

Supply Network Design for Production-Distribution of Fish: A Sustainable Approach Using Mathematical Programming

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Abstract : This research develops a productive context associated with the aquaculture industry in northern Tolima-Colombia, specifically in the town of Lerida. Strategic aspects of chain of fish Production-Distribution, especially those related to supply network design of an association devoted to cultivating, farming, processing and marketing of fish are addressed. This research is addressed from a special approach of Supply Chain Management (SCM) which guides management objectives to the system sustainability; this approach is called Sustainable Supply Chain Management (SSCM). The network design of fish production-distribution system is obtained for the case study by two mathematical programming models that aims to maximize the economic benefits of the chain and minimize total supply chain costs, taking into account restrictions to protect the environment and its implications on system productivity. The results of the mathematical models validated in the productive situation of the partnership under study, called Asopiscinorte shows the variation in the number of open or closed locations in the supply network that determines the final network configuration. This proposed result generates for the case study an increase of 31.5% in the partial productivity of storage and processing, in addition to possible favorable long-term implications, such as attending an agile or not a consumer area, increase or not the level of sales in several areas, to meet in quantity, time and cost of work in progress and finished goods to various actors in the chain.

Keywords : Sustainable Supply Chain, mathematical programming, aquaculture industry, Supply Chain Design, Supply Chain Configuration

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