



UNIVERSITI PUTRA MALAYSIA

**INFLUENCE OF MANAGEMENT CHARACTERISTICS ON
TECHNICAL EFFICIENCY OF RICE FARMING IN THE MUDA
AGRICULTURAL DEVELOPMENT AUTHORITY,
KEDAH, MALAYSIA**

ISMAIL BIN ABDLATIF

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By

ISMAIL BIN ABDLATIF

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

September 2008

Dedication

To

My parents

My wife

My family

My friends

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

**INFLUENCE OF MANAGEMENT CHARACTERISTICS ON
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September 2008

Chairman: Professor Mad. Nasir Shamsudin, PhD

Faculty : Agriculture

Rice is a strategically important crop due to it being a staple food commodity. The rice industry is heavily regulated and completely protected from direct foreign competition. However, technical efficiency remains low. Numerous farm studies have shown the widespread existence of inefficiencies among rice producers. Despite the general adoption of the green revolution technology, enormous differences in farm technical efficiency still exists intra and inter farms, within regions and nations. Even though farms face similar environmental conditions and apply the same production techniques, yield levels still differ between them. Many believe that management skills must be the X factors that contribute to the differences in technical efficiency between farms. This study attempts to examine the farm technical efficiency levels and the effects of management variables on efficiency.

The purpose of the study was to analyze the roles of management proxied as a soft technology variable in determining the technical efficiency of paddy farms in MADA, Kedah. Three hundred and seventy five farm records of MADA paddy farmers in Season 1, 2002 were analyzed for the levels and determinants of technical inefficiency. Data collected included a) production variables: paddy output, land, fertilizer, chemicals, labour, and b) management demographic variables: planning, organizing, directing, controlling, age, education and family size. The data were comparatively analysed via the parametric (Stochastic Frontier Analysis) and non parametric (Data Envelopment Analysis) framework according to regions and farm size. The estimated efficiency indexes and the determinants of technical inefficiency yielded by each method were compared and analysed. The empirical results were subsequently examined to ascertain the extent to which they served the needs of policymakers. Determinants of inefficiency which include planning, organizing, directing, coordinating, control, age, education and experience were analyzed using, i) Battese and Coelli (1995) model, and ii) Tobit model.

Results indicated that farmers have an average farm size of 2.04 hectares. Most farmers were generally old with households' size becoming smaller implying less family labour hours available for farm work. Most farmers have low education levels but are rather well experienced in paddy planting with the knowledge generally being passed down from elders and experienced on the job rather than formal training.

Stochastic Frontier Analysis showed a wide variation in the estimated technical efficiencies, ranging from 37 to 98 percent, indicating opportunities for improvement in the technical efficiency of farms. Parameter estimates show systematic technical inefficiency effects do exist. Management variables that exert positive effects on efficiency are organizing, staffing and controlling. Motivational variables that promote efficiency include maintaining way of life, maintaining environment and increasing farm size. Demographic variables that are positively related to efficiency are experience, household size and education levels.

Data Envelopment Analysis indicated that efficiency levels, ranging from 26 to 100 percent, vary across farms and within each production regions. Most farms are technically efficient with 60 percent of the sample above the mean efficiency score. Efficient farms that are well managed have proper planning, organizing and control schedules. Most of these farms are managed by rather old, very experienced but lowly educated farmers. Farm objective of maintaining environment was the main characteristics of efficient farms. Personal aspects which include years of experience and age exert positive effects on efficiency.

The comparative analysis for the mean technical efficiency for the sample were estimated to be 88 percent for SFA, 72.5 percent for DEA Constant Returns to Scale and 83.1 percent for DEA Variable Returns to Scale. This implies that more work can still be done to increase the efficiency levels. The technical inefficiency effects were found to be significant in explaining the levels of and variation in farm earnings. Organizing, staffing, controlling, environment conscious, maintaining way

of life, maintaining farm size, age and experience exert positive factors on farm efficiency.

