

BMF Collaborative Project 17: Meeting demand for renewable biomass energy through private landowners' wasted resources

AISDL Team

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1. Project description

1.1. Background

Since the dawn of human civilization, wood has been a vital renewable energy source [1]. In the era of fighting against climate change, while meeting the rising energy demand, wood pellets are considered wood-based resources that can help support climate goals and local development [2,3]. The Southeastern United States (SE US) is an area with great potential for wood pellet production and export to the European Union (EU). However, most of the forests in the SE US are controlled by private forest landowners with different management objectives [4]. This creates challenges for the scalability issue of wood pellet production. One promising direction to rapidly increase the resources for wood pellet production is using the woody leftovers from forest management activities.

1.2. Main objectives

The current study has two objectives:

- Identify characteristics of landowners that are likely to waste the woody resources on their lands.
- Identify factors that can increase wasting-woody-resources landowners' likelihood to cut and/or remove trees for sale for woody biomass-based energy shortly.

1.3. Materials

The research project will employ the mindsponge theory for conceptual development and Bayesian Mindsponge Framework (BMF) analytics for statistical analysis on the dataset of 707 private landowners in two SE US fuel sheds that supply most of the wood pellets exported to the EU [5-7]. The bayesvl R package, aided by the Markov chain Monte Carlo (MCMC) algorithm, will be employed for statistical analyses [8-11]. All the materials and code for this study will be made available to reduce the cost of doing science and to provide transparency [12,13]. For more information on BMF analytics, portal users can refer to the following book [14].

1.4. Main findings

The findings show that landowners' age, income, being male, and participation in state/national forestry organizations predict a higher probability of wasting woody resources on their lands (see Figure 1). Among wasting-woody-resources landowners, those considering woody biomass-based energy a viable alternative to fossil fuels are more likely to cut and/or remove trees for sale for woody biomass-based energy in the near future. However, this effect is conditional on the landowners' pride in supplying wood for long-term, renewable energy sources.

