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1. INTRODUCTION

This report presents the stumpage Teak price in Mato Grosso State, regarding the period of January 2017. Mato Grosso State is located in the Central-West Region and is the most important State related to Teak plantations in Brazil. Its share reaches 70% of the country’s total planted area.

Figure 1.01 shows the location of Mato Grosso State and the density of Teak plantations.

It is important to mention that Teak logs with diameter under 15 cm are destined almost exclusively for firewood by the interviewed companies, thus this study considered only logs with diameter above 15 cm.

FIGURE 1.01 – DISTRIBUTION OF TEAK PLANTED AREA IN MATO GROSSO STATE
2. METHODOLOGY

2.1. Equalization of Sale Modality
The market operates on different Teak log selling arrangements (stumpage, on the truck, at road side and FOB). In order to have the stumpage price for Teak log as a result, the costs with harvesting, loading, transportation and port cost were subtracted.

2.2. Equalization of Assortment
Despite the existence of standardized assortments by the market (15-20, 20-25, 25-30, 30-35, 35-40 and >40 cm), there are many variations practiced. Thus, to provide prices for different assortments, CONSUFOR has developed, based on renowned statistical techniques, functions that estimates the price per any negotiable diameter class on the market.

2.3. Prices and Costs
All prices and costs presented in this report are based on weighted average, considering the wood traded volume. The prices were determined not considering Floresteca samples.

2.4. Sample Composition
Figure 2.01 presents the composition of the sample base. In total, 26 companies/forest owners were consulted, generating 38 price samples.

**FIGURE 2.01 – SAMPLE COMPOSITION**

Forest Producer 76%
Timber Industry 12%
Trader 12%
Forest Producer 76%
Timber Industry 12%
Trader 12%
2.5. Equalization of Measure Unit

The market sells wood in different units of measure (st, m³ Hoppus, t). To equalize the measures, based on specific conversion factors, all measures were converted to m³.

The main destination of Brazilian Teak is the international market, therefore some features and particularities should be considered when formulating wood prices.

The first Teak logs market rule is to be absolutely sure of which measurement method is being used, since the evaluation and price negotiations will depend on it. The main trading partner of Brazilian Teak is India, where the most commonly used measurement unit is Hoppus while in Brazil the most common is Smalian.

It is important to note that the Hoppus measurement takes into consideration a “discount”, which considers some log characteristics, such as bark thickness and the amount of sapwood. Typically this amount varies from 4 to 8 cm. The higher the “discount”, the lower the log volume.

Considering an average “discount" of 5 cm, the measure Hoppus is equivalent to approximately 69% of the Smalian cubic meter.

Example of Equivalence:

<table>
<thead>
<tr>
<th>VOLUME</th>
<th>PRICE</th>
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<tbody>
<tr>
<td>1 m³</td>
<td>100 R$/m³</td>
</tr>
<tr>
<td>SMALIAN</td>
<td>144.93 R$/m³</td>
</tr>
<tr>
<td>HOPPUS</td>
<td>144.93 R$/m³</td>
</tr>
</tbody>
</table>

**HOPPUS**

A measurement system developed in Britain and widely used in India to measure Teak logs and to quantify loaded volumes of logs in containers.

\[
\frac{(C - d)^2 \times (h - d)}{16}
\]

C = circumference (meters);
\(d\) = height (meters)
\(d\) = discount (meters)

**SMALIAN**

A method widely used by the forest sector. The formula states that the volume of a log can be estimated by multiplying the average of the two log ends areas by the log’s length.

\[
\frac{(A_b + A_t) \times h}{2}
\]

\(A_b\) = base area (square meters);
\(A_t\) = top area (square meters);
\(h\) = height (meters)

SOURCE: CONSUFOR
3. TEAK WOOD PRICE

In order to identify the average wood prices, CONSUFOR interviewed several companies in the region. The dataset consisted of 25 samples (not considering Floresteca samples), weighted by traded volume for Teak (Figure 3.02).

The observed data result in a function and $R^2$ as follows:

However, the majority of the participants practice the Teak log price in USD (Figure 3.01). In order to convert to R$ (Brazilian Reais) was applied an exchange rate of R$ 3.2 / USD 1.0.

The coefficient of determination, also called $R^2$, is an adjustment measure of a statistical model to the observed values. $R^2$ varies between 0 and 1, indicating in percentage, how the model can explain the observed values. The higher the $R^2$, more explanatory the model is, the better it fits the sample.

**SOURCE: CONSUFOR**
3.1. Roadside Price

Current Teak prices are presented in Figure 3.03 and Figure 3.04 considering the roadside prices, in Reais and Dollar, per assortment class (diameter). It is worth noting an aspect related to the sales modality. Very few companies adopt selling at roadside modality. In general, companies sell logs or blocks delivered at Port (FOB Port).

Thus, the roadside prices presented here can be understood as a potential price. Roadside price was determined adding the harvesting cost to the stumpage prices, considering the following equations:

\[ R$/m^3 \text{ stumpage} = R$/m^3 \text{ FOB port} - \text{Terminal Handling Charges} - \text{Freight Cost} - \text{Transportation Cost} - \text{Harvesting Cost} \]

\[ R$/m^3 \text{ roadside} = R$/m^3 \text{ Stumpage} + \text{Harvesting Cost} \]

**Figure 3.03 – Teak Log Prices – US$ Roadsides**

**Figure 3.04 – Teak Log Prices – R$ Roadsides**

SOURCE: CONSUFOR
Teak market presents some aspects that are quite different from other genus. These are related to forest age and exchange rate, among others, as explained below:

• One important aspect in the wood pricing is related to the forest age. Above 15 years old, the same wood assortment class can present a significantly different price.

• The exchange rates causes fluctuation in the stumpage price, independently on the demand movement. As the majority of prices is provided in USD FOB term, and internal costs (harvesting, transportation, freight, terminal charges, etc.) is in Brazilian Reais (BRL), changes on exchange rates impacts significantly the stumpage prices.