

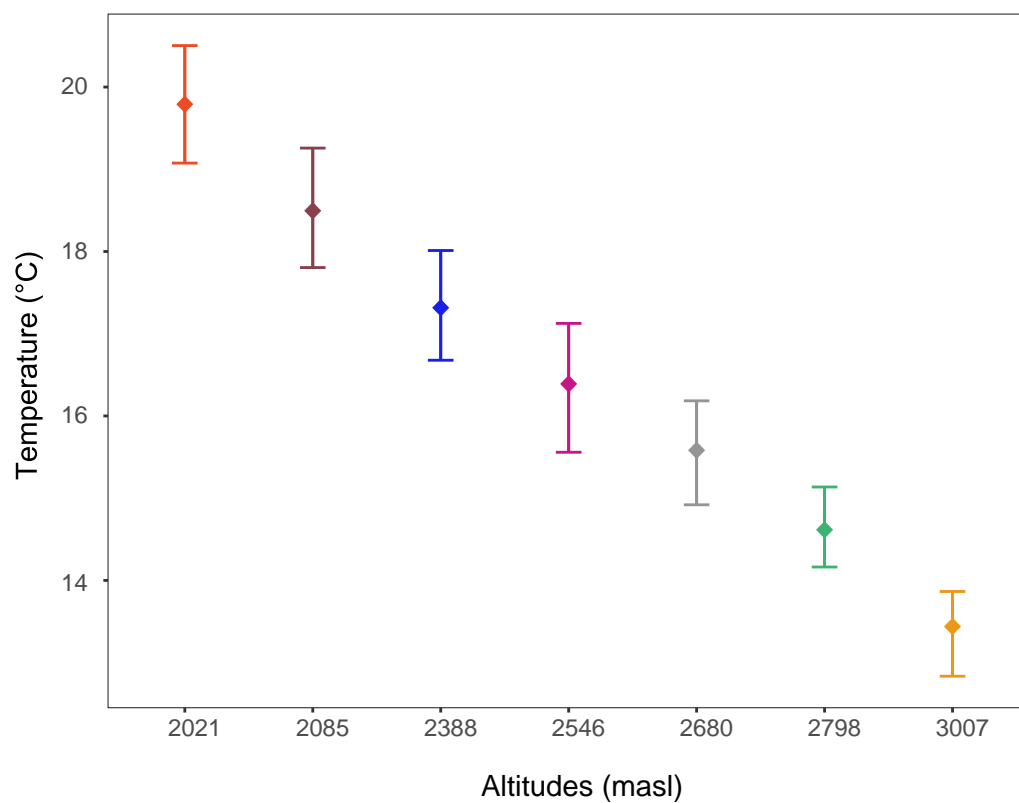
Supplementary material

Figure S1. Annual mean temperature distribution for 25-year historical data in altitude classes in the altitudinal gradient between 2021 and 3101 m, in natural and agroforestry environment of Tara, in Cajamarca region, Andes mountain range, Peru. The bootstrap method uses the mean and confidence interval (CI: 95%) as non-parametric.

