Optimisation of Transportation Costs for Fish Markets.

Dr. Anitha Jandhyala[1], P Veda Satvika[2]

[1]Faculty of Management and Commerce, PES University, Bangalore, India
[2]PES University, Bangalore, India

ABSTRACT-

This research paper deals with how capable the transportation of fish from the beginning spot in harbours to the end customers. fish transportation faces many complex challenges especially for the transportation like fuel costs, demand changes, quality control. For management of such kind of problems many assessment procedures improve the techniques, decision making as well gives a proficient data driven approach. this study investigated this utilization of the lpp methodology for restricting the transportation costs. Additionally, it also examines how these approach solicitations the fish market. After the thorough evaluation of the fish transportation, this investigation highly deals with the cost-efficiency, work on the financial execution. The revelations give us an idea of the minimum transportation costs. 3 different destinations as well as three different suppliers from Nellore, Andhra Pradesh are taken.

<u>Keywords:</u> Transportation Costs, Fish Markets, Cost Reduction, Logistics, Fish Transportation, Efficiency, Supply Chain, Delivery Costs, Fishing Industry, Optimization

INTRODUCTION –

<u>**LPP-**</u>

This transportation of te3h fishes from the harbour to the market is a very complex logistical challenge. It has various factors to ensure efficiency as well as timely delivery of the fresh seafood. One powerful tool for the timely delivery of the sea food challenge is linear programming, this is a mathematical optimisation technique which is applied for the streamline of the transportation process, minimisation of the costs, for overall supply chain performance.

Usually, the LPP around the fish transportation deals with multiple variables like transportation routes, storage facilities and also the market demands. But these all are the secondary objectives, the primary objective is finding the optimum transportation cost. This is a mathematical approach which is particularly dynamic and time sensitive.

Transportation plays a very important role in for the efficient movement of the services in the daily life, with this complex web of transportation logistics linear programming is an efficient mathematical tool helps in optimizing the resource allocation and the perfect decision making. LPP helps us in addressing the various challenges in transportation of fishes from harbour to market and helps in minimizing cost and maximizing efficiency, it balances competitive objectives for the utilization of resources as well as root planning.

Here, linear programming helps in formulating relationship between many variables i.e. suppliers and destinations. The main moto over here is cost effective transportation of fishes, here the beauty lies in ability to handle the complexities in the fish transportation considering various factors. Taking into the consideration all the three suppliers and destinations minimum transportation cost is found with the help of LPP as it offers quantitative as well as analytical approach. Hence it helps in over all performance of the transportation.

OBJECTIVES-

PRIMARY OBJECTIVE –

 1. Construction of a cost matrix as per problem stated.

SECONDARY OBJECTIVE –

1. Finding minimum transportation cost for shipment of fishes from harbour to markets.

2.To find out how many tonnes of fishes should be transported to respective destinations (supply) Along controlling the quality of fishes.

