Voluntary Carbon Markets in Agriculture (9.2.2)

Simone Borghesi, Ilaria Dibattista, Matteo Mazzarano, Mira Manini Tiwari

Department of Political and International Sciences, University of Siena
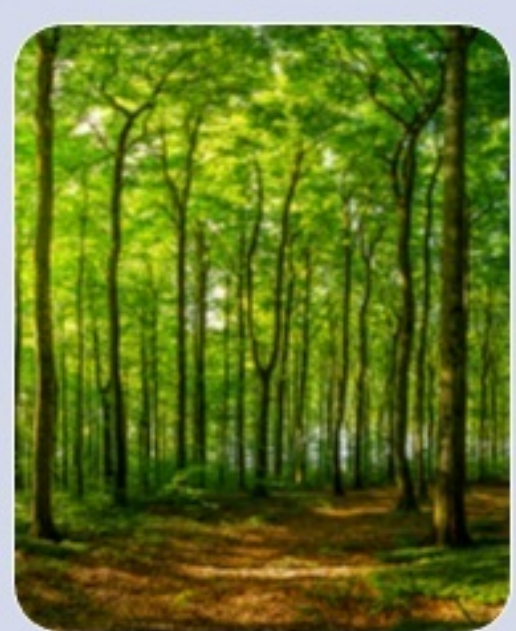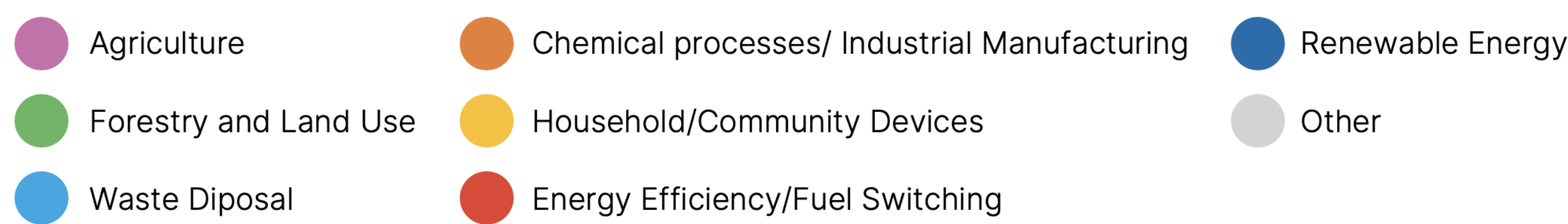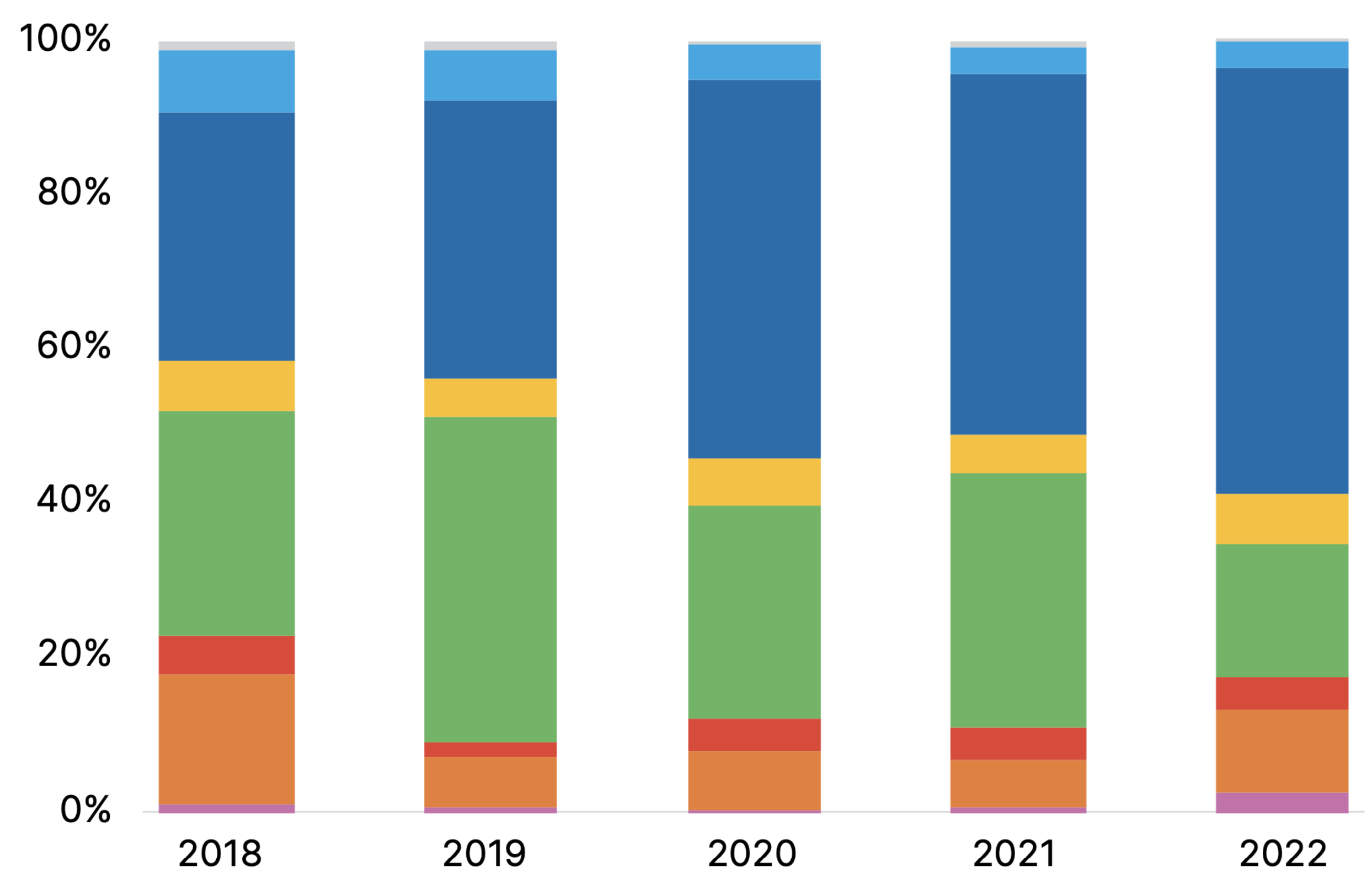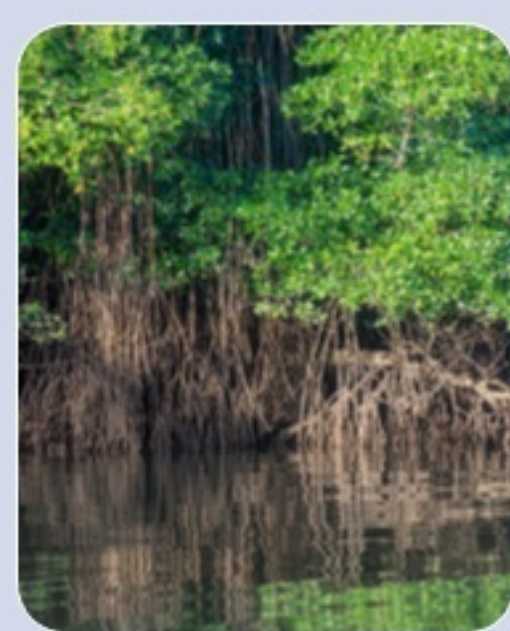
UNIVERSITÀ DI SIENA 1240

