	0.851	0.670	0.012	0.774	0.000
35.4	24.1	0.649	0.649	0.152	0.018	0.801	0.819	0.670	0.017	0.797	0.000
35.5	21.4	0.766	0.766	0.097	0.016	0.863	0.879	0.672	0.036	0.740	0.015
35.1	24.1	0.705	0.705	0.090	0.000	0.795	0.795	0.663	0.017	0.783	0.000
35.3	19.1	0.647	0.646	0.146	0.008	0.793	0.801	0.668	0.016	0.680	0.013
36.4	20.1	0.714	0.714	0.052	0.000	0.765	0.765	0.692	0.005	0.749	0.000
37.5	23.1	0.844	0.844	0.116	0.040	0.960	1.000	0.712	0.061	0.872	0.008
25.1	14.0	0.312	0.312	0.033	0.016	0.345	0.361	0.336	0.000	0.274	0.005
43.4	20.1	1.017	1.017	0.097	0.071	1.114	1.185	0.765	0.122	1.074	0.002
42.4	13.2	0.610	0.610	0.132	0.093	0.741	0.834	0.763	0.000	0.801	0.004
40.9	19.9	0.692	0.692	0.090	0.119	0.782	0.901	0.754	0.001	0.945	0.027
41.7	19.2	0.875	0.875	0.096	0.096	0.971	1.067	0.760	0.045	0.962	0.000
41.5	20.1	0.950	0.950	0.077	0.010	1.028	1.037	0.758	0.072	0.980	0.002
42.6	19.7	0.640	0.640	0.133	0.168	0.773	0.940	0.763	0.000	1.021	0.062
						32.50		28.55	0.779	30.46	0.408

Appendix 11. Comparative Efficiency of Tree Volume Equations

Table A11. Comparative Efficiency of Tree Volume Equations (Sundri)

DBH	THT	STVCR	STV10	BRV10	BRVNM	V10	VTOT	V10 (ODA)	dev^2	V10 (FRMP)	dev^2
36.0	19.6	0.732	0.732	0.196	0.166	0.928	1.094	0.683	0.060	0.720	0.043
31.5	13.3	0.394	0.394	0.076	0.043	0.470	0.513	0.562	0.009	0.433	0.001
26.7	19.2	0.437	0.437	0.066	0.042	0.503	0.545	0.395	0.012	0.380	0.015
33.8	20.5	0.425	0.425	0.174	0.321	0.599	0.919	0.630	0.001	0.650	0.003
17.9	10.3	0.130	0.130	0.041	0.018	0.172	0.189	0.111	0.004	0.107	0.004
30.8	20.3	0.581	0.581	0.055	0.119	0.636	0.754	0.540	0.009	0.533	0.011
21.0	15.8	0.172	0.172	0.107	0.118	0.279	0.397	0.196	0.007	0.199	0.006
29.8	16.8	0.308	0.308	0.144	0.221	0.452	0.673	0.506	0.003	0.441	0.000
33.0	18.5	0.553	0.553	0.161	0.125	0.714	0.839	0.608	0.011	0.580	0.018
22.5	12.8	0.147	0.147	0.050	0.000	0.197	0.197	0.245	0.002	0.205	0.000
24.8	15.3	0.326	0.326	0.070	0.000	0.395	0.395	0.325	0.005	0.282	0.013
30.8	20.8	0.549	0.549	0.123	0.054	0.673	0.726	0.540	0.018	0.541	0.017
18.3	13.1	0.125	0.114	0.010	0.000	0.124	0.135	0.121	0.000	0.129	0.000
16.4	13.7	0.107	0.093	0.006	0.000	0.098	0.113	0.079	0.000	0.102	0.000
11.2	9.5	0.048	0.012	0.005	0.000	0.017	0.053	0.015	0.000	0.026	0.000
30.4	13.6	0.384	0.384	0.059	0.008	0.443	0.451	0.526	0.007	0.407	0.001
19.0	13.6	0.129	0.129	0.014	0.000	0.143	0.143	0.139	0.000	0.145	0.000
12.6	9.5	0.056	0.015	0.006	0.000	0.021	0.062	0.026	0.000	0.039	0.000
10.4	11.7	0.048	0.012	0.013	0.000	0.024	0.060	0.010	0.000	0.023	0.000
7.2	7.8	0.014	0.000	0.000	0.000	0.000	0.014	0.002	0.000	-0.005	0.000
12.2	9.5	0.084	0.068	0.012	0.000	0.080	0.096	0.022	0.003	0.035	0.002
11.1	8.7	0.043	0.016	0.001	0.000	0.017	0.043	0.014	0.000	0.023	0.000
7.8	10.6	0.056	0.018	0.027	0.000	0.045	0.083	0.002	0.002	0.001	0.002
18.8	13.8	0.124	0.124	0.029	0.000	0.152	0.152	0.133	0.000	0.142	0.000
17.8	11.7	0.087	0.066	0.029	0.000	0.095	0.116	0.109	0.000	0.113	0.000
15.6	13.9	0.101	0.101	0.011	0.000	0.112	0.112	0.065	0.002	0.091	0.000
8.1	9.9	0.023	0.000	0.002	0.000	0.002	0.025	0.003	0.000	0.003	0.000
14.9	10.9	0.086	0.081	0.011	0.000	0.091	0.097	0.054	0.001	0.069	0.000
13.3	9.6	0.064	0.048	0.011	0.000	0.059	0.075	0.033	0.001	0.046	0.000
9.4	8.7	0.028	0.002	0.007	0.000	0.009	0.034	0.006	0.000	0.010	0.000
16.4	11.9	0.103	0.093	0.010	0.000	0.103	0.113	0.079	0.001	0.093	0.000
11.8	10.8	0.057	0.029	0.003	0.000	0.032	0.060	0.019	0.000	0.034	0.000
10.0	11.9	0.104	0.104	0.020	0.000	0.125	0.125	0.009	0.014	0.020	0.011
15.0	12.4	0.080	0.057	0.026	0.000	0.083	0.106	0.055	0.001	0.076	0.000
9.8	9.9	0.029	0.008	0.006	0.000	0.014	0.034	0.008	0.000	0.015	0.000
7.4	11.0	0.017	0.000	0.004	0.000	0.004	0.020	0.002	0.000	-0.001	0.000
10.0	9.8	0.035	0.005	0.011	0.000	0.016	0.046	0.009	0.000	0.016	0.000
11.1	12.5	0.048	0.026	0.006	0.000	0.032	0.055	0.014	0.000	0.031	0.000
15.6	13.9	0.121	0.116	0.016	0.000	0.133	0.138	0.065	0.005	0.091	0.002
12.5	10.5	0.056	0.037	0.009	0.000	0.046	0.065	0.025	0.000	0.040	0.000
15.3	13.0	0.091	0.072	0.011	0.000	0.083	0.101	0.060	0.001	0.083	0.000
9.4	7.5	0.024	0.004	0.012	0.000	0.016	0.036	0.006	0.000	0.008	0.000
11.3	9.6	0.049	0.033	0.011	0.000	0.045	0.060	0.016	0.001	0.027	0.000
8.9	5.8	0.006	0.000	0.000	0.000	0.000	0.006	0.005	0.000	0.002	0.000
6.8	7.0	0.012	0.000	0.000	0.000	0.000	0.012	0.001	0.000	-0.008	0.000
10.9	8.5	0.036	0.022	0.010	0.000	0.032	0.046	0.013	0.000	0.021	0.000
14.4	9.1	0.058	0.051	0.014	0.000	0.064	0.072	0.046	0.000	0.056	0.000
11.8	7.5	0.035	0.018	0.005	0.000	0.023	0.039	0.019	0.000	0.026	0.000
9.9	9.1	0.027	0.005	0.005	0.000	0.009	0.031	0.008	0.000	0.014	0.000
12.1	7.4	0.044	0.028	0.005	0.000	0.033	0.049	0.021	0.000	0.028	0.000
15.9	9.0	0.086	0.080	0.012	0.000	0.092	0.098	0.070	0.001	0.073	0.000
24.4	15.6	0.276	0.276	0.031	0.000	0.308	0.308	0.311	0.000	0.275	0.001