REVIEW OF LITERATURE –

(Arijit De, 2022)It basically presents mixed integer linear programming model for supply of food logistics, it addresses environmental concerns.it deals about model capability. Shifting of transportation from road to marine yields financial and environmental gains. (M. L. Aliyu1, 2019) CCNN transportation was utilised, finding out minimum cost from factories to warehouses. All the three methods used for transportation gave the same value and the solution is optimal. (A. Vamsikrishna, 2021) For bringing an optimized routing, cost of transportation as well as time taken plays a pivotal role. It creates scope to solve multiple problems using linear programming as well as excel solver. (Sajida Kousar, 2023)two biomass products-natural gas as well as biofuel are taken into consideration based upon individual routes, networked flow of materials in a cost-effective as well as sustainable manner. (rushikesh a patil, 2023)transportation cost mainly effects total logistics cost, incoterms are taken into the consideration. In the ocean shipping the cost is dependent on whether shipment is FCL or LCL. (C.sengottuvelu, 2020)last mile delivery plays an important role for the achievement of the results. Here lpp is used for development of optimum utilisation of truck space. (Zhang, 2019)it explains the carpooling with detour problem, this method benefits the passengers as well the drivers, hence it is very feasible to choose decisions based on carpooling. (Anila Cyril, 2019)performance optimisation is based on many things like technical, financial as well as human resources too. The paper has identified decision variables for the optimisation, this performance is based on the ksrtc. the terms efficiency, productivity plays a very important role. (Gonsalves, 2023)optimisation is very important even in the mechanical components. New method has been proposed and the proposed method saves a lot of time as well as a lot of effort. Real life examples has been taken into the consideration. Optimum solution from the new method is more efficient compared to the old optimum solution. (stopka, 2019) this paper deals with the waste management, it holds 2 different house hold waste volume as well as the mixed waste, parameters like the capacity of the waste collection vehicles are here compared. The focus was even on other two methods to solve the problem. (RaRdin, 2019)this operations research has been very important especially for the transportation topic, it plays an important role in real life too, the decision making for reducing the costs easy very useful in the real life transportation .it is important to keep the constraints as well as the objectives. (Taha, 2020)the operations research deals with subjective as well as the real life ,manner, it helps us to captivate the information of how we can use it in our lives as it has many things to deal with and the models imitating the simulation of the real life. (International Journal of Mathematics in Operational Research, 2020)this incorporates a lot of utilisations, these models are implied to many transportation modes for different business and for their convenient arrangements, especially tracking down many important arrangements. Including the organisations travelling agencies. (Alok Raj, 2022) this transportation is mainly on the mitigation strategies often transportation work that has been dealt with.it presents a conceptual framework that has affected the global supply chains. This paper helped the other practitioners as well a scholar for the outbreak. (directorate of studies, 2021)it covers everything from project management to strategic analysis to formulation as well s the implementation of the strategy. Conversion of the inputs to the outputs. Service orientation and transportation as the competitive advantage.

RESEARCH METHODOLOGY-

Research Design

Sampling Strategy

Target population (e.g., fish market locations, transportation companies)., Transportation mode - large trucks, Selected a sample that represents different market sizes, geographical locations, and transportation modes (e.g., air, road, sea).

Data Collection Methods

Surveys: Created a survey for fish market managers, transportation companies, and fishermen to gather insights on current practices, challenges, and potential improvements.

Interviews: Conducted interviews with industry experts, logistics providers, to gain qualitative insights and perspectives through phone calls

Observation: Visited fish markets and transportation facilities to observe processes, challenges, and potential inefficiencies firsthand.

Data Analysis

Quantitative Analysis: Used statistical tools to analyze survey data, identifying trends and correlations related to transportation costs and methods.

Qualitative Analysis: Thematic analysis of interview transcripts and observational notes to extract insights and themes.

PROBLEM STATEMENT

The transportation of the business from harbour to the business areas is the important association in any any fish network business.it has many things to deal with especially moving of the fish, changing interests, maintaining the quality. By using such kind of extravagant models and improvement procedures, the main objective here is to make this entire procedure work like a perfect clockwork. This solution is the perfect economical answer for the optimal solution.

D_{ij}= distance from the source i to j(destination) in kms

T_{ij}= travelling time from the source i to destination in kms(j)

This information is collected from Nellore suppliers. The suppliers catch the fishes and transport to their respective destinations,

S1 – MYPADU   D1- JAGADEVI PETA

S2- INDUKURPET   D2-SANTI NAGAR

S3-KOTHA KODURU   D3- BANGLA THOTA

For transporting tonnes of fishes from supplier 1, it costs Rs.90 to Destination 1, Rs.113 to Destination 2, Rs.110 to Destination 3.

For transporting tonnes of fishes from supplier 2, it costs Rs.115 to Destination 1, Rs.105 to Destination 2, Rs.89 to Destination 3

For transporting tonnes of fishes supplier3, it costs Rs.98 to Destination 1, Rs.95 to Destination 2, Rs.125 to Destination 3.

