

Modeling Food Security Insults: A System Dynamics Approach

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Abstract: Food security is a complex issue which impacts all world regions. The Food Security System Dynamics Model (FSSDM) provides insight on the relationships between many factors which affect food security and the total food insecure population fraction. However, this model did not include the impacts following major insults, such as natural disasters. This research analyzes insult threats to food security and evaluates their impacts using the Systems Decision Process to create a framework which captures the impact of insults on food security. Despite the FSSDM limitations, the research determined that following an insult, the food insecure population fraction increases but over time with mitigating factors such as non-governmental organization aid, the fraction decreases and stabilizes. The FSSDM now includes the insults of hurricanes, earthquakes, CBRNE events, and civil unrest and will help decision makers develop policies to respond to and prevent future insults which will maintain national food security.

Keywords: Food Security, System Dynamics, Systems Decision Process, Insults, Food System, Food Distribution, Food Security System Dynamics Model (FSSDM)