19.1	13.4	0.203	0.203	0.017	0.000	0.220	0.220	0 141	0.006	0.145	0 006
17.0	11.7	0.069	0.054	0.031	0.000	0.085	0.100	0.091	0.000	0.101	0.000
9.8	7.9	0.024	0.002	0.015	0.000	0.016	0.039	0 008	0.000	0.011	0 000
8.2	9.1	0.017	0.000	0.003	0.000	0.003	0 020	0 003	0 000	0.002	0 000
10.0	10.1	0.031	0.002	0.001	0.000	0.002	0.032	0 009	0.000	0 017	0 000
16.5	10.2	0.100	0.097	0.021	0.000	0.118	0.121	0.081	0.001	0.087	0 001
10.0	9.5	0.035	0.026	0.016	0.000	0.042	0.051	0.009	0.001	0.016	0 001
20.0	11.0	0.112	0.106	0.033	0.000	0.139	0.145	0.166	0.001	0.144	0.000
13.0	11.2	0.056	0.031	0.013	0.000	0.044	0.070	0.030	0.000	0.048	0 000
10.8	10.5	0.043	0.003	0.000	0.000	0.004	0.043	0 013	0.000	0 024	0 000
22.9	18.2	0.320	0.320	0.064	0.000	0.384	0.384	0 258	0.016	0.264	0 014
16.9	13.0	0.098	0.079	0.007	0.000	0.087	0.105	0.089	0.000	0.106	0 000
19.4	13.6	0.098	0.098	0.062	0.000	0.161	0.161	0.149	0.000	0.152	0 000
12.9	12.3	0.084	0.084	0.073	0.018	0.157	0.175	0 029	0 017	0.050	0 011
14.5	12.5	0.080	0.080	0.025	0.000	0.105	0.105	0.048	0.003	0.070	0.001
11.5	11.4	0.048	0.014	0.014	0.000	0.028	0.061	0 017	0.000	0.033	0 000
18.7	13.4	0.098	0.098	0.068	0.037	0.166	0.203	0.131	0.001	0.138	0.001
9.4	8.8	0.037	0.001	0.000	0.000	0.001	0.037	0.006	0.000	0.010	0.000
19.0	13.0	0.132	0.118	0.043	0.000	0.161	0.175	0.139	0.000	0.141	0.000
25.0	17.8	0.294	0.294	0.090	0.017	0.383	0.400	0.333	0.003	0.315	0.005
11.9	11.6	0.047	0.023	0.008	0.000	0.031	0.055	0.020	0.000	0.037	0.000
15.5	11.4	0.111	0.109	0.052	0.000	0.161	0.162	0.063	0.010	0.079	0.007
27.8	15.8	0.318	0.318	0.086	0.053	0.404	0.457	0.435	0.001	0.367	0.001
35.5	18.5	0.647	0.647	0.054	0.035	0.701	0.736	0.672	0.001	0.675	0.001
31.0	16.3	0.491	0.491	0.042	0.017	0.533	0.550	0.546	0.000	0.471	0.004
30.5	14.9	0.394	0.394	0.076	0.000	0.470	0.470	0.530	0.004	0.431	0.001
30.8	16.1	0.373	0.373	0.079	0.026	0.452	0.478	0.540	0.008	0.461	0.000
24.3	16.1	0.204	0.199	0.038	0.000	0.238	0.242	0.307	0.005	0.278	0.002
28.2	14.1	0.276	0.276	0.120	0.017	0.396	0.414	0.449	0.003	0.354	0.002
35.7	17.3	0.558	0.558	0.080	0.008	0.639	0.647	0.677	0.001	0.655	0.000
33.3	16.1	0.432	0.432	0.045	0.016	0.477	0.492	0 616	0 020	0 543	0 004
27.3	14.9	0.325	0.325	0.084	0.017	0.409	0.426	0 417	0.000	0.341	0 005
24.0	12.9	0.264	0.264	0.074	0.043	0.337	0.380	0.297	0.002	0.237	0 010
34.0	20.1	0.572	0.572	0.197	0.121	0.769	0.891	0.635	0.018	0.650	0.014
33.1	24.1	0.528	0.503	0.094	0.024	0.596	0.646	0.611	0.000	0.694	0.009
34.7	18.1	0.618	0.589	0.083	0.128	0.671	0.828	0.653	0.000	0.635	0.001
38.0	24.9	0.753	0.753	0.168	0.281	0.920	1.202	0.721	0 040	0.943	0.001
38.0	26.1	0.822	0.822	0.042	0.034	0.864	0.898	0.721	0.021	0.974	0.012
35.8	24.1	0.711	0.711	0.070	0.073	0.781	0.855	0.679	0.010	0.816	0.001
35.4	23.1	0.753	0.753	0.028	0.070	0.781	0.851	0.670	0.012	0.774	0.000
35.4	24 1	0.649	0.649	0.152	0.018	0.801	0.819	0.670	0.017	0.797	0.000
35.5	21.4	0.766	0.766	0.097	0.016	0.863	0.879	0.672	0.036	0.740	0 015
35.1	24.1	0.705	0.705	0.090	0.000	0.795	0.795	0.663	0.017	0.783	0.000
35.3	19.1	0.647	0.646	0.146	0.008	0.793	0.801	0.668	0 016	0.680	0 013
36.4	20.1	0.714	0.714	0.052	0.000	0.765	0.765	0.692	0.005	0.749	0 000
37.5	23.1	0.844	0 844	0.116	0.040	0.960	1.000	0 712	0 061	0.872	0 008
25.1	14.0	0.312	0.312	0.033	0.016	0.345	0.361	0.336	0.000	0.274	0.005
43.4	20.1	1.017	1.017	0.097	0.071	1.114	1.185	0.765	0.122	1.074	0 002
42.4	13.2	0.610	0.610	0.132	0.093	0.741	0.834	0.763	0.000	0.801	0 004
40.9	19.9	0.692	0.692	0.090	0.119	0.782	0.901	0.754	0.001	0.945	0.027
41.7	19.2	0.875	0.875	0.096	0.096	0.971	1.067	0.760	0 045	0 962	0 000
41.5	20.1	0.950	0.950	0.077	0.010	1.028	1.037	0.758	0.072	0.980	0 002
42.6	19.7	0.640	0.640	0.133	0.168	0.773	0.940	0.763	0 000	1.021	0 082
						32.50		28.55	0.779	30.46	0.408

Table A11. Comparative Efficiency of Tree Volume Equations (Gewa)

No.	DBH	THT	STVCR	STV10	BRV10	BRVNM	V10	VTOT	V10 (ODA)	dev^2	V10 (FRMP)	dev^2
1	18.5	9.7	0.109	0.103	0.005	0.000	0.108	0.114	0.092	0.000	0.105	0.000
2	11.6	8.0	0.036	0.015	0.001	0.000	0.016	0.037	0.017	0.000	0.034	0.000
3	11.4	8.7	0.036	0.022	0.006	0.000	0.028	0.042	0.016	0.000	0.036	0.000
4	14.5	8.5	0.057	0.057	0.012	0.000	0.069	0.069	0.041	0.001	0.056	0.000
5	10.9	8.7	0.041	0.024	0.005	0.000	0.029	0.046	0.013	0.000	0.033	0.000
6	13.9	9.6	0.054	0.037	0.017	0.000	0.054	0.071	0.035	0.000	0.058	0.000
9	15.0	9.5	0.056	0.039	0.006	0.000	0.045	0.062	0.046	0.000	0.067	0.001
10	8.0	7.3	0.019	0.001	0.004	0.000	0.000	0.022	0.000	0.000	0.000	0.000
11	17.1	9.7	0.099	0.097	0.011	0.000	0.107	0.109	0.072	0.001	0.089	0.000
12	16.6	10.0	0.076	0.069	0.021	0.000	0.091	0.097	0.065	0.001	0.087	0.000
13	19.3	8.9	0.059	0.047	0.001	0.000	0.048	0.061	0.104	0.003	0.104	0.003
15	9.9	9.1	0.037	0.014	0.007	0.000	0.000	0.045	0.000	0.000	0.000	0.000
16	11.0	9.5	0.041	0.020	0.001	0.000	0.021	0.042	0.014	0.000	0.036	0.000
17	8.1	8.3	0.024	0.003	0.001	0.000	0.000	0.025	0.000	0.000	0.000	0.000
18	10.0	9.1	0.038	0.014	0.004	0.000	0.019	0.042	0.009	0.000	0.029	0.000
19	12.0	10.0	0.034	0.016	0.012	0.000	0.029	0.046	0.020	0.000	0.045	0.000
20	6.7	8.5	0.014	0.000	0.004	0.000	0.000	0.018	0.000	0.000	0.000	0.000
23	16.5	9.6	0.077	0.064	0.018	0.000	0.082	0.095	0.064	0.000	0.082	0.000
24	19.0	9.4	0.088	0.080	0.011	0.000	0.090	0.099	0.100	0.000	0.107	0.000
25	20.1	9.8	0.104	0.104	0.023	0.000	0.127	0.127	0.117	0.000	0.125	0.000
26	11.0	8.9	0.042	0.019	0.013	0.000	0.032	0.055	0.014	0.000	0.034	0.000
27	14.4	9.7	0.075	0.056	0.014	0.000	0.070	0.089	0.040	0.001	0.063	0.000
28	13.2	9.2	0.058	0.038	0.008	0.000	0.046	0.067	0.029	0.000	0.050	0.000
29	12.6	7.7	0.043	0.034	0.003	0.000	0.037	0.047	0.024	0.000	0.038	0.000
30	11.7	7.8	0.052	0.030	0.001	0.000	0.031	0.053	0.018	0.000	0.034	0.000
31	7.2	8.8	0.013	0.000	0.005	0.000	0.000	0.017	0.000	0.000	0.000	0.000
32	5.3	6.2	0.007	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.005	0.000
33	13.4	11.0	0.061	0.054	0.005	0.000	0.059	0.066	0.030	0.001	0.062	0.000
34	12.6	9.4	0.052	0.030	0.015	0.000	0.045	0.067	0.024	0.000	0.047	0.000
35	11.3	8.9	0.046	0.022	0.006	0.000	0.028	0.052	0.015	0.000	0.036	0.000
36	12.9	8.9	0.048	0.030	0.010	0.000	0.040	0.058	0.026	0.000	0.047	0.000
37	14.5	9.7	0.078	0.060	0.000	0.000	0.060	0.078	0.041	0.000	0.064	0.000
40	8.9	7.0	0.020	0.006	0.004	0.000	0.000	0.024	0.000	0.000	0.000	0.000
41	10.9	9.8	0.029	0.014	0.012	0.000	0.026	0.041	0.013	0.000	0.037	0.000
42	14.0	7.4	0.069	0.054	0.002	0.000	0.056	0.071	0.036	0.000	0.046	0.000
43	8.3	6.9	0.020	0.002	0.000	0.000	0.000	0.020	0.000	0.000	0.000	0.000
44	16.0	8.0	0.044	0.044	0.035	0.000	0.079	0.079	0.058	0.000	0.064	0.000
45	19.0	7.6	0.080	0.080	0.014	0.000	0.094	0.094	0.100	0.000	0.086	0.000
46	15.3	8.2	0.042	0.042	0.042	0.000	0.084	0.084	0.049	0.001	0.060	0.001
47	9.2	8.2	0.023	0.009	0.008	0.000	0.000	0.031	0.000	0.000	0.000	0.000
48	17.5	8.7	0.077	0.077	0.060	0.000	0.137	0.137	0.077	0.004	0.084	0.003
49	18.5	8.4	0.099	0.099	0.052	0.000	0.150	0.150	0.092	0.003	0.091	0.004
50	17.2	11.0	0.084	0.084	0.075	0.000	0.159	0.159	0.073	0.007	0.102	0.003
51	6.7	6.9	0.013	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.000
52	5.4	6.7	0.008	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.000	0.000
53	16.8	9.9	0.082	0.077	0.007	0.000	0.084	0.089	0.068	0.000	0.088	0.000
54	13.9	7.2	0.070	0.058	0.011	0.000	0.070	0.081	0.035	0.001	0.044	0.001
55	15.8	9.0	0.096	0.096	0.013	0.000	0.109	0.109	0.055	0.003	0.071	0.001
57	10.3	7.1	0.026	0.009	0.004	0.000	0.014	0.031	0.010	0.000	0.024	0.000
58	14.8	10.6	0.078	0.078	0.018	0.000	0.097	0.097	0.044	0.003	0.073	0.001
59	13.1	8.3	0.061	0.041	0.012	0.000	0.053	0.073	0.028	0.001	0.045	0.000

