DRIVERS AND OUTCOMES OF A SHIFT TO SUSTAINABLE FOOD SYSTEMS: A STUDY OF ORGANIC FARMERS' COMMUNITIES IN YASOTHON PROVINCE, THAILAND

ALEXANDER HARROW KAUFMAN

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY
(ENVIRONMENT AND RESOURCE STUDIES)
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY
2012**

Thesis
entitled

DRIVERS AND OUTCOMES OF A SHIFT TO SUSTAINABLE FOOD SYSTEMS: A STUDY OF ORGANIC FARMERS' COMMUNITIES IN YASOTHON PROVINCE, THAILAND

……
Mr. Alexander Harrow Kaufman
Candidate

……
Asst. Prof. Suriyapong Watanasak, Ph.D.
Major advisor

……
Asst. Prof. Opart Panya, Ph.D.
Co-advisor

……
Lect. Solot Sirisai, Ph.D.
Co-advisor

…….
Prof. Banchong Mahaisavariya,
M.D., Dip. Thai Board of Orthopedics
Dean
Faculty of Graduate Studies
Mahidol University

……
Asst. Prof. Suriyapong Watanasak, Ph.D.
Program Director
Doctor of Philosophy Program
Environment and Resource Studies
Faculty of Environment and Resource Studies, Mahidol University

Thesis
entitled

DRIVERS AND OUTCOMES OF A SHIFT TO SUSTAINABLE FOOD SYSTEMS: A STUDY OF ORGANIC FARMERS' COMMUNITIES IN YASOTHON PROVINCE, THAILAND

was submitted to the Faculty of Graduate Studies, Mahidol University
for the degree of Doctor of Philosophy (Environment and Resource Studies)
on
August 22, 2012

……
Mr. Alexander Harrow Kaufman
Candidate

……
Prof. Emeritus Charan Chantalakana, Ph.D.
Chair

……
Asst. Prof. Thanwa Jitsanguan, Ph.D
Member

……
Asst. Prof. Suriyapong Watanasak, Ph.D.
Member

……
Asst. Prof. Opart Panya, Ph.D.
Member

……
Lect. Kulwadee Kansuntisukmongkol, Ph.D.
Member

……
Prof. Banchong Mahaisavariya, M.D., Dip. Thai Board of Orthopedics
Dean
Faculty of Graduate Studies
Mahidol University

……
Assoc. Prof. Kampanad Bhaktikul, Ph.D.
Dean
Faculty of Environment and Resource Studies, Mahidol University

ACKNOWLEDGMENTS

As a long-term resident of Bangkok and Phuket, I knew little about the way of life in Thailand's rural agrarian communities. This research gave me the opportunity not only to learn about organic farming, but to better understand the people of *Issan*. The farmers who participated in this study were gracious hosts and taught me a novel way of seeing the world.

I would like to express my sincere appreciation to the Green Net/Earth Net Foundation, and the Agri-nature Foundation for providing background information on their programs in Thailand. The members of the Dharma Garden Temple in Yasothon province not only provided a welcome refuge after my long journeys, they also have inspired me to follow a 'Middle Path'. *Poh* Songkran helped to guide me through the intricate mazes of rice farms in my endless search for participants. *Kruba* Supatto, *Poh* Wichit, *Poh* Nikom and *Poh* Eam provided a wealth of information on farming methods, local culture, and the introduction of alternative agriculture into their communities. However, I owe eternal gratitude to all of the organic farmers in Yasothon that not only participated in the construction of this study, but taught me a new perspective on human relations to their food systems.

The final draft of this work was only possible through the guidance and persistence of Dr. Opart Panya in pushing me to step out of my comfort zone. I would also like to thank Dr. Solot Sirisai from the Institute of Language and Culture for providing an insiders' perspective on Thai rural culture. Dr. Suriyapong Watanasak offered technical advice, inspiration and fresh coffee to keep me on track. I also am indebted to many different academics from the School of Religion and the School of Social Sciences and Humanities at Mahidol University for their advice and support in my quest to find the best methods to interpret my data. I am particularly, thankful to the staff at Khon Kaen University and the King Mongkut Institute of Technology who taught me the science behind organic agriculture. I also consulted with a number of academics on a globally basis. Dr. Jeremiah Mock was invaluable to developing my skills as a writer and showing me that qualitative research also was a rigorous scientific process. However, Dr. Glenda Kantor's assistance in teaching me the intricacies of quantitative analysis was invaluable to generating an integrated analysis of my work. I also would like to thank Dr. Roberta Sonnino, Dr. Kevin Morgan, and Dr. Terry Marsden for providing an enriching fellowship at Cardiff University during the development of my thesis.

My wife, Ubon was priceless as an interpreter, co-researcher and co-navigator in Northeast Thailand. My newborn son, Austin gave me the motivation to complete this research, so I could become a better father. Finally, I would like to dedicate this research to my Father Ed who supported my early travels around the world, and my Mother Ellen who taught me the joy of knowing foreign countries through their culinary arts. I only wish my Grandfather Sam, was still alive so that I could show him I finally learned the value of an education at 47 years old.

Alexander Harrow Kaufman

DRIVERS AND OUTCOMES OF A SHIFT TO SUSTAINABLE FOOD SYSTEMS: A STUDY OF ORGANIC FARMERS' COMMUNITIES IN YASOTHON PROVINCE, THAILAND

ALEXANDER HARROW KAUFMAN 5038020 ENER/D

Ph.D. (ENVIRONMENT AND RESOURCE STUDIES)

THESIS ADVISORY COMMITTEE: SURIYAPONG WATANASAK, Ph.D., OPART PANYA, Ph.D., SOLOT SIRISAI, Ph.D.

ABSTRACT

The expansion and intensification of agriculture to meet rising human consumption levels has degraded the integrity of global ecosystems. Environmental degradation has been accelerated by the innovations used to alter the ways crops are grown, processed and transported. These changes in the treatment of food also have diminished community food security, health and welfare. Scholars have developed theories about the benefits of local and organic food production, yet few studies have exhibited the impacts of a shift to sustainable food systems from the perspective of farmers. Through mixed methods this research investigated the ways the Thai alternative agriculture network supports farmers, and examined the socio-ecological drivers of well-being in communities of organic rice farmers in Yasothon Province. Data were gathered through three sequential phases: 1) topical interviews with key informants; 2) exploratory interviews; and 3) structured instruments. Results showed that participants shifted to organic farming methods with aspirations of better health, reduced costs, and access to new marketing channels. Governmental agencies raised the capacity of organic farmers' collectives by providing access to loans and technology. Organic extension organizations built up farmer groups through leadership development, instilling environmental values, facilitating knowledge exchange, and crop certification. Participants improved soil fertility with animal manure, nitrogen-fixing plants, and making bio-fertilizers in collectives. As participants learned to nurture the soil through organic methods, environmental values were reinforced. Shared Buddhist beliefs provided the lens through which organic farmers conceptualized well-being. While external socio-economic factors also weighed upon organic farmers' decision making, their worldviews, the methods used, and the ability to access production factors were critical to maintaining organic farms in their communities. Participants' spiritual and environmental values were significantly correlated with their health, debts, and decision to use organic fertilizers. Findings suggest that the expansion of organic farming systems depends on a changed perspective of well-being. This thesis identifies key leverage points for alternative agriculturalists, educators, and policy makers working towards a more sustainable food system.

KEY WORDS: FERTILIZER / ORGANIC FARMING / WELL-BEING / WORLDVIEW

334 pages

CONTENTS

CONTENTS (cont.)

CONTENTS (cont.)

CONTENTS (cont.)

CONTENTS (cont.)

CONTENTS (cont.)

CONTENTS (cont.)

CONTENTS (cont.)

CONTENTS (cont.)

LIST OF TABLES

LIST OF TABLES (cont.)

LIST OF TABLES (cont.)

LIST OF FIGURES

LIST OF ABBREVIATIONS

AAN	Thai Alternative Agriculture Network
ACT	Organic Agriculture Certification (Thailand)
ANF	Agri-nature Foundation
ANT	Actor Network Theory
AFN	Alternative Food Network
BAAC	Bank of Agriculture and Cooperatives
CSA	Community-Supported Agriculture
CFS	Community Food System
CNS	Connectedness to Nature
EM	Effective Microorganisms
FFS	Farmer Field Schools
GDP	Gross domestic product
GN	Green Net/Earth Net Foundation
GNH	Gross National Happiness
GNP	Gross National Product
GT	Grounded Theory
HMK	His Majesty the King
IFOAM	International Federation of the Organic Agriculture Movement
IRRI	International Rice Research Center
KKF	Khao Kwan Foundation
LFN	Local Food Network
LFS	Local Food System
MEA	Millenium Ecosystems Assessment
NEP	New Environmental Paradigm
NGO	Non-governmental organization

LIST OF ABBREVIATIONS (cont.)

NTA	New Theory Agriculture
PTD	Participatory Technology Development
SE	Sufficiency Economy philosophy
SPSS	Statistical Package for Social Sciences
TIN	Thai Impaeng Network
TREE	Technology for Rural and Ecological Development
UNEP	United Nations Environmental Program

LIST OF THAI TERMS

Farang	ฝรั่ง	foreigner
Kamnan	กำนัน	Sub-district chief/District chief
Kaset Amphoe	เกษตรอำเภอ	Department of Agriculture Extension (Dist. office)
Kow kriep kung	ข้าวเกรียบกุ้ง	shrimp flavor cracker
Kruba	ครูบา	monk (Northeastern dialect)
Kway lhek	ควายเหล็ก	Iron buffalo (a tractor)
Kong sibsii	คองสิบสี่	14 rules of conduct
Khun	คุณ	A title of respect (Mr. or Miss.)
Chemi	เคมี	Short term for chemical
Nguen Baht	เงินบาท	Thai currency
Changwat	จังหวัด	Province
Dok kae	ดอกแค	Kae flower (*Sesbania*)
Dok sanoeh	ดอกโสน	Sanoeh flower (*Sesbania javanica*)
Dao Ruang	ดาวเรือง	Marigold flower (*Tagetes patula*)
Tua pee/poom	ถั่วปี (ถั่วฝักยาวพุ่ม)	Cowpea (*Vigna unguiculata*)
Tua prah	ถั่วพร้า	Sword bean (*Canavalia)*

LIST OF THAI TERMS (cont.)

Tai na glop	ไถนากลบ	Second plowing
Tamboon	ทำบุญ	Making merit
Dhammachart	ธรรมชาติ	Nature
Dharma	ธรรม	Teaching of the lord Buddha
Nang let	นางเล็ด	Rice cracker topped with syrup
Na prang	นาปรัง	Second rice harvest (off season)
Nai	นาย	Mister
Pak Khom Jin	ผักโขมจีน	Chinese spinach (*Amaranthus gangeticus* L.)
Plia	เพลี้ย	Mealy bug (*Phenacoccus*)
Bia Khudchum	เบี้ยกุดชุม	Kudchum currency
Sadao	สะเดา	Neem plant (*Azadirachta indica* Meliaceae)
Prabtina	ปรับที่นา	Adjoining of individual rice plots
Poo naa	ปูนา	Rice crabs (*Somanniathelphusa*)
Poo Yai Baan	ผู้ใหญ่บ้าน	Village chief
Poh	พ่อ	Father, elder (Northeastern term)
Bhikku	ภิกขุ	Monks

LIST OF THAI TERMS (cont.)

Muang	เมือง	Town
Mae	แม่	Mother, elder (Northeastern term)
Maeng Khaeng	แมลงแคง (แมงแคง)	Stink Bug (*Tetroda denticulifera)*
Rai	ไร่	A unit of land equal to 1600 m^2
Long khek	ลงแขก	Village people gathering to help neighbors during the harvest season
Waan	ว่าน	Medicinal plants (herbs, hemps)
Sangha	สังฆ	Central bureaucracy of Buddhism
Singwaedlom	สิ่งแวดล้อม	Environment
Moobaan	หมู่บ้าน	Village
Luang Poh	หลวงพ่อ	Venerable monk, senior monk
Hoi cheri	หอยเชอรี่	Golden Apple Snail (*Pomacea canaliculata*)
Aor Bor Tor	องค์การบริหารส่วนตำบล	Sub-district Administration office
Amphoe	อำเภอ	District
Issan (Esaan)	อีสาน	Northeastern Thailand
Heed Sipsong	ฮีตสิบสอง	12 customs

CHAPTER I
INTRODUCTION

1.1 Background

Despite threats of global warming and the depletion of critical natural resources, international institutions entrusted with the task of sustainable development have failed to regulate human progress. Experts have warned that current levels of industrial activity may lead to environmental disaster (Bruntland, 1987; Daly, 1996; Gore, 2006). Nonetheless, humankind remains locked into a perspective that views technology as the solution to the environmental crisis. Undeniably, technology has been essential to human development, but actions associated with this 'worldview' or common set of beliefs, values and perceptions has damaged the integrity of global ecosystems (Castree, 2005; Kempton et. al, 1996; Panya & Sirisai, 2003). Experts argue that ecosystem services have a direct impact on human well-being through the provision of health, social relations, security and basic materials for a good life. And food provisioning depends upon the supporting services of the ecosystem through nutrient cycling, primary production and soil formation (Millennium Ecosystems Assessment, 2005). However, the expansion and intensification of agriculture to meet rising human consumption levels has played havoc with food provisioning systems, primarily through biodiversity loss, soil degradation, water pollution and climate change (UNEP, 2007). Agro-food conglomerates and international institutions have streamlined the crops selected, the ways they are grown, processed and distributed to consumers. As a result of this transformation in production systems, food security and food quality has diminished. Food has lost its role as a catalyst of social and cultural relations in human societies (Pollan, 2007; Kuhnlein, 2006; Shiva, 1991; 2007).

On the other hand, the development of global food supply chains has brought infrastructure improvements to rural agrarian communities: transportation links, access to medical care, formal education, an expanded marketplace, and a reduction in labor requirements through technological innovations. Notwithstanding,

the capital requirements of participation in the global economy has brought many agrarian households into a cycle of debt (Falvey, 2000; Panya, 2003; Rigg, 1997 Shiva, 1991; UNEP, 1994). Critics argue that global corporations have been the main benefactors of a shift to technology-based food production; as they stand to profit from every stage in the system from commodity purchases to the sale of agro-chemicals, seeds and processed food. Under this new system, urban industrialists and policy-makers dictate the terms of inclusion in the agro-food economy (McMichael, 2000; Rosset, 2006).

Dramatic changes in the treatment of food have enabled rapid urbanization, such that most human societies are dislocated from their food provisioning systems. While scholars have developed theories about the societal benefits of reembedding food production in human communities through sustainable agriculture, there has been little progress on this front. It is estimated that less than 1% of global food production is organically certified (Lotter, 2003). Responding to this deficit, scholars have called for an ecological perspective of food provisioning systems through approaches that emphasize the intrinsic value of nature (Capra, 1999; Curry, 2000; Goldsmith, 1996). Scientists have shown the importance of a shift to an eco-centric perspective or worldview with research on the productivity of organic farming systems (Drinkwater, *et al*., 1995; Pimental *et al*., 2005). Meanwhile, experts argue that organic food is higher in nutritional value (Gussow, 2006). Alternative agriculture advocates have exhibited the ways that producers and consumers benefit from shortened food supply chains through fresh food and relations of trust (Jarocz, 2000; Sage, 2003). Some case studies suggest that local food networks preserve the cultural and economic integrity of rural communities (Allen, 2004; Morgan *et al*., 2008; Sonnino, 2007). As an approach to restore the integrity of rural agrarian communities, development experts have introduced organic agriculture certification programs (Allen, 2004; Pretty, 2003). To evaluate the potential benefits of organic farming, researchers have investigated the divergence between organic and conventional farmers' worldviews (Beus & Dunlap, 1991; Baconguis & Cruz, 2005). However, few studies have used empirical methods to examine the ways a shift to organic farming has contributed to the betterment of farmers' communities.

This research suggests some of the ways that farmers and civil society can influence and benefit from alternative modes of food provisioning. Although some studies in Thailand have touched upon the values and beliefs held by organic farmers, most researchers have concentrated upon the financial benefits (Hutanawat & Hutanawat, 2002; Thongtawee, 2006; Kiatsuphimol, 2002; Samerpak, 2006). While these previous works are noteworthy, less is known about the contributions of local and organic food systems to well-being at a community, regional or national level. This thesis investigates this research gap through a critical examination of the influence of a shift to sustainable food systems upon the well-being of organic farmers' communities.

1.2 Statement of the Problem

Although, it is well established that the industrialization of food production has degraded ecosystem services and human health, global research efforts have failed to convince policy makers to alter the current system. Technological changes in food production methods have reduced 'farming' to a subset of urban-based food conglomerates that extend shelf-life through excessive processing, refrigeration, and packaging (McMichael 2000). Dangerous natural pathogens such as *Bovine Spongine Encephalopathy* (BSE), *Escherichia coli* (E. coli), and *salmonella* have flourished within the confines of these industrial supply chains (Goodman, 1999; Murdoch, 1997a; Tanaka, 2006). The agro-chemicals used to sustain production levels have been detrimental to human health in many developing countries (IPM-DANIDA, 2004). Moreover, the misuse of synthetic fertilizers, pesticides and herbicides has been traced to a decrease in fish stocks and a reduction in water quality on a global level (UNEP, 2007). Not only have these changes in the treatment of food degraded the quality of human consumption, they have resulted in a loss of food security, self-determination, and well-being in many agrarian communities (Kuhnlein, 2006; Wasi, 1987).

In Southeast Asia, rural agrarian development programs have stimulated productivity through the innovations of the Green Revolution: namely, manufactured seeds, herbicides, pesticides and synthetic fertilizers (Falvey, 2000; Rigg, 1997).

However, agricultural development through land expansion and intensification has taxed the state of the natural environment. In Thailand, the smallholder farmers that form the backbone of the economy; are suffering from high rates of soil erosion and a reduction in soil quality. To overcome deteriorating environmental conditions, farmers have sustained productivity through an increase in commercial fertilizer. Community food security has been lost as integrated farming methods are discarded in favor of cash crops (Panyakul & Wanlop, 2007). The capital investments necessary to sustain these conventional agriculture methods have led to rising farm debts, and the erosion of traditional social safety nets (Jitsanguan, 2001; Wasi, 1987). Faced with the disintegration of their communities, and financial opportunities in the city, rural dwellers have migrated to work in the manufacturing zones around Bangkok. Those that are left behind in the rural areas, increasingly depend on capital derived from jobs in urban areas to access the new factors of agricultural production (Funahashi, 1996; Rigg, 1997).

In response to the negative impacts of industrial food supply chains, civil society networks have aimed at raising well-being in rural and urban Thai communities through healthy, safe and environmentally-friendly modes of food production. While there has been a steady increase in the production of organically certified food, the costs are prohibitive for most Thai consumers (Roitner-Schobesberger *et al*., 2008). Studies in Yasothon Province show that organizations linked to the Thai Alternative Agriculture Network (AAN) have helped some impoverished farmers to improve their finances and raise household food security through organic agriculture development programs. Despite some progress, only a small percentage of farmers in the Northeastern region have shifted to organic farming methods (Kiatsuphimol, 2002; Samerpak, 2006). Furthermore, farmers, consumers, and advocates of organic and alternative agriculture have few resources at their disposal to challenge the socio-political and economic structures that support modern food production systems.

1.3 Originality and Significance of the Study

Although, Western scholarship has shown the advantages of a shift to local and organic food networks, the composition of Thailand's food provisioning systems differ greatly from those described in North American and European agro-food research (Allen, 2004; Feagan & Henderson, 2008; Feenstra, 2002). Agriculture plays an important role in Thailand's economic development and fresh markets continue to be a predominant feature of the national landscape. In the aftermath of the Thai economic crisis of 1997, researchers exhibited the critical function that agriculture served in reemploying migrant workers (Panya, 2003). Agriculture is more than an economic activity; it is part of the cultural heritage of rural Thai communities (Jitsanguan, 2001). His Majesty the King of Thailand has disseminated a philosophy that emphasizes household level self-sufficiency, moderation, traditional values and strengthening rural communities (Baker, 2007; Chantalakhana & Falvey, 2008). Along these lines, Thai social activists argue that rural communities have lost their cultural identity through the adoption of a new set of values that sustain an export-oriented agricultural system (Sivaraksa, 1996; Wasi, 1987). As a socio-cultural justification for a shift away from conventional agriculture, some Thai scholars have asserted that Buddhist teachings call for the use of natural farming methods (Falvey, 2000; Rigg, 1997). Despite these calls for change, most Thai farmers, not unlike their Western counterparts employ agricultural chemicals to boost production levels (Panya, 2003). The findings in this dissertation exhibit some of the ways that local and organic food production contributes to the preservation of culture, social welfare and the sustainability of regional food systems. This research not only examines the beneficial outcomes of a shift to organic farming, the methods herein draw out the means by which some rural dwellers have reconnected to their food systems through sustainable food production methods.

1.4 Research Questions

This thesis investigates the ways a shift in food production methods bear upon human development through an in depth study of organic farmers' communities in Yasothon Province. Key research questions addressed the following areas:

1. In what ways do Thailand's alternative agriculture networks support the development of communities of organic farmers?

2. How does a shift to organic agriculture change farmers' way of life and contribute to their well-being?

3. Which socio-ecological factors contribute to; and bear upon the well-being of communities of organic farmers?

1.5 Key Research Objectives

This dissertation explores the development of sustainable food systems in rural Thailand with the intent to study its impact on the well-being of communities of organic farmers, from their perspective. The purpose of this study was:

1. To investigate how Thailand's alternative agriculture network support the development of communities of organic farmers.

2. To critically evaluate whether a shift to organic agriculture leads to changes in farmers' way of life and influences their well-being.

3. To identify and measure the socio-ecological factors that bear upon the well-being of communities of organic farmers.

1.6 Conceptual Framework

While research on the natural environment has shown that humankind constitutes only one small link in the food chain, we have failed to act as members of an ecological community (Capra, 1996; 1999). The integrity of the ecosystem is integral to sustaining human well-being. Implicit in this worldview is the concept that human progress depends upon food access, good health, good social relations and the materials for a good life (Gough & McGregor, 2007; Millenium Ecosystems Assessment, 2005; Rojas, 2007).

It is argued throughout this thesis that the well-being in communities of organic farmers is contingent upon their propensity to act as stewards of the natural environment. To investigate this perspective, this research draws on the premise that proximity to nature is a factor in the decision to adopt pro-environmental values and actions (Dunlap & Van Liere, 1978; Vining *et al*., 2008). This thesis investigated the efforts of the Thai alternative agriculture network (i.e. governmental agencies, civil society organizations and advocates) to help farmers tackle the socio-economic and environmental changes in their communities. Well-established groups of organic farmers were selected to investigate the ways their worldviews, knowledge systems and decision-making weighed upon their interactions with the natural environment (Figure 1.1):

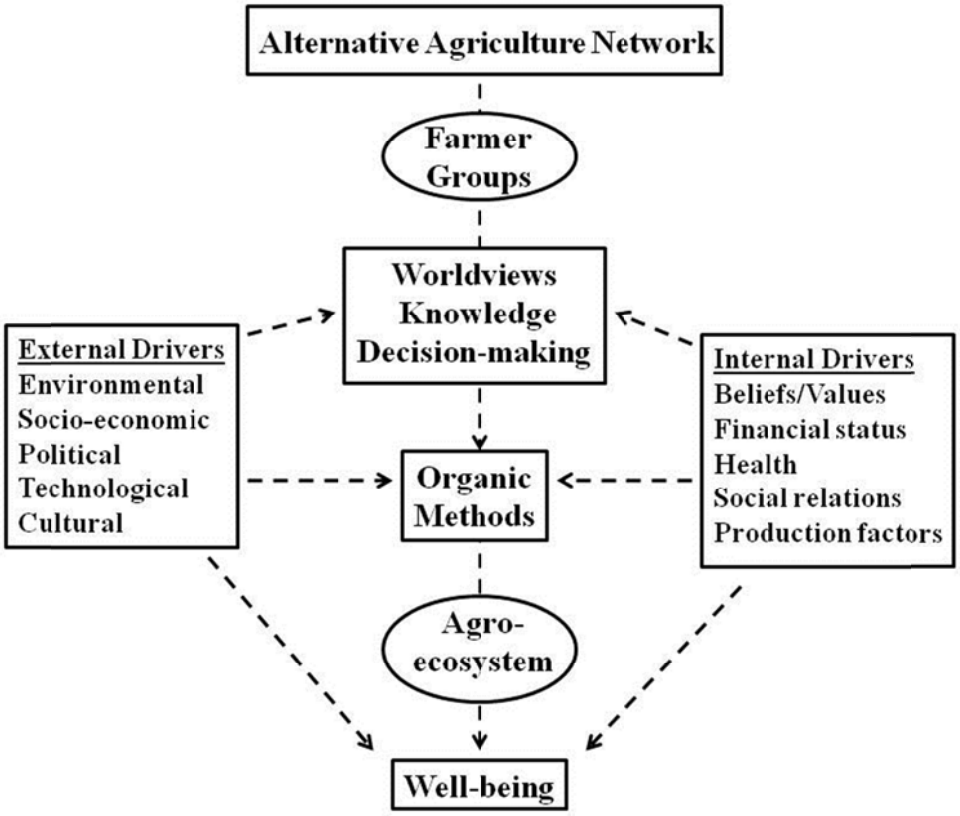


Figure 1.1 Conceptual Framework of the Thesis

This thesis also examined the methods and factors of production that organic farmers relied upon to increase the fertility; and productivity of their farms. This thesis draws out organic farmers' perspectives of the outcomes of a shift to organic food systems. Findings exhibit the role of the key actors (i.e. natural, mechanical and humans); as agents of food production; and well-being within the communities of organic farmers (Callon, 1987; Latour, 1987; 2005; Murdoch, 1997a; 2000).

1.7 Operational Definitions

Alternative Agriculture (Network): A global social movement that advocates for decentralization of decision making over local and regional food systems, a reduction in external sources of energy, and chemical inputs, and supports farmer collectives and local livelihoods. Food production is based on organic and sustainable agriculture methods (Allen, 2004; Leopold, 1949; Pretty, 2003).

Ecosystem services: “The benefits people obtain from ecosystems. These include provisioning services, such as food and water, regulating services, as flood and disease control, cultural services, such as spiritual, recreational and cultural benefits, and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth” (UNEP, 2007:518).

Community: A reference to groups of individuals that co-exist through cultural, social and/or working relationships. Communities are identified by a set of common values, and shared norms. They use a similar language to communicate with each other; and to pursue their objectives.

Conventional agriculture: A system whereby food production is increased through external inputs: chemical fertilizers, pesticides, herbicides and fungicides with a concentration on monocultures. Crops are purchased by large corporation that improve shelf-life through packaging and chemical adulterants. These systems are characterized by centralized control, capital-intensive technology, and exploitive natural resource use (Beus & Dunlap, 1991).

Health: A state of complete physical, mental, spiritual and social well-being based upon individual perceptions of health, not merely the absence of disease and infirmity (Bowling, 2005; Mock, 2000; World Health Organization, 1946).

Organic Agriculture: “Organic production systems are based on specific and precise standards of production which aim at achieving optimal agroecosystems which are socially, ecologically and economically sustainable. Requirements for organically produced foods differ from those for other agricultural products in that production procedures are an intrinsic part of the identification and labelling of, and claim for, such products” (Codex Alimentarius Commission, 1999: 1).

Organic Farming: A system of food production based on ecologically-sound agriculture methods, integrated farms, and appropriate technology. Organic farmers make renewable inputs by raising livestock, cultivating green manure, saving and exchanging seeds. Production strategies are aimed at household food security over cash crops.

Social Capital: The concept that social relations provide benefits to the members of a group or formal organization. Social connections are based on a shared set of values or norms that bring members together through trusting relations. Knowledge and labor can be leveraged to solve problems through the mental and physical resources of the groups' members (Capra; 2000; Putnam, 2008; Sage, 2002).

Well-being: The conditions whereby human beings attain health, and are able to fulfill their dietary requirements, meet material needs, social and family aspirations, and have the freedom to choose the course by which they achieve and define well-being for themselves, their families and communities (Gough & McGregor, 2007; Millenium Ecosystems Assessment, 2005).

1.8 Scope of Study

Many experts have blamed the geographical features of the Northeast Region on low agricultural productivity and sluggish socio-economic development (Grandstaff *et al*., 2008; Lovelace *et al*., 1998). Government agencies have responded to this problem by providing access to loans funneled through the Bank of Agriculture and Agricultural Cooperatives. However, reports show that the Northeastern Province of Yasothon (Figure 1.2) has one of the lowest per capita household incomes in the country (National Statistics Office, 2010).

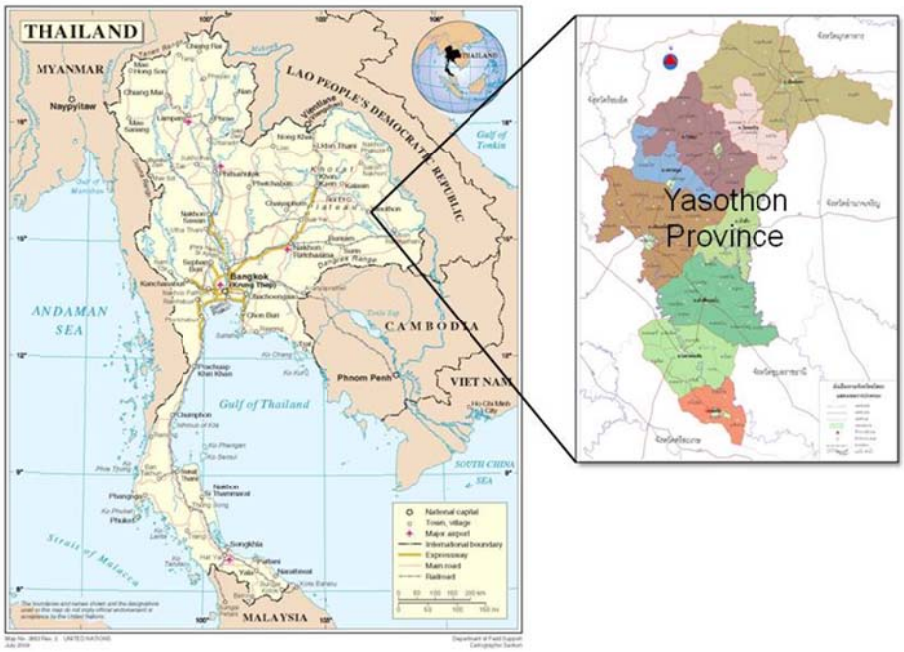


Figure 1.2 Map of Thailand with Yasothon Province

Sources: United Nations Cartographic Section (2011); National Statistics Office (2010)

In Yasothon Province, rice farming is the primary source of revenue and employment. Farmers have raised rice paddy productivity with agricultural loans used to purchase synthetic fertilizers, pesticides, herbicides, and machinery (Ratanamalai, 1999). However, the same loans that have funded agricultural development have fueled high debt levels (Boonman & Anpim, 2006). In the last few decades, many rice farmers in Yasothon Province have shifted away from conventional agriculture methods in an effort to reduce debts, improve household food security and income levels. Non-governmental and governmental organizations have supported training in organic farming methods as part of debt restructuring and rural development programs. Some of these organizations have assisted farmer groups in gaining access to the factors of production and specialized markets (Samerpak, 2006; Hutanawat & Hutanawat, 2000; 2006).

The geographical features of Yasothon Province are an important component of its development. Yasothon Province is located 534 miles from the nation's capital, Bangkok and is part of the Northeast region. There are four principal rivers in the Northeast, the Mekong, the Songkram, the Chi and the Mun. The Chi

River is the most important to Yasothon Province as it serves the water needs of several major districts. Yasothon's political borders lie upon the Khorat Plateau which is separated from Bangkok by four mountain ranges that block much of the precipitation that accompanies the Southwestern Monsoon in what is known as a 'rain shadow' effect (Choomchai & Wongkalasin, 1996; Panya, 1995). Farmer households in Yasothon province grapple with porous, sandy, salinated, and rocky soil. The uneven terrain of this region impedes the flow of formal irrigation systems. As a result of these factors, many of Yasothon's farmers and in the region depend on rain-fed agriculture (Funahashi, 1996).

Based on these aforementioned environmental, geographic, and socio-economic factors, ongoing organic agriculture initiatives, a relatively high density of organic farmers and an established support network, this research focuses on the work of organic rice farmers in Yasothon Province. Meetings with representatives of national level alternative agriculture organizations in Bangkok and the field were conducted to investigate their aims and objectives, namely the Green Net/Earth Net Foundation, the Agri-nature Foundation, and the Dharma Garden Temple (a hybrid religious institution and extension group also based in Yasothon Province). In depth interviews were conducted with organic farmers that received assistance from the aforementioned extension organizations. The farmers selected to participate in this study were certified by the Organic Agriculture Certification (ACT) which is accredited by the International Federation of the Organic Agriculture Movement (IFOAM). Participation on local training programs, religious ceremonies, surveys of rice fields, sharing meals, and stays in the homes of key informants also contributed to the depth of this thesis. The organic rice farmers in this study lived and worked on rice paddies located throughout Patiew, Mahachanachai, Kudchum and Lerngnoktha District in Yasothon Province.

1.9 Contribution

In contrast to the work of prior research on the beliefs and values of Thai organic farmers, this thesis examined participants' perspectives of their well-being through a combination of qualitative and quantitative methods (Hutanawat &

Hutanawat, 2006; Panya & Sirisai, 2003; Thongtawee, 2006). Mixed methods were used to shed light on the advantages of organic farming to a broad range of stakeholders: farmer households, communities, consumers and nature (Cresswell, 1998; 2003; Harrison, 2012). Although this research was based upon data collected from organic farmers, local leaders, and organizational representatives, findings have much to say about the advantages of sustainable food systems in both developing and developed nations. The merit of conducting a study of local food networks in Thailand is that food production remains an integral part of rural society. However, the situation in Thailand contrasts with conditions in developed countries where local food systems provide only a small percentage of the food supply; and many farm workers are migrants from developing countries (Allen, 2004). As this study examined densely-populated communities of Thai farmers, findings show how participants' work together and how their way of life was influenced by a shift to organic farming. The role that a shift to organic farming played in improving farmers' lives in Yasothon Province will be informative to proponents of local food systems and food security in developing and developed countries.

This research uncovers the advantages of community development schemes that employ organic farming as a strategy to raise well-being, and elaborates on possible intervention points in the final chapter. It is hoped that this thesis elicits the interests of both conventional and alternative agriculturalists and educates decision makers on ways to support a shift to more ecologically sustainable food systems. This thesis also aims to stimulate collaborative research between natural and social scientists on local and organic food systems.

A secondary product of this research was the tools that were constructed to suit research endeavors in Thailand's agrarian communities. These research tools also were designed to the social-cultural backgrounds of rural farmers. Notwithstanding, the use of these methods outside of Thailand would necessitate a reformulation of these tools to match participants' background and agro-ecosystems. The methods developed herein will be shared with the governmental institutions, agencies and non-governmental organizations (NGOs) that provided assistance with this research.

1.10 Outline of Chapters

Chapter 1: This chapter discusses the impacts of technological development on ecosystem services and communities of farmers. The critical socio-cultural and environmental problems facing human society with respect to food provisioning systems were outlined and situated within Northeastern Thailand, the setting for this research. This chapter concluded with key contributions of this research.

Chapter 2: The first part of this review examines the impacts of the expansion and intensification of food provisioning systems on the natural environment and human society. The second part explores the theoretical basis for sustainable food systems. The final sections exhibit the socio-economic factors that brought about the inception of Thailand's Alternative Agriculture Network (AAN) and discuss the development of organic agriculture and farming as a strategy for human development.

Chapter 3: Discusses the epistemological influences and rationale behind the choice of a mixed methods approach. The scope of this study is presented within the context of the research objectives. The area of study is examined from a theoretical and geographical standpoint. The body of this chapter justifies the use of qualitative methods to discover key areas of concern, and the quantitative methods employed to validate findings. Finally, the procedures and methods of analysis used to make sense of both qualitative and quantitative data are explained and validated.

Chapter 4: introduces the communities of study in Yasothon province. The socio-economic and environmental factors that contributed to the course of development in Northeastern Thailand are investigated as a foundation for later chapters. The work of key organic extension organizations, support groups, and farmer groups in this study are presented through secondary data and face-to-face interviews.

Chapter 5: exhibits the results of in depth semi-structured interviews with fifty farmers at four study sites in Yasothon Province. Participants described the drivers and factors that influenced their well-being; and the ways they worked with the natural environment on an individual and collective basis to sustain organic farms and their livelihoods.

Chapter 6: examines results of structured interviews with organic farmers. This chapter begins with an outline of the key drivers and outcomes of a shift to organic farming systems. Demographic characteristics of participants are exhibited with the intent to show the means by which these factors bear upon their way of life. Organic farmers' perspectives, knowledge systems, the ways they accessed production factors and the outcomes of their actions are shown through descriptive statistics.

Chapter 7: analyzes qualitative and quantitative phases of this research through mixed methods. Drawing on frequency distributions from Chapter 6, inferential statistics were used to examine correlations between key variables. Analysis of key associations shows the relationships between participants' worldviews, the organic methods they used, and the outcomes of these actions on their well-being.

Chapter 8: discusses the relationship between key findings and the literature review. First, answers to key research questions are addressed. Second, the ways that farmers confronted the challenges of their environment through a shift to organic farming and the help of external organizations exhibits key factors in the development of Yasothon's Alternative Agriculture Network. Third, a discussion of participants' worldviews, knowledge systems, and ways of practice in relation to their perception of well-being draws out the significant findings in this thesis.

Chapter 9: summarizes the key findings in this study and revisits the research questions in this dissertation. The challenges of using mixed methods; and the ways this research could be improved through new innovations are examined. The implications of the findings herein are discussed with the aim to make recommendations to farmer groups, extension organizations, and the research community. Intervention points for a more sustainable food provisioning system are presented with the aim to make recommendations to civil society and policy makers.

CHAPTER II
LITERATURE REVIEW

The purpose of this literature review is to show the ways that a shift from local to global food production systems has affected the course of human development. First, this review examines the worldviews that have accompanied the radical changes in global food production systems. Second, a survey of the theoretical underpinnings of modern food production systems and their impacts on human society draws out critical research gaps. Third, this review discusses the impacts of technology on Thailand's food provisioning systems; and shows the ways that the alternative agriculture movement has responded to these changes.

2.1 Introduction

Human innovations in food provisioning have been instrumental in feeding a growing population. However, the use of modern technology to expand and intensify food production has threatened the ability of the ecosystem to provide for our basic needs. Human-centered food production systems have led to unprecedented biodiversity loss, soil degradation, water pollution and changes in the climate. Experts have used the concept of "ecosystem services" to make arguments for a shift towards a more sustainable food system (Millenium Ecosystems Assessment, 2005; UNEP, 2007). To demonstrate the benefits of sustainable food systems, scholars have drawn on ethnographies of early human societies that lived in harmony with their foodsheds (Goldsmith, 1996; Pretty, 2003). Early human societies were depicted as closed systems supported by locally available resources (Shiva, 1991). The first pastoralists were said to raise crops and domesticate animals through 'local knowledge' learned from elders; rituals were performed to control the unpredictable forces of nature (Rambo, 1983). Religious structures and a lack of technology obligated early pastoralists to work together. Goldsmith (1996) redefined the term 'vernacular' to

describe these early civilizations that shared resources and perceived themselves as part of nature.

As human settlements grew in number they were forced to increase productivity and live apart from their food systems. To raise production levels, human societies experimented with seed varieties, different crops and fertilizers (Diamond, 2005; Pollan, 2007; Roberts, 2008). These new farming methods were recorded and improved upon through formalized knowledge systems or what is 'science' (Allen, 2004; Capra, 1996; Goldsmith, 1996; Sheldrake, 1991). Through these scientific innovations labor requirements diminished and food production increased. However, these great innovations distanced humankind from their food systems and led to the expansion of urban settlements (Pretty, 2002; Shiva, 1991). More importantly, these changes in food provisioning systems degraded the natural environment and eroded the fabric of rural farming communities (McMichael, 2000; Morgan *et al.*, 2008). Gradually, international conglomerates and economic institutions consolidated global food markets and increased their control over the food supply chain through a restructuring of the food chain (Rosset, 2006).

Table 2.1: Techno-centered versus Local Food Networks

Classification	**Techno-centered Food Production**	**Local Food Networks**
Worldview	Techno-scientific *-Humans as separate from nature* *-Extrinsic value of nature* *-Natural resources*	Ecological *-Human are a part of nature* *-Intrinsic value of nature* *-Ecosystem services*
Human relations	Self-interest *-Individualism* *-Business unit*	Cooperation *-Collectivism* *-Social networks*
Food Provisioning Systems	Migrant workers Export Cash crops Intellectual property Factories Global trade Supermarkets Restaurants	Communal labor Self-sufficiency Indigenous varieties Communal knowledge Local industry Local food systems Fresh markets Communal feasts
Agricultural Development Strategies	Green Revolution Factory farms Monoculture High input Conventional	Indigenous knowledge Small family plots Agro-ecology/polyculture Low-input Organic

Source: Adapted from Allen (2004); Beus and Dunlap (1991) and Pretty (2003)

Responding to the negative impacts of changes in food production and distribution, some scholars have argued for a shift from technology-centered food production to local food networks (see Table 2.1 above). Advocates of organic food have claimed that spatial proximity in food provisioning systems correlates with human well-being in the form of food security, healthy food, good social relations and culturally appropriate food sources (Kuhnlein *et al.*, 2006; Millenium Ecosystems Assessment, 2005; Pretty, 2003). Re-embedding food provisioning systems in human communities are said to contribute to pro-environmental values and actions. Research on organic and locally-based food systems suggest that participants have built "relations of trust" through the supply and consumption of "good food" (Jarocz, 2000; Pretty, 2002; Sage, 2000; Tisenkopfs *et al.*, 2008). Studies show that some organic

farms are highly productive and have the potential to contribute to the integrity of ecosystem services (Pimental *et al.*, 2006; Sandhu *et al.*, 2010). Although, scholars have advocated for a closer connection to our 'foodsheds', few have critically examined the socio-ecological forces that influence human food provisioning systems (Callon, 1987; Feagan, 2007; Goodman, 1996; Murdoch, 2000; Pretty, 2003; Winter, 2003a; 2003b).

2.2 Modern Food Production Systems

In the Twentieth Century food businesses exploited agricultural innovations and improved transport routes to expand their supply chains. The ways that businesses structured their supply chains became a defining factor in their development strategy. Food businesses evolved through the transformation of food into commodities that were traded and sold on international markets. Some foods were rendered more valuable through innovations in refrigeration, packaging and processing. These commodity supply chains also enabled the rapid distribution of food to consumers (Figure 2.1).

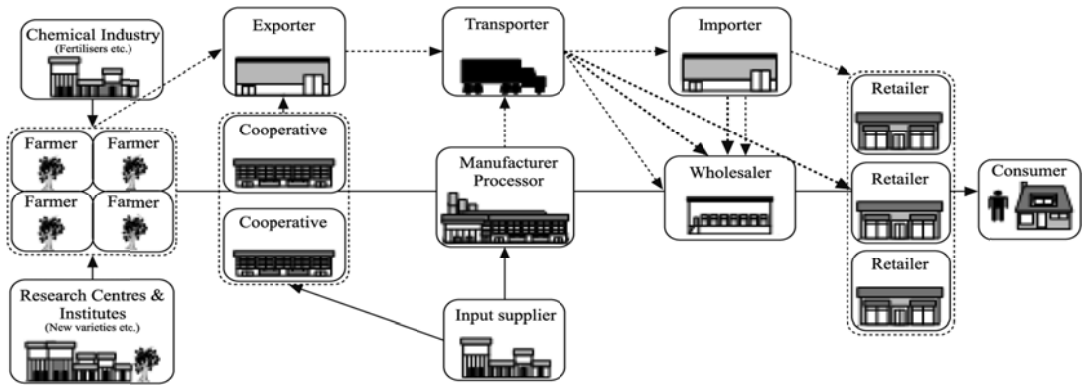


Figure 2.1: A Schematic Representation of the Agri-Food Supply Chain
Source: Matopoulis (*et al.*, 2007)

Modern food supply chains brought farmers into new relationships with agricultural research centers and the chemical industry (Matopoulis *et al.*, 2007). Farmer cooperatives enabled small producers to bring their goods to market and to

some extent were afforded bargaining power over the price of their produce. In turn, exporters profited from the sale of raw food products to manufacturing facilities, finished goods were sold to wholesalers, and finally retailers sold to consumers. Innovations in supply chain logistics helped the food businesses to cut costs, and raise profits.

Some researchers have been critical of the new power relations that have emerged within modern food supply chains (van der Ploeg & Marsden, 2008). These studies have shown that a shift to industrial food production has not only reconfigured the food that reaches consumers' tables, but restructured the relationships between retailers, producers and consumers. Small-scale food producers have lost much of their bargaining power as large monopolies control price levels and the terms of access to the marketplace (Pollan, 2007; Roberts, 2008; Rosset, 2006).

A number of scholars have used the concept of networks to illustrate the impacts of technology on the restructuring of food provisioning systems (Morgan *et al.*, 2008). Some experts have shown concern about the private and public institutions that collaborate in the development of agro-chemicals, seeds and food-based products. Pundits argue that global trading agreements have allowed large corporations to govern decision making over the food we eat and grow (Shiva, 2007). Many scholarly works suggest that the innovations of the "Green Revolution" have provide the cornerstone for the rapid growth of the food trade And studies show this new technology was well-received in developing countries as it enabled smallholder farmers to participate in the global economy through the increased production levels (Pingali & Raney, 2005; Swaminathan, 2007). While some economists contend that free trade agreements have opened international markets to developing countries, many farmers have failed to compete in the new marketplace (McMichael, 2000; Morgan et. al, 2008). Despite some benefits to farmers in developing countries, global corporations have exploited the market for agro-chemicals and seeds to drive down the price of crops. In the United States, multinational food corporations have engulfed small and mid-sized agro-ventures that have failed to compete in the new marketplace (Rosset, 2006). Notwithstanding, expanded supply chains have benefitted consumers as they can access a wide selection of food year round, and at reduced prices (Morgan *et al.*, 2008). However, the expansion and intensification of agriculture to meet human

consumption levels and fulfill the demands of the global food economy has been detrimental to the state of the natural environment.

2.3 Modern Food Systems as a Driver of Environmental Change

Twentieth century advances in agricultural technology effectively removed food production from the limitations of local ecosystems. Modern agricultural science and related innovations eased the work of many farmers and delivered dramatic increases in food production. However, the misuse of this technology has come along with unintended environmental consequences (Shiva, 1991; UNDP, 1994).

Scientists have shown that many agro-chemicals have an adverse affect on the biodiversity that contribute to food provisioning systems (UNEP, 2007). These animals that live above and below the soil surface are integral to sustaining food production (Fouke, 2011). While little is known about the thousands of species that support the soil, the affects of conventional agriculture on pollinator species (i.e. birds, bats, and bees indigenous to specific ecosystems) has drawn the concern of scientists and farmers (Dale & Polasky, 2007; U.S. Department of Agriculture, 2011). North American studies have shown that pollinators such as bees have declined to a point of reducing agro-productivity. To address this problem, commercial enterprises breed and rent out bees as a service to farmers. The costs of this entrepreneurial activity to North American farmers has been costly, approximately two to eight billion U.S. dollars yearly. Pollination is only one the numerous services that biodiversity provides to humankind (UNEP, 2007).

While some studies have started to measure the impacts and costs of biodiversity loss, the wider impacts of these actions on the ecosystem are not well understood (Sandhu *et al.*, 2010). Moreover, showing the impacts of agro-chemicals on aquatic and land biodiversity is complicated as aquatic ecosystems are interconnected through canals, brooks, rivers, streams, lakes and underground water sources. Hence, pollutants travel far from the point of origin. Case studies of synthetic fertilizer[1] and livestock run-off along the Mississippi River have shown a

[1] Synthetic fertilizer is made through a technical process (attributed to Haber-Bosch) that extracts atmospheric nitrogen and transforms it into ammonia for use in fertilizer (Roberts, 2008)

reduction in the productivity of fisheries at the Delta and as far as the Gulf of Mexico (McIssac *et al.*, 2001). Algae blooms associated with eutrophication[2] have decreased oxygen flow and reduced the ability of biodiversity to regulate water quality throughout global waterways. Another significant human action that disturbs both aquatic and land ecosystems is the application of organophosphate pesticides and herbicides. In a phenomenon described as bioaccumulation[3], some researchers claim that organophosphates are absorbed or consumed by small animals in waterways and terrestrial ecosystems, that are passed on to humans in higher concentrations via the food chain (Carson, 1962). On the other hand, some experts argue that chemicals such as DDT (a chlorinated insecticide) have been highly beneficial to agricultural productivity through the suppression of harmful insect populations (Ray, 1990). Despite dissenting opinions, the aforementioned studies explain some of the ways that human food provisioning systems are intertwined with the services of the ecosystem.

2.4 Human Development and the Services of the Ecosystem

The aforementioned scientific studies have shown that changes in the ecosystem have diminished global food provisioning systems, but say little about the impacts on human society. Not until the Millenium Ecosystems Assessment (2005) did scientists begin to delineate the impacts of human actions on the ecosystem, in a format aimed at civil society. Building on prior research, an interdisciplinary team of scientists assembled under the United Nations Environmental Programme (UNEP) produced a globally situated study on the affects of human induced changes in the ecosystem through interdisciplinary approaches (Millenium Ecosystems Assessment, 2005). A highlight of the MEA report was the re-conceptualization of the role of ecosystem services in human development. A key aspect of this research exhibits the intrinsic and extrinsic values of provisioning, regulating, supporting and cultural services (Figure 2.2). Critical to these findings were the direct (e.g. natural resource

[2] The degradation of water quality due to enrichment by nutrients, primarily nitrogen and phosphorous, which results in excessive plant (principally algae) growth and decay (UNEP, 2007: 519)

[3] The increase in concentration of a chemical in organisms that reside in contaminated environments. Also used to describe the progressive increase in the amount of a chemical in an organism resulting from the rates of absorption of a substance in excess of the metabolism and excretion (UNEP, 2007: 516)

consumption and usage) and indirect (e.g. demographic, economic, sociopolitical, technological and cultural) drivers that bear upon ecosystem services and human well-being.

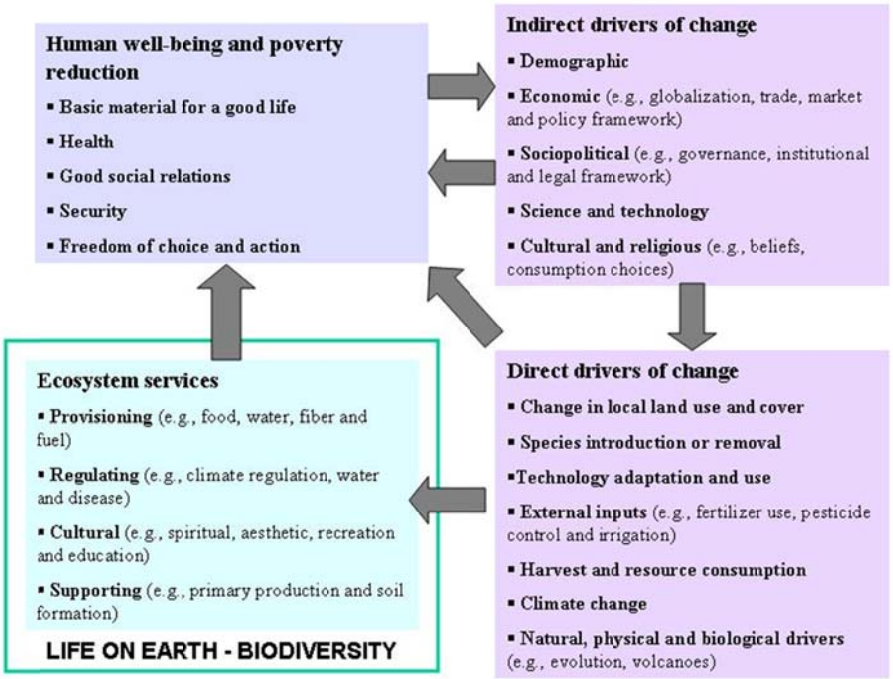


Figure 2.2: Millenium Ecosystem Assessment Conceptual Framework
Source: Millenium Ecosystem Assessment (2005)

While well-being is generally attributed to life satisfaction (e.g. health, finances, employment, family, friendship, individual and community), few studies have shown human well-being as an outcome of environmental integrity (Rojas, 2007).

The MEA report argues that human cultural progress and well-being are linked to the integrity of the ecosystem. These "cultural services" include diversity, spiritual and religious values, knowledge systems, educational values, inspiration, aesthetic values, social relations, sense of place, cultural heritage, and recreation (Millenium Ecosystems Assessment, 2005). Despite these assertions, this report used no "explicit measures" to make claims about the relationship between ecosystems services and human culture (ibid). While this is a critical omission, nature-society relations are an abstract concept, and not easily measured. Confronting this problem, some experts have responded with studies that show the length of time spent in the natural environment correlates with pro-environmental values (Dunlap & Van Liere,

1978; Weinstein *et al.*, 2009). In North America, Kempton (*et al.*, 1997) used descriptive statistics to show that environmental decision-making was based on "cultural models", or the 'beliefs and values shared by a community or society'. While, Kempton's study says something about the role of culture as a factor in environmental values, his work fails to measure the ways these "models" influence human actions towards the environment. Arguing from a historical standpoint, human relationships with the natural environment are constantly changing. And in modern society, people acquire their values within "built environments" by way of formal education, political, religious and social institutions rather than through a relationship with "wild nature" (Franklin, 2002).

Geographic location, cultural perceptions, and socio-economic status all play a part in human development. As it has been recognized that these socio-cultural influences are a factor in human well-being, public institutions have begun to design indicators for specific groups of people, rather than a 'one-size fits all' approach (Rojas, 2007). Health and wellness have started to move from medical laboratories to the realm of individual consciousness. Some researchers have shown that the concept of health or wellness is largely based on human perceptions of their physical conditioning (Bowling, 2005). In Buddhist cultures such as Thailand, wellness is an integrated concept of body and mind; and influenced by rural traditions and religious beliefs rather than governmental health initiatives. As Mock (2000:18) reports, "Thais believe that mental spiritual and bodily well-being are intertwined one with another". Building on these new understandings of health, some researchers have redefined well-being from a community perspective. Researchers have highlighted the importance of providing access to fresh food as a strategy to improve well-being (Potukuchi, 2004). While agricultural exports have been an important factor in rural economic development, pundits argue that local food security should take precedence over export earnings (Rosset, 2006).

Gross National Product (GNP) or financial wealth was not intended as a measure of human development, and measures of GNP rarely correlate with individual well-being (Daly, 1996). In the United Kingdom research shows that an increase in Gross Domestic Product (GDP) over 25 years was associated with a decrease in quality of life (Douthwaite, 1999). Realizing the deficiencies of Western economic

models, some researchers have turned to Asia, and in particular Buddhism as a guide for sustainable development. Schumacher's (1973) introduction of "Buddhist Economics" as a guide for human progresss was based on his experiences in Burma during the 1950s. Along these lines, His Majesty the King of Thailand, Bhumipol Adulyedej formulated the Sufficiency Economy Philosophy to improve the quality of life in both rural and urban areas through moderate consumption patterns, reasonableness in development strategies, and self-immunity from external markets (Chantalakhana & Falvey, 2008). The King of Bhutan, Jigme Singye Wangchuk adopted the Buddhist concept of a "middle way"[4] as a roadmap for sustainable economic development (Van Willensward, 2004). A critical part of Bhutan's economic policies is a move away from GNP, to a human development index based on the concept of Gross National Happiness (GNH). The "four pillars" of GNH are as follows: 1) sustainable development; 2) preservation and promotion of cultural values; 3) preservation and sustainable use of the environment; and 4) good governance. As an overarching policy the government has focused on sustainable development rather than improving financial indicators. The Bhutanese have defined the environment in Buddhist terms, stating that human life is interconnected to the natural environment and decision-making should follow a 'symmetrical valuation of nature's resources' (Faris, 2011). In Sri Lanka, the Sarvodaya movement has carried out community development projects governed by a combination of Buddhist and Gandhian Values (Sivaraksa, 1990b). Despite the uplifting tone of these initiatives, technological development is highly valued in most agrarian societies. In Southeast Asia, the application of modern technology to food provisioning systems has been instrumental in the development of the industrial sector; and rural infrastructure (i.e. roads, telephones, hospitals, schools). However, some experts argue that this modern development path has denigrated social safety nets and traditional values in agrarian communities (Rigg, 1997; Wasi, 1988)

[4] The Middle Way or Middle Path is a Buddhist concept based on moderation that avoids self-deprivation or self-indulgence. Decisions over the use of natural resources and consumption are made with a basis in wisdom and moral considerations. The aim is to satisfy human basic needs (de Silva, 1994).

2.5 Food Systems as a Network of Socio-Cultural Development

Food cultivation and the processing of food is the result of human relationships and their interactions with the natural environment. The production, exchange, and sharing of food with neighbors and friends is a social and cultural act (Goldsmith, 1996). These systems of human interactions that lead to the production of food are bound by common values and belief systems (Capra, 2002). Hence, societal definitions of what constitutes, "good food... convey the multiple attributes of products as well as to capture a heterogeneous set of actors broadly sharing a common set of values around food" (Sage, 2002: 1). Food is more than an object of human consumption, food making and definitions of 'good taste' shape regional cuisines, and play a part in the formation of human societies. Thai people are associated with papaya salad, Indians with curries, Irish with potatoes and Mexicans are sometimes called the 'corn people' (Pollan, 2007). People make cultural, economic and political statements by the food they eat or abstain from eating. For example, Jews and Muslims do not eat pork, vegetarians and Hindus do not eat beef, and vegans do not eat meat or milk products. The food we eat, how we make it and with whom we share is a characteristic of our social, physiological and spiritual identity.

2.5.1 Local Food Sheds as a Driver of Human Culture

Early human societies were said to live in harmony with their food sheds through a cultural system embedded in their natural environment (Goldsmith, 1996). Ritual acts and the construction of idols emerged as a vehicle to appease the gods of the forest and ensure the provision of for their basic needs: food, clothing, shelter and medicines (Santasombat, 1995; Sheldrake, 1991). Goldsmith (1996) used the term "vernacular" to identify these groups of people that were highly organized, managed local natural resources as common property and exhibited an ecological view of the world. The vernacular way of life depicted in Reichel-Dolmatoff's (1996) ethnography of the Tukano people in the Columbian Amazon bioregion revealed an elaborate knowledge system that acted as a set of norms for their members to co-exist in the forest. However, it is important to understand that among the Tukano, 'nature' was not expressed as a separate entity or in absolute terms. There was no dichotomy between human understandings of nature as reflected in the debate over the validity of an eco-

centric over an anthropocentric worldview (Beus & Dunlap, 1991; Capra, 1996; Pretty, 2003; Sheldrake, 1991). As Reichel-Dolmatoff (1996: 8) explains:

> In Western modes of thinking most of us are used to speaking of man and nature as if we referred to an accepted dichotomy. It seems that the Indians do not share this view. In the first place, Tukanoan languages have no word that would be equivalent to our 'nature', our spatio-temporal world as we conceive it

In other words, the Tukano's understanding of their relationship with the environment fails to translate into Western terms such as "ecosystem services", 'environment' or 'nature'. The Tukano conceptualization of the world around them was derived from their direct observations of the animal kingdom and lived experience. For these hunter-gatherers, the world was the provider of their basic needs, and takes on a powerful, mystical and centralized role in their society. In this respect, the Tukano way of life and the services of the ecosystem were not seen as distinctive entities. The Tukano conceptualization of the natural world was interlinked with their culture and part of their physical, social and spiritual nourishment (Goldsmith, 1996).

2.5.2 The Myth of Nature-Cultures

Although, it is argued that early forest dwellers and pastoralists lived in harmony with the natural world, researchers have criticized some of these ethnographic interpretations. Rambo (1983) contended that in many societies, the environmental stewardship were essentially economic rather than spiritually-based decisions. He used the example of South Asians' worship of cows, stating the necessity of their manure as a source of fuel, and their milk as a requirement of their daily nutrition. On another level, Murdoch (1994) claimed that some stories of pro-environmental forest dwellers have been falsely manipulated by researchers to demonstrate local ecological knowledge. In spite of his critique, Murdoch (ibid) went on to label these early societies emanating a symbiosis of myth, ritual and belief as "nature-cultures". Shiva (1991) argued that early pastoralists were stewards of their local environment and used a 'closed loop system' to sustain small farms embedded in

the local ecosystem. Whether through economic or spiritually-based rationale, indigenous societies acted according to beliefs systems that helped them to negotiate their survival in an unpredictable environment (Goldsmith, 1996). Nonetheless, many early societies failed to observe the signs of environmental collapse (Agarwal and Gibson, 1999). A particularly dramatic case is the downfall of the Rapanui people on Easter Island. The Rapanui culture was based upon elaborate rituals and the construction of great monoliths to appease the gods of their island country. However, the continuance of these rituals led to widespread deforestation as trees were cut down to move these great statues. Feeding an army of statue builders contributed to soil erosion, the extinction of indigenous animals and the depletion of local marine food sources (Diamond, 2007).

2.6 Food Security in Modern Society

While innovations in agriculture have generated adequate food supplies for global populations, human society many people have experienced a loss of food security. Rising food prices have meant that some people lack financial access to adequate food, despite increased availability. This situation has worsened as energy security prevails over food security. Dramatic increases in the price of fuel crops (i.e. palm oil, corn, sugar cane) have encouraged many farmers to phase out food crops. In spite of the aims of international agreements to make the food trade more equitable, some argue the opening of the global marketplace has decreased the competitiveness of small-scale producers (Rosset, 2006). The acquisition of land for economic development has dislocated many indigenous groups from their foodsheds (Kuhnlein, 2006). Many major urban centers of the United States have been described as “food deserts” based on a lack of access to fresh food (Potukuchi, 2004). The media has drawn the interest of consumers with reports of harmful pathogens and tainted foods spreading through industrial food supply.

The case of *Bovine Spongine Encephalopathy* (BSE) a disease contracted by cows through the consumption of their own body matter has been cited by many researchers as an example of the deficiencies in modern production networks (Goodman, 1997; Morgan, *et al.*, 2008; Tanaka, 2008). Through what is Actor

Network Theory or a “sociology of associations”, some researchers have recast nature in a new role by drawing attention to the ways that bacteria and viruses (e.g. BSE, *E. coli*, and *salmonella*) have reacted to the confinement of industrial food chains (Goodman; 1997; Murdoch 1997a; Tanabe, 2006). Murdoch (1997a: 740) asserted that it is critical to exhibit the agency of nonhuman entities in agro-food networks, “Natural entities are not to be regarded…simply as passive intermediaries; they retain the ability to subvert the associations of the social thereby recasting associations in new ways”. Tanaka (2008) used Actor Network Theory to examine the associations between Japanese commercial enterprises and government regulators in hiding the truth from the public about beef products tainted with BSE. As Tanaka’s (ibid) research shows, not only are consumers at risk, they know less about the composition of food that turns up on their dinner tables.

Research suggests that access to healthy and fresh food is instrumental in human well-being (Feenstra, 1997; Kuhnlein *et al.*, 2006; Millenium Ecosystems Assessment, 2005). To a great extent local food provisioning networks support human well-being by addressing these concerns. Human development depends on healthy and dependable sources of food for a good life. The consumption of chemical-free and fresh food contributes to human health and nutritional requirements. The availability of food sources within the community enhances self-reliance and security. Furthermore, community food security offers the protection of culturally appropriate food sources (Kuhnlein *et al.*, 2006). The preservation of local food sources underwrites the conservation of biodiversity, and provides a stable income for local people (Sonnino, 2007).

2.6.1 The Right to Food

Despite research that shows the importance of local food access, few policy makers have enacted decisions that have improved community-based food security. Food exports are more highly valued than local food access (Potukuchi, 2004; Rosset, 2006). Although, the distribution of wealth in developing countries has been a long-standing concern of many policy makers, Daly (1996) explained that human welfare is to a greater extent based on a fixed quantity of natural resources. Hence, the degradation of natural resources and in particular food systems inversely

affects human progress. Along these lines, some experts have stressed the importance of providing people greater access to their food sheds, particularly in developing economies (Jones and Carswell, 2004).

An international consortium of researchers from developing countries has proposed the concept of a 'right to food' with the aim to challenge current approaches to indigenous health and nutritional problems (Kuhnlein *et al.*, 2006). In a case study of the Inuit people, the consortium showed that reliance on food subsidies and a lack of access to tribal lands contributed to increased levels of obesity, alcoholism and other associated diseases. These studies uncovered a lack of food access as a short-term and long-term threat to community development. In light of these arguments, the consortium researchers concluded that it may be more beneficial to develop local food systems, than air-lift processed food to marginalized groups (Damman *et al.*, 2007). Kuhnlein (*et al.*, 2006) demonstrates that food cultivation, gathering and processing are a critical factor in sustaining indigenous livelihoods and traditions. These studies suggest that indigenous communities thrive through their engagement with local food systems and bear the burden of programs that provide food aid or financial support. Qualitative research by the consortium exhibits some of the cultural, social and economic benefits of re-embedding food production in indigenous communities. This so-called 'right to food' is not only a concern of former hunter-gatherers deprived of access to their 'foodsheds', food security is a global problem that has reached rural and urban societies (McMichael, 1999).

2.6.2 Food as an Instrument of Economic Security

Agro-researchers have identified a deepening rift between competing locales for the right to produce a product embedded in place, culture and a history of the territory (Hinrichs, 2002; Feagan, 2007). Out of this conflict has arisen a new social movement aimed at the protection of culture and economic security, in what is termed "defensive localism". Producers and consumers have joined together in protests to protect their local foods and production methods. Battles have ensued with global food corporations like McDonalds' (fast food) and Monsanto (agrochemicals and genetically modified foods) who are blamed for a loss of regional cultural and economic integrity. Within this socio-economic context, the French concept *terroir* has gained ground, a branding based on a specific locale or history of a product. To

protect *terroir,* labeling schemes have been put into place such as PDO (Protective Denomination of Origin) and PGI (Protected Geographical Designations) (Penker, 2006; Sonnino, 2007). The debate over what is Champagne (a sparkling wine from the Champagne region) or Parmigiano Reggiano (hailing from Italy and known as parmesan cheese to American consumers) leads to further controversy over multiple meanings of 'embeddedness' (Goodman, 2004). It is evident from the literature that *terroir* and other geographical designations of food are confusing and difficult to prove in a court of law. This blurriness may even pit farmer local groups against each other as they vie for the right to a specific PDO or PGI. Nonetheless, innovative strategies are necessary to challenge the adequacy of modern food provisioning systems.

2.7 Local Food Networks

Scholars have developed theories that the proximity of relations that emerge within locally situated food systems contribute to healthier food and create social capital. Local food networks bring farmers into resilient cooperatives that draw upon heightened levels of social capital through information exchange; and the ability to skills, knowledge and labor of members (Pretty, 2003). On the other hand, North American constructions of local food networks have been more urban-oriented, with attempts to create community-supported agriculture, fresh markets, and city gardens on unoccupied land (Allen, 2004; Altieri, *et al.,* 1999). These alternative production networks are said to engender, "social relations of cooperation and trust… among suppliers, producers, workers, brokers, retailers and consumers" (Jarocz, 2000: 279). For example, Sage (2003) found that consumers and producers develop strong relations around the "good food" found at farmers' markets in the United Kingdom through regular contact with each other. Feagan and Henderson (2008), and Hinrichs (2003) allude to the "alternative" qualities of communities of farmers and consumers that construct food systems outside the confines of conventional food chains.

The development of the global alternative agriculture movement is a response to the concerns of consumers and producers about their health and the state of the natural environment. Community food systems, local food networks, shortened food chains, community-supported agriculture (CSA), food security represent

challenges to the structure of modern food provisioning system (Allen, 2004; Feagan, 2007). Studies of CSAs highlight projects that offer fresh organic food to nearby residents (Feagan & Henderson, 2008; Hinrichs, 2003; Morgan *et al.*, 2008). Pundits point to Tuscany's tourism sector, as an example of how locally-produced food can serve as an agent of cultural and economic development (Miele, 2001; Sonnino, 2007).

Increasing the availability of organic food is a central pillar of the alternative food movement (IFOAM, 2012; Roitner-Schobesberger *et al.*, 2008). Many consumers have turned to 'organic food' as a means to protect themselves from these dangerous pathogens (e.g. *salmonella*, *E. coli*, bird flu, *listeria* bacteria) that have emerged from behind the closed doors of the food industry (Pollan, 2006; Winter, 2003a). Unfortunately, this new consumer class is rather small in comparison to the poor, uneducated or unconcerned consumers who struggle to survive on cheaper and largely unhealthy processed foods (Gussow, 2006). The high price of organic food makes this form of consumption virtually inaccessible to low-income families in urban areas (McMichael, 1999; McCullum *et al.*, 2005).

2.7.1 Community-Supported Agriculture

In response to the increasing demand for healthy and safe food, urban dwellers have started to purchase or takeover undeveloped land in and nearby cities to create small-scale farms within their communities. Community-Supported Agriculture (CSA) is an activity aimed at developing community food security through the development of localized spatial relations, "… premised on a direct, ongoing partnership between the producer and local consumers in the immediate area" (Hinrichs, 2003: 39). Consumers purchase shares in the farm to helps fund the purchase of agricultural supplies for each growing season. The typical CSA grows diverse crops and members receive a box or basket of produce on a regular basis. Part of the CSA agreement includes the acceptance of the quality and variation of produce that arrives in the box. In some CSA schemes members engage in farm work in exchange for food. Although, organic production is not a requisite, many CSA follow sustainable agriculture practices, and promote concepts of healthy food and environmental stewardship (Morgan *et al.*, 2008).

In effect, the CSA acts to give food greater meaning by offering members a sense of embeddedness in their community. Feagan and Henderson (2008: 3) frame the CSA as a sharing and support network characterized by a spirit of collaboration:

1) There is a need to reconnect farmers and eaters, eaters and the land
2) Eaters should take an interest in and responsibility for food production
3) Eaters should know where there food comes from and how it is produced.
4) People need a sense of community

Despite, Feagan and Henderson's (ibid) somewhat romantic depictions of the CSA, they are conflicted by conventional business problems such as maintaining a customer base, paying adequate wages to farm workers and offering a reasonably priced product. CSAs attempt to overcome these deficits by adding intrinsic and intangible value to their product as embedded in locality.

