Research on Optimization of Bulk Agricultural Product Procurement for Chain Operating Enterprises under the Supply Chain Model

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Abstract: This paper analyzes the bulk agricultural product procurement model of chain operating enterprises under the supply chain model, and uses linear programming and fuzzy chance constrained programming methods to establish a deterministic and uncertain procurement optimization model for multi supplier and chain operating enterprises under the supply chain model. The research results of the model and examples indicate that the model can effectively reduce the procurement cost of bulk agricultural products for chain operating enterprises. Figure 1, Table 8, Reference 5.

Keywords: bulk agricultural products; purchase; Chain operated enterprises; Supply chain

Procurement activities play an important role in chain operation enterprises, and are closely related to the entire business activities of the enterprise. The effectiveness of procurement and supply work has a significant impact on the profit level of enterprises, and its costs will have a direct impact on their profits. With the emergence of supply chain thinking, traditional procurement has undergone changes, enabling procurement that was not originally a value-added activity to have the ability to add value. Procurement has become a very important link in supply chain management.

The procurement of bulk agricultural products is an important part of the fresh food business of chain operated enterprises, and its cost directly affects the profits of the enterprise. Taking the procurement process of bulk agricultural products in chain operated enterprises as the research object, this paper discusses the relationship between chain operated enterprises and suppliers under the supply chain model. Using linear programming and fuzzy chance constrained programming methods, a deterministic and uncertain procurement model for bulk agricultural products between multiple suppliers and chain operated enterprises under the supply chain model is established.

1.Procurement of large-scale agricultural products for chain operated enterprises under the supply chain model

The procurement of bulk agricultural products has the characteristics of large procurement volume, strong seasonality, high loss rate, and strong concentration. The procurement of large-scale agricultural products under the supply chain model has the characteristics of low risk, strong technical ability, scalability, unified centralization, and large scale, and adopts a combination of inventory oriented procurement and order driven procurement. Therefore, the procurement method under this model can reduce the procurement cost of products to a certain extent and ensure the quality of products. As a major agricultural product supplier for chain operated enterprises, it can be a purchaser of agricultural products or a farmer. The relationship between chain operation enterprises and suppliers under the supply chain model will become a collaborative and cooperative partnership, focusing on the procurement related fields of the enterprise, establishing a win-win relationship with suppliers, emphasizing shared information,

establishing mutual trust through cooperation and negotiation coordination, improving efficiency, and reducing transaction and management costs. Through information feedback, promote quality improvement and assurance among suppliers, and provide technical training on personalized product quality to enable suppliers to provide qualified products and services as required.

2. Analysis of uncertain procurement models between multiple suppliers and chain operating enterprises

The above problem is described using a deterministic quantitative model, where the parameters in the model are all fixed values. However, in actual supply chain procurement, there are many uncertain factors. Some parameters, such as the demand for a certain agricultural product by chain operating enterprises or the production and supply of a certain agricultural product by suppliers, are often difficult to determine, especially for seasonal agricultural products. Therefore, people usually use fuzzy language such as "the demand for a product is about x tons". If it is used as a fuzzy parameter in modeling, it is more in line with the actual situation. In the established model, the demand for agricultural products and the production capacity of each supplier are considered as fuzzy numbers.

By exploring the cost control issues of bulk agricultural product procurement in chain operated enterprises under the supply chain model, a deterministic and uncertain procurement model for multiple suppliers and chain operated enterprises was established. The research results of the model and case studies indicate that the model can effectively reduce the procurement costs of agricultural products for chain operating enterprises, which has certain significance for enhancing competitive advantages and promoting their own development.