60	11.5	7.3	0.041	0.019	0.008	0.000	0.026	0.049	0.016	0.000	0.030	0.000
61	9.5	8.7	0.035	0.011	0.007	0.000	0.000	0.042	0.000	0.000	0.000	0.000
62	14.2	9.3	0.079	0.059	0.007	0.000	0.066	0.086	0.038	0.001	0.059	0.000
63	15.0	10.3	0.096	0.096	0.017	0.000	0.113	0.113	0.046	0.004	0.073	0.002
64	13.8	9.0	0.049	0.039	0.015	0.000	0.054	0.063	0.034	0.000	0.054	0.000
65	16.5	10.3	0.057	0.052	0.035	0.000	0.086	0.092	0.064	0.000	0.088	0.000
66	11.0	10.1	0.042	0.018	0.003	0.000	0.020	0.045	0.014	0.000	0.038	0.000
67	10.7	9.5	0.073	0.067	0.027	0.000	0.094	0.101	0.012	0.007	0.034	0.004
68	8.7	9.3	0.024	0.005	0.016	0.000	0.000	0.040	0.000	0.000	0.000	0.000
69	13.0	9.8	0.060	0.051	0.014	0.000	0.064	0.074	0.027	0.001	0.052	0.000
70	18.2	12.1	0.103	0.101	0.018	0.000	0.119	0.121	0.087	0.001	0.126	0.000
71	20.3	7.0	0.114	0.101	0.025	0.000	0.126	0.139	0.120	0.000	0.091	0.001
72	16.2	8.5	0.080	0.065	0.012	0.000	0.077	0.092	0.060	0.000	0.070	0.000
73	8.6	6.4	0.021	0.004	0.005	0.000	0.000	0.026	0.000	0.000	0.000	0.000
74	16.3	9.7	0.096	0.095	0.012	0.000	0.107	0.109	0.061	0.002	0.081	0.001
75	15.8	10.7	0.098	0.087	0.008	0.000	0.095	0.106	0.055	0.002	0.084	0.000
76	13.9	8.1	0.078	0.069	0.006	0.000	0.075	0.085	0.035	0.002	0.049	0.001
77	9.8	6.1	0.021	0.007	0.004	0.000	0.000	0.024	0.000	0.000	0.000	0.000
78	23.3	11.7	0.231	0.231	0.062	0.008	0.293	0.301	0.169	0.015	0.200	0.009
79	5.2	5.4	0.007	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000
80	42.0	13.2	0.640	0.625	0.065	0.095	0.690	0.800	0.300	0.152	0.733	0.002
81	19.3	10.4	0.094	0.094	0.035	0.000	0.129	0.129	0.104	0.001	0.122	0.000
82	15.3	8.0	0.076	0.058	0.026	0.000	0.084	0.101	0.049	0.001	0.059	0.001
85	37.3	11.6	0.483	0.483	0.062	0.185	0.546	0.730	0.300	0.060	0.508	0.001
86	34.5	11.8	0.454	0.454	0.059	0.022	0.513	0.535	0.295	0.047	0.442	0.005
87	12.5	8.5	0.056	0.034	0.024	0.000	0.057	0.080	0.023	0.001	0.042	0.000
88	11.0	8.1	0.033	0.016	0.027	0.000	0.043	0.060	0.014	0.001	0.031	0.000
89	18.9	8.6	0.097	0.097	0.045	0.000	0.142	0.142	0.098	0.002	0.097	0.002
90	9.2	6.7	0.017	0.001	0.003	0.000	0.000	0.020	0.000	0.000	0.000	0.000
92	11.4	9.0	0.022	0.006	0.004	0.000	0.010	0.026	0.016	0.000	0.037	0.001
93	8.6	7.7	0.026	0.004	0.003	0.000	0.000	0.029	0.000	0.000	0.000	0.000
95	14.5	8.8	0.058	0.044	0.005	0.000	0.049	0.063	0.041	0.000	0.058	0.000
96	10.7	7.9	0.040	0.017	0.003	0.000	0.020	0.043	0.012	0.000	0.028	0.000
97	10.2	9.4	0.036	0.004	0.003	0.000	0.007	0.040	0.010	0.000	0.031	0.001
99	18.8	10.1	0.166	0.159	0.011	0.000	0.171	0.177	0.096	0.005	0.112	0.003
100	22.4	9.5	0.119	0.119	0.071	0.034	0.189	0.223	0.154	0.001	0.150	0.002
101	10.5	8.8	0.037	0.029	0.027	0.000	0.056	0.064	0.011	0.002	0.031	0.001
102	19.8	10.2	0.157	0.150	0.032	0.000	0.182	0.189	0.112	0.005	0.126	0.003
103	26.0	13.8	0.213	0.213	0.096	0.045	0.309	0.354	0.212	0.009	0.294	0.000
104	10.6	9.0	0.020	0.004	0.008	0.000	0.013	0.028	0.012	0.000	0.032	0.000
105	8.5	8.8	0.057	0.033	0.049	0.021	0.000	0.126	0.000	0.000	0.000	0.000
107	13.3	8.7	0.055	0.055	0.050	0.000	0.105	0.105	0.029	0.006	0.048	0.003
108	12.8	8.6	0.048	0.044	0.030	0.000	0.074	0.078	0.025	0.002	0.044	0.001
109	23.0	9.7	0.162	0.162	0.080	0.000	0.242	0.242	0.164	0.006	0.162	0.006
110	12.5	5.2	0.055	0.055	0.013	0.018	0.069	0.086	0.023	0.002	0.026	0.002
111	16.5	11.2	0.083	0.065	0.068	0.017	0.133	0.168	0.064	0.005	0.096	0.001
112	23.3	10.1	0.190	0.190	0.032	0.000	0.222	0.222	0.169	0.003	0.173	0.002
113	24.0	12.8	0.175	0.175	0.110	0.064	0.285	0.349	0.181	0.011	0.232	0.003
115	22.3	7.0	0.115	0.115	0.038	0.000	0.154	0.154	0.153	0.000	0.110	0.002
116	10.8	11.8	0.032	0.011	0.012	0.000	0.023	0.044	0.013	0.000	0.043	0.000
117	25.8	10.7	0.208	0.208	0.044	0.000	0.252	0.252	0.209	0.002	0.224	0.001
118	20.5	10.6	0.185	0.185	0.043	0.000	0.228	0.228	0.123	0.011	0.140	0.008
119	21.9	11.5	0.198	0.198	0.036	0.020	0.234	0.253	0.146	0.008	0.174	0.004
120	20.0	9.6	0.100	0.100	0.047	0.000	0.147	0.147	0.115	0.001	0.121	0.001
121	16.4	9.2	0.087	0.087	0.060	0.019	0.148	0.166	0.063	0.007	0.078	0.005

122	17.4	9.6	0.125	0.125	0.072	0.019	0.197	0.216	0.076	0.015	0.092	0.011
123	26.9	11.4	0.224	0.224	0.080	0.016	0.304	0.320	0.225	0.006	0.260	0.002
124	19.9	12.2	0.134	0.134	0.057	0.000	0.191	0.191	0.114	0.006	0.152	0.002
125	18.4	8.9	0.069	0.069	0.057	0.023	0.126	0.149	0.090	0.001	0.095	0.001
126	22.1	11.8	0.192	0.192	0.006	0.000	0.197	0.197	0.150	0.002	0.181	0.000
127	20.0	9.8	0.110	0.098	0.028	0.000	0.126	0.138	0.115	0.000	0.123	0.000
128	21.5	8.9	0.149	0.149	0.050	0.000	0.199	0.199	0.140	0.004	0.130	0.005
129	22.4	13.1	0.242	0.242	0.009	0.000	0.250	0.250	0.154	0.009	0.207	0.002
130	31.0	14.3	0.462	0.462	0.051	0.000	0.513	0.513	0.272	0.058	0.433	0.006
131	28.0	8.9	0.309	0.309	0.011	0.000	0.321	0.321	0.239	0.007	0.220	0.010
132	25.0	12.6	0.212	0.212	0.031	0.000	0.243	0.243	0.196	0.002	0.248	0.000
133	21.6	10.8	0.205	0.205	0.020	0.000	0.225	0.225	0.141	0.007	0.159	0.004
134	48.2	16.3	0.630	0.630	0.124	0.034	0.754	0.787	0.300	0.206	1.192	0.193
135	22.0	10.1	0.149	0.149	0.050	0.000	0.199	0.199	0.148	0.003	0.154	0.002
136	22.7	12.3	0.196	0.196	0.066	0.000	0.262	0.262	0.159	0.011	0.200	0.004
137	46.0	12.9	0.870	0.870	0.094	0.180	0.964	1.145	0.300	0.441	0.860	0.011
138	29.0	11.3	0.340	0.340	0.057	0.000	0.398	0.398	0.252	0.021	0.299	0.010
139	24.1	10.3	0.225	0.225	0.090	0.016	0.314	0.330	0.182	0.017	0.188	0.016
140	20.3	9.1	0.147	0.147	0.048	0.000	0.195	0.195	0.120	0.006	0.118	0.006
141	23.3	9.2	0.179	0.179	0.030	0.000	0.209	0.209	0.169	0.002	0.157	0.003
142	25.3	11.9	0.233	0.233	0.024	0.000	0.257	0.257	0.201	0.003	0.240	0.000
144	26.0	9.1	0.198	0.198	0.037	0.000	0.235	0.235	0.212	0.001	0.194	0.002
145	22.5	12.6	0.152	0.152	0.046	0.000	0.198	0.198	0.156	0.002	0.201	0.000
146	20.3	7.5	0.147	0.147	0.019	0.000	0.166	0.166	0.120	0.002	0.097	0.005
147	33.5	12.5	0.474	0.474	0.068	0.018	0.542	0.559	0.290	0.063	0.442	0.010
148	23.5	11.2	0.292	0.292	0.055	0.000	0.347	0.347	0.173	0.030	0.195	0.023
149	20.7	11.5	0.167	0.167	0.056	0.000	0.222	0.222	0.127	0.009	0.155	0.005
150	31.1	13.5	0.394	0.394	0.116	0.016	0.510	0.526	0.273	0.056	0.411	0.010
151	27.7	13.2	0.293	0.293	0.096	0.016	0.388	0.404	0.235	0.023	0.319	0.005
152	25.4	13.8	0.314	0.314	0.039	0.000	0.353	0.353	0.203	0.023	0.280	0.005
							18.96		11.530	1.459	16.226	0.448

Table A11. Comparative Efficiency of Tree Volume Equations (Keora)