TABLE 1

	DESTINATION 1	DESTINATION 2	DESTINATION 3	SUPPLY
SUPPLIER 1	90	113	110	6
SUPPLIER 2	115	105	89	9
SUPPLIER 3	98	95	125	5
DEMAND	5	8	7	20

TABLE 2

AFTER SOLVING IT IN THE EXCEL SOLVER

	DESTINATION 1	DESTINATION 2	DESTINATION 3	LHS	SUPPLY
SUPPLIER 1	5	1	0	6	6
SUPPLIER 2	0	2	7	9	9
SUPPLIER 3	0	5	0	5	5
LHS	5	8	7		
DEMAND	5	8	7		20

Therefore, the minimum possible transportation cost for shipping fish load from harbours to the market site is Rs.1871 The supplier1 supplies 5 metric tons of fishes to destination 1 and 1 metric tons of fishes to destination 2. supplier 2 supplies 2 metric tons of cement to destination 2 and7 metric tons of cement to destination 3. Supplier 3 supplies 5 metric tons of cement to destination2 here the quantity of fishes is taken as a tonne each.

 MINIMUM TRANSPORTATION COST=Rs. 1871 per day

CONCLUSION –

In this research paper, for the complicated transportation of the fishes, it is important to balance two main things.

- 1.smoother experience with quality control
- 2.less expensive

This process of transporting the fishes from the harbour to the business areas needs the adoption of various logistics as well as supply chain practices. In this paper the minimum transportation cost is mentioned, but however it could be attained only when there is joint intiativs such as distribution networks, transportation resources warehouses etc.in this increasing global demand of the sea food the pivotal role played here is the transportation costs.using of the technological enhancements as well as the improvised collaborations it can ensure long term viability. In the end optimisation of the transportation costs is not only about cost cutting strategy but also the involvement of economic, social, efficiency and also an futuristic perspective. Significant things to make sure in fish transportation business- Assess Transporter Execution, Legitimate Consistence, Cleanliness and Sterilization, Lean stock, Use Full Burden Limit, Investigate Agreeable Delivery, Reevaluate Transportation.

REFERENCES-

A. Vamsikrishna, v. r. (2021). Cost Optimization for Transportation Using Linear Programming. researchgate.

Alok Raj, a. A. (2022). Supply chain management during and post-COVID-19 pandemic: Mitigation strategies and practical lessons learned. ncbi.nlm.nih.gov.in.

Anila Cyril, R. H. (2019). Performance Optimization of Public Transport Using Integrated AHP–GP Methodology. springer.

Arijit De, M. G. (2022). Optimization model for sustainable food supply chains: An application to Norwegian salmon. sciencedirect.

C.sengottuvelu, v. s. (2020). DEVELOPMENT OF LPP MODEL TOWARDS OUTBOUND FREIGHT OPTIMIZATION FOR TRADED PARTS AMONG CENTRALIZED WAREHOUSE OPERATIONS. iaeme.

directorate of studies, i. (2021). OPERATIONS management and strategic management. icmai.

Gonsalves, h. (2023). The solution to the Profit maximization transportation problem using new transportation algorithm. e3s-conferences.

International Journal of Mathematics in Operational Research. (2020). inderscience publications.

M. L. Aliyu1, U. U. (2019). A Minimization of the Cost of Transportation. article.sapub.org.

RaRdin, R. l. (2019). Optimization in operations research. industri.fatek.

rushikesh a patil, a. d. (2023). interantional transportation mode selection through total logistics cost based intelligent approach. mdpi.

Sajida Kousar, m. n. (2023). Optimizing transportation cost for biomass supply chain. researchgate.net.

stopka, o. (2019). Application of the Operational Research Method to Determine the Optimum Transport Collection Cycle of Municipal Waste in a Predesignated Urban Area. mdpi.

Taha, H. A. (2020). operations research an introduction. zalamsyah.

Zhang, W. (2019). Research on Taxi Pricing Model and Optimization for Carpooling Detour Problem. hindawi.