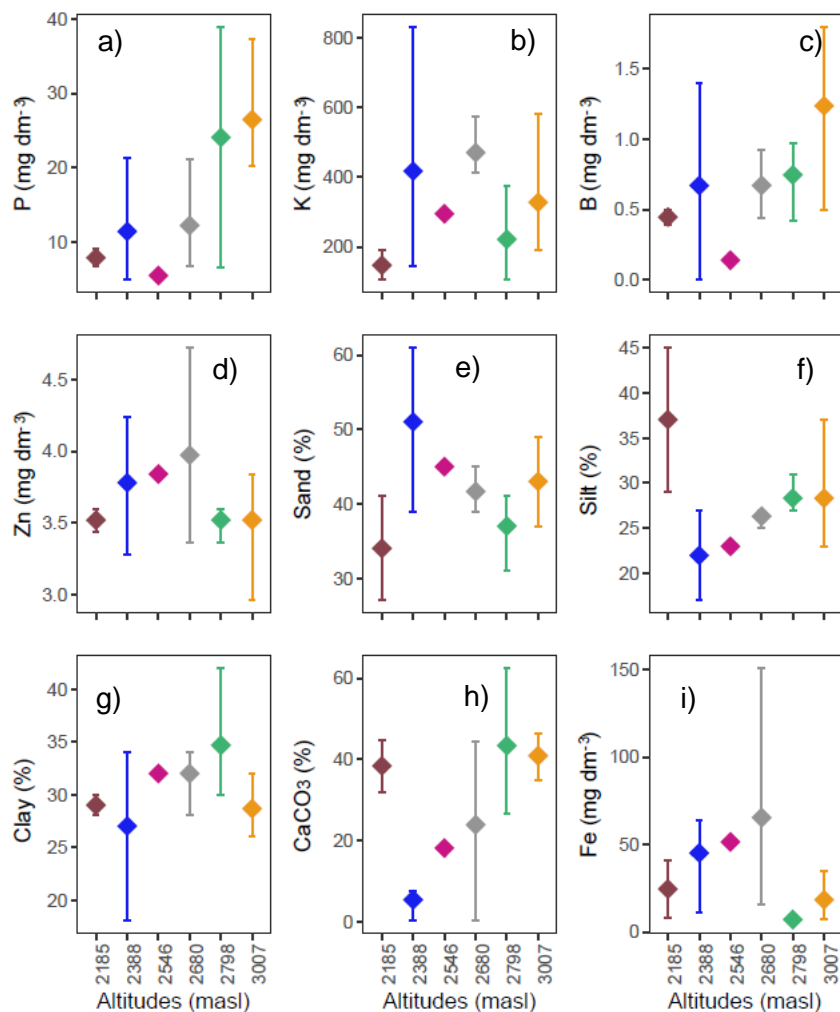


Figure S2. Altitudes in the agroforestry environment of Tara and some soil chemical properties with significant differences. (a) phosphorus (P), (b) potassium (K), (c) boron (B), (d) zinc (Zn), (e) sand, (f) silt, (g) clay, (h) calcium carbonate (CaCO₃), (i) iron (Fe). The mean was followed by the bootstrap method's non-parametric confidence interval (CI: 95%).

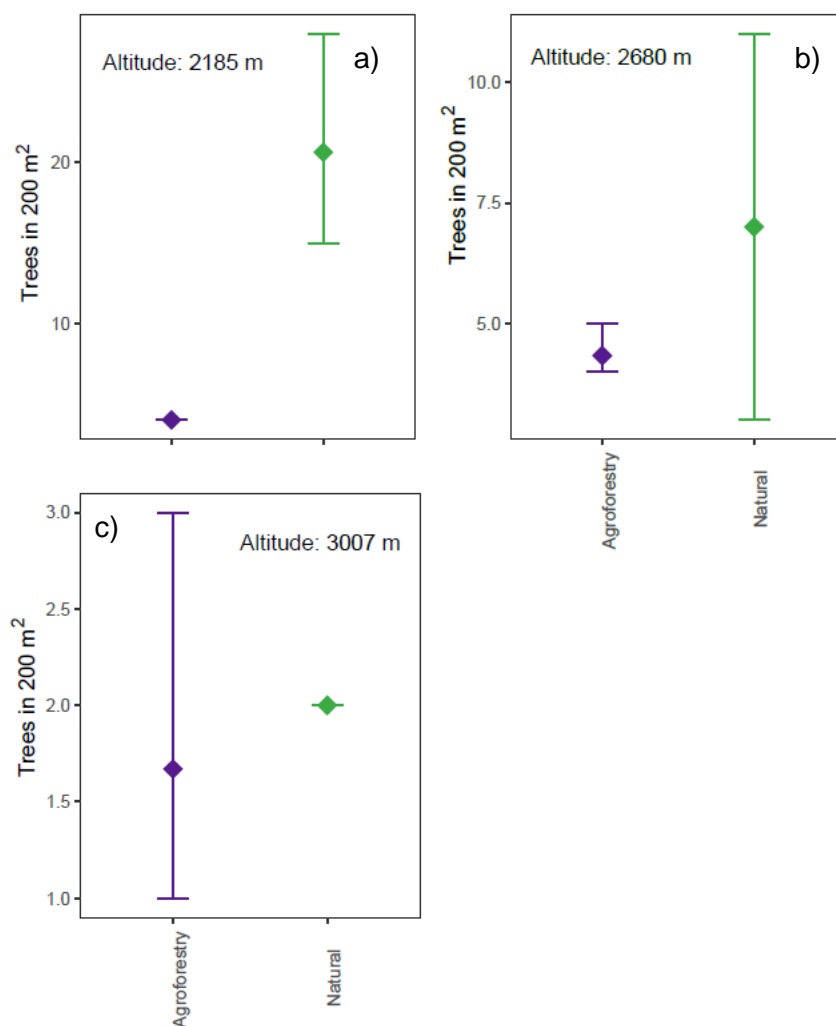


Figure S3. Tara density in agroforestry and natural environments of Tara. Altitude 2185 m (a), altitude 2680 m (b), and altitude 3007 m (c). The mean was followed by the bootstrap method's non-parametric confidence interval (CI: 95%).

