

FROM PEN TO PLATE:

New model could revolutionize inventory management for Canada's agricultural industries

The business of agriculture in Canada is evolving to support global demand for food from Canada's agricultural industries such as livestock, fisheries and poultry. Inventory models and practices must also progress to ensure producers can meet the needs of consumers, while optimizing their production costs.

Inventory management is a key component of the agri-food sector which, if properly managed, can decrease the cost of food production and ensure that high quality food is available to consumers when they need it.

For over a century, researchers and industry leaders have worked to develop and optimize inventory management models for different types of products in order to determine the ideal quantity and replenishment cycle of items that deteriorate over time (decreasing in value) or increase in value by improving over time, such as fine wine. However, the very nature of agricultural industries such as livestock, poultry and fisheries where products are constantly growing, gaining weight and increasing in value, does not suit existing inventory models.

To address this problem, Dr. Eman Almehdawe from the Hill and Levene Schools of Business at the University of Regina and Dr. Abolfazl Gharaei have developed a new generation of inventory models called the Economic Growing Quantity (EGQ) model. The EGQ model builds on previous models but also factors in lifecycle functions, including mortality and survival, which are specific to livestock and poultry that grow and increase in value over time.

The aim of the EGQ model is to minimize total inventory costs in order to optimize the growth cycle by calculating factors such as the quantity of products needed, the weight required for slaughtering, and the feeding, holding and operational costs. Unlike other inventory models, the EGQ model includes the ordering cost of new born animals and the disposal cost of deceased animals. Importantly, the model also calculates the lead time required to reorder to fulfill future consumer demand, thereby reducing the chance of food shortage or over production.

To support the EGQ model the authors developed a new evaluation tool for

inventory systems called the Utility of Growth Functions (UGF) index. Inventory managers can use the UGF as a quality control tool for evaluating and monitoring the value and quality of growth of their products at different times in the growth cycle. This gives managers precise insight into the development of their products in order to customize the management model for a particular agricultural industry such as livestock or poultry.

For example, managers of a poultry company can predetermine the factors needed to meet consumer demand down to the number of chickens being ordered, the number of weeks they are to be fed, the optimal weight to be reached before slaughter time, and the date for the new order to be placed for the next cycle.

In a global economy, the EGQ model can equip inventory managers in agricultural industries with the insight needed to optimize production, ensure that consumer demand is accurately and timely supplied, and support their role as conscientious stewards of food production.

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