A non-instantaneous inventory model of agricultural products considering deteriorating impacts and pricing policies

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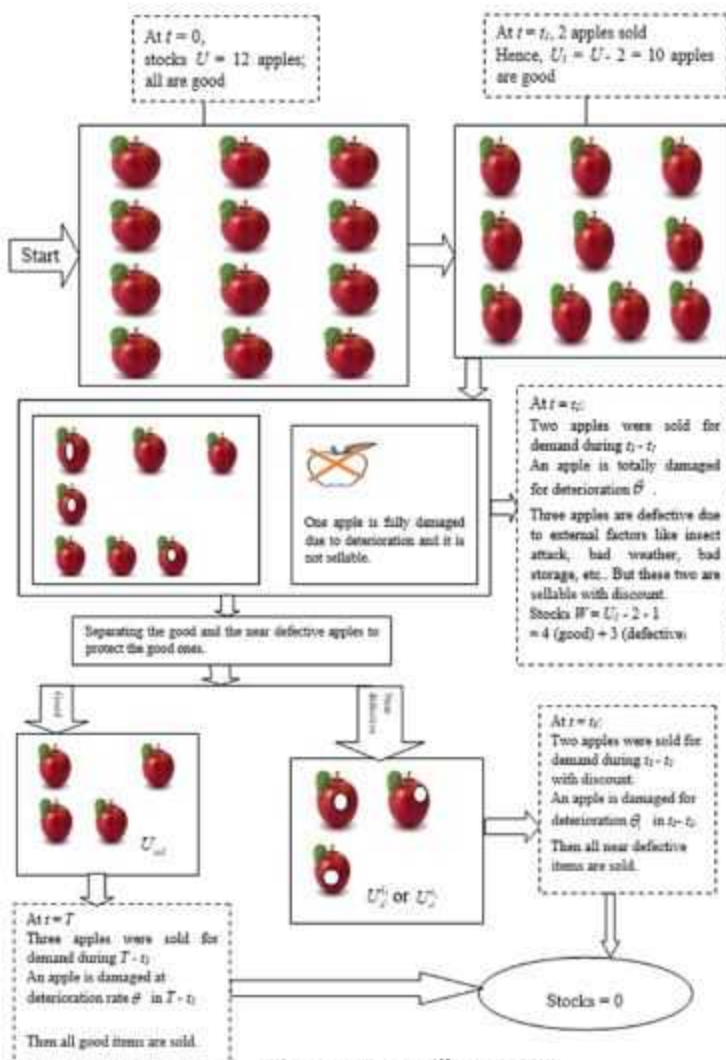[3]Department of Industrial and Systems Engineering, Chung Yuan Christian University, Taiwan

Fig. 1. System illustration

Purpose - External factors such as improper handling, extreme weather and insect attacks affect product quality. It is most obvious in fruit products which have a high deterioration rate. Moreover, decaying fruits will increase the deteriorating of other good ones. The purpose of this study is to derive the optimal pricing and replenishment decisions for agricultural products considering the effect of external factors that induce deterioration.

Design/methodology/approach - In this paper, we investigate ways to reduce the product deterioration rate by separating the near defective items from the other good products, as well as accelerating the quick sales of the near defective items at a discounted price. The objective is to maximize the total profit by optimizing the selling price and the replenishment cycles. Two scenarios are investigated. In the first scenario, the retailer offers a selling price discount for near defective products to stimulate customer demand. In the second scenario, the retailer does not offer such

Findings - An algorithm to solve the model is derived. Further, numerical examples are developed to compare the total profit for the two scenarios. Theoretical derivations and graphical results show the concavity of the profit function. Finally, the sensitivity analysis shows that the total profit of the discount model is higher.

Originality/value - This study contributes to a new pricing and inventory decision model. The research provides insights to retailers on making optimal pricing and replenishment decisions for non-instantaneous deterioration items, as well as reducing the external factors that influence higher deterioration rate through separating good products from the near defective ones which are sold at a discount to induce the sale.

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