2.7.2 *Chisan-Chisho*

While not as well documented, Japan's *Chisan-chisho* movement is said to pre-date the European and North American CSA movement. *Chisan-chisho* is a multi-sectoral partnership of governmental agencies, Japanese Agricultural Cooperatives, and local NGOs. The platform of *Chisan-chisho* is "locally produced and locally consumed products" (Kimura & Nishiyama, 2008). The success of *Chisan-chisho* has been attributed to a rise in food scandals, such as mad cow disease and the falsification of food labels. The organizations involved in the movement focus on awareness raising, education programs and marketing campaigns. The aim is similar to the North American CSAs with an emphasis on building closer relations between producers and consumers through safe food, building local economies, environmental stewardship, traditional foods and better nutrition (ibid).

2.7.3 Urban-Agriculture

In the last decade, an urban-agriculture movement has arisen to confront the challenge of access to healthy and fresh sources of food in the city. Case studies

document stories of urban allotment schemes in the United Kingdom, roof-top gardens in North American cities, and in Cuba, an urban-agriculture movement (Halweil & Nierenberg, 2007). After the fall of the Soviet regime in the 1980s, Cuba lost access to valuable agro-chemical imports. Scrambling to replace the previous agricultural system, a program was created to promote backyard vegetable gardens in the capital of Havana and other major cities. Mainly based on the recycling of household waste, 8,000 plots were established that engaged in egg, meat, vegetable and flower production (Altieri, *et al.*, 1999). Global agro-food scholars have scrambled to write-up accounts successful urban food production systems. More importantly, these initiatives have gained the attention of government policy-makers striving to feed swelling urban populations.

2.7.4 The Philosophy of Alternative Agriculture

While, early Twentieth Century technological advances aimed to increase food production through manufactured fertilizers, pesticides, and advanced machinery, some agriculturalists foresaw the value of farms systems based on ecological principles (Pretty, 2002). The pioneers of these ecological agriculture methods put forth a new philosophy of agriculture in what was later termed biodynamic, organic and natural agriculture. Rudolf Steiner (1924) believed that agriculture should be based on a philosophy of the cosmos that emphasized returning local waste to the soil. The latter work of Sir Albert Howard (1941) provided the empirical basis for organic agriculture through a hypothesis that soil quality was linked to both animal and human health. Aldo Leopold's (1949) observations of the negative effects of output-oriented technologies used on North American farms in the 20th Century inspired the writing of the *Land Ethic.* In Japan, agriculturalists developed an alternative food movement with an emphasis on natural approaches to farming (Setboonsarng & Gilman, 1999). These early alternative agriculturalists shared a common belief that modern agro-technology had failed to take into account both the limitations and the intrinsic value of the natural environment.

Rudolf Steiner (1924) drew on spiritual influences to re-conceive of agriculture as more than a tool for human consumption, he combined a philosophy of the universe with natural farming innovations, in what his followers termed

‘biodynamic agriculture’. Biodynamic agriculture called on farmers to be in tune with the seasons and the astral forces of the universe. As Steiner explained, farmyard manure possesses a life-giving force and animals obtain this energy from the plants that they consume. He concluded that the digestive forces of the cow returned both nutrients and “astral forces” back to the soil. He believed that soil represented a living organism with properties based on its location in the universe. Hence, manure for agriculture had to come from the same area where the cow ate the grass, as both the physiology of the cow and the soil had evolved together.

Sir Albert Howard, a professional agronomist provided the scientific basis for the development of organic agriculture (Rodale, 1949). In field trials, Howard, observed the three critical links between ecology and humankind. First, plant disease was a consequence of poor soil fertility. Second, if the soil was unhealthy the animals that grazed this land were unhealthy. The third link was the connection between plant, animals, and humankind. He found that by returning the waste of plants and animals to the soil he was able to build up the health of the land. Fertile soil meant that those who worked and fed on this land were also healthy (Howard, 1941).

Aldo Leopold a naturalist, farmer and academic expressed that the land held a significance that extended beyond economic value. As argued in Callicott (1987), Leopold perceived that humankind was part of a larger whole or ‘community’ that included water, soil, plants and animals. His poetic writings emphasized “love, respect and admiration for the land” (Leopold, 1949:223). However, Leopold also believed in the practical, functional or what is the extrinsic value of the land to humankind (Mayer and Frantz, 2004). Leopold supported farming and recreational land use, provided that they did not interfere with the balance of nature. As written in Leopold (1949: 221) “A land ethic then reflects the existence of an ecological conscience, and this in turn reflects a conviction of individual responsibility for the health of the land”. Leopold’s work suggested that nature is worthy of conservation as the natural environment holds both an extrinsic and intrinsic value to humankind.

In Japan, the course of the Twentieth Century alternative agriculture movement was aimed at two key problems: 1) an increase in external agricultural inputs to sustain production levels and 2) the erosion of rural farming communities. These problems were compounded by an ageing farmer population dependent on

mechanized assistance (Setboonsarng & Gilman, 1999). However, the Japanese movement was distinctive to Western alternative agriculture in both its ties to particular religious sects and its underlying methodology. The development of Microorganic Agriculture (techniques for breeding and applying enzymes and microorganisms) was a fundamental aspect of the Japanese movement. Kakuya Shimamoto, the father of Microorganic Agriculture was inspired by the teachings of a religion known as Omotokyo. Those faithful to Omotokyo believe that, "Earth is considered a form of deity and should be respected as one of the three main elements of the universe, along with fire and water" (Susumu, 1992: 45). In the early days of the movement, Shimamoto disseminated his new agriculture methods to farmer members of the sect. To expand the scope of their work, his son formed the World Enzyme Company.

Mokichi Okada, another pioneer in the Japanese alternative agriculture movement was one of the first to promote the concept of "natural agriculture". Okada focused on the elimination of poisons from the soil, the use of traditional agriculture practices and the adoption of a holistic view of nature. Okada was an active member of the Sekai Kyusei Kyo religious group. Some of the members of Sekai Kyusei Kyo later founded a branch of the movement to support natural agriculture known as the Kyusei Nature Farming group. The main objectives of the Kyusei Nature Farming group are as follows:

1) To produce high quality food
2) To be economically and spiritually beneficial to farmers and consumers
3) To be sustainable
4) To be environmentally sound
5) To be able to produce enough food for an expanding world population. (Setboonsarng & Gilman, 1999).

Dr. Teruo Higa, a member of the Kyusei movement based at the University of Ryuku, Japan, developed a branch of science based on microbial inoculants and eventually marketed them under the trade name, Effective Microorganisms (EM)[5]. Higa's

[5] Effective microorganisms (EM) are a liquid fertilizer made from food scraps, microbes and molasses invented by members of the Kyusei Natural Farming Group and brought to Thailand by a Japanese missionary in the 1960s (Agri-nature Foundation 2007; Setboonsarng & Gilman 1999).

products were widely sold throughout Asia and have become well known to Thailand's organic farmers (ibid).

Masanobu Fukuoka (1978) a former soil scientist is known by many as the modern day philosopher behind the Japanese alternative agriculture movement. Fukuoka's work was popularized through an English translation of *The One Straw Revolution.* This book explains the nature of "do nothing farming" a technique based on: 1) no cultivation (no plowing or turning over the soil); 2) no chemical fertilizer or prepared compost; 3) no weeding (by tillage or use of herbicides); 4) no dependence on chemicals to foster growth (ibid: 33). Fukuoka's experiential research has been a thorn in the side of the Japanese scientific establishment. In his book, he asserted that agronomy was a reductionist science, as most experiments were conducted far away from the farmers who used these methods. According to Fukuoka (ibid), nature is too complicated, and there are too many variables to replicate natural cycles behind the closed doors of a laboratory. Despite, Fukuoka's bid for a natural food system, the global organic agriculture movement has received greater acceptance from the international community.

2.7.5 The Global Organic Agriculture Movement

> Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects (IFOAM, 2012).

While organic agriculture is based on the work of agro-ecologists, agronomists, environmentalists, concerned consumers and natural agriculturalists, it has developed into a globally regulated system of production. The International Federation of Organic Agriculture Movements or IFOAM has been an influential actor in the development of organic products. IFOAM is a consortium with a global membership and sets its own rules and definition of what constitutes 'organic' produce. Certification schemes have served as an important tool for expanding

production and offered consumers a guarantee that products are developed under similar standards. Inspectors are certified to oversee the process and organic labels are placed upon products that pass through this system. IFOAM has built up a global network of certifying bodies in developing and developed countries (Allen, 2003; IFOAM, 2012).

Despite aims to increase production, as of 2007 less than 1% of global arable land was dedicated to organic agriculture. Growth has been hampered by government subsidies that prop up conventional food systems. And policy makers argue that conventional agriculture methods are necessary to feed a growing human population. However, some researchers argue that organic farms offer equivalent productivity levels to farms using conventional agriculture methods (Lotter, 2003; Pimentel *et al.*, 2005). Although, pundits continue to argue over the strengths and weaknesses of organic production systems, demand for certified organic food in the United States and Europe has increased steadily in the last decade. To fulfill demands, some large commercial enterprises have entered the market. These large-scale organic producers owned in part by industrial food conglomerates, hire migrant labor, and defy some of the underlying principles of the movement (McMichael, 2000). These developments have raised questions about the guidelines for organic certification and the path forward (Allen, 2004).

Nonetheless, the development of organic agriculture has been an important source of revenue for smallholder farmers in developing countries. IFOAM's work has indirectly provided new markets for smallholder farmers. To help these financially disadvantaged farmers, the movement has ensured a higher price at the farm-gate. IFOAM also has worked closely with extension organizations in developing countries to educate smallholder farmers on the certification process. Nonetheless, farmers in developing countries grapple with detailed guidelines that restrict the amounts and types of inputs that are compliant to certification standards (Section 2.10.2 Organic Food Development Strategies in Thailand).

2.8 Thailand: A Case for Alternative Agriculture Development Strategies

In the Mid-Twentieth Century, experts feared that rapidly rising population growth in Asia would overtake food production levels. Aimed at fulfilling food demands and improving rural income levels, researchers at the International Rice Research Institute (IRRI) in the Philippines established new breeds of rice that grew faster, produced more edible flesh than traditional varieties, and were resistant to specific predator species. As a result of these innovations, global rice production doubled from 1967 to 1992 (White, 1994). Nonetheless, these were not stand alone technologies, increases in production required higher inputs of water and synthetic fertilizers. Gradually, pesticides, herbicides and machinery were introduced to resolve pest problems and reduce labor requirements. The sum total of this new technology weighed heavily on the natural environment and farmer health. The cultivation of rice and cash crops were expanded and intensified on unsuitable lands. In Thailand, a 'vicious cycle' of synthetic fertilizer use ensued to sustain production levels on severely degraded soils (Panya, 2003). The growth of Thailand's agricultural economy dragged smallholder farmers into a socio-economic crisis; fueled by high debt levels, outward labor migration, and a loss of community-based social safety nets (Falvey, 2000). While these problems were endemic to much of Southeast Asia, the rapid rate of agricultural development in Thailand and the number of local researchers made the crisis more visible than in neighboring countries (Rigg, 1997).

2.8.1 Rice Farming as a Driver of Social and Environmental Change

Similar to many Southeast Asian nations, Thailand possesses a rich cultural history embedded in the cultivation of rice varieties adapted to diverse bio-geographical zones. Rice is more than the staple food for the Thai people. Rice is a life-giving force, a factor in social systems, religious practices, and a part of regional culinary arts. For thousands of years variations of the Oryza officinalis (wild rice) were grown at subsistence levels to feed families of farmers (White, 1994). And rice paddies still are a dominant feature of the rural landscape throughout the region. Through local knowledge, farmers have cross bred tasteful and resilient strains of rice through traditional methods. Farmers operated according to "embodied knowledge" that was passed on from generation to generation and "learned by doing" (Tanabe,

1994). Rice was cultivated according to natural cycles, and varieties were selected based upon their ecological setting:

> Rice cultivation according to the ways of nature was implemented: rice varieties, that is, using of rice varieties which would be taller than water level during the flooded season, when water from the North would flood over the rice field; soil nourishing: using natural supplies, such as manure from buffaloes … compost from natural decay of straw in the rice field, …annual/rainy season rice cultivation 'na pee" practice, according to natural season rhythm and cycle… (Thongtawee, 2006: 112).

The cultivation and consumption of rice was laden with both economic and socio-cultural values. The religious practices of Thailand's first human inhabitants (predominantly, Lao, Mon, Khmer, Shan, Tai) governed the process of rice cultivation. Although, Buddhism[6] was installed as the official religion in the region, changes in religious practices were slow to take hold. Animist and Brahmanic rituals[7] were entrenched in the local culture and closely tied to community life. Farmer households paid reverence to *Khwan Khao* (Rice soul), *Mae Phosop* (Rice Mother), *Mae Thoranee (*Earth Mother), *Mae Khongka* (River Mother). Rituals were performed on behalf of specific deities at each stage of the process: plowing, sowing, transplanting, harvesting, and threshing (Falvey, 2000). For example, prior to plowing the fields, an auspicious day was chosen and plowing commenced, "from the South in the belief that it would burst the stomach of the Naga to spread its excrement and to fertilize the soil" (Sirisai, 1991: 168). Sowing was the next significant period in the rice farmers'

---

[6] Theravada Buddhism or the "Teaching of the Elders" was said to have migrated from Ceylon (Sri Lanka) and took hold on the Siam (Thai) Peninsula between the Sixth and Ninth Centuries. The Noble Truths, the Eightfold Path, the Dependent Origination, and the law of Karma are the key principles of Theravada Buddhism (Payutto, 2001). Early Thai Buddhist practice was associated with the Mon people and at first named *Dvararvati* after its Indian roots. During the Mon Dynasty and the period thereafter, Lopburi in Central Thailand served as the center of Buddhist studies. The formalized development of a Theravada Buddhist culture and religion in Thailand was attributed to the rise of the Tai civilization around the Eleventh Century (Wyatt, 1982).

[7] *Thewadas* (angels) and *pii* or ghosts were said to inhabit certain forests, mountains, bodies of water (Kabilsingh, 2010). In fact, many large old trees, such as the ironwood and sala are venerated by Buddhists. The *Bodhi* or fig tree (*ficus religiosia*) is considered particularly auspicious, as the Buddha was reported to have attained enlightenment under its branches (de Silva, 1992; ibid).

schedule, in Central Thailand, farmers performed a ceremony to "invite the Rice Mother to come out of the granary for the rice to be sown in the field" (ibid: 169). In *Issan* (the Northeastern region), where rice is transplanted rather than sown, a ritual was performed to venerate the reincarnation of the Rice Mother by transplanting seven stalks of rice (or rice souls) in the paddy. When the grains formed, it is said that the rice had been impregnated by the Rice Mother. Offerings were given to relieve the pains of pregnancy and the farmer recites kind words "to soothe and flatter" the Rice Mother. Prior to the harvest, a ritual was performed to appease the Rice Mother and to avoid frightening the Rice Soul. In *Issan*, the seven stalks of rice were reaped first as they were inhabited by the Rice Soul. After the harvest, the stalks were threshed to release the grain. Many *Issan* rice farmers celebrated, "… *pong khao* which literally means to invite the Rice Goddess down to the floor for threshing" (ibid: 171). In the final ceremony, "boiled egg, rice cake, liquor and banana were offered and the seven rice plants were taken as they symbolized the Rice Soul" (ibid: 172). After this last ritual the rice was ready for consumption. These rituals exhibited the significance of rice as a force for their spiritual, social and economic development.

A great reverence was also extended to the caring of domesticated animals, particularly the Asiatic Water Buffalo. Thai farmer relied upon buffaloes for manure, pulling plow rice fields, and lastly as a food source. Thai buffaloes were venerated for their contributions to rice farming with two traditional rites. *Su Khwan Kwai* was a ritual whereby a Buddhist monk performed a blessing on behalf of the buffalo. The second rite, not identified by name, was conducted by the farmer to give gratitude to the buffalo for his part in the cultivation of rice. Thai buffaloes provided fertilizer, helped with plowing rice paddies, and were trusted members of agrarian society (Thongdee, 1990).

Although, the aforementioned ritual practices signify a deep respect for Mother Nature, some researchers claim these practices were often a reaffirmation of the economic benefits of animal husbandry. Another explanation for the role of rituals in agrarian society was the belief that if the 'gods' were not appeased, the harvest would be damaged by unknown forces. Some experts have stated the use of rituals in many societies was merely an attempt to control the unpredictability of the natural environment (Falvey, 2000; Murdoch, 1994; Rambo, 1983). However, some

ethnographic work shows that up until the early 20th Century Thai rice farmers both respected and understood their place in the natural environment from a Buddhist perspective (Tanabe, 1994).

2.8.2 The Birth of the Rice Economy

The Reign of King Chulalongkorn, Rama V (1868 – 1910) marked a critical period of social and economic transformation in Thailand. During the region of Rama V closer relationships were established with European nations through trade relations. The signing of the Bowring Treaty of 1855 was a major factor in Thailand's transformation into a rice-based economy. As the demand for Thai rice increased farmers were encouraged to make a shift from diversified holdings to monocultures. The affect of this agreement was a two-fold expansion in rice acreage by the 1950s, particularly in the Central Region where rainfall and rich soils were most abundant (Wasi, 1988; Wyatt, 1982). New policies put in place by the Central government brought about both economic and socio-cultural changes in Thai society.

The development of a central Buddhist authority during the Reign of Rama V had a profound impact on pre-modern Thai religious practices. Thai Buddhism became incorporated into a new Western style of government; and institutionalized through a royal proclamation, "The Sangha Centralization Act, passed in 1902 established uniform rules and practices for all monastics throughout Siam" (Tiyavanich, 2003: XVII). The *Sangha* disseminated these rules to temples located throughout the Kingdom. The "…diverse teachings and practices of monks and lay ascetics throughout the land were gradually replaced by a new, 'scientific education' system" (ibid). Many of these rural temples also served a secondary purpose as primary schools, as there were few formal schools outside of Bangkok. Temple schools taught religion, reading and writing. Professional and government officers attended schools in Bangkok (Panya, 1995).

This socio-cultural transformation directed by the Central government and to some extent carried out by the *Sangha* also altered religious practices. Institutional efforts were made to subsume cultural practices into a central ideology. In the Northeastern region rural people fell under the control of a central authority based in Ubon Ratchathani. The *Sangha* was instrumental in imposition of a new moral code

subscribed under Thai Buddhism. The associated cultural practices were called the *Heed Sipsong* (twelve customs) and the *Kong Sibsii* (14 rules of conduct). The purpose of the *Kong Sibsii* was to create a set of rules governing individual conduct[8]. In contrast, the *Heed Sipsong* consists of 12 rituals that were performed monthly, and correspond with the seasonal processes of rice cultivation (Pimsen, 2003). Panya (1995:163) summarized these rituals as follows: offering food to ancestors and guardians; receiving great sermons; showering festival; praying for rain; offering food and respect to house and community; Buddhist lent; offering food and making merit to ancestors; offering food and paying respect to paddy guardians; completion of lent; making grand merit; praying for forgiveness. While, the *Heed Sipsong* and *Kong Sibsii* became ingrained in local culture, Brahmin rituals continued to play an important role in the lives of many Northeastern people. While these new traditions were integrated into community life, it was the introduction of agricultural technology that altered the socio-economic fabric of rural life.

2.8.3 Twentieth Century Socio-Economic Changes on Smallholder Farmers

Seeking to make use of Post World War II weapons technology, American companies refashioned gun powder and nerve gas, into fertilizers and pesticides, respectively. Southeast Asia and in particular Thailand became a lucrative market for these companies. Smallholder farmers welcomed the opportunity to boost production levels through new strains of rapidly growing hybrid rice, synthetic fertilizers, pesticides, herbicides, and fungicides. To increase productivity, Thai farmers utilized funding from cooperatives, and governmental lending institutions to make the shift

---

[8] "The 14 rules of conduct: 1) When the new season crops are harvested they should be offered to a *bhikku* (monk), before they can eat them; 2) Do not be greedy; 3)Build fences around dwellings and spirit houses for deities in all directions 4) Wash one's feet before climbing up to enter the house; 5) Every holy day on the 7th-8th and 14th-15th of the waxing moon, pay respect to the cooking stoves, ladders, and house doors; 6) Wash one's feet before going to bed; 7) On holy days, the wife should bring flowers, incense and candles to pay respect to the husband and take these three things to the *sangha 8)* On special days, invite *bhikku* to the house and offer them food and gifts 9)When *bhikku* make their rounds for alms, do not make them wait for too long;10) When *bhikku* perform a pardoning session, offer them flowers, incense and candles as well as personal material necessities; 11) When meeting *bhikku*, sit down before making conversation; 12) Not to step on the shadows of *bhikku* and those who practice *sila* (Buddhist precepts); 13) Give spoiled food neither to *bhikku* nor to the husband; 14) Do not engage in sexual intercourse on the holy days, at Buddhist lent and on birthdays" (Panya, 1995: 168).

from subsistence farms to commodity-based monocultures (i.e. rice, cassava, maize, and sugar cane). Thai farmers moved from seasonal rice production to multiple cropping systems on small-scale landholdings (Falvey, 2000). Mechanical innovations, such as the *kway lhek* (or Iron Buffalo, a Kubota tractor widely used throughout rural Thailand) expanded the land areas which farmer households were able to cover on their own. Informal non-monetary labor exchange or *long khek* was replaced with wage labor. Farmers sold their rice to traders and mills in exchange for monetary compensation (Kiatsuphimol, 2002; Tanabe, 2004). Many rural folk migrated to Bangkok in search of paying jobs in the rapidly expanding industrial sector (Rigg, 1997). While others maintained rice farms in their home provinces and returned during the planting and harvest season (Funahasi, 1996).

Seeking to bring Thailand into the global economy, governmental agencies looked to agriculture as an opportunity to attract capital to the burgeoning manufacturing sector. To accommodate the development of these new technologies, the government initiated a series of supportive proclamations. Security of Land Title was critical to these new policies as it gave smallholder farmers collateral for loans that could be used to purchase agro-chemicals and machinery (Falvey, 2000; Panyakul & Wanlop, 2007). While, these policy changes allowed rural farmers access to modern factors of production, they inadvertently led to a rise in farmer debts.

2.8.3.1 The Thai Cooperatives Movement

To assist rural smallholder farmers with rising agricultural debts the Thai government set up a national cooperative system. Early cooperatives aimed to help farmers with indebtedness and to secure land ownership. The first of its kind in Thailand, the Wat Chan Cooperative Unlimited Liability was established in 1916 to provide credit to villagers in Phitsanulok Province. The structure of *Wat Chan* (Chan Temple) was used as a model for creation of latter cooperatives and led to the development of a formal cooperative system. While the cooperative movement flourished, the decision to set up a cooperative banking system was a critical juncture in Thailand's course of agro-economic development. As stated by Ratanamalai (1998: 26):

In 1966, the government-cum-credit cooperative-owned Bank for Cooperatives was reorganized into the "Bank for Agriculture and Agricultural Cooperatives", a state enterprise, functioning as a financing centre of agricultural cooperatives and lending directly to individual farmers as well.

While cooperatives were instrumental in providing access to credit, the role of these organizations evolved to include outside sales, purchasing of agricultural inputs and services such as land development and irrigation. Another benefit of agricultural cooperatives was to help smallholder farmers to negotiate selling prices with traders through their membership base. Cooperatives also extend discounts to farmers through bulk purchases of agricultural inputs and technological innovations (ibid).

Table 2.2 Quantities/values of sales of inputs and machinery by agricultural cooperatives, 1995

Type of goods	*Total sales*		*Sales to members*	
	Quantity	*Value (Million Baht)*	*Quantity*	*Value (Million Baht)*
Fertilizer ('000 kg)	517 903.38	2 271.72	326 688.93	1 837.15
Insecticides/pesticides	-	223.99	-	179.50
Machinery ('000)	27.10	1 024.02	21.89	828.34
Agricultural tools	-	383.65	-	361.65
Seeds	-	182.45	-	156.14
Rice ('000 kg)	34 749.14	263.43	20 238.13	189.67
Animal feeds	-	821.88	-	702.14
Petrol ('000 litre)	266 575.80	1 122.54	64 409.50	535.98
Others	-	762.64	-	646.46
Total	-	7 056.32	-	5 437.03

Source: Preedasak & NaRanong (1998)

Past research has shown that the majority of purchases (in terms of value) made from agricultural cooperatives were fertilizer, insecticides/pesticides, and machinery, respectively (Table 4.1). Based on these statistics, the growth of cooperatives has enabled more farmers to acquire resources that they would not have been able to afford on an individual basis. The Bank of Agriculture and Agricultural Cooperatives (BAAC) has become the main source of credit to farmer cooperatives. Despite the so-called benefits of improved access to credit, Preedasak and NaRanong's (1998)

research suggested that the BAAC has followed a strategy that is unsupportive to building long-term savings for members.

2.8.4 Smallholder Farmers: a Force for Economic Growth

As of 2007, 50% of Thais still worked in the agriculture. While some smallholder farmers cultivate a variety of cash crops, rice is the mainstay on most Thai farms. Rice continues to be a leading export, and a significant source of Thailand's agriculture earnings (National Statistics Office, 2011). Significantly, national rice production levels depend on smallholder farms with an, "average of 25.24 rai (equivalent to 4.04 hectare/family)" (Panyakul & Wanlop, 2007:1). It appears that decision-makers have ignored this data, as national agricultural policies have focused on capital intensive methods that are more suitable to large-scale farms. Some argue that small-scale farmers have suffered net losses access, while large landholders are the main benefactors of input-substitution strategies (ibid).

While the Thai government continues to focus financial resources on the industry, the role of small farms as a buffer in the 1997 economic crisis is largely forgotten. Many works show that agriculture served a critical role in reabsorbing Thai people into the labor force after the economic recession (Jitsanguan, 2001; Grandstaff *et al.*, 2008). Some researchers claim that the collective actions of farmer organizations in rural areas helped many people overcome the financial burdens of the crisis (Prayukvong, 2005). In spite of these findings, government policies have favored urban-based social and economic development; and credit schemes for smallholder farmers (Falvey, 2000).

Dependent on this system of credit, many Thai smallholder farmers have become locked into a cycle of debt. Rather than enact policies that support the sustainable use of local natural resources, government offices promote export-oriented agricultural strategies. Seeking to exploit the financial resources direct towards these programs, smallholder farmers have discarded the traditional agricultural practices of their forefathers (Panya, 2003). Few Thai researchers have investigated the impacts of promoting intensive agriculture methods on the long-term productivity of national agro-ecosystems.

2.8.5 Agro-Development as a Driver of Environmental Degradation

In the last few decades, Thai-based researchers have begun to examine the effects of agricultural development on Thailand's natural resources. The loss of forest cover is the most visible change, followed by the logging industry, and urbanization. Scientific innovations in cartography have been a useful means to exhibit the extent of deforestation in the region (Figure 2.3):

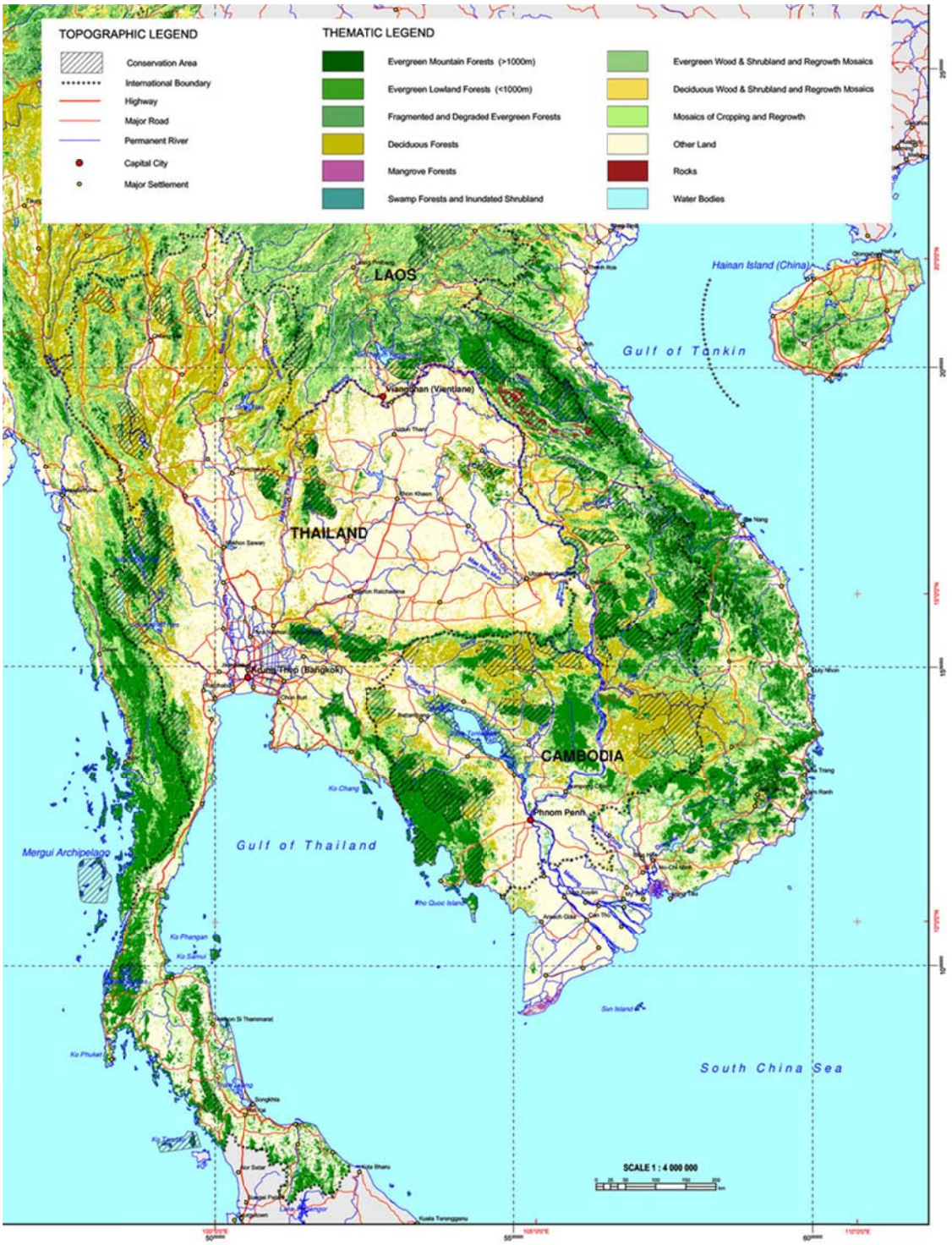


Figure 2.3: Forest Cover Map of Continental Southeast Asia

Source: Terrestrial Ecosystem Monitoring (2004)

The rapid expansion of agricultural land in Thailand has led to dramatic changes in the natural landscape. Forests have been cut-down to plant cassava, rice, rubber trees, oil palm and other cash crops. Of all the Southeast Asian nations, Thailand's economic activities have exacted the greatest toll on the natural environment. Experts estimate that less than 20% of natural forests remain as agricultural development has taken precedence over conservation efforts. Fortunately, the Thai government has acted on the problem of deforestation and interrelated threats to biodiversity by establishing forest reserves throughout the nation (Hardwick *et al.*, 2004). Nonetheless, illegal incursions into wildlife habitats continue to exacerbate the rate of biodiversity loss. Many species have gone extinct or are endangered as a result of present course of economic development (Trisurat *et al.*, 2010).

Reports on the state of deforestation in Thailand have begun to draw out the impacts of human actions on the provisioning services of the ecosystem. Land degradation in the form of soil erosion, salinity and acidity has reached critical levels in many parts of Thailand:

> Land extensive cultivation is a major cause of soil degradation…5.5 million rai of fields in the Central Plain suffers from soil acidity while around 17.81 million rai of farm lands in the North Eastern Region is affected by salinity. The Northern Region looses 4.3 million tons of top soil annually through soil erosion and the Southern region 1 million rai from soil acidity and salinity. (Office of Agricultural Economics as cited in Samerpak, 2006:22).

While some aspects of soil erosion are natural, intensive agriculture methods have taken a toll on soil quality. Thai farmers have increased inputs of synthetic fertilizers to compensate for decreased soil productivity. These effects are interrelated and as soil agro-ecology grows weaker, pest infestations have grown bigger. To combat these invasive species, many small-scale farmers have resorted to more frequent applications of pesticides. Not only has the misuse of pesticides contributed to environmental pollution, health problems have been reported, particularly among farmers. In some cases pesticide use has been linked to farmer deaths. In a joint study

under the direction of IPM-DANIDA (2004:3) the use of agro-chemicals were monitored among 606 farmers in six provinces across four regions and symptoms were reported as follows:

- 56% of the farmers had experienced moderate signs of pesticide poisoning.
- 1% of the farmers experienced severe symptoms of poisoning.
- Only 6% of the farmers reported no signs and symptoms of poisoning.
- Of the 187 farmers that had a blood test, 11% were found to have dangerous levels of cholinesterase inhibition[9].

The IPM-DANIDA (2004) study shows that failing farmer health merits a response. In addition, few studies have discussed the wider impacts of agro-chemicals on Thai consumer health through the contamination of aquatic ecosystems.

Government studies in the Central Region have begun to study the impacts of industrial activities on aquatic ecosystems. However, little is known about the role of agriculture in water pollution. Studies directed by Thailand's Pollution Control Department, under the Department of Natural Resources and Environment demonstrate the combined effects of urbanization, commercial industry, and agriculture (Boonsong, *et al.*, 2010). This governmental study also shows that organophosphates (from pesticides) were only a minor contributor (0.05%) to water pollution. However, this research concentrated on overall contaminants and not

[9] Overexposure to *organophosphate* and *carbamate* insecticides can result in *cholinesterase* inhibition. These pesticides combine with *acetylcholinesterase* at nerve endings in the brain and nervous system, and with other types of *cholinesterase* found in the blood. This allows acetylcholine to build up, while protective levels of the *cholinesterase* enzyme decrease. The more *cholinesterase* levels decrease, the more likely symptoms of poisoning from cholinesterase inhibiting pesticides are to show. Signs and symptoms of *cholinesterase* inhibition from exposure to CMs or OPs include the following:

a. In mild cases (within 4 - 24 hours of contact): tiredness, weakness, dizziness, nausea and blurred vision;
b. In moderate cases (within 4 - 24 hours of contact): headache, sweating, tearing, drooling, vomiting, tunnel vision, and twitching;
c. In severe cases (after continued daily absorption): abdominal cramps, urinating, diarrhea, muscular tremors, staggering gait, pinpoint pupils, hypotension (abnormally low blood pressure), slow heartbeat, breathing difficulty, and possibly death, if not promptly treated by a physician. (Extension Toxicology Network, 2011)

specifically on agriculture. While these studies show that Thailand is making progress on the scientific front, information is lacking on the impacts of agricultural inputs on farmers and consumers.

2.9 Alternative Agriculture as a Sustainable Development Strategy for Thailand

In the 1970s, governmental and non-governmental agencies started to realize the social, environmental and economic impacts of a shift to conventional agriculture systems. Smallholder farmers were facing rising agricultural debts and decreasing productivity as a result of excessive applications of commercial agro-chemicals (Jitsanguan, 2001; Panya, 2003). Social activists have put forth a new vision of rural development based in decentralized governance strategies with a focus on community self-determination (Sivaraksa, 1996). Some Thai scholars suggested a Buddhist-informed system of economic development; (Prayukvong, 2005; Sivaraksa, 1990b; Wasi, 1988). Agencies under the Thai government and Royal Patronage collaborated to develop approaches to "smallholder agricultural development" guided by the Sufficiency Economy Philosophy of His Majesty the King of Thailand (Chantalakhana & Falvey, 2008). Development strategies emphasized integrated farms with the aim of household food security. Alternative agriculture experts and agronomists responded with technical assistance on organic and sustainable farming methods (Samerpak, 2006; Od-ompanch *et al.*, 2009). In Bangkok, proponents and NGOs created the Alternative Agriculture Network (AAN) to support "a national forum of non-government organizations (NGOs), academics, and farmer leaders" (Samerpak, 2006: 27). A wide array of actors: agronomists, farmers, Buddhist monks, environmentalists, non-profit organizations, government agencies, and His Majesty King Bhumibol Adulyadej have begun to steer a course towards sustainable agricultural development.

2.9.1 Sufficiency Economy Philosophy

Since the 1950s, the work of His Majesty the King (HMK- Rama IX) Bhumibol Adulyadej of Thailand has focused on building the prosperity of rural

society through sustainable development strategies aimed at rural dwellers. Early Royal Projects (1946-1979) were designed to improve farmer livelihoods through "land development, water resource development, forest rehabilitation, and application of techniques in plant and animal production" (Senanarong, 2004: 8). HMK's experiences and knowledge gained from working with the Thai people were incorporated into a long-term sustainable development strategy, in what the King termed the Sufficiency Economy' (SE) philosophy: "The pillars on which the SE approach rests on moderation, reasonableness and self-immunity supported by knowledge and information consistent with morality" (Chantalakhana & Falvey, 2008: 2). To attain societal progress through sustainable development HMK proposed a new development path for the Thai people based on "moderation", "reasonableness", and "self-immunity" (National Economic and Social Development Board, 2006). Within the context of rural farmers, "moderation" refers to pursuing a livelihood that meets household food security and family needs. "Reasonableness" pertains to following an appropriate course of development and understanding financial constraints. To achieve self-immunity, farmers should maintain community-based social safety-nets and collectives to access attain the factors of production and to access the marketplace. However, to pursue a "Middle Path", farmers need to consider not only laws and regulations, but act morally and use knowledge with wisdom (Jitsanguan, 2012). Nonetheless, SE is not meant as a set of rules; the philosophy offers flexible guidelines for the Thai citizenry to be resilient and develop "immunity" from fluctuations in global financial markets. On a broader level, SE emphasizes development policies that consider 'social, economic and environmental' factors (Sathirathai & Piboolsravut, 2004).

According to Sathirathai and Piboolsravut (ibid), SE is part of a three-stage process aimed at building integrated farms, community-level integrity, and supportive regional networks. The first stage of this program is an experimental farm plot of approximately 9 hectares:

> This was divided into four zones: 30 percent for digging a pond to store 19,000 cubic metres of water for cultivation in the dry season and to raise fish; 30 percent for rice cultivation sufficient for year round home consumption; 30 percent for other crops and fruit; and 10 percent for housing, animal husbandry and other activities (ibid: 48).

This concept of integrated farming (at a ratio of 30/30/30/10) is commonly referred to in communications from HMK as “New Theory Agriculture” (Senanarong, 2004). The aim of which is to support household level food security and generate “self-immunity” through the use of low-input sustainable agriculture methods. However, this model is not a ‘one-size fits all’ approach; and is intended for modification depending on agro-development methods appropriate to the different bioregions in Thailand.

The United Nations Sufficiency Economy and Human Development in Thailand Report was one of the first international organizations to document projects carried out under the SE approach. This report highlighted the work of the Thai Impaeng Network (TIN) projects in 4 provinces and approximately 900 villages, “The network’s activities include agriculture, community enterprises, health care, environmental conservation and education” (Baker, 2007:58). The report cited several relevant examples of villagers practicing the first stage of NTA. One standout case illustrated how a Thai farmer, Serm Udomna recovered from a cycle of debt and dependence as a result of long-term cassava cultivation through conventional agriculture methods. Influenced by his relationship with TIN, Serm switched from growing cash crops to mixed cultivation practices, and helped to reforest the neighboring hillsides with indigenous trees. When biodiversity was returned to their forest, the village was provided with an additional source of medicine, timber, and firewood. Moreover, Serm had developed alternative and sustainable sources of food production to support his family and pay off his debts (ibid).

The second stage of SE is based on the development of resilient communities, with an emphasis on cooperation, sharing and strengthening social safety nets, “The activities usually start from community enterprises or co-op based production, including a rice bank, a cow/buffalo bank, and a biofertilizer production group” (Sathirathai & Piboolsravut, 2004:12). These community-based enterprises help to fill deficits in state-funded programs and contribute to a spirit of self-reliance.

The final stage of SE calls upon an integrated form of development whereby strengthened communities expand their network and assist surrounding communities. These community links are aided by regional government and non-profit organizations. In turn, regional networks support groups of farmers and villagers through the creation of national trading networks. As reported in the research

of Sathirathai and Piboolsravut, (ibid:18) Mairiang, a village in Nakhon Sri Thammarat, is exemplary of the final stage of SE, "This provincial network consists of three sub-networks of para-rubber farmers, fruit planters and rice growers". Mairiang villagers have built their capacity beyond a village level to link with consumers at a regional level. The work of Mairiang villagers has served as a model for the creation of a "Community Development Master Plan" adopted at a national government level (ibid).

2.9.2 Government-based Support for Sustainable Agriculture

From the 1990s, the Thai government began to incorporate sustainable agriculture initiatives into National Social and Economic Development Plans. In the Eighth Plan (1997-2001) the government initiated efforts to build up rural communities through sustainable agriculture programs (Samerpak, 2006; Thongtawee, 2006). The goal of the Eighth Plan was to develop sustainable agriculture activities on 20% of arable lands. The Ninth Development Plan led to a governmental initiative to support sustainable agriculture: integrated farming systems, organic farming, natural farming, agro-forestry and New Theory Agriculture. Jitsanguan's (2001:4) work further outlines these approaches:

- Integrated farm systems: use of limited farmland to increase range of farm activities. Multiple crops are cultivated, waste is recycled, and animals are raised to diversify source of income.
- Organic farming: use of organic matter as fertilizer, pests and weeds are controlled by cultural practices and herbal pest control methods. The objective is to improve water quality, and to develop the diversity and integrity of agro-ecosystems.
- Natural farming: the aim is to avoid external inputs to improve the ecological balance on the farm. No plowing, weeding, agro-chemicals or fertilizers are used to develop soil systems.
- Agro-forestry: cash crops and livestock are managed in forested areas. These systems enhance the development of forest resources and provide additional incomes to farmers. Soil fertility is increased, nutrients are added, topsoil and watersheds are protected.

- New Theory Agriculture: this system was designed by His Majesty the King to protect water resources, improve food security and self-sufficiency for poor farmers.

These initiatives were designated with an aim to bolster agricultural production through approaches that emphasize “household food security, the quality of life, environmental conservation and rural development” (ibid: 4). While government-funded sustainable agricultural plans helped to build-up the self-reliance of rural farmers, various agencies were attempting to increase farmer incomes through projects that targeted specialized markets (Od-ompanich *et al.*, 2007).

2.9.3 Development of Organic Agriculture Strategies

In 2005, the National Organic Agriculture Agenda was established with an aim to decrease agricultural chemicals, increase farmer income and expand organic food exports. This five-year program aimed to support more than four million farmers in a shift to organic farming methods and to boost organically-certified food products for export by 100% on an annual basis. Under the direction of the Land Development Department, various government agencies supported organic agriculture promotion through seminars, training, and setting up organic fertilizer factories (IFOAM, 2012).

To support this agenda, the Department of Agriculture set-up a voluntary organic certification program with an “Organic Thailand” labeling scheme. However, this government certification was not widely accepted, as most international companies sought after the organic certification system offered through IFOAM. In Thailand, the only firm to achieve this status was the Organic Agriculture Certification Thailand (ACT) which was accredited in 2001. Adding to customer distrust was a number of competing schemes launched by the Ministry of Agriculture and Cooperatives such as the “Hygienic food” label” and the latter “Food quality and safety” label. Meanwhile, a “Pesticide-safe vegetables” label was developed under the Ministry of Health (Roitner-Schoebsberger *et al.*, 2007).

Despite competing food standards, the organic sector has expanded steadily in the last few decades. However, few Thai farmers have discarded conventional agriculture methods. Environmentalists and food activists have increased

consumer demand by alerting civil society to both the environmental and health impacts of conventional agriculture (Allen, 2004). However, organic products are primarily destined for export as the number of Thais that can afford the cost is exceedingly low (Roitner-Schobesberger, *et al.*, 2007). Meanwhile, government agencies and the commercial enterprises continue to support the distribution of lower-priced conventional food products.

Despite some shortcomings, the organic agriculture movement has been an important source of income for a select group of Thai farmers. Local organizations associated with IFOAM and other international groups have created a new marketplace and provided training on the methods and requirements of the certification process. Moreover, partnerships with government agencies and NGOs have created a rural and urban based healthy food movement. The work of the Bangkok based Green Net Cooperative/Earth Net Foundation (GN) is said to have been a major player in the development of Thailand's organic agriculture movement. Studies have examined the role of organic agriculture in the socio-economic development of farmers that participated in GN programs. Researchers have shown some of the costs and benefits of a shift to organic rice cultivation with an emphasis on the role of extension organizations in their development (Boonman and Anpim, 2006). Samerpak (2006) reported that Green Net's collaboration with organic producers from the Nature Care Club led to a substantial increase in net profits[10]. To a lesser extent this study examined the social contributions of organic agriculture, in terms of health, absorption of family labor, educational benefits, and the empowerment of female farmers. Kiatsuphimol (2002) investigated the structure of Green Net with an aim to identify its strengths and weaknesses as a marketing organization for Northeastern organic farmers. Becchetti's (et. al, 2010) university-based research team concluded that despite a rise in per capita income, Yasothon's organic farmers experienced low levels of productivity due to high person-labor hours. Boonman and Anpim's (2006) study in Yasothon Province suggested that rural farmers would stand to benefit from organic rice production methods, only when used in combination with some agro-chemicals. Hutanawat and Hutanawat's (2000; 2003) research is of particular

[10] Based on data collected from organic farmers by Samerpak (2006) before and after a shift to organic agriculture there was an increase in net income of 53% in the first three years, 87% in four to six years, and 152% after seven years.

relevance to this study as it documented some of the drivers and outcomes of organic agriculture in Yasothon Province. This research suggested that the key factors in a shift to organic agriculture were "the adoption of a new vision, the ability to develop new knowledge, and the ability to depend on yourself" (ibid: 19). The underlying factors that influenced a shift in farmers' worldviews were identified as follows:

> 1) changing beliefs and way of thinking; 2) changing the way of production; 3) changing the way of life; 4) stand on your own; 5) learning how to use the knowledge; 6) eagerness to gain new knowledge; 7) ability to fix the problem; 8) ability to develop a sustainable farm; 9) support yourself; 10) working for yourself; 5) increasing income; 6) reducing debt and investment.

Hutanawat and Hutanawat (ibid) assert that "changing beliefs and ways of thinking" are a critical factor in making the shift to organic agriculture. However, these studies only touch upon the role of farmers' spiritual values as factor in sustaining and realizing the benefits of sustainable agriculture (Jitsanguan, 2001).

2.9.4 Buddhist Development Strategies

Social activists have called upon the Buddhist tradition to argue that the Thai people and in particular rural farmers have a predisposition to pro-environmental values (Falvey, 2000; Sivaraksa, 1990a; 1996). Researchers commonly cite the example of sacred trees ordained with a saffron cloth wrapped around them as an indicator of environmental stewardship (Rigg, 1997). Stories of powerful Buddhist monks acting as custodians of community forests have become part of Thai folklore. While, forest monks may elicit environmentally-friendly values, some researchers argue most lay persons and farmers have subscribed to the modern development paradigm (ibid). From a purely linguistic perspective, it is said that the vernacular of rural Thai rice farmers emanates a Buddhist worldview. For example, in rural areas, Thais more commonly use the word "*dhammachart*" (nature) that has its roots in Pali-Sanskrit and the Pali Canon, while Bangkok residents tend to employ the more modern term, *singwaedlom* (environment) introduced by the central Thai authorities (Panya &

Sirisai, 2003). However, few studies have explored the congruence between the use of a Buddhist vernacular and the environmental values of Thai farmers.

Many modern scholars have drawn on the Pali-canon to contend that the practice of Buddhism contributes to an eco-centric worldview; and Thai alternative agriculturists have invoked these teachings to argue their case. The First Precept[11]: "not to kill any living being" has been cited as a justification for the moral imperatives of alternative agriculture and for some Thai people as a basis for a vegetarian diet (Essen, 2002; Henning, 2002). Kabilsingh (2009) asserts that the teachings of the First Precept are not only about refraining from killing, but that practitioners should radiate *metta* or loving-kindness to all living creatures. Some experts have criticized these loose interpretations of the Buddhist scriptures, as the work of Western scholarship (Falvey, 2000; Rigg, 1997). Nevertheless, Panya and Sirisai (2003) found that the "religious values and beliefs" of some Thai rural folk contribute to a "collective eco-consciousness".

2.9.4.1 Buddhist Agriculture

Influenced by E.F. Schumacher, and the work of Thai farmers, Prawes Wasi put forth the concept of "*Buddha Kasetakam*" or Buddhist Agriculture (Puntasen, 2008). In the last few decades "Buddhist Agriculture" has been incorporated into the work of social activists, alternative agriculturalists, and monks throughout Thailand. Along these lines, Buddhadassa (former Abbot of the Suanmokkh Temple in Southern Thailand) preached the "AgriDharma", a form of agriculture based on the Buddhist scriptures:

> The Dharma in rice farming, with its dutiful ploughing in the hot sun behind a buffalo, is enjoyable and conducted with a felt smile. The early rice farmers knew such satisfaction because they felt their duty as their most important moral responsibility and action. The most important thing we can do is our duty. We call it 'farming' using the ordinary materials – natural

[11] "The concept of morality manifests itself in the five basic precepts underlying the rules for monastic life and for laypeople's conduct respectively: 1) not to kill any living being (often interpreted as 'not to harm'); 2) not to take what is not freely given by the owner (stealing), 3) not to indulge in sexual misconduct, 4) not to lie; and 5) not to consume intoxicants that lead to carelessness" (Henning 2002:37).

> resources – to produce the harvest, which when we commit our minds and spirits, is nirvana" (as cited in Falvey, 2002).

Buddhahassa makes reference to the natural environment and the venerable role of the Thai water buffalo, as key factors in rice production. To some extent, Buddhahassa also alludes to the reduced social status of farmers in Thailand's newly industrializing economy. He argues that through 'moral' work, the farmer has the potential to reach nirvana or "a state of absolute calm or enlightenment" (ibid: 11). In essence, Buddhahassa's "AgriDharma" aims to restore dignity to the profession of farming; and life in agrarian communities.

While Buddahassa set out to restore dignity to Thai farmers, Wasi (1988) aimed to transform rural society by reestablishing the value of a traditional way of life based on Buddhist principles. In what Wasi (1988:27) refers to as the "Five Pillars of Society" the teachings of the Dharma form the center of rural community life:

1) The spirit or mind which has Dharma (religious teaching) will always be diligent, harbor no fear of hardship, prefer a quiet life, have the least greed and avoid extravagant spending.
2) Production patterns for self-consumption. Villagers have to practice many things in 'integrated farming'. Basic needs will be adequately met and they will be in balance with the environment
3) A natural environmental balance is achieved through appropriate production patterns.
4) Economic self-reliance depends very much on production for self-consumption, a natural balance with the environment, and non-extravagant behavior.
5) Community and social life improves man becomes closer to the environment. Food is abundant and there is time to communicate and help each other. This helps foster social life, and encourages giving and taking.

Similar to HMK's Sufficiency Economy philosophy, Wasi also emphasized the importance of self-reliance and independence from the capitalist system (Puntasen, 2008). Although the "Five Pillars" reflects a somewhat romantic depiction of traditional Thai rural life, Wasi (1988) suggests the incorporation of the aforementioned principles into a development path that meets the goals and objectives of the local community.

2.9.4.2 Santi Asoke Group

While Prawes Wasi preached Buddhist Agriculture, the Santi Asoke Group was the first to establish an agricultural community that linked Buddhism and alternative forms of agriculture within a formal doctrine of practice. The Santi Asoke Group developed a new form of Buddhism as a response to the influence of societal pressures and global capitalism on Thai culture. This stringent form of Thai Buddhism preached, "...rejecting Buddha images, practicing strict morality (including vegetarianism...) and emphasizing everyday work as meditation" (Essen, 2005: 17). The Santi Asoke actualized their utopian Buddhist society with the construction of communes that produced and grew their own food. Notwithstanding, Asoke's fundamentalist interpretations of the Pali-canon, and a politically-active constituency have led to their infamy (McCargo, 1992; Satha-Anand, 1990).

Despite criticism from the Thai Sangha, the Asoke way of life is based on teachings from the Pali-canon: strong communal ties, well-being through abstinence from vices (no alcohol, cigarettes, illegal drugs, or sex out of wedlock), and hard work. Members strive to cultivate and process their own food without the use of agro-chemicals. Asoke makes a concerted effort to disseminate their way of life through public outreach and training programs. Through Asoke TV (part of the ASTV[12] cable network), they broadcast shows that cover Dharma teachings and instructions on self-sufficiency practices (e.g. how to grow mushrooms).

The spiritual leadership of Asoke and the teachings of Buddhism form the basis of their culture and food provisioning systems. Gaining a deep understanding of *dhammachart* or interconnectedness to the natural environment is part of being an Asoke member:

---

[12] ASTV is a media company that has shown support for the Thai Democratic Party in the last 10 years. ASTV also markets some products through a network of related groups, one of which is organic fertilizer.

> Asoke people try to construct and develop the environment to give rise to abundance and wholeness, in order to bring about thriving soil, sincerity, wooded shade, soft breezes, beautiful views, richness in goodwill, energy to work, joyfulness in Dharma (Than Din Thaam as cited in Essen, 2002:35).

For the Asoke, the natural environment forms the source of their livelihoods and sustenance. Asoke members enjoy nature's bounty, through the act of farming and food making. Central to the Asoke ideology is the control of their food system through a vegetarian diet. Farming methods follow the basic tenets of "natural agriculture" (espoused by Masanobu Fukuoka on his visit to Thailand in the 1970s) combined with key Buddhist teachings. Members manufacture their own organic fertilizers and herbal pesticides to sustain soil life and avoid causing harm to living creatures (ibid).

The Asoke are deeply religious and see the benefits of living in communion with the natural environment. Most members share small houses that lack many of the trappings of modern society. Few own cars, televisions or other modern amenities. Life in the commune offers an alternative lifestyle for those willing to dedicate themselves to strict religious practice and hard work. However, an education is highly valued. Many members possess secondary degrees from prestigious universities (in Thailand and abroad): engineers, technicians and professionals who have opted to depart from the air-conditioned sanctity of Bangkok. Asoke leaders report that their membership has expanded throughout the Kingdom (Nakhon Pathom, Nakhon Sawan, Nakhon Ratchasima, Srisaket, Ubon Ratchathani and Chiangmai Province). In 2009, the population was reported at 2000 individuals, mostly living in formal Asoke communities.

2.9.4.3 Khao Kwan Foundation

As the restrictive society imposed by Asoke membership is not suitable for many Thai s, organizations such as the Khao Kwan Foundation (KKF) have incorporated Buddhist environmental ethics into community-based organic farming programs. KKF also known as TREE (Technology for Rural and Ecological Enrichment Organization) has created a participatory technology development (PTD)

program through the development of organic forms of pest control, fertilizers, and new rice varieties. While these initiatives have attracted farmers, these programs have failed to bring some to adopt a long-term shift to organic farming (Thongtawee, 2006). To tackle this problem, KKF leadership initiated an internal paradigm shift with an aim to promote organic farming through a new strategy:

> Motivation creation: reduction in the cost of production
> 1) Learning process design through farmer field schools
> 2) Enabling farmers to 'critically think and become aware of the sufferings from mainstream agriculture'
> 3) Inspiration through conscience building on the respect for nature's spirituality, through the following ceremonies:
>   a. *Mae Thammachart* (Mother Nature)
>   b. *Mae Phosop* (Rice Mother)
>   c. *Mae Pra Toranee* (Mother Earth)
>   d. *Mae Pra Kongka* (River Mother)
>
> (Thongatwee, 2006: 116)

The first step (above) is similar to the work of many global extension programs, while the second and third steps are based on Thai Buddhist rituals. As part of the first step, participants learned to understand the Buddhist concept of *kharma* or "past sufferings". On a practical level, farmers were requested to undergo blood tests to examine agro-chemical toxicity levels based on premise that conventional agriculture contributed to various illnesses (Thongtawee, 2006). Notwithstanding, the Third Step is a non-traditional interpretation of the Thai Brahman ritual, with the introduction of an all encompassing Mother Nature to the traditional three deities (Sirisai, 1991). According to Thongtawee (2006), the introduction of a Mother Earth concept was aimed at inspiring the farmer to be more receptive to ecologically-friendly agriculture methods. Farmers also were said to have built valuable social capital through their relationship with KKF project leaders or what she referred to as *kalayanamita*[13]. Despite KKF's aims to change the perspectives of farmers through a shift to organic

[13] Pali-Sanskrit for good friendship; good company; association with the virtuous (Payutto 1998)

farming methods, Thongtawee (2006: 141) concluded that, “farmers have shifted at the technical level, rather than at the paradigm level.”

2.10 Summary

Despite scientific evidence that exhibits the impacts of industrial food production and conventional agriculture on food security, quality and human welfare, alternative agriculture forms an insignificant portion of the global food supply. An increase in pesticide-related illnesses, water contamination and a decrease in the nutritional value of food has demonstrated some of the failures of the modern food system to provide healthy food to society. Global interdisciplinary research initiated by the United Nations Environmental Programme shows the links between ecosystems services, sustainable food systems, human culture and well-being. International civil society groups have proposed alternatives to these conventional food production and distribution systems. Advocates have aimed to restore community food security in urban and rural areas through local and organic food production systems. Researchers have begun to support the aims of civil society with studies that show the benefits of a shift to alternative food production systems.

The case of alternative agriculture in Thailand suggests that organic food production systems have the potential to improve the quality of life in rural agrarian communities through economic development, resilient ecosystems, healthy food and improved well-being. Notwithstanding, a whole scale shift to local and organic food production presents a formidable challenge as alternative food networks clash with the aims of agro-industrial conglomerates, lobby groups and a system aimed at food exports over food security. Food has become a commodity item subject to the interests of those setting domestic and international food policies and trade agreements. It is argued here that food is more than a product; it is part of Thai people’s physiology, socio-cultural history, and a foundation for societal progress.

Despite, a plethora of research on local food systems only a handful of studies have uncovered the linkages between organic farmer groups and well-being through empirical research. In Thailand, most of the available literature on community-based organic food development has been carried out by advocates or

funding from project benefactors. There are few objective empirical studies that examine the intangible benefits of organic agriculture to communities of farmers. In subsequent chapters, this thesis makes the case for local and organic food production systems through a mixed methods study of communities of organic farmers in Yasothon Province, in the Northeastern Region of Thailand.

CHAPTER III
RESEARCH METHODOLOGY

This chapter evaluates the methodology, approaches, and tools that contributed to the construction of this thesis. The rationale for the use of a mixed methods design is presented within the context of key research objectives. Sampling procedures are explained in terms of the scope of this thesis. Discussion of the use of qualitative and quantitative methods shows how data was collected and analyzed throughout the research process.

3.1 Introduction

> We seem to have forgotten the original objective of this meticulous and compartmentalized search for knowledge was an understanding of the relationship which natural phenomena have on human life, both from a specialized perspective and from a holistic one (Payutto, 1999).

Despite advances in the natural sciences, researchers have failed to explain the complexities of human decision making around the natural environment (Rambo, 1983). Historically, natural scientists have examined, identified, measured and isolated elements of the abiotic and biotic environment to study their interactions through deductive methods (Capra, 1996; Goldsmith, 1996; Odum, 1970). On the other hand, social researchers have relied on inductive methods to explore human relationships with the natural environment. However, natural scientists and social researchers employ their five senses (i.e. sight, sound, smell, touch and taste) along with technology (i.e. microscopes, laboratories, computers, cameras) to record and interpret their observations in the field. That is to say, all researchers use deductive and inductive methods to make sense of the world around them.

This thesis employed both deductive and inductive methods to examine changes in participants' perceptions of their natural environment and well-being through a shift to organic farming systems. The indicators of well-being shown in this research were drawn from participants' key concerns and defined in terms of their subjective well-being (Rojas, 2007). The methods selected were those suited to objectively evaluate participants' interactions with the world around them (Capra, 1996; Goldsmith, 1996). However, the methods used herein were not without cultural or scientific bias, as all research is to some extent influenced by a researcher's "mental model", that is to say our beliefs and values influence the way we interpret, record and document knowledge (Kempton, et al., 1997).

In this thesis, a mixed methods design was selected to capture the strengths and diminishes the weaknesses of qualitative and quantitative methods (Cresswell, 1998; 2003; Cresswell & Plano, 2007; Onwuegbuzie & Collins, 2007). Initial phases of this research relied on qualitative methods based in Grounded Theory (GT) to draw out emerging areas of concern and to develop structured instruments (Glaser, 1978; Harrison, 2012). Latter phases of data collection were influenced by the work of researchers that have examined environmental awareness and connectedness to nature through structured questionnaires (Kempton, *et al.*, 1997; Weinstein *et al.*, 2009). Data gathering methods were divided into three sequential overlapping phases of inquiry with the aim to address key research objectives (Table 3.1):

Table 3.1: Research Methodology

Epistemology[1]	**Research Questions**	**Research Objectives**
Ontology/Conceptual Development: Ecological Worldview; Actor Network Theory (Callon, 1987; Latour, 2005; Goldsmith, 1996)		
Strategy of Inquiry: Sequential Exploratory Design (Cresswell, 1998; Harrison, 2012)		
Procedures for Data Collection: Phase 1: Topical interviews with key informants. Phase 2: Semi-structured interviews Constructivist Grounded Theory, Qualitative Analysis (Charmaz, 2006; Glaser, 1978).	I. In what ways does Thailand's alternative agriculture network support the development of communities of organic farmers? II. How does a shift to organic agriculture contribute to well-being in communities of farmers?	I. To investigate how Thailand's alternative agriculture network supports the development of communities of organic farmers. II.To critically evaluate whether a shift to organic agriculture leads to changes in farmers' way of life and influences their well-being.
Phase 3: Structured Interviews, Multiple choice questions, Likert scale (Cresswell 2003; Kempton *et al.* 1996) Triangulation (Olsen, 2004a; 2004b; Gilbert, 2001).	III. Which socio-ecological factors contribute to the well-being and resilience of communities of organic farmers?	III.To identify and measure the socio-ecological factors that contribute to the well-being and resilience of communities of organic farmers.
Data Analysis: GT (Glaser, 1978), Descriptive statistics, Crosstabulations with Chi-Square analysis, Correlations with Spearman's Rank statistic (Elliot & Woodward, 2007)		

Research Objective #1 and Research Objective#2 were addressed through exploratory interviews with key informants, and organic farmers (Phase 1; Phase 2). Research Objective#3 employed the use of a structured research design (Phase 3). Analysis of data was conducted throughout the course of this study drawing on qualitative and

[1] The theory of knowledge, which is what philosophy, divorced from metaphysics, is largely about. Because today, only scientific knowledge is regarded as valid, epistemology is difficult to distinguish from the philosophy of science (Goldsmith, 1996: 478).

quantitative methods. "Theoretical coding" was used to analyze data from the qualitative research phases; and assisted in the development of structured instruments (Charmaz, 2006; Glaser, 1978; Onwuegbuzie & Collins, 2007). Results from structured instruments were examined with descriptive statistics. Next, results were transformed (recoded) for correlational analysis using Spearman's rank statistics and crosstabulations using Chi-square statistics to show the relationships between key variables (Easterby-Smith, 2008; Elliot & Woodward, 2007). The use of a "multi-layered analytic approach" contributed to the development of the research design and the breadth and depth of findings (Harrison, 2012).

3.2 Strategy of Inquiry

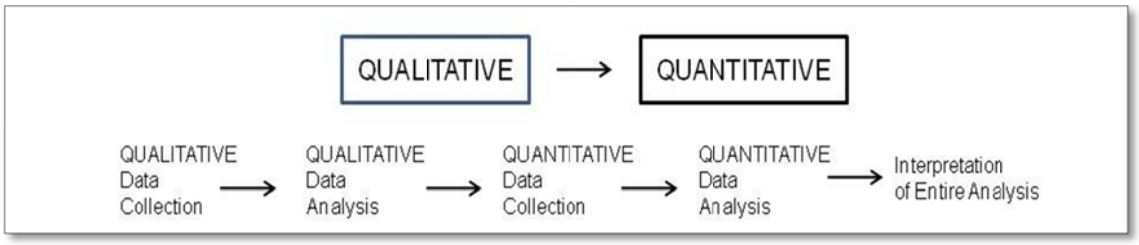


Figure 3.1: Sequential Exploratory Design
Source: Cresswell (2003)

As this thesis aimed to examine the beliefs and values of participants or what are "worldviews", it was important to select an appropriate and credible research design. Mixed methods were decided upon to explore emerging constructs; and to develop further insight into phenomena with quantitative methods (Cresswell & Plano, 2007; Modell, 2009). Although there are diverse mixed methods approaches, a "sequential exploratory design" was elected as it draws upon the advantages of both qualitative and quantitative methods (Figure 3.1, above). In contrast to some mixed methods approaches, sequential exploratory designs stress the use of qualitative components for the purpose of theory development; and to inform the construction of structured instruments (Harrison, 2012). The rationale for use of an exploratory design was based on the research topic, key objectives, and the target audience (Table 3.2):

Table 3.2: Rationale for Exploratory Mixed Methods Design

Rationale	Description
Credibility	Enhances integrity of findings
Development	Qualitative used for theory development and to generate structured questions
Complementarity/Triangulation	Combining methods offsets weaknesses and draws on strengths of both
Utility	Appeals to a wide audience
Sample	Qualitative helps in selection of sample

Source: Adapted from Modell (2009), Harrison (2012), and Onwuegbuzie & Collins (2007)

As characteristic of "exploratory sequential design" this research started with a qualitative phase. Grounded Theory was selected to enable the development of a "formal theory" through in depth interview techniques (Glaser, 1978). Actor Network Theory (ANT) was employed as a tool for conceptual development (Callon, 1987; Latour, 2005). Based on analyses, a structured instrument was constructed to further investigate this "formal theory". Data collected through qualitative analysis, descriptive, and inferential statistics served to 'complement and triangulate' results (Harrison, 2012). Integration of the entire analysis was an iterative process that addressed key research objectives from multiple perspectives.

3.2.1 Grounded Theory as a Qualitative Approach

> What are grounded theory methods? Stated simply, grounded theory methods consist of systematic, yet flexible guidelines for collecting and analyzing qualitative data to construct theories "grounded" in the data themselves (Charmaz, 2003: 1)

To develop the qualitative phase of this thesis, approaches were borrowed from Grounded Theory as its structure is reported to be suitable for exploratory studies (Charmaz, 2003; Glaser, 1978; Yuen-Tsang, 2001). That is to say, in Grounded Theory, a deductive theoretical framework is not firmly established prior to conducting fieldwork. More importantly, data is not forced to fit into boxes or set categories (Holton, 2008; Guthrie & Lowe, 1999). Each subsequent phase is guided by analysis

of data, rather than a preconceived hypothesis. GT approaches encourage, "developing theories from research grounded in data rather than deducing testable hypotheses from existing theories" (Charmaz, 2003:7). Grounded Theory development is an eventual process that depends on the researchers' ability to carry out an extensive analytical process of coding, categorizing and comparing strands of data. As Glaser (1978: 4) states, "for the theory to work, its categories must fit, to be sure, but it must "work" the core of what is going on; it must be relevant to the action of the area." More simply put, as GT researchers cannot presume areas of significance, key categories and concepts must be explored until no new data is uncovered. New theories come to the researcher at various phases of data collection and it is important to stop and analyze this data more thoroughly before conducting further research. No data should be disregarded in GT studies as it may be considered relevant after further analysis. Moreover, data that first appears to be insignificant may be reexamined and exhibit relevance to an emerging "substantive theory" (ibid).

Despite the exploratory premise of Grounded Theory, this thesis aimed to answer a set of predetermined questions (*Research Questions #1 and #2*) as follows:

1) In what ways do Thailand's alternative agriculture networks support the development of communities of organic farmers?

2) How does a shift to organic agriculture change farmers' way of life and contribute to their well-being?

However, as suggested by Holton (2008) related interview questions were loosely structured in an effort to capture all data. And interview questions were altered based on emerging typologies and theories based in the data gathered from participants. The aim was to examine what was really occurring in the field rather than what was conceived of significance through prior study. Incoming data was analyzed for "substantive theories" or "typologies" during the course of field visits, between interviews, and upon returning home from the field (Glaser, 1978). As common to GT research, data was collected through a variety of methods (i.e. observations, semi-structured, structured interviews).

3.2.2 Development of Quantitative Methods

Quantitative methods were used in the last phase of this research as part of a mixed methods approach. That is to say, findings derived from the use of Grounded Theory (*Research Question #1 and #2*), were used to develop a structured instrument with relevance to the key concerns of organic farmers. Structured questions were aimed at clarifying qualitative data and answering *Research Question #3*:

> Which socio-ecological factors contribute to; and bear upon the well-being of communities of organic farmers?

Structured methods were used to ascertain demographic data on organic farmers and to show the ways they worked to sustain their farms. A 'farmer survey' was modeled after Boonman and Anpim's (2003) investigation of organic farmers' communities in Yasothon Province. This research also borrowed from Van Keer's (*et al.*, 1998) work with highland farmers in Northern Thailand to uncover soil quality indicators through participatory approaches. The overall design and structure of questions were based on a review of Cresswell (2003), Hughes and Sharrock (2007), Neuman (2006) and Spector (1994). A combination of rating scales, multiple choice and closed-ended questions were used to compile diverse measures of participants' values and actions around the natural environment.

However, it was also important to consider the complexities of cultural influences upon human perspectives of the natural environment in the research design (Millenium Ecosystems Assessment, 2005). For this purpose, studies were reviewed that had examined environmental ethics through both qualitative and quantitative methods. Beus and Dunlap's (1991) research on conflicting agricultural paradigms provided a conceptual framework for this thesis. While, Kempton's (et al., 1996) study of environmental values through a mixed methods approach helped to inform the research design. However, quantitative instruments were modeled after studies that examined 'embeddedness' in nature as a contributing factor to environmental awareness through inferential statistical models (Dunlap & Van Liere, 1978). One such study the "new environmental paradigm" (NEP) scale measured individuals' "beliefs concerning their relationship to the natural world" (Mayer & Frantz, 2004:505). A later

version of NEP, the "connectedness to nature" (CNS) index claimed human perceptions of the environment were altered by the length of time spent in 'untouched nature' (Vining et al., 2008). Through methods largely influenced by NEP and CNS, Weinstein (*et al.*, 2009: 1317), "examined effects of nature and immersion on intrinsic and extrinsic aspirations by exposing participants to images of either natural or human-made environments, and using an imagery script designed to enhance the experience." While Mayer and Frantz's (2004) and Weinstein's (*et al.*, 2009) approaches were innovative, their use of a laboratory study would not have been easily transferable to the rural agrarian areas examined in this thesis.

