ECONOMIC VALUATION OF INTEGRATED PEST MANAGEMENT AMONG RICE FARMERS OF MUDA AGRICULTURAL DEVELOPMENT AUTHORITY, MALAYSIA

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AUTHORITY, MALAYSIA

By

HAIRUDDIN BIN MOHD AMIR

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

December 2012
This Thesis is Specially Dedicated

Family,

Beloved wife (Norhani Jaafar), Children (Eliyana the student of Medical Surgery Dental, Shahmir the student of Techno Entrepreneur, Nadia, Lukman Hakim) and the rest of my family, without whose support and trust this study could never have been completed.

To my beloved parents,

Father (Hj Mohd. Amir Osman passed away in 1991),
Mother (Hjh. Fatimah Abdullah passed away in 2010), and Son (Muhammad Iqbal Hj. Hairuddin passed away in 2000).
Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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December 2012

Chairman:  Professor Mad Nasir Shamsudin, PhD
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Concerns over the impact of pesticide use have prompted Malaysia and other countries to develop a program of integrated pest management (IPM) which seeks to address the effects of excessive use of pesticides. The program is beneficial to the communities at large and can be measured in economic terms. The benefits include improvements in food safety, water quality, pesticide application safety, and long run sustainability of pest management systems.

This study aims to investigate the health and environment benefits of the IPM practices in paddy (Oryza sativa) cultivation. Primary data were collected from 454 paddy farmers in four regions of the Muda Agricultural Development Authority (MADA) located in the states of Kedah and Perlis. The survey which included areas in Kuala Perlis as Region 1, Kuala Jitra (Region 2), Pendang (Region 3) and Kota Sarang Semut (Region 4) was undertaken to identify farm and farmer characteristics, pesticide usage, pest management practices, awareness and perceptions about pesticide hazards, and willingness to adopt specific IPM technologies. A double-
bounded dichotomous choice of contingent valuation approach survey was used to evaluate farmers’ choice of willingness-to-pay (WTP) to avoid risks of pesticide use in different environmental categories namely human, beneficial insects, aquatic species, avian, and livestocks.

The adoption rates for each of the IPM technologies, were predicted as follows: 97.8% for agronomic practices, 59.91% for complementary weed control strategies, 55.29% for biological control, 54.85% for the optimal use of pesticides, and 30.40% for economic threshold level. A contingent valuation survey approach to reduce pesticide risks by their “bids” on various price of “safer pesticide” each category were RM 170.01 for human safety, RM 164.58 for animal safety, RM 161.24 for aquatic safety, RM 160.96 for beneficial insect’s safety and RM 158.66 for avian safety.

Combining WTP bids each farmers and the risks percentage reduction/avoided, the benefits of the IPM adoption for one paddy season were estimated to total RM442.76. The aggregate environmental benefits to the paddy community in MADA, Malaysia (454 farmer in four region) totalled RM201,014. On top of the benefits in environmental value, the reduction in pesticide use also reduced operating expenses. Calculated aggregate cost savings per season were RM756,393 for insecticides, RM40,537 for fungicides and RM94,753 for herbicides. The cost savings of the IPM practices to 454 farmers in the four regions amounted to RM 891,683 per season. The results of this study can contribute to a better targeting of health policies and design of IPM programmes aiming to reduce negative effects of excessive pesticide use.
Abstrak tesis yang di kemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

PENILAIAN EKONOMI AMALAN PENGURUSAN SERANGGA PEROSAK BERSEPADU PESAWAH LEMBAGA KEMAJUAN PERTANIAN MUDA, MALAYSIA

Oleh

HAIRUDDIN BIN MOHD AMIR

Disember, 2012

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Keperihatinan kesan penggunaan racun perosak telah mendorong Malaysia dan negara-negara lain untuk membangunkan program pengurusan perosak bersepadu (IPM) yang bertujuan menangani kesan daripada penggunaan racun perosak secara berlebihan. Program ini bermanfaat kepada masyarakat dan boleh diukur dari segi ekonomi. Manfaat termasuk tambah-baik dari aspek keselamatan makanan, kualiti air, keselapatan aplikasi racun perosak, dan kemampuan jangka-panjang sistem pengurusan perosak.

