Technical Report on Wood Component Ratio of Acacia Catechu

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Contents

List of Tables

List of Figures

1 Background

1.1 Introduction

Acacia catechu is a primary tree species from *fabaceae* family("Acacia catechu (L.f.) Willd." n.d.) . It is commonly known as *khair* is a multipurpose medium sized tree species primarily found forest with tropical dry and tropical moist condition (Champion and Seth, 1968). Nepal is one of the native habitat of the species along with India, Pakistan and Thailand. It is also found in Indonesia, Kenya and Mozambique as an exotic species. It is associated with *Bombax ceiba, Butea monosperma*, and *Dalbergia sisoo*(Bhattarai et al., 2020). In Nepal, it is widely distributed in Terai, the plain area, and elevated upto 900m above the sea level. Primarily it is regarded as riverine forest of Terai, dun areas and extended to some gravelly river beds and also found in bed pd Seti River near Pokhara. It grows naturally as well as it can be grown artificially by seed, later it grows as a strong light demanding tree with characteristic of highly resistant to the drought (Jackson, 1994).

It is not only valuable species from the medicinal or commercial point of view but also a valuable timber species known for its strong and durable wood, which has been widely used in construction, furniture making, and traditional medicine. The tree is considered important in both ecological and socio-economical terms (Bhattarai et al., 2020). Most important and commercial product from *A.catechu* are katha and cutch, and there are several factories producing katha in Nepal, the end product of which is exported to India (Bhattarai et al., 2020). The product like food, fodder, fuel timber, tannin or dyestuff, gum or resin, poison, medicine as well the barrier or support, with the help of its brushwood fence, service is provided by the species ("Acacia catechu (PROSEA) - PlantUse english," n.d.).

Besides this *A.catechu* has a significant medicinal uses. *A. catechu* is being used traditionally to cure some of the diseases, like gastrointestinal and stomach related problems, leprosy and few skin diseases (Kumar et al., 2019; Kunwar et al., 2010; Thangavelu et al., 2020). *A. catechu* is rich in phytochemicals with diverse pharmaceutical and biological activities in its different components of woods i.e., sapwood and heartwood (Adhikari et al., 2021).

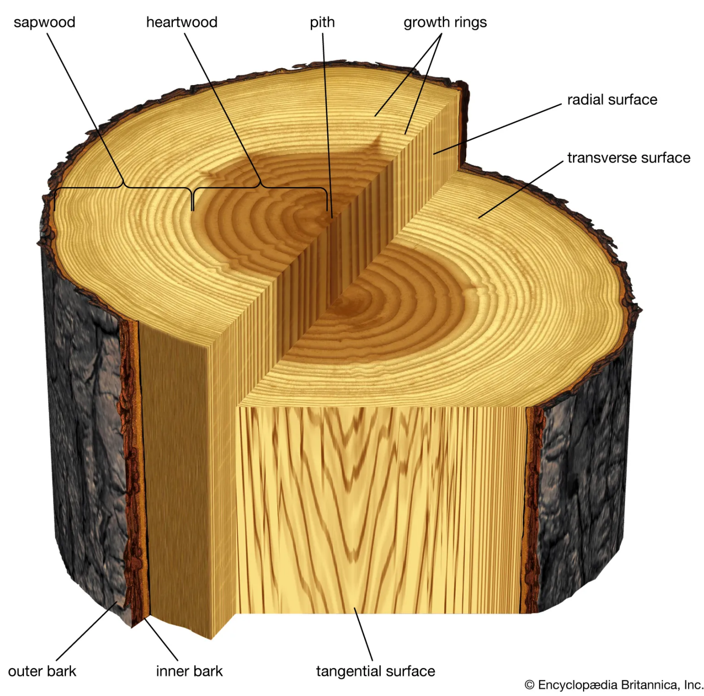

Figure 1: Anatomy of tree trunk

The xylem of the most species has two physiologically different zone called the sapwood and heartwood.

The outer layer i.e., sapwood contains physiologically active living cells and nutrient materials whereas the heartwood as inner dark layer is physiologically inactive zone with strong foundation to the wood (Ayobi et al., 2011). The heartwood of *A.catechu* contains tannins, terpenoides, triterpenoids, carbohydrates etc. (Adhikari et al., 2021) whereas the sapwood of khair posses the great importance in the growth of the tree. Commercially, heartwood is more important because of its richness in chemicals and its medicinal value.

This study aims to emphasizes the quantification of the heartwood volume and sapwood volume in respect to the diameter of the logs. The study provides the heartwood and sapwood ratio to the log volume and its correlation with the diameter of the log. The result in this study provides the comprehensive idea to quantify the amount of heartwood and sapwood without chopping it.

1.2 Objectives

The objective of this study is to assess the ratio of sapwood and heartwood in *A. catechu* trees across the Bagmati Province. The study excels the understanding of the proportion of sapwood and heartwood in different diameter class of the tree logs.

The specific objectives of this study are as follows:

1. To quantify and analyze the ratio of sapwood and heartwood in *Acacia catechu* trees in the Bagmati Province of Nepal.
2. To examine the variations in sapwood and heartwood proportions across different age classes of *Acacia catechu*.
3. To compare the ratio of the wood component in Terai and Mid-hill Region

1.3 Significance of the Study

The findings of this study hold several implications for the management and utilization of Acacia catechu in the Bagmati Province. To begin with the knowledge gained regarding the ratio of sapwood and heartwood can contribute to improved tree age determination for the harvesting of the species which further improves the economic benefit to all stakeholders.

In addition to that, understanding the variations in sapwood and heartwood proportions across different age classes of *Acacia catechu* can assist in sustainable harvesting strategies. By targeting trees with optimal heartwood development, it is possible to maximize timber quality and minimize waste in the processing industry.

Conclusively, the findings of this study can contribute to the scientific knowledge of *Acacia catechu* in the context of the Bagmati Province. It fills a research gap and provides a basis for further investigations and studies related to the species' ecology, physiology, wood properties and business.

2 Methodology

2.1 Secondary source of Knowledge

Several researches on *Acacia catechu* as a riverine forest species were taken into consideration during the before and during the field work which provided comprehensive guide throughout the process. Several national and international publication were extensively reviewed throughout the study period.Forest research and Training center, Ministry of forest and environment, Bagmati province and other organizations were the major source of literature and suggestion. Those sources were highly acclaimed by the research team.

2.2 Access to the log samples

Bagmati province is one of the most prime province in Nepal in terms of the variablity in forest types. There are sufficient amount of river systems which is potential habitat for *acacia catechu* forests. Several districts like Dhading, Chitwan,Nuwakot, Makawanpur, Sindhuli, Sindhupalchok, Kabhrepalachok, etc. are connected with river systems with subtropical climatic conditions. Forest Research Training Center as a client and the organization as a consulting organization jointly made an effort to coordinate with Division Forest Offices to find an desired sample logs for the study. With continued discussion five divisions were chosen as a study site i.e., Chitwan, Dhading, Kabhrepalachok, Sindhuli and Marin Division forest offices. Maximum possible number of sample logs were taken in the designed division forest offices.

2.3 Data Collection

With all available logs following parameters were taken.

- Under bark girth of the log in both thick and thin end of the log in centimeters.
- Under bark girth of the log in the mid section of the log in centimeters.
- Girth are converted into diameter using the formula dividing them by π .
- Length of the log in meters.
- Thickness of the sapwood in cm. (This measurement is taken in two direction in each end of the log. The final thickness is the average of those four measurements.
- Diameter of the heartwood in both ends of the logs in centimeters.

2.4 Data Analysis

Microsoft Statistical package R is used to analyse the data.

2.4.1 Volume of the Log

The volume of the log was calculated using the $smalian's formula$. Which is the average of the cross sectional area in each end of the log multiplied by the length of the log. Then mathematical representation of $smalian's formula$ is as follows:

$$V = \frac{S1 + S2}{2} * L \tag{i}$$

Where

$$S_1 = \frac{\pi * d_1^2}{4} \tag{ii}$$

S_1 as a Basal area in one end of the log. Similarly the S_2 is the basal area of another end calculated using same formula with the d_2 diameter of the second end.

and L is the length of the log from thick end to the thick end.

This formula gives the volume of the whole log. which contains both sap wood and heartwood.

2.4.2 Volume of the Heartwood

As mentioned before, the diameter of the heartwood was measured in both of the ends of the logs. Clear indication of heartwood was judged by the data collector and other forestry officials in the field.

Volume of the heartwood was also calculated using the equation (i). $Smalian'sFormula$ is used to calculate the volume because the diameter of the heartwood at the middle part of the log is impossible. Hence both log volume and heartwood volume is calculated using $smalian'sFormula$.

