UNIVERSITI PUTRA MALAYSIA

EFFICIENCY PERFORMANCE OF MALAYSIAN BRACKISH WATER WHITE SHRIMP PRODUCTION

LIM GHEE THEAN

IKDPM 2014 1

EFFICIENCY PERFORMANCE OF MALAYSIAN BRACKISH WATER WHITE SHRIMP PRODUCTION

LIM GHEE THEAN

DOCTOR OF PHILOSOPHY
UNIVERSITI PUTRA MALAYSIA

2014

EFFICIENCY PERFORMANCE OF MALAYSIAN BRACKISH WATER WHITE SHRIMP PRODUCTION

By

LIM GHEE THEAN

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

July 2014

COPYRIGHT

DEDICATION

Specially dedicated to my beloved

Grandma,

Tang Siew Gan (1926 – 2008)

Wife,

Lee Huay Lin

Parents,

Lim Ah Seng & Ng Gook Hiang

Daughter,

Lim Shu-Na

Lim Xin-Er

Brothers,

Lim Ghee Sern & Lim Ghee Geen

Uncles, Aunties, Cousins

And

Friends

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

EFFICIENCY PERFORMANCE OF MALAYSIAN BRACKISH WATER WHITE SHRIMP PRODUCTION

By

LIM GHEE THEAN

July 2014

Chairman : Mohd Mansor Ismail, PhD
Institute : Institute of Agricultural and Food Policy Studies

Shrimp aquaculture industry is playing a vital role in Malaysia agricultural economy, especially its increasing contribution to balance of trade of agricultural products. Brackish water white shrimp production is the main contributor of Malaysian shrimp aquaculture industry. However, Malaysian brackish water white shrimp production is facing low productivity performance and issue of environmental degradation that caused by shrimp culturing. Hence, this study attempts to measure technical, allocative and cost efficiency, and production risk of Malaysian brackish water white shrimp production. Parametric (stochastic frontier analysis) and non parametric approaches (data envelopment analysis) are applied in this study. In this study, dependent variables are production of white shrimp and cost of production; while independent variables are quantity of inputs (labour, feed and seed) and price of inputs (labour, feed and seed). In addition, the factors such as full-time, farmer's age, education level, experience, seminar, land ownership, pond size, number of ponds, pond age, fertilization, size of fry and culturing days are applied in technical inefficiency and cost inefficiency analyses. Average scores of technical, allocative and cost efficiency that generated by parametric approach are 54.7%, 66.3% and 36.4%, respectively. While average scores of technical, allocative and cost efficiency that generated by non parametric approach are 43.3%, 59.9% and 26.1%, respectively. Besides, result of production risk analysis indicated that labour is considered as a risk decreasing input, but feed and seed are considered as risk increasing inputs. Results of parametric and non parametric approaches consistently showed that factor of seminar negatively and significantly affect technical inefficiency and cost inefficiency. Hence, government authority should organize more seminars that related to shrimp aquaculture, management, accounting and motivation for the shrimp farmers. Besides, government authority should implement mandatory attendance at seminar for the shrimp farmers. Efficiency performance of Malaysian brackish water white shrimp production needs to be improved in order to achieve higher productivity, at the same time minimize the environmental degradation.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk Ijazah Doktor Falsafah

PRESTASI KECEKAPAN PENGELUARAN UDANG PUTIH AIR PAYAU DI MALAYSIA

Oleh

LIM GHEE THEAN

Julai 2014

Pengerusi : Mohd Mansor Ismail, PhD
Institut : Institut Kajian Dasar Pertanian dan Makanan

Industri akuakultur udang memainkan peranan penting dalam ekonomi pertanian Malaysia, terutamanya sumbangan yang semakin meningkat dalam imbangan perdagangan produk pertanian. Pengeluaran udang putih air payau merupakan penyumbang utama kepada industri akuakultur udang Malaysia. Walau bagaimanapun, pengeluaran udang putih air payau Malaysia telah menghadapi masalah-masalah seperti produktiviti yang rendah dan isu pencemaran alam sekitar yang disebabkan penternakan udang. Oleh sedemikian, kajian ini bertujuan untuk mengukur kecekapan teknikal, kecekapan peruntukan input, kecekapan kos, dan risiko pengeluaran dari pengeluaran udang putih air payau Malaysia. Pendekatan parametrik (stochastic frontier analysis) dan bukan parametrik (data envelopment analisis) telah digunakan dalam kajian ini. Dalam kajian ini, variabel dependen ialah pengeluaran udang putih dan kos pengeluaran; manakala variabel bebas merupakan kuantiti input (buruh, makanan dan benih) dan harga input (buruh, makanan dan benih). Tambahan pula, faktor-faktor seperti sepenuh masa, umur petani, taraf pendidikan, pengalaman, seminar, pemilikan tanah, saiz kolam, bilangan kolam, umur kolam, pembajaan, saiz benih dan hari pembelaan telah diaplikasikan dalam menganalisis ketidakcekapan teknikal dan ketidakcekapan kos. Skor purata kecekapan teknikal, kecekapan peruntukan input dan kecekapan kos yang dihasilkan oleh analisis pendekatan parametrik ialah 54.7%, 66.3% dan 36.4% masing-masing. Sebaliknya, skor purata kecekapan teknikal, kecekapan peruntukan input dan kecekapan kos yang dihasilkan oleh pendekatan bukan parametrik ialah 43.3%, 59.9% dan 26.1% masing-masing. Selain itu, keputusan analisis risiko pengeluaran menunjukkan bahawa buruh adalah dianggap sebagai input yang dapat mengurangkan risiko pengeluaran, tetapi makanan dan biji benih adalah dianggap sebagai input yang dapat meningkatkan risiko pengeluaran. Keputusan-keputusan pendekatan parametrik dan bukan parametric sama-sama menunjukkan bahawa seminar didapati mempengaruhi secara negatif terhadap ketidakcekapan teknikal dan ketidakcekapan kos dengan ketaranya. Oleh itu, pihak berkuasa kerajaan haruslah menganjurkan lebih banyak seminar yang berkaitan dengan akuakultur udang, pengurusan, perakaunan dan motivasi untuk penternak-penternak udang. Di samping itu, pihak berkuasa kerajaan juga haruslah mewajibkan penternak-penternak udang untuk menghadiri seminar yang dianjurkan. Prestasi kecekapan pengeluaran udang putih air payau di Malaysia perlu dipertingkatkan supaya dapat mencapai produktiviti yang lebih tinggi sambil mengurangkan pencemaran alam sekitar.