In conclusion, policymakers should not be indifferent to the choice of the frontier models used to score efficiency relationships. They may be well advised to wait until additional research clarifies reasons why DEA and SFA models yield divergent results before they introduce these methods into the policy process. Thus, farm policies should focus more on improving the skills and techniques of farm operations. Correct application and timeliness of farm operation will promote the optimal usage of inputs. Training and extension services can also help farms acquire new technology so that they can be at the frontier of paddy production.

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

**PENGARUH CIRI PENGURUSAN TERHADAP KECEKAPAN TEKNIKAL
PENANAMAN PADI DI LEMBAGA PEMBANGUNAN PERTANIAN
MUDA, KEDAH, MALAYSIA**

Oleh

ISMAIL BIN ABDLATIF

September 2008

Pengerusi : Professor Mad Nasir Shamsudin, Ph.D.

Fakulti : Pertanian

Beras ialah produk strategik dan penting kerana merupakan sebagai komoditi makanan utama. Industri Beras Negara dilindungi sepenuhnya daripada persaingan asing secara perundangan dan peraturan kerajaan. Namun begitu kecekapan teknikalnya masih di takuk yang rendah. Kebanyakan kajian telah menunjukkan keujudan ketidakcekan yang meluas antara petani padi. Walaupun dengan penerimaan teknologi revolusi hijau, perbezaan yang luas dalam kecekapan teknikal ladang masih ujud antara ladang padi di dalam dan di luar negara pengeluar padi. Ladang padi menghadapi keadaan sekeliling yang sama dan menggunakan teknik pengeluaran yang serupa, tetapi hasil padi amat berbeza di antara petani. Ramai penyelidik percaya bahawa kemahiran pengurusan merupakan factor X yang menyumbang kepada perbezaan antara kecekapan teknikal petani. Jadi kajian ini akan cuba menilai tahap kecekapan teknikal ladang dan kesan angkubah pengurusan terhadap kecekapan tersebut.

Tujuan utama kajian ialah menilai peranan pengurusan yang juga dikenali sebagai angkubah teknologi lembut (*soft technology*) dalam menentukan kecekapan teknikal ladang padi di MADA, Kedah. Tiga ratus tujuh puluh lima petani MADA dalam musim 2, 2002 telah di banci dan tahap serta penentu kecekapan teknikal mereka telah dianalisis. Data yang dikutip termasuklah: a) angkubah pengeluaran: keluaran padi, saiz ladang, baja, kimia Pertanian, tenaga buruh, dan b) angkubah pengurusan dan demografi: perancangan, pengarahan, pengawalan, umur, pendidikan dan saiz keluarga. Data di analisis pula secara perbandingan secara kaedah parametrik *Stochastic Frontier Analysis* dan bukan parametric *Data Envelopment Analysis* mengikut kawasan dan saiz ladang. Indeks anggaran kecekapan dan penentu ketidakcekapan yang didapati dari tiap kaedah dibandingkan dan dianalisis. Keputusan empirical di kaji sejauh mana ia memenuhi keperluan pembuat keputusan. Penentu ketidakcekapan yang termasuk perancangan, pengarahan, pengawalan, umur, pendidikan dan kecekapan dianalisis secara, i) *Model Battese and Coelli* (1995), dan ii) *Model Tobit*.

Keputusan menunjukkan petani mengusahakan secara purata 2.04 hektar saiz ladang. Kebanyakan mereka adalah golongan tua dengan saiz keluarga kecil yang menunjukkan kekurangan tenaga buruh keluarga yang boleh digunakan untuk operasi ladang. Kebanyakan petani berpendidikan rendah tetapi agak berpengalaman dalam penanaman padi. Pengetahuan pertanian di warisi dari keluarga mereka dan pengalaman kerja di dapati di ladang dan bukannya dari latihan formal.

Stochastic Frontier Analysis menunjukkan variasi dalam kecekapan teknikal yang dianggarkan bernilai antara 37 ke 98 peratus. Ini menunjukkan masih banyak peluang atau ruang untuk peningkatan dalam kecekapan teknikal ladang. Anggaran parameter menunjukkan kesan ketidakcekapan teknikal ujud pada aras signifikan yang tinggi. Angkubah pengurusan yang memberi kesan positif terhadap kecekapan ialah pengambilan pekerja, perancangan dan pengawasan. Angkubah motivasi yang meningkatkan kecekapan ialah cara hidup, keadaan sekeliling dan menambahkan saiz ladang. Angkubah demografi yang bertalian secara positif dengan kecekapan ialah pengalaman, saiz keluarga dan tingkat pendidikan.