2.4.3 Volume of the Sapwood

The volume of the sapwood is calculated using:

$$V_{Sapwood} = V_{Log} - V_{Heartwood} \tag{iii}$$

2.4.4 Wood Component Ratios

Three ratios is calculated and displayed in the results. **First** is the ratio between the heartwood and total log volume without bark, **Second** the ration between the sapwood volume and the volume of log and **Third one** is the ration of sapwood volume to the heartwood volume.

1. Heartwood ratio to the log volume

$$Ratio_{(HW/Log)} = \frac{Volume_{(Heartwood)}}{Volume_{(Log)}} \tag{iv}$$

2. Sapwood ratio to the log volume

$$Ratio_{(SW/Log)} = \frac{Volume_{(Sapwood)}}{Volume_{(Log)}} \tag{v}$$

3. Sapwood ratio to the heartwood volume

$$Ratio_{(SW/HW)} = \frac{Volume_{(Sapwood)}}{Volume_{(Heartwood)}} \tag{vi}$$

2.4.5 Normality test of the data

To test the normality of the ratio, the most common method called Shapiro-Wilk test of normality was used.The Shapiro-Wilk test is a statistical test used to assess the normality of a dataset. It is widely used to determine whether a sample of data comes from a population that follows a normal distribution. The test is based on the idea that if the data is normally distributed, the expected order statistics (ranked values) will follow a specific pattern.The test calculates the test statistic (W) based on the correlation between the observed data and the expected normal order statistics. The test statistic ranges between 0 and 1, where a value closer to 1 indicates better conformity to a normal distribution.

The Shapiro-Wilk test also provides a p-value, which represents the probability of obtaining the observed test statistic (or a more extreme value) assuming that the data is normally distributed. A small p-value suggests that the data significantly deviates from normality.It's important to note that the Shapiro-Wilk test is more accurate and powerful for small to moderate sample sizes compared to other normality tests like the Anderson-Darling or Kolmogorov-Smirnov tests.

2.4.6 Variance of the ratio of sapwood to heartwood

To test the variance of the heartwood sapwood ratio in different diameter classes,Levene's test was used which is a common test used to assess the equality of variances across multiple groups.Levene's test is a statistical test used to assess the equality of variances between multiple groups or samples. It is particularly useful when the assumption of equal variances is violated. The test calculates a test statistic based on the absolute deviations between each observation and the group mean, and it compares this statistic to a critical value from the F-distribution. If the test statistic is significantly different from the critical value, it suggests that there is a significant difference in variances among the groups.

2.4.7 Choosing the statistical test.

Based on the normality, variance among the groups and number samples among the groups will determine the statistical test. To choose the suitable statistical tests for testing the difference in mean and median, more information about specific data and the nature of the variables is needed. *Sample Size:* Consider the size of your sample. Larger sample sizes tend to provide more reliable estimates of population parameters and increase the power of statistical tests.

Distribution: Assess the distributional characteristics of your data. Determine whether the data follows a normal distribution or if it exhibits skewness or heavy-tailed behavior. This can guide the selection of appropriate statistical tests.

Suitable Statistical Tests:

Difference in Mean: If your data follows a normal distribution and you want to compare the means of two or more groups, you can use parametric tests such as the independent t-test (for two groups) or analysis of variance (ANOVA) followed by post-hoc tests (for more than two groups). If the data does not follow a normal distribution or the assumptions for parametric tests are violated, you can consider non-parametric alternatives like the Mann-Whitney U test (for two groups) or the Kruskal-Wallis test followed by post-hoc tests (for more than two groups).

Difference in Median: If your data does not follow a normal distribution and you want to compare the medians of two or more groups, non-parametric tests are typically used. The Wilcoxon rank-sum test (also known as the Mann-Whitney U test) can be employed for comparing two groups, while the Kruskal-Wallis test followed by post-hoc tests is suitable for comparing multiple groups. These tests assess whether there are statistically significant differences in the medians across the groups.

3 Results

3.1 Preview of the data From field

Primarily dimensions like girth of log, sapwood thickness and heartwood diameter was collected from the field. After transferring to the digital format in excel sheet the data looked like as the table below:

Table 1: A Summary of field data

tree	log_no	girth1	girth_m	girth3	sw_girth1	sw_girth	hw_dia1	hw_dia2	length	remarks
NA	NA	67	72	85	1.80	2.00	14.7500	18.900	110	Chitwan
NA	NA	59	63	55	1.40	2.10	13.9000	15.400	106	Chitwan
NA	NA	70	73	66	1.40	1.50	15.7900	14.980	138	Chitwan
NA	NA	56	58	56	1.25	1.40	13.8000	12.300	110	Chitwan
NA	NA	78	77	83	1.45	1.45	17.5000	18.750	130	Chitwan
NA	NA	54	52	55	1.75	1.30	11.7000	12.800	133	Chitwan
NA	NA	75	75	79	1.35	2.00	18.5000	19.560	136	Chitwan
10	1	167	164	165	1.32	1.21	50.6700	50.380	127	Dhading
2	1	72	85	78	1.40	1.50	15.8500	16.895	135	Dhading
2	3	65	68	70	1.65	1.40	13.5900	15.850	138	Dhading
27	6	100	79	72	1.32	2.01	30.2300	19.670	92	Dhading
10	8	123	119	128	1.09	1.19	37.2100	37.110	150	Dhading
24	11	56	58	56	1.25	1.40	11.9800	11.760	110	Dhading
27	1	120	124	125	1.11	1.70	34.4500	38.020	58	Dhading
54	1	94	96	97	1.98	2.13	27.8800	29.010	112	Kabhre
80	1	109	110	114	1.49	1.13	33.1300	35.090	140	Kabhre
60	1	55	56	59	1.02	1.60	16.0800	17.120	112	Kabhre
12	1	168	173	176	1.23	1.40	52.1200	55.640	150	Kabhre
29	1	87	86	88	1.49	1.02	26.1100	26.070	89	Kabhre
73	2	120	114	110	1.21	2.12	37.0300	32.890	135	Kabhre
12	2	171	178	179	1.50	1.48	42.0200	55.030	140	Kabhre
130	1	101	119	114	1.75	1.30	30.5580	35.014	104	Rapti
118	9	38	34	32	1.40	2.10	10.2823	7.958	122	Rapti
132	5	75	74	78	1.45	1.45	22.2820	23.237	121	Rapti
137	8	61	54	50	1.40	1.50	18.1440	14.324	124	Rapti
158	9	48	43	54	1.55	1.90	13.6870	15.279	130	Rapti
109	2	115	120	129	1.40	1.50	35.3320	39.470	117	Rapti
113	5	128	127	89	1.00	3.00	39.1700	25.465	85	Rapti
21	4	120	124	125	1.00	1.00	34.0000	38.100	58	sindhuli_marin
2	19	53	52	49	3.00	1.00	12.0000	11.000	155	sindhuli_marin
1	12	71	75	70	3.00	3.00	19.7000	16.000	90	sindhuli_marin
19	2	81	82	85	1.00	1.00	24.0800	26.300	67	sindhuli_marin
15	12	72	70	73	1.00	2.00	21.0000	15.900	68	sindhuli_marin
22	10	90	83	82	1.00	3.00	27.1900	23.000	112	sindhuli_marin
16	2	109	114	106	2.00	2.00	32.0000	27.000	66	sindhuli_marin

Note : All the measurements were taken in centimeters (cm)

3.2 Summary of the preliminary results

The diameter of the log and diameter of the heartwood ranges from 8.59 cm and 8.91 cm and to 56.66 cm and 8.91 cm respectively. As described in the table below mean diameters of the log and heartwood are 26.37 cm and 23.4 cm respectively. This means the overall log diameter is lesser in size. This might be the because of the availability of the sample. The fig below further represents the overall distribution of the diameter data.