DBH	THT	STVCR	STV10	BRV10	BRVNM	V10	VTOT	V10 (ODA)	dev^2	V10 (FRMP)	dev^2
23.3	14.1	0.175	0.175	0.050	0.016	0.224	0.240	0.234	0.000	0.219	0.000
52.5	18.4	1.300	1.300	0.316	0.336	1.616	1.952	1.898	0.079	1.600	0.000
26.5	16.5	0.318	0.318	0.034	0.000	0.352	0.352	0.361	0.000	0.350	0.000
16.4	15.5	0.107	0.107	0.046	0.000	0.153	0.153	0.063	0.008	0.119	0.001
41.8	18.5	0.722	0.722	0.179	0.353	0.901	1.254	1.260	0.129	1.018	0.014
10.4	11.3	0.036	0.008	0.000	0.000	0.008	0.036	0.009	0.000	0.025	0.000
34.7	16.8	0.370	0.362	0.084	0.143	0.446	0.597	0.803	0.128	0.621	0.031
56.5	27.4	2.680	2.680	0.128	0.421	2.808	3.229	2.082	0.526	2.953	0.021
35.4	28.9	1.152	1.152	0.135	0.041	1.288	1.328	0.847	0.195	1.226	0.004
38.8	29.4	0.871	0.871	0.160	0.143	1.031	1.174	1.064	0.001	1.503	0.223
33.0	27.8	0.694	0.694	0.103	0.090	0.797	0.887	0.700	0.009	1.019	0.049
15.0	9.7	0.078	0.074	0.033	0.000	0.107	0.112	0.044	0.004	0.048	0.004
33.4	26.3	0.770	0.770	0.062	0.284	0.832	1.116	0.724	0.012	0.980	0.022
23.5	17.3	0.375	0.375	0.041	0.073	0.417	0.490	0.241	0.031	0.291	0.016
20.0	18.7	0.244	0.244	0.062	0.018	0.306	0.323	0.135	0.029	0.230	0.006
44.1	20.3	1.319	1.319	0.300	0.071	1.619	1.690	1.408	0.044	1.268	0.123
26.4	17.8	0.346	0.346	0.134	0.077	0.480	0.557	0.357	0.015	0.382	0.010
39.5	22.7	0.950	0.950	0.148	0.323	1.098	1.421	1.110	0.000	1.159	0.004
27.2	19.3	0.371	0.371	0.075	0.022	0.446	0.468	0.393	0.003	0.449	0.000
41.3	16.0	0.583	0.574	0.298	0.267	0.872	1.148	1.227	0.126	0.830	0.002
24.5	17.5	0.257	0.257	0.040	0.068	0.297	0.364	0.278	0.000	0.321	0.001
9.9	11.3	0.035	0.001	0.004	0.000	0.000	0.039	0.000	0.000	0.000	0.000
15.4	15.1	0.090	0.066	0.006	0.000	0.072	0.096	0.049	0.000	0.100	0.001
11.7	13.2	0.048	0.020	0.007	0.000	0.027	0.055	0.016	0.000	0.044	0.000
40.4	20.5	0.727	0.727	0.270	0.230	0.998	1.228	1.169	0.029	1.075	0.006
23.8	21.2	0.253	0.253	0.134	0.039	0.388	0.427	0.252	0.018	0.383	0.000
37.2	20.8	0.773	0.773	0.192	0.144	0.965	1.108	0.961	0.000	0.926	0.001
31.0	18.8	0.447	0.447	0.094	0.017	0.542	0.559	0.586	0.002	0.567	0.001
19.6	15.4	0.173	0.173	0.052	0.000	0.225	0.225	0.126	0.010	0.172	0.003
13.1	12.5	0.059	0.050	0.032	0.000	0.082	0.091	0.025	0.003	0.053	0.001
55.5	18.8	0.798	0.798	0.120	0.122	0.918	1.040	2.040	1.259	1.836	0.844
38.0	16.3	0.277	0.277	0.103	0.060	0.380	0.440	1.012	0.400	0.718	0.115
27.0	17.0	0.317	0.317	0.099	0.017	0.416	0.433	0.383	0.001	0.378	0.001
35.0	18.6	0.450	0.450	0.296	0.589	0.746	1.335	0.822	0.006	0.716	0.001
20.1	12.7	0.120	0.120	0.058	0.016	0.178	0.194	0.138	0.002	0.139	0.001
16.5	12.6	0.079	0.078	0.022	0.000	0.100	0.100	0.065	0.001	0.090	0.000
46.8	20.7	0.832	0.832	0.433	0.703	1.265	1.968	1.577	0.098	1.462	0.039
11.9	11.1	0.045	0.021	0.018	0.000	0.039	0.063	0.017	0.000	0.035	0.000
30.8	15.1	0.412	0.412	0.257	0.335	0.668	1.003	0.575	0.009	0.426	0.059
36.7	15.5	0.504	0.504	0.356	0.207	0.860	1.066	0.929	0.005	0.628	0.054
20.1	11.7	0.146	0.146	0.125	0.034	0.271	0.305	0.138	0.018	0.124	0.022
15.0	14.2	0.108	0.108	0.033	0.000	0.142	0.142	0.044	0.009	0.087	0.003
26.0	16.3	0.327	0.327	0.056	0.016	0.382	0.398	0.339	0.002	0.332	0.003
31.5	18.5	0.392	0.392	0.090	0.149	0.482	0.631	0.614	0.017	0.574	0.008
13.5	13.8	0.075	0.053	0.008	0.000	0.061	0.083	0.029	0.001	0.066	0.000
10.5	13.1	0.051	0.006	0.019	0.000	0.024	0.070	0.010	0.000	0.034	0.000
17.0	14.9	0.156	0.156	0.040	0.000	0.196	0.196	0.073	0.015	0.122	0.005
14.4	13.8	0.096	0.070	0.028	0.008	0.098	0.132	0.037	0.004	0.076	0.000
13.3	14.8	0.087	0.059	0.020	0.000	0.078	0.107	0.027	0.003	0.071	0.000
20.8	19.1	0.265	0.255	0.042	0.000	0.297	0.307	0.156	0.020	0.256	0.002
12.3	11.3	0.054	0.019	0.020	0.008	0.039	0.082	0.019	0.000	0.039	0.000

17.8	13.9	0.159	0.159	0.000	0.000	0.159	0.159	0.087	0.005	0.122	0.001
17.1	5.9	0.039	0.039	0.097	0.017	0.136	0.153	0.075	0.004	0.023	0.013
22.5	10.4	0.106	0.106	0.009	0.000	0.115	0.115	0.207	0.009	0.132	0.000
23.9	12.8	0.151	0.151	0.062	0.000	0.214	0.214	0.256	0.002	0.203	0.000
15.1	6.3	0.027	0.013	0.001	0.000	0.014	0.028	0.045	0.001	0.019	0.000
10.1	5.4	0.013	0.001	0.000	0.000	0.001	0.013	0.008	0.000	0.000	0.000
16.7	6.5	0.049	0.049	0.001	0.000	0.050	0.050	0.068	0.000	0.028	0.001
22.2	11.4	0.098	0.098	0.011	0.000	0.109	0.109	0.198	0.008	0.147	0.001
11.0	8.1	0.028	0.011	0.005	0.000	0.016	0.034	0.012	0.000	0.015	0.000
13.2	7.3	0.039	0.025	0.022	0.000	0.046	0.061	0.026	0.000	0.019	0.001
22.8	12.0	0.169	0.169	0.062	0.000	0.230	0.230	0.217	0.000	0.168	0.004
17.8	7.9	0.045	0.032	0.009	0.000	0.040	0.053	0.087	0.002	0.049	0.000
8.2	10.6	0.021	0.000	0.001	0.000	0.000	0.022	0.000	0.000	0.000	0.000
9.8	9.5	0.033	0.000	0.006	0.000	0.000	0.039	0.000	0.000	0.000	0.000
16.1	18.1	0.200	0.182	0.033	0.000	0.215	0.234	0.059	0.024	0.140	0.006
19.5	17.1	0.264	0.241	0.046	0.016	0.287	0.326	0.123	0.027	0.195	0.009
22.0	19.1	0.323	0.323	0.003	0.000	0.326	0.326	0.192	0.018	0.287	0.002
18.1	16.1	0.225	0.225	0.019	0.000	0.244	0.244	0.093	0.023	0.154	0.008
21.7	18.1	0.337	0.337	0.033	0.000	0.370	0.370	0.182	0.035	0.261	0.012
20.8	18.1	0.351	0.351	0.014	0.000	0.365	0.365	0.156	0.043	0.239	0.016
26.1	18.2	0.621	0.621	0.065	0.055	0.686	0.741	0.344	0.117	0.384	0.091
27.2	20.1	0.605	0.605	0.028	0.000	0.633	0.633	0.393	0.058	0.471	0.026
29.0	21.0	0.738	0.738	0.075	0.037	0.813	0.849	0.480	0.111	0.566	0.061
25.1	18.9	0.447	0.447	0.035	0.017	0.482	0.499	0.302	0.032	0.371	0.012
27.9	21.7	0.620	0.620	0.055	0.040	0.675	0.715	0.426	0.062	0.544	0.017
27.5	20.9	0.748	0.748	0.030	0.000	0.778	0.778	0.407	0.138	0.505	0.075
29.5	20.1	0.695	0.695	0.077	0.081	0.772	0.853	0.506	0.071	0.556	0.047
28.7	22.1	0.689	0.689	0.026	0.000	0.714	0.714	0.465	0.062	0.589	0.016
28.5	21.7	0.702	0.702	0.036	0.000	0.738	0.738	0.455	0.080	0.568	0.029
36.0	22.9	1.099	1.099	0.068	0.071	1.167	1.237	0.884	0.080	0.971	0.036
34.5	22.9	1.324	1.324	0.081	0.044	1.405	1.448	0.791	0.377	0.891	0.264
35.4	19.9	1.003	1.003	0.089	0.070	1.092	1.161	0.847	0.060	0.795	0.088
30.8	21.9	0.848	0.848	0.049	0.009	0.897	0.907	0.575	0.104	0.672	0.051
37.1	24.1	1.217	1.217	0.108	0.077	1.324	1.402	0.954	0.137	1.095	0.053
42.0	26.7	1.585	1.585	0.063	0.038	1.648	1.686	1.273	0.140	1.581	0.004
33.3	24.6	0.872	0.845	0.081	0.039	0.926	0.992	0.718	0.043	0.902	0.001
35.3	24.1	1.174	1.174	0.062	0.018	1.236	1.253	0.840	0.157	0.990	0.060
31.5	24.7	0.930	0.930	0.069	0.039	1.000	1.039	0.614	0.149	0.810	0.036
32.5	27.1	0.931	0.931	0.065	0.033	0.996	1.030	0.671	0.106	0.959	0.001
33.6	22.5	0.885	0.885	0.160	0.000	1.045	1.045	0.736	0.095	0.827	0.047
35.9	19.8	0.786	0.786	0.113	0.078	0.900	0.977	0.878	0.000	0.813	0.008
31.5	19.5	0.530	0.530	0.139	0.016	0.669	0.685	0.614	0.003	0.612	0.003
13.0	9.6	0.066	0.036	0.029	0.000	0.065	0.094	0.025	0.002	0.033	0.001
21.8	14.3	0.224	0.224	0.081	0.000	0.305	0.305	0.185	0.014	0.194	0.012
26.8	16.3	0.391	0.391	0.047	0.000	0.438	0.438	0.374	0.004	0.353	0.007
30.8	18.3	0.497	0.497	0.124	0.033	0.621	0.654	0.575	0.002	0.542	0.006
20.8	16.3	0.230	0.221	0.048	0.000	0.269	0.278	0.156	0.013	0.209	0.004
33.7	23.7	0.619	0.613	0.248	0.032	0.861	0.899	0.742	0.014	0.885	0.001
42.6	22.1	1.207	1.207	0.264	0.771	1.472	2.243	1.312	0.026	1.307	0.027
29.5	23.1	0.575	0.575	0.158	0.041	0.733	0.774	0.506	0.052	0.656	0.006
36.4	25.1	0.814	0.814	0.268	0.056	1.082	1.138	0.910	0.030	1.104	0.001
24.0	18.9	0.360	0.360	0.117	0.016	0.477	0.492	0.260	0.047	0.339	0.019
8.5	5.3	0.014	0.000	0.000	0.000	0.000	0.014	0.000	0.000	0.000	0.000
7.7	7.3	0.015	0.000	0.004	0.000	0.000	0.020	0.000	0.000	0.000	0.000
14.1	11.3	0.058	0.048	0.029	0.000	0.077	0.087	0.034	0.002	0.054	0.001

