INFORMATION AND COMMUNICATION TECHNOLOGY INNOVATION AS A TOOL FOR PROMOTING SUSTAINABLE AGRICULTURE: A CASE STUDY OF PADDY FARMING IN WEST MALAYSIA

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THESIS SUBMITTED IN FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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KUALA LUMPUR

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ABSTRACT

Sustainable agriculture refers to the farm's ability to maintain production and giving benefits based on maintaining nature and the ecosystem indefinitely. Malaysia aims to transform current agricultural activities into advanced, innovative and sustainable practices. In the recently announced Third National Agricultural Policy, there are many issues highlighted to promote the sustainability of agricultural practices. However, this is not an easy task because there are basic problems that the farmers will encounter, especially with regards to their understanding of sustainable agriculture. As an alternative solution, introducing Information and Communication Technology (ICT) applications is a novel way to increase awareness and promote sustainable agriculture practices. In this context, Sustainable Paddy Farming System (*SiPadi*) is designed as a persuasive learning tool in virtual paddy farming to promote sustainable paddy farming among the young generation, especially among university students in Malaysia. Virtual reality technology and persuasive technology have been adapted in the design of the prototype. This study involved three phases. Phase 1 was undertaken to understand and identify sustainable paddy farming; Phase 2 attempted to develop an education prototype which acts as a tool to disseminate information about sustainable paddy farming. In other words, it means that the real life practices of sustainable paddy farming have been adapted in the design of the prototype. Lastly, Phase 3 involved the testing and evaluating of the prototype. This research employed a qualitative and quantitative research design. Data were collected through reviews of existing literature, interviews, observation and lab experiments. The location of the case study is paddy farming areas in selected areas in West Malaysia. The findings of this study produced two major outcomes: the identification of sustainable paddy farming; and the design strategies of the prototype. First, there are several similarities and differences in the practice of paddy farming in the locations of the case study. The paddy farming in Bandar Baru Tunjong, Kahang and Tanjung Karang can be categorised as sustainable. Second, the evaluation of *SiPadi* indicated that this prototype was successful in creating awareness among the respondents.

ABSTRAK

Pertanian lestari merujuk kepada kebolehan sesebuah ladang untuk mengekalkan pengeluaran tanaman disamping dapat memelihara atau mengekalkan alam sekitar dan ekosistem secara berterusan. Malaysia sedang mengorak langkah memajukan kegiatan pertaniannya ke arah amalan pertanian inovatif dan lestari. Dengan itu, sejajar dengan Dasar Pertanian Nasional 3, terdapat banyak usaha untuk mempromosikan amalan pertanian lestari ini. Namun begitu, ianya bukanlah suatu tugas yang mudah kerana petani sekarang menghadapi pelbagai masalah, terutama berkaitan dengan pemahaman terhadap pertanian lestari. Salah satu strategi ialah memperkenalkan kesedaran amalan pertanian lestari melalui aplikasi teknologi maklumat dan komunikasi. Dalam konteks ini, *SiPadi* (Sistem Penanaman Padi Lestari) direka untuk menjadi satu alat pembelajaran untuk mempromosikan amalan lestari padi di kalangan generasi muda, khususnya mahasiswa Universiti Pertanian di Malaysia. Prototaip yang dibina mengadaptasikan teknologi pujukan dan teknologi realiti maya. Kajian ini melibatkan tiga peringkat kajian. Kajian peringkat pertama dilakukan untuk mengenal pasti dan memahami amalan pertanian lestari. Penyelidikan peringkat kedua pula adalah rekabentuk dan membangunkan prototaip pendidikan (*SiPadi*) yang berfungsi sebagai alat untuk menyebarkan maklumat. Dengan kata lain, amalan sebenar dari pertanian padi lestari telah disesuaikan dalam rekabentuk prototaip. Akhirnya, pengujian dan penilaian terhadap *SiPadi* dilakukan dalam kajian peringkat 3. Metodologi kajian ini menggunakan kaedah penelitian kualitatif dan kuantitatif. Data dikumpul melalui kajian literatur, wawancara, pemerhatian dan eksperimen makmal. Lokasi kajian kes meliputi kawasan pertanian di Utara Semenanjung Malaysia, Barat Laut Selangor, Bandar Baru Tunjong dan Kahang. Dapatan kajian boleh dibahagikan kepada dua, iaitu mengenalpasti amalan penanaman padi secara lestari; dan strategi rekabentuk prototaip. Dapatan pertama menunjukkan terdapat beberapa persamaan dan perbezaan dalam amalan penanaman padi, dan penanaman padi di Bandar Baru Tunjong, Kahang dan Tanjung Karang boleh dikategorikan sebagai penanaman padi secara lestari. Sementara, dapatan kedua menunjukkan bahawa prototaip ini telah berjaya memberi kesedaran tentang amalan lestari di kalangan pengguna.