Table 2: Summary of the log dimensions

	Log Diameter(cm)	Heartwood diameter (cm)
Min	8.59	8.91
Mean	26.37	23.40
Median	24.83	22.00
Max	56.66	54.12
STDEV	9.43	9.31

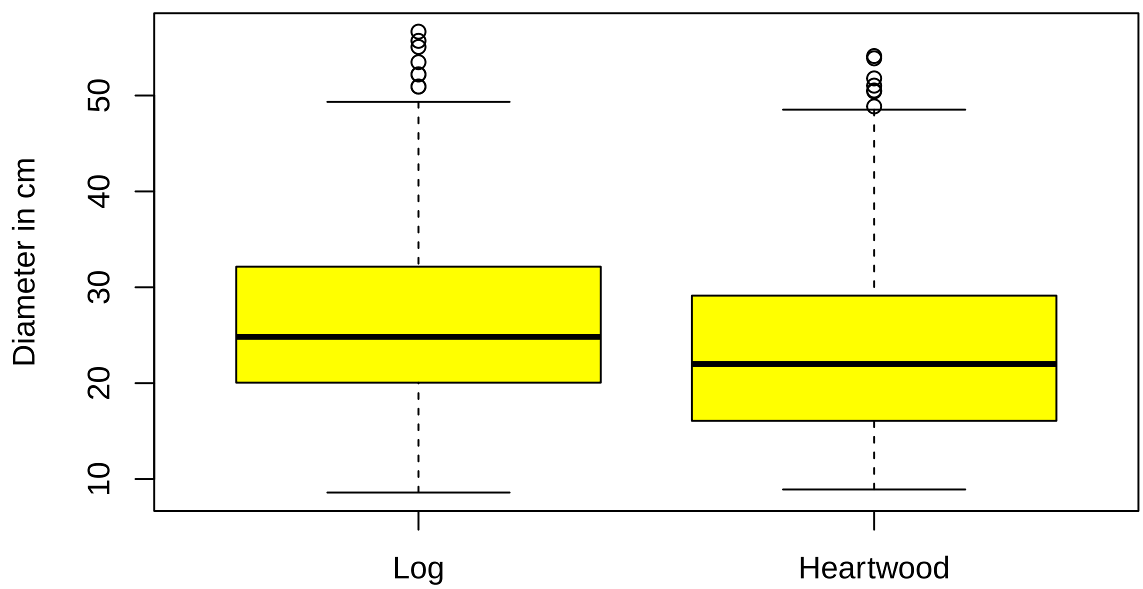

Figure 2: Distribution of diameter

The figure suggests the overall distribution of the diameters are between 20 cm to 30 cm. Very less numbers of the log sample are taken from the diameter class above 50 cm.

3.3 Diameter class division

With the information above total number of logs are divided into three diameter classes i.e., 0 - 30cm in diameter, 30-50 cm in diameter, and logs with diameter above 50 cm. Lesser representation of sample logs with higher diameter class can be regarded as the limitation of the sampling techniques.

Table 3: Number of logs in different diameter classes

Diameter(cm)	Number of logs	Mean diameter	Mean ratio (HW to Log volume)	Mean ratio (SW to Log Volume)
0-30	189	21.09	0.74	0.26
30-50	82	35.90	0.81	0.19
50 above	8	53.40	0.91	0.09

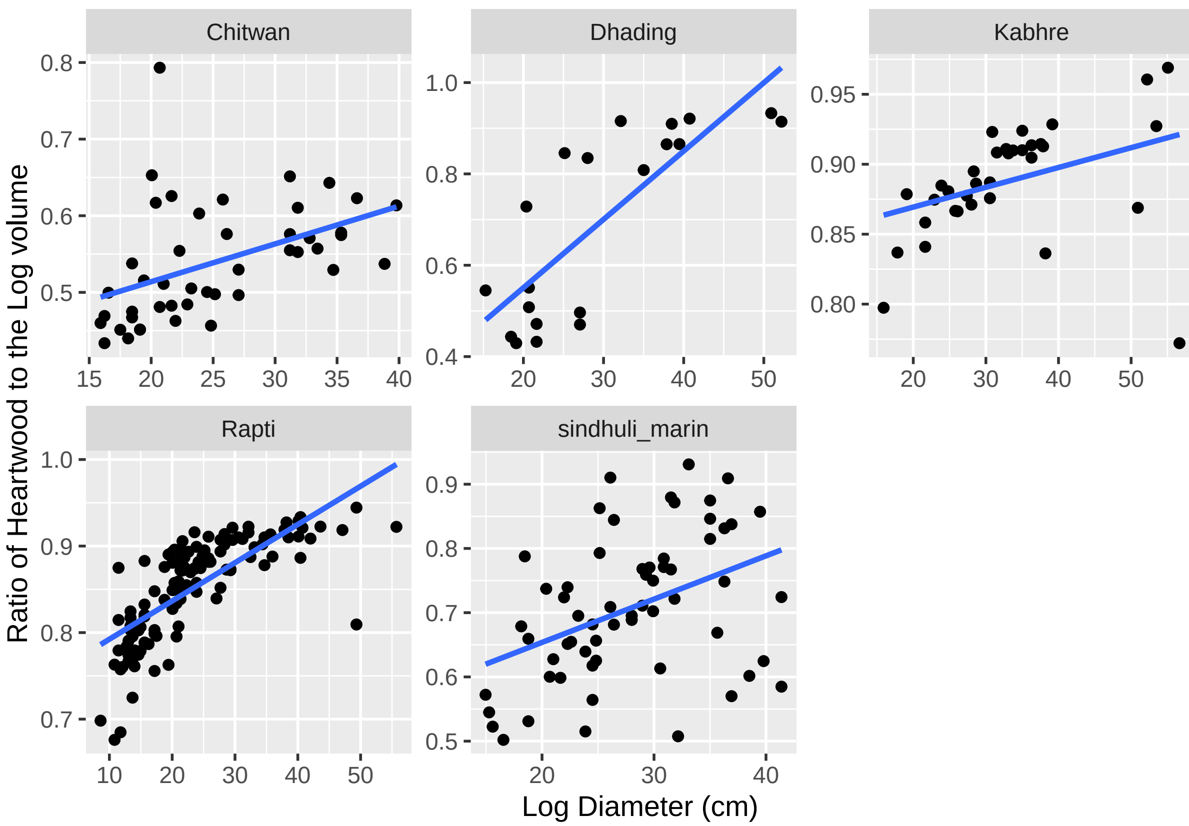

Figure 3: Relation of the diameter and heartwood ratio

The table simply displays the increase in ratio of heartwood volume to the log volume. The fig possess the agreement with the data but there is unclear pattern of data distribution. This can explain the relation of diameter and the ratio of heartwood in a complex way So that it is difficult to predict the ratio of heartwood volume to the total log volume by the diameter of log. The later figure in this part displays the inverse relation between diameter to the ratio of sapwood volume which is as predicted after looking into its relation to the heartwood volume.

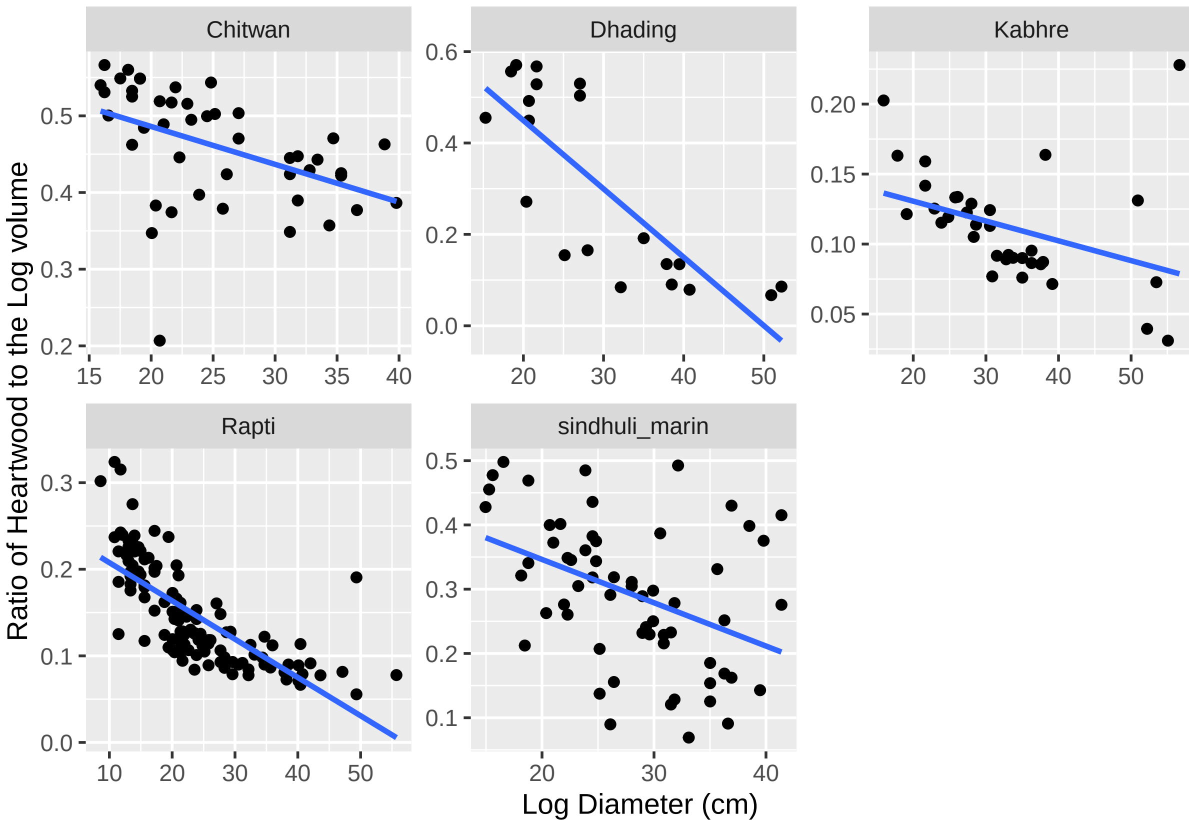

Figure 4: Relation of the diameter and sapwood ratio

3.4 Ratio of sapwood volume to heartwood

There were visible increase of heartwood volume ratio with the increase in diameter of logs as well as the decrease in sapwood volume ratio with the rising log diameter.