3.3 Conceptualizing the Area of Study

Mixed methods were used to examine the premise that the environment where people live and work bears upon their values, beliefs, social relations, communities, and well-being (Castree, 2005; Kempton *et al.*, 1997; Millenium Ecosystems Assessment, 2005; Murdoch, 1994).. These socio-ecological factors influence what are peoples' 'worldviews' and serve as a roadmap for them to negotiate their way through life (Capra, 2002; Curry, 2000). On the other hand, as human societies move into proximity with urban areas, it is more common for people to interpret the world around them through formal or "explicit knowledge" (Franklin, 2002; Goldsmith, 1996). Knowledge acts as a "filter" through which people perceive their natural environment (Figure 3.2):

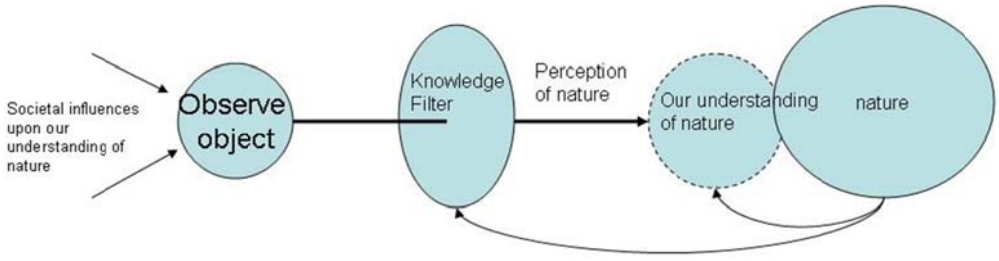


Figure 3.2: Constructions of Nature

Source: Castree (2005)

Knowledge also is acquired through lived experience, what researchers often term "tacit or local knowledge" (Murdoch, 1994; Tanabe, 1994). While some scholars suggest that forest dwellers lived in harmony with nature through local knowledge, others argue that "local knowledge" was only a convention for survival (Agarwal & Gibson, 1999; Diamond, 2007; Rambo, 1987). As most of humankind has relocated itself within the confines of "built-environments", the study of interactions with nature presents a formidable challenge to researchers (Franklin, 2002). Hence, the question arises as to what 'nature' means to people that live in cities? Do rural farmers express more pro-environmental values than city dwellers?

3.4 Community as a Unit of Study

This thesis aimed to explore the benefits of participation in alternative food networks to 'communities of organic farmers'. To carry out this objective, the ways participants accessed the factors of production, related to their natural environment (through organic farming methods), and each other were examined within the context of their organizational affiliations. The collectives, farms and villages of participants provided the physical setting for this research. Notwithstanding, "community" was conceptualized from a social, physical and geographical perspective (Brint, 2001). The villages in this study were selected both for their attributes (e.g. high density of organic farmers) and because of their location within an administrative boundary. In some cases organic farmers formed a 'community' by virtue of their physical proximity to each other; and residence in the same village. In other cases, organic farmers lived in different villages, but came together at a central location (i.e. rice mill, temple, or fertilizer collective). Based on these factors, the term 'community' in this study refers to groups of people connected to each other through interpersonal relations, as characteristic of a "social network" (Capra, 2002). The concept of "community" in this thesis also draws upon specific socio-cultural variables that bring people together:

1) Dense and demanding social ties
2) Social attachment

3) Common rituals, ceremonies or religious beliefs
4) Small groups that exhibit familiarity through physical interactions
5) A similar way of life (Brint, 2001:3)

While these socio-cultural variables are also traits of 'virtual communities' as on the internet, the communities in this research were inhabited by people that interacted on a physical level through social ties, religion practices and work activities. However, they also operated as individuals, members of a family, and as residents of a village. Based on the aforementioned concept of 'community', this thesis examines the lives of organic farmers within the context of their interpersonal relationships, physical locations, and membership in the Thai Alternative Agriculture Network.

3.5 Research Setting

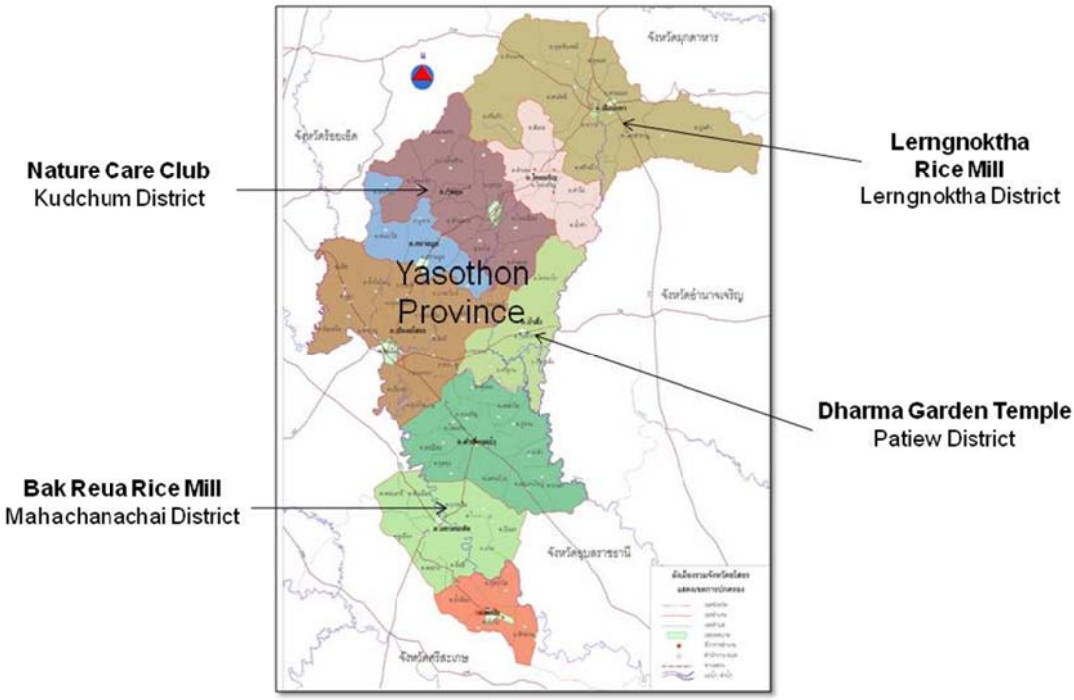


Figure 3.3: Map of Yasothon Province with Key Study Sites
Source: National Statistics Office (2011)

The communities of study in this research were located in Yasothon Province, one of 18 provinces situated in the Northeastern Region of Thailand (Figure 3.3). The Thai people in this region have a distinctive culture and language which are termed *Issan*. As typical of the region, most of Yasothon's population is employed in agricultural work. Farmers cultivate a variety of products, but rice is the principal crop. Farmers typically grow *homali* (jasmine) rice for sale and cultivate glutinous varieties for home consumption. Farmers are dependent upon the machinery available at the rice mill to bring their product to market, but not all small villages have a mill. Yasothon's farmers also engage in the cultivation of cash crops, vegetables, fruit trees, peanuts, and soy beans. However, crop selection and production strategies depend on available capital, access to irrigation and soil quality (Boonman & Anpim, 2006). While the majority of farmers in the region employ what are conventional agriculture methods, this thesis focused on the small percentage of organic farmers that lived in villages throughout Yasothon Province (see Chapter 4 for a detailed discussion of the geographical and socio-economic characteristics of the region).

3.6 Rationale for Sampling Methods

The methods used for sampling were those suggested for use in sequential mixed methods design. To determine the sample size, this research drew upon guidelines set out by Onwuegbuzie and Collins (2007). The sampling methods used reflected a "parallel relationship", that is to say, "the samples for the qualitative and quantitative components of the research are different but are drawn from the same population of interest" (ibid: 293). One key advantage of a "parallel relationship" is that results from qualitative methods can be used to develop the quantitative format of the research. While Olsen (2004b: 213) argues that mixed methods offer triangulation through validation of claims and strengthening of data sets. On the other hand, Onwuegbuzie and Collins (2007) caution that triangulation is negligible in sequential designs as a preliminary qualitative phase may lead to bias in the quantitative phase. While, Glaser (1978) contends that multiple interview rounds with the same informants are critical to theory development.

3.6.1 Site Selection Rationale

To find a suitable population of study for this research, the researcher conducted a series of site surveys to investigate the ways organic farmers worked; and the activities of organizations linked to the Thai Alternative Agriculture Network. Two organizations namely, the Green Net/Earth Net Foundation and the Agri-nature Foundation were selected to provide background information and to help guide the site selection process (Phase 1). Representatives of these organizations also were requested to discuss their organizational objectives and spheres of influence in a formal interview (Appendix A). Site surveys included a three-day residential stay at the Dharma Garden Temple (Yasothon Province), participation in two training programs offered by the Agri-nature Foundation Training Center (Chachoengsao and Phuket) and visits to Santi Asoke[2] communities (Ubon Ratchathani-Ratchathani Asoke and the Sufficiency Economy Village at Ubon Rathathani University).

Based on the recent activities of organic farming support organizations, the socio-economic and environmental challenges in Yasothon Province (see Chapter 4), and a lack of published data on these communities, I decided to conduct exploratory research in four districts: Kudchum, Mahachanachai, Lerngnoktha, and Patiew District. To delineate the population of study, a set of criteria was delineated that fit with key research objectives:

1) Member of an organic farming training center in Yasothon Province affiliated with Green Net/Earth Net or the Agri-nature Foundation.
2) In the process or already certified as an organic farmers under ACT.
3) Villages selected should contain a formal group or collective with organic farmer members.
4) Semi-structured interviews; reside or operate a farm in Yasothon Province: Kudchum, Mahachanachai, Lerngnoktha, and Patiew.
5) Structured interviews; reside or operate a farm in Yasothon Province: Kudchum, Mahachanachai, or Patiew District.

[2] After several visits to the Santi Asoke eco-villages and a review of their literature it was found that the commonality of members' viewpoints, and isolation from Thai mainstream society would make their activities difficult to compare with other farmer groups or communities. However, as the Asoke Group has been a significant player in Thailand's alternative agriculture movement their work is discussed throughout this research.

However, the use of detailed criteria was challenging as some farmers had several residences, lived with different family members or belonged to a center outside of their place of residence. In other cases, an informant was not physically located in the district, but lived only a short distance away. Some farmers owned farm land in other districts. In these special cases, allowances were given to include these participants in the study. In the case of Lerngnoktha District, participants were located at a very low density (50 to 100 kilometers apart from each other). While individual interviews with Lerngnoktha farmers offered data included in qualitative results, it was decided to omit this location from the structured interviews based on the sporadic location of farmers, and the difficulty of examining their social relationships.

In the final stage (Phase 3) of this research, previous and new participants were interviewed with a set of structured questions based on the results of exploratory interviews (Phase 1 and 2). The aim was to attain an even sample of organic farmers from three political districts: Kudchum, Patiew and Mahachanachai. Farmers came from many different villages. Participants for qualitative and quantitative phases of this thesis came from the following villages in these districts:

Table 3.3: Major Districts and Villages of Participants

District	Kudchum (29 participants)	Mahachanachai (23 participants)	Patiew (23 participants)
Collective Organization	Nature Care Club Rice Mill/ Nong Yor Rice Mill	Bak Reua Rice Mill	Dharma Garden Temple (temple/rice mill)
Villages of members	Sokhunpoom Kammed Nong Muangklang Nong Yor*	Dong Yang Dong Pung Tung Mon Dong Can	Baan Sae Baan Pai Chiang Peng Nong Ped Nonekok Kamklang Tubtao Tao Krajai Tao Hai

*The participants at Nong Yor Rice Mill were affiliated with the Dharma Garden Temple.

However, prior to the quantitative research component it was found that most of the organic farmer households (85%) from Don Pung Village had discontinued their membership from the organic farming group. Based on the fluctuation of membership

from Don Pung, additional participants were taken from Kudchum and Patiew District. Members of the Bak Reua Rice Mill were mostly resident of neighboring Dong Yang Village.

3.6.2 Sampling Procedures

In Phase 1, the key objective was to ascertain the location of villages with a relatively high number of organic farmers. For this purpose, organizational informants were recruited based on their knowledge of organic agriculture programs in Thailand. These key informants directed the researcher to several villages that fell within the administrative boundaries of Kudchum, Mahachanachai, Lerngnoktha, and Patiew District. While Easterby-Smith (2008) recommends the use of a "systematic random sample", a procedure that calls for access to a sampling frame, there were few up-to-date lists or a computer database of Thai organic farmers. Key informants provided telephone numbers of their organizational contacts or representatives in the population of study (Yasothon Province). As organizational representatives were busy with their respective duties, they were not available to guide the researcher. Based on time constraints and the logistical challenges of finding organic farmers in unfamiliar rural villages, it was decided to enlist organic and conventional farmers[3] to locate participants, in what Semaan (*et al.*, 2002) refers to as a "chain referral sample".

To ascertain the sample size, the procedures in this thesis were drawn from criteria outlined in mixed methods research designs (Cresswell, 1998, Harrison, 2012). Onwuegbuzie and Collins (2007) contend there are different sample size criteria for qualitative and quantitative approaches. While there are dissenting opinions on 'fixing' a number of samples in qualitative traditions, quantitative researchers have more clearly defined methods of designating a sample size (Mason, 2010). For example, Cresswell (1998) suggests a minimum sample for "saturation" through Grounded Theory method at 20-30 individuals. On the other hand, Glaser (1978) defines the adequacy of a Grounded Theory 'sample' in terms of "theoretical saturation", and does

[3] Preliminary interviews included five conventional (or agro-chemical supported) farmers, who resided in nearby locations. Conventional farmers appeared confused by questions about organic agriculture and mainly provided responses that justified their use of conventional agriculture methods. It was decided that although the work of conventional farmers merited further study, their work did not fit with the core objectives of this research.

not discuss sample sizes. Along similar lines, this thesis applied the concept of "theoretical saturation" to ascertain the adequacy of 50 in-depth interviews. To complement the Grounded Theory phases of this thesis, an additional group of individuals were selected to participate in a round of structured interviews (Phase 3).

Despite the existence of more clearly defined procedures for quantitative research, there is some debate over the effect of sample size alone on conclusion validity. Some researchers suggest that conclusion validity is both a factor of the sample size and statistical significance (Onwuegbuzie & Leech, 2004). Proponents of this convention, advocate that a power coefficient of .80 and a level of significance at .05 is sufficient to demonstrate conclusion validity (Cohen, 1988). Onwuegbuzie and Collins (2007) draw on Cohen's (1988) criteria to set quantitative sample sizes for use in mixed methods studies, with a suggested minimum of 82 participants for (two-tailed) correlations. These studies used G*Power 3 computer software to calculate power samples, "a general stand-alone power analysis program for statistical tests commonly used in the social, behavioral and biomedical sciences" (Faul *et al.*, 2007: 175).

To test for conclusion validity in this thesis, G*Power 3, was used to conduct a power analysis of the quantitative sample (75 participants). Power analysis through G*Power 3 showed a coefficient of .75 with a level of significance set at $p \leq .05$. While this "power coefficient" falls slightly short of .80, Spearman's rank correlations showed significance levels $p \leq .01$ for many of the variable tested in this research. Moreover, the main objective of the quantitative component was to clarify and complement qualitative data, rather than make generalizations from the sample. Furthermore, this study aimed at "methodological triangulation" of data sets (Olsen, 2004a; 2004b). That is to say, 32% of informants participated in the qualitative (Phase 2) and quantitative (Phase 3) stages of this thesis.

3.7 Data Analysis

This thesis drew upon mixed methods to provide a comprehensive analysis of data and provide breadth and depth to conclusions. While this study focused on a qualitative approach, data collection was sequential and quantitative data helped to clarify and complement final conclusions. Qualitative analysis was useful in that it

helped to make sense of fluctuations in numerical data and results that were not easily explained through statistical analysis. Quantitative analysis also provided the researcher with a different perspective on the qualitative analysis. The methods used to collect and analyze data throughout the course of this thesis were those deemed most suitable to a mixed methods research design.

3.7.1 Data Collection Methods

Data was recorded in memo format (without video or tape recorders) as it was important that the respondents felt unburdened and open to answer questions freely. The language of interviews depended upon the ability of the participants in the Thai language or *Issan* (Northeastern) dialect. Although, an effort was made to guide informants through interviews, some more senior individuals led the discussion and did not respond directly to all questions. Formats for interviews included the use of random unstructured and semi-structured questions. Flexibility with the choice of questions, and type of interviews were important as it was necessary to change settings (i.e. homes, farms, rice fields, rice mills, over meals) based on the tasks that required the immediate attention of participants. Hence, not all questions were covered in each interview. And in collaboration, with a Thai co-researcher[4], qualitative interview questions were modified, added and deleted on-site to probe emerging areas of concern. As a proficient, but non-native Thai speaker, the researcher concentrated on listening to the flow of the conversation, bringing discussions back to the main topics, taking notes, and restructuring questions deemed relevant to the study.

3.7.2 Data Recording

During organizational and semi-structured interviews a natural approach was emphasized, that is tape recording was not used as it is said to inhibit some participants from freedom of expression (Glaser, 1978). Moreover after multiple visits, a close relationship was developed with participants, and they spoke candidly on a range of topics. The co-researcher took notes in Thai and helped to translate interview data. Hence, qualitative data was collected in two sets of notebooks (English and Thai). For use with structured instruments in Phase 3, several response sheets were

[4] The Thai co-researcher spoke the local language Issan, as well as Thai and English.

designed to record data in numerical format, but space was allocated for data that fell outside the scope of close-ended questions. Despite efforts to translate all data directly into English, some terminology is presented in Thai with roman characters (accompanied by a translation in English) as literal translations failed to capture the exact meaning.

3.7.3 Theoretical Coding

After the translation of interview transcripts, the researcher initiated the process of coding, categorizing and analyzing data as outlined in the literature of constructivist Grounded Theory approach (Mills & Bonner, 2006). "Coding means that we attach labels to segments of data that depict what each segment is about" (Charmaz, 2003: 5). Transcripts and notes were used to develop an initial set of codes and to search for potential "typologies". Through this exercise a set of key "indicators" were generated and related to a set of "higher level concepts" (Glaser, 1978). The subsequent phase of queries was designed to focus further attention on these "higher level concepts" and evaluate their relevance to participants.

After 30 interviews, a point of "theoretical saturation" was reached, that is, responses to questions (Appendix B) had become repetitive and yielded no new information. In GT theory, the number of participants is only sufficient when a saturation point has been reached. Based on the researchers' inferences, the first saturation point was encountered at approximately 30 interviews, as responses became repetitive and yielded no new information. At this point, the researcher initiated the process of assigning relevant codes to repetitive and interrelated subjects. This exercise led to the consolidation of codes into categories that reflected the key concerns of participants. Six month later another 20 individuals were interviewed with a revised set of questions (Appendix C) designed to probe key concepts (Figure 3.4):

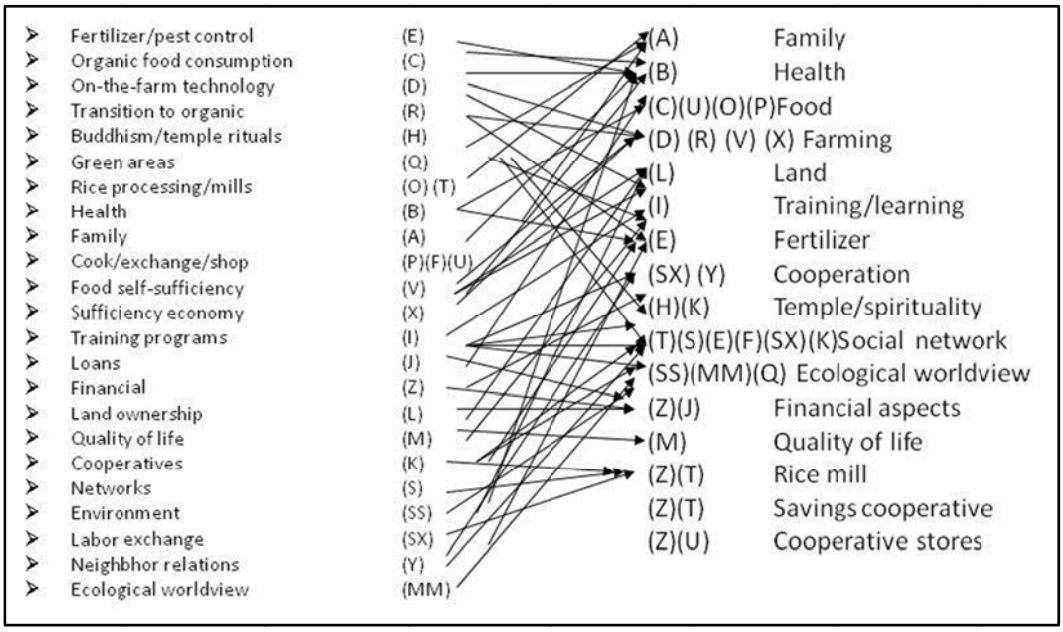


Figure 3.4: Consolidation of Codes into Concepts

As prescribed by GT, attempts were made to conduct repeat interviews with participants (ibid). However, as many of the 'old' participants were unavailable, new individuals also were recruited for interviews. After 15 to 20 interviews, a second saturation point was reached. Both sets of interview data and observations of work activities were re-coded and analyzed. Analysis of this data showed a high frequency of relationships between theoretical codes and the "act of fertilizer making' (Figure 3.5):

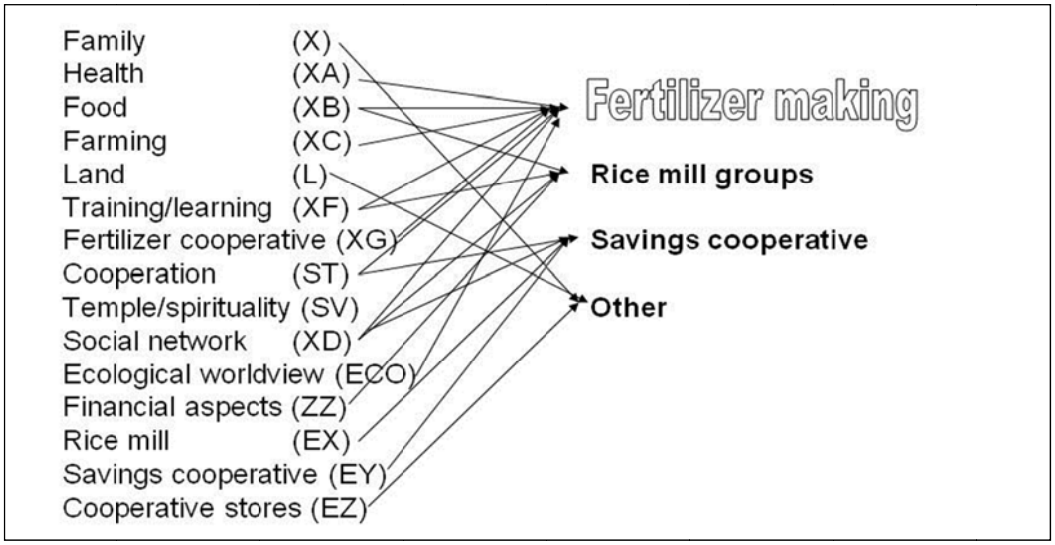


Figure 3.5: Theory Development

Further analysis of the relationships between key concepts exhibited the ways that organic fertilizer making contributed to better health, safe food, cooperation, social networks, a reduction in input costs, and an environmental ethic. Based on this analysis, it was concluded that the "act of fertilizer making" served as cornerstone in the social processes of participants, similar to what Glaser (1978) refers to as a "substantive theory". While GT enabled the development of this "substantive theory", the research design in this thesis called for the use of quantitative method to generate a "formal theory". However, an approach was needed to breakdown this "substantive theory" into a study design for use with quantitative methods. Based on the adaptability of Actor Network Theory (ANT) to research about sustainable food systems (see Chapter 2), ANT was employed to investigate the key agents of fertilizer making in communities of organic farmers (Callon, 1986; Goodman, 1999; 2004, Murdoch, 1997a; 1997b; 2000; Morgan *et al.*, 2008).

3.7.4 Conceptual Development through Actor Network Theory (ANT)

To conceptualize 'fertilizer making' as an actor network, the production process was divided into key tasks, the natural resources, and machinery required to complete these activities. The principal stages in making fertilizers (Appendix D) were analyzed with an aim to draw out the 'factors of production' and the key actors. Subsequent approaches were borrowed from Callon's (1986) study of the cultivation of scallops at St. Brieuc's Bay (see Appendix E). A diagram was developed to show the socio-ecological relations embedded in the act of fertilizer making. This diagram helped to better conceptualize and focus the last phase of inquiry. The use of ANT helped to conceptualize the linkages between organic farmers' to the natural environment through the act of fertilizer; with rice as the end product (Figure 3.6):

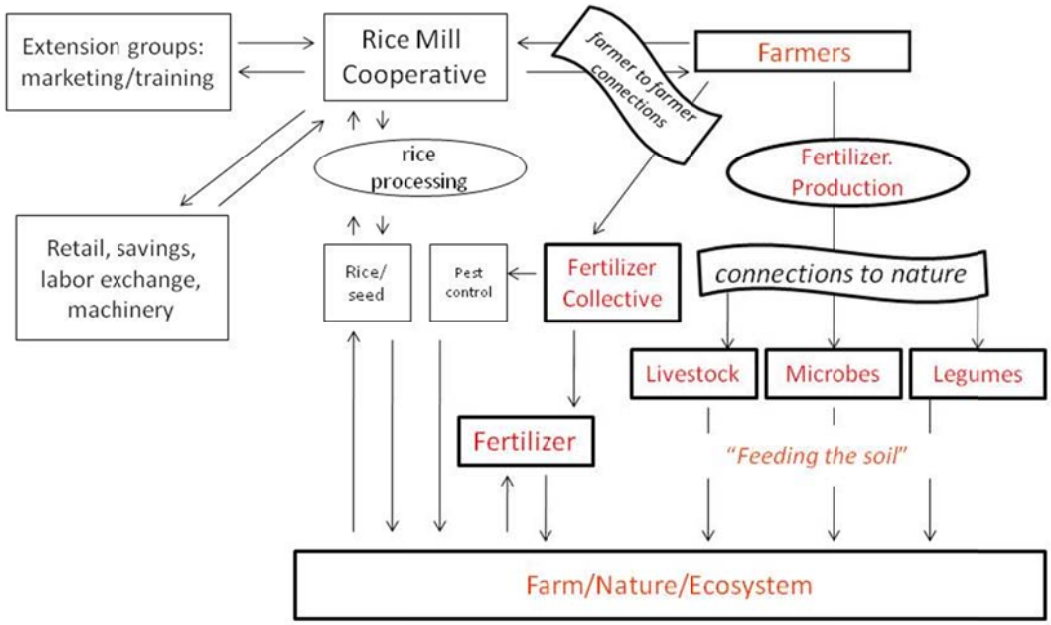


Figure 3.6: Organic Fertilizer Network

Source: Kaufman (2012)

In the final round of interviews (Phase 3), structured questions were designed to investigate the ways fertilizer production methods were connected to the natural environment, their collective work activities, and the outcomes of these actions. Hence, ANT served the form of a conceptual tool and a means to transform theory into a structured component for further study.

3.7.5 Structured Instruments

In Phase 3, a set of structured interview tools were developed to show the process by which informants decided to make a shift to organic farming systems and the ways these actions contributed to their perception of well-being. However, it was found that many participants had difficulty reading, poor eyesight, and minimal formal education level. Hence, it was important that tools were visually engaging, suitable to the local vernacular, and would elicit the attention from participants[5]. Three different formats were created with an aim to gather a high quality of data. These tools included

[5] Participants in a pilot test reported that many researchers had visited their communities, but the data was not gathered by the researchers themselves. They said that locals were hired and villagers were given little instruction on how to fill out questionnaires. Moreover, they felt that the data collected was of poor quality as villagers were not interested in completing the forms accurately.

a farmer profile, play of a game board, and a set of additional questions. The first step in Phase 3 was a farmer survey tool intentionally abbreviated to one-page. Second, a game was developed that would make it interesting for participants to answer questions about the ways they used organic fertilizers. Third, an additional set of multiple choice and rating scale questions were printed out individually on an A4 size (8 by 11 inch) plastic board to resemble game cards and provide greater clarity to participants.

The farmer survey was designed as an introduction to the two games and to gather general information about participants. The questions in this tool included basic personal data, an overview of farming methods, and crop production (Appendix F). Specific information was gathered on fertilizer usage to triangulate data from the interview games that followed.

Game #1 was designed to make sharing knowledge about fertilizers a fun and engaging process (Appendix G). The inspiration for the game came from a Milton Bradley Company board game called *Chutes and Ladders*[6] that was popular in the U.S.A. in the 1960s. Questions embedded in the game were used to gather information about the ways participants employed natural resources, machinery and animals to produce fertilizers individually and in collectives (Appendix H). Due to the familiarity of players through membership in organic farming groups, a 'circle of trust' confirmed the validity of each others' responses. The game began with a brief description of the rules, then each player was given a token (with an illustration of a farmer) to identify themselves. However, there were components added to appeal to the Thai sense of fun (Mock, 2000). The first player to move (based on flipping a coin – heads or tails to advance a step) through all the games squares and reach the finish line won extra points. The participants showed particular enjoyment with the chance aspect of this game, and heads or tails proved to be a culturally acceptable game of luck in Thailand. At each square, participants were asked to answer a question about how they accessed fertilizer with the use of a multiple choice or ranking scale query. Responses were registered on a record sheet (Appendix I). Scores were used to make the game more entertaining. For example, when participants were asked about the

[6] Research revealed that *Chutes and Ladders* was modeled after the 16th Century Indian game of *Moksha Patamu*. Both the American and Indian versions are based on a concept of good deeds bringing one towards the finish and bad deeds pulling one back to the beginning of the game.

animals they raised, a card with a picture of the animal was given along with a corresponding point score. A bias was included in the game, in that farmers who raised many large animals (signifying more manure) received a high final score. Whereas farmers who did not raise animals needed to purchase "manure inputs" and take "credit cards" (points were taken away) in the course of the game. Farmers that produced their own inputs, for example, effective microorganisms (EM)[7] received extra points. Subsequent moves along the game board uncovered the various methods participants used to fertilize their rice paddies and the reasons for making these decisions (no points were given for a 'right' or 'wrong' answer). Although total points were tallied throughout the game, cumulative scores were only used to determine a 'winner' (and were not a factor in the data analysis). The winner received the first choice of a gift (and the losers also received gifts) in the order of their scores (e.g. 1st prize - a hand towel or 2nd prize – a fruit peeler).

In Game #2, participants were grouped together to answer additional questions about environmental values, spirituality and farming practices with the use of a billboard type format (Appendix J). Each question was enlarged to fit onto one A4-sized page, making it easily readable and user-friendly. Participants were given a paper 'star' to place at the choice they deemed most correct. Questions were divided into two formats: multiple-choice and ratings scales. In the case of ordinal questions participants wrote numbered responses onto A4 size question cards. The number "1" denoted the "most important" in a rating scale of five (with "5" corresponding to the least important). Responses were transferred to record sheets (Appendix K).

Data analysis of the results of these games drew out the significance of three key drivers of influence upon farmers' decisions to sustain organic farming systems: a) morality, b) knowledge and c) factors of production. To validate this assumption, an additional question was created by producing three cards with the aforementioned 'drivers' on each card. Participants were requested to rank the "key drivers" based on their importance to sustaining organic farms and to explain their selection criteria. Results from this question and the aforementioned structured instruments were recorded and analyzed as part of the entire analysis.

---

[7] Effective microorganisms (EM) are a liquid fertilizer made from food scraps, microbes and molasses invented by members of the Kyusei Natural Farming Group and brought to Thailand by a Japanese missionary in the 1960s (Agri-nature Foundation 2007; Setboonsarng & Gilman 1999).

3.8 Data Interpretation and Integration of Analysis

In order to analyze data, each phase in this research was reviewed separately and as part of the entire analysis through an iterative process (Cresswell & Plano, 2007; Harrison, 2012). Phase 1 directed the course of this research and provided insight into the work of the alternative agriculture network. Data from semi-structured interviews in Phase 2 was coded and categorized to exhibit participants' key concerns and to show the ways they sustained organic farms. Phase 3 was based on the use of structured questions designed to further identify and measure the ways these concerns weighed upon their perceptions of well-being. Data obtained from structured questions multiple-choice, rating-scale and close-ended questions were examined with descriptive statistics (e.g., frequency distributions, ranges, means, standard deviations) using Statistical Package for Social Sciences (SPSS v.18) computer software.

This research began with an exploratory phase based on Grounded Theory to ascertain the reasons why some farmers adopted organic agriculture methods and to understand the benefits of these actions on their well-being (Glaser, 1978). Participants' responses to structured queries were coded and categorized in terms of external drivers (socio-economic, cultural, environmental), and internal drivers (financial factors, social relations, worldviews, organic farming methods, and the outcomes of these actions). Findings from the exploratory phases of this research were used to generate a structured instrument. Structured queries were designed to examine the drivers and outcomes of a shift to organic farming systems in the communities of participants. Based on analysis of structured results, a series of scales were developed to show the ways participants' worldviews influenced decisions to make a shift to; and stay the course of organic farming.

These scales were constructed by transforming variables (recoding on a hierarchal scale) and then computing scales by summing together relevant variables. Next, correlations between theoretically-related variables were examined to determine if these variables showed a statistical relationship and to see if variables were related in a positive direction. The indicators that were selected to include in these scales exhibited a positive correlation. However, as the statistical models used (Spearman's rank and Chi-square tests) herein do not demonstrate causality, the constructs selected for measure were not defined as 'dependent' or 'independent' variables.

Spearman's rank correlations were used to develop a set of measures that would show the relationships between key variables; and participants in the study (Table 3.4):

Table 3.4: Summary of Key Measurements for Use in Spearman's Rank Correlations

Scales	***Variables***	***Measurements***
Worldviews Indicators (eco-spirituality)	a) Five Precepts[8] b) Devotion to Buddhism c) Benefits of Organic fertilizer d) Why Organic Fertilizer	a); b) high scores=high levels of spirituality c); d) high scores=high levels of spirituality and eco-centric views.
Key Outcomes	a) Loans b) Debts c) Health	a) Loan reduction: low scores = minimal reduction b) Debt, dichotomous variable, (1,2)., 2 = no debt. c) State of Health (perceived), high score = better health

Spearman's rank also was performed to determine significant correlations between key variables at a level of $p \leq 0.05$ to $p \leq .001$ (Elliot & Woodward, 2007; Easterby-Smith, 2008). To examine the associations between variables and participants' locations, crosstabulations were conducted using Chi-square statistics to test significance (Table 3.5, below):

[8] "The concept of morality manifests itself in the five basic precepts underlying the rules for monastic life and for laypeople's conduct respectively: 1) not to kill any living being (often interpreted as 'not to harm'); 2) not to take what is not freely given by the owner (stealing), 3) not to indulge in sexual misconduct, 4) not to lie; and 5) not to consume intoxicants that lead to carelessness" (Henning 2002:37).

Table 3.5: Recodes of Measurements for Use in Chi-squares

Scales	***Variables***	***Measurements***
Worldviews Indicators (eco-spirituality)	a) Five Precepts b) Devotion to Buddhism c) Benefits of Organic fertilizer d) Why Organic Fertilizer	For use in Chi-squares: scores were transformed into three ranges: high (13 to 14); medium (11 to 12); low (7 to 10)
Buddhist Views	a) Five Precepts b) Devotion to Buddhism	For use in Chi-squares: scores were transformed into three ranges: high (8 +); medium (6 to 7); low (3 to 5)
Organic Fertilizer Measures	a) Use of Green Manure b) Use of Fertilizer from Collective c) Use of Manure d) Use of Effective Microorganisms e) Animal Diversity Scale	Dichotomous variables, (1,2)., 1 = no, 2=yes. Animal Raising Diversity sums across 5 animal types; high scores = high diversity. For use in Chi-squares: scores were transformed into three ranges: high (3 to 4); medium (2); low (0 to 1)
Key Outcomes	a) Loans b) Debts c) Health	a) Loan reduction: dichotomous variables: high or med. loans = 1 few or no loans = 2 b) Debt, dichotomous variable, (1.2) 1= no debt. 2= debt c) State of Health (perceived) dichotomous variable: “same" or “better” = 1 "much better" = 2

To fulfill key assumptions of Chi-square statistics, measures were transformed into ranges of low, medium and high (Elliot and Woodward, 2007). Chi-squares were used to test associations examined by crosstabulations: and to determine whether associations were statistically significant at a level of $p \leq 0.10$ to $p \leq .001$.

The final interpretation of data for this thesis was based on the use of mixed methods. In Chapter 4 and 5 exploratory methods were used to provide a foundation for this thesis and were integral to the development of a structured instrument. Analysis of structured queries in Chapter 6 was important to the

development of measures; and to examine the ways participants worked to sustain their way of life. The results of Spearman's rank correlations and Chi-square tests were analyzed separately and exhibited in Chapter 7. Key findings from qualitative phases in Chapter 4 and 5, and quantitative phases in Chapter 6 and 7 were compared and contrasted; and discussed in terms of the literature review in Chapter 8. The final conclusions found in Chapter 9 were drawn from a symmetrical valuation of qualitative and quantitative results.

3.9 Validation of Data

In this study findings were validated through what social researchers call "complementarity", that is to say the sequential use of qualitative and quantitative methods provided clarity and support to data analysis (Harrison, 2012). This thesis also employed "methodologically triangulation" through the use of mixed samples and interview methods (Olsen 2004a; 2004b). While quantitative methods provided objectivity, some participants were more comfortable with open-ended queries. For this reason key variables were drawn from qualitative data for use in the development of structured instruments (Harrison, 2012). And as the qualitative phase addressed similar questions to the structured phase, insight and objectivity were added (Modell, 2009). Hence, the qualitative phase of this study enhanced the integrity of the entire analysis. The diversity of methods used in this dissertation ensured that findings were objective, not biased by one specific type of research method, and offered symmetry to the entire analysis (Cresswell, 1998; 2003).

3.10 Summary

This research aimed to explore the drivers and outcomes of a shift to sustainable food systems through mixed methods as there were few published studies on similar subject matter. This thesis employed qualitative approaches based on Grounded Theory as a means to explore emerging theories throughout the course of this research. Quantitative approaches were used to strengthen the entire analysis. Phase 1 provided the foundation for this thesis, assisted with the location of

informants, and guided the development of latter research steps. Phase 2 provided a critical examination of participants' way of life and assisted in the construction of the structured component of this thesis. Phase 3 employed a series of structured research tools designed to clarify and complement qualitative analysis. Analysis and validation of data was conducted through three iterative stages of inquiry (Figure 3.7):

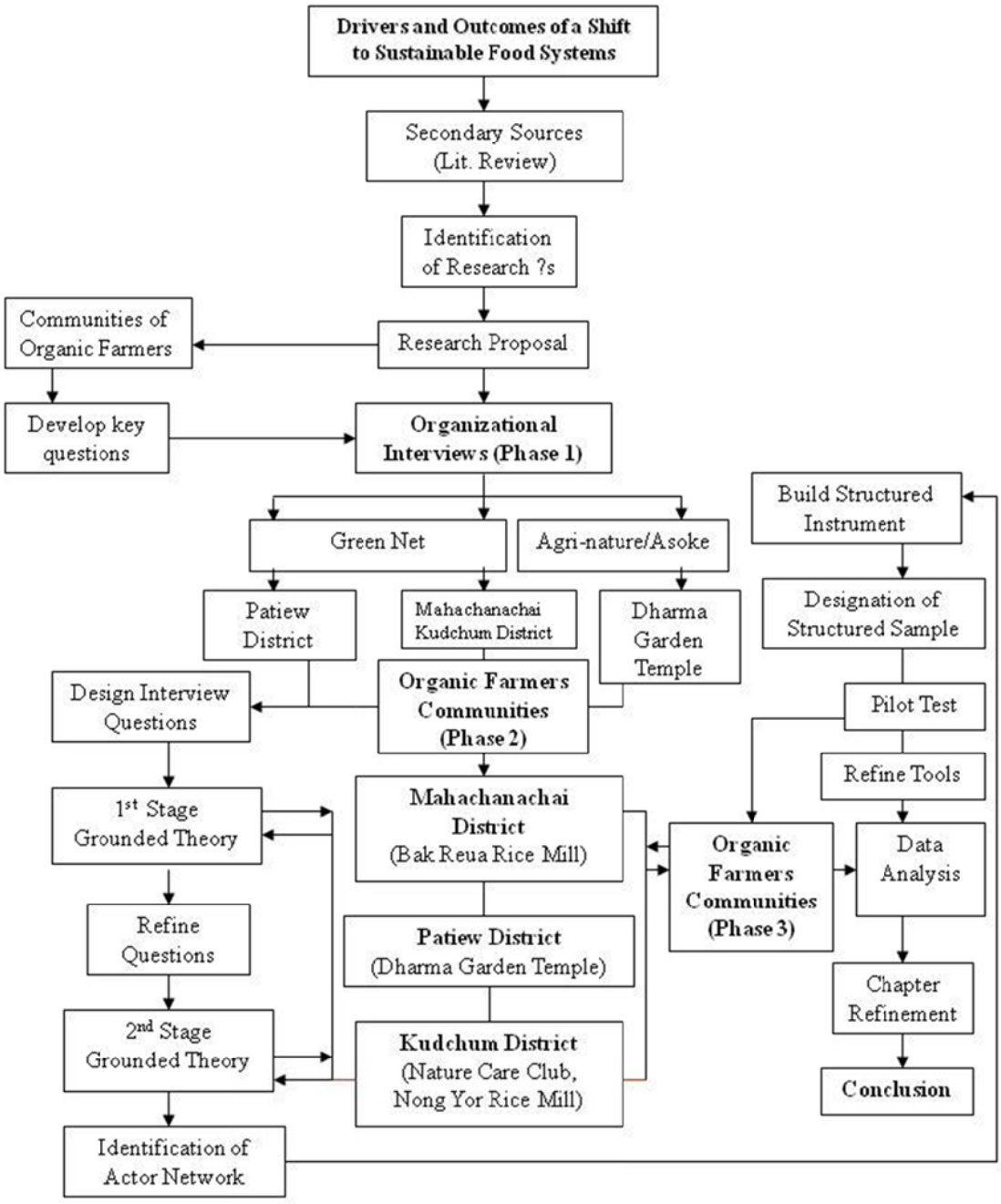


Figure 3.7: Research Steps

The research design and the structured tools developed in this thesis are replicable, systematic and transferable to studies of organic farmers in other rural agrarian societies. Exploratory phases offered a more concise conceptualization of the problem and contributed to theory and instrument development. Presentation of results through inferential statistics helped to deepen the analytical steps and to make this study more accessible to researchers from other disciplines. Furthermore, few researchers have employed mixed methods research designs to study the interrelated social and environmental factors that bear upon organic farmers' well-being. In the chapters that follow, this thesis investigates the ways that external organizations have supported the development of organic farmers and critically evaluates the drivers and outcomes of a shift to organic farming systems from the perspective of participants.

CHAPTER IV
YASOTHON PROVINCE'S ALTERNATIVE AGRICULTURE NETWORK

The purpose of this chapter is to discuss the external factors that influenced the way of life in the population of study. This chapter also responds to the first research objective: to investigate how the Thai alternative agriculture network supports the development of farmer groups. To carry out this objective, the work of Yasothon's alternative agriculture network was documented through a review of secondary data, interviews with support organizations, and members of farmer groups. First, the socio-economic, geographical, and environmental factors are discussed that bear upon the communities in this study. Second, the key organic extension organizations operating in Yasothon Province are introduced with the aim to show the ways organic farmer groups worked together to support a local alternative agriculture network.

4.1 Introduction

Since the 1950s, low household incomes[1] in the Northeast of Thailand have raised concerns from government agencies and civil society. To alleviate poverty in the Northeast some government agencies have undertaken strategies to increase the power of local authorities, and channel funding to agricultural cooperatives. The main thrust of these programs has been to enable access to the factors of production through loan schemes (Ratanamalai, 1999). Unfortunately, these programs have not been entirely successful. Many Northeast farmers have become locked into a vicious debt cycle (Panya, 2003). To solve these problems on their own, Northeast people have increasingly turned to employment in Bangkok or overseas, and

[1] As of 2010, average monthly income per capita of Northeastern people was 3,657 Baht, less than half of wages in Bangkok (National Statistics Office, 2011).

in many cases have improved their financial situation. And household incomes have risen, although still lower than their Bangkok counterparts (Grandstaff et al., 2008). This increase has been linked to remittances from Northeasterners workers employed in urban areas and abroad. The result of this migration has been an ageing population in rural areas, left to oversee farms, and care for young children (Funahashi, 1996). While these studies say much about the financial impacts of these diverse drivers of change, they have failed to uncover the socio-cultural impacts on village life.

Many experts have blamed the features of the natural environment on the retarded economic development in Yasothon Province and the Northeast Region (or *Issan* in the local dialect). Natural factors such as infrequent rainfall, poor soil types, erosion and biodiversity loss are all complicit in a low level of agricultural productivity (Boonman & Anpim, 2006; Panya, 1995; Lovelace *et al*., 1998). To meet these challenges, Northeastern farmers have expanded holdings and used agro-chemicals to make-up for a lack of natural fertility. Some researchers say that these so-called conventional agriculture methods are not well-suited to the fragile farm lands, and have exacerbated the problem (Rigg, 1985). More importantly, the misuse of some agro-chemicals has degraded the health of many Northeastern farmers (IPM-DANIDA, 2004).

Responding to these concerns, organizations under the auspices of the Thai Alternative Agriculture Network have initiated community development strategies aimed at raising household food security through local food provisioning systems based in organic agriculture methods. In Yasothon, one of twenty provinces in the Northeastern Region, some farmers have joined together to improve their livelihoods and well-being through a shift to organic farming systems. Not only have these organic farmers established strong social networks, they openly share knowledge with the aim of building the self-sufficiency of the group. This research examines groups of organic farmers who have attempted to raise their well-being through improvements in food security, food safety through a common set of values based in Buddhist scriptures (Hutanawat & Hutanawat, 2006; Wasi, 1988).

4.2 The Setting: Yasothon Province, Northeast Thailand

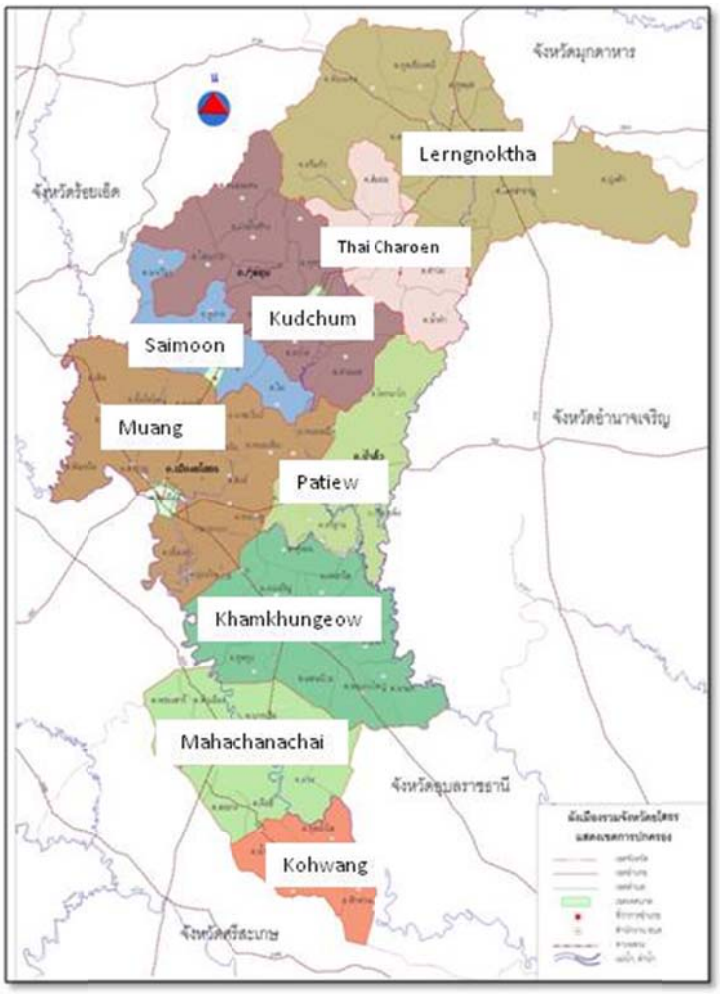


Figure 4.1: Administrative Boundaries of Yasothon Province
Source: National Statistics Office (2011)

Yasothon Province is situated in Northeastern Thailand at the latitude of 15º16´ and the longitude of 104º105´. Yasothon Province was established in 1972, but was formerly an *amphoe* (district) of Ubon Ratchathani Province, the former seat of power in the Northeast during the reign of King Chulalongkorn (1868-1910). Modern day Yasothon is divided into eight *amphoe*: Muang Yasothon, Sai Mun, Kudchum, Khamkhuengeow, Patiew, Mahachanachai, Lerngnokta, Khorwang, and Thai Charoen with a total land area of 4,161.444 square kilometers. The capital of the Province lies within the confines of Muang District. These major districts are separated into 78

tambon (sub-districts) and 862 villages. The population of Yasothon was recorded as 558,530 in the 2010 census with a relatively even distribution of male to females inhabitants (National Statistics Office, 2011). The people of Yasothon are primarily from the Laotian ethnic group. The majority of people speak Thai and *Issan* (a dialect of Lao), with some Phu Thai and Yaw speakers remaining in the northern part of the province (Boonman & Anpim, 2006; Konchan et al., 1995). The people in these areas primarily practice Theravada Buddhism.

4.2.1 Transportation Networks

Yasothon Province is well linked by major highways to the Northeast Region. Highway (23) connects Yasothon with Roi Et Province in the Northwest and Ubon Ratchathani Province to the Southeast. In the South, Sisaket Province is reachable via Highway (2083). From Muang District (the capital) traveling Southwest on Highway (202) is Surin Province, Amnat Charoen to the East along the same highway. The Nine administrative districts are connected by smaller roads. However, there are many villages that are only linked to the outside by unpaved roads. From Bangkok to Yasothon Province buses are available and take five to seven hours to cover the 533 kilometers. The only train line bypasses the province in the South via Sisaket. The closest international airport is located in Ubon Ratchathani.

4.2.2 Major Economic Activities

Agriculture is the main source of employment (62%) in Yasothon Province (National Statisics Office, 2011). *Homali* (jasmine) is the principal variety of rice grown, followed by various commodity crops, fruit and rubber trees, ornamental flowers and vegetables. Glutinous rice is grown for home consumption (Table 4.1). Yasothon farmers also cultivate cassava, maize, sugar cane and other cash crops. Fruit trees ranked third with farmers cultivating mango, tamarind, guava, jackfruit and banana trees. Vegetables and ornamental flowers are primarily grown in areas with access to irrigated water.

Table 4.1: Principal Land Usage in Yasothon Province (2009)

Usage	Land coverage in rai	% of coverage
Rice	1,273,088	50.36
Field crops	127,657	5.05
Fruit/trees	104,361	4.13
Vegetables/ornamental flowers	4,526	0.18
Pasture	25,045	1.00
Forest land	272,728	10.78
Non-agriculture	720,785	28.50
Totals	2,528,190	100.00

Source: Adapted from National Statistics Office (2011)

Animal husbandry is another revenue stream, a food source, and serves an organic fertilizer. Yasothon farmers raise various poultry such as commercial chicken, home range chicken, and ducks both for both meat and eggs. Domestic livestock such as cattle and buffalo are raised for sale and the production of manure. Some local people are engaged in aquaculture and fishing along the 110 kilometers of rivers systems and streams (Boonman and Anpim, 2002).

Rice milling is one of the main manufacturing activities in the province, followed by the sales and service industries. There are some small cottage industries such as colorful handcrafted triangle pillows and mattresses. There are many general mechanic, retail, and tailor shops located throughout the province.

4.2.3 Food Access and Consumption Patterns

Due to the harsh environmental conditions in the Northeast, the *Issan* people augment their diet with many wild foods. These naturally available foods are an important source of vitamins and minerals for local people. *Issan* rice paddies are home to many edible vegetables and animals such as crab, fish, frogs, shrimp, snails, birds, rats and insects. However, these foods are most abundant during the rainy season when paddies are inundated with water. In the dry season, *Issan* people make do with bamboo shoots, edible flowers, diverse insects and lizards. While most of these foods yield only a minor form of income, they provide food security for many *Issan* folk.

To consume and preserve these special food sources, the people of Yasothon prepare a variety of dishes, common to the *Issan* region. Vegetables are steamed or eaten in curries and accompanied by *nam prick*, a chili-based sauce. Fish is dried, fermented, fried steamed, and grilled. Rats and lizards are primarily grilled. Small freshwater crabs and shrimp are eaten in s*om tam* or what Westerners refer to as papaya salad (Somnasang *et al*., 1988). *Issan* people raise chickens, pigs and cattle; and these animals have been incorporated into regional dishes. Most of these delicacies are accompanied by glutinous rice (rather than plain rice) steamed in bamboo decanters.

In spite of romantic depictions of *Issan* farmers living off the fruits of the land there have been substantial changes in food consumption. Earnings from non-agricultural jobs have led to a five-fold increase in outside food purchases. As a result of rise in disposable income modern convenience stores have sprouted up in many villages. Ready-made foods such as instant noodles and packages sweets have become popular. There are an abundance of small noodle shops and fresh food carts that operate in farming communities. Despite their socio-economic levels, most *Issan* households cultivate and consume their own rice (Grandstaff *et al*., 2008)

4.3 Agroecosystems of the Northeast Region

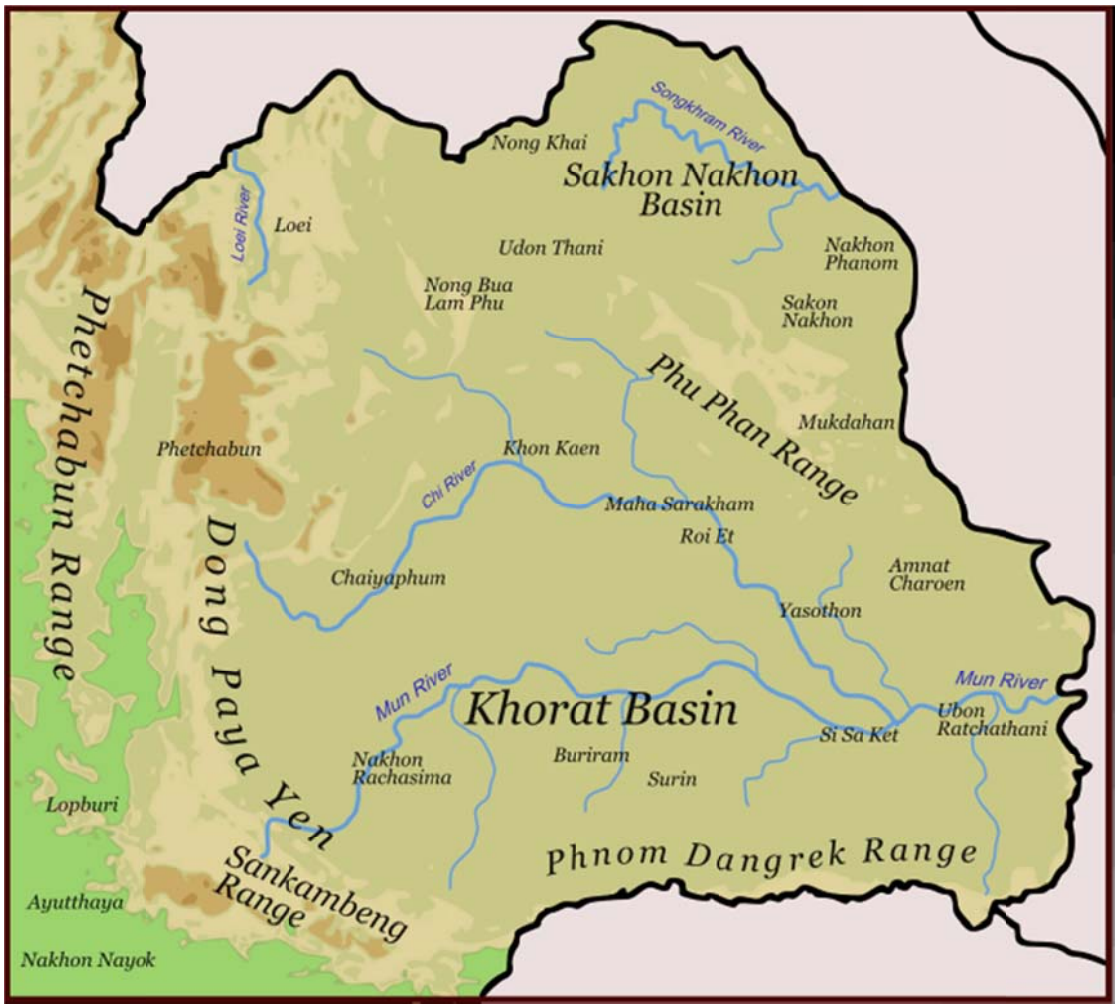


Figure 4.2: Map of the Khorat Basin (Northeastern Thailand)
Source: Wikipedia, Khorat Basin (2011)

In spite of defined political boundaries, Yasothon Province lies within a distinctive ecosystem determined by its natural history (Figure 4.2). From a topographical perspective this region is a plateau with an undulating rolling terrain of 170 to 300 meters above sea level (Limpinuntana, 2001). Known as the Khorat Basin to geographers, this bioregion is separated from Bangkok by four principal mountain ranges: the Phetchaboon (West), Phupan (East) Sankambeng (Southwest), and the Phnom Dangrek which crosses the Cambodian border in the South. In the Northeast, the Mekong River forms another natural border around the region. There are three

other major rivers in *Issan*, the Songkram River, the Chi and Mun River which run into the Mekong (Choomchai and Wongkalasin, 1996).

The Chi River is the most important to Yasothon Province as it serves the water needs of several major districts (Muang, Khamkhungeow, Mahanachai and Kohwang) before feeding into the Moon River in Ubonratchathani Province. Streams such as the Sabek, Ringjohn, Lamsebay, Samnamyang, Samnamtuam and the Nongbung swamp are important sources of water. There are also many canals and reservoirs that provide water to farmers (Boonman & Anpim, 2006).

4.3.1 Climatic Forces

The physiographical features of the Korat Plateau contribute to highly irregular rainfall patterns in Yasothon Province, some years experience drought and others flooding. This phenomenon is referred to as a rain shadow effect and attributed to the expansive mountain ranges that block much of the precipitation from the powerful cyclones that accompany the Southwestern Monsoon (Panya, 1995). Rainfall also varies throughout the plateau. For example, along the Petchaboon Mountains to the West, there is less precipitation as the rain shadow is more prevalent. As the Northern and Eastern areas are located closer to the China Sea, they receive additional rainfall. However, in the period of the Northeast Monsoon the cyclones subside and precipitation is low, which is characteristic of the seasonal changes throughout most of Thailand. Based on the rainfall patterns in their area, farmers employ different cropping patterns (Limpinuntana, 2001). Data collected from 2009 and 2010, shows that Yasothon averaged a high number of rain days and rainfall, associated with productive agricultural lands (Table 4.2):

Table 4.2: Average Number of Rain Days and Monthly Rainfall: Yasothon Province (2009)

	2009		2010	
Month	No. of rain days	Avg. monthly rainfall (mm.)	No. of rain days	Avg. monthly rainfall (mm.)
Jan	-	-	4.00	35.83
Feb	1.00	30.20	4.00	13.33
Mar	7.00	63.23	-	-
Apr	12.00	52.65	11.00	29.51
May	23.00	82.37	16.00	51.53
Jun	23.00	94.12	15.00	56.09
Jul	28.00	167.71	18.00	101.03
Aug	27.00	154.73	28.00	147.93
Sep	25.00	205.06	26.00	114.13
Oct	12.00	42.58	19.00	104.64
Nov	-	-	-	-
Dec	-	-	2.00	0.60
Total yearly	158.00	-	143.00	-
Avg. monthly	13.17	-	11.92	-

Source: Adapted from Northeastern Meteorological Department, Ministry of Information and Communication Technology (2011)

However, the number of rain days or quantity does not directly translate into an adequate water supply for Yasothon's farmers, as rainfall patterns are unpredictable. Farmers are also challenged by the undulating topography, low water-holding capacity of the soil, and a high evaporation rate, all of which make for poor irrigation systems. As researchers report that only 12% of the Northeast is suitable for irrigation, many rice farmers are forced to rely on natural rainfall to inundate their paddies (Limpinutana, 2001).

4.3.2 Topography and Soil Conditions

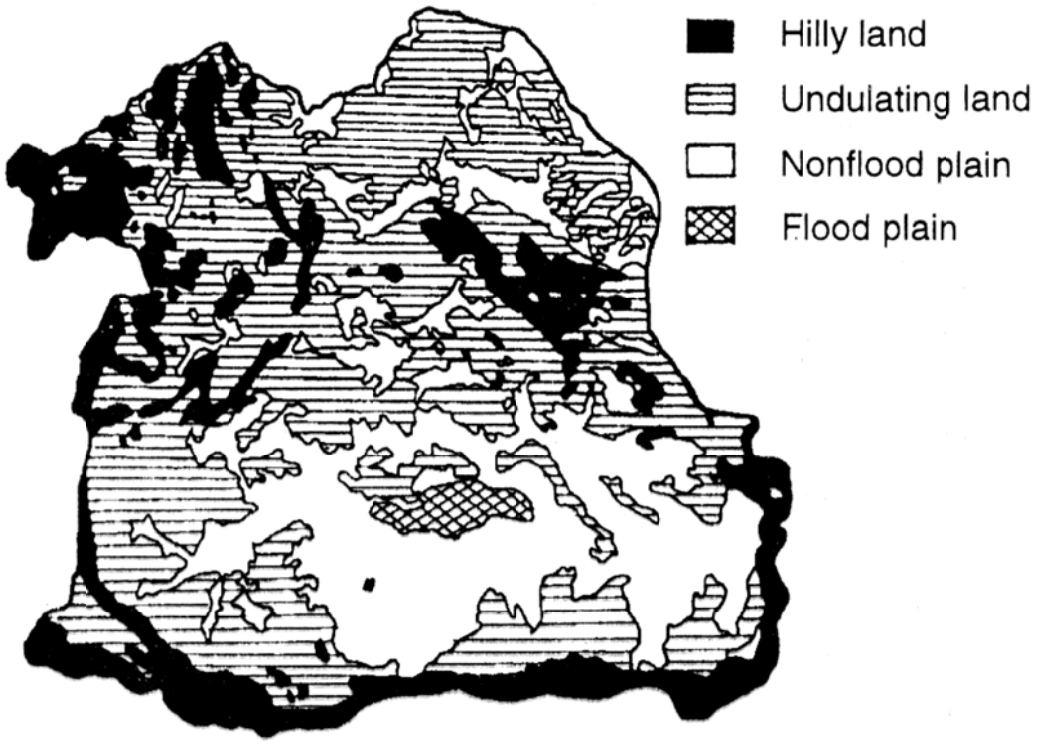


Figure 4.3: Types of Landscapes in the Northeastern Region
Source: Limpinutana, 2001

Along with infrequent rainfall, studies of Northeastern Thailand have exhibited the challenging properties of its soil composition and topography. Yasothon Province is fortunate to be located in the non-flood plain of the Southeast portion of the Khorat Basin (Figure 4.3). The soils of the non-flood plain are said to be better for paddy rice. And in the lower paddy fields of Yasothon, the watershed area is suited for small irrigation ponds that can be used to grow subsistence levels of vegetables in the dry season. Research conducted by the Ubonratchathani Rice Center (2011) characterizes most soils in Yasothon of moderate suitability (Figure 4.4).

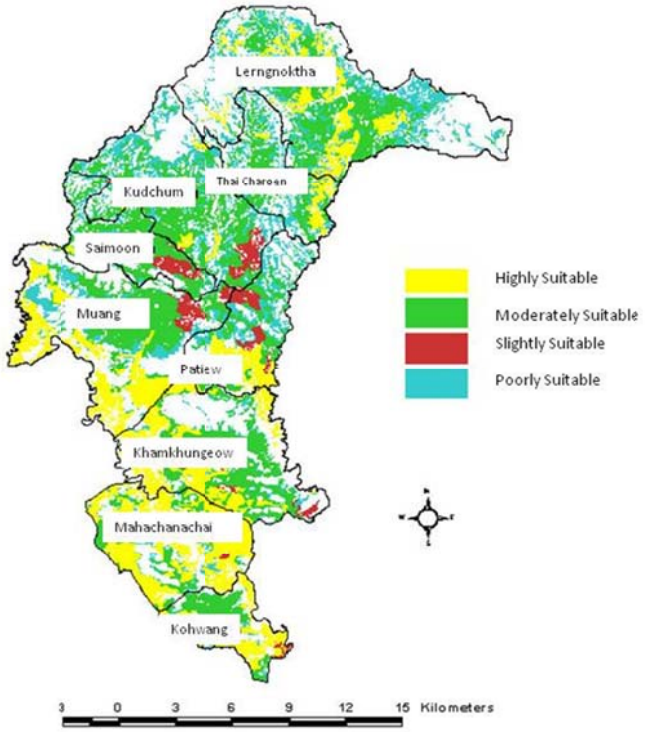


Figure 4.4: Potential Soil Suitability by District: Yasothon Province

Source: Ubonratchathani Rice Research Center (2011)

Boonman & Anpim's (2006) study in Yasothon Province exhibited a high percentage of infertile soil types: 11.79% sandy, saline 11.79% and rocky/sloping soil 68.11%, respectively. While, poor soil quality should be an important consideration for rice farmers in the Northeast, the suitability of soil types to crops appears to have been neglected from agricultural development strategies (Table 4.1).

4.3.2.1 Land Use

The expansion of agricultural lands in Yasothon Province has led to widespread deforestation, considerably higher than the national average of 20%, with estimates that only 10% of natural forests remain. While some villages maintain community forests, there are no national parks or protected reserves in the Province (Boonman & Anpim, 2006). Rice is the leading agricultural product in region and where water resources are available farmers cultivate multiple crops (assisted by synthetic fertilizers) throughout the year. Increasingly, Yasothon farmers have turned to the cultivation of other cash crops such as cassava, sugar cane, and maize. Vegetables and ornamental flowers are primarily grown in areas with access to

irrigation. Many Northeast farmers also have turned to the cultivation of pararubber and eucalyptus as a source of income (National Statistics Office, 2011).

While few studies specifically discuss the environmental impact of cash crops in Yasothon Province, Wu (*et al*., 2011) and Sunder (2011) have shown that cultivating some varieties of trees exacts considerable damage on soil ecosystems. As farmers expand tree cultivation, organic soil matter decreases and along with these actions comes a loss of soil biodiversity (Wu *et al*., 2011). In the case of eucalyptus, the high inputs of water and fertilizers necessary to sustain growth deplete the soil of many nutrients necessary to cultivate food crops. Nonetheless, eucalyptus and para rubber have beneficial uses such as the protection of some highly saline soils from desertification, provided that trees are not harvested too quickly (Sunder, 2011).

4.3.2.2 Agro-chemical Usage

As a means to cultivate cash crops most farmers have adopted conventional methods such as inorganic (synthetic) fertilizers and pesticides. While specific data is unavailable for Yasothon Province, data collected on the Northeastern Region shows that over the last ten years a high number of farmers used inorganic fertilizers to supplement crop production (Table 4.3):

Table 4.3: Number of Holdings with Crops by Using Fertilizer and Pesticide and Area Treated/Quantity of Inorganic Fertilizer Used

Item	Number			Percent			Percentage of change	
	1993	1998	2003	1993	1998	2003	1998/93	2003/98
1. Number of holdings with crops	**2,461,131**	**2,581,759**	**2,596,350**	**100.0**	**100.0**	**100.0**	**4.9**	**0.6**
By using fertilizer								
Not use fertilizer	208,840	81,178	104,423	8.5	3.1	4.0	-61.1	28.6
Use fertilizer	2,252,291	2,500,581	2,491,927	91.5	96.9	96.0	11.0	-0.3
Inorganic	921,275	1,423,633	1,485,054	37.4	55.1	57.2	54.5	4.3
Organic	56,900	40,437	43,306	2.3	1.6	1.7	-28.9	7.1
Inorganic and organic	1,274,116	1,036,511	963,567	51.8	40.2	37.1	-18.6	-7.0
By using pesticide								
Not use pesticide	1,652,997	1,510,803	1,439,688	67.2	58.5	55.5	-8.6	-4.7
Use pesticide [1/]	808,134	1,070,956	1,156,662	32.8	41.5	44.5	32.5	8.0
Chemical			787,650			30.3		
Organic			67,676			2.6		
Natural-enemies			28,245			1.1		
Others			461,938			17.8		
2. Area treated inorganic fertilizer (rai)	**39,512,238**	**42,289,215**	**42,533,519**				**7.0**	**0.6**
3. Quantity used inorganic fertilizer (1,000 kg.)	**968,153**	**1,327,564**	**1,350,335**				**37.1**	**1.7**
Average per rai (kg.)	24.5	31.4	31.7				28.2	1.0

[1/] One holding may report more than one method of using pesticide.
In 1993 and 1998, no question about method of using pesticide in the questionnaire.

Source: National Statistics Office (2011)

Significantly, the use of inorganic fertilizers increased over 50% in the period of 1998 to 2003. Further data shows that 45% of farmers used pesticides, but is not available after 2003. Based on Table 4.3, most farmers have relied on a combination of inorganic fertilizers and pesticides as a tool to raise the productivity of their farms (National Statistics Office, 2011). Notably, there was a small increase (7%) in the use of organic fertilizer. This finding suggests that farmers have begun to adopt organic methods.

4.4 The Development of Organic Food Production Networks

Based on a steady increase in the demand for organic products in the last few decades, a number of organizations have emerged to assist Thai farmers with the development of organic product for export and domestic markets (Hutanawat & Hutanawat, 2000; 2006; Kiatsuphimol, 2002; Od-ompanch *et al*., 2007; Samerpak, 2006). Local non-profit organizations have offered training programs and marketing channels for organic products (Setboonsarng & Gilman, 1999). Agencies under the Thai government and Royal Patronage have lent support through technical expertise; and budgets to support the exchange of knowledge between organic farmers. As there were few refereed international publications on the social and environmental benefits of membership in Yasothon's alternative agriculture network, this section draws on unpublished research, self-published documents, and interviews. In the following sections (4.4.1 and 4.4.2) interviews with the Agri-nature Foundation and Green Net Earth Net, respectively, draw out their organizational structure, philosophy, expansion strategies and the ways they support a shift to organic farming systems in Thailand.

