

USE OF MULTI-ATTRIBUTE DECISION SUPPORT SYSTEM TO COMPARE THE SOCIAL, ENVIRONMENTAL, AND ECONOMIC IMPACTS OF USING WOODY FEEDSTOCKS FOR PELLET PRODUCTION

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The objective of this presentation is to examine and apply a qualitative decision tool to evaluate the impacts of different sustainability indicators and the resulting trade-offs that need to be made to optimize these impacts.

A Multi-Attribute Decision Support System (MADSS) use was demonstrated by analyzing woody feedstock alternatives – naturally regenerated hardwood, plantation pine, and plantation poplar - for pellet production using a combination of social, environmental, and economic sustainability criteria.

A team of experts used a nine-element scale (highest=9, lowest=1) for scoring 28 key sustainability indicators for the three production scenarios. The scores were used as inputs into the MADSS model and the resulting analysis showed plantation pine to be the most sustainable in pellet production closely followed by natural hardwood. On environmental and social indicators, natural hardwood performed better relative to plantation pine or plantation poplar. Economic sustainability was better in plantation pine and plantation poplar, due in large part to their higher growth rates compared to natural hardwood. Our results show the potential for using highly productive plantations for bioenergy. In spite of some challenges, the use of a qualitative tool such as MADSS allows the inclusion of social indicators that are difficult to quantify for evaluating overall sustainability. We discuss challenges as well as opportunities for using this tool in this presentation.

Keywords: Multi-Attribute Decision Supporting System, Bioenergy, Sustainability, Woody Biomass, Pellets.

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Robert was awarded in a Ph.D. in Forest Biomaterials. His forestry knowledge relay on a four-year program at a forestry high school, a five-year M.S. program in Forest Engineering the University of West Hungary, and seven years of experience in auditing sustainable forest management. He received an M.S. in Environmental Engineering from the University of West Hungary and has more than a decade of industrial HSE leadership experience in nine countries. His economics background includes an M.S. in Economics from Budapest Business School and more than a decade of P&L responsibility for up to \$50 million per year.

Robert is a Postdoc in Forest Biomaterials at North Carolina State University. His research is optimizing bioenergy from environmental, social and economic perspective, and developing qualitative and quantitative decision supporting tools to support stakeholder discussions.