Table 4: Ratio of sapwood to heartwood by the diameter class

Diameter class	Number of logs	Mean diameter	Mean ratio (sapwood to heartwood)	Median ratio	STDEV
0-30	189	21.09	0.43	0.26	0.36
30-50	82	35.90	0.28	0.14	0.27
50 above	8	53.40	0.11	0.08	0.08

The above mentioned results is also justified by the table here. The ratio of the sapwood to the heartwood ratio is decreasing with the increasing diameter. Different ratios can be recommended for different diameter if the ratio differs significantly.

3.5 Normality in ratio of sapwood to heartwood

The Shapiro-Wilk test assessed whether a ratio follows a normal distribution by calculating a test statistic (W) and determining the associated p-value. By comparing the p-value to a significance level, you can determine whether the data can be considered normally distributed or not.

Table 5: Result of normality test

	Test_statistic	P.Value	Method
W	0.807	0	Shapiro-Wilk normality test

The Shapiro-Wilk normality test on a ratio, revealing a test statistic (W) of 0.807 and a p-value of 0. In this case, the calculated test statistic of 0.807 indicates that the data may deviate slightly from perfect normality. However, the extremely small p-value of 0 suggests strong evidence against the null hypothesis of normality. This implies that the data is highly unlikely to have been generated from a normal distribution. Therefore, based on the Shapiro-Wilk test results, we can conclude that the data exhibits departures from normality.

3.6 Variance in ratio of sapwood and heartwood.

Levene's test is robust to departures from normality and can be used with unequal sample sizes.

Table 6: Result of variance test

	Stat	P.Value	Method
Test Statistic	3.55	0.03	Modified robust Brown-Forsythe Levene-type test based on the absolute deviations from the median with modified structural zero removal method and correction factor

The statistic value (3.55) represents the test statistic calculated by the Levene's test. This test statistic is used to assess the difference in variances between the different diameter classes. In this case, the specific value of 3.55 is the computed test statistic of the sapwood heartwood ratio.

The p-value (0.03) represents the probability of observing a test statistic as extreme as the one calculated (or more extreme) under the null hypothesis. In Levene's test, the null hypothesis is that the variances of the heartwood sapwood ratios are equal across all the diameter classes. A p-value of 0.03 indicates that if the null hypothesis were true (i.e., if there were no difference in variances), you would expect to observe a test statistic as extreme as 3.55 (or more extreme) in only 3% of cases.

Since the p-value (0.03) is below the typical significance level of 0.05, the null hypothesis and conclude that there is evidence of a significant difference in variances of the heartwood sapwood ratios across the different diameter classes.

In summary, the results suggest that there is a significant difference in the variances of the heartwood sapwood ratios between the diameter classes based on the Levene's test.

3.7 Choosing the statistical test

Our data did not possess the normality and does not have the equal variance so that, non parametric test called Krushkal-Walis test is used in the study.

The Kruskal-Wallis test is a non-parametric statistical test used to determine if there are significant differences between the medians of two or more independent groups. It is an extension of the Mann-Whitney U test, which is used for comparing two groups. The Kruskal-Wallis test ranks the observations from all groups, considering their joint distribution, and calculates a test statistic based on the ranks. The test statistic follows a chi-square distribution with degrees of freedom equal to the number of groups minus 1. By comparing the test statistic to a critical value from the chi-square distribution, the Kruskal-Wallis test assesses whether there are statistically significant differences in medians among the groups. It is particularly useful when the assumptions of normality and equal variances are violated, making it a robust alternative for comparing groups based on medians.

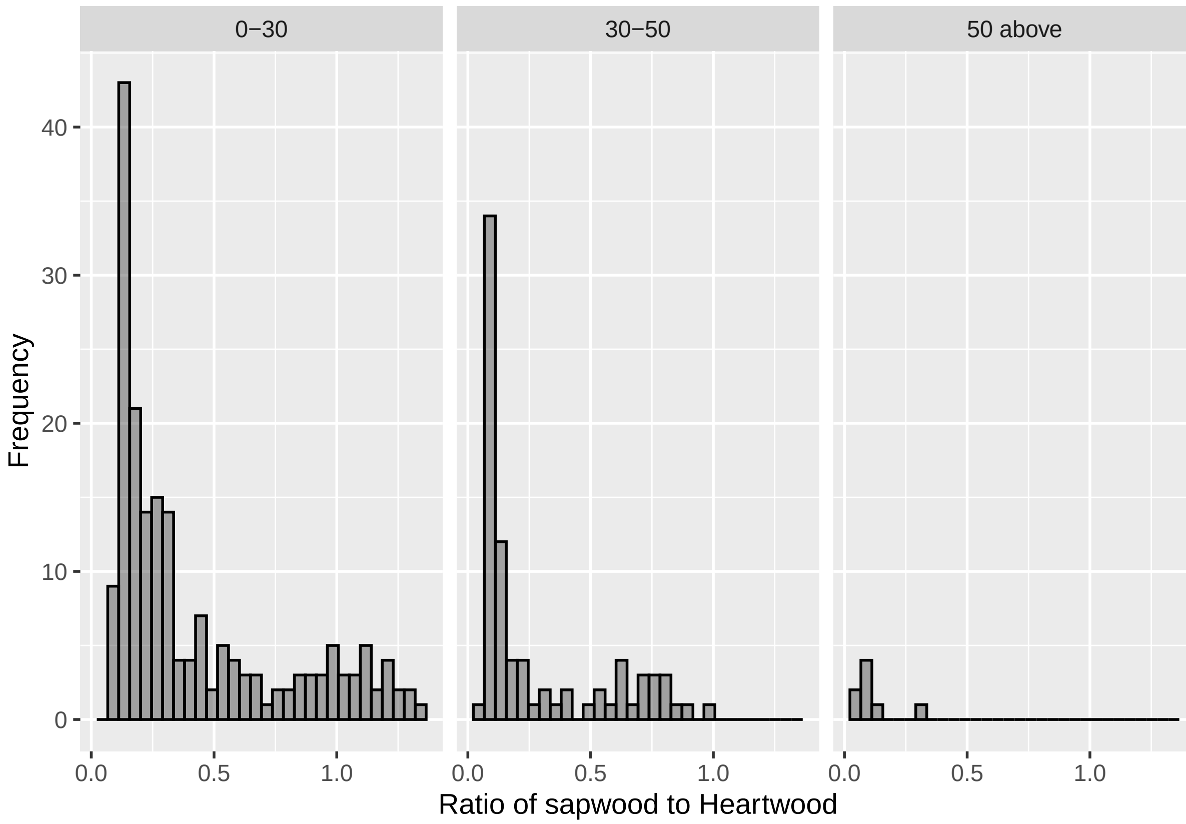

Figure 5: Distribution of ratio by diameter class

As we discussed before the data is faraway from normality. The figure shows the ratio of sapwood to the heartwood could be higher than 1 in smaller logs i.e., volume of sapwood can be higher than that of heartwood specially in smaller logs. The histogram demonstrates that the data is not normally distributed and is skewed, with the means and standard deviations of the different groups differing.

3.8 Kruskal-Wallis Test Results

The Kruskal-Wallis test was conducted on the data, resulting in a test statistic of 36.26329 and a p-value of 0. The test was performed using the Kruskal-Wallis rank sum test, which is a non-parametric test used to compare the medians of multiple independent groups. The Kruskal-Wallis test statistic, which follows a chi-squared distribution, quantifies the differences in ranks among the groups. In this case, the test statistic value of 36.26329 indicates a substantial difference in ranks among the groups. The p-value of 0 suggests that the observed test statistic is statistically significant at conventional significance levels. Therefore, there is strong evidence to reject the null hypothesis that the medians of the groups are equal. In summary, based on the results of the Kruskal-Wallis test (Kruskal-Wallis chi-squared = 36.26329, p-value = 0), we can conclude that there are significant differences in the medians among the groups being compared.