4.4.1 Agri-nature Foundation

The Agri-nature Foundation (ANF) is an active member of the Thai alternative agriculture movement and has established training centers in 87 locations throughout Thailand. While there is no formal ANF center in Yasothon Province, the group has designated the Dharma Garden Temple in Patiew District to carry out farmer development programs. These programs have received ongoing support from the governmental Bank of Agriculture and Agricultural Cooperatives (BAAC) in the form of training allowances for participants (Agri-Nature Foundation, 2008). The trainers on these BAAC-supported programs are organic farmers associated with the Dharma Garden Temple.

The Agri-Nature Foundation is based in Chachoengsao Province, and under the direction of Wiwat Salyakamthon (former Director of Data and Evaluation Division, Office of the Royal Development Projects Board). The Agri-Nature Foundation promotes the practical implementation of the Sufficiency Economy philosophy through training programs that cover New Theory Agriculture and methods of building household level self-reliance (i.e. soap, bio-fuel and charcoal

making). Some members produce larger quantities of natural products that they sell on a commercial basis. The Agri-nature Foundation also places particular emphasis on the use of effective microorganisms (EM) [2], and is known for the motto, "Feed the soil and let the soil feed the plants". Their EM based products are also a source of revenue and available for purchase at their centers.

The primary objectives and goals of the foundation are outlined in their organizational literature as follows:

Objectives

1. To promote organic food production, without chemicals, for the good of humanity.
2. To support training, research and develop organic technology for agriculture, aquaculture, animal husbandry, medication, energy resources and manage the environment through Eastern wisdom.
3. To support the community to help themselves to live in a symbiotic and sustainable relationship with nature. To follow the King's philosophy of Sufficiency Economy and New Theory principles.
4. To support the farmer, community, business organizations to manage and develop organic production methods to subsidize the elimination of chemicals or toxic substances in agriculture.
5. To promote cultural traditions.
6. To provide social benefits for the public, to cooperate with various educational institutions.
7. To not get involved with any type of political activity at all.

Goals

1. To manage the way towards organic agriculture through the creation of networks built through our centers in each region, at least 25 centers (around each original center) within the next 5 years and each center can provide knowledge and training to the farmers in that region.

[2] Effective microorganisms (EM) are a liquid fertilizer made from food scraps, microbes and molasses invented by members of the Kyusei Natural Farming Group and brought to Thailand by a Japanese missionary in the 1960s (Agri-nature Foundation 2007; Setboonsarng and Gilman, 1999).

2. To research and develop organic technology, such as produce herbal EM both water, and tablet types, natural hormones, herbal (pesticides) instead of chemical technologies.
3. To support the community to help themselves through the elements of production, processing, and marketing through stores and cooperatives to complete the cycle.
4. To support, to cooperate, and to advise through various organizations including farmers groups and cooperatives. To work towards adapting sufficiency economy to be the way forward for development, and to expand production methodology to a community economy. (Agri-nature Foundation, 2007:12)

To carry out these objectives, the ANF has established training centers throughout Thailand and receives ongoing support from the governmental Bank of Agriculture and Cooperatives in the form of training allowances for course participants (Salyagamthon, 2008).

In a face-to-face interview, *Khun* Wiwat Salaygamthon discussed the diverse aims of the organization and various aspects of their activities. He emphasized that creating a strong network of centers was of central importance, and described it as a "birthing process" that started with Map-uang Village, which he described as one of his "children". Each new center is created by new members who find their own location and support activities through local fund raising. Many centers seek budgets from local government agencies to deliver extension courses to farmers and civil society. Experienced trainers travel throughout the network to help out with courses at various ANF centers. The structure of each center is unique and depends on the type of agriculture, processing activities and aims of members according to each region (for example: mixed agriculture at Ma-puang Village, fruit horticulture in Chumporn or hydroponic salad vegetables in Phuket Province). The Agri-nature Foundation claims no particular religious influence, members in the North of Thailand are practicing Buddhists and in the South there are many Muslim members. There are thirty-six Centers in total with four entirely vegetarian groups. In 2009, the ANF set-up a small center in Cambodia. The ANF also has collaborated with Santi Asoke and other

groups through the exchange of experts, swapping know-how, and the development of train-the-trainer curriculum on new agricultural techniques. However, training courses are not limited to organic agriculture. Course participants have learned to produce health supplements, soap, biofuel and charcoal.

Khun Wiwat was prompted to provide an overview of the environmental and socio-economic objectives of their organization:

> The environment can be described as follows: that which hurts the Earth such as water pollution, hurts fish and hurts water and plants like pesticides, herbicides, and artificial hormones that destroy biodiversity and microorganisms.
>
> We are facing 4 crises:
> 1) Environmental – tsunami, storm surge, etc
> 2) Social crisis – health related
> 3) Economic crisis – the 1997 "Bubble Burst"
> 4) Political crisis – Thai Rak Thai vs. Democrats

The 4 aforementioned crises refer to political events in Thailand's recent history: 1) the Tsunami that hit Thailand in 2004; 2) an increasing incidence of pesticide poisoning and exposure due to the use of agro-chemicals; 3) the Asian Economic Crisis of 1997; and 4) the ongoing disputes between political parties in Thailand.

Khun Wiwat used the example of a clean river basin to outline a relationship between social and environmental aspects of their organizational strategy. He explained that there is a physical connection between Thai communities and the environment that is strengthened by organic agriculture methods:

1) Helps our health if it is chemical free
2) Reduces capital input
3) Makes the soil more productive: less pesticides and more bacteria/ fungi
4) Organic food keeps longer
5) Profits go up in 4 months

While the primary objectives bear a similarity to the work of many of the organizations discussed in this thesis, his assumption about an increase in profits differs from prevailing studies of organic agriculture (Samerpak, 2003). While *Khun* Wiwat expressed great optimism about organic farming methods, he showed a great concern about Thailand's future and the need for a more insular food policy:

> We need a paradigm shift. The U.S./European economy focuses on food processing as they have a long winter. However, Thailand can grow food all year round and the nation has dignity through food security. As His Majesty the King stated, 'if everyone moves into (formal) industries, there will be no one left to farm'.

In conclusion, *Khun* Wiwat returned to the central focus of their organization a strong belief in nurturing the soil:

> The current process of farming kills the soil and makes people poor. Killing the creatures of the Earth is a sin. There is no respect for the farmer and farming is hard work under the sun.

The concepts of dignity and self-reliance were a recurrent theme in the objectives, information, and video provided by the Agri-nature Foundation. Despite, the affiliations of Asoke members to the Democratic Party, the Agri-nature Foundation asserts a policy of political abstinence. Interviews with ANF affiliated groups in Phuket, Krabi, Chumporn and Yasothon Province showed they welcome a diversity of religious beliefs, agricultural endeavors and activities with an aim towards creating a Sufficiency Economy.

4.4.2 Green Net Cooperative/Earth Net Foundation

Several academics have studied the work of organic farmer groups in Yasothon Province with an aim to draw out the socio-economic benefits of a shift to organic agriculture (Hutanawat & Hutanawat, 2006; Kiatsuphimol, 2002; Samerpak, 2006). These studies highlight the work of Green Net/Earth Net's efforts to provide assistance to organic farmers in the procedures for producing organic-certified

products and to develop a domestic and international marketplace. A registered non-profit organization, Green Net consists of two distinct, but mutually supportive entities Earth Net Foundation and Green Net Cooperative:

> "Earth Net Foundation- Has the role as the main organization developing and supporting grassroots community enterprise as organic agriculture practices place importance on protecting and restoring natural resources and the local environment.
>
> Green Net Cooperative- provides service developing market access for small-scale farmers practicing organic agriculture and producing natural products" (www.greennet.or.th, 2008)

Interviews with representatives aimed to further investigate their organizational structure, aims, objectives and principle activities. Initial interviews were conducted with GN leadership at their Bangkok office and later with extension officers in the field (see Section 4.5.3). Interviews were conducted with the Director, Vitoon Panyakul, Vice President, Tawachai Tositarakul, and Michael Commons, Rice Chain Coordinator.

4.4.2.1 Grassroots Community Development

The interview began with topical questions about the configuration of their network and the role of their organization in supporting organic farmers. *Khun* Vitoon, the Director of GN explained:

> We are an organization, not quite a network, we partner with producer groups. Half of our staff is not onsite. There is a small office in Lerngnoktha District (Yasothon Province).

GN is part of the Thai Alternative Agriculture Network (AAN) and maintains a number of linkages with associated groups. *Khun* Vitoon and *Khun* Michael described their affiliation with the AAN as follows:

> Green Net is a TOTA (Thai Organic Trade Association) member and works with others like Thai Organic Farm and Capital Rice through TOTA. We have relations with some professors at Kasetsart Kamphaengsaen and Sukhothai Thammatirat University related to organic agriculture as well.
>
> Khao Kwan and Green Net are part of the same network and they can learn something from each other. We also have a good relationship with the Joko Learning Center in Nan (province) and have also worked with Pun Pun (Chiangmai Province) on seeds

Khun Michael was prompted to discuss the locations of their most successful farmer group partnerships:

> In the Northeast there are 30 to 40 families (members) but not too productive. The villages with the highest percentage of organic farmers are Baan Don Yang, Kudchum, Lerngnoktha Village, Sokumpoon village (Kudchum District) and Metta District, Lampang (province).

4.4.2.2 Organic Rice Standards

When asked to explain their organizational definition of organic produce, *Khun* Vitoon stated, it is already defined by IFOAM[3], but Green Net added food security to the formula. To make the shift from conventional to organic agriculture under ACT requirements, it takes 2 to 3 years (Appendix M: Guidance Document). For domestic markets, crops are accepted as organic that are grown in the second year of conversion. However those products destined for Europe, are not considered organic until the third year of conversion. To raise the standard of members, GN conducts regular inspections of organic farmers in their programs. As members, farmers should adhere to the following principles:

[3] International Federation of Organic Agricultural Movements (IFOAM) has lent support to GN with the development of organic agriculture certification in Thailand. IFOAM has accredited Organic Agriculture Certification (Thailand) as their inspection body.

1. Consume their own products
2. Grow other crops for consumption
3. Obligated to attend related training
4. (Allow us to) check that they are following the program
5. Raise the quality up

There is no set recruitment policy for new members, sometimes GN approaches farmers and other times they hear about our programs from neighbors or when invited to attend training programs. From village-based interviews, training programs are held throughout the year from growing to harvest time.

Khun Vitoon emphasized that GN staff are facilitators not trainers. GN employs a participatory learning process whereby farmers experiment with organic products on small plots. Training programs follow a format similar to the Farmer Field Schools (FFS) found at the *Khao Kwan* Foundation (KKF) in Suphan Buri:

> When we do training for villagers, if the farmer would like to go organic, they launch it on the whole property (no experimental plot). But there were a few farmers who tried organic on a section of the property to compare production before they made a decision. The changeover was mainly due to the rising price of chemicals. They (farmers) think they have more benefits with organic pricing, as it higher than the market price.

The training process is based on what GN explained as participatory technology development (PTD) and is aimed at creating local solutions. PTD is part of what GN calls the recruitment process or "basic training". PTD serves to prove that their "knowledge" works and to adjust technology to suit local conditions, *Khun* Michael explained their strategies as follows:

> In the Green Net model, organic rice farming practices are initiated in the first season where farmers are guided to learn about different techniques in the farmer field school (FFS). We focus on participatory learning technologies, being Farmer

> Field School (FFS) and then PTD. New farmers should join FFS for first year (season) and then existing farmers may continue with PTD to develop solutions. We respect the Khao Kwan Foundation's (KKF) excellent work with FFS, but we do a one year/season program to organic conversion. We also started using FFS before KKF, but they made many good innovations, and we have learned from them on how to improve our program.

Khun Michael admitted that their budgets were limited and that not all members attended FFS. Hence, some farmers learned the process from other established organic farmers. The basic guidelines of the PTD program are as follows:

- In the first year - no herbicides or pesticides are allowed
- In the second year - no chemical fertilizers are allowed
- In the third year – no chemical fertilizers, pesticides allowed and farmer begin to produce their own rice seed

Green Net admits to facing various challenges in developing its programs in Thailand. When asked of the primary obstacles to their work, *Khun* Vitoon asserted the difficulty of, "finding good groups to work with, not individuals. The biggest (farm) we have onboard is a 120 rai organic plot, there are 1000 families with 1 to 50 *rai*".

4.4.2.3 Building a Marketplace for Thai Organic Products

An important benefit for GN members is the provision of marketing channels and a guaranteed price. All of the organic produce sold by GN is cultivated by their member farmer groups. Rice sales are based on policies set out in European Union standards, under the Fair Trade Labeling Organizations (FLO-CERT). Khun Michael explained the objectives of these standards:

> Rice must meet the minimum FLO fair trade price. Price is also discussed and set every year around harvest time with representatives from all associate rice producing groups (Fair

> Trade Rice Committee). So price will depend upon what is determined to be fair. However, recently the (Thai) government has been guaranteeing the rice price above market price and above FLO's minimum price. This has meant that Green Net has needed to price in relation to the government price. The agreement has then generally been to give a slight premium above the government price, normally one baht. The key point is not this measure of one baht more, but that every year there is a discussion to determine what is the fair price looking at the current situation for that year.

While this price margin is one of the primary incentives for organic farmers to join producer groups (see Chapter 5), GN has to work hard to maintain the quality of products and an adequate supply. European markets are important to GN's strategy as the majority of their rice (80%) is destined for European markets, but there is a small and steadily increasing domestic market (20%). In recent years GN has developed other products in cooperation with members of their network. New products include rice bran oil (produced through a joint enterprise), broken rice (GN labeled baby food), and rice vinegar with Thai Organic Farm. GN products are available at Thai grocery stores and rice products carry the ACT label.

Despite the financial incentives, GN faces multiple challenges. One of which is to develop a steady supply that meets market needs. In the words of *Khun* Vitoon:

> We strive for a continuous process of involvement: learning, marketing and developing the supply chain. The market demand creates a problem: you can't jump from supplier to supplier, the network is more complicated

As *Khun* Vitoon explained, some of the challenges of expanding their network have to do with their budget limitations and the financial resources of their farmer groups:

> Many farmers don't own their land, they rent or lease it. Farmers face day-to-day or season-to-season survival problems, so they are pre-occupied with short term issues. Hence, long-term sustainability agriculture practices (e.g. planting fruit and other beneficial trees) are risky as they could be removed from their land.
>
> Conversion to organic is quite difficult, but awareness is growing. Organic farming is one tool, it can provide positive development for the village, but there are other things needed.

While organic farming offers some financial benefits, *Khun* Vitoon suggested that money alone does not appear to lead to the resilience of farmer groups:

> Many farmers just want to make money from organics. We need to develop group strength. Private sector groups are only interested in the organization for financial reasons. It cannot always be a village based system when commercial interests are involved. It is difficult to supply big exports with other products as you need a large supply (e.g. that of a monoculture farm).

Khun Tawatchai, mentioned some of the other obstacles they face in the promotion of organic agriculture:

> Various government branches are doing the same thing, other branches look at only business opportunities: export market, profit making ventures, and organic fertilizers machines.

From their base in Bangkok, GN provides support to farmer groups via self-funding from the sales of organic products. These support funds have facilitated knowledge exchange among farmers and contributed to the development of local organic farming groups. Despite growth in consumer demand, Thailand's farmers continue to opt for the use of conventional over organic agriculture methods.

Moreover, a lack of land ownership emerges as another critical factor in pushing forward more long-term investments in the establishment of integrated farms through organic agriculture methods.

4.5 The Development of Yasothon's Organic Farmer Groups

The purpose of this section is to introduce the three organic farmer groups featured in this study; and to exhibit their development, philosophy, leadership and structure; and to show their links with aforementioned organic extension organizations. The term 'network' was used to identify the relationships organic farmers forged with their natural environment, each other, and external groups to support their way of life. The networks depicted in this study were based around farmer collectives based at rice mills; and in one case, a Buddhist temple. These farmer groups collaborated on some activities (i.e. training, religious activities, joint-marketing relationships, and had all at one time received support from Green Net/Earth Net). Farmer-leaders articulated the structure of farmer collectives, the history of their development, and the organizations that helped them to build their self-sufficiency.

Through membership in formal and cooperatives, organic farmer leaders discussed the ways government support (i.e. agricultural loans, subsidies and assistance) came into their village. These programs enabled farmer groups to access the factors of production (i.e. milling and fertilizer making machines) and assisted farmers in gaining a higher price for their products. Through non-profit organizations, farmers learned organic farming methods, received assistance with organic certification requirements, and accessed new markets. Despite these efforts, the Yasothon Provincial Agricultural Office reported that only 3,000 out of 82,000 farmer households formally practice organic agriculture.

The farmer groups in this study operated in villages in Kudchum, Patiew and Mahachanachai District (Appendix L: Locations of Organic Farmer Groups). However, the activities of these groups and their membership base extended beyond the administrative borders of their prospective districts. The first network discussed in this section is that of Thailand's first organic farming network based at the *Raksa*

Thammachat (Nature Care Club) Rice Mill in Naso Village, Kudchum District. The second network in this study was based at *Wat Suantham* (Dharma Garden Temple), a religious foundation with extensive landholdings, also known as the *Dharma Ruamjai* (Cooperation through Buddhist Teachings) Community, in Patiew District. This hybrid formation of a Temple-extension agency was the outcome of private donations, funding from the Bank of Agriculture and Agricultural Cooperatives (BAAC), training from Green Net/Earth Net, the Santi Asoke Group and the donations of members. The third group was established at the Bak Reua Rice Mill, Mahachanachai District. The farmers in this area started to produce organic rice with the assistance of Green Net and their salaried extension officers based at Mill. However, as many farmers from the nearby village of Don Pung dropped out of the program during the course of this research, latter interviews focused on the more stable Heaven's Farmers Group in neighboring Dong Yang Village.

4.5.1 The Arrival of Alternative Agriculture in Kudchum District

The District of Kudchum has a long history of organic food production, and has been better documented by researchers than other locations in the Northeast, mainly due to their use of a community currency, the *Bia Kudchum*, that was supported by several international NGOs. Organic farmers and Bangkok-based NGOs referred to Kudchum as an important knowledge base, an innovator of organic farming methods. Research on Thailand's alternative agriculture network highlights the work of farmers at the Nature Care Club in Naso Village (Kudchum) as a model for organic agriculture development (Samerpak, 2003).

The story of Yasothon's Alternative Agriculture Network begins with an interview of the Abbot of Talaad Temple, *Kruba* Supa Jarawat, whom many consider the spiritual inspiration behind this movement. A dialogue with *Kruba* Supa conveys the moral and spiritual imperatives of organic agriculture within the context of sustainable development. The direction of the interview was largely guided by the Abbot and would be better described as an audience[4]. The dialogue began with *Kruba* Supa's musings on the ontology of the organic movement in Kudchum. The aim was

[4] During the interview, we prostrated ourselves according to Buddhist custom. Monks usually accept an audience (or questions) only after the morning meal. According to local customs, a donation was given to the Temple in a sealed envelope after the audience.

to draw out *Kruba*'s understanding of the relationship between Buddhist teachings, organic agriculture and *dhammachart* (nature). *Kruba* explained the moral and physical imperatives of the shift to organic agriculture, drawing on the Dharma as a set of ethical guidelines for community development:

> The objective of organic farming is not to harm the environment such as the soil, plants, animals, water and air. In addition, it does not harm humans. On the opposite side if you use chemicals it will have an impact on both humans and the environment.
>
> In an effort to change peoples' thinking from that of chemical to organic farming, I draw on the Dharma:
>
> 1) *Promwihan* 4 (divine states of mind): *Metta* (loving kindness), *Garuna* (compassion/pity), *Mudita* (sympathetic joy), and *Upekha* (equanimity).
> 2) *Sila* (Five precepts of morality/training rules)
> (not to kill, not to steal, not to engage in sexual misconduct, not to lie, not to engage in consumption of intoxicants)
> 3) *Sandoj* – contentment
> 4) *Satja*-truthfulness
> (Sanskrit translations of Buddhist terms: Prayutto, 1990)
>
> Through these teachings, we aim to reduce their greed**.**

In the perspective of Kruba Supa, organic farming is part of the 'right' practice, by using the word "greed", he is making reference to the negative changes he has seen come about through a shift to conventional agriculture. When prompted to describe the changes in rural society, *Kruba* Supa communicated the following words of advice:

> To change peoples' thinking at present is very difficult, because the culture is changing, it has a western influence and more and more people bring western culture into the village. These western influences create gaps

> between people in the village, for example, the tradition of *long khek* has been replaced by labor for wages.

Kruba Supa attributes many of the problems in his community to the adoption of the Western capitalist system, and the technologies that have replaced human labor:

> The other part of the problem is technology, as it also alters the community. The people with the technology want to trade it for money and everything for them has a monetary value.

Kruba Supa further explained how the introduction of Western technology and the formal economy upset the equilibrium of rural farming society in Thailand:

> The changes in agricultural patterns from the past till the present, is represented by four steps:
> 1) Farming to feed ourselves
> 2) Farming to raise animals
> 3) Farming for trading or export
> 4) Farming for feeding machinery (in reference to palm oil as a petroleum substitute)
>
> The Market demands become more complicated at each step.
>
> I am very concerned with the 4th stage as it will create a food crisis and make farmers laborers or even slaves in the process. For example, investors want to buy a part of land or be a partner in production without investing labor, subsequently the real owners become slaves (to the investors) without knowing it.

Kruba explained the concept of 'sustainable development' from a Buddhist perspective:

> Sustainable development is not a natural concept, we manage the environment. Everything is managed by humans, when we try to change the ecosystem this creates a natural imbalance. However, I still advise and support people to do organic farming with teachings from the Dharma. I emphasizes that farmers need to farm together and create a wild natural environment by growing more trees and supporting wildlife.

Kruba's vision represents a Buddhist perspective of development, or what is referred to in Thai academic circles as socially-engaged Buddhism[5] (Sivaraksa, 1996). While *Kruba* was engaged in the spiritual support of alternative agriculture in his community, training programs were delivered by external non-governmental organizations.

Kruba and other key informants mentioned the significance of Masanobu Fukuoka's visit to Kudchum as a milestone in the shift to organic farming in their community (see Section 2.7). Fukuoka's work as a natural agriculturalist was well regarded by community members. *Poh* Maan Samsii, the former Rice Mill manager in Naso Village explained:

> Fukuoka came to our village in 1979 and introduced the 'do nothing theory'. He passed on his wisdom to the community. Fukuoka said, 'the purpose of being born is to take care of ourselves without disturbing the natural environment, and to just feed ourselves. As soon as you think farming is better for trading rather than feeding yourself then people will start to cut down the trees, invade national parks, cut down the forest, disturb nature and finally problems will arise. You need to fix these problems with nature or by using a chemical fix'.

Although *Poh* Maan was deeply influenced by Fukuoka's work, he described himself as an organic farmer. Moreover, some key informants reported that natural agriculture

[5] Socially-engaged Buddhism is an alternative development frame that calls upon monks to support the empowerment of civil society in solving problems. This movement is largely associated with the work of Sulak Sivraksa, an academic, civil society activist and leader of several influential NGOs (Sivaraksa, 1990).

methods were not suitable for *Issan* soils. However, *Poh* Maan realized that to make agriculture sustainable, farmers need to move away from conventional cash crops:

> I do not support non-indigenous varieties of trees on the farm especially Para-rubber and Eucalyptus, I never saw red ants on these trees, and the water source surrounding these trees dries up rapidly. Around the trunk of the Eucalyptus there are no plants, and fish in the nearby ponds are reduced as well.

While, *Poh* Maan witnessed the environmental impacts of excessive Eucalyptus cultivation, key informants more commonly cited health problems in their decision to adopt organic methods.

4.5.2 Health Concerns

Another concern raised by people in this area was the health impacts of conventional agriculture. *Kruba* expressed that health concerns were a critical factor in convincing many of the farmers in Kudchum to shift to organic agriculture. His first response to the problem was the formation of an herbal medicine group:

> From the beginning, I started this herbal society, as I wanted the villagers to take care of themselves when they got sick, with the use of herbs. Everything they consume like plants or vegetables is a kind of medicine. It also has a good and bad effect, if you consume too much it can be a toxin. In 1972, we set up the Herbal Society, and also supported the community to practice organic farming.

Many informants reported that they used herbal-based methods of treatment for their ailments. These herbal plants or *waan* were the principal ingredient in many medicinal remedies. *Waan* were grown and prepared at home or purchased at the local temple. *Poh* Maan, Chairman of the Nature Care Club Rice Mill, was one of the first members of the organic movement in Sokhumpoon Village (neighboring

Taalad Village). *Poh* Maan[6] explained that joining the "herbal society" was part of his gradual transition to organic farming methods:

> In 1960 chemical agro-products started to come in to the village and attracted the attention of farmers, I also used them. Then in 1982, I joined the herbal society, but still felt that it did not solve my health problems, I realized the food that I eat had some kind of chemical in it that must be affecting my health. I thought maybe the chemicals were making me sick and I went back to organic farming. This can be described as the beginning of my interest in organic farming.

Khun Chutima Muangman, who recently took over as the Nature Care Rice Club Mill Manager from her father, discussed *Poh* Maan's physical condition:

> Before my father changed to be an organic farmer, he applied all kind of chemical agro-products. In 1995, he got very sick and had an operation to remove his bladder. Doctors believe it was because of chemical deposits in his body.

While *Poh* Maan's health had improved in recent years, he still was concerned about his fellow farmers. As he stated, "in Yasothorn there are a lot of people with a severe skin disease due to chemicals". *Poh* Maan's work was critical to the development of the first organic farming group in Kudchum District.

4.5.3 The Nature Care Club Rice Mill

Poh Maan and his daughter *Khun* Chutima (Rice Mill Manager) each point to the establishment of the community rice mill as a key factor in promotion of organic rice farming in their district. According to *Khun* Chutima, the Nature Care Club Rice Mill was initiated in 1981, but it was constructed to support both organic and conventional rice. The funds to build up the mill originally came from members, bank

[6] The statements below are mainly from Poh Maan, with additional information from his daughter Chutima, who took over the position of Rice Mill Manager from her father.

loans and support from the Thai Department of Cooperatives (Od-ompanich *et al*., 2007). Latter support came from through the Provincial Governor's Office under the *Thaksin CEO program*.

In order to become a member of the organic club, the changeover takes a minimum of 2 years, during this time the farmer must be subject to organic audits and pay an annual membership fee of 350 *Baht*. The Mill functions as a production center, marketing channel and enables the fair distribution of proceeds to its members. Although, the Mill now has more than 260 organic farmer members[7], many farmers have struggled to make the transition to organic production. *Poh* Maan said that he made several attempts before achieving success with organic methods. He finally passed the requirements for the Organic Agriculture Certification Standard in the late 1980s.

The Green Net/Earth Net Foundation assisted many of the farmers in this area with achieving organic certification and finding a stable market for their produce (see Chapter 4). *Poh* Maan stated the importance of receiving support with marketing and sales:

> There were some problems with engaging in the market ourselves as we could not do our own marketing. Some brokers conned us and took our rice, but only paid a deposit, and then never paid the remaining money.

Later, Green Net provided assistance to Kudchum through the placement of an organic extension officer[8] at the rice mill who facilitated various assistance programs (e.g. knowledge exchange, fertilizer making, raising animals organically and developing their ability to market their own products). *Poh* Maan elaborated upon the importance of developing a farmer's network through knowledge exchange:

---

[7] In 2008, Nature Care Club Rice Mill had over 1000 members and approximately 800 are conventional farmers.

[8] Although, the Nature Care Club Rice Mill pays its own extension officer with members' dues, it still retains a strong connection with Green Net.

> The Rice Mill has three connections: producer, manager and exporter[9]. Producers provide support through the Learning Center which utilizes the following inputs: knowledge, technology, leadership, local wisdom and investment. Producer members are made up of other smaller rice mills and farmers. Learning Centers are made up of others organizations which farm organically and exchange knowledge. The rice mill has a strategy to expand organic farming, they have meetings with members monthly, and they spread the word.

The Green Market is one of many efforts to build the self-sufficiency of their members and has helped to stimulate demand for organic products.

> We have a Green Market which sells all organic foods and is supported through a budget from the Thailand Research Fund. The Green Market was launched in May 2008. All organic production from villagers is collected to sell in town every Saturday morning, and they get a good response from consumers, but they can't meet the variety required by market needs.

From my observations at the Green Market (outside the Kudchum District Hospital), they have a steady customer base. Farmers sell fresh vegetables, rice and some finished products.

Community savings strategies are an important component of the organic farming networks in this study. As *Poh* Maan explained their members depend on the community bank[10] to help reduce external debts and strengthen their network:

> The community savings bank has an agreement for new membership, if they want to join they have to agree to work together through a process of *prab ti-na* (to adjoin rice plots). The bigger plots produce more, and bring

[9] In this sentence the term "exporter" refers to Earthnet/Green Net which serves as a buyer for a significant portion of the organic rice produced at this mill.

[10] The community savings bank was located at their rice mill. The closest commercial bank is nearly 10 kilometers on an unpaved road from Naso Village.

> more money into the group. The purpose of this effort is to reduce members' debts. Moreover, *prab ti-na* serves to widen the walking path (between rice paddies) to add other types of agriculture like fruit trees and herbs. This system leads to a greener environment and improves the atmosphere of the community.

Poh Maan asked his daughter *Khun* Chutima to provide further information on the community savings bank:

> The community savings bank was set up two years after the rice mill, they did this to benefit members because the members used to borrow from the commercial bank, and had to pay interest. This system uses the members' investment to improve the cash flow of the rice mill. It is more like a local investment, they have savings accounts as well and get interest, but cannot borrow or loan money.
>
> Community Social Welfare System for members, 10% of profit is used each year for when members are sick, for funeral.
>
> There is also a stock market to get investors from outside, the rule is they can have a maximum of 100,000 baht per share, for at least 3 years, and receive profits from the fund once a year. There is another special system where stockholders can buy products from their cooperative at a special price.

Despite his ongoing involvement with the Nature Care Club, *Poh* Maan expressed some disillusionment with the course of development in their community. In response, He formed a new group which emphasizes a higher sense of morality and is based on traditional farming practices:

> Later we created the Organic Farming Group of Naso Village with 25 members, these people live their lives in an old fashioned way: exchange seeds, knowledge, labor, maintain mixed crop farms, and other types of

> agricultural activities. All members depend on themselves and have a high level of consciousness about being farmers. They intend to train the next generation to be farmers as well. The Group shares information and experience with other groups such as the Agri-nature Foundation. I still think that our group is not successful, and I want more people to adopt the organic method.

The decision to create this more stringent organic farming group appears to have emerged in rejection of the profit-oriented approaches followed by some organic agriculturalists in the area. At the Dharma Garden Temple (Patiew District), some former members of the Nature Care Club decided that they wanted to establish a more formal division between themselves and the so-called capitalist organic farmers.

4.5.4 Dharma Garden Temple

The Dharma Garden Temple became an organic farming center in the 1980s under the direction of the resident abbot and the tutelage of the Alternative Agriculture Network. The Abbot of the Temple, *Luang Poh* Khammak initially set out to rejuvenate the temple lands through organic agriculture, and because of these activities he was named *Luang Poh Thammachart* (the Nature Abbot). The Dharma Garden Temple has served as an important training and networking center for organic farmers in Yasothon Province and the region.

The Santi Asoke, the Agri-Nature Foundation and Green Net/Earth N*et al* provided assistance to the Dharma Garden Temple at various stages of its development. Although, the Santi Asoke had no official presence at the Temple, Asoke members were found at the temple grounds on several occasions. Moreover, members, monks and laypeople were observed watching the Asoke TV Channel, before and after the daily sermon. In the last few years, the Dharma Garden Temple has served as a representative and partner of the Agri-Nature Foundation. While members learned the guidelines of organic agriculture standards from GN extension officers, they do not currently maintain official ties to GN.

The temple community consists of 150 rai in total: 50 rai of lands are designated for temple activities only, the remainder are active and inactive rice fields.

There are 4 regular resident volunteers, 10 monks and some members[11] reside at the temple for different periods of time[12]. The temple community encompasses rice lands, fruit trees, vegetable gardens, a mill, a fertilizer center, a learning center, a cooperative store and a radio station. The community radio station 91.5 MHz is considered the cornerstone of their networking activities (Figure 4.5).

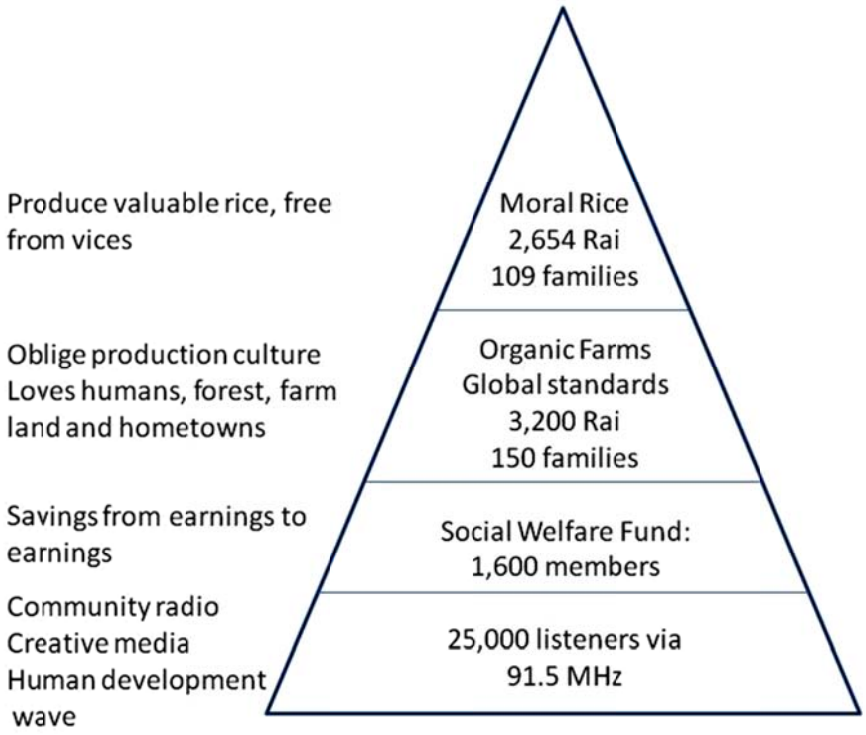


Figure 4.5: Moral Rice Network

Source: Moral Rice Network (2010)

In 2010, the radio station joined the global communications network with a website (www.moralrice.net, 2010). The radio also serves to advertise the Temple's training programs. "Moral Rice" refers to the program designed by Temple elders to create a new form of organic rice certification based on the teachings of the Five Precepts (Section 4.5.4.1). To promote their way of life, the Dharma Garden Temple

[11] Registries show that there are currently 121 active organic members, but nearly 1000 farmers subscribe to their social welfare fund.

[12] A volunteer told me that the resident population has decreased considerably under the current leadership. However, the network is larger and more widespread than in the past.

offers specialized trainings programs throughout the year on organic agriculture methods and self-sufficiency skills with the support of various partnering organizations. Dharma Garden Temple is a registered foundation under the Ministry of Agriculture. In recent years the Temple also has received funds from the Bank of Agriculture and Cooperatives and the Ministry of Agriculture to train indebt farmers. The Temple also serves as the Center for Local Wisdom[13] in Yasothon province and they are registered under the Ministry of Agriculture as an official trainer. Dharma Garden Temple training programs typically include: participatory learning, team building, vegetarian cooking, producing Effective Microorganisms[14] (a form of highly concentrated liquid fertilizer) and organic fertilizer production.

Based on numerous visits to the Temple, *Poh* Nikom Petcha acts as the resident manager. *Poh* Nikom runs most of the training courses, yet he does not carry an official title. Previously, Poh Nikom was a soldier in the Thai army and held a senior position in the Bank of Agriculture and Cooperatives (BAAC). *Poh* Nikom's experience with the bureaucratic establishment appears to have been the key to securing ongoing contracts for civil society training programs funded by the BAAC and supported by the Agri-Nature Foundation. No activity is beneath *Poh* Nikom, he is a training facilitator, conducts lectures at universities throughout Thailand, and in one case he was found 30 meters up a tree removing decaying branches to avert damage to temple property. He also maintains an organic farm in the area to help support his family as Temple "volunteers" do not receive salaries.

4.5.4.1 Moral Rice

The most recent effort at the Temple is *Khunatham* (Moral) *Rice*. Temple staff suggested an interview with *Poh* Wijit Boonserm, to learn more about the movement. The researcher first interviewed *Poh* Wijit and his wife *Mae* Tham, at their home in Sokhunpoom Village[15] in the Spring of 2009. *Poh* Wijit was first asked to explain the chain of events that led to his decision to revert to organic methods of agriculture:

[13] Throughout Thailand there are numerous Local Wisdom Centers linked through an office in Bangkok.
[14] Effective Microorganisms is the trademark of the Kyusei Foundation
[15] This interview was conducted during my second visit to Poh Wijit's home.

> From 1964 until 1975 we used chemical agriculture methods. At that time there was a regional contest to see who could produce the most rice. A foreign company cooperated with the provincial agricultural authority to study the use of these chemicals on local rice farms. The company provided two bags of fertilizer for free, if we wanted more, then we had to pay for it. Farmers trusted these methods because they thought everything *farang* (foreign) was good. Despite the increase in production, we noticed the soil was getting hard. We also had to buy pesticides that were introduced by the company to get rid of the *plia* (mealybug) eating the rice.

Poh Wijit conveyed the origins of the Moral Rice movement:

> Organic farming started at the Dharma Garden Temple in 1972 by *Prah* Tassa, and he expanded this knowledge to the villagers, for these actions he was named *Luang Poh Thammachart (the Nature Monk).* I got to know the *Luang Poh Thammachart* intimately since I was very young because as he is from a district nearby Patiew District. When I got ordained with *Luang Poh*, I got a deep sense of his thoughts.
>
> *Luang Poh* is the role model for organic farming, as he practiced and did it himself. The people who lived around that area saw what he was doing and had respect for that. He allowed the homeless people to live on temple property under the condition of helping with farming and then they got some land to farm for themselves. *Luang Poh* made the example of organic farming for people to have good, safe food aligned with nature and an excess to sell. They had the IFOAM certificate when they opened the temple, but the objective was to move away from the idea of only thinking about selling.

> You have to change yourself first. Organics is part of good Buddhist practice, which is training by combining Buddhism and organics together, thus leading to *Khunatham Rice*. To make rice you must have morality and farmers must be moral, make sacrifices, and not only talk about it.

When asked does *Khunatham Rice* embody the spirituality of the farmers who grew it, *Poh* Wijit responded as follows:

> The benefit of *Khunatham Rice* is that it can raise the farmer's level of spirituality. Which brings good spirits to the rice, and it does not produce toxins. The producer does good by making pure food for himself, his family and for consumers. The aim is for consumers to have good health. That is the farmer must be good and moral. To make the rice pure the farmer's spirit must be pure first and then good things will come back to him.

Poh Wijit had spent many years as a leader of the Nature Care Club Rice Mill in his village, but had become disillusioned with the way his fellow farmers sought after material fulfillment:

> After going organic, farmers raise their economic and social level. At first the economic level is quite good, high price for export. Safe food is not toxic to the farmers and gets a better price.
>
> The farmers thought only about price, not about self-consumption, just money, export abroad and make money. After six to seven years money still remains as the main motivation. Although Green Net wanted them to eat their organic rice, this is not the case. Green Net's ideas are good, but the support teams were not properly trained, and too fixed

on the standard, and you must pass to export. Your own health and the environment are secondary, we took the wrong path.

Khunatham Rice happened because I gave them a way to solve the problem and a protection method from the economy, to solve the farmer's flaws and that of their families, by using Dharma as the basis, the Five Precepts to support their mind. Because as they do organic farming it is difficult to achieve success as they depend on money, they don't have morality in the treatment of the environment, to themselves and others. Morality is an important factor for organic farmers to be successful, even the farmer who has many certificates it does not help them as long as they are immoral. Farmers should have safe food to consume – this is the most important point about joining *Khunatham Rice*. Next the farmer should live in a proper environment to keep the environment safe. Keep the consumers safe. Manage marketing as a means for left over production more than a need to sell to the market, which is why they need IFOAM as a guarantee for the customers worldwide.

The way to start becoming a member of *Khunatham Rice* is to have them join at Wat Suantham, learn to sacrifice themselves, give to the others by becoming a member of the savings cooperative, they give 1 Baht a day to support others members when they are in trouble for example pay their hospital bills, medication, funeral, etcetera. Now there are 1218 members that join this program, but not everyone is a member of *Khunatham Rice*, so that is a lot of money. The fund will separate into 2 parts: one is for members welfare – helping those in the hospital, another is to support *Khunatham Rice* activities like buying rice from members, buying machines, tools for the mill and making fertilizer.

> The Four Types of Lotus[16] is about changing people's ways. If the new member can accept this point, that means they truly want to change their way of thinking. If they think this change is good, than they can decide to become a *Khunatham Rice* member later on. However, to be a *Khunatham Rice* member one needs to strictly practice the Five Precepts.
>
> As for the Green Net support team: when they do public relations to get new members, they mainly talk about the price of organic rice, which is higher than the market price. And Green Net also has a guaranteed price in each year plus a profit share. This changed the concept of being an organic farmer, new members only produce rice for sale.

A joint interview with *Poh* Songkran, an active volunteer (and working member of the fertilizer cooperative) and *Khun* Grasehboon, a full-time volunteer provided further details about the workings of *Khunatham Rice*. *Khun* Grasehboon formerly worked with NGOs concerned with social services. *Poh* Songkran is a local farmer and described himself as a former drug abuser, gang member, and Bangkok taxi driver. It is important to note that *Poh* Songkran claims to have made a full recovery through his relationship with the Temple and other members. They also managed organic farms on family landholdings. *Poh* Songkran and *Khun* Grasehboon related general information about the Temple as follows:

> *Khunatham Rice* was started in 2006 by *Poh* Wichit[17] because he knew that people can produce safe rice, as farmers are still in debt, the reason is because they are addicted to vices. He wanted to introduce organic farmers to a Buddhist way of

[16] The Four Types of Lotus refers to different stages of human awareness from a Buddhist perspective. Some lotuses were submerged and thus eaten by animals in the pond, while others rose well above the surface. The height of the lotus corresponded with developed faculties such as mindfulness, meditation and wisdom (Kabilsingh, 2009).

[17] Poh Wijit was one of the first members of the Nature Care Club in Kudchum and served as an influential member of the rice mill board for many years, until he became disillusioned with the moral progress of the group.

> farming. *Khunatham Rice* currently has 79 members, which are mainly in Yasothon province.

As mentioned in the introduction to this section, one of the unique features of the Temple is there establishment of a local community radio station (91.5 MHz). Their broadcasting efforts are the cornerstone of networking, outreach and extension activities. *Poh* Songkran and *Khun* Grahsehboon serve multiple roles at the Temple, one of which is as radio disk jockeys. The volunteers take great pride in their broadcasting activities:

> The radio station was started in 2002 by the *SIF* (Social Investment Fund) Fund and it serves as a center to connect Suantham Temple projects. The station now reaches six other provinces: Ubon Ratchathani, Sisaket, Amnat Charoen, Roi Et and Mukdahan. I believe that there are at least 10,000 people listening to their radio station and 80 percent are farmers. The station has volunteers who assist with work all year round. Our objective is to deliver radio programs which cover Buddhism, art, culture, way of life, and self-reliant agriculture ventures. The radio station talks more about organic farming on weekends, and we often invite local wise men to talk about or discuss their experiences.

Poh Nikom, who also serves as the station director was keen to provide additional information about their programming:

> It is estimated that their member-listeners produce 2000 kilograms of rice per year. There is no advertising on the radio station and efforts are funded mainly through donations. Various community residents and the Temple's Abbot serve as the announcers. The radio broadcasts national news, community news, Dharma, organic farming techniques and a schedule of their activities.

In order to verify information from key informants at the Temple, the researcher requested to interview some members from the surrounding communities. A visit was suggested with *Poh* Suvit, a chairperson of Dharma Garden Temple and President of the Nong Yoh Rice Mill (Kudchum District), a collective with 252 members and 30 organic farmer-members[18]. *Poh* Suvit offered his explanation of *Khunatham Rice*:

> *Khunatham Rice* is a second stage objective of *Suantham Temple* created through the Buddhist religion, such as teaching the Four Noble Truths and some other teachings which equate with *Khunatham Rice*. *Khunatham Rice* also equals quality of food, plus the value of farmers' efforts. Dharma helps to shape peoples' lives, minds and as a tool to aid good people to live together in harmony, without fighting each other for their own benefit. Most people do not look at morality as having an application to farm work, because they just want to make more money, with a focus on high production only. But for me, morality is the thing that one can implement in his daily life and it does not have negative effects on others in the community, the environment, and finally visible and invisible matter.

Poh Suvit explained the ecological and moral components that support the movement:

> Before I joined *Khunatham* I lived in the village, but now I moved to live in my rice field. From the beginning, we felt alone, then we realized that we were living in symbiosis with the environment, as we grows plants and trees for air and also animals, we raise the cow, the cow eat our plants and the cow manure is good for the plants and the soil. When the soil is healthy, it helps to manufacture my products.

[18] *Poh* Suvit admitted that although there are many organic farmers in his group, very few formally qualify under the Khunatham Rice certification.

> Organic farming is beneficial as one can feel that he owns everything. It is a way of learning, of life, and building knowledge. Organic farmers look at things differently from chemical farmers. This is because organics means life and life involves other lives and health. A healthy life means you exercise (in reference to manual farm work). You know the value of food and you know how all living things can live together.

According to the Temple committee the Moral Rice movement is not yet an official certification program. At present the objective of the Moral Rice Movement is to impart the spiritual teachings of the Temple and expand organic agriculture. Members work in closely knit groups and monitor each others' progress against the Five Precepts. More recently, Moral Rice has become an established brand and it used to market the member rice in the domestic market.

4.5.4.2 Moral Rice as a Marketing Channel

The work of Moral Rice is only one facet of the group's aim to provide a secure market for their rice products and elicit a change in consumer demand. There marketing programs have evolved over the years; and while initially supported by Green Net/Earth Net in the organic certification process, they have turned to new marketing channels. During the first visit to the Temple in 2007, Khun Grasehboon reported the following markets for ACT certified rice growers:

> *Khunatham Rice h*as set-up a network through Nong Yoh Rice Mill, Non Koh Tung Rice Mill, Nong Phed Community Rice Mill and the Dharma Garden Temple Rice Mill. We send their products to the Mall, Siam Paragon, Thai Airways, and some other private companies.

In 2009, the Temple initiated some changes in their marketing strategy through an alliance with TV Burapha which receives approximately 60% of their organic rice products. TV Burapha helps to market their rice through three key channels: 1) friends and colleagues of the company; 2) special events; 3) sale to green shops. Of this

amount some rice is now destined for export again under the Songdeur Corporation (a Thai healthy foods brand). The Temple also has established a relationship with the Kasetsart University Farmer Shop where they sell 20% of their rice production. Lastly, under their new "Symbiosis" program, the final 20% of their products is destined to consumers in what resembles a "farm to table" scheme (Allen, 2004). Despite the expansion of these networks, to date there are only fifty 'qualified' Moral Rice farmers, meaning "Moral Rice" is not yet a commodity product ready for the global marketplace.

4.5.5 Bak Reua Rice Mill and the Heaven's Farmers' Group

This section provides a discussion of the organic support activities under the direction of the Bak Reua Rice Mill in Don Pung Village (the location of the mill) and neighboring Dong Yang Village also Bak Reua Sub-District, Mahachanachai. In 2008, there were 941 members in the Bak Reua cooperative from the following sub-districts: Bak Reua, Muang, Nonsai, Khen Noi, Bunggay, and Dongken Yai The majority of organic members came from Bak Reua with 49 families. Muang District had the highest organic production levels because they have a better irrigation system. At the Bak Reua Rice Mill they had five Green Net representatives. Three were born in the village and two come from another province[19]. In 2008, there were four trainings on organic agriculture with fifty participants. *Khun* Tao, a Green Net staff member related the origins of the Bak Reua organic farmer network:

> There was a safe food movement which came into the village in 1995. This was Green Net's first project to help support their group, the Safe Food and Natural Agriculture Cooperative. This group started in 1996 when Green Net came to work with the villagers and convinced them to join the organic program. The villagers were satisfied to work with Green Net and became partners. ACT came to audit and gave a certificate individually to each farmer who earned it. In 2001, organic farmers grouped together and earned a certificate on behalf of community rice mill.

[19] Information in this section was drawn from an interview with Khun Tao, a local rice farmer whom was a paid employee of Green Net.

Khun Tao further explained Green Net's strategy for launching participatory extension programs at the village level:

> When they do training for villagers, if the farmer would like to do organics, they would launch it on the whole property (no experimental plot). But there were a few farmers who tried organics on a section of their property to compare production before they made a decision. The changeover was mainly due to the rising price of chemicals. They thought they would have more benefits with organic price as it obtained a price higher than the market price.

According to *Poh* Arai[20] the Rice Mill President there was several reasons for his decision to shift over to organic agriculture:

> I have been doing organic since 2001. The reason I changed was because of *Khun* Niran's presentation to the farmers. I used to do farming with chemicals for about 20 years. After the training, I thought back when I was young my parents farmed without chemicals, had their own fertilizer and they survived, this is why I decided to go back to organic farming.
>
> Another reason why I changed to do organics was that I was getting sick often, such as diabetes, and allergies. When I was 40, I had a vein clotting problem. And the doctor suggested that I should consume safe food, more brown rice and live a healthy life. Plus in my family history on my father's side, the men have a shorter life, they live up till around 50 years old and then pass away. I thought that there must be some reason behind that. Those are all the reasons why I changed to consume safe food by growing it myself, rice, vegetables, fruit and natural fish pond in my own farm.

[20] *Poh* Arai passed away in late 2010 before the completion of this research. The cause of his death was apparently due to overexposure to agro-chemicals in the earlier part of his life.

> After the Pak Ruea Group gathered together to do organics, *Khun* Niran[21] helped the group to get the IFOAM certificate. There were 212 Pak Ruea members, but the group total was 800. This year (2009) there are a few farmers dropping off from organic farming and more dropping off because many would like to do the off-season rice crop which requires chemical fertilizer, because in organic farming you need to do things the organic way: such as do it by yourself, eat what you grow! Make sure that you get safe food for yourself; for sure you will have a better quality of life.

Poh Arai was asked the difference between nature and the environment, he provided the following explanation:

> The organic farmer must stick to a self-sufficiency idea. They need to understand morality by using religion to hold you to the path. I think if we have the passion, then it will give us the strength. Something like if you really want to do it, you won't feel tired, especially when you see the outcome, then you want to do it over and over again. When I went to my farm, I see nature all over my farm, the green, the animals it brings me peace and happiness. And I think this feeling comes to the people when they get older. Because when I was young I did not appreciate nature that much. Now, I love to stay at my house, I feel the wind, the things in the field, it is peaceful, most older people feel this way. I don't want to go travel!

Lastly, he was asked him to talk about the Heaven's Farmer Group:

> Heaven's Farmers is an organic farming group, they are members of Pak Ruea Rice Mill. The reason they have their own name is because they are a group of farmers that stick together, produce organic fertilizer and it (the fertilizer) is famous. Then *Khun* Niran came to help by doing research on this group and sending it (this research) to Khon Kaen University. Then they got a

[21] Khun Niran, was formerly quite active in the movement and also served as the Lerngnoktha Rice Mill President until his resignation.

> budget of 200,000 baht. The purpose of this budget was to help the village to set-up their own organic farming group and run some small activities.

Interviews with members of the Heaven's Farmers Group of Don Yang Village revealed a great pride in their efforts to form a successful cooperative. Interviews suggest *Poh* Eam, a Dong Yang farmer-leader was a primary influence behind the groups' accomplishments. A discussion with *Mae* Baanyen, a member of the collective related the administrative origins of the Heaven's Farmers group:

> Heaven's group started with 21 members in the year 2000, as a sub-group under Bak Reua (rice mill). They started activities by exchanging labor, to build a fertilizer warehouse on *Poh* Eam's property. And put in 300 baht per person as a fund to buy the equipment and material for making organic fertilizer. In 2008, the Sub-district Administrative Office came to help make a new warehouse, support the Housewife's group and to make this a center for the Sub-district. The villages under this sub-district could use this warehouse to produce fertilizer, but they lost profit because there was no one in charge. Also the material that the Sub-district stocked in the warehouse spoiled because no one came to process it in time. Finally, they gave Heaven's Rice group the right to manage the Sub-district (fertilizer collective). Then Heaven's Farmers decided to move their operation to the Sub-district warehouse. After Heaven's Farmers came to be in charge, our main duty was to produce organic fertilizer for the group, secondly to work for the Sub-district, to make fertilizer. Now the Sub-district sells it in their name; and members or non-members can buy it.

The ability of Heaven's Farmers Group to manage the local fertilizer cooperative by themselves differentiated this group from the other farmer members at Bak Reua Rice Mill. Despite, Green Net's efforts to form a strong centralized organic cooperative at the Bak Reua Rice Mill, they have been challenged to bring together farmers from diverse villages.

4.5.6 Summary Findings: Organic Farmer Groups

This section exhibits some of the key characteristics of the organic farmer groups in this thesis. The Nature Care Club, a rice mill-based organization has received preliminary and ongoing support from Green Net. The Bak Reua Rice Mill, and in particular Heaven's Group, were the result of government and local leaders efforts to build a community level organization (Hutanawat and Hutanawat, 2000). The Moral Rice movement at Dharma Garden Temple, emerged as a hybrid organization that expanded its membership base through the enlistment of practicing Buddhists, organic farmers and consumers. These three organizational networks differed according to their spheres of influence, structure, leadership, membership base and communication strategies (Table 4.4):

Table 4.4: Organic Farmer Collectives

Name	**Nature Care Club**	**Bak Reua Rice Mill**	**Moral Rice**
Location	Rice Mill, Sokhunpoom Village	Don Pung Village	Dharma Garden Temple, Patiew Village
Sub-collectives	n/a	Heaven's Farmers, Dong Yang Village	Nong Yor Rice Mill (Kudchum District)
Sphere of influence	Kudchum District	Bak Reua District	Yasothon province
Management	local resident	local resident	non-local resident
Influential spiritual leader	Local Abbot	not applicable	Resident Abbot
Network Structure	Large Cooperative	Farmer Group	Temple
Membership base	1000	941	1218
Organic members*	260	45	120
Bangkok based support	Green Net/Earth Net	Green Net/Earth Net	not applicable
Rice mill	industrial mill	use nearby mill	several small mills
Communication strategy	Training	joins with other groups	Training/radio station

*There was a constant fluctuation in reported organic members throughout course of the study.

The Nature Care Club was the first of the three networks to be established and is considered a pioneer of Thailand's Alternative Agricultural Network (AAN). The local abbot, *Kruba* Supa was a key figure in the formation of the group. However, *Kruba's* influence appears to have dissipated over the years (he was nearly 90 years old at the time of his interview). Furthermore, some changes have occurred in the leadership of the Nature Care Club and it has grown in size over the last few decades. Although, the Nature Care Club funded its own representative to Green Net, it has been reliant on Green Net as it primary market for organically-certified products.

The Bak Reua Rice Mill's organic farmer group suffered from a significant decrease in organic farmers from neighboring Don Pung Village. However, the Heaven's Farmers group at Dong Yang village (on the other side of the highway) managed to sustain membership as a splinter group, but continued to use Green Net as its main marketing channel. With only forty members, Heaven's Farmers have maintained their their activities with local governmental support, the assistance of the Sub-district Administrative Office, and community-based leadership. The leader of the Heaven's Farmers group collective both guided farmers in the organic process and donated a piece of his land for the construct of a fertilizer collective.

The Dharma Garden Temple's acts as the center for organic farmers in Patiew District with a leadership comprised of both lay persons and monks. Despite, appearances of a unified group of Temple followers, only 10% of farmers have been certified organic under ACT, and only a select few have complied with all the spiritual requirements of membership in the Moral Rice Network. The Temple has maintained operations through a 1000 member social welfare fund (which is reported to have doubled from 2008 to 2012). The temple has assisted in the development of several small farmer collectives in the area. The closely affiliated Nong Yor Rice Mill in Kudchum has acquired a rice mill; and organic farmer members produce their own fertilizer and have started to develop new markets. Despite, the widespread locations of the Temple's membership base, followers join together during temple ceremonies and training courses. The Temple network also is well-linked through communications that take place via their radio station.

4.6 Summary

Despite research that has exhibited the negative impacts of conventional agriculture methods, many *Isaan* farmers have turned to the cultivation of cash crops as a means to gain household financial security. As the first half of this chapter shows the course of agro-development directed by the private sector and some government agencies has been unsuitable for the agro-ecology of the Northeast. Faced with sometimes interconnected ecological and socio-economic problems, alternative agriculturalists have launched diverse forms of support to farmer groups in the region.

While farmer groups have accessed marketing channels through non-profit organizations and private enterprises, initial government support has been critical to the development of formal cooperatives. Moreover to bring products to market, both conventional and organic farmers depend on the services of a local rice mill. Physical resources (i.e. warehouses, rice mills and fertilizer processing machines) have helped organic farmer groups to reduce costs and sell a value-added product.

Many of the farmers have taken the words of His Majesty the King to heart by building integrated farms and working together to develop “self-immunity” from commercial agro-enterprises. Extension organizations have assisted farmer groups with learning a new set of skills and put in place structures for collective organizations. Local organizations have done more than transfer technical skills to farmer groups, they have promoted a new way of life based around organic farming systems. The extension organizations in Yasothon Province have showed diverse strategies for working with their constituents, but share a common desire to build farmers’ self-reliance. Despite common aims, organic farmers have different socio-economic and spiritual characteristics, which are discussed in the following chapters.

The story of Yasothon’s alternative agriculture network provides a backdrop for understanding organic farmers’ worldviews, knowledge systems and ways of practice within the context of their communities and their agro-ecosystem. In the next chapter, the physical and natural environment where organic farmers live, the ways they sustained their farms, and the influence of these changes on their well-being are examined through the use of in depth unstructured and structured interviews with organic farmers.

CHAPTER V
SOCIO-ECOLOGICAL DRIVERS OF CHANGE IN ORGANIC FARMERS' COMMUNITIES

The purpose of this chapter was to critically evaluate whether a shift to organic agriculture led to changes in farmers' way of life and influenced their well-being. First, semi-structured interviews examine the ways that external organizations helped to support organic farmers; and the financial factors that weighed upon their success. Second, this chapter shows the methods they employed to support organic food provisioning systems in their communities. Third, organic farmers discussed the beliefs and values that supported organic agriculture, the role of social networks in building up self-reliance, and the factors that contributed to their well-being.

5.1 Introduction

The decision to make the shift to organic agriculture was dictated by diverse factors: community structure, family status, social relations, health, financial status, and values systems. Although, the organic farmers' in this study exhibited a distinctive way of life, they also were influenced by many of the external economic, social and environmental factors that bear upon conventional farmers. Notwithstanding, organic farmers worked to isolate themselves from fluctuations in the external marketplace by tackling financial problems as a group; and building up the capacity of their collectives (Table 5.1):

Table 5.1: Drivers of a Shift to Organic Farming Systems

Drivers	**Factor**	**Indicators**
Community/ Natural Environment	➢ Weather ➢ Community structure ➢ Household structure	o Water access o Climatic conditions o Homesteads/Farms o Neighborhood o Family life
Financial Resources	➢ Access to capital ➢ Access to labor ➢ Machinery use ➢ Market Access	o Land ownership status o Labor/ machinery o Government loans o Organic rice prices
Building Organic Farming Knowledge	➢ Organic farming methods ➢ Farmer exchanges	o Governmental assistance o Sufficiency Economy o NGO support o Youth Education Programs
Social Capital	➢ Organizational affiliations ➢ Informal networks ➢ Access to production factors	o Rice Mills Cooperative o Cooperative Savings funds o Communal Property o Cooperative Stores o Communal Food Production o Communal Fertilizer Production o Local Exchange o Buddhist Associations
Well-being	➢ Health status ➢ Household Food Security ➢ Spirituality ➢ Environmental Values	o Disease/illness o Food purchasing/trade o Organic food consumption o Understandings of nature/environment o Buddhist practice

However, the ways participants expressed the benefits of organic agriculture were not clearly divided into separate categories. Health, food security, spirituality, and the natural environment were regarded as interconnected concepts. While conventional and organic farmers resided in the same communities as conventional farmers, the ways that organic farmers chose to interact with each other and the natural environment on their farms were appreciably different. Organic farmers learned to use locally available resources rather than purchase commercial inputs. Organic farmers

constructed specialized collective organizations to develop and produce environmentally-friendly fertilizers and pest control methods.

Using sampling methods based on Grounded Theory, theoretical saturation was reached after analysis of in-depth interviews 50 farmers (45 organic rice farmers and 5 conventional rice farmers). The mean age of participants was fifty years old. Participants were predominantly female (29 of 50), but were representative of a household. Interview questions were adjusted throughout this phase of the study based on the emergence of "substantive theories" (Glaser, 1978).

The chapter exhibits the drivers, factors and indicators that affected participants' decisions to shift to; and sustain organic farming systems in their communities. Queries focused on those areas in their life that that had changed as a result of adopting organic farming systems. Participants spoke about changes in their financial status, health, spirituality, food security and the new values they adopted in their groups:

- Low investments, and a premium price
- Health benefits
- Food security and exchange among organic farmer households
- Mental and spiritual health
- Intrinsic benefits of nature
- Social capital

Participants perceived that these factors led to an improvement in their well-being. Although, participants expressed a combination of reasons for making the shift, financial incentives emerged as an important factor in the initial decision to move away from conventional agriculture methods. While the infrastructure in the communities where they lived and the surrounding natural environment were important to their daily lives, the participants in this study lacked the resources to change these factors.

5.2 Community Infrastructure and the Natural Environment

While the shift to organic agriculture enabled many farmers to improve their livelihoods, there were many aspects that proved difficult to change such as the physical structure of their villages, the amount of land owned, and the life choices of their family members. Participants had a limited level of formal education (third to the ninth grade). Most lived in a detached house located in a *Moobaan* (village) situated throughout the districts of Kudchum, Khamkhungeow, Patiew, and to a lesser extent in Lerngnokta[1]. Generally speaking, the villages in this study were agrarian, contained few businesses and no industry other than rice milling. The main physical structures in most villages were a rice mill, a Buddhist temple, a school, and a cooperative store. Some villages contained a small government office or health clinic. There were few defining features about the villages or homes that would set them apart from other areas of Northeastern Thailand. While some participants lived in Thai style wood houses, most homes were built from bricks or cement, and resembled Western homes. Some streets were paved and others were not. Participants primarily relied on bicycles and motorbikes for transport, while some owned a pick- up truck. In most cases, the rice paddies of participants were located on the outskirts of the village, and were bordered by conventional farms. Notably, only a few participants lived on their farms.

Participants primarily worked alone or with family members. In most areas only a handful of people were organic farmers. Organic farmers participated in religious festivals, training courses, and harvest related activities at their local rice mill with conventional farmers. Despite the distances between the primary locations in this study (50 to 100 kilometers) participants displayed similarities in their choice of agriculture methods, livelihoods and cultural practices. Although, the density of organic farmers in many of these villages was relatively low, extension organizations reported that the number was higher than in most areas of Thailand.

[1] Although, Lerngnoktha was suggested as an ideal location for this study by Green Net, an investigation of the physical location of participants revealed a low density of organic farmers. As this network was relatively new and underdeveloped it was decided not to include the Lerngnoktha Rice Mill Cooperative as part of the three farming districts studied in the structured phase of this research.

5.2.1 Homesteads

Initial queries sought to uncover if organic farmers improved the greenery around their homes. Most responded that they were happy with the green spaces around their home and made some effort to grow decorative plants. Some farmers cultivated decorative plants, herbs and fruit trees around their houses.

As trash collection services were not widely available in the communities of participants, refuse was commonly found surrounding the homestead, and burning it was the primary option available. While, most participants collected food scraps and placed them into special composting bins on their property. Based on my observations, participants did not show much concern about the green areas around their house. Perhaps, the absence of home gardens was possibly due to the extensive work requirements of organic farmers.

It was also significant that few farmers lived on property adjacent to their rice fields. Typically, rice fields were located on the outskirts of each village creating an imaginary division between farmers and their natural environment. Participants found it difficult to live on their farms as there was no electricity or running water in these areas. Organic farmers preferred to live closer to their neighbors for safety reasons. A few participants said thieves regularly pilfered their produce as they did not reside on their farms. However, in harvest season, many camped near their rice fields due to a fear of thievery, and the intensity of work requirements.

5.2.2 Farms

The geographical and environmental conditions in Yasothon Province presented an ongoing challenge for rice farmers and their households. To work with poor soil quality and a lack of water resources, the organic rice farmers in this study elected to make a shift to organic agriculture methods. The organic farmers in this study scattered (or sowed) rice seedlings with the first heavy rain in the late spring (May/June); and harvested rice near the end of the year (i.e. November, December, and January) depending upon climatic factors. Participants performed agricultural rituals year-round according to the Buddhist calendar and as delineated in the *Heed Sipsong* (Panya, 1995). Participants grew only one crop of rice per year as they relied on the natural cycle of the seasons to irrigate their fields. Some responded to water

shortages by building small ponds to hold excess rain water for irrigation and to raise fish. Although natural cycles helped to guide their way of life, machinery played a major role in the harvest and processing of rice. Despite the role of technology in accomplishing critical tasks, irregular weather patterns increasingly affected their livelihoods. Some farmers attributed these irregular weather patterns to what they thought was climate change. A heavy drought was reported in 2008, the second year of this study, and those without access to irrigated water reported that production was very low during this period.

5.2.3 Family Life

In the villages where participants were interviewed, it was found that very few families still resided together as a close knit unit. In many cases, the husband or children worked and studied outside the village, primarily in Bangkok. Although, the participants stated that their families had good relationships, a few participants revealed they did not see each other often. Some participants were widowers or had made a decision not to marry. Statements about personal relationships were brief (as Thais typically do not share intimate family details with strangers):

> My relationship with the family is good, because everyone has their own duty, such as my husband and I are in charge of the rice field, my Mother takes care of the house and weaves cloth, my two daughters do household chores and study. (*Mae* Tassanee, Organic Farmer)

> In the future I wish that my children and grandchildren will become farmers, rather than employees, because they can be their own boss, have food all the time and be together with their family. (*Khun* Pornchai, Organic Farmer).

> In the future I wish that my family members remain farmers in the rice season, and can work at some other place during other seasons (*Khun* Bangon, Organic Farmer)

Historically, many Northeasterners have sought employment in urban areas after the harvest season (Panya, 1996). And research shows that urban industries in Bangkok have started to employ large numbers of Northeasterners full-time in the construction, manufacturing and tourism industry (Funahashi, 1996; Rigg, 1997).

5.3 Financial Factors

Not unlike conventional farmers, the organic farmers in this study depended on financial assets to cultivate rice and other crops. Land ownership was a critical asset and enable farmers to borrow money from government and private institutions. As few organic farmers were able to work their lands by themselves they hired day laborers for different portions of the cultivation and harvesting of rice. While organic farmers aimed to reduce costs, land ownership was an important factor in farmers' livelihoods.

5.3.1 Land Ownership Status

Many organic farmers did not own all their land and there were a variety of land ownership patterns. Some participants grew rice on a friend or families' land, and in compensation returned a portion of the product to the landowner. Other participants rented land and paid financial compensation based on each harvest. Hence, land ownership was an important factor in organic farmers' income levels:

> I own property and rent three *rai* of land from my cousin and pay rent with half of my harvest (*Khun* Bangon, Organic Farmer)

> I have ten *rai* of ricefield and another six for mixed agriculture efforts. (*Khun* Sunaret, Organic Farmer).

> I own some property, but rent an additional fourteen *rai* for farming (*Khun* Wanpen, Organic Farmer)

> The problem about farmers in Thailand is they inherit land from their family, separate the land into small plots to give to children and then the plots are too small to do mixed agriculture and each plot cannot produce enough to feed the family. This also leads to more renting of farmland and increases debt! (Mae Baanyen, Organic Farmer)

While this research focused on the ways farmers sustained organic agriculture; inadequate land ownership is a recognized problem in many agrarian communities (Panyakul and Wanlop, 2007). In Thailand, land holdings serve as an important asset in loan programs. From an economic standpoint, rent also factors into long-term investments in horticulture such as trees for shade and fruit production (Grandstaff *et al*., 1986)

5.3.2 Access to Labor

There were several forms of agricultural labor found in the villages under study, required primarily during the planting and harvesting seasons. Participants reported that they hired local freelance or Thai migrant workers to assist with planting rice. During the harvest season a number of farmers employed a mechanical harvester, as it served to quickly collect the rice, and avoid spoilage. However, the use of industrial harvesting machines is slowly supplanting village labor deficits. There was a coveted service that travelled from village to village providing mechanical harvesting and threshing at a fee. However, many farmers still used a traditional hand held tool to harvest and shake the rice free from the stalk. Some farmers sold the whole rice plant directly to traders. Most farmers tended to contract labor during some stage of the production process as they lacked labor or were too old to complete the work themselves:

> I hire labor from outside the village, I used sixty six people to plant for three days at 170 Baht per day. At harvest time I use my son's machine. (*Mae* Baanyen, Organic Farmer)

Only a few families in the study practiced a form of *long khek* whereby labor is traded rather than compensated financially. Moreover, based on responses the practice of *long khek* has changed in the last few decades:

I practice *long khek*, during the planting process: eight persons, my cousins, for seven days, these cousins stay in the village and rotate to help each other. The rule is the host must prepare lunch, every day until completion. (*Poh* Woradej, Organic Farmer)

I hire the machine for harvest one day, plus exchanging labor with my cousins over the last four years which helps reduce her labor costs. After farming season my husband goes to work in town as a construction laborer, but I stay home and take care of my children. (*Mae* Buathong, Organic Farmer)

For harvest I contracted nineteen workers and pay is equal to 150 baht per day. This was for only five *rai* of land for the other five *rai* she used a harvest machine. Sometimes credit comes in asking for a favor such as transporting/carrying rice to the mill. However, if there is no time to make exchange then money will change hands. I harvested five rai myself as 5 rai was affected by the drought, so there wasn't much rice to harvest (*Mae* Pragai, Organic Farmer)

My son comes back home once a year during harvest season and other important seasons, to help out in the farm, but my husband only comes back two to three times a year (it was discovered later that he works as a taxi driver in Bangkok). In planting season I hire six to seven people for three days. During harvest time I hire a machine for two days on one property and on another property I hire eighteen people for three days. (*Mae* Samree, Organic Farmer)

In spite of changes in the labor force, organic farmers completed many tasks on their own or as part of a collective. Participants explained the differences in labor requirements between conventional and organic farming:

> In my village they say that organic farmers are diligent as they stay on their farm most of the time and produce a variety of food. While chemical farmers stay home and buy food from organic farmers. (*Poh* Somjai, Organic Farmer)

> Organic farmers are diligent as they have to rejuvenate the soil all the time; busy making fertilizer, EM growing plants and other activities. (*Mae* Therm, Conventional Farmer)

> The reason why many don't want to do organic rice is because they are lazy and they feel production will fall below their current level. (*Khun* Wanpen, Organic Farmer)

Drawing from these statements, the work of organic farmer is an arduous set of tasks that not many farmers are able or willing to undertake by themselves. Extended families, capital resources and land ownership all bear upon farmers' choices.