14.5	12.3	0.063	0.047	0.022	0.000	0.069	0.085	0.039	0.001	0.065	0.000
5.8	6.2	0.007	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000
7.0	9.3	0.014	0.000	0.004	0.000	0.000	0.018	0.000	0.000	0.000	0.000
15.2	13.4	0.069	0.057	0.039	0.000	0.096	0.108	0.047	0.002	0.082	0.000
20.1	13.3	0.102	0.084	0.040	0.000	0.125	0.143	0.138	0.000	0.149	0.001
14.4	13.4	0.086	0.073	0.021	0.000	0.094	0.107	0.037	0.003	0.073	0.000
22.9	12.3	0.179	0.173	0.125	0.008	0.298	0.312	0.221	0.006	0.175	0.015
16.1	12.3	0.097	0.075	0.069	0.008	0.144	0.175	0.059	0.007	0.082	0.004
19.8	14.3	0.137	0.122	0.061	0.000	0.183	0.198	0.131	0.003	0.159	0.001
20.5	12.3	0.143	0.138	0.063	0.000	0.201	0.206	0.148	0.003	0.139	0.004
11.4	8.0	0.041	0.014	0.009	0.000	0.023	0.050	0.014	0.000	0.016	0.000
19.0	11.2	0.128	0.119	0.076	0.000	0.195	0.204	0.112	0.007	0.103	0.009
19.5	14.1	0.146	0.145	0.048	0.000	0.193	0.194	0.123	0.005	0.151	0.002
27.3	20.9	0.436	0.436	0.048	0.000	0.484	0.484	0.397	0.008	0.498	0.000
29.3	21.8	0.526	0.524	0.079	0.000	0.603	0.605	0.495	0.012	0.604	0.000
28.5	21.9	0.458	0.458	0.058	0.017	0.516	0.533	0.455	0.004	0.574	0.003
33.5	21.0	0.720	0.719	0.097	0.122	0.816	0.939	0.730	0.007	0.758	0.003
35.5	22.1	0.760	0.760	0.078	0.038	0.838	0.876	0.853	0.000	0.905	0.005
36.3	21.4	0.761	0.761	0.079	0.017	0.840	0.857	0.903	0.004	0.912	0.005
40.8	24.1	0.979	0.979	0.128	0.041	1.106	1.148	1.195	0.008	1.326	0.048
30.3	19.7	0.374	0.365	0.087	0.070	0.452	0.532	0.548	0.009	0.573	0.015
30.9	18.0	0.428	0.428	0.048	0.017	0.475	0.492	0.580	0.011	0.534	0.003
47.3	14.4	1.081	1.081	0.157	0.152	1.237	1.389	1.607	0.137	0.955	0.080
44.2	18.3	1.142	1.142	0.151	0.243	1.293	1.536	1.415	0.015	1.124	0.028
40.0	14.9	0.598	0.598	0.158	0.057	0.756	0.813	1.142	0.149	0.711	0.002
28.8	13.9	0.352	0.352	0.055	0.000	0.407	0.407	0.470	0.004	0.333	0.006
39.2	14.9	0.601	0.601	0.146	0.034	0.747	0.780	1.090	0.118	0.683	0.004
38.0	14.0	0.467	0.462	0.117	0.035	0.579	0.619	1.012	0.188	0.591	0.000
						69.730		62.773	6.572	64.768	3.121

Table A11. Comparative Efficiency of Tree Volume Equations (Baen)

DBH	THT	STVCR	STV10	BRV10	BRVNM	V10	VTOT	V10 (ODA)	dev^2	V10 (FRMP)	dev^2
25.1	10.6	0.122	0.122	0.079	0.000	0.201	0.201	0.273	0.005	0.223	0.000
31.8	12.5	0.233	0.233	0.158	0.187	0.390	0.577	0.468	0.006	0.440	0.002
45.4	19.3	1.051	1.051	0.403	0.365	1.454	1.818	1.013	0.194	1.430	0.001
31.1	9.8	0.263	0.263	0.123	0.142	0.386	0.528	0.445	0.003	0.329	0.003
19.3	10.8	0.092	0.092	0.031	0.000	0.124	0.124	0.147	0.001	0.125	0.000
41.0	9.8	0.534	0.534	0.068	0.205	0.602	0.807	0.817	0.046	0.588	0.000
31.3	16.3	0.485	0.485	0.117	0.128	0.602	0.730	0.452	0.023	0.555	0.002
13.0	8.1	0.043	0.018	0.014	0.000	0.032	0.057	0.056	0.001	0.032	0.000
21.0	12.5	0.161	0.161	0.044	0.044	0.205	0.249	0.180	0.001	0.176	0.001
25.1	11.3	0.157	0.157	0.057	0.041	0.214	0.255	0.273	0.003	0.238	0.001
34.0	13.9	0.452	0.452	0.119	0.171	0.571	0.742	0.543	0.001	0.564	0.000
13.6	5.8	0.034	0.019	0.020	0.000	0.039	0.054	0.063	0.001	0.027	0.000
36.7	15.7	0.594	0.594	0.179	0.105	0.773	0.878	0.643	0.017	0.748	0.001
28.7	13.7	0.266	0.266	0.139	0.243	0.404	0.648	0.371	0.001	0.387	0.000
30.1	15.8	0.487	0.487	0.061	0.103	0.548	0.651	0.414	0.018	0.494	0.003
25.8	11.5	0.200	0.200	0.091	0.019	0.291	0.310	0.291	0.000	0.257	0.001
19.5	11.0	0.095	0.075	0.031	0.019	0.106	0.144	0.151	0.002	0.130	0.001
9.8	4.5	0.025	0.008	0.009	0.000	0.017	0.034	0.028	0.000	0.006	0.000
13.2	6.9	0.037	0.037	0.024	0.000	0.061	0.061	0.058	0.000	0.029	0.001
55.0	16.6	0.993	0.993	0.500	0.783	1.493	2.276	1.496	0.000	1.822	0.109
38.0	14.1	0.417	0.417	0.207	0.249	0.624	0.873	0.694	0.005	0.722	0.010
32.8	11.4	0.276	0.276	0.160	0.095	0.437	0.532	0.502	0.004	0.428	0.000
20.3	9.3	0.087	0.087	0.064	0.123	0.151	0.274	0.166	0.000	0.121	0.001
16.3	8.7	0.072	0.072	0.040	0.022	0.112	0.134	0.098	0.000	0.066	0.002
9.1	9.1	0.017	0.000	0.008	0.000	0.000	0.025	0.000	0.000	0.000	0.000
12.1	7.2	0.045	0.045	0.062	0.000	0.107	0.107	0.047	0.004	0.023	0.007
16.8	8.2	0.095	0.095	0.099	0.000	0.194	0.194	0.105	0.008	0.067	0.016
28.3	12.3	0.245	0.245	0.097	0.038	0.341	0.380	0.359	0.000	0.337	0.000
31.4	13.4	0.402	0.402	0.132	0.180	0.534	0.714	0.455	0.006	0.459	0.006
20.3	10.5	0.123	0.123	0.074	0.052	0.196	0.248	0.166	0.001	0.136	0.004
25.8	13.1	0.186	0.186	0.051	0.073	0.238	0.311	0.291	0.003	0.293	0.003
34.2	11.6	0.188	0.188	0.216	0.137	0.404	0.541	0.550	0.021	0.476	0.005
21.5	14.1	0.153	0.153	0.077	0.036	0.230	0.266	0.190	0.002	0.209	0.000
30.4	13.6	0.355	0.355	0.142	0.081	0.497	0.578	0.423	0.005	0.435	0.004
17.7	9.9	0.088	0.088	0.062	0.000	0.150	0.150	0.119	0.001	0.092	0.003
23.7	10.2	0.163	0.163	0.122	0.021	0.286	0.307	0.239	0.002	0.189	0.009
47.5	15.3	1.004	1.004	0.018	0.684	1.022	1.706	1.113	0.008	1.244	0.049
33.0	14.8	0.295	0.295	0.085	0.036	0.381	0.416	0.508	0.016	0.563	0.033
34.5	17.1	0.580	0.580	0.073	0.018	0.653	0.672	0.561	0.008	0.715	0.004
52.7	13.1	1.348	1.348	0.069	0.000	1.418	1.418	1.374	0.002	1.318	0.010
47.0	15.3	1.075	1.075	0.061	0.172	1.136	1.308	1.089	0.002	1.217	0.007
32.6	14.8	0.680	0.680	0.129	0.078	0.809	0.887	0.495	0.098	0.549	0.067
35.8	16.3	0.584	0.584	0.114	0.077	0.698	0.775	0.609	0.008	0.737	0.002
24.2	11.3	0.222	0.222	0.054	0.017	0.276	0.293	0.251	0.001	0.219	0.003
8.5	10.3	0.029	0.000	0.005	0.000	0.005	0.034	0.020	0.000	0.004	0.000
9.0	11.3	0.029	0.000	0.006	0.000	0.006	0.035	0.023	0.000	0.008	0.000
16.4	12.3	0.099	0.095	0.063	0.000	0.158	0.162	0.099	0.003	0.095	0.004
11.6	13.1	0.059	0.028	0.013	0.000	0.041	0.073	0.043	0.000	0.036	0.000
8.2	8.1	0.022	0.000	0.004	0.000	0.004	0.026	0.018	0.000	0.002	0.000
17.0	16.1	0.127	0.123	0.035	0.000	0.158	0.162	0.108	0.002	0.136	0.000
24.9	14.1	0.243	0.216	0.055	0.000	0.272	0.299	0.268	0.000	0.292	0.000

