Life-Cycle Assessment of chestnut produced in the north of Portugal

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I. CONTEXT

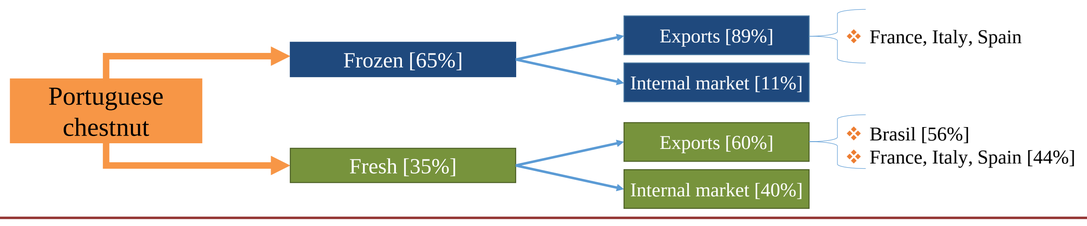
Portugal & chestnut:

- 3rd largest producer of chestnut in Europe (EU 28); 7th worldwide.
- Annual production of 24.7 thousand tons .
- Orchard area of 35 thousand hectares, [1,2].

Main production region – **north of the country**:

- 84% of production; 88% of the chestnut orchard area [2].

In general, 70-80% of Portuguese chestnut is **exported** [3]:

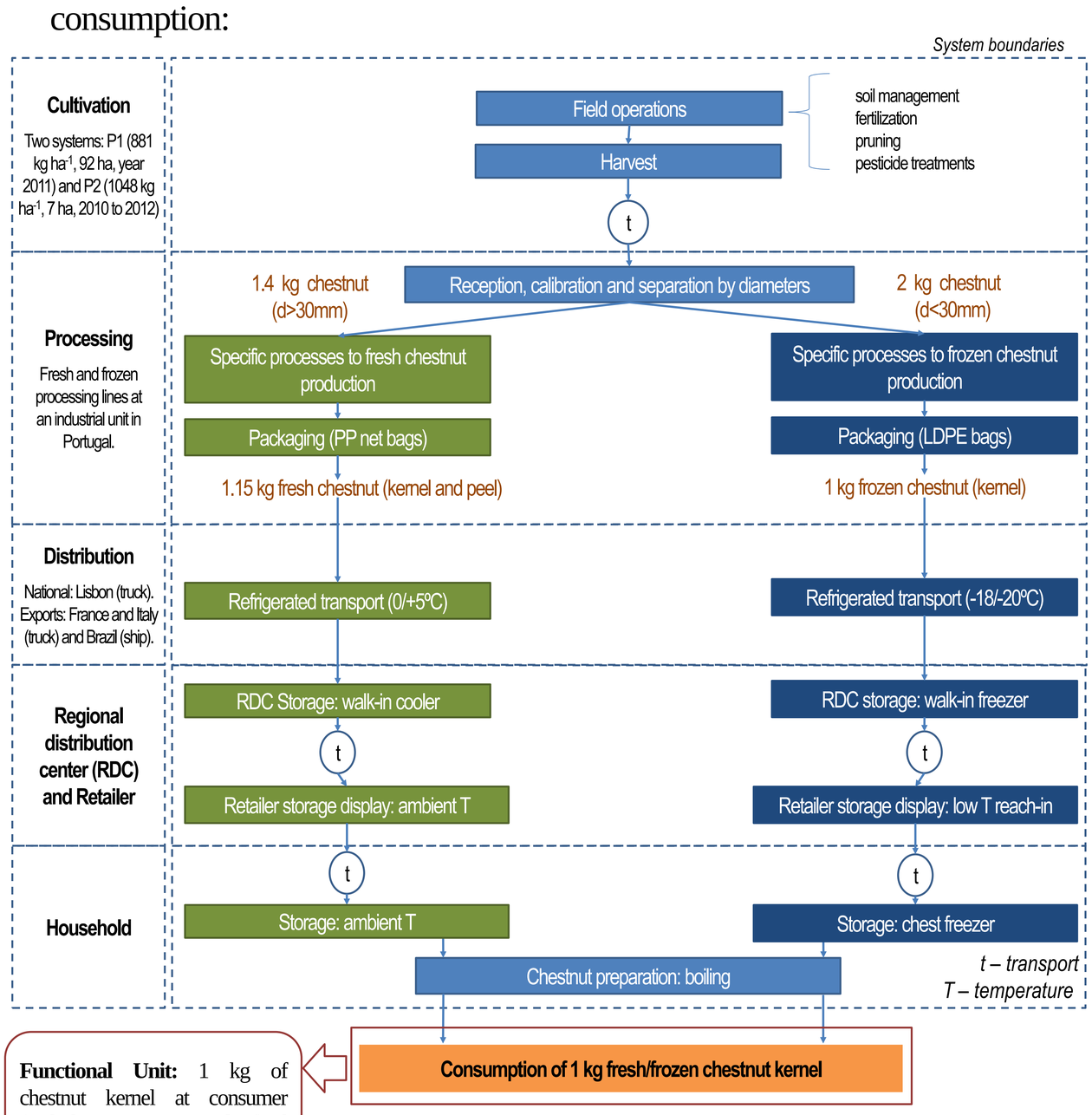


II. AIM

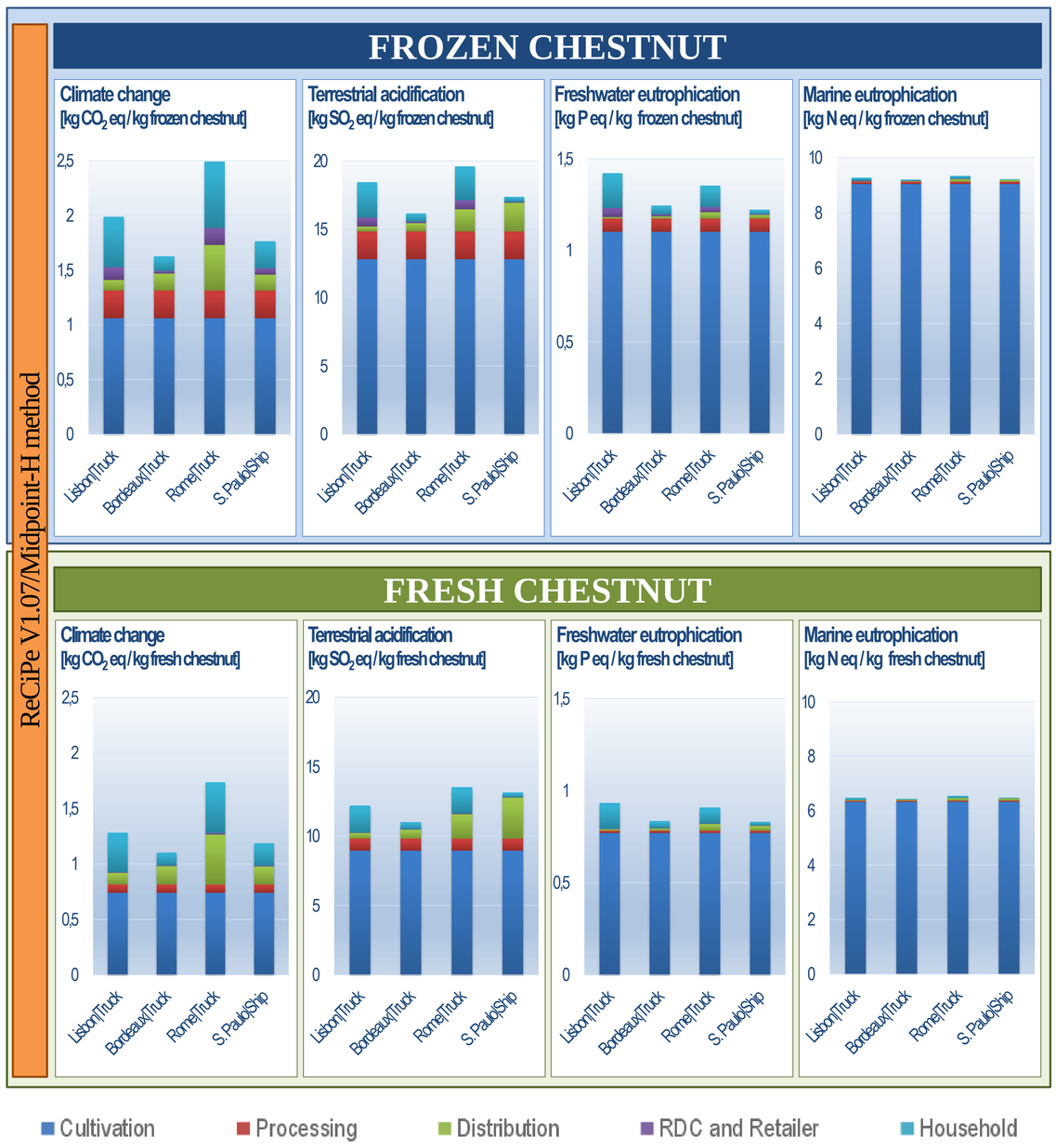
- Compare the environmental impacts of fresh and frozen chestnut produced in Portugal (for exports and national consumption).

III. LC MODEL AND INVENTORY

- A life-cycle model and inventory was implemented for chestnut cultivation, processing and packaging, distribution, retail and final preparation for consumption:



IV. LIFE-CYCLE IMPACT ASSESSMENT



- The **cultivation stage** presented the most significant contributions for the environmental impacts of both fresh and frozen chestnut (from 43% in CC to 98% in ME). Impacts from cultivation derived mostly from diesel requirements (41% for P1) and fertilizer use (58% for P2).
- **Frozen chestnut** presented higher environmental impacts than fresh (from 24% for TA to 36% in CC), due to higher losses of frozen chestnut at the processing stage and higher energy requirements for frozen storage at the factory, retailer and household.
- Chestnut **distribution to Rome** by truck presented the highest life-cycle impacts in three impact categories (truck had higher impacts than ship, and also the electricity mix in Italy had higher environmental impacts, except for FWE, in which the highest impacts were calculated for **Lisbon**, mainly due to electricity consumption in household stage).

V. CONCLUSIONS

- **Resource management practices at the cultivation stage** should be improved, e.g. an efficient use of fertilizers and fossil fuels, as this stage presented the most significant contributions to the life-cycle impacts of fresh and frozen chestnut.
- Frozen chestnut presented higher impacts than fresh, mainly due to **higher losses** at the processing stage and the **additional energy requirements** with refrigeration.
- **Increasing chestnut yield** is critical to reduce the overall impacts, followed by the minimization of chestnut losses in the processing stage.

REFERENCES

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[3] Matos, A., 'A fileira da castanha: situação actual dos mercados', Congresso de Estudos Rurais II, 2004).

ACKNOWLEDGMENTS

Portuguese Science and Technology Foundation (FCT) Project FCOMP-01-0124-FEDER-029055(PTDC/EMS-ENE/1839/2012) and FEDER funds through COMPETE ("Programa Operacional Factores de Competitividade") project FCOMP–05–0128–FEDER–018643

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