Table 7: Result from Kruskal-Wallis test

	Statistic	Parameter	P.Value	Method
Kruskal-Wallis chi-squared	36.26329	2	0	Kruskal-Wallis rank sum test

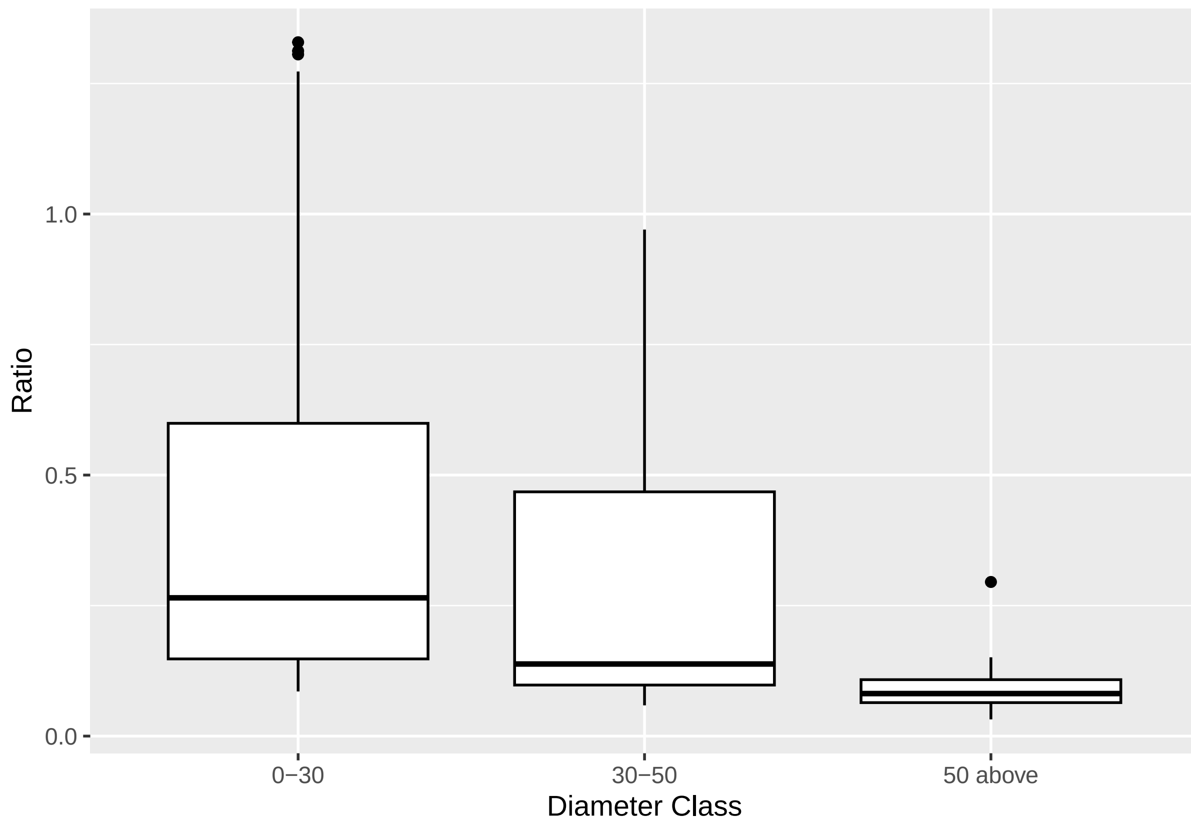

Figure 6: Box Plot of Ratio of sapwood to heartwood by diameter class

The dunn test as a post hoc analysis of kruskal-Walis test was performed to identify the groups having difference in median.

```
##   Kruskal-Wallis rank sum test
##
## data: x and group
## Kruskal-Wallis chi-squared = 36.2633, df = 2, p-value = 0
##
##
##                           Comparison of x by group
##                                 (Bonferroni)
## Col Mean-|
## Row Mean |       0-30      30-50
## ---------+----------------------
##    30-50 |   4.885026
##          |    0.0000*
##          |
## 50 above |   4.041137   2.194151
##          |    0.0001*     0.0423
```

```
##
## alpha = 0.05
## Reject Ho if p <= alpha/2
```

Table 8: Result of dunn test (Post-HOC of Kruskal-Walis test)

Diameter Class	Chi-squared Value	Z- Value	P.Value	P.Adj
0-30 - 30-50	36.2633	4.8850	0.0000	0.0000
0-30 - 50 above	36.2633	4.0411	0.0000	0.0001
30-50 - 50 above	36.2633	2.1942	0.0141	0.0423

The dunn test preformed the post HOC analysis of non parametric test i.e., kruskal walis test. The result illustrated the clear difference in ratio of sapwood to the heartwood within different diameter class. The table suggested that, there is no significant difference higher diameter classes i.e.,30-50 and 50 above which might be because of small number of samples in the highest class.

3.9 Heartwood and Sapwood ratio in Terai and higher altitudes

The data is collected from five districts. Most of the sample log $n = 225$ is from Terai region i.e., Sindhuli marin, chitwan and Rapti divisional forest area from sindhuli, chitwan and makawanpur district respectively whereas the sample from middle hill region i.e., from kabhrepalanchok and dhading district is significantly less $n = 54$. Whereas it depends upon the habitat of *Acacia catechu* inside the district. The table donot reflect any significant difference in ratio between the log samples from Terai and Mid-hill Region. In addition to that the table shows high number of sample (see the difference in standard deviation of both groups and comparison with the number of samples in each) can decrease the deviation in the data which makes easier for decision makers.

Table 9: Distribution of the samples by the region

Region	N	Minimum	Average	Median	Maximum	SD
Mid-hill	54	0.03	0.29	0.14	1.33	0.37
Terai	225	0.06	0.39	0.26	1.31	0.32

4 Conclusion

Acacia catechu named as *khair* in Nepal is a valuable economic species which has great importance in national as well as local economy. This study helps the forest manager, traders as well as local users/plantation farmers to quantify the resource and valuate it in terms of financial resources.

The study highlighted that the wood component ratio i.e., heartwood volume to log volume, sapwood volume to log volume and ratio of sapwood and heartwood volume are significantly different in different diameter classes. The mean ratios for three diameter class of logs i.e, 0 - 30, 30 - 50, 50 above are 0.43, 0.28 and 0.11 respectively. Whereas median ratio of those classes are 0.26, 0.14, 0.08 respectively. The diameter and samples were not normally distributed and possess some outlier in the distribution. In this case median data is highly recommended because mean in highly sensitive to the distribution and outlier of the data. The ratio between the wood components do not possess the significant difference in Terai and Mid-hill regions.

The study concludes and recommend the median ratios as the findings to use as a management tools. However, the study should be broaden with greater number of sample logs so that it will be easier for decision makers to imply it as management as well as financial tool.