Kajian bertujuan menilai manfaat kesihatan dan persekitaran dari amalan IPM dalam penanaman padi (Oryza sativa). Data primer dikumpul daripada 454 penanam padi di empat wilayah daripada Lembaga Kemajuan Pertanian Muda (MADA) yang terletak di negeri Kedah dan Perlis. Kaji selidik di empat wilayah tersebut iaitu Kuala Perlis sebagai Wilayah 1, Kuala Jitra (Wilayah 2), Pendang (Wilayah 3) dan Kota Sarang Semut (Wilayah 4) telah dilaksanakan untuk mengenal pasti ciri-ciri petani dan ladang, penggunaan dan amalan pengurusan racun perosak, kesedaran dan persepsi
bahaya racun perosak, dan kesediaan menerima pakai teknologi tertentu IPM. Satu pilihan berganda melalui pendekatan penilaian kontigensi diguna untuk menilai kesanggupan membayar untuk mengelakkan risiko racun perosak dalam kategori alam sekitar yang berlainan iaitu manusia, serangga bermanfaat, spesis akuatik, burung, dan ternakan.

Keputusan kajian mendapati tahap amalan teknologi IPM adalah seperti berikut: 97.8% bagi amalan agronomi, 59.91% untuk strategi pelengkap kawalan rumpai, 55.29% untuk kawalan biologi, 54.85% bagi pengunaan optimum racun perosak, dan 30.40% untuk aras ambang ekonomi. Nilai kesanggupan membayar petani terhadap tawaran harga formulasi baru "racun perosak yang selamat" adalah sebanyak RM170.01 untuk keselamatan manusia, RM 164.58 untuk keselamatan haiwan, RM 161.24 untuk keselamatan akuatik, RM 160.96 untuk keselamatan serangga bermanfaat dan RM 158.66 untuk keselamatan burung.

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In the process of completing this research and Doctor of Philosophy degree, I have incurred many intellectual and personal debts. I have benefited from the expertise and guidance of the committee members, Professor Dr. Mad Nasir Shamsudin, Dean of Faculty Agriculture UPM as the Chairman of my supervisory committee. He has been an invaluable adviser and counselor. His encouragement and moral support have made it all possible for me to complete my work here in UPM. I am indeed honored to have him as my adviser, and I concur with statements made by his former students, that he is everything a student can ask for as an adviser. I am also grateful for help, comments and suggestions from my committee members, Professor Dr. Zainal Abidin Mohamed, Professor Dr. Mohd Ariff Hussein and Associate Professor Dr. Alias Radam.

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May Allah bless all who have kindly helped me.
I certify that a Thesis Examination Committee has met on 3 December 2012 to conduct the final examination of Hairuddin bin Mohd Amir on his thesis entitled "Economic Valuation of Integrated Pest Management Among Rice Farmers of Muda Agricultural Development Authority, Malaysia" in accordance with the Universities and University Colleges Act 1971 and 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.

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DECLARATION

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

__________________________
HAIRUDDIN MOHD AMIR

Date: 4 December 2012
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>iii</td>
</tr>
<tr>
<td>ABSTRAK</td>
<td>v</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>vii</td>
</tr>
<tr>
<td>APPROVAL</td>
<td>ix</td>
</tr>
<tr>
<td>DECLARATION</td>
<td>xi</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xv</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xvii</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td>xviii</td>
</tr>
</tbody>
</table>

## CHAPTER

### 1 INTRODUCTION
1.1 Background 1.1
1.2 Problem Statement 1.5
1.3 IPM Implementation in MADA 1.7
1.4 Objectives of the Study 1.8
1.5 Significance of the Study 1.9
1.6 The Study Area 1.9
1.7 Organization of the Study 1.11

### 2 INTEGRATED PEST MANAGEMENT IN RICE PRODUCTION
2.1 The National Agricultural Policy and Rice Industry 2.1
2.2 Area and Production 2.2
2.3 The Cost Structure 2.4
2.4 The Trade and Consumption of Rice 2.5
2.5 Paddy Cultivation 2.8
2.6 Use of Agricultural Chemical in Rice Farming Practices 2.8
2.7 Integrated Pest Management (IPM) in Rice Farming Practices 2.10