The project

The research focuses on assessing and modelling a regulated voluntary carbon market (VCMs) in the Province of Siena. The first phase involved a review of existing and past voluntary carbon markets at similar scales, both in Europe and internationally, analysing their stakeholders; costs and revenues; and monitoring, reporting, and verification (MRV) systems. Building upon findings from prior experience with similar projects in the area, we approach VCMs in terms of their role within socio-ecological systems: fair paymentsand leadership for project workers, localisation, social and environmental co-benefits, and the interactions between climate and biodiversity targets, practices, and impacts. The project uses surveys with agricultural actors, liaison with agronomists and environmental scientists, modelling, and policy research to propose the framework for a local VCM involving wine, olive oil, and fruit and vegetable producers.

State of the Art in Voluntary Carbon Markets

- Agriculture
- Forestry and Land Use
- Waste Diposal
- Chemical processes/ Industrial Manufacturing
- Household/Community Devices
- Energy Efficiency/Fuel Switching
- Renewable Energy
- Other

| **Avoided nature loss**	**Nature Based Sequestration**	**Additional emission Avoidance/reduction**	**Technology-based removal**
Avoided deforestation	A/reforestation	Renewable energy	Bioenergy w carbon capture and storage (BE-CCS)
Avoided peatland degradation	Agroforestry	Industrial manufacturing	Direct Air CCS
Avoided coastal wetland degradation	Coastal restoration (mangroves, seagrasses)	Energy efficiency	Biochar
	Cover crops	Transport	Enhanced weathering
	Grassland conservation	Waste management	

The barplot above indicates which are the most used practices to generate offsets (Source: Ecosystem Marketplace data (2022) in World Bank (2023)). The distinction on how carbon is accounted is presented above (Source: Carney et al. (2020))