Data Envelopment Analysis menunjukkan tahap kecekapan yang bernilai antara 26 ke 100 peratus antara ladang dan kawasan pengeluaran. Kebanyakan ladang adalah cekap dalam penggunaan input dengan 60 peratus sampel melebihi skor purata kecekapan teknikal. Ladang yang efisien diurus dengan baik dan mempunyai pelan, perancangan dan pengawasan yang teratur. Objektif memaksimumkan untung adalah ciri utama dalam pengurusan ladang yang baik. Aspek demografi seperti pengalaman dan umur memberikan kesan positif terhadap kecekapan.

Analisis perbandingan untuk skor purata kecekapan teknikal dianggarkan 88 peratus untuk kaedah *SFA*, 72 peratus untuk kaedah *DEA CRTS* dan 83.1 peratus untuk kaedah *DEA VRTS*. Ini menunjukkan masih banyak program yang boleh dilakukan untuk meningkatkan tahap kecekapan. Kesan ketidakcekapan teknikal didapati signifikan dalam menerangkan tahap dan variasi dalam kecekapan ladang.

Angkubah pengurusan seperti pelan, perancangan, pengambilan pekerja, pengawasan manakala angkubah sosioekonomi seperti memelihara alam sekeling, meneruskan cara hidup, membesarkan saiz ladang, umur dan pengalaman petani memberikan kesan positif terhadap kecekapan ladang.

Kajian ini menunjukkan pemilihan model frontier yang tepat harus dilakukan pembuat keputusan dalam menilai kecekapan ladang. Kedua kaedah kajian menunjukkan keputusan kecekapan yang berbeza dan ini akan menyulitkan penggubalan polisi yang jitu dan mampan. Kedua dua model ini harus dikaji seterusnya dan dinilai berikutan keputusan yang berbeza ini. Secara amnya, kajian mencadangkan polisi pertanian yang patut fokus kepada peningkatan kebolehan dan teknik dalam operasi di ladang. Aplikasi input ladang yang betul mengikut ketepatan masa akan memastikan penggunaan input yang optima. Latihan dan khidmat pengembangan juga akan membantu petani mengaplikasi teknologi baru supaya mereka boleh berada di tahap pengeluaran yang optimal.

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I certify that an Examination Committee met on 25th September 2008 to conduct the final examination of Ismail Bin AbdLatif on his Doctor of Philosophy thesis entitled “Influence Of Management Characteristics On Technical Efficiency Of Rice Farms In Muda Agricultural Development Authority, Kedah, Malaysia” in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulation 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

Norsida Man, Ph.D

Senior Lecturer
Faculty of Agriculture
Universiti Putra Malaysia
(Chairman)

Mohd Mansor Ismail, Ph.D

Associate Professor
Faculty of Economic and Management
Universiti Putra Malaysia
(Member)

Amin Mahir Abdullah, Ph.D

Senior Lecturer
Faculty of Agriculture
Universiti Putra Malaysia
(Member)

Dato’ Jamalludin Sulaiman, Ph.D

Professor
School of Social Sciences
Universiti Sains Malaysia
(Independent Examiner)

HASANAH MOHD GHAZALI, Ph.D.

Professor/Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

Date :

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 are as follows:

Mad Nasir Shamsuddin, Ph.D.

Professor
Faculty of Graduate Studies
Universiti Putra Malaysia
(Chairman)

Mohd Ghazali Mohayidin, Ph. D

Professor
Faculty of Graduate Studies
Universiti Putra Malaysia
(Member)

Mohamad Arief Hussein, Ph.D.

