



Environmental Science  
& Policy Program  
*at Michigan State University*

ESPP Student Research Presentation

## **Pasture Diversification to Combat Climate Change Impacts on Grazing Dairy Production**

3:00 p.m. Friday Dec. 9  
273 Giltner Hall



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with

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### **Abstract**

Livestock systems are being impacted by climate change, mainly due to the seasonal variability in temperature and precipitation. Among these systems, grazing livestock is likely to be the most impacted due to its dependence on forage quality and availability. Therefore, adaptation strategies should be implemented to reduce the negative impacts of climate change on grazing livestock. The goal of this study is to identify the best and most resilient pasture composition for a representative grazing dairy farm in Michigan to adapt to climate change. A representative grazing dairy farm was established based on the results from several surveys that were performed in the Lower Peninsula regarding typical management strategies. The representative farm data was incorporated into the Integrated Farm System Model (IFSM) to evaluate the effectiveness of the adaptation strategy concerning economic and resource use criteria. The pasture compositions evaluated in this study consist of a mixture of the most common cool-season grass species (Orchardgrass, Perennial ryegrass, Kentucky bluegrass, and Tall Fescue) and legume species (white clover and red clover) for the area under study. Each pasture composition was evaluated under both current (21 climate models) and future (42 climate models) climate scenarios. Considering the economic and resource use criteria, the best and most resilient pasture composition was identified as a mixture of 50% perennial ryegrass and 50% red clover.

Keywords: Climate Change; Grazing Dairy; Adaptation; Pasture; Economic; IFSM