ACKNOWLEDGEMENTS

In the Name of Allah, Most Gracious, Most Merciful, Peace be upon His beloved our Prophet Muhammad SAW, his family and his companions from whom, and by the will of God we escape from darkness into lightness.

I dedicate this thesis in memory of my late mother. Indeed, her motivation and love remains the stronghold of this research effort.

Special thanks to the Ministry of Malaysia Higher Education and Institute of Research Management and Consultancy, University of Malaya (PS368-2009C and PS218-2008B) for the financial support in carrying out this study. Thanks to the organizations whose support my data collection, such as MADA, MARDI, Department of Agriculture, UM VR Centre and also Department of Science and Technology Studies who provided administrative support for this study.

Many dedicated people contributed to the completion of this study.
I extend my special thanks to the following individuals for their valuable contributions:

- My supervisor Dr. Amran Muhammad, for his support and guidance and whose thoughtful consideration of study findings generated strong recommendations for moving the field forward.
- The participant at each of the five study sites, Mr. Tam Pak Suew, Mr. Mahadi Abu Bakar, Mr. Shamsuri bin Miswan, Encik Yunus, Dr. Sariam Othman, Puan Salmah Hashim, Mr. Rumzi Ahmad, Mr. Firdaus, Miss Engku Mazlin Engku Halim, Mr. Kamarulzaman Abdullah, Mr. Farid Othman, Mr. Aep Saipudin and Rosmaniyah Abdul Rahman (Assistant Environment Control Officer from Department of Environment Malaysia), who spent many hours making arrangements for and taking part in the site visits, as well as supplying additional information as needed to guide the development of this thesis.
- My expert panel members, Prof Madya Dr. Anizan Isahak, Prof. Dr. Abdul Razak Yaakub and Prof Madya Nasir Zulkifli, whose comments and suggestions helped in the development prototype.
- The assistants in my prototype developing, Dinul Adli Arjuna, Irsyad, Huda and Faruqi.
- My colleagues at UUM and UM who helped me on various aspects of this study, including Dr Rohaida Saad, who provided guidance on the qualitative research; Mr. Bala, Miss Mariatul Kibtiyah Silahudin Jarjis, Dr. Fadhilah, Dr. Nurul Sadiqin, Miss Arul, Dr. Norlena and Ms Aini, who review my thesis; Mrs Ainul, Norani, Nur Nafhatul, Sobihatul Nur and Fiza, whose my friendship with them prevail throughout the study period and beyond

Lastly, all appreciations go to my beloved family for their love, she stupport, inspiration, care, patience and understanding of my situation. Especially to my husband, Mr. Akib and my Children, Aisyah, Khadijah and Zikri, I can only afford a token of appreciation and gratitude – dedication of this research to them with all my love. Thanks.

TABLE OF CONTENTS

Chapter 3 METHODOLOGY

Chapter 4 FIELD STUDY

APPENDICES

List of Figure

List of Table

List of Abbreviations

3D	3 Dimension
BERNAS	Padiberas Nasional Berhad (National Rice Company)
BLS	Barat Laut Selangor (North West)
CD-ROM	Compact Disc-Read-Only Memory
CEDAC	Center for Studies and Development of Cambodian Agriculture
CNRRI	China National Rice Research Institute
COA	Council of Agriculture
DID	Drainage and Irrigation Department
DOA	Department of Agriculture
DVD	Digital Video Disk
GAP	Good Agriculture Practice
GB	Gigabyte
ICT	Information and Communication Technology
IRRI	International Rice Research Institute
IST	Information Society Technologies
IADA	Integrated Agriculture Development Area
IPM	Integrated Pests Management
JPEG	Joint Photographic Experts Group
KADA	Kemubu Agricultural Development Authority (Kelantan)
KETARA	Northern Terengganu
KOREF	Kahang Organic Rice Eco Farm
KSM	Kerian Sungai Manik (Perak)
MADA	Muda Agricultural Development Authority

MARDI	Malaysian Agricultural Research and Development Institute
MB	Megabyte
NGO	Non-Governmental Organization
PDA	Provincial Departments of Agriculture
RAM	Read Access Memory
R&D	Research and Development
SAAS	Sichuan Academy of Agricultural Sciences
SECURE	SocioEconomic and Cultural Upliftment in Rural Environment
SiPadi	Sistem Penanaman Padi Lestari (Sustainable Paddy Farming System)
SLAM	Sistem Amalan Ladang Baik Malaysia (Malaysia Good Plantation Resources Practices System)
SOM	Sijil Organik Malaysia (Malaysia Organic Certificate)
SRI	System of Rice Intensification
STSB	Syarikat Sunnah Tani Sdn Bhd
SVGA	Super Video Graphic Array
TNAU	Tamil Nadu Agricultural University
VR	Virtual Reality
UKM	Universiti Kebangsaan Malaysia (National University Malaysia)
UPM	Universiti Putra Malaysia
UM	Universiti Malaya