Profesor
Faculty of Graduate Studies
Universiti Putra Malaysia
(Member)

Zainal Abidin Mohamed, Ph. D

Associate Professor
Faculty of Graduate Studies
Universiti Putra Malaysia
(Member)

AINI IDERIS, Ph.D.

Professor/Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

DECLARATION

I declare that this thesis is my original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been previously and is not concurrently submitted for any other degree at UPM or at any other institution.

ISMAIL BIN ABDLATIF

Date: 19th November, 2008

TABLE OF CONTENTS

| | Page |
|--|-------------|
| DEDICATION | iii |
| ABSTRACT | iv |
| ABSTRAK | viii |
| ACKNOWLEDGMENTS | xii |
| APPROVAL | xiii |
| DECLARATION | xv |
| LIST OF TABLES | xix |
| LIST OF FIGURES | xxi |
| LIST OF ABBREVIATIONS | xxii |
| | |
| CHAPTER | |
| 1 INTRODUCTION | |
| 1.1 Introduction | 1-1 |
| 1.2 Performance of the Agricultural Sector | 1-2 |
| 1.3 Review of the Policy in the Paddy and Rice Industry | 1-3 |
| 1.3.1 Pre-Independence Production Policy | 1-3 |
| 1.3.2 Post Independence Production Policy | 1-5 |
| 1.4 Recent Policies Guiding the Paddy and Rice Industry | 1-8 |
| 1.5 Problem Statement | 1-13 |
| 1.6 Objectives of Study | 1-15 |
| 1.7 Significance of Study | 1-16 |
| 1.8 Organization of Study | 1-18 |
| 2 PADDY AND RICE INDUSTRY IN MALAYSIA | |
| 2.1 Introduction | 2-1 |
| 2.2 Production Area | 2-2 |
| 2.3 Trend in Domestic Paddy Production | 2-3 |
| 2.4 World Production and Market for Rice | 2-5 |
| 2.5 Trend in World Production and Consumption | 2-7 |
| 2.6 Rice Production, Consumption and Self Sufficiency in Malaysia | 2-8 |
| 2.7 Paddy Farm Characteristics, Farm Returns And Productivity | 2-9 |
| 3 LITERATURE REVIEW | |
| 3.1 Introduction | 3-1 |
| 3.2 Economic, Allocative and Technical Efficiency | 3-1 |
| 3.3 Estimation of Production Functions | 3-4 |

| | | |
|----------|---|------|
| 3.4 | Frontier Production Functions | 3-5 |
| 3.5 | A Historical Development of Efficiency Measurement | 3-6 |
| 3.6 | General Model Specifications: Stochastic Frontier Analysis | 3-9 |
| 3.7 | General Model Specifications: Data Envelopment Analysis | 3-12 |
| 3.8 | Past Studies in Agricultural Efficiency | 3-15 |
| 3.8.1 | The SFA Approach | 3-16 |
| 3.8.2 | The DEA Approach | 3-30 |
| 3.9 | Management Factors in Farm Operations | 3-35 |
| 3.10 | Farm and Farm Managers | 3-37 |
| 3.11 | Common Characteristics of Successful Farmers | 3-38 |
| 3.12 | Management Characteristics in Farm Operations | 3-39 |
| 3.13 | Management Differences among Farmers | 3-41 |
| | | |
| 4 | METHODOLOGY | |
| 4.1 | Introduction | 4-1 |
| 4.2 | Sources of Data | 4-1 |
| 4.3 | Variables of The Model | 4-1 |
| 4.4 | Study Area and Data Collection | 4-2 |
| 4.5 | The Qualitative Model: Measurement of Management Parameters | 4-5 |
| 4.6 | The Quantitative Model: Stochastic Frontier Model | 4-6 |
| 4.7 | The Quantitative Model: Data Envelopment Analysis | 4-8 |
| 4.8 | The Tobit Model | 4-10 |
| | | |
| 5 | RESULTS | |
| 5.1 | Introduction | 5-1 |
| 5.2 | Gross Margin Analysis | 5-1 |
| 5.2.1 | General Characteristics of Farms | 5-1 |
| 5.2.2 | Regional Characteristics of Farms | 5-4 |
| 5.2.3 | Production System Characteristics of Farms | 5-6 |
| 5.3 | The Qualitative Model: Management Differences Among Farms | 5-8 |
| 5.3.1 | Management Differences between Farm Works | 5-9 |
| 5.3.2 | Management Differences between Contract Works | 5-11 |
| 5.4 | Farm Motivations and Objectives | 5-13 |
| 5.5 | The Quantitative Model: Stochastic Frontier Analysis | 5-15 |
| 5.5.1 | Model 1: Without Management Variables | 5-18 |
| 5.5.2 | Model 2: With Management Variable | 5-18 |