9.4	13.1	0.026	0.003	0.009	0.000	0.012	0.035	0.025	0.000	0.013	0.000
11.2	9.9	0.045	0.018	0.013	0.000	0.031	0.058	0.039	0.000	0.024	0.000
14.7	11.3	0.062	0.042	0.013	0.000	0.055	0.076	0.076	0.000	0.065	0.000
21.0	13.1	0.149	0.149	0.047	0.000	0.196	0.196	0.180	0.000	0.184	0.000
20.4	13.3	0.138	0.138	0.057	0.017	0.195	0.213	0.168	0.001	0.175	0.000
24.5	11.4	0.214	0.214	0.047	0.000	0.261	0.261	0.258	0.000	0.228	0.001
25.3	14.3	0.228	0.228	0.126	0.043	0.354	0.397	0.278	0.006	0.307	0.002
10.5	7.0	0.025	0.003	0.002	0.000	0.005	0.027	0.033	0.001	0.013	0.000
15.0	12.8	0.105	0.093	0.015	0.000	0.107	0.119	0.080	0.001	0.078	0.001
14.7	12.1	0.116	0.116	0.009	0.000	0.125	0.125	0.076	0.002	0.069	0.003
10.0	8.8	0.022	0.003	0.005	0.000	0.008	0.027	0.029	0.000	0.013	0.000
8.6	9.3	0.026	0.000	0.007	0.000	0.007	0.033	0.020	0.000	0.004	0.000
9.2	11.6	0.024	0.000	0.013	0.000	0.013	0.036	0.024	0.000	0.010	0.000
9.1	10.8	0.023	0.002	0.005	0.000	0.007	0.028	0.023	0.000	0.009	0.000
9.9	9.9	0.042	0.015	0.009	0.000	0.023	0.050	0.029	0.000	0.013	0.000
26.7	19.1	0.347	0.347	0.061	0.066	0.408	0.473	0.315	0.009	0.461	0.003
28.0	18.2	0.431	0.431	0.083	0.025	0.514	0.539	0.351	0.027	0.487	0.001
28.8	13.8	0.209	0.172	0.098	0.085	0.270	0.392	0.374	0.011	0.393	0.015
25.0	15.6	0.348	0.348	0.131	0.238	0.479	0.717	0.270	0.044	0.326	0.023
38.4	12.8	0.794	0.794	0.092	0.056	0.886	0.941	0.710	0.031	0.670	0.046
43.1	13.8	0.806	0.806	0.133	0.383	0.939	1.322	0.908	0.001	0.918	0.000
30.2	13.5	0.451	0.451	0.035	0.000	0.487	0.487	0.417	0.005	0.425	0.004
8.0	7.0	0.015	0.000	0.004	0.000	0.004	0.019	0.017	0.000	0.001	0.000
14.4	11.3	0.061	0.047	0.027	0.000	0.073	0.088	0.072	0.000	0.061	0.000
14.7	10.3	0.098	0.098	0.041	0.000	0.139	0.139	0.076	0.004	0.059	0.006
17.4	11.3	0.158	0.158	0.072	0.000	0.230	0.230	0.115	0.013	0.101	0.016
16.3	12.3	0.106	0.095	0.051	0.000	0.146	0.157	0.098	0.002	0.093	0.003
15.3	9.9	0.077	0.077	0.033	0.000	0.110	0.110	0.084	0.001	0.063	0.002
9.7	6.0	0.028	0.001	0.019	0.000	0.020	0.046	0.027	0.000	0.007	0.000
15.9	12.9	0.111	0.094	0.047	0.000	0.141	0.157	0.092	0.002	0.092	0.002
11.5	8.3	0.043	0.018	0.009	0.000	0.027	0.052	0.042	0.000	0.022	0.000
8.8	7.3	0.024	0.000	0.018	0.000	0.018	0.043	0.021	0.000	0.004	0.000
12.4	9.3	0.041	0.019	0.016	0.000	0.036	0.057	0.050	0.000	0.032	0.000
9.0	8.1	0.016	0.000	0.008	0.000	0.008	0.024	0.023	0.000	0.006	0.000
13.6	8.3	0.067	0.051	0.036	0.000	0.087	0.102	0.063	0.001	0.038	0.002
19.2	13.1	0.151	0.151	0.069	0.000	0.220	0.220	0.145	0.006	0.149	0.005
15.8	11.9	0.095	0.091	0.028	0.000	0.120	0.123	0.091	0.001	0.083	0.001
8.3	7.4	0.025	0.004	0.019	0.000	0.023	0.044	0.018	0.000	0.002	0.000
23.4	11.3	0.182	0.182	0.106	0.016	0.288	0.304	0.232	0.003	0.204	0.007
25.5	13.9	0.237	0.237	0.113	0.009	0.351	0.359	0.283	0.005	0.303	0.002
23.0	9.3	0.169	0.169	0.100	0.000	0.268	0.268	0.222	0.002	0.161	0.011
27.0	8.9	0.226	0.226	0.098	0.076	0.324	0.400	0.323	0.000	0.220	0.011
21.4	8.6	0.128	0.128	0.035	0.000	0.164	0.164	0.188	0.001	0.126	0.001
33.0	14.7	0.349	0.349	0.452	0.306	0.801	1.107	0.508	0.085	0.560	0.058
30.9	13.9	0.304	0.304	0.131	0.064	0.435	0.499	0.439	0.000	0.460	0.001
28.4	13.6	0.361	0.361	0.143	0.079	0.504	0.583	0.362	0.020	0.375	0.016
27.2	14.6	0.339	0.339	0.180	0.017	0.518	0.536	0.328	0.036	0.367	0.023
28.7	13.3	0.336	0.336	0.199	0.051	0.535	0.586	0.371	0.027	0.376	0.025
34.2	15.3	0.414	0.414	0.173	0.139	0.587	0.726	0.550	0.001	0.628	0.002
44.0	15.3	0.838	0.835	0.257	0.448	1.092	1.543	0.949	0.021	1.062	0.001
30.2	14.3	0.439	0.435	0.090	0.036	0.525	0.565	0.417	0.012	0.451	0.006
31.7	12.1	0.414	0.414	0.094	0.099	0.509	0.607	0.465	0.002	0.423	0.007
30.5	12.9	0.419	0.419	0.085	0.034	0.504	0.538	0.426	0.006	0.415	0.008
62.0	13.1	0.634	0.634	0.123	0.195	0.757	0.952	1.887	1.275	1.835	1.163
37.0	13.1	0.449	0.449	0.095	0.113	0.544	0.658	0.654	0.012	0.635	0.008

Table A11. Comparative Efficiency of Tree Volume Equations (Kankra)

DBH	THT	STVCR	STV10	BRV10	BRVNM	V10	VTOT	V10 (ODA)	dev^2	V10 (FRMP)	dev^2
10.1	9.4	0.020	0.004	0.010	0.000	0.014	0.029	0.041	0.001	0.016	0.000
9.6	10.1	0.019	0.006	0.010	0.000	0.000	0.029	0.000	0.000	0.000	0.000
6.9	9.0	0.010	0.000	0.006	0.000	0.000	0.016	0.000	0.000	0.000	0.000
7.8	7.9	0.016	0.000	0.004	0.000	0.000	0.020	0.000	0.000	0.000	0.000
11.7	10.6	0.040	0.022	0.010	0.000	0.032	0.050	0.051	0.000	0.034	0.000
16.3	11.5	0.091	0.083	0.012	0.000	0.095	0.103	0.084	0.000	0.094	0.000
16.5	10.6	0.067	0.051	0.012	0.000	0.063	0.079	0.085	0.001	0.088	0.001
17.1	11.8	0.119	0.109	0.015	0.000	0.124	0.134	0.090	0.001	0.109	0.000
20.9	11.8	0.326	0.326	0.059	0.000	0.385	0.385	0.121	0.070	0.172	0.045
15.8	10.9	0.087	0.062	0.042	0.000	0.104	0.129	0.080	0.001	0.082	0.000
18.5	11.6	0.123	0.123	0.109	0.035	0.232	0.267	0.101	0.017	0.128	0.011
24.5	10.5	0.222	0.222	0.044	0.000	0.265	0.265	0.154	0.013	0.215	0.003
17.9	10.5	0.049	0.023	0.020	0.000	0.043	0.069	0.096	0.003	0.106	0.004
14.7	11.3	0.064	0.042	0.016	0.000	0.057	0.079	0.072	0.000	0.071	0.000
23.0	10.2	0.229	0.229	0.087	0.000	0.316	0.316	0.140	0.031	0.181	0.018
25.0	9.6	0.140	0.140	0.148	0.017	0.288	0.306	0.158	0.017	0.204	0.007
26.0	10.3	0.193	0.193	0.129	0.048	0.322	0.370	0.168	0.024	0.240	0.007
19.3	10.3	0.107	0.107	0.057	0.000	0.164	0.164	0.108	0.003	0.123	0.002
16.6	10.8	0.083	0.083	0.162	0.000	0.245	0.245	0.086	0.025	0.091	0.024
18.6	11.2	0.114	0.109	0.027	0.000	0.136	0.141	0.102	0.001	0.125	0.000
13.0	10.3	0.061	0.051	0.018	0.000	0.069	0.079	0.060	0.000	0.045	0.001
14.1	11.3	0.031	0.013	0.005	0.000	0.017	0.036	0.068	0.003	0.064	0.002
12.7	10.7	0.028	0.016	0.017	0.000	0.033	0.045	0.058	0.001	0.045	0.000
8.2	7.7	0.014	0.000	0.003	0.000	0.000	0.017	0.000	0.000	0.000	0.000
23.5	15.8	0.274	0.274	0.050	0.000	0.324	0.324	0.144	0.032	0.306	0.000
26.3	14.8	0.277	0.277	0.049	0.081	0.326	0.407	0.171	0.024	0.362	0.001
14.7	11.8	0.072	0.072	0.063	0.000	0.136	0.136	0.072	0.004	0.075	0.004
25.7	16.2	0.349	0.349	0.073	0.018	0.422	0.439	0.165	0.066	0.379	0.002
11.8	10.9	0.049	0.021	0.017	0.000	0.038	0.066	0.052	0.000	0.037	0.000
8.5	9.6	0.022	0.006	0.007	0.000	0.000	0.029	0.000	0.000	0.000	0.000
9.2	7.6	0.024	0.005	0.007	0.000	0.000	0.031	0.000	0.000	0.000	0.000
16.3	11.6	0.079	0.066	0.021	0.000	0.087	0.100	0.084	0.000	0.095	0.000
9.2	8.5	0.034	0.007	0.010	0.000	0.000	0.044	0.000	0.000	0.000	0.000
29.7	15.8	0.304	0.304	0.161	0.159	0.465	0.624	0.204	0.068	0.500	0.001
10.1	10.8	0.040	0.007	0.013	0.000	0.020	0.052	0.041	0.000	0.021	0.000
8.3	6.3	0.016	0.000	0.245	0.064	0.000	0.325	0.000	0.000	0.000	0.000
12.8	13.7	0.078	0.050	0.020	0.000	0.070	0.098	0.059	0.000	0.064	0.000
7.8	9.9	0.018	0.000	0.004	0.000	0.000	0.022	0.000	0.000	0.000	0.000
15.9	12.5	0.102	0.097	0.016	0.000	0.113	0.118	0.081	0.001	0.098	0.000
12.6	8.8	0.042	0.022	0.011	0.000	0.033	0.053	0.057	0.001	0.032	0.000
28.0	12.0	0.337	0.337	0.068	0.032	0.405	0.437	0.187	0.047	0.331	0.005
10.0	8.5	0.029	0.004	0.009	0.000	0.013	0.038	0.041	0.001	0.012	0.000
15.5	10.3	0.090	0.074	0.025	0.000	0.100	0.115	0.078	0.000	0.073	0.001
31.8	14.8	0.470	0.470	0.077	0.018	0.547	0.565	0.226	0.103	0.538	0.000
14.5	11.5	0.067	0.042	0.038	0.000	0.079	0.104	0.071	0.000	0.070	0.000
16.7	12.1	0.140	0.140	0.101	0.017	0.241	0.257	0.087	0.024	0.106	0.018
11.9	13.0	0.061	0.020	0.020	0.000	0.040	0.081	0.053	0.000	0.049	0.000
17.1	11.0	0.122	0.102	0.012	0.000	0.115	0.134	0.090	0.001	0.100	0.000
20.0	12.3	0.178	0.178	0.047	0.000	0.225	0.225	0.114	0.012	0.164	0.004
26.4	11.7	0.223	0.223	0.127	0.036	0.350	0.387	0.171	0.032	0.284	0.004
24.8	10.5	0.293	0.293	0.062	0.043	0.355	0.398	0.156	0.039	0.221	0.018