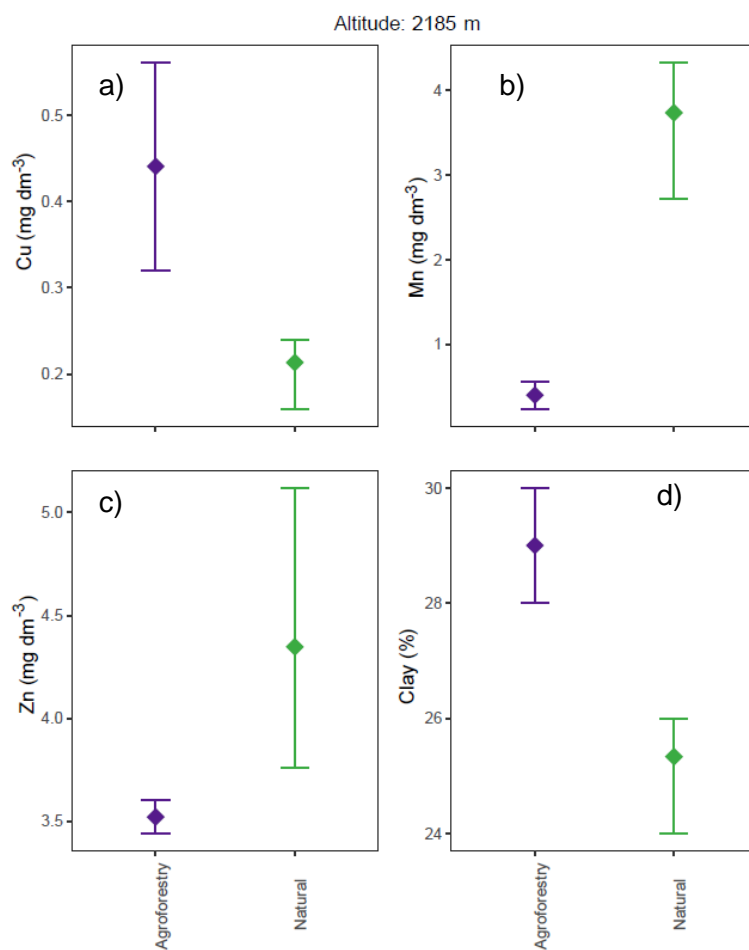


Figure S4. Altitude 2185 m in natural and agroforestry environment of Tara, and some soil chemical properties. Copper (Cu) (a), manganese (Mn) (b), zinc (Zn) (c) and clay (d). Mean followed by the bootstrap method's non-parametric confidence interval (CI: 95%).

