

SIMULATION MODEL FOR PADDY TRANSPORTATION STRATEGY IN SRI LANKA

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The thesis submitted in partial
fulfillment of the requirements for the
degree of

M.Sc. in Operational Research



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ABSTRACT

Cost effective paddy harvest transportation strategy is simulated in this operational study. Paddy production of administrative districts of Sri Lanka is assumed to be distributed among the districts proportional to their respective populations. Paddy production vary highly among the administrative districts of Sri Lanka and district wise consumption also varies based on population. Aim of this study is to find out the cost benefit transportation over Sri Lanka treating it as stochastic transportation problem which describe as minimize total transportation cost subject to with realized minimum probabilities of supply and demand constraint.

Transportation problem of each cultivation seasons of each year is solved by finding out the districts and amounts that need the commodity from others (called consumers) and those that can supply called suppliers. It is assumed that overall paddy production of a cultivation year is sufficient enough for total population. A transportation pattern is figure out from supplier districts to consumer districts by solving this deterministic transportation problems.

Almost all real life problems encounter uncertainty. Therefore this analysis is extended to introduce simulation model to find out optimum transportation strategy considering uncertainties. Simulated transportation strategy is presented by solving the chance constrained stochastic programming problem. The classical transportation problems for the years from 1989 to 2000 is solved here. Moreover simulated and actual results are presented for the years 2000 .

Finally this simulation model is implemented as decision support system for the cost effective transportation strategy of such products.

DEDICATION

To the memory of my Father

and to my Mother



my wife Suranji and
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daughter Samadhee



TABLE OF CONTENTS

	<i>Page</i>
List of Tables	ii
List of Figures	iv
Acknowledgements	v
Glossary	vi
Introduction	1
Stochastic Programming Problem	5
Deterministic Equivalents for Stochastic Transportation Problem	7
Data Collection and Methodology	11
Analysis of Results	20
Discussion	41
Conclusion and Future Works	43
Appendix A	51
Appendix B	66
Bibliography	75



LIST OF TABLES

<i>Number</i>	<i>Page</i>
Table 3.1 Transportation Tableau	7
Table 4.1 Initial transportation table of the year 1989 (a) 'Maha' season (b) 'Yala' season('000 MT)	16
Table 4.2 Initial table of the year 2000 (a) 'Maha' season (b) 'Yala' season('000 MT)	17
Table 4.3 Simulated initial transportation table of the year 2000 (a) 'Maha' season $\alpha=0.85$, $1-\beta=0.85$ (b) 'Yala' season $\alpha=0.85$, $1-\beta=0.85$ ('000 MT)	18
Table 4.4 Simulated initial transportation table of the year 2000 (a) 'Maha' season $\alpha=0.99$, $1-\beta=0.99$ (b) 'Yala' season $\alpha=0.99$, $1-\beta=0.99$ ('000 MT)	19
Table 5.1 The amount of paddy to be transported(optimum tables) (a) - (l) for the years 1989 – 2000 'Maha' seasons('000 MT)	21-26
Table 5.2 The amount of paddy to be transported(optimum tables) (a) – (l) for the years 1989 – 2000 'Yala' seasons('000 MT)	27-32
Table 5.3 The annual transportation strategies for the years from 1997 to 2000 (a) – (d)('000 MT)	33-34

Table 5.4 Simulated transportation strategy of 'Maha' season of the year 2000 (paddy '000 MT to be transported) (a) $\alpha=0.85$ $1-\beta=0.85$ (b) $\alpha=0.95$ $1-\beta=0.95$ (c) $\alpha=0.99$ $1-\beta=0.99$	37-38
Table 5.5 Simulated transportation strategy of 'Yala' season of the year 2000 (paddy '000 MT to be transported) (a) $\alpha=0.85$ $1-\beta=0.85$ (b) $\alpha=0.95$ $1-\beta=0.95$ (c) $\alpha=0.99$ $1-\beta=0.99$	39-40
Table B.1 Data sheet of the year 1989	66-67
Table B.2 Data sheet of the year 2000	67-68
Table B.3 Adjusted supply and demand(minus values) amounts of each year 'Maha' season	68-69
Table B.4 Adjusted supply and demand(minus values) amounts of each year 'Yala' season	69-70
Table B.5 Simulated supply and demand(minus) amounts for 'Maha' season of the year 2000. The α and $1-\beta$ probabilities are 0.85, 0.95, and 0.99	70-71
Table B.6 Simulated supply and demand(minus) amounts for 'Yala' season of the year 2000. The α and $1-\beta$ probabilities are 0.85, 0.95, and 0.99	72
Table B.7 Adjusted supply and demand(minus) amount of the year 2000 simulated values for the α and $1-\beta$ probabilities are 0.85, 0.95, and 0.99	73
Table B.8 Cost matrix: Distance among the administrative capitals of districts(Km).	74

LIST OF FIGURES

<i>Number</i>	<i>Page</i>
Figure 1.1 Network for Transportation Problem	2
Figure 4.1 Flow chart to find out supplier and consumer districts and calculation their amounts.	13
Figure 4.2 Adjust the supply and demand amount according to the 'Maha' and 'Yala' requirement.	14
Figure 4.3 Flow chart of the forecast supplier or consumer amounts.	15
Figure 5.1 Simulsted and actual supply and demand amounts of paddy in year 2000 'Maha' season	35
Figure 5.2 Simulated and actual supply and demand amounts of paddy in year 2000 'Yala' season	36



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ACKNOWLEDGMENTS

It is with my heartiest pleasure, I express my deep appreciation to my supervisor Prof. G. T. F. de Silva for his guidance, assistance and emotional support to make this project a success. I wish to give my special thanks with my great pleasure to Prof. M Indralingam, Course Coordinator who encouraged me throughout my study of this MSc degree. I would like to mention him with deep gratitude about his constructive advice given to me. Besides it enabled me to fulfill this task and make my project work a quite pleasant one. I wish to convey my appreciation to all Lecturers who conducted lectures on M.Sc (OR). Their valuable guidance and advice made me a firm mind for success in the M.Sc. degree. I wish to mention with gratitude to all other academic and non-academic staff members of Department of Mathematics, University of Moratuwa for their help to success my studies.

I wish to make special vote of thanks to ADB for their financial assistance to success my postgraduate study at University of Moratuwa.

Great thanks to all colleagues of the PG Dip/M.Sc. degree in Operational Research for their co-operation with my work.

The Galle Advanced Technical Institute, Labuduwa and the staff who helped and encouraged me to make this project a success receive a big thank with my pleasure.

GLOSSARY

Cultivation Year. Include both Maha and Yala seasons, from September/October to August/September of the next year.

Decision Support System. An interactive, flexible and adaptable computer based information system that utilize decision rules, models and model base coupled with a comprehensive database and the decision maker's own insights.

Linear Programming Problem. A mathematical modeling technique designed to optimize the usage of limited resource

Maha Season. An agricultural season from September/October to March/April

Random Variable. A numerically valued faction defined on a sample space.

Simulation. Imitation of real world process or system over time.

Stochastic Programming Problem. Deals with situation where some or all parameters of the problem are described by random variables

Transportation Problem. A special class of the linear programming problem dealing with the situation in which a commodity is supplied from source to destination

Yala Season. An agricultural season from April/May to August/September

