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Modeling Food Security: A Distribution Approach

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Abstract: Food security exists when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life. The food security industry is concerned with food availability, access to food, and food utilization. The objective of this research is to model the food security system of a nation using system dynamics to assist strategic level decision makers. This research is intended to provide decision makers with an accurate model to represent the effects of insults to a food distribution system. A food system contains many inherent vulnerabilities which threaten the overall health of a population to include physical security at production facilities, decreases in biodiversity, and poor quality maintenance practices. Most of the focus of the food industry is concerned with increasing food availability to improve overall food security, but recent research proves this technique is inadequate for solving the problems involved with global hunger. Access to food is crucial to improving a nation's food system. This component encompasses all of the distribution processes, such as transportation, infrastructure, processing, storage, packaging, and marketing. This research broke down the distribution stages into many key variables which are used in the model. System dynamics modeling captured the relationships between different variables in the food distribution system and predicts the effects of insults to the system. The model confirmed that maximizing a population's access to food is critical to ensuring food security. In the wake of food insults, the mechanisms of infrastructure, security, quality management, and food policy are the most important in a state's response.

Keywords: Food Security, Distribution, Infrastructure, Strategic Level Decision Makers, System Dynamics Modeling