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Application of Goal Programming in Sustainability Studies: Soybean Transportation in Brazil

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Abstract

Richard Silva et al. (under review) studied the sustainability of road and rail systems in the transport of Brazilian soybeans between producer and exporter centers (1,982 km). For this, the FIVE SEctor SUstainability Model (5 SEnSU) was considered. Among ten indicators simultaneously evaluated by the 5 SEnSU model, the results indicated greater sustainability for rail transportation. However, due to the multimetric approach used, the graphical interpretation of results can become a difficult task that requires statistical tools as support. In this sense, this work applies the philosophy of goal programming in the results obtained by Richard Silva et al. (under review) to quantitatively assess the sustainability of road and rail soybean transport systems, integrating all the previously obtained indicators into a single global sustainability indicator named as WSI. Results show that rail system has a WSI of 3.47, while road system has 3.55, indicating that rail system is slightly more sustainable. Besides providing subsidies to decision makers on soybean transportation in Brazil, it is expected that this work can be considered as a reference of a multicriteria method in evaluating sustainability for other transport systems.

Keywords: multicriteria, goal programming, soybean, sustainability, transport.