| | |
|---|------|
| 5.5.3 Hypothesis Testing | 5-19 |
| 5.6 Technical Efficiency Estimates | 5-20 |
| 5.7 Farm Motivation and SFA | 5-22 |
| Technical Efficiency Scores | |
| 5.8 Management Levels and SFA | 5-23 |
| Technical Efficiency Scores | |
| 5.9 The Quantitative Model: | 5-24 |
| Data Envelopment Analysis | |
| 5-10 DEA Inefficiency Model: Tobit Analysis | 5-26 |
| 5-11 Farm Motivation and DEA | 5-28 |
| Technical Efficiency Scores | |
| 5-12 Management Levels and DEA | 5-31 |
| Technical Efficiency Scores | |
| 5-13 Measuring Technical Efficiency of Paddy Farming: | 5-32 |
| A Comparison of Two Approaches | |

6 CONCLUSIONS

| | |
|----------------------------|-----|
| 6.1 Introduction | 6-1 |
| 6.2 Summary of the Study | 6-1 |
| 6.3 Issues and Challenges | 6-3 |
| 6.4 Policy Recommendations | 6-5 |
| 6.5 Conclusion | 6-7 |

BIBLIOGRAHY BIODATA OF STUDENT

LIST OF TABLES

| Tables | Pages |
|--|--------------|
| 1.1 Agencies Created for the Paddy and Rice Industry | 1-8 |
| 2.1 Paddy Areas and Yield in Malaysia, 2004 | 2-1 |
| 2.2 Distribution of Paddy Areas by State and by Type | 2-2 |
| 2.3 Distribution of 8 Granary and 74 Mini Granary Areas | 2-3 |
| 2.4 Total Paddy Production by Granary and Non Granary Areas | 2-4 |
| 2.5 Average Yield of the Main Granary Areas (1985-2004) | 2-5 |
| 2.6 World Main Paddy Producers, 2004 (million mt) | 2-5 |
| 2.7 World Main Rice Exporters, 2004 (million mt) | 2-5 |
| 4.1 List of Inputs and Output Variables | 4-2 |
| 5.1 General Characteristics of Farms | 5-2 |
| 5.2 Regional Characteristics of Farms | 5-4 |
| 5.3 Production System Characteristics of Farms | 5-7 |
| 5.4 Management Inventory Score for Farm Works | 5-10 |
| 5.5 Management Inventory Score for Contract Works | 5-12 |
| 5.6 Ranking of Farm Motivations and Objectives | 5-14 |
| 5.7 The Translog SFA Model | 5-16 |
| 5.8 The Inefficiency Effects Model | 5-17 |
| 5.9 Hypothesis Testing | 5-19 |
| 5.10 Technical Efficiency of Models With and Without Management | 5-20 |
| 5.11 Ranked Farm Motivation and Average SFA Technical Efficiency Scores | 5-23 |
| 5.12 Management Levels and Average SFA Technical Efficiency Scores | 5-23 |

| | | |
|------|---|------|
| 5.13 | Frequency Distribution of Technical Efficiency and Scale Efficiency | 5-24 |
| 5.14 | Determinants of Technical Inefficiency under CRS | 5-27 |
| 5.15 | Ranked Farm Motivation and Average DEA CRS and VRS Technical Efficiency Scores | 5-30 |
| 5.16 | Management Levels and Average DEA CRS And VRS Technical Efficiency Scores | 5-30 |
| 5.17 | Summary of Effects on Efficiency by SFA and DEA Models | 5-33 |