ACKNOWLEDGEMENTS

I gratefully acknowledge the funding from the project of Research Grant Scheme (vote number: 5524023). My sincere appreciation goes to the staffs of Institute of Agricultural and Food Policy Studies (IAFPS) for their precious support and the use of their survey materials. Special thank to Mr. Ng Xin Khai, research officer of IAFPS for assisting me throughout the survey interview. I am grateful for his patient, attention, and support.

My sincere thank to my chairman of the supervisory committee, Prof. Dr. Mohd Mansor Ismail, for his guidance, patience and kindness throughout my graduate experience. Thanking for sharing your valuable knowledge and experiences with me. I am also grateful to the members of the supervisory committee Assoc. Prof. Dr. Alias Radam and Dr. Gazi Nurul Islam for their precious guidance and invaluable advice. I would like to thank the supervisory committee for creating a pleasant impression for discussion and spending countless time for me.

My sincere appreciation goes to the staffs in state of Department of Fisheries (Penang, Perak, Selangor, Pahang, Johor, Sabah and Sarawak) for their invaluable assistance. Special thanks to Mr. Johari Tim (Putrajaya Department of Fisheries) for his assistance and permission to use the secondary data. I would like to thank all the shrimp farmers for their patient, support and understanding during the survey interview.

I wish to express my sincere gratitude to my dearest wife and beloved parents and for their invaluable encouragement, understanding and support. The moral support of my family has given me the strength to overcome all the obstacles in completing my study.

Special acknowledgement also extended to the Ministry of Education for the sponsorship of my education through the My Brain. Without the financial support, it is impossible for me to complete this degree with full focus on time. Last but not least, I thank to God for enabling me to go though my PhD degree study.

APPROVAL

I certify that a Thesis Examination Committee has met on **14th July 2014** to conduct the final examination of Lim Ghee Thean on his thesis entitled "**Efficiency Performance Of Malaysian Brackish Water White Shrimp Production**" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

Members of the Thesis Examination Committee were as follows:

Khalid b Abdul Rahim, PhD
Professor
Faculty of Economics and Management
Universiti Putra Malaysia
(Chairman)

Ahmad b Shuib, PhD
Professor
Institute of Agricultural and Food Policy Studies
Universiti Putra Malaysia
(Internal Examiner)

Datuk Mad Nasir b Shamsudin, PhD
Professor
Faculty of Agriculture
Universiti Putra Malaysia
(Internal Examiner)

Indah Susilowati, PhD
Faculty of Economics and Business
Diponegoro University
Indonesia
(External Examiner)

_____
NORITAH OMAR, PhD
Associate Professor and Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 18 August 2014

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

Mohd Mansor Ismail, PhD
Professor
Institute of Agricultural and Food Policy Studies
Universiti Putra Malaysia
(Chairman)

Alias Radam, PhD
Associate Professor
Faculty of Economics and Management
Universiti Putra Malaysia
(Member)

Gazi Nurul Islam, PhD
Research Fellow
Institute of Agricultural and Food Policy Studies
Universiti Putra Malaysia
(Member)

BUJANG BIN KIM HUAT, PhD
Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

Declaration by graduate student

I hereby confirm that:

- this thesis is my original work;
- quotations, illustrations and citations have been duly referenced; a
- this thesis has not been submitted previously or concurrently for any other degree at any other institutions;
- intellectual property from the thesis and copyright of thesis are fully-owned by Universiti Putra Malaysia, as according to the Universiti Putra Malaysia (Research) Rules 2012;
- written permission must be obtained from supervisor and the office of Deputy Vice-Chancellor (Research and Innovation) before thesis is published (in the form of written, printed or in electronic form) including books, journals, modules, proceedings, popular writings, seminar papers, manuscripts, posters, reports, lecture notes, learning modules or any other materials as stated in the Universiti Putra Malaysia (Research) Rules 2012;
- there is no plagiarism or data falsification/fabrication in the thesis, and scholarly integrity is upheld as according to the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) and the Universiti Putra Malaysia (Research) Rules 2012. The thesis has undergone plagiarism detection software.

Signature: _____ Date: _____

Name and Matric No.: _____

Declaration by Members of Supervisory Committee

This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) are adhered to.

Signature: _____	Signature: _____
Name of Chairman of Supervisory Committee: _____	Name of Member of Supervisory Committee: _____
Signature: _____	Signature: _____
Name of Member of Supervisory Committee: _____	Name of Member of Supervisory Committee: _____

TABLE OF CONTENTS