

Costs and key points of forest harvesting

Forest harvesting mainly has three types of costs: (1) **costs of felling and limbing the trees**, which can vary considerably depending on the size and species of the trees cut; (2) **costs of dragging the logs to the track**, which is performed with an adapted agricultural tractor from the track; and (3) **product preparation costs**, which include cutting the logs to size for use and transportation.



Figure 1. Dragging logs out of the forest largely determines the total cost of forest harvesting. Photo: AV Video.

■ Quantification of the costs of forest harvesting

The quantification of forest harvesting (Figure 1) is based on calculating three different types of costs:

1. **Cost of felling and limbing the trees.**
2. **Cost of dragging the logs to the track.**
3. **Cost of preparing the logs.**

Globally, it is possible to estimate in 2 h the total time that it takes to carry out all these processes for 1 Tm placed on track. Below are described the different alternatives we have analyzed for each one, indicating their costs and variability (Table 1).

1. Cost of felling and limbing the trees. All the materials necessary for felling and limbing the trees (chainsaw, protective equipment, etc.) are considered to be already **available on the farm**, otherwise the corresponding costs to obtain them should be included. **The time for felling and delimiting obviously depends on the size and the species.** Thus, the yields obtained in the use of holm oak are lower compared to those of other species, especially conifers, where the **scarcity of branches and the straightness of the trees facilitate processing works.** Guideline values can range from 10 to 12 min (10% of the total time) to cut the trees necessary to obtain 1 Tm, and around 50 min (40% of the total time) to limb them.

2. Cost of dragging the logs to the track. This cost includes dragging the logs from where they were felled to the track. This cost **depends on the availability or not of a good network of tracks.** If the dragging of the logs to the track is long, the total cost of extracting them will be higher. This is done with an **agricultural tractor** adapted from the track. Two situations can occur:

- **If the farm has an agricultural tractor**, the time used to drag the logs is around **40-45 min** (35% of the total time) to obtain 1 Tm.
- **If the farm does not have an agricultural tractor**, the **cost of renting the tractor** must be added to the above costs, which can be **€50/day**.

3. Cost of preparing the logs. This cost includes preparing the product and placing it on the track. When the job is finished, **the wholesaler pays for the kg that he/she loads onto the truck**, but these costs are not included in forest harvesting at farm level. The logs are left as necessary for use and transport. The time to do it can be estimated at **15-20 min** (15% of the total time) to obtain 1 Tm.

Based on these considerations, we can establish a series of simple calculations to estimate the total costs of forest harvesting in the Mediterranean forest. This quantity **corresponds to 1 Tm. The overall cost is the sum of the three costs described above:**

$$C_{\text{total}} = C_{\text{felling}} + C_{\text{dragging the logs}} + C_{\text{transport}}$$

Felling and limbing trees (for 1 Tm):

$$C_{\text{felling}} = 0.20 \text{ h / Tm} \times \text{Salary/hour}$$

$$C_{\text{limbing}} = 0.80 \text{ h / Tm} \times \text{Salary/hour}$$

Trunks delimiting:

$$C_{\text{dragging the logs}} = 0.75 \text{ h / Tm} \times \text{Salary/hour} + 0.25 \text{ day} \times 50 \text{ € / day (tractor cost if necessary)}$$

Trunk preparation:

$$C_{\text{preparation}} = 0.25 \text{ h / Tm} \times \text{Salary/hour}$$

■ Considerations on the optimal strategy for forest harvesting

We must consider the following key points in forest harvesting:

- The **size** and, above all, the **species of the felled trees** largely determines the costs incurred, especially for delimiting and dragging the logs.
- **The network of tracks** is essential to determine if the

exploitation is viable or not. If the network of tracks is insufficient, **dragging the logs is sometimes infeasible**. This activity is more appropriate to subcontract to forest harvesting experts.

- The **final use of the product**, whether it is for poles, wood or firewood, can considerably condition the costs of preparing the product on the track.

Parameter	Unit	Value used	Variability and causes
Total time of laying 1 Tm of wood on the track	h / Tm	2	It varies depending on whether it is near or far from the track and the slope between 1 and 4
Tree felling time	h / Tm	0.20	It varies slightly depending on the size and species of the trees cut
Tree limbing time	h / Tm	0.80	It varies slightly depending on the size and species of the trees cut
Log dragging time	h / Tm	0.75	If the track is far away, the cost of dragging the logs increases
Farm tractor rental cost	€ / day	50	It depends on the availability or not on the farm
Time to prepare the logs on the track	h / Tm	0.25	It may vary depending on whether the product is prepared for wood or firewood

Table 1. Parameters used to calculate the costs of forest harvesting, indicating the values used in Polyfarming and any variability that can occur in these values.