5 Annex

5.1 Data used for Analysis

Table 10: Final Field Data

tree	log_no	girth1	girth_m	girth3	sw_girth1	sw_girth	hw_dia1	hw_dia2	length	remarks
108	4	93	92	104	1.35	1.90	27.3300	31.1940	128.0	Rapti
108	1	120	113	122	2.50	2.00	35.6510	36.9240	121.0	Rapti
108	3	102	104	126	2.00	2.00	30.5580	38.1970	124.0	Rapti
108	2	115	112	111	1.65	1.50	35.0140	33.7410	130.0	Rapti
109	5	91	81	58	1.40	1.25	27.2930	17.1890	143.0	Rapti
109	7	65	67	78	1.55	1.90	19.0990	22.9180	120.0	Rapti
109	6	68	63	65	2.10	1.75	19.4170	19.0990	133.0	Rapti
109	2	115	120	129	1.40	1.50	35.3320	39.4700	117.0	Rapti
109	4	93	77	78	1.70	1.90	28.0110	22.9180	128.0	Rapti
109	1	142	126	123	2.00	1.00	43.2900	37.1970	124.0	Rapti
110	1	141	126	128	1.25	1.30	43.0800	39.4700	135.0	Rapti
110	3	113	108	109	0.85	1.60	34.0140	33.1040	129.0	Rapti
111	5	96	89	83	0.85	1.00	29.0300	25.4650	120.0	Rapti
111	6	117	109	95	1.50	3.00	35.6510	27.3750	128.0	Rapti
111	7	123	102	66	2.00	2.00	37.2420	19.0990	90.0	Rapti
111	3	161	155	167	3.00	1.00	45.5180	48.3830	130.0	Rapti
111	2	116	121	142	1.80	2.00	35.0140	43.2900	126.0	Rapti
111	4	105	109	112	1.50	1.50	31.8310	34.0590	118.0	Rapti
111	1	160	175	194	1.25	1.40	49.0560	59.1790	125.0	Rapti
111	3	131	137	145	2.00	1.50	39.7890	44.5630	123.0	Rapti
113	6	85	78	76	1.00	1.00	25.1010	23.2370	130.0	Rapti
113	5	128	127	89	1.00	3.00	39.1700	25.4650	85.0	Rapti
113	4	134	127	132	1.75	1.30	41.0620	40.7440	126.0	Rapti
113	1	167	155	149	1.30	1.50	51.8850	45.8370	125.0	Rapti
116	12	31	27	36	1.55	1.90	8.2760	9.5490	125.0	Rapti
118	1	91	85	89	1.00	3.00	27.0110	25.4650	128.0	Rapti
118	4	44	41	47	2.00	1.50	12.0960	13.3690	116.0	Rapti
118	3	43	42	44	1.25	1.35	12.4140	12.7320	98.0	Rapti
118	8	38	34	37	1.75	1.30	10.3504	10.5040	130.0	Rapti
118	9	38	34	32	1.40	2.10	10.2823	7.9580	122.0	Rapti
119	2	57	49	47	1.50	2.35	16.5520	12.7320	128.0	Rapti
121	6	65	63	65	1.25	1.30	19.4170	19.4170	119.0	Rapti
121	5	74	68	62	1.60	1.25	21.9630	18.4620	113.0	Rapti
121	1	104	101	105	1.40	1.50	31.8310	31.8310	123.0	Rapti
121	3	64	76	83	1.40	1.50	19.0990	24.8280	124.0	Rapti
121	2	111	128	135	1.65	1.50	33.7410	41.3800	130.0	Rapti
121	4	64	65	72	2.10	1.75	18.1440	21.3270	120.0	Rapti
122	4	60	59	65	0.70	0.85	17.4620	19.7350	129.0	Rapti
122	6	50	46	37	1.60	1.25	14.3240	10.5040	127.0	Rapti
122	2	75	69	69	1.00	1.00	22.1800	21.0080	119.0	Rapti
122	3	71	65	68	3.00	2.00	19.7350	19.7350	125.0	Rapti
122	8	61	54	51	2.00	2.00	17.5070	14.3240	128.0	Rapti
123	5	63	64	67	1.15	1.00	18.7800	20.3720	128.0	Rapti
123	3	82	75	76	1.35	2.00	24.2800	22.2820	125.0	Rapti
123	1	94	87	87	1.00	1.00	28.1600	26.7380	124.0	Rapti
123	2	85	81	85	1.45	1.50	25.4650	25.4650	124.0	Rapti
124	4	96	75	63	3.00	1.00	27.6930	19.0990	120.0	Rapti

tree	log_no	girth1	girth_m	girth3	sw_girth1	sw_girth	hw_dia1	hw_dia2	length	remarks
124	3	91	87	92	1.45	1.45	27.3750	27.6930	109.0	Rapti
124	1	88	93	101	1.40	1.25	26.3800	30.8760	124.0	Rapti
125	3	73	69	67	1.45	1.40	21.6450	20.0540	142.0	Rapti
125	7	44	49	35	0.50	0.50	13.1300	10.5040	85.0	Rapti
125	5	63	67	74	1.00	2.50	19.0100	21.0080	126.0	Rapti
125	6	59	54	54	2.00	3.00	16.8700	14.3240	110.0	Rapti
125	1	122	132	85	1.65	1.50	37.2420	25.4650	103.0	Rapti
125	4	70	68	69	1.00	1.00	21.1000	21.0080	136.0	Rapti
127	8	78	70	68	2.00	1.50	22.9180	20.0540	100.0	Rapti
128	5	59	64	68	1.45	1.50	17.1890	20.0540	122.0	Rapti
129	4	53	51	53	1.50	2.35	15.2790	14.6420	132.0	Rapti
129	6	49	41	47	1.50	2.35	14.0060	12.7320	119.0	Rapti
130	2	87	67	62	1.75	1.30	26.1010	18.4620	128.0	Rapti
130	1	101	119	114	1.75	1.30	30.5580	35.0140	104.0	Rapti
131	7	66	64	69	1.65	1.50	19.4170	20.3720	122.0	Rapti
131	2	97	92	87	2.10	1.75	28.6480	26.1010	124.0	Rapti
131	3	86	90	94	1.35	1.90	25.5101	28.0110	125.0	Rapti
132	9	70	63	70	2.00	1.50	20.3720	20.6900	93.0	Rapti
132	5	75	74	78	1.45	1.45	22.2820	23.2370	121.0	Rapti
132	7	78	72	70	1.50	1.50	23.2370	20.6900	119.0	Rapti
135	3	54	43	42	1.80	2.00	15.2790	11.4590	127.0	Rapti
136	2	90	77	80	1.85	1.50	26.7380	23.8730	122.0	Rapti
136	4	81	66	59	1.00	2.00	24.2800	16.8700	120.0	Rapti
136	3	70	67	78	1.50	1.00	20.6900	23.8730	130.0	Rapti
136	5	49	46	51	2.00	2.00	13.6870	14.3240	126.0	Rapti
136	8	46	42	50	1.45	1.50	13.0510	14.3240	110.0	Rapti
136	9	49	43	52	2.20	2.50	13.3690	14.0060	126.0	Rapti
136	10	40	38	47	1.40	2.10	11.4590	12.7320	127.0	Rapti
136	4	49	63	73	0.85	1.00	14.6420	22.0282	134.0	Rapti
136	12	37	36	35	1.15	1.00	10.5040	10.1860	126.0	Rapti
136	11	45	42	49	1.40	1.50	13.0510	14.0060	106.0	Rapti
136	6	38	40	48	1.65	1.50	10.5040	13.6870	135.0	Rapti
137	10	39	36	38	0.50	1.00	11.7770	11.1410	150.0	Rapti
137	6	65	66	67	1.00	1.00	19.3500	20.3720	128.0	Rapti
137	7	68	61	66	3.50	2.00	18.1440	19.0990	127.0	Rapti
137	5	66	67	83	1.45	1.45	19.4170	24.8280	126.0	Rapti
137	6	52	66	46	1.45	1.50	14.9610	13.0510	105.0	Rapti
137	2	102	96	94	1.45	1.40	30.8760	28.6480	118.0	Rapti
137	1	103	98	102	0.85	1.60	31.3100	30.8760	111.0	Rapti
137	4	84	79	82	1.25	1.30	25.1650	24.8280	117.0	Rapti
137	8	61	54	50	1.40	1.50	18.1440	14.3240	124.0	Rapti
137	9	43	37	44	2.20	2.50	11.4590	11.4590	114.0	Rapti
139	8	61	59	57	1.45	1.45	17.8250	16.5520	104.0	Rapti
144	2	74	74	73	1.00	1.00	22.6000	22.1820	125.0	Rapti
144	3	66	55	50	3.00	1.00	18.1440	14.9610	109.0	Rapti
144	1	83	81	79	0.70	0.85	25.0300	24.1920	116.0	Rapti
145	3	58	61	80	1.25	1.35	17.1890	24.1920	122.0	Rapti
145	9	78	75	73	1.15	1.00	23.5550	22.0200	128.0	Rapti
145	5	46	44	48	1.80	2.00	12.7320	13.3690	136.0	Rapti
147	1	61	54	54	1.80	2.00	17.5070	15.2790	122.0	Rapti
151	10	42	41	49	1.35	1.90	12.0960	13.6870	142.0	Rapti
151	7	53	49	49	1.40	1.50	15.5970	14.0060	124.0	Rapti