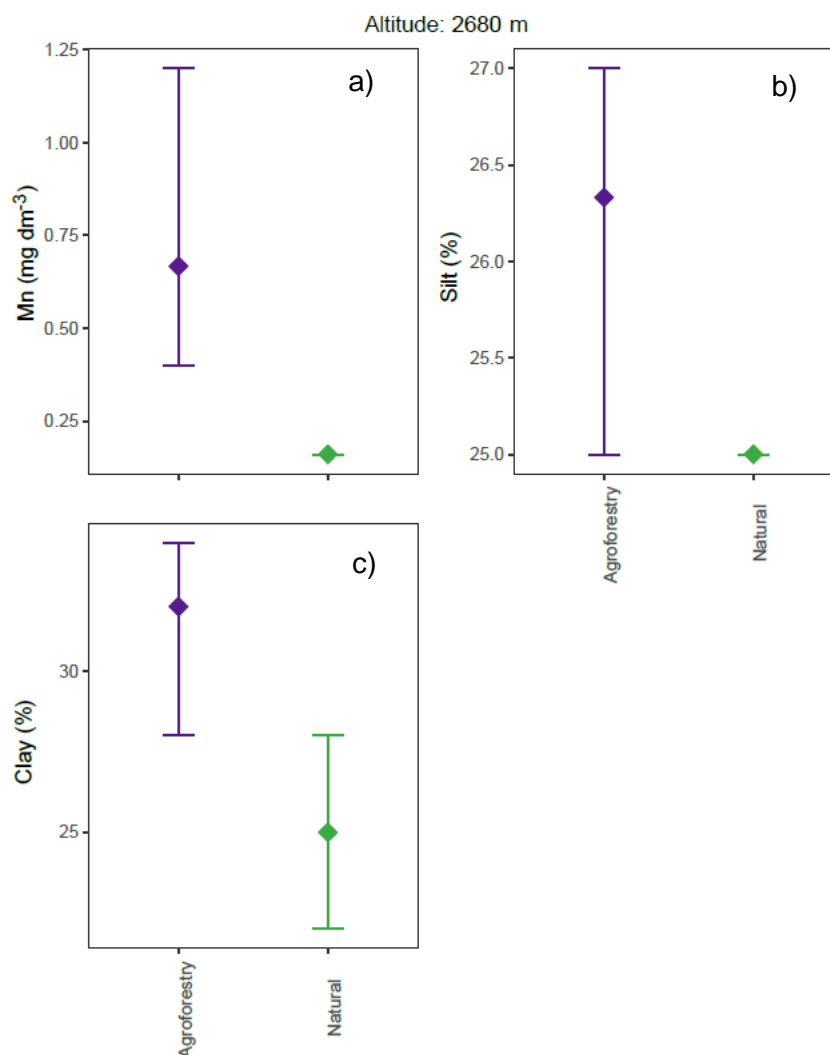


Figure S5. Altitude 2680 m in natural and agroforestry environment of Tara and some soil chemical properties. Manganese (Mn) (a), silt (b) and clay (c). The mean was followed by the bootstrap method's non-parametric confidence interval (CI: 95%).