42.0	11.2	0.400	0.400	0.053	0.096	0.453	0.549	0.860	0.166	0.706	0.064
45.3	12.1	0.501	0.501	0.058	0.035	0.558	0.594	1.009	0.203	0.892	0.112
38.8	14.9	0.523	0.523	0.073	0.117	0.596	0.712	0.726	0.017	0.797	0.040
37.7	13.7	0.604	0.604	0.152	0.426	0.756	1.181	0.682	0.005	0.690	0.004
35.6	14.7	0.521	0.521	0.124	0.172	0.645	0.817	0.601	0.002	0.657	0.000
39.5	12.1	0.435	0.435	0.090	0.231	0.525	0.756	0.754	0.052	0.672	0.021
35.8	11.9	0.381	0.381	0.023	0.008	0.404	0.412	0.609	0.042	0.538	0.018
36.4	9.1	0.301	0.301	0.031	0.017	0.332	0.350	0.632	0.089	0.426	0.009
36.6	15.1	0.571	0.571	0.117	0.079	0.688	0.767	0.639	0.002	0.715	0.001
39.0	13.1	0.637	0.637	0.041	0.040	0.677	0.717	0.734	0.003	0.708	0.001
						41.166		40.727	2.796	40.890	2.139

28.7	11.1	0.261	0.261	0.071	0.048	0.332	0.380	0.194	0.019	0.321	0.000
33.4	12.8	0.467	0.467	0.154	0.190	0.622	0.811	0.243	0.143	0.513	0.012
40.8	18.3	0.702	0.673	0.133	0.186	0.805	1.020	0.327	0.229	1.116	0.097
23.4	15.8	0.336	0.336	0.095	0.156	0.430	0.587	0.143	0.082	0.303	0.016
26.0	15.6	0.252	0.252	0.187	0.075	0.439	0.514	0.168	0.074	0.374	0.004
8.7	7.7	0.021	0.000	0.003	0.000	0.000	0.024	0.000	0.000	0.000	0.000
7.7	7.0	0.013	0.000	0.003	0.000	0.000	0.015	0.000	0.000	0.000	0.000
8.0	7.8	0.017	0.000	0.001	0.000	0.001	0.018	0.029	0.001	0.000	0.000
7.6	5.3	0.157	0.059	0.005	0.000	0.064	0.162	0.027	0.001	0.000	0.004
11.0	8.8	0.039	0.015	0.000	0.000	0.015	0.039	0.047	0.001	0.020	0.000
7.9	7.9	0.022	0.000	0.000	0.000	0.000	0.022	0.029	0.001	0.000	0.000
9.2	7.3	0.020	0.000	0.101	0.090	0.101	0.211	0.036	0.004	0.003	0.010
9.8	7.6	0.023	0.002	0.000	0.000	0.002	0.023	0.039	0.001	0.008	0.000
9.5	8.6	0.021	0.005	0.006	0.000	0.010	0.027	0.038	0.001	0.009	0.000
8.9	8.1	0.025	0.000	0.005	0.000	0.005	0.030	0.034	0.001	0.004	0.000
25.0	15.6	0.228	0.228	0.071	0.274	0.299	0.572	0.158	0.020	0.344	0.002
32.1	8.8	0.269	0.269	0.127	0.072	0.396	0.468	0.229	0.028	0.318	0.006
22.8	8.9	0.116	0.099	0.038	0.019	0.137	0.174	0.138	0.000	0.153	0.000
10.8	7.3	0.029	0.013	0.007	0.000	0.020	0.036	0.046	0.001	0.012	0.000
28.3	11.3	0.194	0.194	0.168	0.125	0.363	0.487	0.190	0.030	0.318	0.002
25.1	6.1	0.089	0.083	0.070	0.053	0.153	0.212	0.159	0.000	0.124	0.001
13.4	4.8	0.057	0.048	0.002	0.000	0.050	0.059	0.063	0.000	0.012	0.001
12.0	5.0	0.019	0.019	0.008	0.000	0.027	0.027	0.053	0.001	0.007	0.000
21.5	9.8	0.158	0.158	0.020	0.000	0.178	0.178	0.127	0.003	0.149	0.001
11.0	7.5	0.030	0.013	0.025	0.000	0.037	0.054	0.047	0.000	0.014	0.001
19.9	10.2	0.100	0.093	0.028	0.000	0.121	0.128	0.113	0.000	0.131	0.000
15.5	10.2	0.155	0.149	0.051	0.000	0.199	0.206	0.078	0.015	0.072	0.016
16.8	12.3	0.130	0.119	0.008	0.000	0.127	0.137	0.088	0.002	0.110	0.000
14.9	9.8	0.048	0.033	0.026	0.000	0.059	0.074	0.073	0.000	0.061	0.000
16.9	11.6	0.146	0.139	0.066	0.016	0.205	0.228	0.089	0.014	0.104	0.010
15.6	7.8	0.057	0.054	0.029	0.000	0.083	0.086	0.079	0.000	0.051	0.001
21.6	12.5	0.206	0.196	0.078	0.000	0.274	0.284	0.127	0.022	0.198	0.006
19.6	13.2	0.155	0.148	0.059	0.000	0.207	0.213	0.110	0.009	0.169	0.001
23.5	14.2	0.205	0.204	0.039	0.000	0.243	0.243	0.144	0.010	0.273	0.001
25.0	13.2	0.249	0.249	0.068	0.000	0.317	0.317	0.158	0.025	0.288	0.001
26.0	13.4	0.320	0.320	0.051	0.000	0.370	0.370	0.168	0.041	0.318	0.003
25.7	12.3	0.253	0.248	0.060	0.000	0.308	0.312	0.165	0.020	0.283	0.001
27.6	16.2	0.453	0.453	0.047	0.000	0.500	0.500	0.183	0.101	0.440	0.004
						15.004		8.466	1.565	12.775	0.384

Table A11. Comparative Efficiency of Tree Volume Equations (Passur)

DBH	THT	STVCR	STV10	BRV10	BRVNM	V10	VTOT	V10 (ODA)	dev^2	V10 (FRM)	dev^2
20.0	9.0	0.000	0.000	0.124	0.064	0.124	0.189	0.153	0.001	0.133	0.000
27.6	8.2	0.136	0.136	0.146	0.082	0.282	0.364	0.436	0.024	0.254	0.001
17.0	11.5	0.061	0.061	0.060	0.052	0.121	0.174	0.070	0.003	0.111	0.000
21.6	9.4	0.082	0.075	0.045	0.000	0.119	0.126	0.153	0.001	0.163	0.002
35.0	11.9	0.430	0.430	0.064	0.071	0.495	0.565	0.436	0.003	0.541	0.002
12.7	6.7	0.035	0.025	0.009	0.000	0.033	0.044	0.070	0.001	0.033	0.000
18.5	7.3	0.092	0.092	0.049	0.016	0.141	0.157	0.153	0.000	0.096	0.002
17.2	7.8	0.085	0.080	0.042	0.000	0.122	0.126	0.070	0.003	0.084	0.001
16.5	8.7	0.088	0.079	0.039	0.000	0.118	0.127	0.070	0.002	0.083	0.001
12.5	8.0	0.042	0.023	0.005	0.000	0.028	0.048	0.070	0.002	0.037	0.000
16.3	8.0	0.087	0.081	0.021	0.000	0.102	0.108	0.070	0.001	0.075	0.001
13.5	8.6	0.034	0.024	0.012	0.000	0.036	0.045	0.070	0.001	0.049	0.000
27.0	11.0	0.306	0.306	0.071	0.000	0.377	0.377	0.289	0.008	0.297	0.006
31.0	12.5	0.319	0.319	0.187	0.077	0.506	0.583	0.436	0.005	0.436	0.005
23.8	8.8	0.173	0.173	0.041	0.000	0.214	0.214	0.289	0.006	0.193	0.000
25.5	7.8	0.239	0.239	0.045	0.000	0.284	0.284	0.289	0.000	0.207	0.006
37.2	11.3	0.434	0.434	0.497	0.009	0.931	0.940	0.436	0.245	0.591	0.115
33.5	12.3	0.269	0.269	0.146	0.213	0.415	0.628	0.436	0.000	0.506	0.008
24.4	11.2	0.193	0.193	0.194	0.072	0.387	0.458	0.289	0.010	0.242	0.021
14.8	8.8	0.049	0.049	0.017	0.033	0.066	0.099	0.070	0.000	0.064	0.000
17.4	8.4	0.086	0.086	0.080	0.000	0.166	0.166	0.070	0.009	0.092	0.005
19.5	13.3	0.112	0.112	0.057	0.035	0.169	0.204	0.153	0.000	0.170	0.000
18.3	9.8	0.094	0.094	0.097	0.077	0.190	0.267	0.153	0.001	0.116	0.006
28.8	14.4	0.454	0.454	0.160	0.047	0.614	0.661	0.436	0.032	0.416	0.039
43.0	10.4	0.764	0.764	0.360	0.075	1.123	1.199	0.436	0.472	0.751	0.138
39.5	14.9	0.775	0.775	0.150	0.045	0.925	0.970	0.436	0.239	0.820	0.011
10.3	5.0	0.017	0.017	0.033	0.000	0.050	0.050	0.040	0.000	0.011	0.002
7.3	7.4	0.013	0.000	0.022	0.000	0.022	0.035	0.000	0.000	0.000	0.000
8.2	6.7	0.016	0.000	0.043	0.008	0.043	0.067	0.000	0.002	0.000	0.002
20.0	7.8	0.081	0.068	0.203	0.018	0.271	0.303	0.153	0.014	0.120	0.023
28.0	9.9	0.226	0.226	0.092	0.000	0.318	0.318	0.436	0.014	0.298	0.000
24.5	9.7	0.151	0.151	0.077	0.030	0.229	0.259	0.289	0.004	0.220	0.000
32.7	12.5	0.435	0.435	0.059	0.053	0.494	0.548	0.436	0.003	0.487	0.000
19.7	7.5	0.110	0.110	0.050	0.036	0.160	0.196	0.153	0.000	0.113	0.002
13.1	7.1	0.027	0.027	0.023	0.000	0.050	0.050	0.070	0.000	0.038	0.000
25.7	7.4	0.171	0.171	0.046	0.023	0.217	0.240	0.289	0.005	0.203	0.000
32.7	10.6	0.363	0.363	0.155	0.121	0.518	0.639	0.436	0.007	0.433	0.007
38.0	13.0	0.455	0.455	0.354	0.365	0.809	1.174	0.436	0.139	0.684	0.016
23.0	9.8	0.164	0.164	0.091	0.022	0.255	0.276	0.289	0.001	0.193	0.004
31.0	9.4	0.320	0.320	0.136	0.163	0.456	0.619	0.436	0.000	0.356	0.010
29.5	10.6	0.363	0.363	0.117	0.088	0.479	0.567	0.436	0.002	0.349	0.017
24.5	9.6	0.171	0.171	0.102	0.054	0.273	0.327	0.289	0.000	0.219	0.003
34.5	11.4	0.321	0.321	0.315	0.184	0.636	0.820	0.436	0.040	0.509	0.016
24.6	15.7	0.292	0.292	0.098	0.000	0.390	0.390	0.289	0.010	0.320	0.005
28.5	11.5	0.235	0.235	0.227	0.216	0.462	0.678	0.436	0.001	0.344	0.014
22.4	11.9	0.182	0.182	0.063	0.000	0.246	0.246	0.153	0.009	0.211	0.001
25.3	10.5	0.198	0.198	0.158	0.037	0.355	0.392	0.289	0.004	0.250	0.011
23.3	7.7	0.063	0.063	0.187	0.210	0.250	0.460	0.289	0.002	0.168	0.007
17.6	7.2	0.063	0.063	0.085	0.021	0.148	0.169	0.153	0.000	0.084	0.004
						15.216		12.272	1.327	12.173	0.516