### 3 LITERATURE REVIEW
3.1 Previous Studies and State of Knowledge 3.1
3.2 Methods Used to Evaluate Health and Environmental Benefits 3.2
  3.2.1 Valuation from the Benefit-Side 3.6
  3.2.2 Valuation from the Cost-Side 3.6
  3.2.3 Market-Oriented Approach 3.6
  3.2.4 Valuation Using Surrogate (or Implicit) Markets 3.7
  3.2.5 Double Bounded Contingent Valuation Approach 3.7
3.3 Conclusion the Methods of Assessment in the Survey Area 3.8
4 METHODOLOGY
4.1 The Theoretical Framework of Economic Evaluation 4.1
4.2 The Stage of Evaluating the Benefits of IPM Program 4.4
4.3 Stage 1: Classification of the Relevant Impacts of Pesticide Use 4.4
4.3.1 Impact on Human Health 4.5
4.3.2 Impact on Beneficial Insects 4.6
4.3.3 Impact on Aquatic Species 4.6
4.3.4 Impact on Avian Species 4.7
4.3.5 Impact on Farm Animals 4.7
4.4 Stage 2: Assessing The Level of Pesticide Impacts on Safety 4.7
4.4.1 The Basis for Rating Pesticide Impacts 4.8
4.4.2 Measuring the Degree of Pesticide Impacts: Scoring System 4.8
4.5 Stage 3: Measuring the Rate of IPM Technology Adoption 4.10
4.5.1 The Economy Model of IPM Adoption 4.12
4.5.2 The Exogenous Variable 4.12
4.5.2.1 Farmer Characteristics 4.12
4.5.2.2 Managerial Factors 4.14
4.5.2.3 Farm Structure 4.14
4.5.2.4 Physical/ Location Factor 4.14
4.5.2.5 Institutional/Informational Factors 4.15
4.5.2.6 Attitude/Perception the Impacts of Pesticides 4.15
4.5.3 The Endogenous Variables 4.17
4.6 Stage 4: Evaluating Effects of IPM Adoption on Pesticide Use 4.17
4.7 Stage 5: Estimating Society’s WTP to Reduce Pesticide Risks Using CVM 4.19
4.8 Stage 6: Estimating the Benefits of the IPM-program in Malaysia 4.20
4.9 Respondents and Sampling 4.21
4.10 The Survey and Analysis Tools 4.21
4.11 Data and Analytical Methods 4.21
4.11.1 Descriptive Analysis 4.22
4.11.2 Single Bounded of Dichotomous Choice Method 4.23
4.11.3 Double Bound of Choice Method

5 RESULTS AND DISCUSSION
5.1 Characteristics of the Study Area 5.1
5.1.1 Socio-economic Profile of Respondents 5.3
5.1.2 Farm Characteristics and Operations 5.8
5.1.3 Pest Management 5.11
5.1.3.1 Paddy Pests and Diseases 5.11
5.1.3.2 Pest Control Practices 5.12
5.1.3.3 Source of Information Pest Control Strategy 5.15
5.1.3.4 Knowledge of IPM 5.16
5.2 Perceptions about the Environmental Impacts of Pesticide Use 5.17
5.3 Summary of Survey Results 5.22
5.4 Evaluation of the IPM Program 5.24
5.4.1 The Environmental Categories 5.24
5.4.2 The Pesticide Impact Scores 5.25
5.4.3 Willingness to Adopt IPM Technologies 5.27
5.5 Estimated IPM Adoption Rates based on Logistic Regression 5.30
5.6 Factors Affecting Willingness to Adopt IPM Technologies 5.30
5.7 Descriptive of Variable in Dichotomous Choice Models of CVM 5.36
5.8 Estimated Single Bounded Dichotomous Choice of WTP 5.37
5.9 Estimated Double Bounded Dichotomous Choice of WTP 5.39
5.10 Estimation of Society’s WTP for Reduction Risks Posed by Pesticides 5.44
5.11 The Impacts of Economic Benefits of IPM Adoption 5.45

6 SUMMARY AND CONCLUSIONS
6.1 Summary of the Study 6.1
6.2 Major Contributions 6.3
6.3 Policy Implications 6.4
6.4 Conclusions 6.5
6.5 Limitations and Recommendations for Future Research 6.6

REFERENCES R.1
APPENDICES A A.1
APPENDICES B B.1
APPENDICES C C.1
APPENDICES D D.1
BIODATA OF STUDENT G.1