tree	log_no	girth1	girth_m	girth3	sw_girth1	sw_girth	hw_dia1	hw_dia2	length	remarks
151	5	73	72	77	1.45	1.45	21.6450	22.9180	128.0	Rapti
156	1	103	101	99	1.25	1.35	31.5130	30.2390	133.0	Rapti
156	6	72	71	74	1.25	1.40	21.6450	22.2820	130.0	Rapti
157	9	46	44	48	1.50	2.00	13.0510	13.3690	125.0	Rapti
157	8	47	46	49	1.45	1.45	13.3690	14.0060	125.0	Rapti
157	3	78	77	84	2.00	1.25	22.9180	25.4650	120.0	Rapti
157	2	101	93	98	1.25	1.40	30.8760	29.9210	137.0	Rapti
158	9	48	43	54	1.55	1.90	13.6870	15.2790	130.0	Rapti
158	11	41	37	49	2.10	1.75	10.8230	14.0060	127.0	Rapti
158	7	52	49	53	1.35	1.90	15.2790	14.9610	130.0	Rapti
158	8	50	47	48	1.65	1.50	14.3240	13.6870	125.0	Rapti
158	6	54	49	63	1.55	1.90	15.5970	18.1440	115.0	Rapti
158	3	101	89	96	1.35	1.90	30.8760	28.6480	130.0	Rapti
158	10	36	36	40	1.45	1.40	9.8680	11.4590	125.0	Rapti
158	5	86	74	65	1.65	1.50	25.7830	19.0990	126.0	Rapti
158	4	104	87	88	2.20	2.50	30.8760	25.4650	138.0	Rapti
NA	2	150	148	145	1.00	1.00	45.7920	44.2000	133.0	Rapti
NA	9	54	47	49	3.00	1.00	14.3240	14.6420	124.0	Rapti
NA	8	45	42	44	1.60	1.25	12.7320	12.7320	106.0	Rapti
NA	4	79	82	86	1.35	1.90	23.8730	25.4650	129.0	Rapti
NA	NA	110	111	120	1.10	1.35	26.5000	29.0000	119.0	Chitwan
NA	NA	100	105	101	1.35	1.15	23.5000	24.2500	123.0	Chitwan
NA	NA	102	103	103	1.75	1.50	24.5000	24.8000	92.5	Chitwan
NA	NA	95	100	105	1.00	1.35	26.0000	23.7500	131.0	Chitwan
NA	NA	115	115	95	1.30	1.50	27.4600	25.5000	140.0	Chitwan
NA	NA	122	108	98	0.70	0.85	33.0000	22.5000	125.0	Chitwan
NA	NA	103	109	102	0.85	1.00	24.5000	22.9500	135.0	Chitwan
NA	NA	93	98	111	1.40	1.25	22.0000	30.0000	130.0	Chitwan
NA	NA	106	98	90	1.25	1.30	27.0000	19.9900	132.0	Chitwan
NA	NA	98	100	93	1.95	1.40	21.8900	23.3000	130.0	Chitwan
NA	NA	130	111	99	1.15	1.00	31.8000	23.5000	111.0	Chitwan
NA	NA	91	122	111	1.25	1.35	22.5000	24.8000	140.0	Chitwan
NA	NA	115	125	139	1.60	1.25	28.5000	34.8000	139.0	Chitwan
NA	NA	61	69	70	2.55	2.90	13.1600	15.2000	135.0	Chitwan
NA	NA	65	64	60	2.10	1.75	16.7000	14.5000	139.0	Chitwan
NA	NA	71	78	79	1.85	2.60	15.8000	16.5000	131.0	Chitwan
NA	NA	51	51	50	1.65	2.90	11.5000	10.5000	105.0	Chitwan
NA	NA	70	73	66	1.40	1.50	15.7900	14.9800	138.0	Chitwan
NA	NA	63	68	63	1.97	2.90	14.9000	12.8900	131.0	Chitwan
NA	NA	62	55	52	1.85	1.50	13.2300	11.1500	132.0	Chitwan
NA	NA	75	75	79	1.35	2.00	18.5000	19.5600	136.0	Chitwan
NA	NA	55	57	57	3.25	3.00	11.8500	11.8000	120.0	Chitwan
NA	NA	60	61	55	1.50	1.40	13.5000	12.8000	136.0	Chitwan
NA	NA	72	85	78	1.40	1.50	16.2000	18.5000	135.0	Chitwan
NA	NA	76	85	89	1.40	1.40	17.0000	20.0000	135.0	Chitwan
NA	NA	65	68	70	1.65	1.40	16.5000	17.5000	138.0	Chitwan
NA	NA	65	65	62	1.35	1.25	17.5000	18.5000	140.0	Chitwan
NA	NA	66	66	60	1.90	0.80	14.8000	13.8900	135.0	Chitwan
NA	NA	79	79	80	1.35	1.45	18.0000	17.7000	139.0	Chitwan
NA	NA	80	81	92	1.50	1.25	17.9000	24.8000	138.0	Chitwan
NA	NA	93	98	87	1.30	1.35	22.8000	19.8000	140.0	Chitwan
NA	NA	75	70	79	1.45	1.50	18.0000	18.5000	135.0	Chitwan

tree	log_no	girth1	girth_m	girth3	sw_girth1	sw_girth	hw_dia1	hw_dia2	length	remarks
NA	NA	78	77	83	1.45	1.45	17.5000	18.7500	130.0	Chitwan
NA	NA	55	58	52	2.20	2.50	11.7800	11.7000	137.0	Chitwan
NA	NA	54	52	55	1.75	1.30	11.7000	12.8000	133.0	Chitwan
NA	NA	67	72	85	1.80	2.00	14.7500	18.9000	110.0	Chitwan
NA	NA	62	60	61	1.50	2.35	13.5000	12.8000	136.0	Chitwan
NA	NA	59	63	55	1.40	2.10	13.9000	15.4000	106.0	Chitwan
NA	NA	61	58	59	1.50	1.50	13.5000	12.6000	105.0	Chitwan
NA	NA	56	51	61	3.50	2.00	11.6700	12.8500	136.0	Chitwan
NA	NA	70	82	91	2.00	1.25	15.8000	22.8000	90.0	Chitwan
NA	NA	56	60	60	1.65	1.50	11.9000	12.9000	115.0	Chitwan
NA	NA	56	58	56	1.25	1.40	13.8000	12.3000	110.0	Chitwan
NA	NA	61	65	66	1.90	1.35	13.2900	14.7300	139.0	Chitwan
NA	NA	49	50	50	2.00	1.80	10.5000	10.8700	115.0	Chitwan
23	6	100	99	101	2.00	0.50	30.0000	30.0000	59.0	sindhuli_marin
23	1	114	114	124	2.00	1.50	34.1300	35.0000	62.0	sindhuli_marin
23	5	98	99	104	2.00	1.00	29.3000	27.0000	61.0	sindhuli_marin
18	3	123	125	107	1.00	1.50	29.0000	29.0000	64.0	sindhuli_marin
21	5	118	116	115	1.00	1.00	28.0000	28.0000	62.0	sindhuli_marin
21	9	106	101	103	2.00	1.00	23.6000	23.8000	64.0	sindhuli_marin
11	1	104	112	128	2.00	1.00	31.0000	29.7000	65.0	sindhuli_marin
1	10	77	78	88	2.00	1.50	22.3000	20.3000	91.0	sindhuli_marin
1	13	69	68	65	1.00	2.00	16.0000	17.0000	86.0	sindhuli_marin
12	1	129	130	134	2.00	1.00	33.0000	31.0000	65.0	sindhuli_marin
12	13	65	59	60	3.00	1.50	14.0000	15.0000	67.0	sindhuli_marin
29	2	123	121	120	1.00	1.50	30.0000	30.0000	59.0	sindhuli_marin
9	11	73	77	79	1.00	2.00	20.0000	18.0000	71.0	sindhuli_marin
17	9	95	96	98	1.00	2.00	21.7000	26.2000	65.0	sindhuli_marin
19	6	74	79	92	1.00	1.00	22.0000	27.1000	66.0	sindhuli_marin
19	3	76	77	83	0.50	0.50	18.0000	20.0000	63.0	sindhuli_marin
19	2	81	82	85	1.00	1.00	24.0800	26.3000	67.0	sindhuli_marin
29	1	137	130	127	2.00	1.00	40.0000	31.0000	67.0	sindhuli_marin
29	5	122	115	113	1.50	1.00	37.1800	34.1300	62.0	sindhuli_marin
19	9	55	57	52	0.50	1.00	15.0000	13.0000	93.0	sindhuli_marin
19	22	49	49	49	3.00	2.00	10.5000	12.0000	125.0	sindhuli_marin
13	1	115	116	115	1.50	2.00	34.0000	33.0000	57.0	sindhuli_marin
13	4	99	104	98	0.50	1.00	30.5000	30.0000	66.0	sindhuli_marin
13	8	80	83	84	1.00	2.00	20.0000	23.0000	64.0	sindhuli_marin
6	2	102	110	107	2.00	2.00	30.2100	32.0000	63.0	sindhuli_marin
8	11	80	77	76	2.00	1.00	21.0000	20.0000	64.0	sindhuli_marin
8	7	96	94	100	1.00	2.50	26.0000	28.0000	63.0	sindhuli_marin
8	9	90	91	89	2.00	2.00	25.0000	23.0000	63.0	sindhuli_marin
8	16	64	65	66	1.50	3.00	15.0000	17.0000	61.0	sindhuli_marin
8	19	56	58	89	2.50	2.00	14.0000	26.2000	91.0	sindhuli_marin
16	2	109	114	106	2.00	2.00	32.0000	27.0000	66.0	sindhuli_marin
7	14	70	69	74	2.00	3.00	20.0000	19.0000	60.0	sindhuli_marin
7	8	94	93	96	1.00	3.00	28.0000	25.0000	67.0	sindhuli_marin
10	13	70	71	70	2.00	2.00	19.0000	17.0000	63.0	sindhuli_marin
7	23	51	47	49	2.00	2.00	13.0000	11.0000	64.0	sindhuli_marin
22	10	90	83	82	1.00	3.00	27.1900	23.0000	112.0	sindhuli_marin
22	8	87	88	81	1.00	1.00	25.0000	19.0000	67.0	sindhuli_marin
27	6	102	100	100	1.00	1.00	31.0000	29.0000	59.0	sindhuli_marin
28	12	90	88	85	3.00	1.00	25.6000	20.6000	65.0	sindhuli_marin