5.3.3 Access to Capital

A reduction in costs through the elimination of agro-chemicals is a common theme in research pertaining to organic agriculture in Thailand (Hutanawat & Hutanawat, 2006; Kiatsuphimol, 2002; Samerpak, 2006). Similar to previous findings, participants learned to make organic fertilizer as a means to reduce costs. Farmers also expressed that after they completed the transition to organic farming they were better off financially. Despite mention of the financial advantages of organic farming outstanding loans were common amongst participants. Perhaps, this situation is due to the predominance of government loan programs as a way to assist farmers (Preedasak & NaRanong, 1999).

Some participants said they accessed loans through the One Village One Million Baht project under the Thaksin Administration (1999-2004). However, the most common source of loans was the Bank of Agriculture and Cooperatives (BAAC) (Ratanamalai, 1999):

> I used to borrow money from the BAAC, but after shifting to organics I paid off my debt in the third year (*Khun* Baanyen, Organic Farmer).

Participants further explained the financial aspects of a transition from conventional to organic farming in relation to a reduction in debts:

> As conventional farmers we had high debts. The learning curve is a changeover stage of 1-3 years, there was even higher investment because the land needed to adjust that is to redo the size of the rice field, water management, learning to make fertilizer and EM. Starting to earn production, less investment, less debt and so on. I gained better production after I changed to do organic farming and it took about 3-4 years after the change (*Mae* Somparn, Organic Farmer).

> I reduced the investment and have a higher savings rate and lowered expenses because I have everything to eat in my property, soon I will pay off all my debts (*Khun* Somwang, Organic Farmer).

However, some farmers felt trapped in the cycle of debt incurred over many years of agro-chemical usage:

> I think that only 1% of farmers are free of debt (*Khun* Sunaret, Organic Farmer).

> Debt is hard to get off as it is a continuation from before. The organization also increases the rate of interest (*Poh* Arun and *Poh* Woradej, Organic Farmers).

In some instances debt is unrelated to agriculture. Organic farmers take out loans to fund their children's education, pay out dowries and afford modern amenities:

> I borrowed money from the BAAC, to send my kids to university (*Poh* Woradej, Organic Farmer).

> I borrow money from the agricultural bank and the one million per village project to send my children to school, still making payments on the loans (*Khun* Wanpen, Organic Farmer).

> I borrowed money from the bank to buy a pick-up truck for my son-in-law (*Mae* Pornchai, Organic Farmer).

> All members of the group have debts since the BAAC started to provide loans, 99% of farmers have their own land, but it is collateral for their loans (*Poh* Suvit, Farmer).

Some participants perceived that organic agriculture was a good investment based on a reduction in capital requirements:

> It is better to be an organic farmer because my land is totally without chemicals and it helps to reduce my investment (*Poh* Phanomporn, Organic Farmer).

5.3.4 Marketing Channels

Farmers in these communities explained that Green Net/Earth Net (GN) provided support through representatives placed at rice mills. According to farmers' responses, the GN price was one baht higher than what is usually offered in the market. Farmers enjoyed the incentives provided by GN:

> Compared to the market price, we get a better price with GN (Poh Prayoon, Organic Farmer).

> Organic rice is a market need and has a higher price than chemical rice. Green Net members get a minimum guaranteed price and they will get a profit share once a year, Green Net agreed to pay half of transport costs in 2008 (Organic Farmers - group interview).

However, some farmers expressed reservations with the requirements of organic certification schemes:

> In Dong Yang, there are fifty organic rice farmers, thirty joined GN and twenty sell directly to the middleman, the reason they don't want to join GN is they think the buying process from GN is too complicated[2]. More importantly they don't want to attend meetings. The twenty that don't join still get a higher price for their rice through other buyers (*Poh* Eam, Organic Farmer).

> The Rice Mill should explain the calculation for each section more clearly. In the slip (GN) should put the total amount of money they should receive from the harvest, not just the grade and deductions. They should have suggestions or advise for farmers on how the quality will affect the price. I heard that somebody puts their hand in the bag, which creates moisture (Organic Farmers - group interview).

Despite some drawbacks, GN membership offered a variety of benefits and provided a stable outlet for organic farmers' products. Moreover, GN facilitated knowledge exchange between organic farmers and guidance in the organic certification process.

[2] Analysis of moisture percentages, soil samples, and general quality requirements were all part of organic certification requirements.

5.4 Building Organic Farming Knowledge

The acquisition of organic farming skills was critical to building self-reliance. Not only were farmers taught the methods of organic farming, external organizations provided funds for accomplished organic farmers to share learning with others. In many cases these prominent organic farmer-teachers also acted as leaders of community-based cooperatives. Through training courses, and exchanging knowledge, participants gained a wide variety of information about organic farming methods. Organic rice farmers kept seeds from previous harvests, cultivated different varieties, and traded seeds with each other. Based on their 'tacit knowledge', participants perceived that organic methods were a better long-term strategy for rice cultivation.

5.4.1 Farming Methods

Most of the farmers in this study used similar techniques to augment soil fertility. These techniques were traced back to the support organizations that provided training to participants. Moreover, organic extension groups and government agencies hired local farmers based on the extensive knowledge they gained through their work (Table 5.2):

Table 5.2: Summary of Chemical versus Organic Farming Methods

Chemical	Organic
• high capital investment • apply fertilizer twice a season • weeds grow quickly • have to apply herbicide • rice stalk and leaf beautiful/seed weight emaciated • soil hard • few fish and crab	• low investment • apply fertilizer once • strong stalk • leaf not so beautiful, but the seeds are healthier and more quantity • suits the market need • improves quality of soil • more fish and crab in the paddy

Source: *Poh* Woradej, Organic Farmer

Participants expressed that they were strongly against any kind of chemical application to their fields. Many farmers produced their own fertilizer with chicken, cow or buffalo manure as a principal ingredient. Participants reported that rice straw was laid over young plants to retain moisture in the soil or kept to feed livestock. After rice was process the by-products of the husk were reused in fertilizers. Participants learned to produce different types of bio-fertilizers for use on their farms:

> I never buy chemical fertilizer; I use chicken manure which I buy from the Pak Ruea Rice Mill, I also make my own fertilizer from cow manure. I collect my own seeds (Mae Pornchai, Organic Farmer).

> Since I joined the organic group I never buy chemical fertilizers or pesticides, I make my own fertilizer and collect my own seeds (*Mae* Bangon, Organic Farmer).

Homemade Effective Microorganisms (EM) was another type of bio-fertilizer used by most organic farmers. Participants reported that EM was used along with manure and processed organic fertilizers. They also created special hormones to improve the growth of fruit through a fermentation process similar to that used to produce EM. As no pesticides or herbicides were permitted in organic agriculture programs, participants hand weeded gardens and used various methods to rid their rice fields of pests.

5.4.2 Pest Control

Organic farmers reported that they suffered less pest problems than Central farmers as they cultivated a variety of local rice breeds. While organic farmers stated that integrated farms were the best protection against invasive species, an increase in biodiversity also meant a decrease in the rice harvest. Nonetheless, informants were confident in Mother Nature's abilities to create ecological balance and provide a variety of natural food sources:

> Many natural pests are the best solution, spiders, frogs and grasshoppers live in my rice field and eat the insects, they are all part of the food web. We might lose 5% of the harvest to animals, but they are all part of the

> food web. By giving away some of our harvest we are making merit (*Poh* Nikom, Organic Farmer).

To protect their farms from natural enemies, farmers also stated that it was important the soil had the right amount of nitrogen. Pig and chicken manure was a common type of fertilizer[3] for organic farmers. However, overuse of these manures contributed to excess nitrogen levels and caused rice stalks to grow greener and thicker than normal. These enlarged rice stalks sometimes attracted insects. To counteract this problem, farmers added calcium and potassium to the soil.

Despite some optimism over nature's ability to create balance in the agro-ecosystem, there were some pest infestations that caused damage to the rice harvest such as cherry snails, stink bugs, and rice crabs. Organic farmers used different methods and concoctions to rid their fields and vegetable gardens of excess pests. Several methods involved spraying diluted mixtures over the affected areas:

- A mixture of local herbs fermented over several months, of which the principal ingredient is the *Sadao* leaf
- Wood vinegar, a by-product of the charcoal making process

While other forms of pest control were more labor intensive:

- Growing *Dao Ruang* flowers (marigolds) were reported as a measure to rid vegetable gardens of unwanted insects
- To decrease cherry snail levels, some farmers raised ducks
- Hand removal of pests such as snails which also were collected for use in bio-fertilizers.
- Rice crabs were caught in special traps with broken rice and then collected for home consumption.
- For stinkbugs ripe papayas were placed near an infested location, were they would swarm and then could be collected.

[3] Organic certification requirements stated that chicken manure could not be used if sourced from factory farms.

As exhibited above the work of organic farmers was time consuming and many of these natural pest control methods required multiple applications. As most of these products were made by the farmers themselves, they required additional investments in time.

Many of the methods discussed above have been refined and altered based on the 'tacit knowledge' of local farmers. To share this knowledge farmer groups and support organizations developed 'explicit knowledge' systems to disseminate information to farmers in remote locations. Video CDs, power point presentations and books were used along with farmer field schools to share knowledge with other farmers. Nonetheless, the development of these programs required funding and technical advice from governmental and non-governmental organizations.

5.4.3 Training Programs

Participatory training programs were a key objective of the non-profit organizations discussed in this study. While, local organic farmer experts were the prime source of knowledge, some organizations provided financial support and introduced innovation. Farmers typically attended these courses out of interest, an opportunity to strengthen social networks and sometimes for free meals. Government agencies promoted organic farming in Yasothon through local and national budgets. In many cases budgets were allocated to support project based around the Sufficiency Economy philosophy.

5.4.3.1 Sufficiency Economy

Many of the government projects in Yasothon province have gained seed funds through projects either supported directly or indirectly by the development of the Sufficiency Economy Philosophy (SE). Farmers were asked questions about their understanding of what is termed New Theory Agriculture (NTA) (see Chapter 2). While some participants were unclear about the specifics of the approach, most understood the meaning of SE. Many participants believed that organic farming was equivalent to NTA:

> People who do NTA differ from others as the King is their role model. We depend on ourselves, we are diligent. We live a simple life not full of wants and have improved mental health (*Mae* Pornthip, Organic Farmer).

> SE means to learn how to eat in one's own village/grow your own food. NTA means to have a reservoir, rice, and grow vegetables (*Mae* Pragai, Organic Farmer).

> We studied about SE and NTA theory from government documents and joined related training in town. We think SE is good for the farmer, because it reduces the cost of investment, you can grow what you like to eat, make it yourself and use it yourself. I don't think that our farm has reached the perfect NTA yet (*Poh* Somwang, Organic Farmer).

In some cases, organic farmers understood SE as building up self-sufficiency and food security:

> I think that SE means to depend on being diligent to produce your own food, depend on yourself, eat it yourself (*Mae* Somri, Organic Farmer).

While not all the participants in this study received direct assistance through SE programs, there were many initiatives to promote the concept at a village-level:

> Political leaders in my village support sufficiency economy projects, elected leaders have a positive effect on the community (*Khun* Bangon, Organic Farmer).

Few were critical of SE programs, but some expressed concern with the ways government officials excluded villagers from decision making:

> Sufficiency Economy is the way to make a living by doing anything you can by yourself on your land to make it into a source of food and earn a profit. However, I do not agree with the way New Theory Agriculture (NTA) is carried out, because

> it is has become a formula that is made by humans, not natural, nature should formulate things itself. However, NTA can help people to adapt the formula to fit each farmer's way of life. It also can become symbiotic with each particular environment. Government officers that come to promote NTA are not successful because the representatives themselves are not farmers, so they do not deeply understand the environment, and they are more concerned with managing the budget. So they do not see the potential, they do not see how the farmers or the environment are related to their efforts. When their projects are unsuccessful, they blame the village as the reason for failure, for example, the farmer did not cooperate or the farmer does not understand the program. Then the farmer feels that NTA does not suit their lives (*Poh* Suvit, Organic Farmer).

Based on responses, SE is part of the broad agricultural assistance programs that are well-suited to organic agriculturalists. While, organic farmers are in many cases recipients of SE supported programs, they possess knowledge on how to best allocate these funds. Moreover, some experienced organic farmers worked as trainers under SE development courses on a national level.

5.4.3.2 Government Assistance

Many government agencies on a local and national level had budget allocated to support sustainable agriculture programs. Some villages received direct government support for organic agriculture via provincial or district offices. In the course of this research it was found that many national and local government offices supported organic agriculture. The Bank of Agriculture and Agricultural Cooperatives also was reported as a provider of seed funds for training. Sometimes funds were used to hire non-governmental organizations to do the work. An interview with the Yasothon Provincial Agricultural Office exhibited the allocation of specific funds to support organic farming starting in the year 2004:

> Under funding from national level CEO Program in 2004, Yasothon initiated a safe and organic food program. The first level was safe food, without pesticides. The second level was organic agriculture. To support the program the Provincial Agricultural Office decided to train farmers on the adoption of a new vision. Through the cooperation of several outside institutions: the Army Center, the Dharma Garden Temple, the Agricultural and Technology College, Career Training College, and their Offices. This program was 3-days and conducted over a three year period (2004-2007) and trained 30,000 farmers. The CEO program ended in 2007 and there was no budget to continue this program.

To show the ways these funds were used in the areas of study, organic farmers were asked to talk about the types of training programs they attended:

> The Agricultural Extension Office, Provincial Office and Green Net organize training for villagers, introduce them how to make EM, and do mixed agriculture. Now Dong Yang has a farmer school, *Poh* Eam's land is used for demonstration and teaching purposes, it is organized by the Pak Ruea Rice Mill (Nai Woradej, Organic Farmer).

> *Poo Yai Baan, Kamnan and the Kaset Amphoe* (governmental officers - see Thai terms) support farmers on organic agriculture, they sometimes give a budget for training programs and sometimes give out seeds (*Poh* Boonkwang, Organic Farmer).

> The Skills Department (Ministry of Labor and Social Welfare) came to train the villagers, training is on how to do marketing or quality improvement, as we already have our own products (*Mae* Buathong, Organic Farmer).

Some participants were less positive about training programs support by government offices:

> Basically, our knowledge about organic farming was learned mostly from NGOs, the Thai government has a small amount of trainers. Organic farming is an independent form of farming whereby participants depend on themselves (*Poh* Suvit, Organic Farmer).

While, this section suggests that the *Kaset Amphoe* is active in promoting organic agriculture, participants stated these activities were carried out on a sporadic basis. And some participants reported that government offices also support conventional agriculture, particularly where commercial interests were intertwined.

5.4.3.3 Non-Governmental Training

The majority of farmers interviewed relied on Green Net/Earth Net Foundation support to facilitate training programs (see Chapter 2 and 4). However, participants also referred to programs they attended through the Community Development Organization, *Khao Khwan* Foundation, *Kyusei* Foundation (from Japan), the Local Wisdom Group, and the Sufficiency Economy Training Center in Saraburi. Accomplished organic farmers in these villages also served as trainers. Participants provided an overview of the training programs they attended:

> I went to training at Dharma Garden Temple, and believed I could do it right away. I joined organic farming in 2002. Next year we will set up an organic fertilizer processing center in my village (*Khun* Somwang, Organic Farmer).

> In 1999, I started to practice mixed farming from the King. I went to study at *Kyusei*. I studied EM and other organic support activities and I got seeds from *Kyusei* (Me Pragai, Farmer).

> I attended a training organized by the Community Development Organization, which taught about crop rotation, and tilling plants back into the soil (Poh Sompong, Organic Farmer).

> I overheard Radio 91.5 MHZ (from the Dharma Garden Temple). I tried to understand their approach and change my way of doing farming (Poh Suphot, Organic Farmer).

Training programs were integral to the way that farmers adopted organic agriculture and sustained these practices. While government programs were of lesser importance to organic farmers, there appeared to be a growing interest on the part of many local offices and to some extent in local public schools. Programs were aimed at teaching school children about Sufficiency Economy, providing some agricultural skills and a portion of school lunches.

5.4.3.4 Youth Education

Many schools in Thailand have small vegetable gardens. However, the school nearby the Nature Care Club offers a potential model for the Thai school system. *Khun* Chutima (Manager of the Nature Care Club Rice Mill) provided further information on their programs:

> The mission of our members is to go out and spread the knowledge to students, and provide a full circle program through making fertilizer, EM, growing vegetables, plants, and fruit all by organic methods. They also should raise animals such as ducks and fish, and teach them how to find a market for their products. Now they sell their products in the local areas, through the Green Market and other provincial markets.

Interviews with school teachers (also organic rice farmers) and students provided a brief summary of the program at the *Baan Sok Talaad Patana* School in Kudchum District. It was explained that *Khun* Chutima wrote a proposal to

the Thai Research Fund (TRF) to get assistance for an organic food program at this local elementary school. In May 2008, they received the funds to assist with a learning-by-doing type program for Grade 4 to 6 students. They also went out to real farms to study the work of farmers and learn from the Local Wisdom Group. As part of the project students helped to put together a summary report of their activities. This project is a one year program and at the time of my visit they were writing-up conclusions to send to the TRF for further funding.

Khun Chutima and *Khun* Tao came to assist teachers with the program. Teachers requested that students do their own research on how to take care of vegetables, raise frogs, and chickens. Students made their own fertilizer and EM to apply in the garden as well. Students sold the products at the Green Market every Saturday morning as a part of the program. A student in the playground explained how her activities on the school farm applied to all academic subjects:

> I learn math when I sell at the market and science such as how certain insects prey on each other. We also do internet searches to learn more.

Usually in the afternoons, the students were sent out to work on the school farm as part of their general responsibilities. Despite the strengths of this approach, it was found that this program was not intended to support organic meals as a lunch fund was provided under a larger government budget. Nonetheless, school-based organic farming programs provided a potential source of new farmers for Yasothon's alternative agriculture network. The involvement of organic farmers in school programs was part of building their knowledge based and building a new social structure in these communities.

5.5 Social Capital

This section provides a general overview of the formal and informal associations that were influential in the lives of organic farmers. Queries examined the social networks they joined to sustain organic farms and the organizations they

created to engage in non-monetary exchanges of goods, access production factors and maintain social relationships. Most organic farmer participants were active members of a local temple, a rice mill, a collective savings fund, and purchased some food items at a retail food cooperative. However, most farmers also acquired food from local fresh markets, noodle shops and large superstores. Participants joined small collectives to access the production factors necessary to make organic fertilizers. Only a few participants were involved in communal food production or exchanged food products.

5.5.1 Rice Mills

All of the participants interviewed joined an organization with a rice mill operation. The mill offered a place to exchange information with colleagues and access the marketplace. Several of the mills in this study contracted local people to assist with general operations. Farmers' primary source of income was organic rice and Green Net (GN) was the one of the biggest buyers in these areas, particularly for the Nature Care Club Rice Mill and the Bak Reua Rice Mill. In the case of Dharma Garden Temple farmers utilized various agents and focused more on the domestic organic market.

Most participants relied upon a rice mill for their economic success and as a social network:

> I sell organic rice to the Pak Ruea Rice Mill and they are trustworthy (*Khun* Pornchai, Organic Farmer).

> Our organic farmers have their own group, Heaven's Farmers, and we have a good reputation for the quality of our rice. We send rice to Pak Ruea Mill and other customers, the biggest is from Chantaburi (Mae Baanyen, Organic Farmer).

> I go to the Rice Mill to exchange knowledge and seeds, and members of the committee set rice prices and other benefits (*Khun* Sunaret, Organic Farmer).

The rice mill serves a purpose for both conventional and organic farmers by helping them to bring their produce to the market. However, the mill is a source of financial and social capital, drawing farmers into the formation of different sub-groups.

5.5.2 Cooperative Savings Funds

In this study, the three principal rice mills provided a community savings program for both organic and conventional rice growers. The fund is a way of bringing farmers' savings together to earn more interest, support mill activities, and provide loans to members. All members can borrow from the fund, and interest is quite low (1%) in most of these schemes, but members can only borrow small amounts. At Bak Reua Rice Mill they encouraged family members to send their children to the mill with weekly deposits to teach them the importance of savings programs. One participant reported that her daughter gave her back massages, and she paid her 100 baht per time, these funds were placed into the savings scheme on her behalf.

5.5.3 Communal Property

In many of the villages there are very few areas which are considered communal property. Temple land represents one the few vestiges of communal property in rural Thailand. Some Thai villages have community forests where local residents can access medicinal herbs. At Don Pung village land owned by the local government was set aside as a community vegetable garden, similar to the allotment system in the United Kingdom. Information on the vegetable garden was gathered from farmers on-site, the Cooperative Clerk (as the store is located next to the garden) and the local Green Net Extension Officer. It was explained that the land had served as a mulberry plantation for silk making, under a former government project. Eventually, people became too lazy to make silk and started to grow vegetables. The garden is located in the center of the village and expands over approximately five *rai*. Villagers inherit or take over small plots of land and grow their own vegetables there. Some used organic methods, but from interviews it was found that many applied chemicals. There was an abundance of vegetables and people of all ages working in the area engaged in watering, planting and general caretaking. According to participants, the *Kamnan* is in charge of the area, and the land is owned by the

government. A farmer told us that you can rent a plot for 20 baht from others and that it should be paid on each harvest of vegetables. She also suggested that there was some 'illegal' brokering of plots by those who are not interested in farming, but own the titles to various allotments.

5.5.4 Cooperative Stores

The cooperative store is a common feature of many rural villages and found in all of the locations in this study. Most of the residents expressed a preference to shop at the cooperative as it sells basic necessities such as soap, shampoo, snacks and alcohol. Many villagers made purchases and joined the cooperative store as members to participate in profit-sharing schemes:

> Twice a year, if the shop makes a profit they return these funds to the members. Members write down their purchases in a small book, but do not need to pay right away (*Khun* Watana, Clerk).

Members received this profit share twice a year. Moreover, as many of these villages are located far from a large retail store these cooperatives were an important source of household items in the community.

5.5.5 Communal Food Production

Dong Yang was the only village in this study with a commercial food making group, they call themselves the Housewives' Food Processing Group. The Center has a kitchen facility, storage area and a variety of tools; it was built with funds from the local provincial office that also supported organic agriculture in their community. They produced a multitude of snacks items for sale and provided work for unemployed and senior citizens. On multiple visits, it was observed that a small number of elderly women frying various items for sale. Villagers and members discussed the formation of the group:

> CDO and the Skills Department came to train the villagers to make products a long time ago. Recently when they came, they trained us how

> to do marketing and quality improvement as the villagers already had their own products (*Mae* Buathong, Organic Farmer).

> My wife joined the Housewives Food Processing Group, they produce snacks from organic rice such as *nang let* (crispy rice*), cow kiep* (shrimp crackers), and fried banana (*Poh* Eam, Organic Farmer).

Although, food production groups serve as a social safety net in a few locations, most farmers stated that they lacked extra time for these activities. And due to labor shortages farmers must concentrate on supporting their farms rather than building additional forms of income.

5.5.6 Communal Fertilizer Production

Communal fertilizer production was another common activity of organic farming groups in Yasothon Province. According to many participants, fertilizer groups help to reduce external costs. Participants stated that the shift to organic fertilizer represented the first step in the conversion to an organic farm. In some villages, farmers formed small collectives to produce organic fertilizer. Participants described some of their joint fertilizer making activities:

> I donated part of my property to build the Fertilizer Cooperative. We received a budget from the government and the farmers pooled money together (*Poh* Eam, Organic Farmer).

> In 2000, the Dong Yang Farmers grouped together to form an organic fertilizer cooperative (*Khun* Baanyen, Organic Farmer).

> Since I joined the organic group I never buy chemical fertilizers or pesticides, I make my own fertilizer and collect my own seeds (*Mae* Bangon, Organic Farmer).

Although, rice mills accommodate many activities, fertilizer collectives were not a common feature of these organizations. Some organic farmers made fertilizer individually, while others carried out the task in smaller groups.

5.5.7 Local Exchange

Participants exhibited a cooperative spirit and a strong desire to work together. Collecting seeds and sharing work with neighbors was a common among participants:

> Our local organic group is very helpful and work together, other villagers don't work together as much (*Mae* Pragai, Organic Farmer).

> I try to convince my friends and neighbors to do organic farming (*Khun* Somwang, Organic Farmer).

> I collect my own seeds and exchanges seeds with neighbors. I use the Buddhist teachings which refer to helping each other, such as self-reliance and a symbiotic type of living (*Mae* Buathong, Organic Farmer).

Although, some farmers worked together, it was found that the most common form of cooperation occurred between neighbors. It was not necessary that their neighbors were organic farmers, as organic farmers were also welcoming of *chemi* farmers.

5.5.8 Buddhist Associations

The participants in this study were all practicing Buddhists, and the village temple was social center of many communities (Wasi, 1998). Food fulfilled an important role in religious events. As there are numerous Buddhist holidays the villagers regularly convened at local temples and brought alms to make merit on auspicious days. In addition, villagers awoke in the early morning to feed local monks as they made alms walks through the village. In the case of Dharma Garden Temple,

their property served as a religious center and an extension agency. At village Temples, participants donated food and money during religious celebrations:

> My mother is the cook for our home, and we always go to make merit every time and donate food/volunteer labor (Nai Woradej, Organic Farmer).

> I help with local festivals by donating labor, money and food products (*Poh* Somjai, Organic Farmer).

> I always help out at the Temple, and family parties such as weddings, when I go to these events I bring my own fruit and vegetables. I grow ornamental plants and flowers to bring to the temple (*Khun* Bangon, Organic Farmer).

As Thais are predominantly Buddhist, the Temple is a feature of most Thai villages both large and small. The Temple historically served as a school and place of worship (Panya, 1996). While some of the monks in this study had a considerable influence on local culture, some did not bear upon the uptake of organic agriculture or preach environmentally friendly values.

5.6 Well-being in the Communities of Organic Farmers

The concept of farmers' well-being was examined through rural agrarian perspective, based in the socio-cultural values of farmers in the region. Spirituality, food security, health, and environmental values influenced organic farmers' well-being. Notwithstanding, organic farmers' way of life depended on their financial status and the ability to access capital. However, through membership in organic farmer groups participants reported the ability to leverage improvements in their mental and physical health, spirituality, and food security through integrated and organic farms. Some farmers expressed that health and financial benefits were an integrated outcome of a shift to organic farming methods. Farmers' subjective well-

being was supported by an appreciation of the improvements they made in their natural environment on their farms. The result of these improvements was an abundance of natural foods that were sufficient to provide for family dietary needs and sell an excess to a specialized marketplace. Although, participants expressed a combination of reasons for making the shift, perceived health benefits were the most common response when prompted to explain their initial decision to make a shift to organic farming systems; and the benefits of their new way of life.

5.6.1 Health

Based on findings, organic farmers' health improved as a result of the changeover to organic farming methods. As reported by farmer leaders in Chapter 4, many organic farmers converted to organic agriculture as a means to remedy their health problems. Participants stated that *chemi* (chemical-based) farming had contributed to headaches, skin rashes, and a variety of other ailments. Participants told stories of family members and friends who contracted serious illnesses such as cancer from *chemi* farming. In many cases, participants perceived a link between conventional farming and their poor state of health. While, some doctors told farmers that these afflictions were due to the long-term use of chemical fertilizers, pesticide and herbicides. Participants described the ailments they attributed to chemical farming:

> Chemical farming used to make me sick, I could not breathe properly, my stomach hurt and I got diarrhea, I had to go to the doctor quite often (*Nai* Woradej, Organic Farmer).

> When I did chemical farming I used all types, I often got sick. Before I changed over I went for a complete physical, they found chemicals in my blood, this worried me and this made me decide to changeover (*Poh* Boonkwang, Organic Farmer).

> My brother died because of chemicals in 1993, he was 38 years old. I passed out because of pesticides in 1995 and then started to reduce the amount of chemicals on the farm. I went to see the doctor twice a month to

> take some medication which reduced toxins in his body. My wife convinced me to do organic farming, because she was concerned about my health, and our debts, as we had 3 kids to send to school. My wife was afraid I might also die. And my father had "*chemi*" related chest pains (*Khun* Somwang, Organic Farmer).

Some farmers reported that they felt better soon after a shift to organic farming and that their physical strength improved as well:

> Life is much better than before, because I was allergic to chemicals and got rashes and itchiness from chemicals, now I am healthy (*Poh* Onsri, Organic Farmer).

> It is better since changing to be an organic farmer because my family is safe from chemicals (*Mae* Amporn, Organic Farmer).

Several participants expressed that health and financial benefits were interrelated:

> They can rely on themselves: better health, and better income, because they have low investment – as they can sell rice and other products that they can produce on their farm (*Poh* Boonkwang, Organic Farmer).

> My health is much better after a change to do organic farming. Fertilizer investment decreased, chemical fertilizer is expensive, and organic fertilizer has a good price (*Poh* Boon-Ruang, Organic Farmer).

Perceived health was a driver in the shift from conventional to organic farming, participants reported that organic farming methods contributed to a reduction in debts, (Samerpak, 2006; Thongtawee, 2006). Based on interviews health steadily improved in the period after participants shifted to organic agriculture. Improvements were explained not only in terms of absence of illness, but their overall strength was better. Participants expressed that a reduction in synthetic agro-inputs led to better finances, health and more productive agro-ecosystems.

5.6.2 Household Food Security

Participants grew a large variety of crops, especially, fruit, vegetable, organic jasmine rice for sale, and sticky rice for home consumption. Fruit was a supplemental crop and many organic farmers had fruit trees growing throughout their rice fields. Fruit trees also contributed to the biodiversity of the paddy, leaf litter as fertilizer, and served as a form of shade (Grandstaff *et al*., 1986). Vegetables were mainly grown after the harvest season in the winter. Farmers also cultivated vegetables as a product for sale or for family-based consumption. Legumes were grown mainly as a form of green manure to increase nitrogen levels, while some types of legumes were sold (i.e. string beans and peanuts). Farmers also raised a variety of domesticated animals such as fish, chickens, ducks, pigs, cows and buffaloes. Wild fish and frogs were another important source of nutrition, and on organic rice fields these animals were said to occur naturally (Somnasang *et al*., 1998):

> In my farm I have ponds to raise fish. Ducks, chickens, pigs, cows, and buffalo, this is the other reason why I don't need to buy food from outside (*Mae* Buathong, Organic Farmer).

> I raise much of my own food: fish, chickens, vegetables for self-consumption, not for sale, Coconuts, papaya, noni berry, mango, and sapodilla (*Mae* Pragai, Organic Farmer)

> In my farmland, there is a pond which contains natural fish, free-range chicken for sale, and cows. There are vegetables, fruit trees both at home and in our farmland. I give produce out to cousins and neighbors (*Mae* Somri, Organic Farmer).

According to one respondent, the presence of passion fruit vines indicates the home is of an organic farmer:

> The passion fruit vine is a sign of the home of an organic farmer, organic farmers like to experiment. They eat some of the fruit and keep the seeds to grow (*Poh* Wichit, Organic Farmer).

Based on interview data, few farmers were self-sufficient in terms of food production. It was found that most farmers purchased basic household items (e.g. soy sauce, oyster sauce, sugar, and salt) from a local cooperative or small retail stores in their area. There were small carts that circulated throughout the village selling fruit, vegetables, and meat products that were popular among villagers. Those who travelled to sell their goods or produce at the district fresh market often purchased additional food items prior to their return home. A few of the participants stated that they occasionally went to big superstores like the Big C in Yasothon City. According to participants, a visit to the Big C also provided a form of entertainment. Participants discussed food acquisition methods as follows:

> I never buy vegetables from food stalls, once in a while meat, I mostly fish in my pond and have never been to big retail store or superstores (*Khun* Pornchai, Organic Farmer).

> I often buy fish from other villagers (who catch their own) and then keep them alive (in water) till I am ready to eat them (*Mae* Tongda, Organic Farmer).

> I don't like to go to Big C and other retail stores, but my daughter and son sometimes go, so I go once or twice a year, but I don't like to waste money on travel, when I see the products I want to have everything (*Khun* Wanpen, Organic Farmer).

> I often buy cooked food and meat from the local food stand for my niece. I go to a retail shop in the market area when I go to sell stuff in the market, but I don't go to Big C as it is too far and I have no time to travel (*Khun* Sompong, Organic Farmer).

> I only go to Big C twice a year to see the outside world (*Khun* Pornthip, Organic Farmer).

Participants usually took their meals at home, while a few purchased processed foods to take home or ate at small noodle stands in the village. Cooking was primarily done by the farmers themselves, or in a few cases by an elder relative who lived with them. Food carts circulated throughout the villages selling cooked items and snacks.

> I always cook my own food, buy some snacks from outside and rarely eat out or with other families (*Khun* Pornchai, Organic Farmer).

> I make food for my family, sometimes my Mother, cooks for the family (*Khun* Bangon, Organic Farmer).

> My wife does all the cooking, we never eat out (*Poh* Boonkwang, Organic Farmer).

The number of meals prepared at home depended on the location of their extended family and the sources of food available to them. Many participants were found sharing meals together at various times of the day.

5.6.2.1 Commercial Food Sales, Trade and Purchases

Most participants did not sell or trade food in the village, even less sold their produce at local fresh markets. However, a number of participants travelled to the Green Market organized by the Green Net/Earth Net Foundation. A few of the participants prepared special dishes to sell at the fresh market. Many participants stated that as rice cultivation filled the majority of their working day, they had little time to enter into the commercial food trade. The few participants who made food products were asked to describe the ways they traded and sold them:

> My wife and I make *Patong Goh* (similar to a donut) for sale in Khamkhungaeow every day and on the way home we buys some food products (*Poh* Woradej, Organic Farmer).

> I prepare some foods such as fried pork and fresh spring rolls to sell at the market (*Khun* Pornthip, Organic Farmer).

> I never exchange any food products with neighbors as I have very little surplus vegetables or fruit (*Poh* Saweng, Conventional Farmer).

The sale of food products was not a common characteristic of the participants in this study as most produced only sufficient quantities for home consumption. However, for some, fresh markets were a chance to earn additional income outside of the rice harvest.

5.6.2.2 Food Processing

Although, many of the organic extension agencies and support organizations aimed to generate self-sustaining agricultural communities, organic farmers acquired packaged food products at retail shops similar to urban Thais. Despite these findings, a few farmers strived to attain independence from the marketplace:

> I do some food processing: pickled mango and dried mango mostly not for sale, but to trade or give away as presents (*Mae* Pragai, Organic Farmer).

However, as most participants did not grow large quantities of edible crops besides rice, surpluses were given to neighbors or kept for personal consumption. In a few villages, farmers manufactured products from the surplus, such as dried fruit to sell at the local market.

5.6.2.3 Organic food

As organic extension organization aimed to encourage farmers to consume their own products, participants were asked to discuss the meaning of organic food. Most participants ate their own rice and were able to access naturally occurring organic products in their paddies. Moreover, some participants expressed a fear of eating food that came from chemical farms:

> If there is an exchange of food between myself and fellow chemical farmers, I will give it away and not consume it. If

> my neighbors are eating a meal from a chemical farm, I will not eat the food (*Poh* Kanit, Organic Farmer).
>
> Organic food means no chemicals and indigenous food, safe food means it might have chemicals, but at a safe level (*Mae* Buathong, Organic Farmer).
>
> Organic food is natural food and protects you from illness (*Khun* Bangon, Organic Farmer).
>
> Organic food is the food that you can trust, it does not contain chemicals, it is not equal to safe food and you can't trust it like organic food (*Mae* Somri, Organic Farmer).
>
> Organic food is different from safe food, organic food is the food that you know is completely without chemicals and you can eat it without any doubts. Safe food is the food that has the stamp of approval from some formal organization, but it is not 100% safe. For example, the FDA stamp should make it safe, but it is not safe like it supposed to be (*Poh* Suvit, Organic Farmer).

Participants clearly understood that organic food was grown without any chemicals at all. They expressed a range of definitions that exhibited a clear understanding of the benefits they derived from their transition to organic agriculture. Many participants expressed distrust in Thai certification schemes as there were several standards issued by different organizations with varied levels of credibility (Roitner-Schobesberger *et al.*, 2006).

5.6.3 Spirituality and Environmental Values

Extension groups aimed to show the ways that ecologically-sound farm systems were an attribute to farmers' spiritual and physical well-being (Agri-nature Foundation, 2008; Thongtavee, 2006). While government initiatives to promote food

safety and security were of influence in these communities, organic farmers' decisions to use organic methods was in many cases based on a Buddhist concept of morality. Based on a literature review of the Thai alternative agriculture movement, Buddhist teachings were used as a vehicle by many extension groups to teach environmental stewardship (Falvey, 2000; Rigg, 1997). As all the participants in this study were Buddhists, queries aimed to understand their concept of spirituality as related to farming practices. Participants were asked to describe the relationship between themselves and the natural environment. And to explain the importance of Buddhist practices in the process of organic farming. Many farmers mentioned the Five Precepts of the Buddhist Scriptures when asked about the meaning of nature (ibid):

> I believe organic farmers must believe in themselves to produce organic food in order to protect nature, the Five Precepts help farmers to be honest (*Poh* Peng, Organic Farmer).
>
> I believe the Five Precepts are a good path for organic farmers, because they do not kill other organisms (*Mae* Pikul, Organic Farmer).
>
> Without the Five Precepts in a farmer's heart they can't be a true organic farmer, because they might easily break the rules (*Mae* Boontham, Organic Farmer)

Farmers were prompted to explain the difference between *dhammachart* (nature) and *singwetlom* (environment):

> The difference between nature and the environment is that nature is something you can touch and it happens on its' own, the environment is both nature and other things that humans build (*Nong* Bia, Organic Farmer).
>
> Nature is real, touchable and doesn't need technology. Nature is for example, the air and the wind, it makes you feel refreshed. In town you

> need air-conditioning to feel refreshed, and without electricity it is useless (*Mae* Porn, Organic Farmer).

Farmers linked organic farming to concepts of environmental stewardship, but their responses exhibited a more spiritually-based connection to nature:

> Organic farmers love Mother Earth more than chemical farmers and avoid killing other lives (*Mae* Kamphon, Organic Farmer).

> It is agriculture that you can depend on, to reproduce it needs nature to support it, and farmers must also support nature (*Mae* Pungpah, Organic Farmer).

Despite responses that suggest the presence of a Buddhist ecological worldview, many participants had a more practical understanding of nature as a service. These participants linked the integrity of the natural environment on their farms to greater health, food security and an improved state of well-being:

> Better soil, soil is much healthier.
> Better ecosystem: more natural food such as fish, crab, snail, and shrimp. More natural vegetables occur.
> Less shopping, because you can grow anything, such as vegetables and fruit in healthy soil (*Mae* Kluay, Organic Farmer).

> The quality of life of organic farmers is better than chemical farmer because they have better health, a variety of natural food. In other seasons, chemical farmers come to buy from organic farmers or ask if they can come and hunt for crab, fish, frog, shrimp and some wild vegetables (*Poh* Kanit, Organic Farmer).

In several queries, organic farmers were prompted to discuss the differences between themselves and conventional farmers in terms of religious practice. Participants' revealed decision making based on a Buddhist concept of morality:

> To be a devout Buddhist, Buddhists must live in harmony with other lives, protect the environment and microorganisms, to keep the environment in balance, so farmers can keep the rice field in balance (*Mae* Kampoon, Organic Farmer).

> Organic farmers are more devout Buddhists, because the organic farmer has more morals in order not to kill lives and is more honest (*Mae* Jansri, Organic Farmer).

> Organic farmer are more devoted to Buddhism, because to be a true farmer one must study and practice Buddhism in order to be able to talk about organic farming with others (*Poh* Si, Organic Farmer).

> Organic farmers are more devout Buddhists because chemicals kill lives (*Mae* Pin Anong and *Mae* Mohn, Organic Farmers).

> Organic farmers are more devout Buddhists because we are not greedy (*Mae* Wanee, Organic Farmer).

One farmer explained the ways morality, nature, health, and financial well-being were all a characteristic of organic farmers:

> They are generous, ethical and moral. Chemical farmers are not good because they do not depend on themselves, grow one crop, have to buy other kinds of food, their income comes from one product only. Their health is not good – and they have chronic illnesses, they don't care about nature (*Poh* Boonkwang, Organic Farmer).

However, some farmers felt uncomfortable about making comparisons between themselves and conventional farmers:

> Organic farmers are more devout than chemical farmers, it all depends on each person, but it doesn't have anything to do with farming (*Poh* Ratri, Organic Farmer).

> I disagree that organic farmers are more devout Buddhists because any Buddhist can be devout (*Mae* Ngern, Organic Farmer).

> Buddhism teaches people to love nature, but that does not mean that chemical farmers are less devout (*Mae* Malaa, Organic Farmer).

Finally, organic farmers were asked to discuss some of the rituals related to Buddhism with an emphasis on the *Heed Sipsong* (12 customs) to determine if Buddhist teachings about the natural environment were part of the local culture (see Chapter 2). *Poh* Nikom, an organic farmer-leader offered his interpretation of the *Heed Sipsong:*

> Before the rice is sown the family performs a ritual. First we say a prayer: *satoo duu* (pali-sanskit), we want to grow rice and fruit in the soil, we wish that Mother Earth will take care of the soil, and help the plants to provide a bounty for eating, giving, and sharing with others.

Poh Nikom further explained the importance of Mother Earth, the Rice Mother, and the Water Goddess in the practice of the *Heed Sipsong*:

> Mother Earth – no matter where you fall, or where you are, you fall into the soil. Rice represents all kinds of food that come from the Earth. And you need water. Every single drop of water is from the Water Goddess.

I asked some other organic farmers to describe the rituals they conducted to show respect for these deities:

> All farmers practice the *Heed Sipsong*. They make reverence to Mother Earth by pouring water at the base of a tree (Mae Pragai, Organic Farmer).

By chance I observed a female organic farmer performing ritual to Mother Earth shortly after the December rice harvest. This ritual entailed placing offerings of betel nut, tobacco and sticky rice on four large leaves that were placed at the base of a tree. Each reported that each leaf represented one of her relatives. She then made prayers to Mother Earth, lit three candles and stuck them into the ground. Last she poured water on to the base of the tree.

In the perspective of participants, organic farming was not only an ethical decision, but a practice related to their cultural traditions. Nonetheless, this Buddhist ecological worldview also offered tangible benefits. Organic farmers built diverse food systems that afforded them greater food security and diverse sources of income. The decisions farmers made around the natural environment were influenced by Buddhist teachings, and a necessity to conserve scarce resources.

5.7 Summary

This chapter explored the drivers that influenced a shift to organic farming systems (Table 5.1). While, data shows that organic farmers may work harder than conventional farmers, their livelihoods and concerns were similar. Nonetheless, organic farmers were dependent on affiliations with rice mills, organic extension agencies, non-profit organizations and the work of government bodies to support their way of life. Sufficiency Economy and national level sustainable agriculture programs have helped farmers to gain access to technical skills and resources that support organic farming. Government credit schemes have been instrument in building rice mils. As discussed in Chapter 4, the machinery available at the mill was critical to adding value to the price of organic rice. However, the mills in these communities were unable to assist organic farmers with the rice harvest. Not unlike conventional farmers, many organic farmers hired laborers to harvest and thresh the rice. And when available a mechanized harvesting machine was enlisted to speed up the harvest and reduce spoilage.

Financial incentives and an access to a stable marketplace was an important incentive to organic farmers; and without price premium few farmers would opt for organic agriculture certification. On the other hand, rising conventional rice prices, and the multiple harvests enabled by the use of agro-chemicals have encouraged some farmers to opt out of organic farming programs. In this respect, the availability of government loans has acted as a disincentive for the adoption of organic agriculture.

Hence, the morality of some farmers appears to have influenced their decision to sustain organic farming in the long-term. All the while, this process is not an individual one, as organic farmers rely on the strength of their groups and the leadership in their communities. The role of extension groups, Buddhist monks (*Kruba*), local farmer-experts and their colleagues have all contributed to sustaining the organic farmers in this study.

Organic farmers expressed that their new way of life was preferable to their former life as conventional farmers. When prompted about the benefits of organic farming, participants expressed that they felt wealthy in terms of food, rather than capital on hand. Findings show that organic farming required a great physical effort, a willingness to learn new farming methods, and spend added time on the farm. Participants explained the ways that their physical efforts contributed to the improvement of the natural environment on their farms. They observed increased levels of biodiversity in their rice paddies (i.e. fruit, vegetables, soil-based organisms). They described the food they produced as “safe” and they had the added benefit of access to naturally occurring food (e.g. insects, frog, fish, shrimp and natural vegetables) within the environment of their own farms.

Membership in a collective was critical to sustaining their way of life. All participants worked with a rice mill or associated collective that was certified to process organic rice. Under the rice mill collective, farmers were able to pool capital and other resources to gain access to the factors of production. However, many farmers also joined smaller collectives located closer to their homes. Fertilizer collectives emerged as a key point for accessing knowledge, natural resources and building social relations.

In Chapter 6, an instrument was designed to carry out structured queries with participants about the key drivers and outcomes of shift to organic farming systems in their communities. The key questions in this instrument were derived from analysis of qualitative findings. In Chapter 7, the associations between participants' worldviews, knowledge, ways of practice; and the outcomes of a shift to organic farming systems are examined through the use of inferential statistics. The final chapters of this thesis integrate qualitative and quantitative findings with the aim of providing an interpretation of the entire process.

CHAPTER VI
MEASURING DRIVERS AND OUTCOMES OF SHIFT TO ORGANIC FARMING SYSTEMS

This chapter examines the key drivers and outcomes of a shift to organic farming systems in the communities of informants through structured methods. Qualitative findings and analysis from Chapters 4 and 5 are clarified and supported through the presentation of structured data on worldviews, agricultural knowledge, organizational affiliation and the outcome of these actions. In the first section, data gathered through an agricultural survey exhibits the demographic characteristics of participants in this structured phase of the thesis. Second, the perspectives of organic farmers' are shown through frequency distributions and explained with qualitative data.

6.1 Introduction

Building upon the researcher's analysis of qualitative findings, this chapter examines the influence of farmers' worldviews, ways of knowing, and ways of practicing agriculture on their well-being. As findings suggested that farmers' worldviews were a key factor in their decision to adopt organic farming methods, this chapter focused on the beliefs and values that underscored participants' decision making. Agricultural knowledge acquisition was another significant driver of organic farming and primarily an outcome of learning fertilizer methods on training courses and exchanging knowledge with peers. Participants' agricultural practices were influenced by both knowledge acquisition and access to the factors of production. Notwithstanding, responses showed that worldviews, agricultural knowledge and ways of practice were not always clearly differentiated in the perspective of organic farmers.

The benefits of a shift to organic farming systems were a product of participants' perception of their financial status, physical health and to some extent their household food security. Many participants indicated that they were able to

improve their financial status (reduce loans) through the adoption of organic farming methods. Health emerged as an important aspect of participant's initial decision to make a shift to organic farming methods and as an indicator of their well-being (Table 6.1):

Table 6.1: Key Drivers and the Outcomes of a Shift to Organic Farming Systems

Drivers	**Factors**	**Indicators**
Worldviews	▪ Beliefs ▪ Values	- marketing networks - environmental values - religious practices - collective values
Agricultural Knowledge	▪ Learning process ▪ Information exchange	- local expertise - training related knowledge - learning from family - observations/induction
Ways of Practice	▪ Factors of Production	- fertilizer making - green manure - animal husbandry - access to machinery - cooperative access - access to capital
Outcomes	**Factors**	**Indicators**
Perceived Well-being	▪ Spirituality ▪ Health ▪ Financial Status ▪ Self-reliance	- Buddhist practice - health status - loans - debt decrease/increase - food security

6.2 Key Drivers and Outcomes in the Communities of Organic Farmers

This section exhibits significant demographic variables, measures of participants' worldviews, ways of knowing, and ways of practice through descriptive statistics. Questions were designed to examine the changes farmers underwent through the adoption of organic farming methods; and to further examine their key concerns through quantitative methods. Although, demographic variables were not statistically significant in the decision of participants to 'go organic', it is evident that the 75

participants in the structured component of this thesis shared a common socio-cultural background. Most farmers presented themselves for interviews in groups of two or more participants. Participants were small-holder organic farmers (less than 50 *rai*[1]) as per the definition put forth by the Green Net Cooperative/Earth Net Foundation. Most farm holdings were located nearby participants' homes, while some farmers traveled longer distances, anywhere from one to twenty kilometers to reach their rice paddies. The communities of farmers were located in three districts of Yasothon province and linked with the three main farmer groups discussed in Chapter 5: Kudchum (Nature Care Club), Patiew (Dharma Garden Temple) and Mahachanachai (Pak Reua Rice Mill).

The majority of participants were female (72%), over the age of forty (85%), Buddhist (100%), and married (92%). The high percentage of females was based on their availability, as male farmers showed a lower tendency to present themselves for interviews (Table 6.2):

Table 6.2: Demographic Characteristics of Yasothon's Organic Farmers

Gender	**(n)**	**%**	**Ages**	**(n)**	**%**	**Religion**	**(n)**	**%**
Female	54	72.0	> 40	11	14.6	Buddhist	75	100
Male	21	28.0	40 +	64	84.4	Other	0	0.0
Total	75	100	Total	75	100	Total	75	100
Marital Status	**(n)**	**%**	**Land Ownership**	**(n)**	**%**	**Farming Districts**	**(n)**	**%**
Married	69	92.0	Rent/own	15	20.0	Mahachanachai	23	30.7
Single	3	4.0	Own all	60	80.0	Patiew	23	30.7
Widow	3	4.0				Kudchum	29	38.7
Total	75	100	Total	75	100	Total	75	100

Females represented a household of two or more members. In some cases, male household members either were involved in seasonal jobs or were not available for interview[2]. For example, one participant reported that her husband drove a taxi in Bangkok, while another participant raised her grandson as both parents worked in Bangkok. They owned most of their land (80%) and a lesser number (20%) rented

[1] 1 rai = 0.16 hectares

[2] It seems some participants had separated from their spouses, but I decided not to probe further into their marital status as it is deemed culturally inappropriate in Thai society.

additional farm land. Participants were evenly distributed in the three primary districts of location, with a slightly higher number from Kudchum District (39%).

6.3 Organic Farmers' Worldviews

This section measures participants' beliefs and values through structured queries. As the qualitative phase of this thesis showed that organic farmer-leaders expressed a "collective ecological worldview", related queries aimed to uncover if this was a prevalent trait among organic farmers (Capra, 1996; Curry, 2000; 2003; Goldsmith, 1996). Participants' spirituality, understanding of the natural environment, and the concept of 'collectivity' are shown through their membership in formal groups. While worldviews also were influenced by family, friends, and religious leaders, participants' organizational affiliations provided guidance and weighed upon their decision to maintain organic farming systems in their communities.

The creation of marketing channels for organic rice was a critical to the livelihoods of the farmers in this study. The farmers at Pak Reua Rice Mill received logistical support from a Green Net staff member based at their mill. As the Nature Care Club was better established they hired their own liaison whose main responsibility was to work with Green Net. However, both of the aforementioned mills sold organic rice to Green Net (Table 6.3):

Table 6.3: Key Marketing Channels for Organic Farmer Collectives

Marketing Channels	%	(n)
1) Pak Reua Rice Mill (Green Net)	33.3	25
2) Nature Care Club (Green Net)	18.7	14
3) Dharma Garden Temple	48.0	36
Total	100	75

In the case of the Dharma Garden Temple organic farmer members sold their rice through the Temple's Moral Rice Network (see Chapter 4). While a select group of Dharma Garden Temple farmers' were developing their own *Moral Rice* standard, they also joined the same organic agriculture certification program (ACT accredited

by IFOAM) as Green Net Farmers (ACT, 2012; Green Net and Earth Net Foundation, 2008). Although the development of a market for organic rice was a factor in reducing household debt, findings show the adoption of a new 'worldview' was an important factor in staying the course of organic agriculture.

The scholarly work of Henning (2003) and Kabilsingh (2008), Sivaraksa (1996) suggests that some Buddhism teachings suggest that humankind is interconnected with the natural environment. In Southeast Asia, scholars have drawn on these teachings as a foundation for promoting alternative agriculture (Falvey, 2000). With an aim to measure spirituality, participants were queried on different aspects of their Buddhist practice and the ways related beliefs influenced actions on the farm. When participants were asked about the importance of Buddhism in their everyday life, 64% stated that they "depended on the teachings as a way to live" (Table 6.4):

Table 6.4: Spirituality and Practice

Do you consider yourself a devout Buddhist?	**%**	**(n)**
1) I depend on the teachings of Buddhism as a way to live	64.0	48
2) I consider myself a Buddhist as I follow the teachings and make merit	24.0	18
3) I follow the teachings when I have problems	6.7	5
4) I have faith in Buddhism, but rarely practice formally	5.3	4
Total	100.0	75

Organic farmers exhibited a strong conviction to the Buddhist religion. Queries revealed that most organic farmers (69%) believed they were more devout than '*chemi*' farmers, while some participants added that all people were capable of showing a devotion to Buddhism, regardless of the type of farming they practiced:

Table 6.5: Spirituality of Organic and Conventional Farmers

Are organic farmers more devout Buddhists than "*chemi*"[1] farmers?	**%**	**(n)**
1) Strongly agree	69.3	52
2) Agree	20.0	15
3) Moderately disagree	9.3	7
4) Strongly disagree	1.3	1
Total	100	75

[1]*Chemi*, the Thai expression for chemical refers to conventional farmers.

In order to measure the relationship between farmer perceptions' of the natural environment and spirituality, participants were asked to assign a meaning to *dhammachart* (nature) from four selections (Table 6.6):

Table 6.6: Spirituality and the Natural Environment

Which statement best describes dhammachart?	**%**	**(n)**
1) To not harm each other and reduce world suffering	34.7	26
2) Humans are a part of nature	24.0	18
3) Humans and nature are two different subjects	4.0	3
4) Everything around us (trees, soil, houses, cars etc.)	37.3	28
Total	100.00	75

In queries, *singwaedlom* (environment) was purposely defined as 'everything around us (trees, soil, houses, cars etc.)' to establish whether participants conceptualized a dualism between nature and the "built-environment" (Franklin, 2003). The premise for this question also was based on research by Panya and Sirisai (2003) that found "*singwaedlom*" was introduced by Thai authorities to replace the antiquated "*dhammachart"* with a more modern expression. Hence, the imposition of the term "*singwaedlom*" was one component of the larger development process that has transformed Thailand from an agricultural to an industrial economy (Rigg, 1997). Despite this assumption, organic farmers did not clearly differentiate between *dhammachart* and singwaedlom. Moreover, 37% of respondents attributed similar meanings to *dhammachart* and *singwaedlom*.

As key leadership figures in these communities made references to the Five Precepts of the Pali-canon, participants were queried on the ways these teachings were applied to farming and daily life. When asked if they practiced the Five Precepts, a significant number of participants (70%) stated that they aimed to follow at least one of the five (Table 6.7):

Table 6.7: The Five Precepts

Do you practice the Five Precepts?	**%**	**(n)**
A) Do my best to follow all 5 precepts	46.7	35
B) I only follow one precept	22.7	17
C) Practice when I have time	4.0	3
D) I rarely follow the 5 precepts	37.3	28
Total	100.0	75

And few (4%) participants expressed that they did not consciously follow any of the Five Precepts. As many organic farming groups in Thailand paid special attention to the First Precept, "thou shall not kill", a question was constructed to draw out the way this concept was put into practice. In this query, 47% selected "I try hard not to harm living creatures" over multiple responses related to the costs and hazards of chemical fertilizers (Table 6.8):

Table 6.8: Decisions Governing Fertilizer Usage (n=75)

Why use organic fertilizer?	**1**	**2**	**3**	**4**
1) Chemical fertilizer is hazardous to your health	24.0	25.3	30.7	20.0
2) Supports soil life	56.0	8.0	25.3	10.7
3) Chemical fertilizer damages soil life	10.7	44.0	20.0	25.3
4) Costs less than chemical fertilizer	9.3	22.7	24.0	44.0

Note: data in percent; scale from 1 to 4 ranked according to importance.

The decision to shift over to organic fertilizer also was interrelated with health concerns, finances and environmental values. In queries, most participants (56%) stressed the importance of "supporting soil life" by the use of organic fertilizers (Table 6.16). Some farmers were more concerned about health (24%). On the other

hand, only a few farmers (9%) showed a concerned about the cost savings they gained from a shift to organic fertilizer methods.

6.4 Agricultural Knowledge

Organic Farmers learned about organic farming from diverse sources: family, friends, training course and lived experience. As participants were previously engaged in *chemi* farming, few exhibited a prior knowledge of traditional agriculture practices. Based on semi-structured queries all participants had to some extent learned about organic agriculture on training courses. Notwithstanding, many farmers exhibited inductive knowledge of the natural environment from direct experience on their land.

Participants in this study accessed knowledge from a diversity of external organizations that facilitated training courses in their communities. Through a collaborative learning process, organic farmers were linked together with common goal, to support organic farms. Participants were not secretive about the methods they learned and exchanged ideas openly with friends, neighbors, and outsiders. Although, most organic farming courses were taught by local farmer-experts, open-ended queries revealed that participants attended trainings in different provinces supported by domestic and international NGOs, and some provincial governmental agencies.

Many of these courses promoted the concept that organic farming was an act supported by the Buddhist scriptures (Falvey 2000; Rigg, 1997). Agricultural knowledge and spirituality were integrated teachings in the perspective of some organic farmers. As exhibited in Table 6.9, a high percentage of farmers (47%) expressed an eco-centric perspective:

Table 6.9: Knowledge as Linked to Worldviews

Which statement best describes your farming practices?	**%**	**(n)**
1) I try hard to avoid harming living creatures	46.7	35
2) I follow the teachings of Buddhism as a way of farming	8.0	6
3) I learn all my skills on training courses	17.3	13
4) I learn all my skills from family members	28.0	21
Total	100.0	75

Participants put this ecological worldview into practice through the use of organic fertilizers on their farms. Participants shared knowledge of best practices in organic farming through training courses and exchanged information with friends and neighbors openly. Rice mills and village collectives were another important source of knowledge exchange.

Although, participants lacked access to laboratory based scientific methods of soil testing, participants were able to draw upon 'tacit' knowledge to manage their farms. To explain 'tacit' knowledge, participants were asked questions about the use of sensory perceptions to measure soil quality (Appendix O). This premise was based on an instrument developed by Van Keer's (*et al*., 1998) to help Thai farmers develop soil indicators based on their observations. The majority of farmers (32%) in this study identified healthy soil with the term *ruensuey* (sandy clay loam) and as a secondary response, "Dark color (red or black)" (Table 6.10):

Table 6.10: Soil Evaluation Methods

Indicators of healthy soil [1]	**%**	**(n)**
1) Presence of a specific weed	10.5	4
2) *Ruensuey* (sandy clay loam)	31.6	12
3) Dark color (red or black)	28.9	11
4) Other indicators[2]	28.9	11
Total	100.0	38

[1] This query was conducted as a follow-question and reached 38 informants (and only 25 of the 75 original participants).

[2] Other indicators: wild vegetables, odors, rice growth, worms/worm droppings, softness, and stickiness

Curiously, one participant likened good soil to a multi-flavored ice cream at the right temperature, "not too frozen or too soft", while others identified good soil as "soft". Several participants mentioned the presence of worms or their droppings in the soil. Only a few mentioned other types of indicators such as the presence of wild vegetables: *paak khom* (Chinese spinach) and *sadao dinh* (Neem plant). For example, one participant said that when the soil was fertile he could smell the roots of the trees. Another participant could smell an odor akin to organic fertilizer, or what he described as a muddy aroma, while one said that good soil released air bubbles after a heavy rain and that you can see red blotches in the soil after it dries. A few participants

mentioned that certain weeds were good indicators: *wai* (Centipede grass), *nok khao* (Bird's rice or Jungle rice). While other participants stated that a multitude of weeds in the dry season was a good indicator.

Some participants chose to describe the qualities of poor (rather than good soil) such as saltiness, white sandy color, the presence of bad weeds such as *hua ngork hua ngok* (Pipewort). Several farmers said that bad soil was hard, and one participant was not sure how to judge soil fertility. One participant said that on *chemi* farms a white powder was visible above the soil.

In summary, knowledge of soil quality was based on participants' observations of their rice paddies. Although, "brown soil" emerged as the most common measure of good soil, farmers utilized a combination of ways to determine when to add fertilizers and which were most beneficial. The ways that farmers determined soil quality were part of an intimate connection with their land.

6.5 Collective Structures

Of the 75 farmers interviewed all were members of a cooperative, namely the Dharma Garden Temple (Patiew District), Nong Yoh Rice Mill (a rice mill affiliated to the Dharma Garden Temple in Kudchum District), Heaven's Farmers (Mahachanachai District) and the Nature Care Club (Kudchum District). Based on structured queries, organic farmers built up collectives to access the factors of production. Collectives primarily took the form of rice mills, and to a lesser extent fertilizer production centers. Fertilizer collectives were an important way to reduce dependence on external markets. Participants stated that they entered into these collectives to access fertilizer as well as to pool capital, manpower and technology.

Table 6.11: Profile of Members in a Fertilizer Making Group

Member of Fertilizer Group	%	(n)
1) Suantham Temple	17.3	13
2) Heaven's Farmers	33.0	25
3) Nong Yoh Rice Mill	12.0	9
4) Other group	2.7	2
5) Not a member	34.7	26
Total	100.0	75

Although, most farmers (65%) reported they were members of a specific fertilizer collective, 35% of participants stated that they did not join a production group (Table 6.11). Many of the farmers (38%) that did not join a fertilizer collective responded that they could make fertilizer themselves with the natural resources on their farm (Table 6.12, below). One of the main impediments reported by participants was that there were no collectives located nearby their homes (50%).

Table 6.12: Collectivity Indicators

Why don't you join a fertilizer group?	**%**	**(n)**
1) Can make it myself	37.5	6
2) Prefer to work alone	6.2	1
3) Too far to travel/not convenient	50.0	8
4) More convenient to buy it	6.2	1
Total	100.0	16

Note: 16 of 75 participants reported they were not members of a fertilizer collective. However, it appears some participants misunderstood the question, as 26 of 75 participants reported they were not members when asked to "name their fertilizer collective" (see Table 6.11).

To rate the importance of collectives as a contributing factor to the practice of organic farming, queries concentrated on the purpose and structure of these groups. As all the organic farmers were members of larger cooperative organizations, it was difficult to differentiate collectivity. However, small-scale fertilizer collectives were used more frequently and were an important source of social capital. Moreover, farmers could better account for their activities in these organizations. For this reason, structured questions aimed to examine membership in fertilizer collectives. And based on analysis of qualitative findings, the Thai term *kalayanamitta* (Pali Sanskrit for good friendship; good company; association with the virtuous) was used to present the concept of collectivity to participants. Significantly, 60% of participants that join fertilizer collectives selected the importance of *kalayanamitta* over labor, machinery, fertilizer and cost factors (Table 6.13):

Table 6.13: Measures of Collectivity

Why do you join a fertilizer group?	%	(n)
1) Too much work to do by myself	1.7	1
2) *Kalayanamitta* (associations of the virtuous)	61.0	36
3) Saves money/expenditures	18.6	11
4) Access to machinery	6.8	4
5) To obtain organic fertilizer	11.9	7
Total	100.0	59

Note: only 59 of 75 participants were members of a fertilizer collective.

Making fertilizer in collectives also fulfilled diverse technical functions: access to raw materials, technology and as a center of knowledge exchange. Collective workers reported that organic fertilizer also was sold to *chemi* farmers who mixed these concoctions with agro-chemicals. Hence, *kalyanamitta* linked organic farmers to each other and the larger community of farmers where they worked. While, data shows that organic farmers valued the importance of fertilizer collectives, there were some impediments to joining collectives; namely location and the ability to engage in the physical work required.

6.6 The Factors of Production

The ways farmers supported organic farming brought them into close connection with the natural environment. Organic farmers in this study cultivated their own beneficial microorganisms, employed green manures to fix nitrogen in the soil and raised animals for manure. While, these locally-based and natural methods of agriculture were organic, the overall process of organic agriculture required that farmers follow stringent regulations set out by the Organic Agriculture Certification Thailand in Bangkok (accredited by IFOAM). Despite, reports from some participants that these regulations were overly rigorous, they had some freedom in the methods selected provided they were “organic” (Appendix M). Participants developed a series of innovations to sustain their farms that combined methods learned on trainings, small-scale appropriate technologies and their own innovations. The practices that

participants selected were also influenced by the agricultural products they deemed most suitable to the conditions on their land.

6.6.1 Soil Fertility Building: Methods and Practice

The act of making fertilizer brings organic farmers into close association with animals, microorganisms, plants, and fellow farmers. Participants relied on bringing together a network of living and nonliving actors to cycle natural elements through their rice paddies. The ways that farmers chose to stimulate these cycles were based upon the requirements of organic certification, the availability of natural resources, their knowledge systems, and worldviews.

Findings show that participants employed a combination of methods prior to planting rice: raising animals for manure/home-made fertilizers, use of cooperative-made fertilizer, propagation of effective microorganisms (EM)[3], and the cultivation of green manure (Table 6.14):

Table 6.14: Profile of Organic Fertilizer Methods

Combination of Fertilizer Methods in Use	%	(n)
Manure/ Homemade Fertilizer	90.7	68
Coop. Manufactured Fertilizer	50.7	38
Green Manure	66.7	50
Effective Microorganisms	100	75

Note: 75 participants reported the use of more than one type of fertilizer method.

These methods were applied at different times, based on availability of resources, and soil quality. Participants reported a wide variation in the soil quality of their rice paddies (and on each plot) and there was no set standard, or quantity of fertilizer applied by organic farmers. Moreover, the fertilizer used was based on the availability of manure and other resources. The amount of fertilizer applied was based on the 'tacit' knowledge of each farmer. A significant number of organic farmers (91%) applied some form of animal manure from domesticated animals or purchased manure

[3] EM refers to the trademark name for Effective Microorganisms. While participants used the trademark name, they learned to prepare these bio-fertilizers themselves.

to make their own fertilizer. The use of fertilizer manufactured in a collective was in use by only 38% of farmers. Green manure (i.e. nitrogen fixing plants) was used by 67% of farmers. Effective Microorganisms (EM) was cultivated at home by a significant number of participants (100%). Organic farmers also augmented soil fertility with rice straw, leaves and other foliage.

6.6.2 Animal Husbandry as a Factor in Fertilizer Making

Raising livestock played an important part in farmers' efforts to replace nutrients back into the soil through organic methods. Participants' also reported that raising animals was an important part of their work. Among the farmers interviewed, 90% had made a conscious decision to rear animals to acquire manure (Table 6.15):

Table 6.15: Decisions on Animal Husbandry

Why do you raise animals?	**%**	**(n)**
1) Raise for income	5.7	4
2) Raise for food	2.9	2
3) Raise to assist with work	1.4	1
4) Raise animals for manure	90.0	63
Total	100.0	**70**

Note: 5 of 75 participants did not raise animals and were not asked this question.

Although some manure is deposited in the fields by grazing animals, farmers purposely collected manure from their stalls for home-made fertilizers. While manure was an important by-product of animal husbandry, only one farmer used an animal as a source of labor (e.g. pulling a traditional plow with a buffalo). Despite, a high incidence of animal husbandry (93%), five participants lacked the financial or labor capacity to raise animals (Table 6.16):

Table 6.16: Animal Husbandry Challenges

Why do you choose not to raise animals?	%	(n)
1) No time	40.0	2
2) Too much work	20.0	1
3) Machinery is better than animals	20.0	1
4) More convenient to purchase manure	20.0	1
Total	100.0	**5**

Note: 5 of 75 participants did not raise animals.

Some of the reasons farmers lacked time was due to a shortage of household labor, extensive landholdings, or the type of animals raised did not produce enough manure (Table 6.16, above). A few farmers expressed that it was too much effort to raise animals or they were too old for the task of taking cows to graze twice a day. Nonetheless, many farmers supplemented homemade fertilizers, or manure with fertilizers purchased at a local collective (Table 6.14).

6.6.3 Effective Microorganisms

Farmers interviewed in this study expressed the importance of building soil fertility through Effective Microorganisms (EM). EM was produced by mixing organic waste with molasses, water and microbial additives, then fermenting them for use as a fertilizer (Appendix N). Farmers diluted the EM solution by adding water and spraying the EM mix on the soil or crops with diverse aims[4]. The participants in this study learned to make EM on various training courses. An overwhelming majority (100%) of organic farmers expressed a basic knowledge of how to produce effective microorganisms (Table 6.14). Reflecting an inclination towards pro-environmental values, most participants (47%) expressed that 'promoting life in the soil' was more important than productivity gains (Table 6.17):

[4] It is important to note that a similar fermentation process is used with *Sadao* leaves to make a natural form of pest control. Another set of recipes are used to produce growth hormones, for example pineapple based EM is spread on fruit trees to increase fruiting (Agri-nature Foundation, 2007).

Table 6.17: Effective Microorganisms (EM) Use

Why do you make EM?	%	(n)
1) It is the secret to organic Rice	9.7	7
2) Saves money	31.9	23
3) Promotes life in the soil	47.2	34
4) Learnt it on a training course	11.1	8
Total	100.0	**72**

Note: 3 of 75 participants did not make their own EM.

This finding also is important as it shows that participants did not necessarily separate the production methods they selected from their belief systems. Nevertheless, as EM use was universal (100%), it appears that it has been formally incorporated into the farming methods of participants.

Although, 100% of respondents applied EM to their rice paddies, either directly or as an ingredient in their fertilizer, there were few scientific studies that demonstrate EM applications increase crop productivity. Although Figa and Parr (1994) are proponents of EM, they blame the failure of scientists to prove EM works on the difficulty of replicating the interactions among thousands of microorganism species in a "controlled laboratory setting". Notwithstanding, laboratory refined microorganism concoctions or what are termed "microbial inoculants" are crossing into realm of the scientific community and are widely sold by commercial enterprises (Kaewchai *et al.*, 2009).

6.6.4 Green Manure

The use of green manure was another common method adopted by organic farmers to nurture soil fertility. Most participants (77%) surveyed grew nitrogen fixing plants (i.e. *dok kae, dok sanoeh, tua prah, tua pee*) in their fields after the rice crop in the winter time (Table 6.14). After these nitrogen fixing plants are grown they are either left in the fields to biodegrade naturally or plowed under, in what farmers call *tai na glob.* The ability of legumes to fix atmospheric nitrogen in the soil is well-documented by the scientific community (Drinkwater *et al*., 1995). Researchers have shown that legumes such as *tua prah* and *tua pee* are drought resistant, adapt to marginal soil and are high in protein (International Institute of Tropical Agriculture,

2010). Despite the nutritional qualities of these green manures, few farmers reported that they consumed them. However, *dok kae* and *dok sanoeh* produce an edible flower that I observed on the dinner tables of many participants.