LIST OF FIGURES

| Figures | | Pages |
|----------------|---|--------------|
| 2.1 | Trends in Area Planted, Paddy Production and Yields in 1985-2004 | 2-4 |
| 2.2 | World Production, Consumption and Stock for Rice (million mt) | 2-7 |
| 2.3 | Rice Production, Consumption and Self Sufficiency in Malaysia, 1990-2004 | 2-8 |
| 3.1 | Input Oriented Efficiency Measures | 3-2 |
| 3.2 | Output Oriented Efficiency Measures | 3.3 |
| 3.3 | A Historical Development of the Frontier Analysis Methodology | 3.8 |
| 3.4 | Management Capacities in Relation to Environment, Biological Processes and Farm Results | 3-16 |
| 4.1 | Location of MADA | 4-4 |
| 4.2 | Management Inventory of Paddy Farms | 4-6 |
| 5.1 | Cost Components of Rice Production (%) | 5-3 |
| 5.2 | Average Costs of Production for MADA Regions 1, 2, 3 and 4 | 5-5 |
| 5.3 | Average Costs of Production for Production System | 5-7 |
| 5.4 | Distribution of Technical Efficiency in SFA Model | 5-21 |
| 5.5 | Distribution of Technical Efficiency in DEA Model | 5-26 |

LIST OF ABBREVIATIONS

| | |
|---------|---|
| 9MP | Ninth Malaysian Plan |
| AFTA | ASEAN Free Trade Area |
| BERNAS | Padiberas Nasional Berhad |
| BOT | Balance of Trade |
| BPM | Agriculture Bank of Malaysia |
| CRS | Constant Returns To Scale |
| DEA | Data Envelopment Analysis |
| DOA | Department of Agriculture |
| DOS | Department of Statistics |
| FAMA | Federal Agriculture Marketing Authority |
| FAO | Food and Agricultural Organization |
| FELCRA | Federal Land Consolidation and Rehabilitation Authority |
| FELDA | Federal Land Development Authority |
| FOA | Farmers' Organizational Authority |
| GDP | Gross Domestic Product |
| GMP | Guaranteed Minimum Price |
| GNP | Gross National Product |
| HYV | High Yielding Variety |
| IADP | Integrated Agricultural Development Projects |
| IMP | Industrial Master Plan |
| KADA | Kemubu Agricultural Development Authority |
| KESEDAR | Kelantan Selatan Development Authority |

| | |
|----------|--|
| KETENGAH | Trengganu Tengah Development Authority |
| MADA | Muda Agricultural Development Authority |
| MARDI | Malaysian Agriculture Research and Development Institute |
| MOA | Ministry of Agriculture and Agro-Based Industries |
| NAFAS | National Farmers' Association |
| NAP | National Agricultural Policy |
| NEP | New Economic Policy |
| OPP | Outline Perspective Plan |
| RM | Ringgit Malaysia |
| SFA | Stochastic Frontier Analysis |
| SSL | Self Sufficiency Level |
| TE | Technical Efficiency |
| VRS | Variable Returns To Scale |

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The Malaysian rice industry is of great importance based on the strategic nature of the crop as a staple food commodity. This industry is heavily regulated and promoted through the establishment of specialized bodies beginning with the Rice Commission and followed by the Federation of Malaya Rice Committee in 1956. Subsequently, the National Paddy and Rice Board (LPN) were formed in 1971. In 1994, LPN was corporatised but the government retained the regulatory functions of LPN. These moves were aimed at reducing the government's direct involvement in commercial activities and further liberalize the industry. At the same time, the government undertook massive investment in infrastructure and support services to enhance productivity and provided various price and income support measures to sustain profitability and producer incomes. These measures were aimed at maintaining a specific level of self-sufficiency for rice in the country which at the present time is at 71% self sufficiency level.

However, paddy cultivation generally remains uneconomic in spite of it being subsidized with a guaranteed minimum price and protected against imports. The level of production too has been stagnant from 2.12 million metric tones in 1995 to 2.29 million metric tones in 2004. (Paddy Statistics of Malaysia 2004)