Break-Even Carbon Price (BECaP) in Different Business Models

$$BECaP = \min_p \left[-K_0 + \sum_{t=1}^{T} \frac{Qp - C_f(1+e)^t}{(1+r)^t} \right]$$
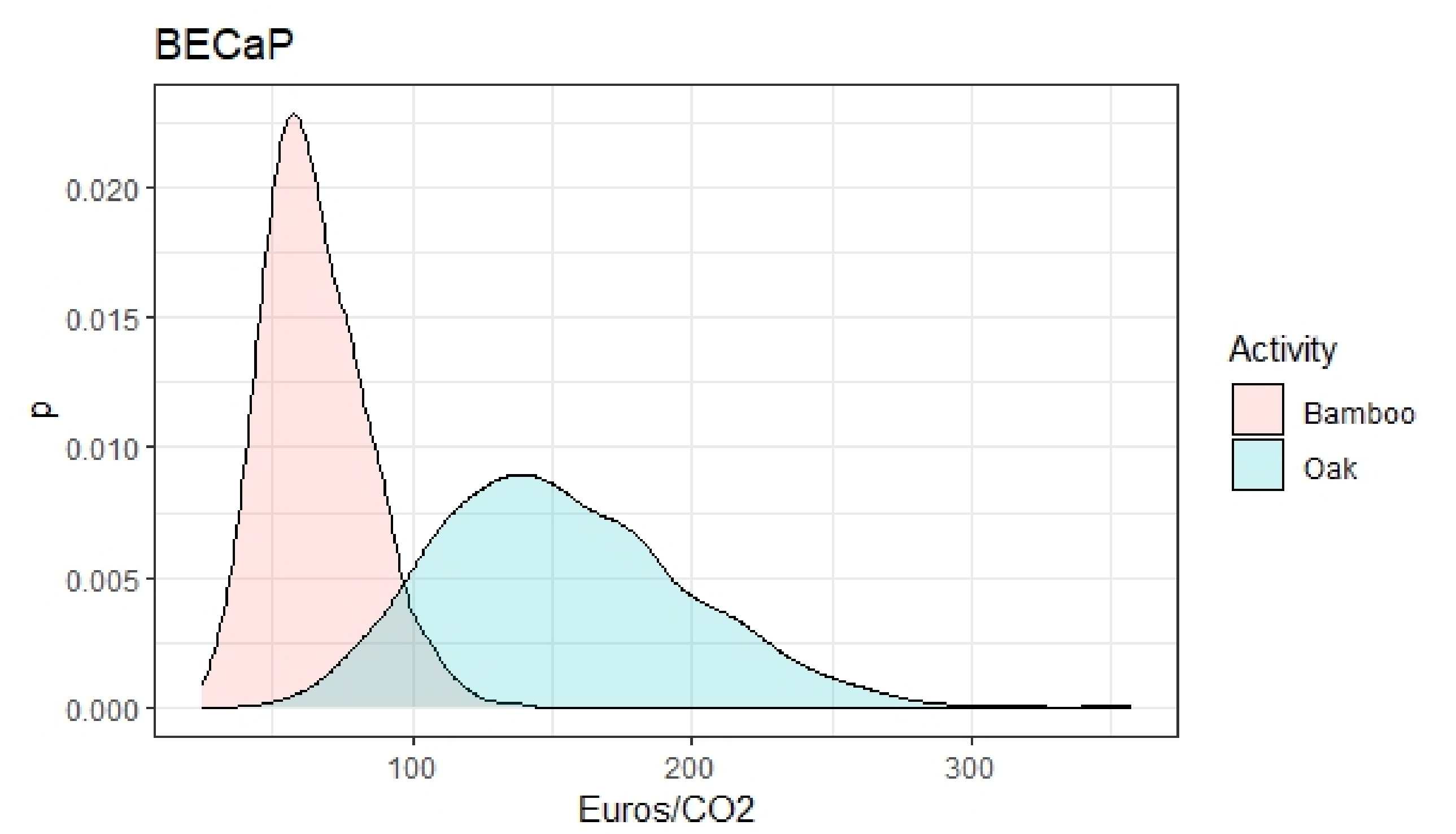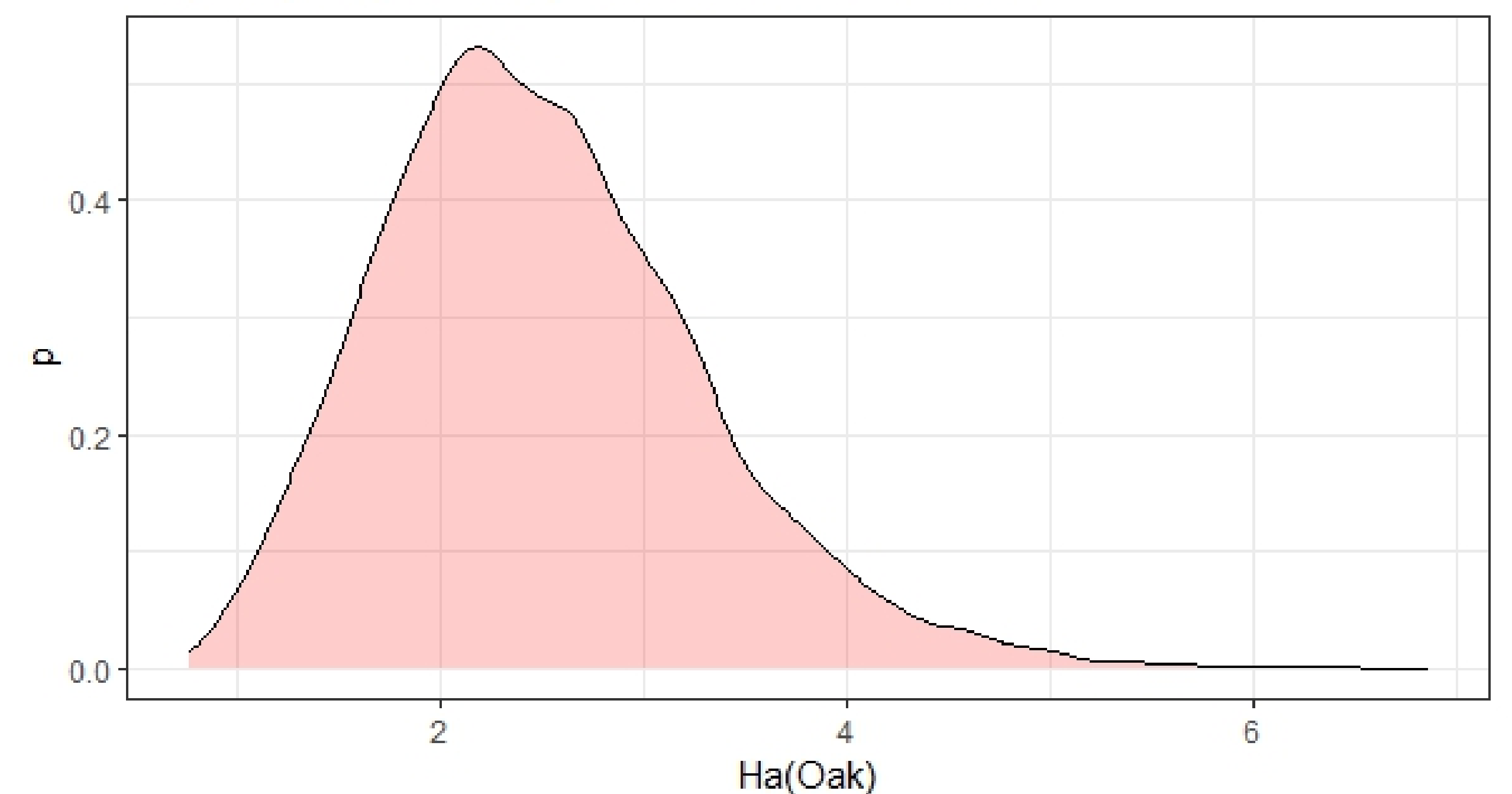
The upper histogram shows the variability of the potential break-even carbon price for carbon offsets generated by one hectare of bamboo versus oak. The 'Oak' type involves a low-cost, low-upkeep and mostly nature-based afforestation strategy, with comparatively lower carbon absorption capabilities. The 'Bamboo' type presents high absorption capacity with high maintenance costs, including higher water footprint and complex soil management. The social impacts of the two are still under discussion. The lower figure shows how many hectares of oak might be necessary to achieve the same BECaP of bamboo.

Challenges and Policies

There is still a long way to go to make VCMs reliable. Many policy issues need to be studied, incorporated, and regulated, among which:

- How to accommodate offsets for residual emissions while maintaining states' nationally-determined contributions at the highest possible level of ambition.
- The localisation of offset projects within the context of the emitter, i.e., the buyer of the offset.
- The development of stricter, bottom-up governance for offset projects that remain outside of the emitter's context, to ensure fair payment, community leadership and benefits, and ecological protection for the land.
- Refining and applying regulation such that offsets are truly long-term (in general, technology-based), and supporting regulation that protects natural ecosystems.

References

Carney, M., et al., Taskforce on scaling voluntary carbon markets: Consultation document. (2020).

Ecosystem Marketplace (2022), State of the Voluntary Carbon Markets 2022 Q3. Washington: Ecosystem Marketplace.

World Bank. (2023). State and trends of carbon pricing 2023.

LaTeX TikZposter