Table A11. Comparative Efficiency of the New Tree Volume Equations (Dhundal)

DBH	THT	STVCR	STV10	BRV10	CRV	V10	VTOT	V10 (ODA)	dev^2	V10 (FRMP)	dev^2
53.2	6.3	0.366	0.366	0.079	0.093	0.445	0.538	0.436	0.000	0.673	0.052
23.2	6.5	0.093	0.093	0.065	0.098	0.158	0.256	0.289	0.017	0.125	0.001
20.0	5.4	0.061	0.061	0.046	0.008	0.107	0.115	0.153	0.002	0.074	0.001
18.1	4.8	0.053	0.050	0.044	0.010	0.093	0.107	0.153	0.004	0.052	0.002
16.8	7.7	0.062	0.059	0.053	0.000	0.112	0.115	0.070	0.002	0.075	0.001
27.8	6.5	0.088	0.088	0.062	0.038	0.150	0.188	0.436	0.082	0.184	0.001
19.2	6.8	0.057	0.049	0.012	0.000	0.061	0.069	0.153	0.008	0.088	0.001
19.9	5.8	0.063	0.063	0.054	0.016	0.117	0.133	0.153	0.001	0.080	0.001
16.0	5.8	0.059	0.059	0.042	0.000	0.101	0.101	0.070	0.001	0.049	0.003
17.1	6.1	0.046	0.035	0.067	0.000	0.102	0.113	0.070	0.001	0.060	0.002
9.3	4.3	0.009	0.000	0.008	0.000	0.008	0.018	0.000	0.000	0.006	0.000
9.0	4.3	0.014	0.006	0.000	0.000	0.006	0.014	0.000	0.000	0.005	0.000
18.4	5.6	0.082	0.082	0.070	0.000	0.152	0.152	0.153	0.000	0.064	0.008
23.9	6.1	0.081	0.074	0.068	0.017	0.143	0.166	0.289	0.021	0.125	0.000
22.0	6.6	0.051	0.039	0.018	0.026	0.057	0.095	0.153	0.009	0.114	0.003
11.6	5.3	0.037	0.028	0.000	0.000	0.028	0.037	0.040	0.000	0.019	0.000
20.8	7.3	0.094	0.091	0.077	0.150	0.168	0.321	0.153	0.000	0.112	0.003
10.5	4.4	0.019	0.012	0.022	0.000	0.034	0.041	0.040	0.000	0.010	0.001
8.1	5.3	0.025	0.009	0.000	0.000	0.009	0.025	0.000	0.000	0.005	0.000
15.9	4.9	0.043	0.043	0.037	0.000	0.079	0.079	0.070	0.000	0.039	0.002
9.5	5.3	0.022	0.002	0.000	0.000	0.002	0.022	0.000	0.000	0.010	0.000
9.0	4.9	0.032	0.022	0.000	0.000	0.022	0.032	0.000	0.000	0.007	0.000
19.6	5.3	0.103	0.103	0.038	0.036	0.141	0.177	0.153	0.000	0.070	0.005
10.9	6.3	0.046	0.036	0.011	0.000	0.047	0.057	0.040	0.000	0.020	0.001
21.2	6.0	0.043	0.030	0.020	0.000	0.050	0.064	0.153	0.011	0.095	0.002
11.3	7.0	0.034	0.018	0.005	0.000	0.023	0.038	0.040	0.000	0.026	0.000
23.3	9.3	0.102	0.102	0.028	0.000	0.130	0.130	0.289	0.025	0.185	0.003
19.8	9.6	0.131	0.131	0.034	0.000	0.164	0.164	0.153	0.000	0.136	0.001
10.5	6.4	0.030	0.016	0.052	0.000	0.067	0.082	0.040	0.001	0.019	0.002
12.3	9.6	0.042	0.028	0.017	0.000	0.045	0.059	0.070	0.001	0.047	0.000
8.0	7.4	0.017	0.000	0.001	0.000	0.001	0.018	0.000	0.000	0.010	0.000
14.3	5.4	0.031	0.015	0.016	0.000	0.031	0.046	0.070	0.002	0.034	0.000
13.4	3.1	0.019	0.007	0.005	0.000	0.012	0.024	0.070	0.003	0.013	0.000
9.3	6.2	0.021	0.005	0.016	0.000	0.022	0.038	0.000	0.000	0.012	0.000
15.9	10.2	0.073	0.060	0.016	0.000	0.076	0.090	0.070	0.000	0.090	0.000
12.2	9.2	0.040	0.020	0.015	0.000	0.036	0.055	0.070	0.001	0.044	0.000
8.2	6.4	0.014	0.000	0.008	0.000	0.008	0.022	0.000	0.000	0.008	0.000
9.5	7.1	0.020	0.005	0.008	0.000	0.013	0.029	0.000	0.000	0.016	0.000
19.4	8.9	0.143	0.143	0.079	0.000	0.222	0.222	0.153	0.005	0.120	0.011
7.0	4.9	0.011	0.000	0.006	0.000	0.006	0.017	0.000	0.000	0.001	0.000
16.0	10.1	0.062	0.051	0.033	0.000	0.085	0.096	0.070	0.000	0.091	0.000
8.9	6.2	0.019	0.006	0.013	0.000	0.019	0.032	0.000	0.000	0.011	0.000
11.1	5.6	0.035	0.024	0.027	0.000	0.051	0.062	0.040	0.000	0.018	0.001
11.2	9.1	0.030	0.016	0.015	0.000	0.031	0.045	0.040	0.000	0.035	0.000
16.8	6.1	0.049	0.047	0.030	0.000	0.076	0.079	0.070	0.000	0.058	0.000
6.2	4.9	0.007	0.000	0.005	0.000	0.005	0.012	0.000	0.000	0.000	0.000
26.1	9.1	0.187	0.187	0.061	0.045	0.248	0.292	0.289	0.002	0.229	0.000
19.2	8.1	0.128	0.128	0.072	0.042	0.200	0.242	0.153	0.002	0.106	0.009
19.5	9.0	0.110	0.110	0.058	0.027	0.168	0.196	0.153	0.000	0.123	0.002
23.0	7.2	0.118	0.118	0.093	0.039	0.211	0.250	0.289	0.006	0.137	0.005
13.9	6.9	0.042	0.032	0.023	0.000	0.055	0.065	0.070	0.000	0.043	0.000

10.2	5.2	0.028	0.018	0.008	0.000	0.026	0.036	0.040	0.000	0.013	0.000
14.1	6.1	0.052	0.048	0.027	0.000	0.075	0.079	0.070	0.000	0.038	0.001
11.3	6.8	0.039	0.022	0.012	0.000	0.034	0.051	0.040	0.000	0.025	0.000
23.6	7.9	0.146	0.146	0.060	0.018	0.206	0.225	0.289	0.007	0.160	0.002
25.1	6.4	0.138	0.138	0.034	0.008	0.172	0.180	0.289	0.014	0.146	0.001
27.2	9.1	0.127	0.127	0.054	0.064	0.181	0.245	0.289	0.012	0.249	0.005
25.4	8.1	0.163	0.163	0.066	0.019	0.229	0.248	0.289	0.004	0.191	0.001
11.0	7.5	0.041	0.028	0.036	0.000	0.064	0.077	0.040	0.001	0.027	0.001
14.9	7.1	0.069	0.060	0.030	0.000	0.089	0.099	0.070	0.000	0.052	0.001
23.5	9.1	0.122	0.122	0.087	0.073	0.209	0.282	0.290	0.007	0.184	0.001
27.9	7.1	0.185	0.185	0.084	0.212	0.268	0.480	0.436	0.028	0.203	0.004
27.0	9.1	0.184	0.184	0.095	0.107	0.279	0.386	0.289	0.000	0.245	0.001
20.1	4.1	0.064	0.054	0.041	0.009	0.095	0.113	0.153	0.003	0.055	0.002
32.0	8.1	0.207	0.207	0.112	0.032	0.320	0.352	0.436	0.014	0.309	0.000
24.8	7.1	0.126	0.114	0.079	0.043	0.193	0.249	0.289	0.009	0.159	0.001
22.3	6.2	0.131	0.131	0.089	0.075	0.220	0.295	0.153	0.005	0.110	0.012
20.3	7.1	0.131	0.131	0.093	0.075	0.224	0.299	0.153	0.005	0.104	0.015
31.3	8.2	0.194	0.194	0.070	0.060	0.264	0.323	0.436	0.030	0.299	0.001
						7.545		9.477	0.348	6.3392	0.175