Towards Sustainable Development in the EGQ Model with Constraints under Demand Uncertainty

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ABSTRACT

An economic growth quantity model for fast-growing animals is a mathematical or statistical framework used to analyse and forecast the financial aspects of maintaining and rearing animals that grow quickly while adhering to sustainable and environmentally friendly breeding practices. This model generally takes into account a number of variables and aspects involved in the production and management of these animals, such as the cost of acquisition, cost of retention and disposal, cost of feeding, as well as taxes on the emission of carbon dioxide and cost of shortage. The production of carbon dioxide can be expressed through a functional polynomial equation, wherein the variables are impacted by both the age of the animals and the mortality function. This study proposes an economic growth quantity model for rapidly growing animals with discrete ordering, slaughter, and service level constraints where shortage is permitted and is backordered under uncertain demand. When an animal reaches the consumption age, it is prepared for processing and eventual slaughter to make meat products. The objective of the model is to find the ideal age for slaughter and the most efficient quantity of newly hatched chicks procured from the supplier, aiming to minimize the overall expenses. We used spherical triangular fuzzy numbers to represent uncertain demand. Finally, we employ numerical examples to elucidate the envisaged model

Keywords: Sustainable Economic Growth Quantity, Spherical Triangular Fuzzy numbers, Economic Order Quantity

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