6.6.5 Dry Organic Fertilizer Production

Fertilizer making emerged as a salient theme throughout this study and was a focal point of training programs offered by extension organizations. The majority of farmers stated that access to homemade fertilizer constituted an integral first step in the transition to organic farming, as it reduces reliance on external inputs and offers bountiful yields. Participants exhibited a strong inclination to acquire greater knowledge about fertilizer making as evidenced by enrolment on training seminars[5]. Nevertheless, a significant portion of organic farmers purchased fertilizer as they lacked resources or maintained extensive landholdings. Although farmers primarily produced fertilizer to reduce costs, respondents revealed a deeper motivation, whereby fertilizer making is part of a spiritual and physical process that connects them to fellow farmers and diverse natural entities. Numerous queries about fertilizer aimed to measure these connections by exhibiting the ways farmer' groups accessed resources and manufactured fertilizer. However, many farmers produced fertilizer on their own.

Although, fertilizer making draws on natural resources and the work of animals, it is also a formalized production process that requires labor, machinery and warehouses. To acquire the factors of production farmer groups need to pool capital and purchase important inputs. Fertilizer making is hard work and lifting 50 kilogram bags of fertilizer requires able-bodied labor (primarily men based on observations). Labor is contracted on a daily wage during the periods that fertilizer is in production. Fertilizer making in this study occurred after the harvest season in March through April, or on demand. Although, some farmers made fertilizer by hand, machinery is common and 65% stated that it saves both money and labor (Table 6.18). Organic farmers also placed a premium on time, as there were many other activities that occupied their attention.

[5] Although a high attendance on training seminars is attributed to a strong interest, some may argue that high attendance on these course were due to a paid per diem and free meals.

Table 6.18: Fertilizer Production: Use of Machinery

Why you use a fertilizer making machine?	%	(n)
1) It is quick and effective	23.0	11
2) It helps production process	10.9	5
3) Saves money and labor	65.2	30
Total	100.0	46

Note: 46 of 75 participants used a machine to make fertilizer.

While machinery is useful to organic fertilizer making, most participants (68%) made fertilizer on their farms without machinery (Table 6.19):

Table 6.19: Fertilizer Production: Non-use of Machinery

Why don't you use a fertilizer making machine?	%	(n)
1) Too expensive	14.3	4
2) Access to a cooperative is difficult	17.9	5
3) Better to do it by hand	67.9	19
Total	100.0	**28**

Note: 28 of 75 participants chose not to, or did not have access to a machine.

Despite the inclination to work independently, many participants had no access to a cooperative in their neighborhood. Moreover, transportation of fertilizer to and from a distant location was a costly process for farmers without their own vehicle.

In order to make dry fertilizer, participants depended upon diverse resources: manure, EM, mineral additives, and sufficient labor. Participants were asked to rank fertilizer making activities by order of importance. According to responses the key components in making fertilizer were ‘getting manure’ and ‘EM’ as exhibited in the table below:

Table 6.20: Fertilizer Making Activities (n=75)

What are the most important components of fertilizer?	1	2	3	4
1) Getting manure	37.0	30.7	17.3	16.0
2) Getting EM	34.7	42.7	18.7	4.0
3) Various additives	17.3	17.3	41.3	24.0
4) Laborers	12.0	8.0	25.3	54.7

Note: data in percent; scale from 1 to 4 ranked according to importance.

After farmers gathered the key resources, they also needed to access the means of generating and bagging fertilizer for sale and storage. Highlighting the importance of a production center, most farmers ranked access to a warehouse (56%) and a fertilizer making machine (36%) as more important than finding manure and workers:

Table 6.21: Fertilizer Production Steps (n=75)

Steps in making organic fertilizer?	1	2	3	4
1) Get a warehouse	10.7	56.0	6.7	26.7
2) Get a machine	36.0	27.0	21.0	16.0
3) Acquire manure	25.3	15.0	28.0	32.0
4) Find workers	28.0	2.7	44.0	25.3

Note: data in percent; scale from 1 to 4 ranked according to importance.

Although, the majority of activities detailed in this section depict a closed-ended ecological cycle whereby farmers produce natural fertilizer with inputs from their local environment, farmers who manufacture fertilizer in collectives, must also purchase supplementary ingredients. According to participants, these “organic” components were purchased from companies with affiliations to their network, while other ingredients such as dolomite and molasses were often donated by the Thai Ministry of Agriculture and Cooperatives. In summary, farmers formed collectives to access natural resources, pool capital and manpower.

6.7 Outcomes of a Shift to Organic Farming Systems

While low profits and poor health may explain some of the reasons farmers were drawn to experiment with organic farming methods, participants perceived the shift to organic farming as having certain tangible benefits. Participants reported improved physical health, reduced costs, a decrease in debts, and a diversity of safe food sources available for home consumption and sales. Despite participants' perceptions, findings do not show that organic farming increased rice production or the income levels of organic farmers.

6.7.1 Agricultural Production

Based on the teachings of the extension groups in this study, farmers were taught to raise a variety of agricultural products as part of sustaining integrated organic farms, providing household food security and a secondary source of income. All of the participants grew *Homali* (jasmine) rice for sale, and glutionous rice (a variety known as *Kow Niaw Goh Koh 6*) for their own consumption[6]. Red glutinous rice and other varieties also were grown by a fewer number of participants, but were gaining popularity among farmers due to the expansion of a niche market. Of participants, 47% either grew some vegetables for sale or had a small plot for home consumption (Table 6.22):

Table 6.22: Diversity of Crops Grown by Participants

Crop Diversity	**%**	(n)
1) Rice only	9.3	7
2) Rice and Fruit	6.7	5
3) Rice, fruit and vegetables	46.7	35
4) Rice, fruit and veg., and other[1]	9.3	7
5) Rice and other	10.7	8
6) Rice and veg.	17.3	13
Total	100.0	75

[1] Cultivation of commodity crops for sale.

[6] Sticky or glutinous rice is commonly consumed by Northeasterner s, while in the central region Thai people prefer plain rice.

Farmers also consumed wild vegetables that grew naturally in and around their rice paddies. Commodity crops such as cassava, rubber, teak and eucalyptus trees (for paper) were popular amongst 20% of participants (Table 6.23):

Table 6.23: Overview of Crop Varieties Grown by Participants

Commodity crops	bamboo, cassava, eucalyptus, pararubber, sugar cane, corn
Vegetables	eggplant, chili, lettuce, medicinal/cooking herbs, onions
Grains/Beans	rice (glutinous, non-glutinous), peanuts, sesame, black beans
Uncultivated Fruit	banana, coconut, custard apple, papaya, mango, sapodilla, and rose apple
Cultivated Fruit	watermelon, tomato, jicama

Fruit trees were common, but not grown specifically as a form of revenue. Fruit trees were found around homes and rice paddies, varieties included custard apple, banana, coconut, mango, papaya and rose apple. Very few farmers processed fruit into other products and some gave it away to neighbors. Most participants reported that they could not feed their families from produce solely grown on their landholdings. Although the extension groups aimed to build up the self-reliance of organic farmers, most participants engaged in the formal economy. Monetary income was important to organic farmers as a means to purchase fresh and processed food.

When asked about the animals they raised, participants reported a wide variety of domesticated animals: cows (81%), poultry (68%), and buffaloes (21%) on their farms (Table 6.24):

Table 6.24: Animal Husbandry

Which animals do you raise? [1]	**%**	**(n)**
1) poultry	68	51
2) pigs	2.7	2
3) fish	26.7	20
4) cows	81.3	61
5) buffalo	21.3	16

[1] Percentage of domestic animals raised (in various combinations) by 75 participants.

Farmers also mentioned that they sold the offspring of domesticated animals as a secondary form of income (Table 6.16). Participants reported that fish was a minor source of fertilizer, but also an important form of protein in their diets. Farmers were observed raising fish in ponds, and participants reported that fish spawned naturally in the rice paddies during the rainy season.

The quantity of organic rice production varied greatly depending upon land available, soil quality, access to water and other production factors. As qualitative findings showed that fertilizer was one of few areas impoverished farmers could intervene in their agro-ecosystems at a low-cost, structured queries focused on the ways participants improved soil fertility. Data was collected based on the years engaged in organic farming (8.5 years average), total landholdings, quantity of organic fertilizer[7], and fresh manure[8] used in their rice paddies. In Table 6.25 (below), are shown the types of fertilizer used per *rai*, and total land usage separated by the number of years engaged in organic farming.

Table 6.25: Profile of Average Fertilizer/Manure Usage and Yield in 2009 (n=75)[1]

Years Organic Farming[2]	Land Usage (in rai)[3]	Bio-Fertilizer (kg per rai)	Animal Manure (kg per rai)	Rice Yield (kg per rai)
1 to 5	21.20	203.60	170.82	317.48
6 to 10	22.76	112.21	116.94	285.81
11 to 15	23.54	75.90	101.54	437.50
16 to 20	22.76	112.21	164.47	285.81

[1] 4 of 75 values missing
[2] Average years as organic farmer = 8.5.
[3] Land is exhibited in *rai* and combines land owned and rented (1 rai = 0.16 hectares).

Data shows no positive significant relationship between years in organic farming and yield per *rai* (0.16 hectares); and a fluctuation in productivity. These results are explained by number environmental, social, and economic factors. Rice crops are affected by droughts, access to irrigation, and the topographical characteristics of the land and individual rice paddies.

[7] Organic fertilizer in this context signifies any type of organic fertilizer made through a production process and mixed multiple with additives (see Appendix D).
[8] Manure refers to the feces of different domesticated farm animals: chickens, ducks, buffaloes, cows and fish.

Poh Tulang, a trainer at the Dharma Garden Temple explained that as organic farmers built up their expertise (initial 5 years), productivity on their farms rose significantly. In later years, they earned additional income as outside trainers for NGOs or government bodies that promoted organic farmers. Hence, the productivity of their rice paddies often decreased as they spent less time on their farms. Moreover, depending on financial and labor resources participants used different quantities and types of fertilizers. Another significant factor that influenced the results in Table 6.25 was a major drought in 2009 (the year this data was collected).

6.7.2 Health Status

Although, participants reported that they suffered from multiple ailments related to agro-chemicals they used to sustain conventional agriculture, no statistics were available on changes in the blood toxicity of organic farmers in Yasothon Province. To measure farmers' perspective of their health, participants were asked to describe their health status after a shift to organic farming. The vast majority (98%) of participants responded that they felt 'better' or 'much better' as a result of their new way of life (Table 6.26):

Table 6.26: Health Status

Describe your state of health after switching over to organic fertilizers?	**%**	**(n)**
1) Worse	0	0
2) Same	1.3	1
3) Better	32	24
4) Much better	66.7	50
Total	100	**75**

Unstructured questions on health topics revealed broad concerns about exposure to agro-chemicals. Most farmers attributed their physical ailments to the use of agro-chemicals. While some farmers decided to quit drinking alcohol and smoking cigarettes based on the new values they acquired. However, the conclusions farmers made about their health were based on their perception, and in some cases their doctor's had suggested they minimize their exposure to agro-chemicals.

6.7.3 Financial Status

Literature on the Thai alternative agriculture movement points to the widespread financial problems of small holder farmers. Although, the incidence of debt was prevalent among most of the participants (88% as reported in the farmer profile), a large number (85%, cumulative total) had reduced their debts by decreasing the purchase of agricultural supplies (Table 6.27):

Table 6.27: Financial Reasons: Debts

Have you reduced your loans after switching to organic fertilizer?		**%**	**(n)**
1) Debts increased		5.3	4
2) Debts are the same		20.0	15
3) Reduced debts		62.7	47
4) No debts		12.00	9
	Total	100.0	**75**

One farmer added that it was important to borrow money on a yearly basis, in order to avoid a complicated reapplication procedure if they needed a loan in the future. Despite a lack of financial resources, most farmers alluded that the benefits of becoming an organic farmers were more than monetary (Table 6.28 below). Participants were more concerned with both the production (23%) and sale of healthy/safe rice (51%) than obtaining a high price[9] for their bounty (17%).

Table 6.28: Benefits of a Shift to Organic Fertilizer (n=75)

What are the benefits of organic fertilizer in terms of rice production?	**1**	**2**	**3**	**4**
1) Bountiful rice (high output)	22.7	72.0	0.0	5.3
2) Produce healthy/safe rice for self-consumption	50.7	20.0	23.0	6.7
3) Sell healthy/safe rice	10.7	2.7	63.0	24.0
4) Obtain a high price	17.3	4.0	15.0	64.0

Note: data in percent; ranked in a scale from 1 to 4 according to importance.

[9] Participants reported that un-milled organic rice was paid at one Baht more per kilogram than conventional rice.

Furthermore, an integral teaching of the extension groups in this study (Green Net, Dharma Garden Temple, Agri-Nature Foundation) was the concept of food security or self-reliance. Farmers were encouraged to consume their own organic rice[10] and grow additional crops to diversify their income. Despite the prevalence of these practices, organic farmers expressed that they often purchased goods at outside markets or superstores.

6.8 Internal Validation of Key Drivers

A final structured query aimed to validate the significance of key drivers from the perspective of participants; and to better understand the process by which farmers made the decision to stay the course of organic farming. Interviews were conducted with 36 organic farmers (24 of which were new participants from the same Districts) with a card game that asked participants to rank values, knowledge, and production factors in order of importance. Based on the ways participants ranked the three components (Table 6.29), it was found that most (70%) chose the first response which represented "worldviews" this term was described to participants as a combination of values, spirituality, and morality:

Table 6.29: Organic Farmers' Development Process (n=36)[1]

Rank the following topics in order of importance to staying the course of organic farming[2]:	**1**	**2**	**3**
A) Worldviews (values, morality)	70.3	27.1	2.7
B) Knowledge (of organic farming)	21.6	48.6	29.7
C) Production factors (innovations)	8.1	24.3	67.6

[1] This query was conducted as a follow-question with 36 participants (only reached 25 of the 75 original participants).
[2] Data in percent; ranked on a scale from 1 to 3 in order of declining importance.

Participants ranked "knowledge" second (49%), but in some cases participants had difficulty ranking one response over another. One key informant expressed that "knowledge" was interlinked with other factors:

[10] Although it would seem to the outsider that all rice farmers would eat their own rice, the difficulty of getting a small quantity of rice milled means that many conventional rice farmers buy their own rice.

> People who are organic farmers need to understand Mother Earth by living, staying and learning about it. If somebody claims they don't know how to do it they can go to the training or learn with other real organic farmers, then try it on their own or can get advice from the organic farmer. After you have done the pilot study then you decide based on your own mind.

Statistically, farmers ranked the concepts presented to them in the following order: 1) values, 2) knowledge, and 3) productivity factors. However, one informant expressed that it was important to have all factors in place simultaneously, with morality as the starting point:

> Morality is most important. It should come first because it influences the success of the organic farmer. If you have a strong will and a stable mind then you can do it. Second is production, third is knowledge... However, everything should come together as they are equal parts of sustaining the farm. But, if someone is lacking morality, it won't be sustainable.

Some participants (8%) ranked production factors highly, while most (67%) placed less emphasis on the factors of production. However, one participant explained that natural factors were intertwined with production factors:

> Earth, wind, and rain are important for the farmer. Tools are not necessary because the farmer can do it if they really want to, it does matter how much you produce, if you have enough to survive.

Despite statistical variances to this question, based on an analysis of narrative responses participants did not typically differentiate "values", "knowledge" and "productivity factors" as separate concepts. Participants viewed their surroundings from a holistic perspective where many factors were judged equally important to sustaining their way of life.

6.9 Summary

The decision to stay the course of organic farming was based on several drivers: market access, external organizations, the values shared by farmers, agricultural knowledge, and access to production factors. Participants carried out the tasks they learned in their collectives with aspirations of better physical health and improved financial status. Participants joined collectives to gain access to key resources and machinery necessary to complete the production process. To make organic fertilizers, participants depended on knowledge exchange, natural resources, and technological innovations. Some raised animals for manure and as a secondary source of income. While many members opted not to join fertilizer collectives, some valued these organizations for their social capital rather than as an access point to the factors of production.

Many participants propagated animal life and plants as set out in organic training guidelines, but a lesser amount of participants were able to articulate the intrinsic value of the nature in Buddhist terms. Nonetheless, participants felt rewarded for their actions through the natural food sources available in their rice paddies. Results show that through a reduction in chemical inputs, most participants perceived that their health improved. And the majority of participants stated that they reduced their debts after a shift to organic farming. However, results do not show that rice production levels were a factor in farmers' decisions to make a shift to organic farming systems. Moreover, findings show organic rice production varied greatly among participants. In summary, participants' worldviews were influenced by the knowledge they acquired, how they were able to carry the skills they learned, and the ability to access production factors. The perceived benefits of their work; and the opportunity to gain a steady source of income through certified organic products was instrumental in sustaining participants' way of life. In Chapter 7, the ways participants' worldviews bear upon their decision-making, ways of practicing organic farming, and their well-being are shown through an examination of statistically significant variables.

CHAPTER VII
ORGANIC FARMERS' WORLDVIEWS, WAYS OF PRACTICE, AND WELL-BEING

It is argued in the previous chapters that the ways the farmers in this study changed their food provisioning systems contributed to their socio-cultural development and well-being. The purpose of this chapter is to clarify and support findings from analysis of qualitative and quantitative data. Drawing upon analysis of frequency distributions in Chapter 6, this chapter examines associations between key variables that were positively correlated and statistically significant. Research objectives are addressed through a critical examination of the relationships between participants' worldviews, use of organic farming methods, and the outcomes of these actions on their perception of well-being.

7.1 Introduction

The 75 informants that participated in the structured phase of this research belonged to different sub-groups, collectives and marketing networks that were linked to the Thai Alternative Agriculture Network (AAN). In Patiew District most participants are members of the Dharma Garden Temple; in Mahachanachai District most are from Heaven's Farmers' Group (an affiliate of the Pak Reua Rice Mill); and in Kudchum District they are members of the Nature Care Club and the Nong Yor Rice Mill (affiliated with the Dharma Garden Temple). Based on findings from previous chapters that suggested worldviews (i.e. beliefs and values) were a key driver in participants' decisions to adopt organic farming methods, this section starts by showing the associations between participants' worldviews and organizational affiliations. Organic farming methods are discussed in terms of participants' relationships with external organizations, membership in local collectives, and access to the production factors necessary to sustain organic farms. The outcomes of

participants' actions on the farm and in collectives are exhibited through their health, and financial status. Results show that there was a divergence between groups in terms of their worldviews, the organic methods used, and the perceived outcomes of their work.

A series of scales were formulated to show the worldviews of the 75 organic farmers that participated in the structured phase of this study. The indicators selected to include in these scales were those that were statistically significant according to Spearman's rank correlations ($p \leq 0.05$ to $p \leq 0.01$). Crosstabulations using Chi-square statistics were used to show associations between variables; and determine those associations that were statistically significant at a level of $p \leq 0.10$ to $p \leq 0.001$.

7.2 Organic Farmers' Worldviews

To exhibit the values and beliefs that governed participants' decision making, a *Worldviews Indicators Scale* was constructed. This scale was a composite measure of four different indicators: 1) Adherence to the Five Precepts; 2) Devotion to Buddhism; 3) Benefits of Organic fertilizer; 4) Why Organic Fertilizer (Table 7.1):

Table 7.1: Construction of Worldviews Indicators Scale

Variables	***Responses***
1) Five Precepts	1 = "Rarely follow precepts" 2 = "Practice when I have time" 3 = "I only follow one precept" 4 = "Do my best to follow all 5 precepts".
2) Devotion to Buddhism	1 = "Have faith in Buddhism, but rarely practice formally" 2 = "I follow the teachings when I have problems" 3 = "I consider myself Buddhist as I follow the teachings and make merit regularly" 4 = "I depend on the teachings of Buddhism as a way of life"
3) Benefits of Organic Fertilizer	1 = "Obtain a high price" 2 = "Bountiful rice or high output" 3 = "Safe rice"
4) Why Organic Fertilizer	1 = "Costs less than chemical fertilizer" 2 = "Chemical fertilizer is hazardous to my health" 3 = "Supports soil life"

The variables used in the *Worldviews Indicator Scale* were determined based on relevance and frequency distributions. However, as a method to provide greater congruence between responses and as a basis to uncover associations, these indicators were transformed (re-coded in a consistent direction) to show the degree to which participants expressed a high level of spirituality or eco-centricity.

As discussed throughout this thesis, farmers' relationships with external organizations were critical to supporting organic farming systems in their communities. The majority of farmers joined organizations that were able to bring their products to market, offer financial assistance, or provide technical expertise. Of the three major farmer groups in this research, two were supported by Green Net/Earth Net (GN) product marketing and training on organic certification requirements, namely the Pak Reua Rice Mill and the Nature Care Club, respectively. The third group, the Dharma Garden Temple had established their own marketing channels through various partnerships (see Chapter 4). While participants had their own pre-existing belief systems, findings show that these *marketing networks* also had some influence on the *worldviews* of their affiliates. Chi-square statistics show that among marketing networks, there was a significant association ($p<0.05$) between organizational affiliations and the *Level of Worldviews* (Table 7.5):

Table 7.2: Worldviews Indicators Scale[1]: Percentage of Farmer Membership in a Marketing Network (N=75)

	Green Net/ Earth Net (%) n=36	**Dharma Garden Temple (%) n=39**
Worldview Indicators Scale (levels):		
(1) Low	65.0	35.0
(2) Medium	63.0	37.0
(3) High	32.1	67.9

Green Net supported groups *Worldviews* scored in the low to medium range, while the majority, two-thirds, of Dharma Garden Temple members scored in the high range (68%) of *Worldviews*. This finding suggests that members adhered to the spiritual and

ecological values disseminated by Temple leadership. On the other hand, Green Net members were less inclined to express an eco-centric or spiritual justification for adopting organic agriculture methods.

Table 7.3 examines the associations between *Worldviews* and *District of Location*. As shown (below), composite scores on the *Worldviews* scale were significantly associated ($p<0.001$) with their *District of Location*.

Table 7.3: Worldviews Indicators Scale[1]: Percentage of Members by District of Location (N=75)

	Kudchum (%) n=25	**Mahachanachai (%) n=36**	**Patiew (%) n=14**
Worldviews Indicator Scale (levels):			
(1) Low	34.5	34.8	8.7
(2) Medium	51.7	34.8	17.4
(3) High	13.8	30.4	73.9

[1] Worldview Indicators Scale sums 2 measures of Buddhist spirituality, and 2 measures of Buddhist eco-centric views; high scores=high levels of spirituality and eco-centric views.

Results clearly demonstrate that the majority (74%) of organic farmers in Patiew District scored in the high range on the *Worldviews Indicators Scale* compared to only 14% of organic farmers in Kudchum and 30% from Mahachanachai District. Kudchum residents were most likely (52%) to score in the mid-range on the *Worldviews Indicators Scale* which corresponds with the diversity of farmer groups in the District. On the other hand, results show that Mahachanachai residents were equally divided among the three levels of scale scores (approximately a third at each level). While farmer leaders in Mahachanachai District expressed themselves in a Buddhist vernacular, some participants had shown difficulty in responding to structured queries.

While the *Worldviews Indicators Scale* exhibits organic farmers' eco-spirituality, data in Table 7.4 shows that to some extent environmental values and spirituality were interdependent variables.

Table 7.4: Buddhist Views Indicators: Percentage of Members by District of Location (N=75)

	Kudchum (%) n=29	Mahachanachai (%) n=23	Patiew (%) n=23
Buddhist Views (Levels):			
(1) Low	27.6	26.1	8.7
(2) Medium	62.1	34.8	21.7
(3) High	10.3	39.1	69.6

[1] Buddhist Worldviews Scale sums 2 measures of Buddhist spirituality; high scores=high levels of spirituality and eco-centric views.

Results demonstrate that the majority (70%) of participants from Patiew District (Dharma Garden Temple members), exhibited a high level of spirituality. This strong result at Patiew District is explained by the eco-centric and Buddhist values taught on training courses at the Dharma Garden Temple. This finding was not surprising given the location of Patiew's key organic training center at a Buddhist institution[1]. The organic farmers that resided in Kudchum and Mahachanachai District (mainly GN members) exhibited a lower level of *Buddhist Views* than farmers in Patiew District (Dharma Garden Temple members). However, 62% of Kudchum organic farmers still scored in a medium range. This result is attributed to the fact that of 29 participants in Kudchum District, and 12 were from the Nong Yor Rice Mill (affiliated with the Dharma Garden Temple).

Table 7.5: Chi-square Values and Asymptotic Significance of Worldviews Measures

Factors	Chi-square values	df[1]	Asymptotic Significances
Worldviews by Market Network	7.07	2	0.029
Worldviews by District of Location	21.07	4	0.000
Buddhist Views by District of Location	19.97	4	0.001

[1]df = degrees of freedom

[1] A trainer at the Yasothon Provincial Agriculture Office noted the expertise of Dharma Garden Temple members in organic farming methods.

Based on the importance placed upon organic fertilizers by participants, it was important to examine associations between worldviews; and the ways participants used fertilizer on their farms. As results from both qualitative and quantitative analysis had shown that many key informants had referred to the *Five Precepts* of the Dharma as a set of guidelines for building soil fertility. For this reason the *Five Precepts* was selected as one measure of eco-centric values. This assumption was also supported by advocacy of the First Precept "not to kill" by Thai alternative agriculturalists and environmentalists (Falvey, 2000; Kabilsingh, 2010; Rigg, 1997). To further investigate this premise, Spearman's rank correlation was selected as it is appropriate for use with scaled or ordinal variables. Correlations between the practice of the *Five Precepts, Fertilizer Group Membership* and the *Use of Organic Fertilizer* are shown in Table 7.6:

Table 7.6: Spearman's Rank Correlations among Fertilizer Group Membership, Use of Organic Fertilizer and Buddhist Beliefs (N=75)

	Buddhist Beliefs (Five Precepts)[1]	**Fertilizer Group Membership[2]**	**Use of Organic Fertilizer from Collective[3]**
Buddhist Beliefs (Five Precepts)		0.001	0.334**
Fertilizer Group Membership			0.085
Use of Organic Fertilizer from Collective			

[1] Likert scale with a 4 point measure of adherence to the Five Precepts. Coded so that a high score (4) = high adherence to Buddhist precepts.
[2] Dichotomous variable measuring membership in a Fertilizer Group Cooperative: coded 0 = non-member; 1=collective member.
[3] Dichotomous measure coded as 1=non-usage, 2= usage of cooperative fertilizer.
** Correlation is statistically significant at 0.01 level (2 - tailed).

Based on results, there was a significant correlation between farmers that practiced the Five Precepts and the decision to use organic fertilizer from a collective. While participants that expressed a high level of adherence to the Five Precepts used organic fertilizer, this variable did not necessarily correlate with joining a fertilizer making

group. Perhaps, the reason this correlation (r =.001) was insignificant is that many participants had sufficient resources on their farm to produce their own fertilizer or were located too far away to work in a collective on a regular basis (see Chapter 6 for further details).

7.3 Use of Organic Farming Methods

In this section, the results of a composite measure exhibits the way participants practiced farming in the three key locations in this study. The *Organic Fertilizer Subscale* included five related variables as follows: 1) Use of Green Manure (cultivation of nitrogen-fixing plants); 2) Use of Effective Microorganisms; 3) Use of Fresh Manure; 4) Use of Fertilizer from a Collective; and 5) Animal Raising Diversity. To provide greater congruence between responses and as a basis to uncover associations, responses were re-coded to show the degree to which participants utilized a broad range of organic methods (Table 7.7):

Table 7.7: Organic Fertilizer Subscale (Measures)

Key Variables	***Responses (codes)***
Organic Fertilizer Practices	Green manure: 1 = "no" 2 = "yes" Use of Effective Microorganisms 1 = "no" 2 = "yes" Use of Fresh Manure: 1 = "no" 2 = "yes" Fertilizer from a Collective: 1 = "no" 2 = "yes"
Animal Raising Diversity	Buffalo, cattle, fish, pigs or poultry (sum across types): 0 = "no" 1 = "yes"

To examine the relationships between organic production methods, crosstabulations with Chi-square statistics were used to show differentiation by the location of participants, and their organizational affiliations. The *Organic Fertilizer Subscale* shows the ways participants put into practice organic methods learned on training programs: 1) Green Manure; 2) Effective Microorganisms (EM); 3) Fresh Manure; 4) Fertilizer from a Collective (Table 7.8):

Table 7.8: Organic Fertilizer Subscale[1]: Percentage of Members by District of Location (N=75)

	Kudchum (%) n=29	**Mahachanachai (%) n=23**	**Patiew (%) n=23**
Green Manure Usage:			
(1) No	20.7	47.8	34.8
(2) Yes	79.3	52.2	65.2
Effective Microorganism (EM) Usage:			
(1) No	10.3	0.00	0.00
(2) Yes	89.7	100	100
Fresh Manure Usage:			
(1) No	6.9	56.5	30.4
(2) Yes	93.1	43.5	69.6
Fertilizer from a Collective Usage:			
(1) No	69.0	8.7	0.00
(2) Yes	31.0	91.3	100

[1] Use of Green Manure; Effective Microorganisms; Use of Fresh Manure; Use of Fertilizer from a Collective expressed as dichotomous variables, (1,2)., 1=no; 2 = yes.

Crosstabulations tested with Chi-square statistics show that there was a statistically significant differentiation between many of the methods used by participants to sustain organic farms in each *District of Location* (Table 7.8 and Table 7.10). While the use of fresh manure, dry fertilizer, and green manure plants were all recommended by local organic farming support organizations, some participants reported that they lacked access to a collective. Results of crosstabulations (Table 7.10) show no statistically significant differentiation (p=.12) among participants in the *Use of Green Manure*. Many organic farmers reported that they did not have time to cultivate green manure plants or could not obtain seeds. There also was no statistically significant

differentiation (p=.08) between locations in EM usage, as this type of bio-fertilizer was easily made from food scraps and other substances at home (row 2). Participants in Kudchum District reported a high percentage of fresh manure use (93%) available through animals raised on their farms. As many participants in Mahachanachai and Patiew District had access to a local fertilizer collective, they were less likely to depend on sources of manure on their farms (Table 7.10, p<.001). *Use of Fertilizer from a Collective* examines (by District of Location) those participants that either purchased or received organic fertilizer from a collective in exchange for work or vested capital (row 4). Results show that the *Use of Fertilizers from a Collective* was statistically differentiated among the three locations (Table 7.10, p<.001). Participants in Patiew District were highly likely (100%) to use fertilizers from the Temple-based collective in place of manure, or as a supplemental form of fertilizer. Moreover, Dharma Garden Temple (Patiew District) members reported that collective fertilizer was an important production factor in the making of "Moral Rice" (see Chapter 4).

Animal husbandry was a key factor in the farmers' ability to access manure for fertilizers and provided a source of income. A composite measure of *Animal Raising Diversity* was formulated to show differentiation by *District of Location* (Table 7.9):

Table 7.9: Animal Raising Diversity: Percentage of Members by District of Location (N=75)

	Kudchum (%) n=29	**Mahachanachai (%) n=23**	**Patiew (%) n=23**
Animal Raising Diversity[1]:			
(1) Low	13.8	26.1	56.5
(2) Medium	44.8	26.1	34.8
(3) High	41.4	47.8	8.7

[1] Buffalo, cattle, fish, pigs or poultry (sums across animal types): 0 = "no"; 1 = "yes".

Crosstabulations using Chi-square statistics show the ways participants raised animals were not evenly distributed among the 75 participants (Table 7.10). This result was reflected by a high significance level (p<0.01). Results also show that participants in Kudchum and Mahachanachai District raised a greater diversity of animals than those

in Patiew District. Moreover, in Patiew District more than half (56%) of organic farmers exhibited a *low* level of *Animal Raising Diversity*. This result is consistent with other findings that showed many farmers lacked time to raise animals. To make up for this deficit, many participants in Patiew purchased organic fertilizer from the collective at the Dharma Garden Temple. On the other hand, participants from Mahachanachai District were most likely (48%) to demonstrate a high level of *Animal Raising Diversity*. This result suggests that many Dong Yang villagers (Mahachanachai District) raised animals to obtain manure for use at their fertilizer collective. However, at the Nature Care Club in Kudchum District there was no local fertilizer collective. Despite this factor, Kudchum farmers still exhibited a relatively high level of animal diversity. This result is partially explained by the location of the Nong Yor Rice Mill in Kudchum District, which also manufactured fertilizers in a collective.

Table 7.10: Chi-square Values and Asymptotic Significance of Organic Methods by District of Location

Factors	Chi-square values	df[1]	Asymptotic Significances
Green Manure Usage	4.28	2	0.118
Effective Microorganism Usage	4.96	2	0.084
Fresh Manure Usage	15.26	2	0.000
Fertilizer from a Collective Usage	36.25	2	0.000
Animal Raising Diversity	15.33	4	0.004

[1] df = degrees of freedom

7.4 Outcomes of a Shift to Organic Farming Systems

In this final section of the results chapter, associations are shown between the decision to make a shift to organic farming systems and participants' well-being or what are referred to as key *outcomes*. Qualitative findings displayed an integrated concept of well-being that was reflected by spirituality, mental health, physical health, family, and social relations and financial status (Chapters 4 to 6). However, the

measures of (perceived) well-being shown in this section are not comprehensive, only those indicators that were positively or significantly associated, and clearly represented with numerical values were examined. As a basis to uncover associations between key outcomes of a shift to organic agriculture, variables were re-coded for congruence (Table 7.11):

Table 7.11: Key Outcomes (variables)

Variables	***Responses (codes)***
Debt (status)	1 = "yes" 2 = "no"
State of Health	1 = "worse" 2 = "same" 3 = "better" 4 = "much better".
Loan Reduction	1 = "debts increased" 2 = "debts are the same" 3 = "reduced debts" 4 = "No debts".

Correlations using Spearman's rank statistics were used to exhibit the associations between participants' debts, health and worldviews. Table 7.12 (below) shows significant correlations between participants' worldviews, a reduction in debt, a decreased dependence on loans; and perceived improvements in their health status.

Table 7.12: Spearman's Rank Correlations with Debt, Loan Reduction, State of Health and Worldviews Indicators Scale (N=75)

	Buddhist Beliefs (Five Precepts)[1]	**Fertilizer Group Membership[2]**	**Use of Organic Fertilizer from Collective[3]**
Buddhist Beliefs (Five Precepts)		0.001	0.334**
Fertilizer Group Membership			0.085
Use of Organic Fertilizer from Collective			

[1] Worldviews Indicators is a composite measure that includes 1) adherence to the Five Precepts; 2) Devotion to Buddhism; 3) Benefits of organic fertilizer; 4) Why organic fertilizer. High scores=high levels of spirituality and eco-centric values.
[2] Debt, dichotomous variable, (1,2). 1=debt (low score), 2 = no debt (high score).
[3] Loan reduction: low scores = high debts
[4] State of Health (perceived), high score = better health
* Correlation is statistically significant at 0.05 level (2 - tailed).
** Correlation is statistically significant at 0.01 level (2 - tailed).

Key outcomes: *Loan Reduction,* a decrease in *Debts,* and an improved *State of Health* were significantly and positively correlated ($p<0.05$). In addition these variables were all positively correlated with the variables found in the *Worldviews Indicators Scale* at a level of $p\leq0.05$ (2-tailed). However, these findings suggest that the extent to which participants adopted an eco-spiritual worldview weighed upon their conceptualization of well-being. As participants adopted this changed 'worldview' they improved their financial self-reliance ($p<0.01$). Participants that exhibited an "ecological" worldview were more likely not to have debt ($p<0.01$), and to not take on more loans ($p<0.05$). An important finding in terms of the conclusions in this thesis, was the high correlation between improved financial status and health ($p<0.01$). In other words, as participants' financial status improved they reported that their health was better. *Worldviews* also were significantly correlated with the aim to become financially self-reliant ($p<0.01$) and to a lesser extent associated with their perceived *State of Health.* Based on the use of two key variables related to participants understanding of the benefits of organic fertilizers in the composite *Worldviews Indicators Scale*, it was

inferred that the 'decision to use organic fertilizers' is a contributing factor in participants' perception of their well-being.

To further explore the associations between the aforementioned outcomes of a shift to organic farming systems, crosstabulations using Chi-squares statistical tests were used to show participants' perceptions of *Debt, Loan Reduction*, and *State of Health by District of Location* (Table 7.13, below).

Table 7.13: Debt Status, Loan Reduction and State of Health by District of Farming Location (N=75)

	Kudchum (%) n=29	**Mahachanachai (%) n=23**	**Patiew (%) n=23**
Debt:			
(1) Yes	72.4	82.6	55.2
(2) No	27.6	17.4	47.8
Loan Reduction Scale:			
(1) High levels of debt	41.4	26.1	4.3
(2) Low debts	58.6	73.9	95.7
State of Health:			
(1) Same/better	55.2	26.1	13.0
(2) Much better	44.8	73.9	87.0

In structured queries, participants were asked to report whether they had debts, with a simple "yes or "no" answer on a one-page survey form. As shown in Table 7.13 and Table 7.14, results show there was a small differentiation in debt status ($p<0.07$), that is most participants reported they still had outstanding loans . However, when asked about impact of a shift to organic farming methods on a reduction in loans, participants in the districts of location showed a significant statistical differentiation ($p=0.01$). While there were only moderate differences between farmers in the low to medium range, Kudchum District exhibited a relatively higher percentage (41%) of organic farmers carrying a debt burden. As there was no fertilizer collective operated by the Nature Care Club, results suggest that Kudchum participants had higher fertilizer costs. However, in Patiew District where worldviews levels were highest, participants reported low debts (96%). Based on the *State of Health* measure, participants in Mahachanachai (74%) and Patiew District (87%) showed a "much

better" level of perceived health status compared with Kudchum District (45%). These results suggest that members of the Dharma Garden Temple attributed more benefits to a shift to organic farming systems than other organic farmers. In terms of *State of Health* participants were significantly statistically differentiated ($p<0.01$) in their responses to the question, "Describe your state of health after shifting over to organic fertilizer methods?" (Table 7.14):

Table 7.14: Chi-square Values and Asymptotic Significance of Key Outcomes by District of Location

Factors	Chi-square values	df[1]	Asymptotic Significances
Debt status	9.22	2	0.074
Loan reduction	9.31	2	0.010
Health status	11.03	2	0.004

[1] df = degrees of freedom

It also is noteworthy that Patiew District's organic farmers reported a higher incidence of no debt, a greater reduction in loans and a better perceived *State of Health*. Moreover, Patiew farmers showed the highest level on the *Worldviews Indicators Scale* (see Table 7.2). The most likely reason for this finding is that participants were all members of Temple that promoted organic farming methods. From these results, it was inferred that Dharma Garden Temple organic farmers had a higher level of perceived well-being than participants from Mahachanachai and Kudchum District (Green Net members). Based on findings from crosstabulations and correlations, participants' *worldviews* were significantly associated with both their organizational affiliations; and their *locations.*

7.5 Summary

Affiliates and members of the Dharma Garden Temple exhibited a significantly higher level on the worldviews scales which suggests that they perceived the world differently from other participants. The Five Precepts and other Buddhist

scriptures provided a guidelines or lens through which organic farmers judged the 'right actions' on their farm. Participants joined collectives to gain access to fertilizer and exchange knowledge. Participants that expressed a high level of spirituality were more apt to see the benefits of using organic fertilizers. The decision to raise a diversity of animals also was associated with the ways participants made fertilizers, that is individually or as part of a collective. Results show that the use of organic fertilizer methods was significantly associated with participants' worldviews, but differentiated by their location. By making their own agricultural inputs, participants reduced expenditures and avoided the use of chemical fertilizers, pesticides and herbicides. Nonetheless, many organic farmers carried a debt burden. However, participants' perceived that their decision to use organic farming methods contributed to their financial independence (a decrease in loans) and an improvement in their health.

Results do not show that participants gained financial wealth through the adoption of organic farming systems, rather their perception of well-being shifted in the process. This changed perception of their farms, community and the world around them was integral to the acceptance of a way of life based on self-reliance rather than financial wealth. However, results show that some organic farmers were more inclined to adopt organic agriculture based on incentives (price premiums and a guarantee of purchase for their products). While qualitative data exhibited a broad range of intangible benefits related to a shift to organic agriculture, quantitative results show only a significant association between a reduction in debt, loans and an improvement in participants' perceived health status. These statistically significant outcomes were a critical part of participants' decisions to sustain organic farms in the three locations in this study. Notwithstanding, the bearing of spirituality, good family relations and the help of friends are not exhibited in this chapter. Chapter 8 offers an integrated analysis of qualitative and quantitative findings within the context of the relevant literature.

CHAPTER VIII
DISCUSSION

This chapter synthesizes analysis from three sequential phases of inquiry: Phase I and II (qualitative); and Phase III (quantitative) designed to methodologically triangulate data. First, this chapter examines the aims and objectives of the organic farming support organizations worked within the communities of organic farmers. Second, the chapter evaluates the ways that some farmers altered their way of life through a shift to organic farming systems and organic agriculture certification. Third, an analysis of participants' relationships to each other and the natural environment on their farms to sustain their livelihoods leads into a discussion of key findings. Finally, this chapter examines the associations between worldviews, organic farming methods, and the internal and external drivers that bear upon the well-being of the communities of organic farmers in this study.

8.1 Introduction

Yasothon's Alternative Agriculture Network emerged as a response to human drivers of change on their natural environment. While Yasothon's farmers and their households have coped with the geographic characteristics of the region (i.e. poor soil quality and infrequent precipitation), in the last few decades the expansion and intensification of agriculture has further degraded natural conditions (Boonman & Anpim, 2006; Lovelace *et al*., 1998; Panya, 1995, Samerpak, 2006). The expansion of farm lands has increased erosion rates and reduced the integrity of local ecosystems (Hardwick, *et al*., 2004). The use of chemical fertilizers, pesticides and herbicides has contributed to biodiversity loss and degraded farmer health (IPM-DANIDA, 2004). In responses to these problems some farmers have adopt organic methods. Nonetheless, socio-economic trends also prevail upon the livelihoods of both organic and conventional farmers.

Governmental agricultural policies and fluctuations in global rice markets are an important factor in the decision making of smallholder farmers and their households. Many farmers have been attracted to organic rice based on price premiums and fair trade marketing channels. Not unlike, conventional farmers, organic farmers and their families seek to exploit the benefits of membership in a capitalist society. However, the pressures of raising a family in the twenty-first century are similar among organic and conventional farmers, particularly concerns about educating their children, the purchase of modern comforts, and the acquisition of farm technology (Rigg, 1997). Cases of barter were only found among close-friends or neighbors in this study. Organic farmers reported that they enjoyed visits to large hypermarkets as a form of *tiaw* (looking around) and to buy important commodity items at discounted prices. Furthermore, participants purchased many consumable and non-consumable goods outside their village. Organic farmers own motorcycles, and pick-up trucks both as a business investment, and for some as a status symbol. In the last few decades, urban-based wage labor has helped to pay for many of these goods, and affected the level of unpaid work exchange that was once found in many rural Thai villages (Tanabe, 1994). As a result of these changing socio-economic conditions, organic farmers face many challenges in sustaining their way of life.

8.2 The Development of Yasothon's Alternative Agriculture Network

Research Question#1: In what ways do alternative agriculture networks support the development of communities of organic farmers?

Building upon the conceptual framework and research objectives, this thesis investigated the benefits of a shift to organic farming systems in Yasothon Province. Research examined the ways this production network was held together; and influenced by outside organizations, farmers, and natural resources (Callon, 1986; Goodman, 1997; Murdoch, 1996; Latour, 1986; 2005). Findings suggest the organic farming methods selected by each farmer was supported by interactions (i.e. knowledge exchange, collective formation) with fellow farmers, the soil (i.e. animals,

plants, and bio-fertilizers), and machinery (rice mills, tractors, fertilizer processors). These heterogeneous actors came together in the act of food production. Findings show that participants engaged in four principle sets of relationships linked to the act of food making: farmer-to-nature, farmer-to-farmer, farmer-to-external groups and farmer-to-human society. The actions of organic farmers and their supporters helped to develop and expand Yasothon's Alternative Food Production Network (Figure 8.1):

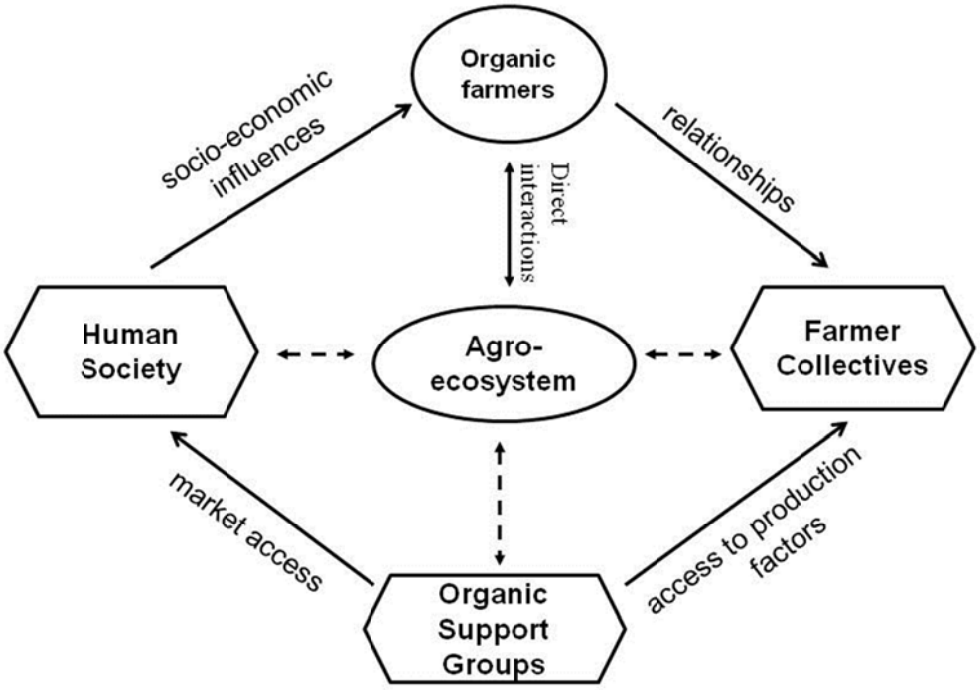


Figure 8.1: Yasothon's Alternative Food Production Network

Local level actions carried out by organic farmers were critical to sustaining ecological agriculture (McNeely & Scherr, 2003). Organic farmers nurtured the soil and connected with each other through agricultural collectives to access the factors of production (Oostinide & van Broekhuisen, 2008). The collective provided an interface that brought organic farmers into contact with supportive agencies, communities of people (families, and consumers), financial capital and new technologies (Pretty, 2003). Organic support groups assisted farmers and were intertwined with food supply chains through manufacturers, marketers, agro-supply companies, and consumers (Matapoulis *et al*, 2007; Morgan *et al*., 2007).

Participants' way of life also was influenced by external socio-economic, political and environmental drivers (Allen, 2004; Millenium Ecosystems Assessment, 2005).

Each extension group discussed in this research assisted farmers in making or sustaining a shift to organic agriculture in different ways. Many governmental and non-governmental organizations assisted with development of farmer collectives, raising the quality of products, and enabling market access (Od-ompanich *et al*., 2007). Assistance with organic agriculture certification was a critical aspect of these programs. Notwithstanding, the ways that external organizations raised the "social capital" of farmer groups was similar: empowering community leaders, instilling values that upheld collectivity and self-reliance, learning based around principles of alternative and organic agriculture, and building up cooperatives to access key production factor (Oostinide & van Broekhuisen, 2008; Pretty, 2003).

Training programs emphasized ways to attain financial independence through manufacturing the factors of production. Many of these organizations helped farmers to build their own collectives, rice mills, warehouses, and sometimes provided loans for technological innovations (Boonman & Anpim, 2006; Hutanawat & Hutanawat, 2002; Kiatsuphimol, 2002; Samerpak, 2006). However, these farmer organizations needed the assistance of strong leadership to carryout programs and bring converts on board. In this respect existing farmer groups were important as they had already established relationships of trust (Jarocz, 2000; Sage, 2003). As described in Thongtawee's (2006) work, 'relationships of trust' between leaders and members helped to build a spirit of *kalayanamitta*.

8.2.1 Sufficiency Economy as a Support Factor

Many participants reported the significance of Sufficiency Economy as a guiding philosophy in the lives of organic farmers. Farmers learned about Sufficiency Economy through diverse agencies and activities. Some organizations encouraged participants to change their lifestyles by reducing consumption and protecting themselves from fluctuations in the marketplace as outlined in the Sufficiency Economy philosophy (Chantalakhana & Falvey, 2008; Sathirathai & Piboolsravut, 2004). In the case of the Dharma Garden Temple, leadership figures saw the concept of Sufficiency Economy as integrated with their guiding principles.

External organization drew upon grants to disseminate organic agriculture methods, the use of integrated farm systems, and to explain His Majesty the King's philosophy through practical examples. Basic concepts in ecology were interwoven with teachings on organic agriculture methods to emphasize the value of sustainable farms and to promote the use of natural fertilizers. Participants also learned a wider range of skills (i.e. making soap, biodiesel, charcoal, and mud brick houses) to reduce their dependence on the external marketplace (Agri-nature Foundation, 2008). Participants generated self-immunity through the elimination of agro-chemicals, and by increasing the diversity of food available on their farms. The use of traditional Thai medicines and food sources were emphasized as a preventive health measure. Participants reported that the Dharma Garden Temple received funds to train debt-ridden conventional farmers in organic agriculture methods and self-reliance strategies through the same program as the Agri-nature Foundation (under the Bank of Agriculture and Agricultural Cooperatives, Thailand).

The programs directed by the Agri-nature Foundation advocated moderation, self-reliance and reasonable consumption patterns along with integrity and morality as tool to confront changing economic conditions. The work of ANF to promote the use of effective microorganisms (EM) to rejuvenate the soil was well known to organic farmers in Yasothon Province. The majority of participants made their own EM with materials around their home. And on the shirts of many participants were found the ANF motto: "feed the soil and let the soil feed the plants" (Agri-nature Foundation 2008; Sathirathai & Piboolsravut, 2004).

8.2.2 Thai Governmental Support for Organic Agriculture

While some experts argue that the Thai government has focused on increasing agricultural exports through conventional farming methods, there are many agencies that have attempted to promote organic agriculture (Falvey, 2000; Panyakul & Wanlop, 2007). Factions within the Yasothon Provincial Agriculture Office have supported organic farmers in the province through national and locally allocated budgets. However, based on the findings in this study, these government agencies lack staff trained in organic agriculture methods. For this reason, budgets are targeted at facilitating training rather than providing expertise.

The Bank of Agriculture and Agricultural Cooperatives (BAAC) is a principal lending body that acts to promote government policies and support farmer groups. The BAAC is active in Yasothon province and has made funds readily available to both organic and conventional farmers. Despite the merits of providing access to capital, the failure of farmers to pay back these loans has led to a series of government supported debt relief programs. Some of these programs have mandated training in organic farming methods and have been carried out in collaboration with the Agri-nature Foundation and the Dharma Garden Temple.

Based on discussions with key informants, government subsidies and aggressive agro-supply companies were the reason farmers initially discarded their traditional practices. On the other hand, many younger farmers are unfamiliar with the ways Thai farmers grew rice prior to the Green Revolution of the 1970s. While price levels are sometimes based on national polices, they are also tied to global commodity markets. Fluctuations in the price of rice and fertilizers have affected the decision making of both organic and conventional farmers. Many farmers (in Mahachanachai District) that participated in the early phases of this study opted to quit the organic agriculture group supported by Green Net, as the price of rice increased rapidly from 2009 to 2010. This factor was particularly apparent at Don Pung Village, were 23 or 27 organic farmer households made a shift back to *na prang* (a second rice crop) through the use of agro-chemicals. It appears unlikely that these previously organic farmers will revert back to organic methods, due to the three year transition period necessary to regain organic certification (and an initial drop in productivity as reported by participants in the first few years).

Notwithstanding, organic agriculture support programs have provided new marketing outlets for many farmers in Yasothon Province and throughout Thailand (IFOAM, 2012). International and domestic organizations have helped to develop the capacity of Thai farmers to meet the stringent requirements of organic certification through diverse methods (Thongtawee, 2006). While Thailand has created premium organic rice brands, few farmers have stayed the course of organic agriculture in the long-term (Samerpak, 2006). And as consumer demand for organic products increase, corporate entities have started to engage in organic farming on an industrial scale.

8.2.3 Green Net Cooperative/Earth Net Foundation

Findings show that the Bangkok based Green Net Cooperative/Earth Net Foundation has played an important part in the development of the organic farmer groups discussed in this thesis. Green Net assisted participants with learning new techniques, exchanging knowledge and understanding the requirements of organic certification. More importantly, Earth Net has functioned as a middleman between farmers and the organic rice market in Europe through support programs based in fair trade labeling and organic agriculture certification (FLO-CERT, 2012; IFOAM, 2012). Through Farmer Field Schools, Green Net convinced some participants of the benefits of consuming and producing organic rice (a key tenet of their outreach policies). While there were significant fluctuations in the membership numbers of organic in some villages, Green Net continues to attract new "partners" and develop Thailand's organic marketplace. Furthermore, several unpublished university-based studies have concluded that Green Net has provided an important source of support to organic farmers through their marketing activities (Kiatsuphimol, 2002; Samerpak, 2006). While Green Net faces many challenges, partly due to a lack of funding, their activities were of particular relevance to opening new markets for the organic farmers in this study.

8.2.4 Santi Asoke Group

While, the Santi Asoke religious community is considered one of the better known Thai alternative agriculture groups, they do not have a formal presence in Yasothon Province. However, many Dharma Garden Temple members reported that they participated on Asoke training programs. Asoke members reside in eight self-contained eco-villages located throughout Thailand, two of which are in the Northeast Region (Sisaket and Ubonratchathani Province). There is also a small farming center at Ubonratchathani University which is linked to a bachelors' degree program in Sufficiency Economy studies housed at the Management School. Professors in the program reported that most of their undergraduate students are the children of Santi Asoke members. Based on interviews and my observations, Asoke communities are somewhat isolated from the political and social influences of Thai society. Nonetheless, Asoke communities have done a great deal to disseminate alternatives to

mainstream capitalism through household food security and a way of life aligned with the teachings of Buddhism (Essen, 2002). Based on interviews with leaders their population has reached over 2000 since their inception. Despite a large following and successful commercial enterprises (vegetarian restaurants and organic fertilizer manufacturing), Asoke's religious and political viewpoints have been viewed by many Thai governments as seditious (McCargo, 2002; Satha-Anand, 1990). And in 2006, Asoke members formed part of the political demonstrations that ousted former Prime Minister Thaksin Shinawatra.

Despite the politicization of Asoke, their main goal is to be self-sufficient, and they have achieved this goal to some extent through their vast network. Notwithstanding, their way of life may be too demanding for most of the Thai populous (Essen, 2002). To create what some scholars might call a society based around "Buddhist Agriculture", they have eliminated many of the comforts of modern life (Wasi, 1988). Although, the organic farmers in this study have strong connections with Asoke, they prefer not to live in their communities. Some participants expressed that their regulations were too restrictive. Nevertheless, participants stated that they gained valuable knowledge from Asoke training courses, and these skills (i.e. alternative energy, fertilizer production, mushroom cultivation, and food processing) contributed to their livelihoods. And experienced farmers in this study reported that they collaborated on training projects; and joined Asoke activities in nearby Ubon Ratchanathani Province.

8.3 Yasothon Province's Organic Farmer Groups

The key informants in this research were members of three different organic farmer sub-networks; namely the Nature Care Club in Kudchum District, Heaven's Farmers Group in Mahachanachai Province and the Dharma Garden Temple in Patiew District. This research examined the connections between locations, farmer groups, farmer-members and the ways they interacted with the natural environment. The organic extension groups depicted in this study taught farmers the value of biodiversity, social capital, and helped them make connections with the national level alternative agriculture network.

Research showed that the appointed leaders in the communities of organic farmers herein were skillful facilitators and orators. Farmer-leaders helped to facilitate interviews with a wide breadth of participants. Interviews were carried out at the homes or rice paddies of participants and public spaces. This research concentrated on organic farmers at three key locations: Nature Care Club, Naso Village, the Bak Reua Rice Mill, Mahachanachai District, and the Dharma Garden Temple, Patiew District. The following sections further examine the results of semi-structured interviews with organic farmers and farmer-leaders to provide a comparison of their aims and objectives (see Chapter 4-5 for more details).

8.3.1 Nature Care Club

The Nature Care Club had a large mill for their base of operations that provided additional employment and served as an access point to the factors of production. They had a well-established organic farming group and a long-standing relationship with Bangkok-based organic extension groups, particularly the Green Net/Earth Net Foundation. However, interviews with some members revealed that they did not feel strong linkages to the Nature Care Club. Significantly, the Nature Care Club Rice Mill also maintained a high membership of conventional farmers. In recent years, some of the farmers left the Nature Care Club to join the Dharma Garden Temple and other groups in the vicinity. A former leadership figure in the Nature Care Club reported that he set-up a special group with 25 members to concentrate on reviving traditional agricultural practices. They called themselves the Organic Farming Group at Naso Village. Although, the Nature Club was established in the 1970s, my findings show that social relations appear to be dissipating, rather than building strength.

8.3.2 Bak Reua Rice Mill

The collaboration between Bak Reua Rice Mill farmers, government agencies, and Green Net representatives led to the development of an organic farmer group. However, many of the members of this group were located in Dong Yang Village and were linked to what is called the Heaven's Farmers group. This organization was important as they established their own sub-collective through the efforts of a small group of neighbors. As most farmers lived in the same neighborhood they were able to

development a strong social network (Capra, 2002; Oostinide & van Broekhuisen, 2008). Group members were led by a few key leadership figures in the community that pooled resources to build an organic fertilizer production center. Notwithstanding, the average age of members was between 40 to 60 years old, which meant that the work of making fertilizer was carried out by more able-bodied contract workers.

While this research highlights the success of the Heaven's Farmer Group at Bak Reua Rice Mill, many farmers from neighboring Don Pung quit the organic agriculture program. Participants stated that the main reason for this decision was many farmers' wanted to cultivate a second rice crop (with commercial fertilizers) to take advantage of a rise in price levels. While Green Net/Earth Net was influential in bringing about the shift to organic agriculture in Mahachanachai Provice, the immediate financial gains of some villagers took precedence over the intangible benefits of organic agriculture.

8.3.3 Dharma Garden Temple

Dharma Garden Temple in Patiew District, exhibited a hybrid structure as a spiritual center, organic training hub and social network. From a physical perspective, the Temple encompassed rice lands, fruit trees, vegetable gardens, a mill, a fertilizer center, a learning center, a cooperative store, a restaurant (with free vegan food for members and participants) and a radio station. It was reported by participants that Santi Asoke, Agri-Nature Foundation and Green Net were all important to the Temple's development. However, the Temple had opted to pursue independent marketing channels with an emphasis on the domestic market. The community radio station 91.5 MHz was a significant part of their networking activities. In my discussions with farmers throughout the region most listened to their radio broadcasts[1]. The social welfare fund was another important source of support for the Temple's activities, and maintained a thousand registered members in 2010. Despite appearances, only 20% of members had completed the transition to organic agriculture in 2009. While, some of their members have chosen to follow the Temple's

[1] I was interviewed by Temple staff about my research on the daily radio show in 2008 and 2010. Based on discussions with participants many listened to these interviews and the other broadcasts on a regular basis.

Khunatham (moral) Rice standard, only 25 were registered as members at the time of this study.

Followers of the Temple's *Khunatham* (moral) farmers monitored each other to ensure compliance to moral guidelines. The core mandate, the Five Precepts served as a guide to farming activities and a set of rules that governed the daily life of members. In accordance with the First Precept, participants attempted 'not to kill living beings' in the soil and around their farm (Hennings, 2003; Payutto, 1996). These principles were incorporated into the structure of the *Khunatham* standard. Despite its challenging requirements, the 'certification process' is conducted by fellow members and verified through "relations of trust" (Jarocz, 2003). However my findings suggest that Moral Rice is more of a process of continuous improvement, than a certification equivalent to the IFOAM standard (IFOAM, 2012). Moreover, some participants expressed that the scientific standards or requirements of IFOAM certified rice were not suitable to their way of life. While IFOAM rice was destined for foreign markets, Moral Rice was aimed at domestic consumption.

Fertilizer production was a successful component of the Temple's extension work as shown by the higher percentage of collective fertilizer used by Patiew farmers in comparison with the other locations in this research. A sub-group at the Temple manufactured fertilizer for the Temple's rice paddies, to sell to members and collective workers. Both members and non-members labored in the collective. Compensation for collective work was monetary or used as a credit towards fertilizer purchases. Members of the collective reported that they freely disseminated fertilizer recipes to outsiders and sold their fertilizer at no profit.

Members of the Temple had also established smaller locally-based collectives that exhibited high levels of social and ecological capital through a proximity of spatial relations and a frequency of connections (Brindt, 2001; Sage, 2003; Tisenkopf *et al*., 2008). At Khud Hin, only 6 kilometers from Naso Village, Kudchum District, farmers set-up their own organic group closely aligned with the Moral Rice Network, but located 50 kilometers away from the Dharma Garden Temple. This sub-network was called Nong Yor Organic Farmer Limited. There also was a small, but cohesive collective at Nong Phed Village, 20 kilometers from the Temple, where they made some of their own fertilizer, and had a small rice processing

machine. From my findings at many of these small-scale collectives, a "proximity of relations" was an important factor in sustaining organic farming in their communities (Jarocz, 2000).

8.4 Organic Farmers' Worldviews as a Factor in Well-being

Research Question #2: How does a shift to organic agriculture lead to changes in farmers' lives and influence their well-being?

Findings suggest that a shift in farmers' actions began with changing their perception of the natural environment. Similar to Curry (2000), I found that many organic farmers exhibited a "collective ecological worldview". A key step in the adoption of this new worldview was learning to nurture the soil. As they acquired this knowledge, participants adapted and diversified organic methods to strengthen the agro-ecology on their farms. The methods that organic farmers employed were intertwined with their "tacit knowledge" derived from a close connection to nature (e.g. microorganism cultivation, green manure, animal husbandry). Some participants expressed that after they moved from the village to live on their farms, they came to appreciate the intrinsic value of the natural environment. The presence of family members, neighbors or others that practiced organic agriculture was another important sphere of influence.

8.4.1 Demographics

This section concentrates on the significant demographic information for the organic farmers that participated in the structured phase of this thesis; and to a lesser extent the 50 farmers (58% female) that participated in the qualitative phase of this thesis. Of the 75 participants in the structured phase, 72% were female and representative of a farmer household. Age emerged as a key area of concern as data showed that 85% of participants were over the age of 40. Findings suggest that the high age of organic farmers is because agriculture has become a less attractive profession. Government studies report that many farmers have low earnings (National

Statistics Office, 2011). These findings also concur with Funahashi's (1996) study about the factors that led to the outward migration of labor from Yasothon Province. Along these lines, organic farmers in this study expressed a desire to earn sufficient income for their children to obtain a formal education and obtain work in the service sector. Some organic farmers said their children attended university or had graduated, but did not want to work as full-time farmers. Some family members of participants worked semi-permanently in Bangkok (Rigg, 1997). The trend of outward labor migration is common in the Northeast, and households have shown an overall decline in agricultural income from 70% to 35%. However, household earnings and the acquisition of durable goods has risen (Grandstaff *et al.*, 2008). For the reasons stated above, the way of life practiced by organic farmers may face resistance from a younger generation seeking access to formal sector jobs and the technological comforts that are commonly found in urban areas.

Although most organic farmers were happy to share information about their work, it was challenging to gather information on aspects of their home life (or the whereabouts of family members) as these subjects were not discussed openly with strangers. Although most participants were married (82%), it is not clear whether they were living together with spouses for the duration of this research. Although, extended families were an important source of labor and capital, widowers, separated and single organic farmers depended on the "network" to help sustain their farms and as a source of lasting friendships (Prayukvong, 2005).

Findings suggest that land ownership was a factor in the decision to pursue organic agriculture. Most of the farmers in this study owned a portion of their land (80%), and practiced more permanent forms of agriculture (i.e. fruit or shade trees grown around the rice paddy). However, some farmers (20%) rented additional plots of land to cultivate more rice. Another challenge for participants was that farmers inherited smaller portions of land as holdings were sub-divided among siblings over past and future generations.

8.4.2 Defining Organic Farmers' Worldviews

Based on analysis of data from semi-structured and structured interviews with 122 organic farmers from the Nature Care Club, Kudchum District, the Bak Reua

Rice Mill, Mahachanachai District and the Dharma Garden Temple, Patiew District, the decision to adopt and sustain organic farms was based on a shift in their beliefs and values or what are called "worldviews" (Curry, 2000; Hutanawat & Hutanawat, 2006; Thongtavee, 2006). This 'worldview' was influenced by participants' spiritual practice, collectivity and ecological values. Many of the extension organizations in this study drew upon Buddhist environmental values as a vehicle to influence changes in farmer perceptions of agriculture and the natural environment. Through the knowledge imparted by extension organizations, NGOs, and other leaders, participants increased the amount of time spent in the natural environment. Collectivity was of importance to the formation of an ecological worldview and this indicator was measured with queries around farmers' decisions to join networks, work together and share knowledge.

Many advocates of sustainable development have adopted Buddhist concepts of nature as a basis for promoting environmental stewardship (de Silva, 1994; Faris, 2004; Kabilsingh; 2010; Sivaraksa, 1996). This argument comes from the premise that, "…Buddhism allows an ecocentric perspective to be adopted, where human beings are just one element in a highly complex web of interactions" (Rigg 1997:56). Responding to these works, some scholars say that alternative agriculturalists have manipulated the Pali-Canon to show that Thai farmers have a pre-disposition to an ecological worldview (Falvey, 2000). In spite of these arguments, most of the participants articulated a pro-environmental perspective, a proximity to the natural environment through the use of organic farming methods, and a high level of spirituality.

Participants' values were influenced by their observations, understanding of the natural environment, and physical actions on the farm. While, participants' narratives yielded a Buddhist conceptualization of the natural environment, in structured questions many participants did not demonstrate a related worldview. Only 24% of participants chose the selection, "humans are a part of nature", while 37% selected the structured response assigned as the equivalent of the Thai word for environment, "everything around us (trees, soil, houses, cars etc.)". Despite, the fact that some participants did not clearly distinguish between *dhammachart* (nature) and *singwaedlom* (environment) in a multiple choice question, many farmers expressed an intrinsic valuation of nature and a feeling of connectedness to the natural environment.

Nonetheless, both unstructured and structured interview data showed that environmental values were to some extent influenced by interpretations of Buddhism. However, as Buddhist teachings include many abstract concepts, it is possible that participants' had difficulty responding to some closed-ended questions about their spirituality. Moreover, the concept of a "collective ecological consciousness" or Buddhist ecological worldview was more commonly displayed by the leaders of organic farming groups.

Building on the work of Curry (2000) and Panya and Sirisai (2003), this research examined the emergence of a "collective ecological worldview" as a product of existing belief systems coupled with influences from the practice of organic farming. The participants in this study described themselves as practicing Buddhists; and 64% responded that they 'depended on the teachings of Buddhism as a way of life. And 56% reported that their decision to use organic fertilizers was governed by the principles of the First Precept: "not to kill living things" (Henning, 2002). Organic farmer-leaders expressed themselves in a vernacular akin to 'Buddhist Agriculture' (Wasi, 1988). These findings are supported by many scholarly works that discuss the use of the First Precept as a basis for the promotion of natural agricultural practices (Falvey, 2000; Rigg, 1997).

In the case of the Moral Rice practitioners at the Dharma Garden Temple, many referred to the First Precept as a moral justification for being an organic farmer. In comparison to the other groups in this study they showed a higher mean score on questions related to the concept of a Buddhist-based eco-spiritual worldview. They expressed a firmly embedded code of conduct based on their religious beliefs. As one participant stated, "Organics is part of good Buddhist practice, which is training by combining Buddhism and organics together, thus leading to *Moral Rice.*" While, I cannot definitively say that the organic farmers in this thesis upheld an ecological worldview, their actions were shown to promote biological diversity on their farms.

As exhibited in this study some organic farmers more clearly exhibited their religious convictions than others. While, *Luang Poh* Supa Jarawat was the spiritual force behind the development of the Nature Care Club, members belonged to many Temples in the area. *Luang Poh* expressed concern about the course of organic agriculture in recent years. Similar to leaders at the Dharma Garden Temple, *Luang*

Poh felt many farmers were more focused on making a profit from organic products rather than changing their values. In Mahachanachai District, there were many devout Buddhists, particularly at Dong Yang Village, but the local Temple or monks did not function as a catalyst in their decision to pursue organic agriculture. Nonetheless, the strength of the Dharma Garden Temple was not only the result of influential monks. After the passing of the Nature Monk, volunteer-members helped to chart their course of development.

Buddhist teachings had a strong influence on the ways that organic farmers related with each other and natural entities on their land. Participants expressed a moral obligation to help each other with the demands of organic agriculture. As organic farming materials were not widely available in the marketplace, farmers sustained "relations of trust" through collectives that also decreased their costs (Jarocz, 2000; Sage, 2003). The majority of participants (60%) that joined fertilizer collectives described their associations with fellow farmers through the Buddhist term *kalayanamitta or* "virtuous associations" (Payutto, 1998). Members of the collectives in this study shared both knowledge and work responsibilities without expectations of a return on investment. Common acts of *kalayanamitta* also included the sharing of food and companionship among both members and neighbors. Participants expressed a willingness to cooperate as it was part of sustaining the strength of their networks. Despite the importance of *kalayanamitta*, farmer groups also depended on access to capital, strong leadership, local experts, labor, resources and technology.

8.4.3 Social Capital

As participants lacked readily available inputs and machinery, they had an incentive to pool capital by forming cooperatives or short-term collectives. Collective actions led to tight-knit social networks and engendered high levels of social capital amongst participants. While, Putnam (2008) defined social networks as a product of human relations, organic farmers depend upon an extended ecological web of non-human agents (Capra, 2002; Goodman, 1997). By cultivating relationships with animals, plants and other organic farmers, participants reduced costs and improved their livelihoods. Participants gained social capital through the exchange of knowledge that occurred within these networks. Some participants shared surplus food or

provided physical assistance to neighbors or other members, thus increasing their social capital. Despite the pragmatic benefits of collectives, most farmers expressed that collectives and farmer groups were a place to make lasting friendships. The farmer groups in this study created an organizational network with a unique sub-culture fueled by ecologically-friendly values (Capra, 2002).