tree	log_no	girth1	girth_m	girth3	sw_girth1	sw_girth	hw_dia1	hw_dia2	length	remarks
28	10	96	94	92	2.00	1.50	27.0000	23.0000	55.0	sindhuli_marin
1	15	60	59	60	3.00	2.00	16.0000	15.0000	92.0	sindhuli_marin
1	12	71	75	70	3.00	3.00	19.7000	16.0000	90.0	sindhuli_marin
1	11	72	75	77	3.00	2.00	18.0000	16.0000	91.0	sindhuli_marin
1	8	96	97	101	2.00	2.00	26.0000	29.0000	101.0	sindhuli_marin
26	13	82	78	74	2.00	2.00	22.0000	17.0000	64.0	sindhuli_marin
26	12	73	73	74	2.00	1.00	20.0000	19.0000	61.0	sindhuli_marin
15	9	75	82	78	2.00	2.00	21.0000	20.0000	66.0	sindhuli_marin
15	12	72	70	73	1.00	2.00	21.0000	15.9000	68.0	sindhuli_marin
4	3	92	97	96	0.50	1.00	27.0000	26.0000	64.0	sindhuli_marin
4	1	98	110	110	1.00	1.00	30.0000	31.0000	60.0	sindhuli_marin
20	11	95	91	88	3.00	1.00	27.0000	24.0000	63.0	sindhuli_marin
20	13	96	100	100	3.00	1.00	27.0000	26.0000	66.0	sindhuli_marin
2	20	46	48	48	2.00	1.00	10.0000	12.0000	160.0	sindhuli_marin
2	17	77	64	64	2.00	2.00	22.2000	16.0000	96.0	sindhuli_marin
2	19	53	52	49	3.00	1.00	12.0000	11.0000	155.0	sindhuli_marin
11	9	70	70	69	2.00	1.00	20.0000	18.0000	67.0	sindhuli_marin
11	4	90	92	87	1.00	2.00	26.0000	23.0000	63.0	sindhuli_marin
11	11	61	66	74	2.00	2.00	17.2000	17.0000	100.0	sindhuli_marin
21	14	100	79	72	1.00	2.00	30.5100	17.0000	92.0	sindhuli_marin
21	4	120	124	125	1.00	1.00	34.0000	38.1000	58.0	sindhuli_marin
21	10	110	110	102	1.00	3.00	33.6000	27.0000	64.0	sindhuli_marin
12	1	168	173	176	1.23	1.40	52.1200	55.6400	150.0	Kabhre
12	2	171	178	179	1.50	1.48	42.0200	55.0300	140.0	Kabhre
12	3	163	168	170	1.03	1.76	49.7700	52.2900	139.0	Kabhre
12	4	167	164	165	1.00	1.24	52.3400	51.2300	113.0	Kabhre
12	5	162	160	151	1.75	1.09	50.0200	42.6100	118.0	Kabhre
54	1	94	96	97	1.98	2.13	27.8800	29.0100	112.0	Kabhre
54	4	80	88	91	1.14	2.00	24.1100	26.7300	135.0	Kabhre
54	3	79	90	93	1.34	1.68	23.4900	28.0200	168.0	Kabhre
54	8	71	78	76	1.33	1.38	21.1900	22.7200	120.0	Kabhre
54	9	76	75	81	0.89	1.40	23.0100	24.0100	137.0	Kabhre
54	10	67	68	70	1.78	1.13	19.2800	21.0900	106.0	Kabhre
60	1	55	56	59	1.02	1.60	16.0800	17.1200	112.0	Kabhre
60	5	51	50	48	1.58	1.38	14.2800	13.8700	119.0	Kabhre
29	1	87	86	88	1.49	1.02	26.1100	26.0700	89.0	Kabhre
29	4	71	72	74	1.04	1.01	21.0200	22.1400	145.0	Kabhre
29	7	65	68	69	1.34	1.75	18.9000	20.2100	133.0	Kabhre
29	8	58	60	61	1.21	0.89	17.2100	18.2900	128.0	Kabhre
80	1	109	110	114	1.49	1.13	33.1300	35.0900	140.0	Kabhre
80	2	104	106	107	1.18	1.74	31.8900	32.1800	131.0	Kabhre
80	4	101	103	106	1.31	1.53	30.7800	32.1100	110.0	Kabhre
80	5	99	99	102	1.35	1.50	30.0800	30.9000	86.0	Kabhre
80	7	101	97	99	1.05	1.46	31.0700	30.0900	100.0	Kabhre
80	8	89	89	90	1.43	1.02	26.7900	27.1100	168.0	Kabhre
80	9	82	82	80	1.04	1.39	24.0200	23.9800	75.0	Kabhre
80	14	80	81	83	0.95	2.01	24.1000	24.2100	142.0	Kabhre
71	1	118	123	130	1.57	0.98	36.0100	40.0400	110.0	Kabhre
71	3	118	119	121	1.68	1.51	35.7800	36.9000	124.0	Kabhre
71	4	120	118	126	1.34	1.89	36.8000	38.0900	86.0	Kabhre
71	5	116	114	111	1.57	1.88	35.2700	33.4500	119.0	Kabhre
71	6	103	110	114	1.79	1.41	30.9700	34.8900	95.0	Kabhre

tree	log_no	girth1	girth_m	girth3	sw_girth1	sw_girth	hw_dia1	hw_dia2	length	remarks
73	1	113	120	124	1.63	1.60	34.2900	34.7700	156.0	Kabhre
73	2	120	114	110	1.21	2.12	37.0300	32.8900	135.0	Kabhre
73	5	103	104	98	1.64	1.17	30.9500	30.0200	120.0	Kabhre
73	6	93	96	104	1.71	1.41	27.8900	31.1700	115.0	Kabhre
2	1	72	85	78	1.40	1.50	15.8500	16.8950	135.0	Dhading
2	2	76	85	89	1.40	1.40	17.0000	20.0000	135.0	Dhading
2	3	65	68	70	1.65	1.40	13.5900	15.8500	138.0	Dhading
2	7	65	65	62	1.35	1.25	14.9500	13.8500	140.0	Dhading
10	1	167	164	165	1.32	1.21	50.6700	50.3800	127.0	Dhading
10	2	159	160	169	1.11	1.70	49.0800	51.7800	120.0	Dhading
10	7	128	121	128	1.23	1.01	38.7100	39.0100	80.0	Dhading
10	8	123	119	128	1.09	1.19	37.2100	37.1100	150.0	Dhading
24	2	111	128	135	1.65	1.50	33.7410	41.3800	130.0	Dhading
24	3	104	101	105	1.40	1.50	31.8310	31.8310	123.0	Dhading
24	5	77	64	64	2.00	2.00	22.0000	16.0000	96.0	Dhading
24	6	46	48	48	2.00	1.00	10.0000	12.0000	160.0	Dhading
24	10	56	60	60	1.65	1.50	11.5000	12.6800	115.0	Dhading
24	11	56	58	56	1.25	1.40	11.9800	11.7600	110.0	Dhading
27	1	120	124	125	1.11	1.70	34.4500	38.0200	58.0	Dhading
27	2	110	110	102	1.24	3.01	33.0100	27.4500	64.0	Dhading
27	6	100	79	72	1.32	2.01	30.2300	19.6700	92.0	Dhading
27	9	83	88	96	1.21	2.01	24.6700	27.4500	70.0	Dhading
30	1	65	68	70	1.65	1.40	13.5000	14.7500	138.0	Dhading
30	2	65	65	62	1.35	1.25	15.5000	14.5000	140.0	Dhading

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