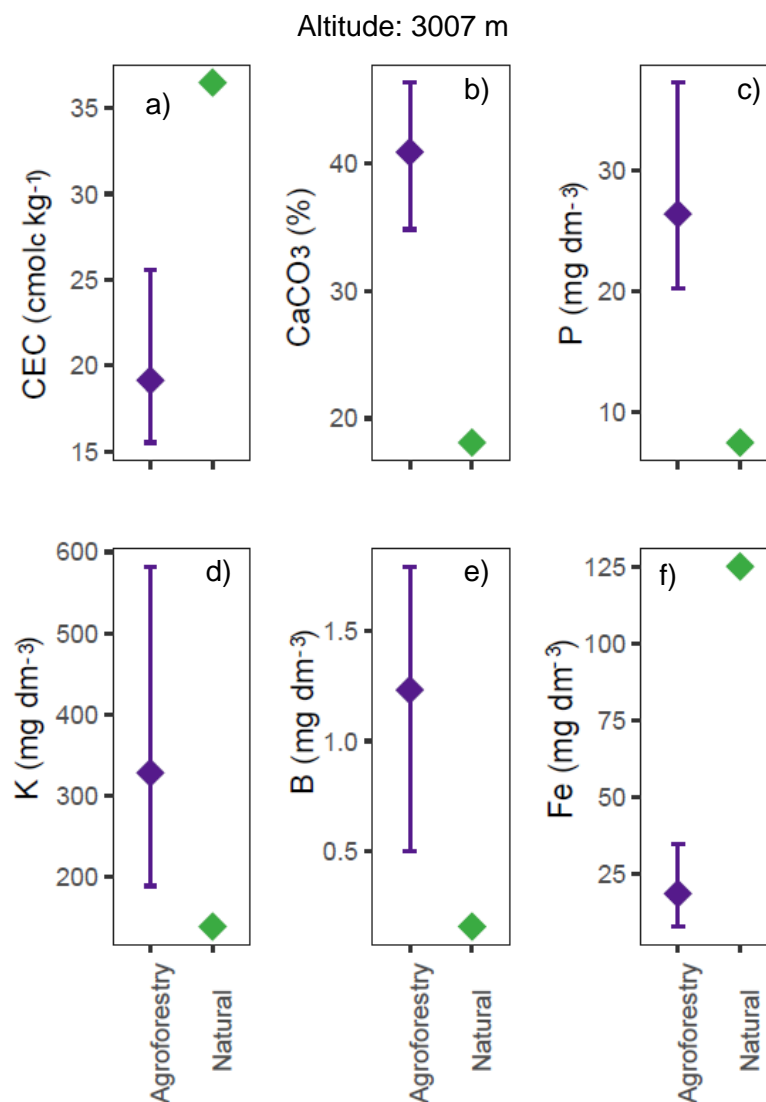


Figure S6. Altitude 3007 m in natural and agroforestry environment of Tara and some chemical properties only with significant differences. Cationic exchange capacity (CEC) (a), calcium carbonate (CaCO₃) (b), phosphorus (P) (c), potassium (K) (d), boron (B) (e) and iron (Fe) (f). The mean was followed by the bootstrap method's non-parametric confidence interval (CI: 95%).

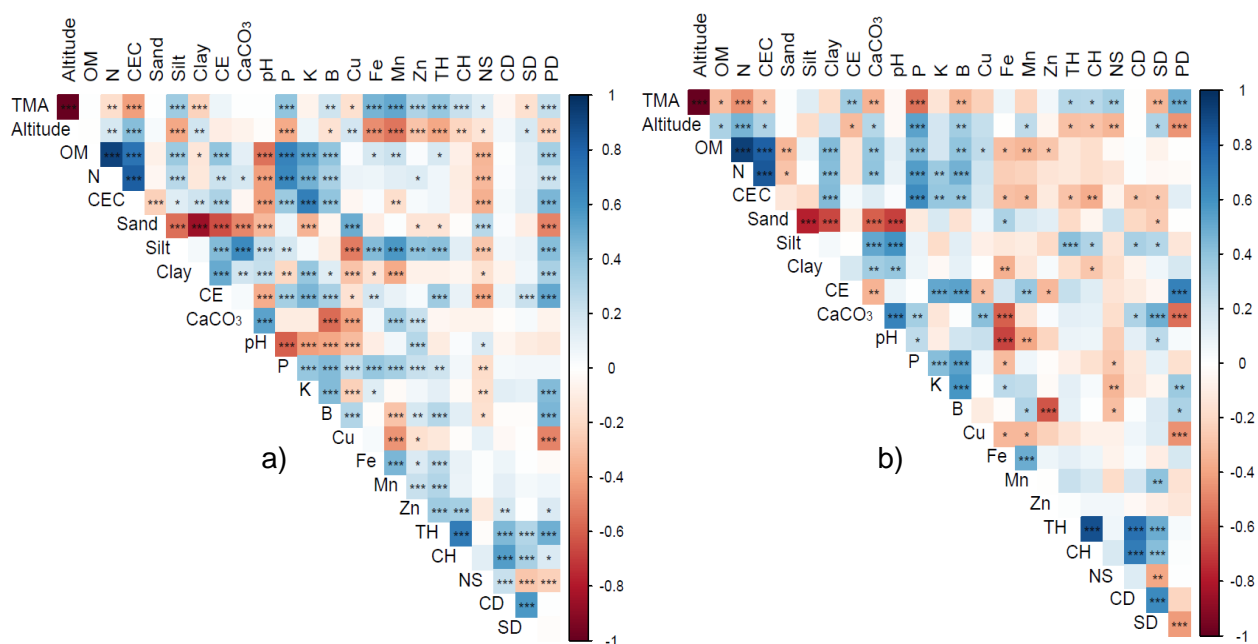


Figure S7. Pearson's correlation coefficient (r) of mean annual temperature (TMA), altitude and soil properties with dendrometric variables of the Tara tree. (a) Natural environment and (b) agroforestry. **NS** - number of stems, **CD**- crown diameter, **TH** - tree height, **CH** - crown height, **SD**- stem diameter, **PD** - plant density, **EC** - electrical conductivity, **CaCO₃** - calcium carbonate, **pH** - potential of hydrogen, **OM** - organic matter, **N** - nitrogen, **P** - phosphorus, **K** - potassium, **B** - boron, **Cu** - copper, **Fe** - iron, **Mn** - manganese, **Zn** - zinc, **CEC** - cation exchange capacity, significance level : * (p<0.05), ** (p<0.01) and *** (p<0.001).