As with most Thai farming communities the rice mill serves many important functions: namely, milling, packaging and access to the markets. For Thai farmers the mill acts a point of contact to external assistance, and the marketplace (Ratanamalai, 1999). For participants, the rice mill also served as a social safety net through the development of collective savings funds that could be accessed in times of need. While for many participants the mill acted as a place to gather with colleagues and friends to socialize or exchange knowledge. Both organic and conventional farmers associated with each other either through work or social relations at the mill. However, organic farmers tended to form smaller collectives outside of the rice mill premises that exhibited higher levels of social capital.

Based on the importance of nurturing the soil through collective actions, this research closely examined the ways organic farmers produced fertilizer. Although, it was assumed that fertilizer making was an activity based at every rice mill, fertilizer collectives were a form of sub-network which was loosely or not all associated with the mill. Two of the key locations in this study did not contain an active fertilizer collective during the course of my research: Naso Village (Nature Care Club) and Don Pung Village (Bak Reua Rice Mill). Notably, most of the Don Pung Village farmers (23 of 27 families) quit the organic club. On the other hand, Dong Yang Village (linked to Bak Reua Rice Mill) who had established their own fertilizer collective, maintain a much more stable membership of organic farmers. While 35% of participants were not members of a fertilizer collective, qualitative findings suggest that fertilizer collectives were critical for some farmers who lacked manure on their farms. In the case of Dharma Garden Temple fertilizer collective was managed by a group of farmers who worked there and earned credit towards purchases or financial remuneration. Several small groups affiliated with the Temple also came together in their respective villages to make fertilizer prior to planting season. Based on analysis of qualitative and quantitative data, fertilizer collectives were an important means to

attract and sustain organic farmer membership. Several other communal work structures were surveyed in this study: namely, communal food production groups, communal property ownership, and cooperative stores. Based on my findings, these activities did not contribute to a significant level of social capital in these communities. A formal food processing group was found in only one village and was made up several elderly women. In Don Pung village there was a communal vegetable garden with an allotment structure, but many of the farmers were growing crops through conventional methods. The cooperative store was a feature in all of the villages in this study, but did not sell organic products except at the Dharma Garden Temple. Most cooperative stores attracted an equal mix of organic and conventional farmers.

8.5 Agricultural Knowledge Development

The adoption of new knowledge emerged as the primary aim of the extension agencies discussed in this study (see Chapter 4). However, the presence of organic extension organization staff (e.g. Green Net) in the community or the availability of training courses did not guarantee wide scale conversion to organic farming methods. Hutanawat and Hutanawat's (2003) study in Mahachanachai District showed that farmers' 'eagerness to gain new knowledge' and 'learning how to use this knowledge' were the key factors in making a successful shift to organic farming methods. Furthermore, the ways farmers accessed knowledge and developed a relationship with extension agents was an important factor in the acceptance of organic methods (Kanayama-Phiri *et al*., 2008; Lotter, 2003). In most of the communities in this study, the placement of Green Net representatives helped to elicit information sharing, facilitate training and disseminate the requirements of organic certification (Samerpak, 2006). However, findings suggest that the presence of a local expert on organic farming; with strong leadership capacities was critical to sustaining organic collectives. Prominent local organic farmers exhibited the ability to convince friends and neighbors to experiment with and sometimes sustain organic farming methods. These findings concur with Thongtawee's (2006) research on the shift to organic farming in Suphanburi, Central Thailand. Moreover, local leaders provided a source of moral support and encouraged farmers to engage in collective work activities (e.g.

fertilizer production). However, important tasks in rice production such as planting, harvesting and polishing rice were paid work. Traditional forms of work exchange (e.g. *long khek*) were not a prevalent characteristic in organic farmers groups. Although, this study did not aim to identify the traits of 'good leaders', qualitative findings show that participants held those leaders who were strict Buddhists, diligent, and maintained successful organic farms in high regard.

8.5.1 Acquisition of Agricultural Knowledge

Although, some of the elder informants mentioned that they shifted to conventional agriculture in the 1970s. Few participants reported that they had learned organic farming methods from family members. Findings suggest that participants' families had discarded the traditional agriculture methods that were practiced by former generations of Thai agriculturalists. Most participants learned organic methods on training courses and from their colleagues. And closed-ended questions revealed that only 28% of participants had acquired organic farming skills from family members. That is to say, only a few participants reported they engaged in traditional agriculture practiced learned from their parents.

However, organic farming in Yasothon Province was more than a product of methods learned from external experts. Participants in this study have started to gather "embodied knowledge" from elders and incorporated this data into the development of new organic methods (Tanabe, 1994). Results show that participants gained 'explicit knowledge' by attending organic farming courses and 'tacit knowledge' was acquired through working the land. That is to say, a synthesis of "old" and "new" agricultural knowledge has led to 'local' innovations in organic farming methods.

8.5.2 External Support Organizations

This new knowledge had led to the development of Farmer Field Schools (FFS) suit to the needs of local farmers and taught by local experts. Notwithstanding, farmer experts require financial support and training allowances to farmers helped to support the expansion of organic farming. Findings show that some farmers attended these courses out of interest, as an opportunity to expand their social networks, or for

some free meals. Nevertheless, the facilitation of training programs was an important part of gaining new converts.

Participants also referred to programs they attended at *Khao Khwan, Kyusei* Foundation and the Sufficiency Economy Training Center in Saraburi. Accomplished organic farmers in this study also served as trainers for some of these organizations. Many of the provincial government projects in Yasothon province gained seed funds through proposals under the guidelines of the Sufficiency Economy Philosophy (SE). While, some farmers were unclear about the details of New Theory Agriculture (NTA), when it was explained to them, they reported that they followed similar practices on their farms.

While government policies have focused building the technical knowledge of Thai youth with the aim to build up the industrial sector, there continues to be support for agricultural education programs. And the schools in these villages offered courses that incorporated the Sufficiency Economy philosophy into activities. In a few schools, organic farmers from the community worked with teachers. Elementary school students learned to make fertilizers, EM, grow vegetables, plants, and fruit trees through organic methods. These programs have shown some promise and have received funding from the Thai Research Fund and other government agencies.

8.6 Use of Organic Farming Methods

Organic farmers used low-input and environmentally friendly agricultural practices to work with the harsh conditions of the Northeastern ecosystem. Participants improved soil fertility and discovered new ways to raise crops through their own ‘scientific’ experiments in the field. Participants improved soil quality and controlled pests through natural methods. They sustained soil fertility through a continuous effort to stimulate biodiversity above and below the ground. Participants were assisted by domesticated animals, plants and microorganisms that cycled nutrients back into the soil. Through their actions, participants perceived the soil as a living entity rather than an inert substance (Fukuoka, 1978; Steiner, 2002). Participants joined with each other in communal tasks to sustain soil life by pooling natural resources, and making fertilizers in small collectives.

Most participants (56%) stressed that organic fertilizer methods were important to protecting life in the soil, and only 9% reported that they accessed organic fertilizers based on their reduced costs. The majority of participants (65%) joined fertilizer cooperatives, while the remainder made their own fertilizer or purchased it from organic farming networks. A significant number of participants (93%) raised animals, thus maintaining their own source of fertilizer onsite. Some farmers expressed that they were too old for the arduous work of raising animals. Despite their age, many farmers (91%) raised animals as a source of manure. Although, some farmers (43%) were capable of producing their own fertilizer, the majority chose to join a collective to access related machinery. Despite the significance given to fertilizer collective herein, 36% of participants did not to join a collective for various reasons. And half of those who did not join collectives reported that the closest collective was too far away.

The amounts and types of fertilizers used by participants depended on available natural resources, capital and labor requirements, and soil quality. Participants provided information on the quantity of land under cultivation, amount of manure and fertilizer that was purchased from outside sources or made in a local collective. Many participants reported that the amount of fertilizer used was based on observations of rice quality from the previous harvest. A few long-term organic farmers (10 years or more) did not apply fertilizer every year. However, in some cases they acquired new landholdings that required extra fertilizer. Newer organic farmers (5 years or less) used higher quantities of fertilizer, but did not show higher outputs than other organic farmers in this research (see Chapter 6). Despite the collection of data on productivity levels as a factor of fertilizer use for 2009, it was difficult to make comparisons between farmers as rainfall was not evenly distributed, some had access to irrigation, and many reported that outputs were lower on some areas of their land associated with uneven terrain. As such, some areas of paddy were more productive than others, and required more or less fertilizer. The amount of fertilizer used was not necessarily based on observed requirements, but on a combination of factors: available capital, ease of access to a collective, and whether they raised domesticated animals. From a statistical perspective findings on organic fertilizer usage are inconclusive. Nonetheless, an expert from Dharma Garden Temple reviewed these

findings and explained that many successful organic farmers lessen the amount of time spent on their farms to assist as trainers in later years (which is a paid activity). Hence, rice productivity fluctuates depending on the needs, responsibilities, labor, financial, and ecological capital under the control of each farmer.

The introduction of microorganisms was recognized as a critical intervention point and 96% of participants reported making EM for use on their farm. Notwithstanding, empirical studies that examined the growth benefits of EM on Thai farms were largely inconclusive (Kamla *et al*., 2008). While, one web-based study suggested that the lack of conclusive evidence on EM effectiveness reflects the complexity of measuring 20,000 varieties of microorganisms in a controlled experiment (Figa & Parr, 1994). Despite the lack of refereed studies, the overwhelming majority (100%) of participants reported that they applied EM to their rice paddies.

Green manure is another common method of building soil fertility. Several studies show nitrogen rich plants such as sword beans and cow peas are a renewable resource and a nutritious food (Institute of Tropical Studies, 2010). However, only 67% of organic farmers reported having the time or the resources to cultivate green manure. Some participants mentioned that it was difficult to find seeds. And few participants consumed these legumes as a part of their diets.

Mineral additives are another component of building soil fertility, and additives were purchased from organizations within their networks. The government also donated some substances required for soil development such as dolomite or molasses. In this regard, organic farming as practiced by participants was not a completely independent form of agriculture embedded within the confines of the local natural environment.

Although dry organic fertilizer can be produced at home, it is useful to have access to industrial machinery to make larger amounts. Hence, participants formed collectives to access raw materials, machinery and labor. Fertilizer making is an arduous process best carried out by young and able-bodied workers. The majority of participants were over 40 years old (85%), as such many groups elected to contract outside labor to assist with the production process. In this respect, organic farming is not a venture which is isolated from the external socio-economic influences and

natural resources. While previous studies have shown the positive impacts of organic farming methods on soil quality, this study aimed at social factors, primarily well-being (Pimentel *et al*., 2005). The final section addresses the question whether a shift to organic farming contributes to well-being.

8.7 The Shift to Organic Farming Systems as a Driver of Well-being

Research Question #3: Which socio-ecological factors contribute to; and bear upon the well-being of communities of organic farmers?

Participants described well-being in terms of spiritual, mental and physical health, dietary requirements, material needs, social and family aspirations, and self-reliance. Health was judged based on participants' perceptions of their well-being, not only the absence of disease and infirmity (World Health Organization, 1946). As there were no specific studies on blood toxicity levels conducted in the population of study, this thesis emphasized the use of one specific question designed to capture participants' overall perception of their health (Bowling, 2005).

Participants reported that the benefits of organic agriculture extended beyond physical health. Friendships were of great importance to participants. And their proximity to the natural environment influenced their perspective of well-being (Mayer & Frantz, 2004). In the words of one participant, "I see nature all over my farm, green, animals, and it brings me peace and happiness."

Participants' worldviews, knowledge systems and actions were interlinked to their well-being, but analysis of frequency distributions did not unveil a uniform pattern in which these drivers were valued by participants. However, 70% of participants queried reported the importance of an 'ecological worldview' over knowledge and production factors in staying the course of organic farming. Qualitative data suggests that participants adopted a 'pro-environmental' or 'ecological worldview' after they realized some of the extrinsic benefits (i.e. food security, pesticide free crops) of organic farming methods. A number of participants were attracted to organic agriculture for health reasons, while other participants exhibited a

disposition to organic agriculture through a firm belief in the Buddhist scriptures. Analysis of participants' responses to unstructured questions also showed that one reason for adopting organic agriculture was the social capital they derived from membership in a group. While the financial arguments for a shift to organic farming systems also were prevalent, many farmers were drawn to the programs that supported organic agriculture because of a desire to reduce their debts and improve their health.

8.7.1 Health

Through the adoption of organic farming methods, 98% of participants reported an improvement in their health status. While this finding is significant it is important to understand that rural farmers often perceive health as integrated with their overall well-being (Mock, 2000). Analysis shows that some organic farmers linked spiritual and physical health to what they perceived as increase in biodiversity within their agro-ecosystems. Participants also perceived that the consumption of organic foods contributed to better health; and that health concerns were the main reason for making a shift to organic farming systems. Despite these findings, many participants reported that they suffered from various ailments related to agro-chemical use. During the course of this research one prominent organic farmer leader in Bak Reua District passed away from the long-term side effects of what were reported as prior agro-chemical use. While, participants linked these ailments to the use of commercial agro-chemicals, the links were medically-proven.

Despite a lack of comprehensive medical data for the organic farmers in this thesis, studies by IPM-DANIDA (2002) in other areas of Northeast Thailand show that conventional farmers have high blood toxicity levels. Along these lines, medical tests facilitated by the Khao Kwan Foundation in Central Thailand showed that farmers reduced blood toxicity levels after they eliminated the use of agro-chemicals (Thongtawee, 2006).

8.7.2 Self-Reliance

The organic farmers in this study work hard to build biodiversity and strengthen the resilience of their agro-ecosystems. Integrated farms were one way that participants generated "immunity" from fluctuations in external markets (Sathirathai

& Piboolsravut, 2004). As most of the organic farming support organizations in this study encouraged farmers to grow a diversity of crops to improve household food security and diversify income, these practices were adopted by most participants. And most participants (91%) exhibited the ability to fulfill many of their dietary needs through integrated farms; that generated rice for consumption and sale, a seasonal supply of fruit, vegetables, fish, and other food products. While rice was grown by organic methods, some participants reported that there were farmers who used conventional methods to grow commodity crops on other plots of land. In terms of household food security, few farmers processed their own food. Most participants found it necessary to purchase additional food products and condiments from cooperative stores, fresh markets and large retail chains. In some villages, farmer groups maintained a "commons" in forested areas where residents extracted special food products and medicinal herbs (Lovelace *et al.*, 1998).

Only a few participants raised animals for their self-consumption (poultry or fish), large animals such as buffaloes, and cows were sold or kept for manure. Nonetheless, many farmers (51%) had insufficient manure and had to purchase it from outside their collectives.

Financial independence was the outcome of a holistic approach to organic farming, rather than a focus on profits. The methods that participants employed were low-input and when possible derived from local sources. Formerly dependent on loans to purchase seeds and associated agro-chemicals, participants reported a 63% reduction in loans and 12% stated they had no debts at all. However, participants expressed that in many cases, the consumption patterns of other members of their family challenged their "immunity". To meet some of these financial requirements, 20% of organic farmers opted to grow commodity crops as an additional source of income.

8.7.3 Perceptions of Well-being

To uncover the key drivers, factors and indicators that bear upon organic farmers' well-being participants were asked questions aimed at drawing out their worldviews, the ways they worked together, and the organic methods they selected to rejuvenate their farms. To examine the relationships between these variables, scales were constructed to show aggregate measures of participants' worldviews

(Worldviews Indicators Scale), their ability to adopt key fertilizer methods (Organic Fertilizer Subscale), and the benefits (Key Outcomes) of these actions. While Buddhist concepts of eco-centrism permeated throughout Yasothon's alternative agriculture network, Chi-square statistics show there was a significant association ($p<0.05$) between organizational affiliations and participants worldviews. Green Net supported farmers scored in the low to medium range, while the majority of Dharma Garden Temple members scored in the high range (68%) on the Worldviews Indicators Scale. While some of the organic farming extension groups in this thesis promoted "Buddhist agriculture" spiritual training typically was supplemented with formal organic extension programs (Wasi, 1988).

Based on Spearman's rank statistic, the decision to practice the Five Precepts was significantly correlated with the Use of Organic Fertilizer from a Collective ($p<0.01$). While, kalayanamitta (associations of the virtuous) was reported as an important factor in the decision to join collectives, many participants opted not to join a fertilizer collective (Prayukvong, 2005; Payutto, 1998). And not all participants that used collective fertilizer worked in these sub-groups. This finding was attributed to the work requirements of making fertilizer, and the higher ages of the participants in this study (85% were older than 40). Nonetheless, half of the participants that did not join fertilizer collectives reported these organizations were located too far away from their homes. Many farmers reported that they were able to produce fertilizers at home by raising animals. Most participants raised animals (93%), but not in sufficient quantities for their fertilizer needs. Those participants that had access to a fertilizer collective supplemented their home fertilizers with those from the collective. However, there was only a small variation in the ways participants' practiced organic farming in the three key districts of location. A smaller number used cultivated green manure due to the extensive work requirements. And as most participants found it convenient to produce their own Effective Microorganisms (EM), 100% reported its' use as a fertilizer. Although, participants' districts of location were of some significance, qualitative findings show that the formation of sub-groups within these locations; and the abilities of community leaders to instill eco-spiritual values also had a bearing on the uptake of organic farming methods.

Closer examination of the benefits of a shift to organic farming systems: namely financial independence and an improved state of health were significantly correlated ($p<0.01$). Hence, as participants shifted to organic agriculture, their health improved and their debts went down. Participants' worldviews were significantly correlated with health status, an absence of debt and loan reduction. In other words, the benefits participants gained from a shift to organic farming systems reinforced their environmental and spiritual values.

In this research, participants were given the 'freedom to choose the course by which they achieve and define well-being for themselves, their families and communities' (Millenium Ecosystems Assessment, 2005: 28). And in the case of Yasothon's organic farmers, well-being was an integrated concept that combined mental health, physical health, self-reliance, food security and the ability to meet material needs, social and family aspirations. Participants were asked to provide their own perception of their well-being rather than complete spreadsheets or submit to clinical testing. This thesis placed an emphasis on qualitative findings, as a means to ascertain the benefits of well-being in the communities of organic farmers.

8.8 Summary

This chapter examines the factors that influenced participants' decisions to sustain organic farms, and the outcomes of these actions on their well-being. While organic farmers in Yasothon Province have attempted to "immunize" themselves from the outside world, external socio-economic, political, technological, and cultural forces have weighed upon their way of life. Although government agencies have contributed to the development of farmers through loans and assistance to farmer cooperatives, some of these programs are blamed for high levels of farm debt; and the breakdown of traditional social safety-nets.

Despite setbacks, governmental and non-government organizations have helped some farmers acquire the skills to sustain organic farming systems. Organic agriculture proponents based in Bangkok have shown farmers the ways to generate organic-certified crops and to provide a market for their products. Governmental agencies have used similar strategies, and provided funds to develop related programs.

Diverse organizations have promoted the Sufficiency Economy philosophy as a strategy to expand integrated farming systems. While the work of these external organizations are important to smallholder organic farmers, some groups have learned that long-term success comes from the ability to pool internal resources and drawn upon the financial and social capital of members. The presence of able leadership is another important factor in their success. As these organic farmer collectives develop they also have made direct linkages to the marketplace through partnerships with consumers; and organizations aimed at promoting lower-cost organic food for Thai consumers. Notwithstanding, most farmers are reluctant to tackle the labor intensive methods used by organic farmers.

Based on the results of this thesis, the transition to organic farming is a labor intensive process that brings farmers into a close relationship with each other and the natural environment. The physical actions of informants, such as EM making, raising animals, and making fertilizers in collectives were part of an arduous and cyclical effort to "feed the soil" (Agri-nature Foundation, 2007). Although, this thesis shows that access to; and production of fertilizers in formal collectives was a critical step in the transition to an organically-certified farm, these tasks depended on sustaining a living network of plants and animals on the farm (Capra, 1996; Odum, 1996). Many participants worked together in collectives to access the natural factors of organic production. As participants realized the advantages of organic farming methods, ecological values were reinforced. This newly formed perception of the environment and mutually-supportive belief system gave way to a Buddhist-informed ecological consciousness (Panya & Sirisai, 2003). Participants' new ways of interacting with their agro-ecosystems was a reflection of a shift in their perception and valuation of natural resources. While organic farmers showed a tendency to understand that their acts were justified by Buddhist teachings, not all farmers displayed a statistically significant understanding of *dharmmachat* (nature). Participants chose a course of action based on organic certification requirements, available resources, and the new methods and values they acquired through their social networks.

Some of the organic farmer groups in this study created a sub-culture based on shared values and beliefs. By working together in collectives and learning to trust each other, farmers generated financial and social capital. Organic farmers more

highly valued collectives as a source of *kalayanamitta* (associations of the virtuous) rather than as access point to the factors of production. Participants exchanged knowledge openly and gained life-long friends through their associations with other organic farmers (Prayukvong, 2005). Community-based leadership was influential in shaping participants' worldviews and their decisions to work collectively (Thongtawee, 2006). Organic farmer groups, collectives, regional networks, and external agencies helped to instill environmental values and self-reliance. Despite the value of social networks to the communities of farmers in this study, access to markets and a premium price on organic rice were a significant factor in the decision to stay the course of organic agriculture. Moreover, economic and political conditions continue to influence the well-being in communities of organic farmers and limit the expansion of the alternative agriculture network.

The teachings of the Dharma as embodied in the Five Precepts formed the basis of an organic farmers' code of conduct, this concept was most clearly exemplified in by "Moral Rice" farmers. In scales designed to measure organic farmers' ecological values and religious practices, participants from the Dharma Garden Temple in Patiew District showed the highest level on the *Worldviews Indicators Scale* in the three districts of location. While changes in farmers' environmental values were important to sustaining organic farms, so were the benefits of adopting a new system of agriculture. Organic farmers expressed the intrinsic benefits of their work (i.e. heightened ecological consciousness, spiritual health, green environment). Bountiful rice and good health were viewed as part of the extrinsic benefits (i.e. economic self-reliance, food security) of staying the course of organic farming. These findings were supported by a significant correlation between participants' *worldviews* and their perceptions of the benefits or outcomes afforded by a shift to organic farming methods.

Although, Temple members in this study admitted they sometimes broke the rules of the Five Precepts, Buddhist teachings served as a roadmap for their way of life (Curry, 2000). Participants rationalized organic agriculture as part of Buddhist practice and placed an emphasis on 'not taking the lives of the creatures in the soil. Based on findings herein, some organic farmers and their households in Yasothon have created a community of Buddhist agriculturalists (Wasi, 1988). And the farmer

leaders in these communities have adopted a vernacular akin to Buddhahassa's AgriDhamma to restored dignity to the act of disciplined work (Falvey, 2002). To sustain their sub-culture, some groups of organic farmers have adjusted their economic life according to Buddhist principles (Schumacher, 1973). To what extent the farmers in this study have the power to challenge conventional food systems through Buddhist practice is a question for future research. The last chapter of this dissertation revisits the external and internal drivers that bear upon the well-being of participants, the methodological challenges, research gaps, and puts forth key intervention points for the expansion Thailand's alternative food production network.

CHAPTER IX
CONCLUSION

Food making is a social process that calls upon people to work together; and with the natural environment to foster human development. Humankind's interactions with their food systems have played a part in the creation of regional cultures, society, and contributed to our well-being (Kuhnlein, 2006; Millennium Ecosystems Assessment, 2005; Pretty, 2003). While, innovations in food provisioning systems have been essential to human development, the technology humankind has used to increase productivity has degraded the quality of the natural environment. Not only has this change in the treatment of food degraded the natural environment, it has reduced well-being through a decline in food security, health, and human welfare in rural and urban areas.

It is argued in this research that an improvement in the well-being of the organic farmers in Yasothon Province was contingent upon the new values they adopted to underwrite and alter their food provisioning systems. Findings suggest that organic farmer-participants showed a significant association between the presence of a "collective ecological worldview", the use of organic methods, and an increase in their perceived level of well-being (Figure 9.1):

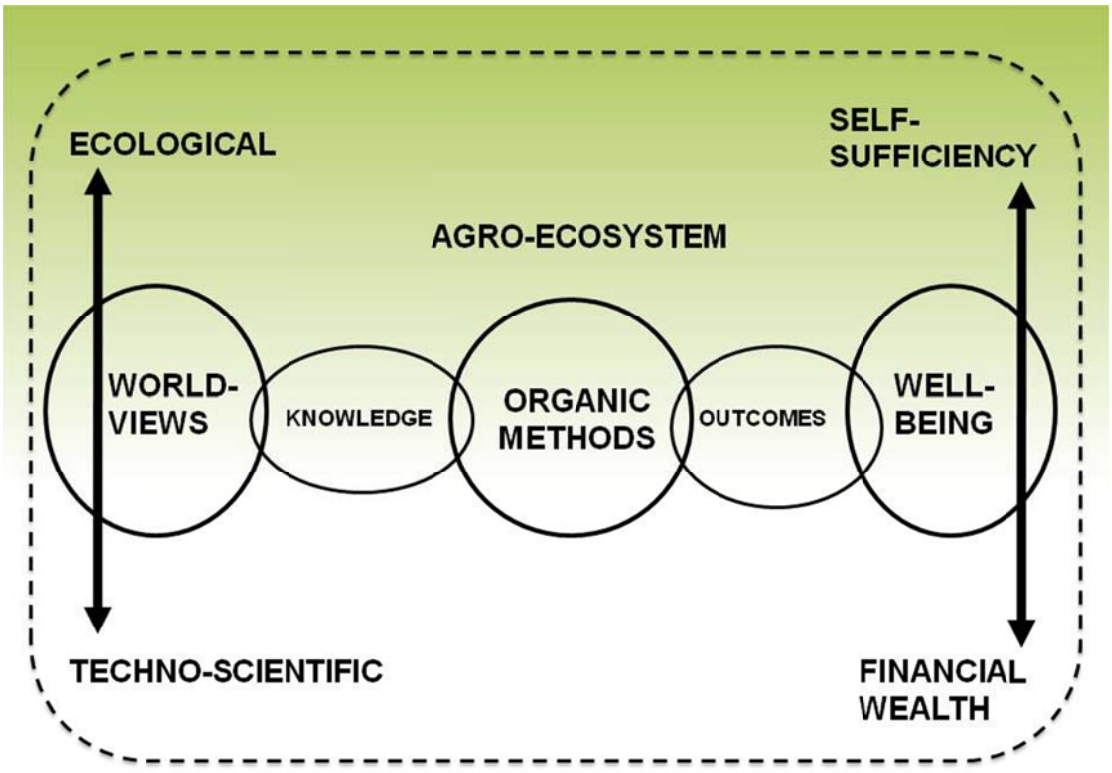


Figure 9.1: Changing Worldviews through a Shift to Organic Farming Systems

However, the ways organic farmers perceived an increase in well-being was based on a shift in their values and the acquisition of new knowledge. Organic farming methods were the cornerstone of this new knowledge and brought farmers into a close association with their natural environment. Participants expressed an intimate knowledge of their natural environment and the methods to best stimulate the growth of their crops. This information was gained by attending training courses and exchanging knowledge with their colleagues. The use of a diversity of organic methods was a critical success factor for the farmers in these communities. Participants reported that through the use of organic methods their soil was more fertile, and a diversity of natural food sources became more available. As participants did not use chemical additives, they concluded that the rice and other products cultivated on their farms were healthy and safe.

The outcomes of a shift to organic agriculture were critical to an improvement in farmers' financial well-being and health. Many participants reported that they had myriad health problems and high blood toxicity levels prior to a shift to

organic agriculture. Some participants reported that their doctors suggested they avoid the use of agro-chemicals as part of their treatment. The majority of participants believed that as they increased their consumption of organic foods, their health improved. Moreover, as they reduced chemical usage, they stated that their physical strength levels increased. Participants also reported a decrease in their stress levels as they reduced their debts, and eliminated outstanding loans.

For many participants organic farming was a lifestyle choice that helped to isolate them from fluctuations in the marketplace. Financial status became less important to some farmers who improved food security and reduced their reliance on manufactured agricultural inputs through organic methods. Notwithstanding, household food security was not the primary aim of all participants, some farmers grew rice, commodity crops, and raised animals to increase their income levels. Many participants adopted organic agriculture as a means to gain a premium price and access to a specialized marketplace.

To buffer themselves from the external marketplace, organic farmers built their own social safety-nets with the help of “good friends” (Prayukvong, 2005). The organic farmer groups depicted in this research all invested in a savings or welfare fund with their colleagues as a form of social security independent of private banking and government schemes. These savings groups helped farmers gain access to the factors of production. However, findings suggest that some organic farmers chose to join small-scale collectives to access machinery and financial capital, not unlike conventional farmers. Nonetheless, many participants benefitted from membership in collectives to gain social capital or what organic farmers in this study referred to as *kalayanamitta*.

9.1 Revisiting Research Objectives

This research aimed to exhibit the development of an alternative food production system in Yasothon Province; with the intent to study its impact on the well-being of communities of organic farmers; and to identify key intervention points. In this section key research questions; and objectives are revisited. The sections that follow reflect on the key findings in this thesis. Table 9.1 provides a summary of

epistemological influences, strategy of inquiry, procedures for data collection, and analysis; followed by key research questions and objectives:

Table 9.1: Research Framework

Epistemology	**Research Questions**	**Research Objectives**
Ontology/Conceptualization: Ecological Worldview; Actor Network Theory (Callon, 1987; Latour, 2005)		
Strategy of Inquiry: Sequential Exploratory Design (Cresswell, 1998)		
Procedures for Data Collection: Phase 1: Topical Interviews Phase 2: Semi-structured interviews Constructivist Grounded Theory, Qualitative Analysis (Charmaz, 2006; Mills and Bonner, 2006; Cresswell, 2003)	I. In what ways does Thailand's alternative agriculture network support the development of communities of organic farmers? II. How does a shift to organic agriculture contribute to well-being in communities of farmers?	I. To investigate how Thailand's alternative agriculture network supports the development of communities of organic farmers. II.To critically evaluate whether a shift to organic agriculture leads to changes in farmers' way of life and influences their well-being.
Phase 3: Structured Interviews Qualitative Games (Mock, 1997) Multiple choice questions/Likert scale (Cresswell 2003; Kempton *et al*., 1996), Triangulation (Olsen, 2004a; 2004b; Modell, 2008)	III. Which socio-ecological factors contribute to the well-being and resilience of communities of organic farmers?	III.To identify and measure the socio-ecological factors that contribute to the well-being and resilience of communities of organic farmers.
Data Analysis: Grounded Theory (Glaser, 1978), Descriptive statistics (Neuman, 2006), Spearman's rank correlation, Chi-squares (Elliot & Woodward,2007)		

9.1.1 Research Objective #1

To investigate how Thailand's alternative agriculture networks support the development of communities of organic farmers.

The Bangkok based and local organic support organizations discussed in this research aimed to assist farmers in making a shift to organic agriculture. Select governmental agencies channeled funds through national level sustainable agriculture and Sufficiency Economy development programs. While most of these organizations aimed to build up self-reliant farmer groups, some organizations provided financial support and technical know-how, and others concentrated on a shift in values. These new values were founded upon ecological knowledge and Buddhist teachings. Support organizations emphasized the need for greater food security, and a reduction in costs by eliminating external inputs. Despite differences in the ways these organizations interacted with farmers, they had common goals:

- Development of ecological knowledge/organic methods
- Household food security
- Financial self-reliance
- Access to a specialized marketplace
- Farmer group empowerment

Extension work focused on facilitating training and the exchange of knowledge with the help of local experts. Financial independence was attained by supporting cottage manufacturing of the factors of production, and to a lesser extent value-added products. Many of these organizations provided the seed funds for farmers to build their own collectives, rice mills, warehouses, and acquire technological innovations. Self-sufficiency extended beyond food security, as organic farmers learned to fabricate their basic needs (e.g. soap, biodiesel, charcoal), and some built homes from natural materials. The basic principles of ecology were a key component of training courses. Some courses taught the use of traditional Thai medicines and the ways to cultivate and prepare these remedies.

In the case of the Dharma Garden Temple, Buddhist teachings were a key component of their training courses and extension efforts. While Green Net/Earth Net Foundation aimed at a more practical understanding of organic agriculture, many affiliated members expressed a high level of spirituality. Nonetheless, all of the farmer groups in this study benefitted from the marketing channels provided by the Green Net/Earthnet Foundation and steady growth in the demand for organic food on a domestic and international level.

9.1.2 Research Objective#2

To critically evaluate whether a shift to organic agriculture leads to changes in farmers' way of life and influences their well-being.

Findings show that participants underwent significant changes in their way of life and improved their well-being through a shift to organic farming systems. Participants came to reevaluate their well-being as they learned to conceptualize the soil and their farms as a living network; guided by the 'right livelihood'. For most, but not all participants, the right actions were based around the teachings of the Buddhist scriptures. Participants were taught to realize their interconnectedness with the world around them; and as a result endeavored not to harm life in the soil. While some participants provided a spiritual justification for a shift to organic methods, some farmers did so to sustain long-term productivity. Despite the near absence of traditional work exchanges (e.g. *long khek*) among organic farmers, they did share some work responsibilities and freely exchanged knowledge with others.

Participants perceived the linkages between their mental, physical and spiritual health; and increased levels of biodiversity in their agro-ecosystems. Participants observed improvements in their health through a shift away from agro-chemical use. As participants relinquished their material desires, they became more content with village life and spent more time on their farms. They realized their role as stewards of the natural environment, and many shifted towards an ecologically-centered worldview. For some participants this ecological worldview was a natural extension of their religious practice, while for others it was gained through their

experiences as farmers. Buddhist teachings inspired the formation of these values; and shaped participants' perception and treatment of the natural environment. Shared beliefs and values also provided a lens through which participants conceptualized well-being. Self-sufficiency was integral to this new perspective of well-being that combined Buddhist scriptures with His Majesty the King's Sufficiency Economy philosophy. This new values set was supported by five integrated concepts:

- Physical health attained through the consumption of organic foods and a reduction in agricultural loans.
- The production of 'good food' for self-consumption rather than a surplus for sale.
- Organic farming methods and participation in certification schemes as an opportunity to achieve financial independence.
- Membership in an organic farmer collective to achieve these goals.

Although findings show the significance of adopting environmental values and an increase in household food security, additional income sources were a critical part of participants' new perception of well-being. Participants cultivated fruit, vegetables, commodity crops, medicinal herbs, various types of rice, and raised fish, and livestock. Their rice paddies offered a diversity of wild food sources: edible flowers, plants, snails, fish, frogs and lizards. This bounty was shared with less fortunate members of their collectives, extended family, friends, and neighbors.

Notwithstanding, financial remuneration through organic monocultures and the latest in agro-technology have captured the hearts of many farmers. Organic farmers also have aspirations of sending their children to university and acquiring modern amenities. Some participants reported that they supported their children to study in Bangkok, but as returns from their rice harvest were insufficient they still took out loans. Although, some participants' children assisted them during harvest time, they were not hopeful that they would take over their farms. Many organic farmers hired contract workers to help with various stages of the harvest, and rented or owned technological innovations that reduced their labor requirements (i.e. small-milling machines, harvesting machines, and tractors). As members of collectives,

participants gained access to many of these aforementioned technological innovations. Hence, access to capital and technology also were critical factors in organic farmers' livelihoods and weighed upon their well-being.

9.1.3 Research Objective #3

To identify and measure the socio-ecological factors that contributes to the well-being and resilience of communities of organic farmers.

Through analysis of qualitative and quantitative findings, staying the course of organic agriculture was dependent on four key factors:

1) A shift in worldviews (beliefs, values and mindsets)
2) Gaining sustainable agricultural knowledge
3) Access to the factors of production
4) Membership in a marketing network

Statistical analysis showed that there was a positive correlation between organic farmers' worldviews, and their perception of well-being. While participants associated the use of organic methods with their well-being, this study did not draw out a positive statistical relationship between these variables. Notwithstanding, findings suggest that through a shift to organic forms of food production and working closely with fellow farmers, participants elicited a new conceptualization of well-being. Participants came to understand well-being as an increase in food security, the quality of relations in their collective, a reduction in debts, and a better state of health. This concept of well-being was integrated with participants' spirituality and understanding of their interconnectedness to the natural environment. The ability of participants to sustain their way of life was supported by local organic farmer collectives, and the larger networks that provided a market for their products and helped them to develop the technical skills to make the shift to organic agriculture.

Quantitative results show that participants' environmental values correlated with a Buddhist conceptualization of eco-centrism. This Buddhist or

'collective ecological worldview' was both a result of participants' attendance on training courses and the knowledge they obtained from building soil fertility on their farms individually and collectively. While there was a significant difference in participants' *worldviews* ($p<0.01$), the *Organic Fertilizer Subscale* measures revealed there was less variation between the ways they worked on their farms. On the other hand, Spearman's rank statistic shows that there was a significant association between participants' spiritual values and the reasons that they used organic fertilizer methods in their rice paddies ($p<0.01$). Furthermore, there was a strong correlation between their worldviews and their perceptions of well-being ($p<0.01$ level). And Chi-square statistics showed that Dharma Garden Temple members expressed the highest level of (perceived) well-being ($p<0.001$).

Worldviews and organic methods were linked together through the ways that knowledge was put into practice. This research shows that outcomes of a shift to organic farming systems: namely financial independence and an improved state of health were significantly correlated ($p<0.01$). Notwithstanding, Chi-square statistics showed that participants' worldviews were significantly associated with their *District of Location* and their *Marketing Networks* ($p<0.05$). Although their geographical location was of significance, the sub-groups formed within these areas; and their leadership also had a bearing on their quality of life and perception of well-being. Most participants raised a high diversity of animals as a source of both income and manure. However, raising animals was significantly differentiated between the three *Districts of Location* ($p<0.05$).

Participants' perception of their financial status, physical and mental health were all significant factors in their decision to adopt organic farming methods. The ability to fulfill dietary requirements, meet basic material needs, social and family aspirations, and the help of good friends sustained organic agriculture in the communities documented in this study. Despite findings herein, some farmers in these communities gave up organic and alternative agriculture in favor of more profitable methods; and an increase in conventional rice prices.

9.2 Methodological Challenges

Although, some obstacles were confronted during the course of this research, a choice of mixed methods was well-suited to the exploratory components of this thesis. Making sense of the subtleties of environmental values and showing their relationship to well-being required both qualitative and quantitative approaches. This thesis benefitted from the use of qualitative methods as an approach to draw out and investigate participants' key concerns, while quantitative methods served to clarify and support qualitative findings. As an outcome of this research, a set of tools were designed that are replicable for similar studies in other regions and appropriate to the socio-cultural background of farmers. However, some challenges were faced during this research in relation to the methods, population, and scope of the study.

9.2.1 The Benefits of Organic Methods

While some natural scientists rely on laboratory tests to show the affects of organic fertilizers on plant growth, this research focused on evaluating the ways that organic farmers interacted with each other and their natural environment. This thesis was not designed as a productivity study or a comparison between organic and conventional farmers. Expert research on the viability of alternative and organic farming methods has been accepted by many scientists (Allen, 2004; Dale & Polasky, 2007; Lotter, 2003; Pimentel *et al*., 2005). Despite the value of scientific studies, some experts also qualify farmers as authorities on their soil systems through the tacit knowledge they gain on their farm (Tanabe, 1994; Van Keer *et al*., 1998). Meanwhile, studies have shown the negative impacts of conventional agriculture on the services of the ecosystem without an ability to sway public opinion towards an alternative food production system (Millenium Ecosystems Assessment, 2005; Sandhu *et al*., 2010; UNEP, 2007). Building on these scientific studies, this thesis responds to a lack of research on the intangible benefits of organic farming systems (Feenstra, 1997).

9.2.2 Concepts of Well-being

This thesis aimed to define well-being as an outcome of a shift to organic farming systems. Participants reported improved health, the ability to fulfill dietary requirements, meet basic material needs, social, and family aspirations (Gough &

MacGregor, 2007; Millenium Ecosystems Assessment, 2005). Revisiting the work of Mock (2000) Thai wellness is an integrated concept influenced by rural traditions and religious beliefs rather than government health initiatives. To investigate this community-based concept of well-being both qualitative and quantitative findings were incorporated into conclusions. Participants were asked to discuss their health status before; and after the adoption of organic farming methods. Participants explained their health from diverse perspectives, integrating physical, mental, and spiritual health with perceived improvements in the natural environment on their farm. Structured components aimed to more specifically examine physical health based on, "Single, global questions…to measure health status, quality of life (QoL), and health related quality of life (HRQoL)" (Bowling, 2005:345).

To further ascertain the ways organic farming influenced financial status, participants were asked questions around the development of fertilizers as a means to improve self-reliance. Findings suggest that participants' were able to achieve some degree of financial self-reliance through making fertilizers in collectives and on their farms. And some participants reported that as they reduced the stress levels associated with a debt burden, their mental health improved (Drentea & Lavrakas, 2000). These findings also were supported by a significant correlation between participants' debt reduction levels and (perceived) a better state of health.

As spirituality is another key aspect of Thai perceptions of well-being, this thesis drew upon both unstructured and structured data to analyze participants' values and belief systems. The ways that participants applied environmental values and translated these concepts into 'pro-environmental' actions on their farms were measured through ordinal scales. Results show that participants' Buddhist and environmental values were significantly correlated ($p<0.01$).

While spirituality, health and individual self-reliance bear upon the well-being of organic farmers, it is recognized that external political and socio-economic factors are of significance. Although there were no explicit measures used herein, qualitative data shows that governmental promotion of organic agriculture was one of many factors that influenced the decision making of farmers to adopt alternative and organic agriculture methods. On the other hand, some farmers quit organic agriculture programs when government pricing policies favored conventional forms of rice

production. Hence, research on what prevents conventional farmers from adopting organic methods merits further study.

9.2.3 Sampling Methods

This thesis aimed to investigate well-being in communities of organic farmers. Through advice from experts, a few villages were identified with a relatively high density of organic farmers in Yasothon Province. However, even in these communities organic rice farms were located on the outskirts of the village, and only in a few cases were they adjacent to each other. Few people lived directly on their farms. Many organic farmers lived far away from an organic rice collective or rice mill; and only gathered together sporadically with their colleagues. Hence, this thesis examined well-being as a factor of organic farmer networks rather than on a village level.

The population of study covered diverse groups of organic farmers that lived and worked in four different districts of Yasothon province. Although, the sample used for the exploratory phase was sufficient in itself to address research questions, a structured component was added to clarify and support data (Onwuegbuzie & Collins, 2007).

The adequacy of samples for the exploratory phase of this thesis was determined through “theoretical saturation” (Glaser, 1978). The use of mixed methods provided “complementarity” and strengthened the “integrity” of conclusions (Harrison, 2008).

Although interpretation of qualitative and quantitative findings suggests that the spirituality of organic farmers’ influenced their decision to stay organic, the reasons that most Thai Buddhist farmers elect to use conventional agriculture methods merits future study. Notwithstanding, several studies have examined the differences in the values of conventional and organic farmers in the Philippines and North America, and this methodological framework has not been used in Thailand (Baconguis & Cruz, 2005; Beus & Dunlap, 1991). Returning to the objectives herein, this thesis investigated the factors that helped some communities of farmers to stay with organic farming methods; and their perceptions of this new way of life.

9.2.4 Use of Actor Network Theory

Influenced by the predominance of Actor Network Theory (ANT) in contemporary agro-food literature, ANT provided a framework to explain the ways organic farmers worked with each other and the natural environment in the act of food making (Callon, 1987; Goodman, 1997; Morgan *et al*., 2008, Murdoch, 2000). Findings show that participants built up soil fertility by stimulating the growth of biodiversity above and below the soil. This process entailed the cultivation of microorganisms, green manure, fertilizer manufacturing and raising domestic animals as a source of manure. The sum of these interactions brought participants into tight-knit social groups and close contact with the natural environment on their farms.

While findings show the importance of cooperating with the natural world to produce organic food, these results do not verify the existence of a symbiotic relationship between organic farmers and the natural entities on their farm. In the words of Lorenz (1966: 180), "It is in principle impossible to make any scientifically legitimate assertion about the subjective experiences of animals". Despite Lorenz's argument, observations show that the daily grazing rituals shared by domesticated animals and their caretakers served mutual interests (e.g. exercise and fertilizer for farmers; exercise and food for animals). Based upon the naturally available food sources for both humankind and animals on organic farms, it was presumed they are more inviting to animal life than a monoculture farm. In the absence of objective research that measures the intentions of animals, controlled scientific studies confirm that manure applications, grazing activities and legume crops; sustain animals, plants, and contribute to an increase in soil fertility (Drinkwater *et al*., 1995; Hecht, 1987; International Institute of Tropical Agriculture 2010; International Livestock Research Institute, 1998; McNeely & Scherr, 2003; Savory 1999; USDA, 2011). These scientific studies are valuable in that they exhibit some of the ways that human societies are physically bound to the natural environment through their food systems.

Returning to the question of the reliability of Actor Network Theory as a theoretical framework, there are few accepted methods that measure the agency or intentions of the non-human world (Whittle & Spicer, 2008). Until a "translation" device is invented that helps humans speak to *anima mundi*, Actor Network Theory (ANT) offered the best means to conceptualize an investigation into the realm of

nature-to-society interactions (Callon, 1987; Latour, 1987). In the case of this thesis, ANT provided a useful method to conceptualize the interactions between humankind and animal life within the context of their natural environment.

9.2.5 Instruments of Experimentation

Although ANT was useful as a conceptual method, a tool was sought after to measure human behavior towards the natural environment. The methods selected in this study drew upon Mayer and Frantz's (2003) "connectedness to nature" (CNS), Dunlap and Van Liere's (1978) New Environmental Paradigm (NEP), and Kempton's (*et al*., 1996) study of North American environmental values. These previous studies used structured questionnaires to measure societal environmental values with descriptive and inferential statistics. Although the qualitative phase of this thesis supported the development of the structured instrument, closed-ended queries with abstract concepts about 'Buddhism and nature' proved confusing for some farmers. Moreover, structured questions that limited participants' abilities to express themselves were not well represented through numerical descriptions. While structured methods may have credence for researchers making assumptions about environmental behavior, eco-spirituality is not a concept that is easily analyzed with numerical devises. Moreover, tools such as the *Connectedness to Nature Scale* or the *New Environmental Paradigm* would require extensive modifications to provide adequate measures of the environmental values of rural dwellers from diverse cultures and socio-economic backgrounds (Dunlap & Van Liere, 1978; Mayer & Frantz, 2004). This research shows that human behavior and decision making around the environment is influenced by a multilayered set of variables that depend upon individual and collective beliefs, values, culture and socio-economic concerns. Discerning human perspectives of the natural environment is not only contingent upon the skills of the researcher, but the willingness of participants to reveal their worldviews.

To overcome the deficiencies of previous studies, questions were designed to be culturally appropriate, and at a level suited to the educational backgrounds of participants. More importantly, tools were aimed at attracting the interest levels of participants. This objective was based on participants' reports that other researchers

had dispersed questionnaires without proper guidance, or trained unqualified people to collect the data for them. Participants in this thesis stated that the games used to collect data were interesting, and helped them to appreciate the diversity of ways they worked on their farms. On a follow-up visit to the study sites a participant stated that as he received a low score on the *Organic Fertilizer Game*, he decided to raise a greater variety of animals in the following year. Based on these findings, agro-studies in Thailand could benefit from the use of methods better suited to the socio-cultural background of farmers.

Despite the engaging qualities of the games played with participants, when asked abstract questions (through structured formats) about beliefs and values, a decreasing level of interest was observed. Moreover, leadership figures more readily engaged with abstract queries about their worldviews. For the aforementioned reasons, mixed methods helped to build the overall integrity of this research.

9.2.6 Socio-cultural and Personal Challenges

As a foreigner with a non-native ability in the Thai language, the researcher recognized some limitations in the analysis of data. However, this deficit was countered by advice and linguistic interpretations from a Thai co-researcher and academic experts throughout the course of this study. On each rounds of interviews, approaches were restructured based on both external input and the researchers' inferences. However, it is possible that in some instances participants may have provided responses that were constructed to please a foreigner visiting their community. And on one occasion a participant was wary that their knowledge might be stolen away for commercial purposes.

An expert from the Faculty of Agriculture at Khon Kaen University suggested that depending upon the location of the interview, farmers may exhibit different responses, for example, 'groups of farmers interviewed at a Temple might state they followed the *Five Precepts*, while at home with friends they might indulge in intoxicants and/or respond differently'. However, in the researchers' estimation, participants were not intentionally deceitful about their beliefs, values or actions. For example, in the case of Dharma Garden Temple participants, there was no apparent difference in the results of interviews conducted at the Temple or outside locations.

Notwithstanding, it may be argued that Dharma Garden Temple members were linked by a common religious dogma and for this reason did not openly express dissenting opinions to an outsider.

As this thesis attempted to draw out participants' interpretations of 'the world around them' within the context of the researcher's Western mental model (i.e. nature vs. environment), it proved more reliable to triangulate responses with surveys of farming methods, observations and in depth interviews (Kempton *et al*., 1996). Within the rural agricultural context of this study, organic farmers' actions spoke louder than words. For this reason, participants' worldviews were investigated from multiple perspectives: open-ended queries; close-ended queries, and observations of the ways they put their knowledge into practice on their farms; and in their communities.

9.3 Research Gaps

Although, findings show that local and organic food networks contributed to the social and economic development of the communities in this study, there were few related empirical studies on Thailand. Some institutional and university-based research was available, but published in a format and vernacular that is inaccessible to those that might benefit from its' reading (e.g. farmers). In other cases, participants reported that researchers had been to their communities, but never shared final reports with them. It was a painstaking process to locate related research either Thai or English. The Thai Alternative Agriculture Network could benefit from funding to support a library or centralized database.

While research conducted by foreigners, may offer a new perspective, they sometimes lack the cultural and linguistic background to make appropriate or practical recommendations. Findings suggest that Thai researchers should receive education support to pursue both positivist and constructivist methods to agro-food research. Too often it was found that the studies that discussed abstract concepts lacked rigorous analysis. On the other hand, studies that examined the science of organic agriculture were well-constructed, but failed to elaborate on socio-cultural or human behavior as a factor in the value of proposed innovations.

More importantly, this research shows that spirituality plays a part in the uptake of environmental values and organic methods. In light of these findings, it is hoped that this study inspires other researchers to explore the relationship between spirituality and human behavior. One aim of this thesis is that other researchers draw upon the tools developed herein to further exhibit the socio-ecological benefits of organic methods to farmers, communities and society. Finally, more research is needed that convinces agro-policy makers to support a nation-wide shift to sustainable food production with the input of rural people.

9.4 Intervention Points in the Food System

Governmental and non-governmental organizations in Yasothon Province have done much to promote the use of alternative and organic agriculture methods. Some of these programs have focused on providing marketing channels or directing funds to support a shift to organic farming. While political and economic institutions have the tools at their disposal to implement policy changes, modern food systems have been firmly established. Studies show that leveraging systemic change is rooted in changing individual beliefs, values and ultimately people 'worldviews' (Goldsmith, 1996; Meadows, 1999). Advocates of organic food production have argued the environmental, economic and socio-cultural benefits of a shift to sustainable food systems (Allen 2004; Goldsmith, 1996; Pretty, 2003). And some researchers have claimed that alternative food systems have the potential to match the productivity of conventional systems (Pimentel *et al*., 2005). However, urban-based decision makers cling to techno-scientific solutions and a 'business as usual' approach. Drawing on a broad analysis of findings herein, this thesis offers key intervention points for a shift to a more sustainable food system.

In contrast to techno-scientific food supply chains, organic food systems are based on five principle sets of human interactions: farmers to their agro-ecosystem, farmers to farmers, farmers to communities, farmers to consumer society. The work of organic farmers is embedded within a larger system of interactions between themselves and nature. Figure 9.2 (below) displays the relationships between humankind and the food system with potential intervention points:

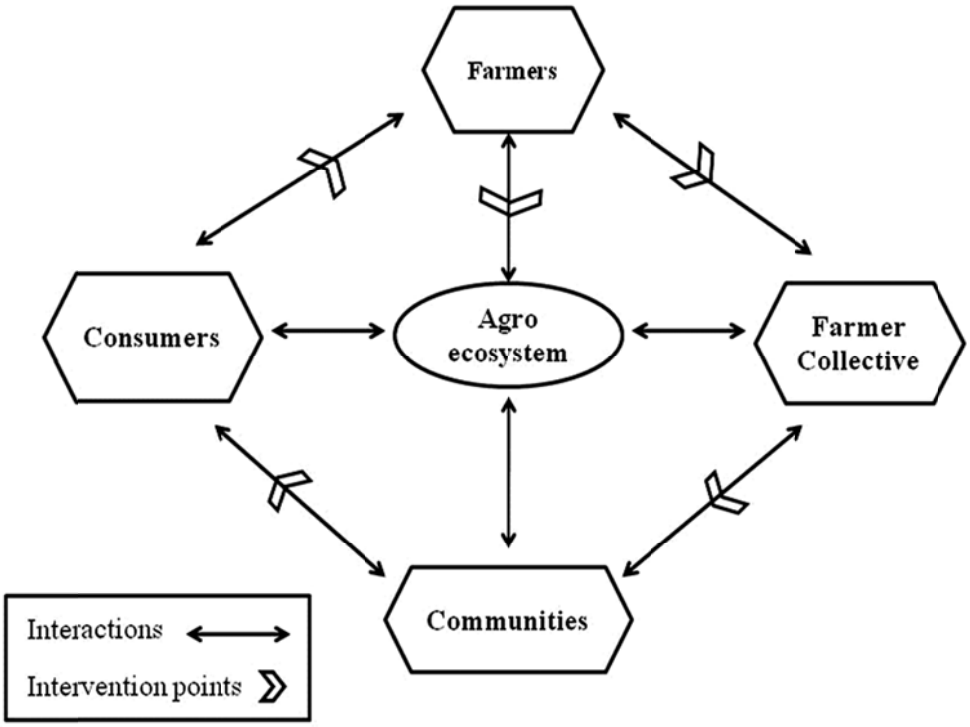


Figure 9.2: Intervention Points in the Food System

Source: Adapted from Castree, (2005), Odum (1997) and Shiva (1991)

The agro-ecosystem is placed at the center of the diagram to exhibit the interrelationship between human society and the natural environment. Farmers work with the natural environment to stimulate plant growth through the methods they find most appropriate to achieve their objectives. Farmers' interactions with each other and human society bear upon their worldviews, actions upon the land, and their livelihoods. The formation of collectives helps organic farmers to gain access to the factors of production, and bring their output to the marketplace. Food is harvested and processed (by people and machinery), and purchased by diversity of organizations (governmental, private, and NGOs). External organizations intervene in the system through product promotion, education and the introduction of innovations. Rural and urban dwellers affect policy and institutional decisions through their purchasing decisions that in turn impact the larger food system, and the integrity of the ecosystem. In the next section, this structural framework is used to provide recommendations for building up locally-situated collectives as a center for knowledge exchange, and as an access point to the factors of production.

9.4.1 Development of Farmer Collectives

While findings show the importance of rice mills as a center for diverse work activities, smaller-scale collectives exhibited a higher level of social capital; primarily through relations of proximity. This research shows that small collectives, particularly those focused on fertilizer production served as a point of knowledge exchange, long-term friendships, and trusting relations. Although Dharma Garden Temple members were spread out over long-distances, they retained the integrity of their network by fostering the development of affiliated small scale collectives in remote areas.

These findings suggest that decision makers should foster the growth of small-scale collectives through the provision of key resources and small loans or start-up grants. While, these organizations stand to grow and develop strength in numbers, assistance programs should encourage the birth of new organizations embedded in smaller localities. In addition to ecological knowledge, education programs should aim at building leadership qualities and empowering members to address community level problems. Local natural resources could be better controlled by small groups of farmers whom are directly impacted by decisions made around their use, such as natural waterways, irrigation canals, small reservoirs and forested areas. While organic farmers might lack explicit scientific knowledge, they possessed a tacit knowledge of the way to preserve ‘the commons’ in their localities.

While collectives are a critical intervention point in rural communities, organic farmers are first and foremost part of families with diverse interests. Findings show that organic agriculture brings with it myriad benefits to family members, and fellow farmers. While, this study shows that some communities of organic farmers have improved self-reliance, physical and mental well-being, these benefits have not transferred to other members of the community, at least directly. More significantly, only a small percentage of farmers in the region of this study have converted to organic agriculture. Hence, future assistance programs should aim to draw in a larger population of farmers, and in particular conventional farmers into the development of small-scale community-based organic fertilizer collectives.

9.4.2 Local Economic Assistance

As discussed in the literature review (Chapter 2) North America and Europe have initiated development programs that address the economics of rural agrarian communities and ecosystem conservation through the preservation of regional food sources (Allen, 2003; Morgan & Sonnino, 2007; Pretty, 2002). In Thailand, designations of origin could sustain the price levels of regionally cultivated foods with 'buy local' initiatives. These programs also could stimulate cottage manufacturing with raw food products sourced from the region. Entrepreneurs, farmers, and local residents could benefit from an increase in regional employment and the manufacturing and sale of value-added products. Government projects such as One Village One Product could cluster together with organic initiatives to build strength and share resources, similar to the initiatives found in the Tuscany region of Italy (Sonnino, 2007).

A Thai version of community-supported agriculture (CSAs) could serve to educate urban consumers, offer students opportunities for practical learning, and dish up healthy food. Meanwhile, Bangkok could benefit from the use of vacant properties as green spaces, a source of locally available healthy food and to regain food security. Urban gardens on vacant lands could provide additional income for residents and a source of food for restaurants. Programs that engage urbanites in weekend food making programs could start a trend more attractive than walking the endless shopping malls of the major cities.

Although food tourism is a part of contemporary Thai culture, there is much work to be done on promoting regional food through better branding, community fairs, farm-stays, and eco-tourism directed at urbanites. Long-term farm stays might even include programs where Bangkok residents trade their business acumen with organic farmers in exchange for healthy food, fresh air and relaxation in greener surroundings. The benefits of bridging the urban-rural divide are limitless, particularly in improving human well-being, restoring Thailand's natural environment, and instilling a collective ecological worldview among urban dwellers.

9.4.3 Health Networks

Until recently, few consumers called into question the treatment of food and were unaware of the potential dangers of modern food production systems. Studies have shown that as food supply chains expand, food undergoes a series of processes to prolong shelf life, and it becomes increasingly difficult to control or trace food-borne illnesses (Morgan *et al*., 2008). Outbreaks of salmonella and other viruses prone to the confines of industrial food chains have harmed many consumers in Western nations (Tanaka, 2006).

Findings suggest that many conventional farmers in Thailand are suffering from health problems. Significantly, few Thai studies are available on the side effects of farmer exposure and ingestion of chemical fertilizers, pesticides and herbicides (IPM-DANIDA, 2003). This research shows that better health is an important part of farmers' decisions to adopt organic agriculture. Based on the findings herein, it is recommended that a nation-wide comparative study is carried out to examine the physical health of both organic and conventional farmers. On the other hand, rural dwellers are reluctant to visit hospitals and sometimes rely on alternative forms of health care (Samerpak, 2006). Little is known about the success rates of these alternative remedies and less of the long-term impacts of agro-chemicals on the health of rural farmers and their households. Health related studies on organic agriculture and food in by Thai researchers would be of great benefit to farmers, consumers and policy-makers.

Healthy food initiatives in urban and rural areas are a critical intervention point, particularly in regards to preventive medicine programs that link public and private sector organizations. For example, in Kudchum District, a local hospital has invited organic farmers to sell their products once a week at the "Green Market". The integration of organic food as a source of sustenance for government employees holds the potential for growing these initiatives to other public sector food services. 'Good food' initiatives could both transform the food economy and reduce governmental healthcare budgets.

9.4.4 Changing Worldviews through National Education Policies

While economic incentives may encourage some farmers to grow organic crops, this study shows that financial incentives are not a critical leverage point in making a shift to sustainable food provisioning systems. Many converts to organic farming in this thesis expressed spiritual rather than financial motivations for staying the course of organic farming. These findings concur with Meadows (2008) work that found system shifts start with changing societal beliefs. If policy-makers are serious about adopting more sustainable food systems, than a shift in educational systems is critical to leveraging change.

The adoption of socio-culturally appropriate educational systems in rural and urban Thai schools may restore farming as a respected profession, and build a new generation of organic farmers. These programs need to show students the ways that their food consumption and diets are linked to the services of the ecosystem. In Europe and North America, school food programs have begun to integrate cooking, environmental studies, nutrition and agricultural skills (Morgan & Sonnino, 2008). While agricultural training is a mainstay of the Thai educational system, few programs focus on integrated learning methods, organic production, and even fewer grow sufficient quantities to feed their students. In Yasothon Province some schools adjacent to organic agriculture initiatives have begun to integrate farming, small-scale business ventures and even selling their products as part of the curriculum. These programs have relied on seasoned organic farmers and extension workers as teachers. Unfortunately, Thailand's public school programs are poorly funded and few teachers in Thailand are trained to provide an integrated curriculum centered-around organic agriculture. The organic farmers in this study exhibited a high level of know-how that could be replicated and expanded throughout the Thai school system.

At the university level in Thailand, there is great potential for change. Many of the universities in Thailand with agricultural departments are physically and academically separated from other faculties. Too often agricultural programs lean towards Western agricultural strategies and fail to draw on rural farmers' knowledge and capabilities. Agriculture is an integrated field that merits the attention of anthropologists, biologists, chemists, economists, ecologists, historians and linguists. University students could learn far more about the problems facing rural farmers

through living and working in their communities, rather than in a classroom setting. Not only would university students receive an interdisciplinary education, they would benefit from a greater understanding of the externalities that are generated by food that is cultivated, processed, and delivered to their family dinner table. Moreover, these initiatives might encourage more university students to apply their knowledge on family farms and appreciate the work of smallholder farmers in the national economy. This new class of trained educators could potentially leverage a shift to a more sustainable food production system and move Thai society towards a Sufficiency Economy.

9.5 Building a Sufficiency Economy

In Thailand, rural agrarian communities are no longer immune to the socio-cultural decay that initially plagued urban centers. High crime rates, drug addiction and prostitution have become a means for many to earn a living. The allure of car ownership, computers, and mobile technology has also attracted rural Thais (Wyatt, 1982). To access the capital to obtain these luxuries, many rural dwellers have adopted the use of western agricultural technologies (Rigg, 1985; 1997). While some have benefitted from technology, the farmers in this thesis reported that agro-chemicals were to the detriment of soil quality, natural food sources, and their long-term health.

In an effort to improve the socio-economic conditions in Thai rural society, His Majesty the King has forth a new theory of development. This approach known as the Sufficiency Economy philosophy calls for a sustainable economic system (National Economic and Social Development Board, 2006:2):

> *"Sufficiency Economy" is a philosophy that stresses* ***the middle path*** *as an overriding principle for appropriate conduct by the populace at all levels. This applies to conduct starting from the level of the families, communities, as well as the level of nation in development and administration so as to modernize in line with the forces of globalization. "****Sufficiency****" means moderation, reasonableness, and the need of self-immunity mechanism for sufficient protection from impact arising from*

> *internal and external changes. To achieve this, an application of knowledge with due consideration and prudence is essential. In particular great care is needed in the utilization of theories and methodologies for planning and implementation in every step. At the same time, it is essential to strengthen the moral fibre of the nation, so that everyone, particularly public officials, academic, businessmen at all levels, adheres first and foremost to the principle of honesty and integrity. In addition, a way of life based on patience, perseverance, diligence, wisdom and prudence is indispensable to create balance and be able to cope appropriately with critical challenges arising from extensive and rapid socioeconomic, environmental, and cultural changes in the world."*[1]

Many public and private institutions have incorporated the philosophy of HMK into their organizational objectives. Organizations under Royal Patronage have offered guidance and provided technical know-how. Some institutions have translated the Sufficiency Economy philosophy into practical approaches aimed at the improvement of smallholder farmer livelihoods through the development of sustainable agriculture methods and appropriate technology (Senanarong, 2004).

[1] "Unofficial translation of the Thai working definition approved by His Majesty and sent by His Majesty's Principal Private Secretary to the NESDB on November 29, 1999." (National Economic and Social Development Board 2012:2).

Table 9.2: Applications of the Sufficiency Economy Philosophy from Thai Organic Farmers

Sufficiency Economy "Key Terms"	Characteristics of Organic Farming Systems
3 Matters	
Moderation	• Optimization of land through integrated farming • Emphasis on household food security
Reasonableness	• Wise use of natural resources • Sustainable growth
Self-immunity	• Strength through farmer collectives (*kalyanamitta*) • Risk avoidance through community savings • Production of local inputs to create immunity from market fluctuations
2 Conditions	
Knowledge	• Understood local ecological conditions • Building tacit knowledge • Spiritual values related to environmental stewardship
Integrity	• Patience (three year shift to organic agriculture) • New morality "shifting to an ecological worldview"

Source: Adapted from Jitsanguan (2012) and Chantalakhana & Falvey (2008)

This thesis shows that some groups of organic farmers have adopted a way of life that is exemplary of the Sufficiency Economy philosophy (Table 9.2). Participants in this research have "moderated" their approach to farming through the optimization of landholdings (e.g. integrated farming). Nonetheless, some farmers reported insufficient landholding to generate an adequate income to support their families. For this reason, many organic farmers rent additional land to generate a diversity of agricultural products.

While farmers that rent their land may have less propensity to practice long-term agricultural strategies. Organic farmers use natural resources with "reasonableness". That is to say, they are conscious of the ecological carrying capacity of their rice paddies and do not use chemicals that are hazardous to biodiversity or their health. Patience is another key virtue, as many farmers reported an initial

productivity loss during the transition period to organic agriculture. The participants in this thesis also have placed an emphasis on household food security over surplus production. Notwithstanding, many participants employed diverse methods to supplement their income: raising livestock, cultivating commodity crops and rare rice varieties. In the process, the organic farmers in this thesis have built "self-immunity" through small-scale collectives aimed at generating agricultural inputs (e.g. bio-fertilizers) and processing rice for sale. Participants also achieved financial self-reliance through the creation of community-based savings funds. These community organizations have helped members to leverage the resources, labor and capital to improve their way of life. While not all organic farmers were active members of collectives, others depended on these organizations as a source of organic farming knowledge, friendship, and moral guidance. As participants in this thesis developed the ecological diversity of their farms, they improved food security, health, and reduced their debt levels. They also lifted their dignity through the spiritual, health-related and commercial values placed upon organic food products by domestic and overseas consumers.

As "knowledge" and "integrity" are the key conditions of a shift to Sufficiency Economy, policy-level initiatives need to be based on a new perspective of development that supports a sustainable future (Jitsanguan, 2012). That is to say, the Thai populous may never realize the benefits of "moderation", "reasonableness" and "self-immunity" if there is no change at the individual level. As this research shows, some organic farmers have seen the merits of a 'worldview' based around concepts of environmental stewardship and Buddhist teachings (in line with the Sufficiency Economy philosophy). Furthermore, findings suggest that farmers acquired both technical skills and moral discipline through membership in organic farming collectives. Many organic farmers acquired a solid understanding of ecology; and were able to impart this knowledge to others with little formal education. These local farmer trainers gained both technical know-how and a tacit knowledge of their environment through 'experimentation' in their rice paddies. They imparted their knowledge by emphasizing the extrinsic and intrinsic value of building biodiversity on their farms. While not all participants expressed a high level of spirituality, belief systems emerged

as a significant factor in the decisions of many farmers to shift away from conventional agriculture methods.

Based on the finding in this thesis, many organic farmers have gained the expertise to participate in the delivery of Sufficiency Economy programs through "sustainable knowledge" (Murdoch, 1994). While government institutions have helped to facilitate many of these programs, rural government agencies often lack expertise useful to farmers. In some cases, government agencies funded worthy projects (e.g. reservoir construction), but their efforts failed to benefit recipients as they are excluded from the decision making process. Hence, government policies need to take a more collaborative approach that engages farmers, families, and community leaders (Chantalakhana & Falvey, 2008). And while some government policies have dovetailed Sufficiency Economy with sustainable agriculture development programs, there is an overemphasis on marketing, certification and labeling schemes (IFOAM, 2012). Creating new markets is an important incentive to farmers, but the high cost of organic food makes it unavailable to local consumers (Roitner-Schobesberger *et al*., 2008). Furthermore, most of the organic-certified rice grown in Yasothon Province is destined for overseas markets or financially exclusive retail shops. In this respect it would be beneficial if government agencies promoted consumption of organic rice as a safe, secure, and morally-based food supply.

Despite the moral argument for a shift to organic farming systems, Thailand has embraced the opportunities provided by the global food trade. Conventional and organic farmers have exploited new technologies to expand production and achieve financial security for their families. However, as this research shows, the capital investments required of these technologies has not been a "reasonable" development path for many farmers and propelled some into a 'vicious cycle of debt'. Notwithstanding, results suggest that organic farmers have reduced their dependence on some costly technology (i.e. chemical fertilizers, pesticides, herbicides). However, on a national scale, agricultural policies and industrial interests have veered away from the course set out by His Majesty the King.

9.6 Final Words

Despite efforts to build immunity from the global marketplace, the future course of Thailand's alternative agriculture movement may depend upon the extent to which they can shield farmers from external socio-economic, political, and environmental factors. And at the same time maintain linkages to an international customer base. In this respect, the premium price offered for organic rice has been an important incentive for some farmers. However, findings suggest that as international rice prices increase, some farmer shift back to conventional agriculture.

The impacts of the great floods of 2011 in Thailand show that the natural environment has the ability to disrupt both organic and conventional food provisioning systems; and the income of the wealthy and impoverished. The extent of flood damage on Thailand's food supply and economic growth is yet to be determined. Research is forthcoming on the linkages between this disaster and the extent of deforestation carried out to meet human needs. While organic farmers aim to buffer themselves from the external marketplace, they also are increasing affected by the negative impacts of conventional farming and heavy industries on the natural environment.

Significantly, in the last decade, a growing demand for organic products has started to drive changes in the marketplace (Lotter, 2003). The Thai government has begun to respond to the demands of their 'organic' constituents, and lent support to alternative and organic agriculture initiatives (Thongtawee, 2006). Furthermore, current trends show a steady increase in Thai consumption of organic food (Roitner-Schobesberger *et al*., 2003). Thai consumers and producers have started to join hands in bringing about an increase in safe and organic foods. Entrepreneurs have followed these trends, and have made available a wide variety of processed organic foods and fertilizers.

While an increase in the demand for organic food has the potential to reduce prices in organic produce, global food conglomerates and institutions continue to influence the policies that govern the international marketplace. Results suggest that restructuring the global food economy through local and organic food networks will take more than financial incentives. This research shows that a move towards sustainable food provisioning systems is contingent upon a shift to a collective ecological worldview.

