The Role of Ruminant Animals in Sustainable Livestock Intensification Programs

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Abstract
Food supply has improved considerably since the eighteenth century industrial revolution, but inadequate attention has been given to protecting the environment in the process. Feeding a growing world population while reducing the impact on the environment requires immediate and effective solutions. Sustainability is difficult to define because it embodies multifaceted concepts and the combination of variables that make a production system sustainable can be unique to each production situation. Sustainability represents the state of a complex system that is always evolving. It is an intrinsic characteristic of the system that needs to be shaped and managed. A sustainable system has the ability to coexist with other systems at a different output level after a period of perturbation. Resilience is the ability of a system to recover and reestablish a dynamic equilibrium after it has been perturbed. Sustainable intensification (SI) produces more output(s) through the more efficient use of resources while reducing negative impact on the environment; it provides opportunities for increasing animal and crop production per area while employing sustainable production alternatives that fully consider the three pillars of sustainability (planet, people, and profit). Identifying the most efficient animals and feeding systems is the prerequisite to successful applications of sustainable livestock intensification programs. Animal scientists must develop strategies that forecast the rate and magnitude of global changes as well as their possible influences on the food production chain. System modeling is a powerful tool because it accounts for many variables and their interactions involved in identifying sustainable systems in each situation.


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