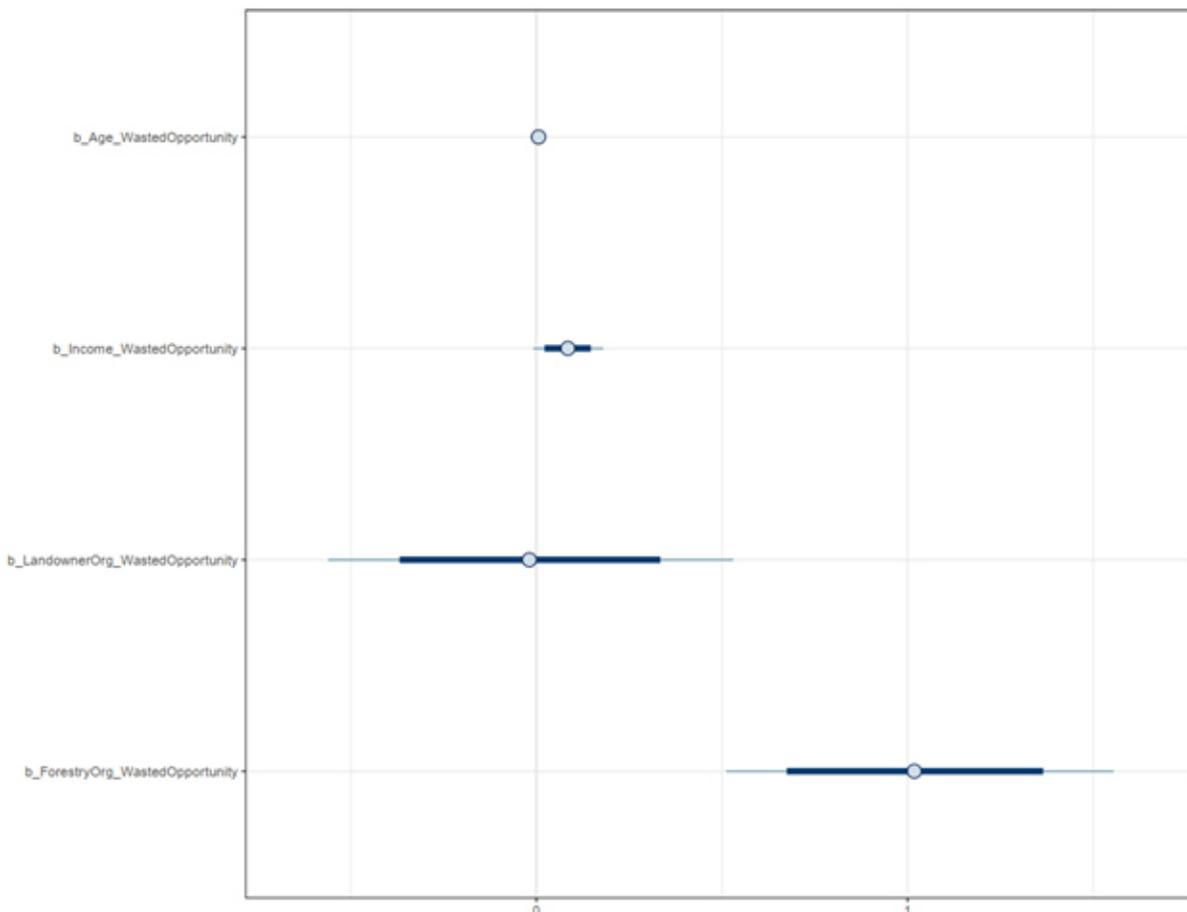


Figure 1: Distributions of the first analytical model's posterior coefficients.

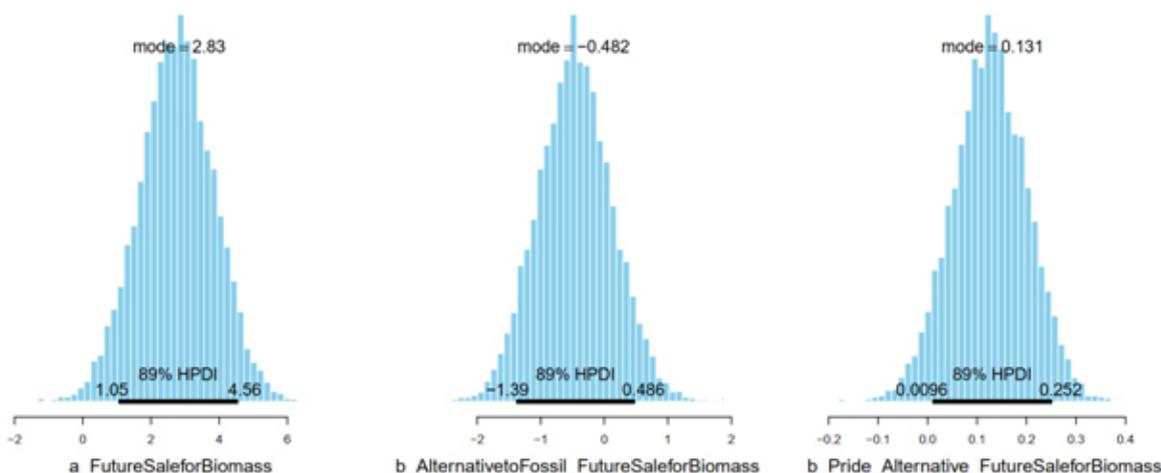


Figure 2: Distributions of the second analytical model's posterior coefficients with HPDI at 90%.

2. Collaboration procedure

Portal users should follow these steps to register to participate in this research project:

- Create an account on the website (preferably using an institution's email).
- Comment your name, affiliation, and desired role (e.g., literature review, method and material description, result presentation, discussion, etc.) in the project below this post.
- Patiently wait for the formal agreement on the project from the AISDL mentor.

If you have further inquiries, please contact us at aisdl_team@mindsponge.info

If you have been invited to join the project by an AISDL member, you are still encouraged to follow the above formal steps.

All the resources for conducting and writing the research manuscript will be distributed upon project participation.

AISDL mentor for this project: **Minh-Hoang Nguyen.**

AISDL members who have joined this project: Quy Van Khuc, Viet-Phuong La, and Quan-Hoang Vuong.

The research project strictly adheres to scientific integrity standards, including authorship

rights and obligations. We look forward to working with participants on this research project.

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