REFERENCES

Agri-Nature Foundation, Center for Natural Agriculture, Mapuang. (2007). *Development of Natural Agriculture for the Sufficiency Economy System*, Bangkok: Kanaabukhon Publishing (in Thai).

Agrawal, A. & Gibson, C., (1999). Enchantment and Disenchantment: The Role of Community in Natural Resource Conservation, *World Development*, 27, 629-649.

Allen, P., FitzSimmons, M., & Warner, K. (2003). Shifting plates in the agrifood landscape, *Journal of Rural Studies*, 19, 61-75.

Allen, P. (2004) *Together at the Table: Sustainability and Sustenance in the American Agrifood System*, Pennsylvania State University Press: Pennsylvania.

Altieri, M., Companioni, N, Cañizares, K., Murphy, C., Rosset, P., Bourque, M., & Nichols, C.I. (1999). The greening of the "barrios": Urban agriculture for food security in Cuba *Agriculture and Human Values,* 16 (2),131-140.

Anderson, M. & Cook J. (1999) Community food security: Practice in need of theory?. *Agriculture and Human Values,* 16, 141-150.

Ariyaratne, A.T. & Macy, J. (1994) The Island of Temple and Tank. Sarvodaya: self-help. In Sri Lanka Bachelor, M. and Brown, K. (Eds.). *Buddhism and Ecology (pp.78-86)*. New Delhi: Motilal Banarsidass Publishers.

Baconguis, R. & Cruz, F. (2005) Paradigmatic Outlook of Alternative and Conventional Rice Farmers in Southern Philippines, *Philippines Scientist,* 42, 15-39.

Baker, C. (2007). *Thailand Human Development Report, "Sufficiency Economy" and Human Development in Thailand*, Bangkok: United Nations Development Programme.

Baskin, Y. (1997). *The Work of Nature: How the Diversity of Life Sustains Us*: Washington D.C.: Island Press.

Becchetti, L., Conzo, P., & Gianfreda, G. (2010). Market access, organic farming and productivity: the determinants of creation of economic value on a sample of Fair Trade affiliated Thai farmers. University of Rome [unpublished research].

Berry, W. (1976). *The Unsettling of America: Culture and Agriculture*, San Francisco: Sierra Club.

Beus, C.E., & Dunlap, R.E. (1991), Conventional versus Organic Agriculture: The Paradigmatic Roots of the Debate, *Rural Sociology*, 55 (4), 590-616.

Bermúdez, J. (1997) Scepticism and Science in Descartes, *Philosophy and Phenomenological Research,* 57 (4), 743-772.

Block, D., Thompson, M., Euken, J., Liquori, T., Fear, F., & Baldwin, S. (2007). Engagement for transformation: Value webs for local food system development, *Agriculture and Human Values*, 25, 379-388.

Bowling, A. (2005) Just one question: If one question works, why ask several? *Journal of Epidemiology and Community Health,* 59, 342–345.

Boonman, C., & Anpim, U. (2006). *The Possibility of Homali Rice Production in Organic Farming Systems as an Alternative Farming Career with Poverty Alleviation Potential for Lower-Northeastern Farmers: A Case Study of Yasothon Province.* Bangkok: Thai Research Foundation [in Thai].

Boonsoong, B., Sangpradub, N., Barbour, M.T., & Simachaya, W. (2010). An implementation plan for using biological indicators to improve assessment of water quality in Thailand. *Environmental Monitoring Assessment,* 165, 205–215.

Brint, S. (2001). Gemeinschaft Revisited: A Critique and Reconstruction of the Community Concept. *Sociological Theory*, 19 (1), 1-23.

Bruntland G. (1987). Our Common Future: The World Commission on Environment and Development, Oxford University Press. Retrieved July 11, 2011, from http://www.un-documents.net/ocf-02.htm.

Callon, M. (1986). Some Elements of a sociology of translation: domestication of the scallops and the fisherman of St Brieuc Bay, In John Law (Ed.) *Law, Power Action and Belief A New Sociology of Knowledge? (pp.196-233)*. London: Routledge & Kegan Paul.

Callicott, J.B. (1987). *Companion to a Sand County Almanac*. Wisconsin: University of Wisconsin Press.

Capra, F. (1996). *The Web of Life*, New York: First Anchor Books.

Capra, F. (2002). *The Hidden Connections*, New York: Doubleday

Carson, R. (1962). *Silent Spring*, New York: Houghton Mifflin

Castree, N. (2005). *Nature*, New York: Routledge.

Chantalakhana, C., & Falvey, L. (2008) *Sufficiency Economy: An Approach for Smallholder Agricultural Development to Enhance Peace and Stability*, Bangkok: Sermmit Printing.

Charmaz, K. (2006). *Constructing Grounded Theory*, London: Sage Publications.

Choomchai, A., & Wongkalasin, S., (1996). Sustainable Agriculture and Rural Development in Thailand, Poungsomlee, A., (Eds.) In *Strategies for Sustainable Agriculture and Rural Development (pp. 236-239)*. The Faculty of Environment and Resource Studies, Salaya: Mahidol University.

Codex Alimentarius Commission (1999). Guidelines for the Production, Processing, Labeling and marketing of Organically Produced Foods. Retrieved on June 5, 2012, from http: www.codexalimentarius.org/input/download/standards/360/cxg_032e.pdf.

Conroy, C. (2008). The Nature of Agricultural Innovation. (Eds.) Snapp, S., Pound, B. in *Agricultural Systems: agroecology and rural innovation for development (pp.309-323)*. Amsterdam: Elsevier/Academic Press.

Cresswell, J.W. (1998). *Qualitative Inquiry and Research Design: Choosing Among Five Traditions, Quantitative, and Mixed Method Approaches*, Sage Publications, London.

Cresswell, J. W. (2003). *Research Design: Qualitative, Quantitative, and Mixed Method Approaches*, Sage Publications, London.

Creswell, J. W., & Plano, V. L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage Publications.

Curry, J. (2000). Community Worldview and Rural Systems: A Study of Five Communities in Iowa, *Annals of American Geography*, 90 (4), 693-712.

Curry, J & Groenendyk, K. (2006). Nature Seen Through the Eyes of Faith: Understandings among Seminarians, *Worldviews: Environment, Culture, Religion,* 10 (3), 326-354.

Dale, V. & Polasky, S. (2007). Measures of the effects of agricultural practices on ecosystem services, Ecological Economics 64(2), 286-296.

Daly, H. (1996). Beyond Growth: The Economics of Sustainable Development, Massachusetts: Beacon Books.

Damman D., Eide,W., & Kuhnlein, H. (2008). Indigenous Peoples' Nutrition Transition in a Right to Food Perspective, *Food Policy,* 33, 133-155.

Diamond, J. (2007). *Collapse*, New York: Penguin Books.

Diamond, J. (2005). *Guns, Germs, and Steel*, London: Vintage Books.

DeLind, L. & Howard, P. (2008). Safe at any scale? Food Scares, food regulation, and scaled alternatives, *Agriculture and Human Values,* 25 (3), 301-317.

De Silva, L. (1994). The Hills Wherein My Soul Delights. In Bachelor, M. and Brown, K. (Eds.), *Buddhism and Ecology (pp.18-30)*. New Delhi: Motilal Banarsidass Publishers.

Douthwaite, R. (1999). *The Growth Illusion*, United Kingdom: Green Books Ltd.

Drentea, P., & Lavrakas, P. (2000). Over the limit: the association among health, race and debt. Social Science & Medicine, 50 (4): 517-529

Drinkwater, L.E, Letouneau, D., Workneh., F., van Bruggen, A.H.C., & Shennan C. (1995). Fundamental Differences between Conventional and Organic Tomato Agroecosystems in California, *Ecological Applications,* 5(4), 1098-1112.

Dunlap, R., Van Liere, K. (1978). The "new environmental paradigm": A proposed measuring instrument and preliminary results. *Journal of Environmental Education,* 9, 10-19.

Dunlap, R., Van Liere, K., Mertig, A.G., & Jones, R.E. (2000). Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale. Journal of Social Sciences (56) 3, 425-442.

Dupuis M., & Goodman, D. (2005). Should we go "home" to eat?: toward a reflexive politics of localism, *Journal of Rural Studies,* 21, 359-371.

Elliot, A.C., & Woodward, W.A. (2007). Statistical Analysis Quick Reference Guidebook with SPSS Examples. California: Sage Publications.

Easterby-Smith, M., Thorpe, R., & Jackson, P. (2008). *Management Research: Third Edition*. London: Sage.

Essen, Juliana (2005). "Right Development" *The Santi Asoke Buddhist Reform Movement of Thailand*, Maryland: Lexington Books.

Extension Toxicology Network, Cornell University Extension (2011). Cholinesterase Inhibition, Toxicology Information Brief 9/93. Retrieved 16 October, 2011, from http://pmep.cce.cornell.edu/profiles/extoxnet/TIB/cholinesterase.html.

Falvey, L. (2000). *Thai Agriculture: Golden Cradle of Millennia*. Bangkok: Kasetsart Press.

Falvey, L. (2002). AgriDhamma: The Duty of Professional Agriculturalists, A Lecture by Buddhahassa Bhikku to Agricultural Teachers and Officials on 25 March 1991 at Suan Mokkhapharam, Chaiya, Surat Thani Province, Thailand. South Australia: Institute for International Development.

Faris, C. (2004) Information and Communications Technology and Gross National Happiness – Who Serves Whom? In Ura, K. and Galay, K. (Eds.). *Gross National Happiness and Development (pp.140-173.).* Bhutan: Center for Bhutan Studies.

Faul, F., Erdfelder, E., Lang, A., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis for the social, behavioral, and biomedical sciences. Behavior Research Methods 39(2): 175-191.

Feagan, R. (2007). The place of food: mapping out the local food systems, Progress in *Human Geography,* 31, 23-42.

Feagan R. & Henderson, A. (2008). Devon Acres CSA: local struggles in a global food system, *Agriculture and Human Values,* 26, 203-217.

Feenstra, G. (1997). Local food systems and sustainable communities, *American Journal of Alternative Agriculture,* 12, 28-36.

Feenstra G. (2002). Creating space for sustainable food systems: Lessons from the field, *Agriculture and Human Values,* 19, 99-106.

Figa, T., & Parr, J. (1994). Beneficial and Effective Microorganisms for a Sustainable Agriculture and Environment, *International Nature Farming Research Center.* Retrieved 14 November, 2011, from http://embokashi.com/parrhigabklt CF1%20on%20EM.pdf

FLO-CERT (2012). Fair Trade Labeling Organizations. Retrieved 12 June, 2012 from http://www.flo-cert.net/flo-cert/30.html

Fouke, D. (2011) Humans and the Soil. *Environmental Philosophy,* 3(2), 147-161.

Franklin, A. (2002). *Nature and Social Theory*. London: Sage Publications.

Fukuoka, M. (1978). *One Straw Revolution: The Natural Way of Farming.* Pennsylvania: Rodale Press.

Funahashi, K. (1996). Farming by the Older Generation: The Exodus of Young Labor in Yasothon Province, *Southeast Asian Studies* 33 (4), 625-639.

Gilbert, N. (Eds.) (2001). *Researching Social Life*, Sage Publications: London.

Glaser, B. (1978). *Theoretical Sensitivity.* University of California San Francisco: Sociology Press.

Goodman, D. (1999). Agro-Food Studies in the 'Age of Ecology': Nature, Corporeality, Biopolitics. *Sociologia Ruralis*, 39 (1), 17-38.

Goodman, D. (2003). The quality 'turn and alternative food practices: reflections and agenda, *Journal of Rural Studies*, 19, 1-7.

Goodman, D. (2004). Rural Europe Redux? Reflections on Alternative Agro-Food Networks and Paradigm Change, *Sociologia Ruralis*, 44 (1), 1-16.

Goldsmith, E. (1996). *The Way*. Devon: Themis Books.

Gore, A. (2006). An Inconvenient Truth, New York: Rodale Press.

Gough, I., & McGregor, J.A. 2009 (Eds.). *Well-being in Developing Countries*. Cambridge University Press, New York.

Green Net and Earth Net Foundation (2008), Retrieved 7 April, 2008, from http://www.greennet.or.th/content/main%20framesets/g_history.html

Grandstaff, S.W., Grandstaff, T.B., Rathakette, P., Thomas, D.E., & Thomas, J.K. (1986). Trees in Paddy Fields in Northeast Thailand. In (Eds.) Marten, G.G., *Traditional Agriculture in Southeast Asia, A Human Ecology Perspective (pp. 273-291)*. Boulder: Westview Press.

Grandstaff, T., Grandstaff , S., Limpinuntana, V., & Suphanachanchaimat, N. (2008) Rainfed Revolution in Northeast Thailand. *Southeast Asian Studies*, 46 (3), 289-376.

Gray, R. (2007). Practical bioregionalism: A philosophy for a sustainable future and a hypothetical transition strategy for Armidale, New South Wales, Australia, *Futures*, 39, 790–806.

Gussow, J. (2006). Reflections on Nutritional Health and the Environment: The Journey to Sustainability, *Journal of Hunger & Environmental Nutrition*, 1, 2-25.

Guthman J. (2002). Commodified Meanings, Meaningful Commodities: Re-thinking Production-Consumption Links through the Organic System of Provision, *Sociologia Ruralis*, 42, 295-311.

Guthrie, W., & Lowe, A. (1999) Infiltration: An emerging grounded theory of penetrating and sustaining presence with the inner circles of others, *The Grounded Theory Review: An international journal*, 1, 9-21.

Halweil, B., & Nierenberg, D. (2007) Farming the Cities. In Starke, L. (Ed.) *State of the World 2007: Our Urban Future (pp. 48-63)*. New York: W.W. Norton & Company.

Hansson, C., & Wackernagel, M. (1999). Rediscovering place and accounting space: how to re-embed the human economy, *Ecological Economics* 29, 203-213.

Hannigan, J. (2006) *Environmental Sociology (Second edition)*. New York: Routledge.

Hardin, G. (1968). The Tragedy of the Commons. *Science*, 162, 1243-1248.

Harding, S. (2006). *Animate Earth: Science, Intuition and Gaia*, Vermont: Chelsea Green Publishing.

Hardwick, K., Heaey, J.R., Elliot, S., & Blakesley, D. (2004). Research needs for restoring seasonal tropical forests in Thailand: accelerated natural regeneration. *New Forest*, 27, 285-302.

Harrison, R. (2012). Using mixed methods designs in the Journal of Business Research, 1990-2010. Journal of Business Research [in press].

Hassan, R., Scholes, R., & Ash, N. (2005). *Ecosystems and human well-being: current state and trends:findings of the Condition and Trends Working Group, Millenium Ecosystems Assessment*, Washington D.C.: Island Press.

Hecht, S. (1987). The Evolution of Agroecological Thought. In Altieri, M. (Ed.) *The Scientific Basis of Alternative Agriculture (pp. 1-27).* London: Intermediate Technology Publications.

Hendrickson, M. and Heffernan, W. (2002). Opening Spaces through Relocalization: Locating Potential Resistance in the Weaknesses of the Global Food System, *Sociologia Ruralis,* 42, 347-369.

Henning, D. (2002). *A Manual for Buddhism and Deep Ecology.* Bangkok: The World Buddhist University.

Higgins, V. (2006). Re-figuring the problem of farmer agency in agri-food studies: A translation approach, *Agriculture and Human Values,* 23, 51-62.

Higgins, V., Dibden, J., & Cocklin, C. (2008) 'Building Alternative Agri-Food Networks: Certification, Embeddedness and Agri-Environmental Governance', *Journal of Rural Studies*, 24, 15-27.

Hill, S. (1983) Redesigning the Food System for Sustainability, EAP Publication 23, Retrieved March 28, 2008, from http://eap.mcgill.ca/publications/eap23.html.

Hinrichs C. (2003). The practice and politics of food system localization, *Journal of Rural Studies,* 19, 33-45.

Holton, J.A. (2008). Classic Grounded Theory Methology, Graduate Seminar, Department of Applied Social Sciences, The Hong Kong Polytechnic University, February 23-24, 2008, [unpublished presentation].

Howard, A. (1941). The Circulation of Organic Matter in Nature, *The Royal African Society,* 40, 19-26.

Hughes, J., & Sharrock, W. (2007). *Theory and Methods in Sociology: An Introduction to Sociological Thinking and Practice*. New York: Palgrave MacMillan.

Hutanawat, N., & Hutanawat, N. (2000). *Before the Shift to a Community Rice Mill Enterprise*. Bangkok: Kledthai Co Ltd [in Thai].

Hutanawat, N. & Hutanawat, N. (2006). *Sustainable Agriculture: Vision Process and Indicators*. Nonthaburi: Kledthai Company [in Thai].

International Federation of Organic Agricultural Movements (2012). Retrieved June 1, 2012, from http://www.ifoam.org/growing_organic/2_policy/case_studies/thailand_organization_lessons.php.

International Institute of Tropical Agriculture (2010). Retrieved April 28, 2009, from http://www.iita.org/cms/details/cowpea_project_details.aspx?zoneid=63&articleid=26.

International Livestock Research Institute (1998). ILRI, 1997: Livestock, People and the Environment, Nairobi, Kenya. Retrieved March 10, 2012, from http://www.ilri.org/html/publist99_03.pdf

IPM-DANIDA (2004) Pesticide Health Surveys. Data from 606 farmers in Thailand. Report 62 by the IPM DANIDA Project: 'Strengthening Farmers IPM in Pesticide Intensive Areas" Retrieved October 2010 from http://thailand.ipm-info.org/download_documents.htm

Jarocz, L. (2000). Understanding agri-food networks as social relations, *Agriculture and Human Values,* 17, 279-283.

Jitsanguan, T. (2001). Sustainable agriculture systems for small scale farmers in Thailand: implications for the environment. Retrieved 1 May, 2011, from http://www.agnet.org/library/eb/509/html.

Jitsanguan, T. (2012). Alternative Route to Agricultural Development: Sustainable Path under the Sufficiency Economy Philosophy. 5th International Conference of the Asia-Pacific Educators in Agriculture and Environment (APEAEN) at the National Agricultural Extension and Training Center, November 7-10, 2011. Kasetsart University, Kamphaengsaen, Nakhon Pathom, Thailand,

Jones, S., & Carswell, G. (Eds.) (2004). *Environment, Development and Rural Livelihoods*, Earthscan: United Kingdom.

Kabilsingh, C. (1990). Early Buddhist Views on Nature, In Badiner, A. (Eds.). *Dharma Gaia: A Harvest of Essays in Buddhism and Ecology (pp. 8-13)*. Berkeley: Parallax Press.

Kabilsingh, C. (2010). *Buddhism and Conservation*, Thai Tibet Center: Bangkok.

Kaewchai, S., Soytong, K., & Hyde, K.D. (2009). Mycofungicides and fungal biofertilizers. *Fungal Diversity* 38: 25-50.

Kaufman, A., & Watanasak, S. (2011). Farmers and Fertilizers: A Socio-Ecological Exploration of the Alternative Agriculture Movement in Northeastern Thailand, *Environment and Natural Resources Journal* (9)3: 1-11.

Kaufman, A. (2012). Organic Farmers' Connectedness with Nature: Exploring Thailand's Alternative Agriculture Network, *Worldviews, Global Religions, Culture and Ecology* 16: 154-178.

Kamla, N. Limpinuntana, V., Ruaysoongnern, S., & Bell, R. (2008). Role of Fermented Bio-extracts Produced by Farmers on Growth, Yield and Nutrient Contents in Cowpea (*Vigna unguiculata* (L.) Walp.) in Northeast Thailand. *Biological Agriculture and Horticulture*, 2008, 25, 353-369.

Kanayama-Phiri, G., Wellard, K., & Snapp, S. (2008). Introduction. In Snapp, S. & Pound, B. (Eds.) *Agricultural Systems: agroecology and rural innovation for development (pp. 1-26)*. Amsterdam: Elsevier/Academic Press.

Kempton, W., Boster, J., & Hartley, J. (1997). *Environmental Values in American Culture*, Cambridge: The MIT Press.

Khantipalo, B. (1970). *Buddhism Explained: An Introduction to the Teachings of the Lord Buddha.* Bangkok: Thai Watana Panich Press.

Kiatsuphimol, J. (2002). A Strategy for Green Net to Promote and Organic Farming Product in Bangkok, Thailand, M.A. Thesis. Manila: Asian Institute of Management.

Kimura, A., & Nishimura, M. (2008). The Chisan-chisho Movement: Japanese local food movement and its challenges, *Agriculture and Human Values*, 25, 49-64.

Konchan, S., Yoshiaki, N., & Hayao, F. (1995). Food and Population under Subsistence Rice Farming in Three Villages in Yasothon, Northeast Thailand. *Southeast Asian Studies*, 33(3), 58-80.

Kuhnlein H., Erasmus, B., Creed-Kanashiro, H., Englberger, L., Okeke, C., Turner, N., Allen, L., & Bhattacharjee, L. (2006). Indigenous peoples' food systems for health: finding interventions that work, *Public Health Nutrition, 9,* 1013-1019.

Kuhnlein, H., Erasmus, B., & Spigelski, D. (2009). Indigenous Peoples' Food Systems: the many dimensions of culture, diversity and environment for nutrition and health, Food and Agriculture Organization of the United Nations Centre for Indigenous Peoples' Nutrition and Environment, Retrieved 1 May, 2010, from http://www.fao.org/docrep/012/i0370e/i0370e00.htm.

Latour, B. (1986). “The Powers of Association”, in John Law (Ed.) *Power Action and Belief A New Sociology of Knowledge? (pp. 196-233)*. London: Routledge & Kegan Paul.

Latour, B. (2005). *Reassembling the Social: An Introduction to Actor-Network-Theory.* New York: Oxford University Press.

Law, J. (1992). Notes on the Theory of the Actor Network: Ordering, Strategy and Heterogeneity, Center for Science Studies, Lancaster University, Retrieved 13 March, 2008, from http://comp.lancs.ac.uk/sociology/papers/Law-Notes-on-ANT.pdf.

Leopold, A. (1949). *A Sand County Almanac.* New York: Oxford Press.

Limpinuntana, V. (2001). Physical factors as related to agricultural potential and limitations in Northeast Thailand. Kam SP, Hoanh CT, Trébuil G, Hardy B, (Eds). *Natural resource management issues in the Korat Basin of northeast Thailand: an overview*. *Proceedings of the Planning Workshop on Ecoregional Approaches to Natural Resource Management in the Korat Basin, Northeast Thailand: Towards Further Research Collaboration*, held on 26-29 October 1999, Khon Kaen, Thailand. Los Baños (Philippines): International Rice Research Institute.

Lorenz, K. (1966) *On Aggression*. Vienna: Verlag Dr. G Borotha-Schoeler.

Lotter, D.W. (2003). Organic agriculture. *Journal of Sustainable Agriculture*, 21(4), 59-128.

Lovelace, G., Subhadhira, S.,& Simarks, S. (1998). Introduction. In Lovelace, G., Subhadhira, S. Simarks, S. (Eds.) *Rapid Rural Appraisal in Northeast Thailand (pp. 3-19). Khon Khen*: KKU-FORD Rural Systems Research Project.

Mason, M. (2010) Sample Size and Saturation in PhD Studies Using Qualitative Interviews. Forum: Qualitative Social Research. 11(3). Retrieved on July 1, 2012, from http://www.qualitative-research.net/index.php/fqs/article/viewArticle/1428/3027

Mayer, F., & Frantz, C. (2004). The connectedness to nature scale: A measure of individuals’ feeling in community with nature, *Journal of Environmental Psychology*, 24, 503-515.

Matopoulos, A., Vlachopoulou, M., Manthou, V., & Manos, B. (2007). A conceptual framework for supply chain collaboration: empirical evidence from the agri-food industry. Supply Chain Management: An International Journal, 12 (3), 177-186.

Meadows, D. (1999) Leverage Points: Places to Intervene in the System. Vermont: The Sustainability Institute.

McCargo, D.J. (1997). *Chamlong Srimuang and the new Thai politics*. London: Hurst and St. Martin's Press.

McCullum C., Desjardins E., Kraak V., Ladipo P., & Costello, H. (2005). Evidence-Based Strategies to Build Community Food Security, *Journal of the American Dietetic Association*, 105, 278-283.

McGinnis, M. (1999). *Bioregionalism*, London: Routledge.

McIsaac, G.F., David, M.B., Gertner, G.Z., & Goolsby, D.A. (2001), Nitrate flux in the Mississippi River, *Nature* 414, 166-167.

McMichael, P. (2000. The power of food, *Agriculture and Human Values*, 17, 21-33.

McNeely, J. & Scherr, S. J. (2003). *'ecoagriculture': Strategies to Feed the World and Save Biodiversity*, Washington DC: Island Press.

Miilunpalo, S., Vuori, I., Oja, P., Pasanen, M., & Urponen, H. (1997). Self-rated health status as a health measure: the predictive value of self-reported health status on the use of physician services and on mortality in the working-age population. *Journal of Clinical Epidemiology***,** 50(5):517-28.

Millenium Ecosystems Assessment (2005). *Ecosystems and Human Well Being: Synthesis*, Washington D.C.: Island Press.

Miller, T.G., Jr. (2004*). Environmental Science: Working with the Earth. California*: Brooks/ Cole-Thomson Learning.

Mills, J., & Bonner, A., & Francis, K. (2006). The Development of Constructivist Grounded Theory, *International Journal of Qualitative Methods* (5) 1, 1-10, Retrieved 1 June, 2009, from http:www.ualberta.ca/~iiqm/backissues/5_1/pdf/mills.pdf.

Mock, J. (2000). Thai Views of Wellness, Sabaay, Smoking, and Buddhist Health Promotion. Unpublished doctoral dissertation. San Francisco, University of California, San Francisco.

Modell, S. (2009). In defense of triangulation: A critical realist approach to mixed methods research in management accounting. Management Accounting Research 20: 208-221.

Moral Rice Network (2010), Retrieved 1 June 2011, from http://www.moralrice.net/ข้าวคุณธรรม.html.

Morgan, K., Marsden, T., & Murdoch, J. (2008). *Worlds of food: Place, Power and Provenance in the Food Chain*. Oxford: Oxford University Press.

Morgan, K., & Sonnino, R. (2008) *The School Food Revolution: Public Food and the Challenge of Sustainable Development*. London: Earthscan.

Morris, C., & Kirwan, J. (2006). Vegetarians: Uninvited, Uncomfortable or Special Guests at the Table of the Alternative Food Economy, *Sociologia Ruralis*, 46, 192-213.

Morris, M., & Thornhill, R. (2006) Animal Liberationist Responses to Non-Anthropogenic Animal Suffering, *Worldviews: Environment, Culture, Religion*, 10 (3), 354-379.

Murdoch, J. (1997a). Inhuman/non-human/human: actor-network theory and the prospects for a nondualistic and symmetrical perspective on nature and society, *Environment and Planning D. Society and Space*, 15, 731-756.

Murdoch, J. (1997b). Towards a geography of heterogeneous associations, *Progress in Human Geography*, 21 (3), 321-337.

Murdoch, J. (2000). Networks – a new paradigm of rural development? *Journal of Rural Studies*,16, 407-419.

Murdoch, J. (1994). Sustainable Knowledge, *Geoforum* 25(2), 115-132.

National Economic and Social Development Board (2006). An Introductory Note Sufficiency Economy. Retrieved 1 July, 2012, from http://www.sufficiency economy.org/old/en/files/4.pdf.

National Statistics Office (2011). Statistical Yearbook 2010, Retrieved 1 October, 2011 http://web.nso.go.th/eng/link/solink.htm.

Neufeldt, V. & Guralnik, D. (1997) *Webster's New World College Dictionary, 3rd Edition*, New York: MacMillan Inc.

Neuman, L.W. (1994). *Social Research Methods: Qualitative and Quantitative Approaches (2nd edition)*. Boston: Allyn and Bacon.

Od-ompanich, W., Kittsiri, A., & Thongchai, M. (2007). Organic Rice Marketing, Organic and Inorganic Rice Production, Retrieved 21 August, 2008 from www.wiso.boku.ac.at/fileadmin/_/.../2007_Lassmann_DA.pdf.

Odum, E. (1997). *Ecology: A Bridge between Science and Society*. Massachusetts: Sinauer Associates Inc.

Olsen, W. (2004a) Triangulation in Social Research: Qualitative and Quantitative Methods Can Really Be Mixed, Forthcoming as a chapter. In (Ed.) M. Holborn in *Developments in Sociology (pp.1-6).* Ormskirk: Causeway Press.

Olsen, W. (2004b). Methodological Triangulation and Realist Research: An Indian Exemplar. In Carter, B. & New, C. (Eds). *Making Realism Work: Realist Social Theory and Empirical Research (pp. 212-224),* London: Routledge.

Oostinide, H., & van Broekhuisen, R. (2008). The dynamics of novelty Production. In van der Ploeg, J.D. and Marsden, T. (Eds.) *Unfolding Webs: The Dynamics of Regional Rural Development (pp. 68-86)*, Netherlands: Van Gorcum.

Onwuegbuzie, A., & Collins, M.T. (2007). A Typology of Mixed Methods Sampling Designs in Social Science Research. The Qualitative Report 12 (2): 281-316.

Onwuegbuzie, A., & Leech, N.L. (2004). Post Hoc Power: A Concept Whose Time Has Come. Understanding Statistics 3(4): 201.

Organization Development Institute (2010). Thailand's Progress in Agriculture: Transition and Sustained Productivity Growth, Retrieved 11 October, 2011. http://www.developmentprogress.org/sites/default/files/thailand_ report_-_master.pdf.

Panya, O. (1995). Change from Within: Adaptation and Self-Determination in Three Rural Communities of Northeast Thailand 1900-1992, Unpublished doctoral dissertation, Victoria University of Wellington, New Zealand.

Panya, O. (2003). "Community-first" Agriculture: A Search for Thailand's Post-crisis Sustainable Transformation", Robert Doyle (Eds) in *Strengthening Community Competence for Social Development* (pp. 219-235). Thailand: Asia-Pacific Perspectives, Naresuan University.

Panya, O., & Sirisai, S. (2003). Environmental Consciousness in Thailand: Contesting Maps of Eco-Conscious Minds, *Southeast Asian Studies,* 41, 59-75.

Panyakul, V., & Wanlop, P. (2007). "Country Paper – Thailand": Proceedings form the Regional Conference on Organic Agriculture in Asia, December 12-17, 2007 Bangkok, Thailand.

Payutto, P.A. (1998). *A Dictionary of Buddhist Terms*. Bangkok: Mahachulalongkorn University.

Payutto, P.A. (1993). *Towards Sustainable Science: A Buddhist look at trends in scientific development*. Bangkok: Buddhadhamma Foundation.

Payutto, P.A. (2001). *Thai Buddhism in the Buddhist World*. Bangkok: Buddhadhamma Foundation.

Pongsak, P.A. (1994). In the Water there were fish and the fields were full of rice: Reawakening the Lost Harmony of Thailand. In Bachelor, M. and Brown, K. (Eds.), *Buddhism and Ecology (pp.87-99)*. New Delhi: Motilal Banarsidass Publishers.

Penker, M. (2006). Mapping and measuring the ecological embeddedness of food supply chains: *Geoforum,* 37, 368-379.

Petcha, N. (2007). Dharma Ruamjai Natural Agriculture Center, Presentation at Dharma Ruam Jai Community, Yasothon (unpublished presentation in Thai).

Peters, J. (1997). Community food Systems: Working toward a sustainable future, *Journal of the American Dietetic Association,* 97(9), 956-956.

Pimentel, D., Hepperly, P., Hanson, J., Douds, D., & Seidel, R. (2005). Environmental, Energetic, and Economic Comparisons of Organic and Conventional Farming Systems. *Bioscience,* 7, 573-582.

Pimsen, P. (2003). *Heed 12 Kong 14 Puksiew*, Khon Kaen: Institute of Culture, Kalayanatwat School [in Thai].

Pingali, P. & Raney, T., (2005). From the Green Revolution to the Gene Revolution: How will the Poor Fare? *ESA Working Paper* No. 05-09. Retrieved 10 August, 2009 from http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/008/af276e/af276e00.htm.

Pollan, Michael (2007). *The Omnivore's Dilemma: A Natural History of Four Meals*, New York: Penguin Press.

Potukuchi, K. (2004). Community Food Assessment: A First Step in Planning for Community Food Security, *Journal of Planning Education and Research* 23: 356-377.

Prayukvong, W. (2005). A Buddhist economic approach to the development of community enterprises: a case study of Southern Thailand. *Cambridge Journal of Economics,* 29, 1171-1185.

Preedasak, P., & NaRanong, V. (1999). Roles of agricultural cooperatives and village credit unions in rural financial markets in Thailand. Food and Agriculture Organization, Decentralized rural development and the role of self help organizations A regional workshop held from 4-6 November 1998, Chiang Mai, Thailand, Regional Office for Asia and the Pacific Bangkok.

Pretty, J. (2003). *Agri-Culture: Reconnecting People, Land and Nature*. London: Earthscan Publications.

Puntasen, A. (2008). Buddhist Economics: Evolution, Theories and Its Application to Various Economic Subjects. *The Chulalongkorn Journal of Buddhist Studies* Special Issue One, 2-108.

Putnam, R. (2008). Tuning In, Tuning Out: The Strange Disappearance of Social Capital in America. In Hoover, K. & Donovan, T. (Eds.). *The Elements of Social Scientific Thinking*. Boston: Thomson Wadsworth.

Ramakrishnan, P. S. (2007). Traditional forest knowledge and sustainable forestry: A north-east India perspective, *Forest Ecology and Management,* 249, 1-9.

Rambo, T. (1983). Conceptual Approaches to Human Ecology, Research Report 14 East-West Environmental and Policy Institute, Hawaii.

Ratanamalai, A. (1999). Thailand cooperatives role in decentralized rural development for poverty alleviation and food security at the community level. Food and Agriculture Organization, Decentralized rural development and the role of self help organizations A regional workshop held from 4-6 November 1998, Chiang Mai, Thailand, Regional Office for Asia and the Pacific Bangkok.

Ray, D.L. (1990). *Trashing the Planet*. Washington D.C.: Regnery Gateway.

Reichel-Dolmatoff, G. (1996). *The Forest Within: The Worldview of the Tukano Amazonian Indians*, Devon: Themis Books.

Rigg, J. (1985). The Role of the Environment in Limiting the Adoption of New Rice Technology in Northeastern Thailand, *Transactions of the Institute of British Geographers, New Series*, 10 (4), 481-494.

Rigg, J. (1997). *Southeast Asia: the human landscape of Modernization and Development***.** London: Routledge.

Rodale, J.I. (1949) *The Organic Front*. Pennsylvania: Rodale Press Emmaus.

Roitner-Schobesberger, B., Darnhofer, I., Somsook, S., & Vogl, C. R. (2008). Consumer Perceptions of organic foods in Bangkok, *Food Policy,* 33, 112-121.

Roberts, P. (2008). *The End of Food: The Coming Crisis in the World Industry*. London: Bloomsbury Publishing.

Rojas, M. (2007). The Complexity of Well-Being: a life satisfaction conception and a domains-of-life approached in Wellbeing in Developing Countries. In Gough, I and McGregor, J.A. (Eds). *Well-being in Developing Countries (pp.259-280)*. Cambridge University Press, New York.

Rosset, P. (2006). *Food is Different, Why We Must Get the WTO Out of Agriculture*, Nova Scotia: Fernwood Publishing.

Russell, B. (1945). *A History of Western Philosophy*, New York: Simon and Schuster.
Sadoff, C. (1991). The Value of Thailand's Forests, TDRI Quarterly, 6 (4) 1991, 19-24**.** Retrieved Sept 20, 2010, from http://www.tdri.or.th/library/quarterly/text/d91_3.htm

Sage, C. (2003). Social embeddedness and relations of regard: Alternative 'good food' networks in South West Ireland. *Journal of Rural Studies* 19: 47-60.

Sale, K. (2000). *Dwellers in the Land: The Bioregional Vision*, Georgia: University of Georgia Press.

Salyakamtorn, W. (2008). Conceptual Initiation of Agri-nature Foundation, Retrieved 1 May, 2008 from http://www.agrinature.or.th/modules/talk/.

Samerpak, P. (2006). A Strategy for Sustainable Agriculture System by Rak Thammachat Club in Kudchum District, Yasothon Province, Thailand. M.A. Thesis, Manila, Asian Institute of Management.

Sandhu, H.S., Wratten, S.D., & Cullen, R. (2010). Organic agriculture and ecosystem services, *Environmental Science and Policy* 13, 1-7.

Santasombat, Y. (1995). Community Based Natural Resource Management and Rural Development in Thailand. In Poungsomlee, A. (Ed.). *Strategies for Sustainable Agriculture and Rural Development (pp.12-27)*. The Faculty of Environment and Resource Studies, Salaya: Mahidol University.

Satha-Anand, S. (1990). Religious Movements in Contemporary Thailand: Buddhist Struggles for Modern Relevance, *Asian Survey* 30 (4), 395-408.

Sathirathai, S., & Piboolsravut, P. (2004). *Sufficiency Economy and a Healthy Community*, Presentation: 3rd IUCN World Conservation Congress, Bangkok, Retrieved 17 November, 2004, from www.sufficiencyeconomy.org.

Savory, A. (1999). *Holistic Management: A New Framework for Decision Making*, Washington D.C.: Island Press.

Scoones, I., & Thompson, J. (1994). *Beyond Farmer First: rural people's knowledge agricultural research and extension practice*. London: Intermediate Technology Publications.

Schizas, D., & Stamou, G. (2005) Network Rethinking of Nature & Society, *Ludus Vitalis*, XXX (24), 55-82.

Schumacher, F. (1973). *Small is Beautiful*. New York: Harper and Row Publishers.

Selfa, T., Jussaume, R.D., & Winter, M. (2008). Envisioning agricultural sustainability from field to plate: Comparing producer and consumer attitudes and practices toward 'environmentally friendly' food and farming in Washington State, USA, *Journal of Rural Studies* (24) 3: 262-276.

Semaan, S., Lauby, J., & Liebman, J. (2002). Street and Network Sampling in Evaluation Studies of HIV Risk-Reduction Interventions. *AIDS Review*, 4, 213-223

Senanarong, A. (2004). His Majesty's Philosophy of Sufficiency Economy and the Royal Development Study Centres, The Ministerial Conference on Alternative Development: Sufficiency Economy, Retrieved 11 March, 2007, from www.sufficiencyeconomy.org.

Senge, P. (1990). *The Fifth Discipline*, New York: Doubleday/Currency.

Setboonsarng, S., & Gilman, J. (1999). Alternative Agriculture in Thailand and Japan, *Asian Institute of Technology*, Retrieved 11 December, 2007 from www.solutions-site.org/cat11_sol85.htm.

Seyfang, G. (2006). Ecological citizenship and sustainable consumption: Examining local organic food networks, *Journal of Rural Studies* 22, 383-395.

Shiva, V. (1991). *The Violence of the Green Revolution.* Penang: Third World Network.

Shiva, V. (2007). *Manifestos on the Future of Food and Seed*. Cambridge: South End Press.

Shiva, V. (2000). *Stolen Harvest: The Hijacking of the Global Food Supply*, Cambridge: South End Press.

Sheldrake, R. (1991) *The Rebirth of Nature*, Vermont, Park Street Press.

Sirisai, S. (1990). "Rice Goddess and Rice Farming in Thailand", In Kyaw Than U & Ratanakul, P. (Eds.), *Development, Modernization and Tradition in South East Asia (pp. 163-177).* Salaya: Mahidol University.

Sivaraksa, S. (1990a). *Seeds of Peace*. Bangkok: Sathirakoses-Nagapradipa Foundation.

Sivaraksa, S. (1990b.) "True Development", In Badiner, A. (Ed.), *Dharma Gaia* (pp 169-177). Berkeley: Parallax Press.

Sivaraksa, S. (1996). *Global Healing*. Bangkok: Sathirakoses-Nagapradipa Foundation.

Sonnino, R. (2007). Embeddedness in action: Saffron and the making of the local in southern Tuscany, *Agriculture and Human Values, 24*, 61-74.

Somnasang, P., Rathakette, P., & Rathanapanya, S. (1998). The Role of Natural Foods in Northeast Thailand. In Lovelace, G., Subhadhira, S. & Simaraks, S. (Eds.). *Rapid Rural Appraisal in Northeast Thailand (pp. 78-103). Khon Kaen*: KKU-FORD Rural Systems Research Project.

Spector, P. (1994). Summated Rating Scale Construction: An Introduction. (Ed.) Lewis-Beck, M. in *Basic Measurement*. United Kingdom: Sage Publishing.

Swaminathan, M.S. (2007), "Can science and technology feed the world in 2025?" Field Crops Research, 104 (1-3), 1-9.

Steiner, F. (2002). *Human Ecology*, Washington D.C., Island Press.

Steiner, R (2003). *Agriculture*. United Kingdom: Rudolf Steiner Press (original version published in 1924).

Sunder, S.S. (2011) The Ecological, Economic and Social Effects of Eucalyptus, Food and Agriculture Organization (FAO), Retrieved 2 October, 2011 http://www.fao.org/docrep/005/ac777e/ac777e08.htm

Susumu, S. (1992). View of the Environment as Reflected in Alternative Knowledge Movements in Japan: Case of Kakuya Shimamoto's Microorganic Agriculture in *Views of the Environment-Their Relationship to Sustainable Development (pp. 37-46)*. Asia-Pacific Center, Fukuoka: The United Nations University.

Tanabe, S. (1994). *Ecology and Practical Technology: Peasant Farming Systems in Thailand*. Bangkok: White Lotus.

Tanaka, K., (2008). Seven samurai to protect "our" food: the reform of food safety regulatory system in Japan after the BSE crisis of 2001, *Agriculture and Human Values*, 25 (4), 567-580.

Thongdee, I. (1990). Thai Farmers and Buffaloes a Cultural Interpretation, In Kyaw Than U & Ratanakul, P. (Eds.), *Development, Modernization and Tradition in South East Asia (pp. 178-183).* Salaya: Mahidol University.

Thongtawee, C. (2006). Attractors in the Paradigm Shift Process Towards Sustainable Agriculture of Farmers, Unpublished doctoral dissertation, Nakhon Pathom: Mahidol University.

Tisenkopf, T. Lace, I., & Mierina, I. (2008) Social Capital. In van der Ploeg, J.D. & Marsden, T. (Eds.) *Unfolding Webs: The Dynamics of Regional Rural Development* (*pp. 87-110*). Netherlands: Van Gorcum.

Tiyavanich, K. (2003). *The Buddha in the Jungle*, Thailand: Silkworm Books.

Tomosugi, T. (1995). *Changing Features of a Rice Growing Village in Central Thailand: A Fixed-Point Study from 1967 to 1993,* Tokyo: The Centre for East Asian Cultural Studies for UNESCO.

Trisurat, Y., Alkemade, R., & H. Verburg (2010). Projecting Land-Use Change and Its Consequences for Biodiversity in Northern Thailand. *Environmental Managemen*t, 45,626-639.

Ubonratchathani Rice Center (2011) Knowledge Management Center, Yasothon Province, Retrieved 14 October, 2011, from http://ubn.brrd.in.th/km/index.php.

United Nations Cartographic Section (2011) Thailand Map 3853 Revision 2, July 2009. Retrieved Oct 1, 2011, from http://www.un.org/Depts/Cartographic/english/htmain.htm.

United Nations Development Programme (1994). *Sustainable Human Development and Agriculture*. New York: United Nations Development Programme.

United States Department of Agriculture, National Resources Conservation Service, Retrieved 11 July, 2011, from http://soils.usda.gov/sqi/concepts/soil_biology/soil_food_web.html.

UNEP. (2007). *Global Environment Outlook 4*. Malta: Progress Press Ltd.

Van Keer, K., Comtois, J.D., Turkelboom, F., & Ongprasert, S. (1998). *Options for soils and farmer friendly agriculture in the Highlands of Northern Thailand,* Bangkok: GTZ.

Van Willensward (2004). Will 'Middle Way Economics' Emerge from the Gross National Happiness Approach of Bhutan? In Ura, K. & Galay, K. (Eds.). *National Happiness and Development (pp. 214-221).* Bhutan: Center for Bhutan Studies.

Vining, J., Merrick, M.S., & Price, E.A. (2008). The Distinction between Humans and Nature: Human Perceptions of Connectedness to Nature and Elements of the Natural and Unnatural, *Human Ecology Review* 15: 1-11.

Wasi, P. (1988). Buddhist Agriculture and the Tranquility of Thai Society, In (Eds.) Phongphit, S. and Bennoun. *Turning Point of Thai Farmers (pp. 1-43).* Bangkok: Thai Institute for Rural Development.

Weinstein, N., Prizbylski, A.K., & Ryan, R.M. (2009). Can Nature Make Us More Caring? Effects of Immersion in Nature on Intrinsic Aspirations and Generosity, *Personality and Social Psychology Bulletin*, 35: 1315-1329.

Whittle, A., & Spicer, A. (2008). 'Is Actor Network Theory Critique?' *Organization Studies*, 29(4), 611-629.

Wilkin, R. M. (2003). Figuring the Dead Descartes: Claude Clerselier's "Homme de René Descartes" (1664) *Representation,* 83, 38-66

Willer, H., & Kilcher, L. (Eds.) (2009) *The World of Organic Agriculture – Statistics and Emerging Trends 2009*. IFOAM, Bonn; FiBL, Frick; ITC, Geneva.

White, P. (1994) Rice: The Essential Harvest. *National Geographic*, 185(5), 48-79.

Wikipedia (2011). Korat Plateau. Retrieved 1 October, 2011, from http://en.wikipedia.org/wiki/Khorat_Plateau.

Winter, M. (2003a) Embeddedness, the new food economy and defensive localism, *Journal of Rural Studies, 19,* 23-32.

Winter, M. (2003b) Geographies of food: agro-food geographies-making reconnections, *Progress in Human Geography,* 27, 505-513.

World Health Organisation (1948). Constitution of the World Health Organisation. Geneva: World Health Organisation.

World Health Organization (2011), What is the WHO definition of Health. Retrieved 29 October, 2011, from http://www.who.int/suggestions/faq/en/index.html.

Wu, W., Chen, M., & Sun, B. (2011), Effects of land use changes on soil chemical properties of sandy soils from tropical Hainan, China, Retrieved 22 September, 2011, from http://www.fao.org/docrep/010/ag125e/AG125E13.htm.

Wyatt, D. (1982) *Thailand: A Short Hist*ory. Bangkok: Silkworm Books.

Yaimung, S. (2008). Farmers' Network for Sustainable Agriculture, Retrieved 1 October, 2009, from www.sathai.org/article/0021%20Famer%20 network(2).htm.

Yuen-Tsang, A. (2001). Generating a Theory of Chinese Communal Support Networks: The grounded theory method in action, *The Grounded Theory Review: An international journal,* 3, 13-20.

APPENDICES

APPENDIX A
TOPICAL INTERVIEW QUESTIONS (PHASE 1)

Key Topics for Discussion
Organizational Overview
Funding/support structure
Objectives
Organic development in Thailand
Philosophical understandings of food
Networks
Perspectives on U.S./European initiatives
Perspectives on the Thai situation
Sufficiency Economy Philosophy

APPENDIX B
EXPLORATORY QUESTIONS (PHASE II)

Preliminary Questions

A) Marital status:
B) Male or female:
C) Age:

1) Are you content/happy with the quantity of green space around your home?
2) Do you feel safe in your neighborhood both day and night?
3) Does your family live together?
4) If not, how often do you see your family?
5) How would you describe our family relations?
6) How would you describe your physical health?
7) Have you had any major illnesses in the last 10 years?
8) Do you understand the term organic food and can you explain it?
9) What is the difference between organic and safe foods?
10) Do you grow any of your own food?
11) Do you grow food on your own land?
12) Do you own your land?
13) Do you rent your land or some portion of it?
14) Do you grow fruit trees, if so what types?
15) Is the fruit for sale or self-consumption?
16) Do you use pesticides or herbicides?
17) Do you use store bought chemical fertilizers?
18) Do you make your own compost or natural pesticides?
19) Where do you get your seeds?

20) Do you contract outside labor to help on your farm?
21) How many days a year do you contract outside labor?
22) Do you use community labor?
23) Do you pay those who come to work from the community?
24) Do you trade agricultural products with neighbors or those in the community?
25) Do you trade home made processed food products with neighbors or those in the community?
26) Do you purchase food in your community?
27) Do you purchase food in a nearby fresh market?
28) How often do you purchase food items from a small retail store?
29) How often do you purchase food from a large hypermarket (Big C, Lotus, Supercheap?)
30) Are you familiar with the King's concept of Sufficiency Economy?
31) Please explain it in your own words?
32) Are you familiar with New Theory Agriculture?
33) Can you explain it in a few words?
34) Do you have any of the following items on your farm (water pond, fruit trees, eatable gardens, buffalo, cattle, etc.)?
35) Do you use any herbal remedies which you grow in your garden or farm?
36) Do you cook your own meals? If not who does?
37) Do you eat at restaurants? If so how often?
38) Are you the main cook in your family, cook for two or more people? If so, how many?
39) Do you ever participate in communal meal participation (weddings, funeral, festivities, temple events)?
40) How often do you participate in such activities? Does your whole family participatein these activities?
41) Do you get along with your neighbors?
42) Do elected leaders provide any benefit to your community?
43) Do elected leaders promote Sufficiency Economy programs in your community?
44) Do you receive assistance with agricultural programs or food processing and who provides these trainings?

45) Do you receive any financial assistance or loans? and from who?
46) Do you grow flowers, trees and other plant with no value for consumption, and if so why?
47) Do you have sufficient food production/monetary income to feed your family?

APPENDIX C
EXPLORATORY QUESTIONS 2ND DRAFT

2ND STAGE QUESTIONS

A) Marital status:
B) Male or female:
C) Age:

FARMING

1) Why did you choose to go organic?
2) Do you remember the day you went organic? Was there a particular event which contributed to the changeover?
3) What percentage of your food do you grow?
4) If so, do you grow fruit, vegetables?
5) Do you raise or gather any type of animals in your farm?
6) Do you exchange seeds with members in the organic network?
7) Do you exchange labor with farmers in your network?
8) Do you grow any medicinal herbs in your garden or farm?

FOOD PRODUCTION/CONSUMPTION

9) Do you trade agricultural products with neighbors or those in the community?
10) Do you trade homemade processed food products with neighbors or those in the community?
11) Do you purchase food in your community?
12) How often do you purchase food items from a retail store or market outside your community?
13) How often do you eat/cook meals with people outside your family?
14) How often do you participate in communal meal participation (weddings, funeral, festivities, temple events)?

NETWORK CHARACTERISTICS

15) What benefits do you receive from involvement in the organic network?

16) Are you a member of a cooperative savings network?

17) Are you a member of a cooperative store?

18) Are you a member of any other type of cooperative?

19) Do you get along with other organic growers in your community?

20) How do you rate the spirit of cooperation in your network?

ADDITIONAL NETWORKS

21) Do you receive assistance with agricultural programs or food processing and who provides these trainings?

22) Do you depend on financial assistance for the success of your farm?

MISCELLANEOUS: QUALITY OF LIFE

23) Do you grow flowers, trees and other plants around your house or farm which are not for sale, and if so why?

24) Do you have sufficient food production/monetary income to feed your family?

25) Do you farm land in exchange for non-monetary products?

APPENDIX D

STAGES IN MAKING DRY ORGANIC FERTILIZER PELLETS

Stage 1) Farmers decide to form a collective to produce fertilizer
Stage 2) The farmers pool resources to purchase a fertilizer machine
Stage 3) The farmers build a facility to produce and store fertilizer
Stage 4) The farmers obtains the key ingredients to produce fertilizer, manure, and Microbes
Stage 5) The farmers add ingredients into the fertilizer machine
Stage 6) Fertilizer pellets are gathered and dried out in the sun
Stage 7) Fertilizer pellets are bagged and placed in storage for later use

Source: This table is based on the researcher's observations at a training course held at the Dharma Garden Temple, December 2009.

APPENDIX E
THE LANGUAGE OF ACTOR NETWORK THEORY (ANT)

After I perused the literature of ANT, I questioned how to tackle its convoluted language and lack of structure? How to carry out a study that utilizes ANT as a central method, theory or conceptual framework? One of the seminal works in this field, *Some Elements of a sociology of translation: domestication of the scallops and the fisherman of St Brieuc Bay*, Callon (1986) offers an interesting, yet rather inconclusive story of the ways human and non-human entities associated in a living laboratory under the ocean. In Callon's tale of St. Brieuc Bay, fishermen, researchers, and larvae were enlisted in a scientific experiment to make scallops grow, and all agents are granted the potency to influence the outcome. In the excerpt below, Callon (1986) explained the purposes of employing an ANT-based epistemology:

> Not only is the observer impartial towards the scientific and technological arguments used by the protagonists of the controversy, but he also abstains from censoring the actors when they speak about themselves or the social environment. He refrains from judging the way in which the actors analyze the society which surrounds them. No point of view is privileged and no interpretation is censured (Callon, 1986: 200).

Hence, ANT serves up a method for which the researcher conceptualizes the study and objectively examines the key agents. Rather than fixing on only one potential perspective the researcher concentrates on both the actors and their interrelationships. Callon (1986) bridged the nature-society divide found in previous sociological studies by utilizing ANT to ensure objectivity and a holistic expression of the problem.

ANT offers a new vocabulary which is somewhat confusing, and probably more approachable to the French speaker[1], nevertheless essential for the researcher to grasp the subtleties of this case study. A central element of this new vernacular is the importance of "translation", "...to express in one's own language what others say and want, why they act in the way they do and how they associate with each other: it is to establish oneself as a spokesman" (Callon, 1986: 223). "Translation" assists the researcher in representing the key agents, while keeping in mind their inherent associations.

Callon's (1986) paper guides the reader through the progressive stages of ANT with more terminology: "problematisation", "interessement", "enrolment", "mobilization", and "dissidence" (Callon, 1986; Latour, 2005). "Problematisation" begins with the exploration of a particular conflict or situation, the agents involved and delineating (but, not limiting) the network under study. At the level of "interessement", the concerns of the agents are unveiled, and in St. Brieuc Bay the objective of the human actors is to encourage scallops to reproduce more successfully within their natural setting. "Enrolment" involves the unveiling of the "mutual concessions" and the tricks necessary to bring together actors towards a centralized objective. In this case, the larvae are encouraged or 'enrolled' to grow through a mechanical devise. To achieve this objective, the scientists engage in the "mobilization" of the actor network through the introduction of a technique, and a set of rules for human participants (intended to sustain the long-term productivity of the fishery). Callon (1986: 223) concluded his study with the problem of "dissidence", "the fisherman penetrate the barriers, and refusing to follow the researchers, devastate the fish reserve; the scallops and their larvae avoid the nets that are meant to anchor them." Therefore, a successful outcome or "translation" depends upon both the characteristics of the network and the unpredictable actions of heterogeneous agents.

Despite, the difficulties of learning the language of ANT in Callon's (1986) study, the diagrams are illustrative and demonstrate the differences between a conventional scientific interpretation of an empirical process and the ANT approach. Perhaps, ANT could be usefully acquired by biologists, chemists and other "hard" scientists to develop a fresh perspective on their areas of study or to direct them in the inclusion of external factors related to their experiments.

---

[1] Note that Michael Callon and Bruno Latour are both native French speakers.

APPENDIX F
FARMER PROFILE

Name …… Gender: ☐ Male ☐ Female

Location …… Support Network……

Age: ☐ 21-30 ☐ 31-40 ☐ 41-50 ☐ 51 -60 ☐ over 60

1) What products do you grow on your farm?

……

2) How many rai of your farm do you own?

……

3) How many rai of your farm do you rent?

……

4) How much fertilizer do you use per year? In kilos
……..……

5) How much rice do you produce per year on average? In kilos
……..……..

6) Do you raise animals for manure?
A) Yes B) No

7) Are you a member of a fertilizer group or cooperative?

A) Yes B) No

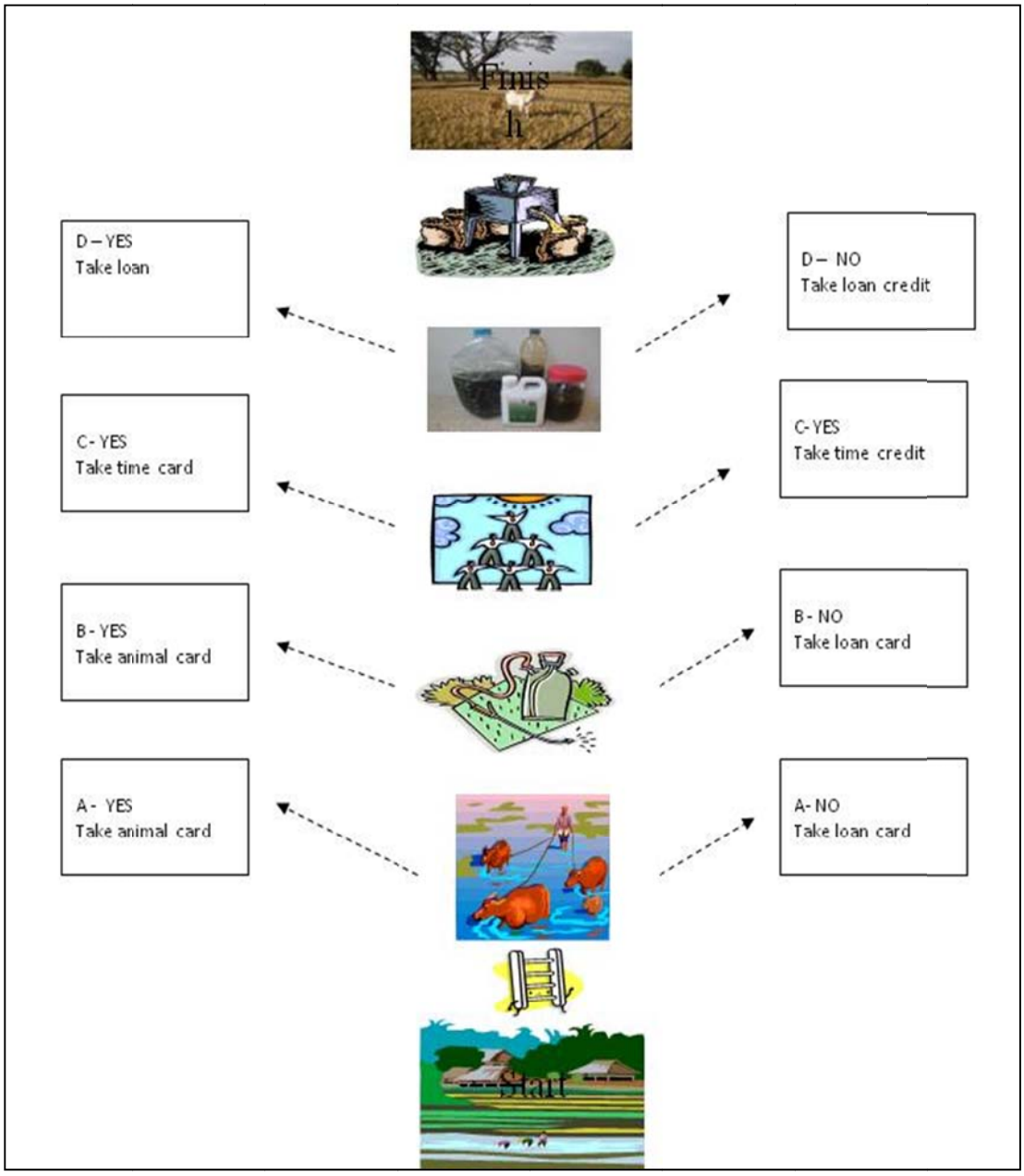
8) Do you have any outstanding loans?

A) Yes B) No

9) Do you grow natural fertilizing plants (green manure)? Which ones?
……...…..……

A) Yes B) No

APPENDIX G
GAME BOARD



APPENDIX H
GAME BOARD QUESTIONS

A) YES

I raise animals because ...

1) It is additional income (ie.sell offspring)
2) To feed myself
3) Assist with work (i.e buffalo)
4) For manure

NO

I don't raise animals because...

1) No time
2) Too much work
3) Machinery is better than the work of animals
4) As it is more convenient/easier to buy manure

B) YES

Why do you make EM?

1) It is the secret to organic rice
2) It saves money
3) Promotes life in the soil
4) I learned to do it at training

NO

I don't make EM because...

1) No time
2) I don't believe it works
3) It is easier to buy it
4) Too difficult to make it right

C) YES

I join fertilizer groups because...

1) Too much work by myself
2) *Kalayanamit* (make good friends in the community)
3) Saves money/expenditures
4) It enables access to machinery
5) I can get fertilizer to use

NO

Why don't you join fertilizer group?

1) I can make it by myself at home
2) I prefer to work alone
3) To far to travel and not convenient
4) More convenient to buy it
5) No time

D) YES

I purchase several inputs because...

1) It is necessary to making effective fertilizer
2) Manure alone not effective
3) I learned to do it this way in trainings
4) The way of nature is to slow to feed us

NO

I don't purchase anything because...

1) I buy ready-made fertilizer
2) Have everything on my farm
3) Not necessary (manure is enough)
4) Don't have money to buy

E) YES

I/we use a machine because...

1) It is quick, effective and convenient
2) It helps production process, so we bought one
3) It saves money and labor

NO

I/we don’t use a machine to make organic fertilizer because...

1) Too expensive
2) Coop access is difficult
3) Better to do it by hand

APPENDIX I

GAME RESPONSE RECORD #1

LOCATION		DATE			
PLAYER NAME 1		PLAYER NAME 2		PLAYER NAME 3	
QUESTION	POINTS	?	POINTS	?	POINTS
A					
B					
C					
D					
E - FINISH					
TOTAL					
NOTES					

APPENDIX J

QUESTIONS FOR GAME#2

Questions 1-5 are to be answered in order of importance to you, there are no right or wrong answers (discussed in Thai language with participants).

1) What are the steps in making fertilizer in order of difficulty:
   A) Getting a warehouse or a place to keep manure
   B) Getting machine or tools to make fertilizer
   C) Acquiring/finding manure
   D) Finding workers to make the fertilizer

2) What are the most important parts of making good fertilizer?
   A) Manure from farm animals
   B) EM (liquid fertilizer)
   C) Additives (dolomite, nitrogen, humus etc.)
   D) Workers to make it

3) What is the benefit of organic fertilizer?
   A) I want to grow bountiful amounts of rice
   B) I want to grow healthy rice for the public
   C) I want to sell healthy food
   D) To get a high price for my rice

4) Why do you use organic fertilizer?
   A) I want to support life in the soil
   B) Chemical fertilizer damages the relationship between man and the soil
   C) Chemical fertilizer is hazardous to our health
   D) It costs less than commercial fertilizer

5) Why are microorganisms important?
   A) They are a component of making fertilizer
   B) Making EM is one part of a farmer's life
   C) Microorganisms are one of many creatures which help to produce crops
   D) Making EM saves money for farmers

6) How do you practice the 5 precepts?
   A) I practice when I have time or when I can
   B) I do my best to follow all 5 precepts
   C) I only follow this precept
   D) I rarely follow the precepts

7) Which of the following statements best describes the meaning of *dhammachart*?
   A) To not harm each other and to reduce suffering in the world
   B) Humans are a part of nature (*dhammachart*)
   C) Humans and nature are 2 different subjects without a relationship
   D) Everything around us (trees, soil, houses, cars etc.)

8) Which phrases describe your farming practices best?
   A) I try very hard to avoid harming living creatures on my farm
   B) I follow the teachings of Buddhism as a way of farming
   D) I learn all my skills on training courses
   E) I learned all my skills from relatives, family or ancestors

9) Do you agree with the statement: organic farmers are more devout Buddhists, than conventional farmers:
   A) Strongly agree
   B) Agree
   C) Moderately disagree
   D) Strongly disagree

10) Which phrase best describes your feelings about being a farmer
   A) It is hard work, but I have no other choice
   B) Hard work is the key to a successful farm
   C) Plants, animals and man work together equally to make rice
   D) I just love everything about being a farmer

11) Describe your state of health after switching over to organic fertilizer
   A) Worse
   B) Same
   C) Better
   D) Much better

12) Have you reduced your loans since switching to organic fertilizer
   A) Debts have increased
   B) Same
   C) I reduced my debts
   D) I have no debts

13) Do you consider yourself a devout Buddhist
   A) I depend on the teachings of Buddhism as a way to live
   B) I consider myself as a Buddhist because I follow the teachings and regularly make merit
   C) I follow the teachings when I have problems
   D) I have faith in Buddhism, but rarely practice the religion

APPENDIX K

GAME RESPONSE RECORD #2

LOCATION DATE

PLAYER 1: NAME		PLAYER 2: NAME	PLAYER 3: NAME	NOTES
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

MORE NOTES

APPENDIX L
LOCATIONS OF FARMER GROUPS

1) **Nature Care Club**
   57 Moo 2
   Sokhunpoom Village
   Naso Sub-District, Kudchum District
   Yasothon Province 35140

2) **Pak Reua Rice Mill**
   118 Moo 4
   Pak Reua Sub-District,
   Mahachanachai District
   Yasothon Province 35130

3) **Dharma Garden Temple**
   80 Moo 8
   Grajai Sub-District
   Patiew District
   Yasothon Province 35150

APPENDIX M

GUIDANCE DOCUMENT FOR COMPLIANCE WITH ORGANIC AGRICULTURE CERTIFICATION THAILAND (ACT)

1. Synthetic fertilizers are prohibited
2. Insecticides and herbicides are prohibited
3. Synthetic hormone is prohibited
4. Farm equipment used conventional farming shall not be used for organic farming
5. Farmer must maintain records of sources of all farm inputs
6. Crops in organic fields must be different from crops in conventional fields
7. Organic crops must be at a minimum 1 meter away from conventional crops
8. If adjacent farms spread prohibited substance, the organic field must have buffer crop to prevent drifts by planting a crop higher than conventional crop and crops in buffer area is not organic crop.
9. Buffer area must be set up to prevent outside contamination. It can be earth dike, drainage canal or buffer crop to filter contamination. Buffer crops are not organic crops.
10. Clearing primary forest for organic farming is prohibited.
11. Annual crop has a minimum of 12 months as conversion period. Annual crop sown after conversion period is organic crop.
12. Perennial crop has a minimum of 18 months as conversion period. Perennial crop harvested after conversion period is organic product.
13. GMO seeds are prohibited
14. Organic seed and stocks are preferable.
15. Seeds shall not be treated with prohibited pesticides before sowing.
16. Organic fertilizers must be used in an integrated manner, e.g. animal manure, compost and green manure.
17. Burning of stock and straw is prohibited, except for traditional shifting cultivation.
18. Night soil is prohibited.
19. Chicken manure from factory farm is prohibited for organic farming. Manure from chicken farm raised on the ground is allowed.

APPENDIX N

HOW TO MAKE AND USE EFFECTIVE MICROORGANISMS (EM)

Gather the following items together:

Vegetable scraps (bamboo shoots, grass or fruit are most effective)	10 kilograms
Rain water	10 liters
Effective Microorganisms	½ cup
Molasses	½ cup
Sea water (or salt 1 tablespoon)	100 cc.

Follow these steps:

1) Chop up vegetables into very small pieces, place it in a tall black bucket (or trashcan and should have a lid).
2) Put rain water in the bucket, add salt water, molasses and mix them well. Next add EM and stir the mix gently. Last add vegetable scraps to the mixture.
3) Close the bucket and leave it under the shade of a tree.
4) Three days later check that the decomposition process is under way, then close the lid again.
5) Wait approximately 90 days and the EM concentrate will be ready for use.

How to apply EM

1) Place 1 to 5 liters of water in a bucket or pesticide sprayer machine.
2) Add 5 cc of EM to liter of water.
3) Lightly cover the surface of the area for planting.
4) Leave the land fallow for approximately 30 days before planting.
5) If time permits, after 30 days turnover the soil and apply another layer of EM to the surface soil.
6) Wait another 30 days and begin planting.

(Source: Agri-nature Foundation, 2008)

APPENDIX O
SOIL QUALITY QUESTIONS

Name ……. Village ……..

District……

I. How do you know the soil quality (e.g. color, hardness, stickiness, animal life)?

1) color ___ 2) hardness ___ 3) stickiness ___

4) taste ___ 5) animal life ___

6) others _____

II. How does the quality of the soil influence fertilizer methods?

_____

_____

_____

BIOGRAPHY

NAME	Mr. Alexander Harrow Kaufman
DATE OF BIRTH	25 May, 1965
PLACE OF BIRTH	Danville, Pennsylvania, U.S.A
INSTITUTIONS ATTENDED	University of California, San Diego, June 1987, Bachelor of Arts (Double Major in History and Third World Studies) University of Bath, England, March 2003, Master in Science (Responsibility and Business Practice), School of Management Mahidol University, Thailand, 2007 –2012 Doctor of Philosophy, Faculty of Environment and Resource Studies
HOME ADDRESS	37/17 Moo 4 Chalong, Ampur Muang, Phuket, Thailand, 83130 Tel. 0818161248 E-mail: lex_int@yahoo.com
RESEARCH GRANTS	Research Assistantship Faculty of Graduate Studies Mahidol University
PUBLICATIONS	Alexander Kaufman, 2012. Organic Farmers' Connectedness with Nature: Exploring Thailand's Alternative Agriculture Network, Worldviews. Global Religions, Culture and Ecology, 16, 154-178. Alexander Kaufman and Suriyapong Watanasak, 2011. Farmers and Fertilizers: A Socio-ecological Exploration of the Alternative

Agriculture Movement in Northeastern Thailand. Environment and Natural Resources Journal, Mahidol University, 9 (3), 1-11.

PRESENTATIONS

The Moral Rice Revolution. Alternative Route to Agricultural Development: Sustainable Path under the Sufficiency Economy Philosophy, 5th International Conference of the Asia-Pacific Educators in Agriculture and Environment (APEAEN) at the National Agricultural Extension and Training Center, Kasetsart University, Kamphaengsaen, Nakhon Pathom, Thailand, May 2011.

Thailand's Moral Rice Movement: Certification Scheme or Post-Productivist Agriculture? Food & Agriculture Under the Big Sky, Joint Annual Meeting of Agriculture, Food and Human Values Society, University of Montana, Missoula, U.S.A., June 2011.

Farmers, Fertilizer and Food Security: A Socio-ecological Investigation of Organic Agriculture in Northeastern Thailand International Conference on the Environment and Resource Studies, The Changing Environment: Challenges for Society, Mahidol University, Salaya, November 2010.

Farmers, Fertilizers and Sufficiency Economy: A Socio-ecological Investigation of Organic Agriculture in Northeastern Thailand 1st International Symposium on Agricultural Technology: "Sufficiency Agriculture", King Mongkut University of Technology, Latkrabang, August 2010.

Exploring the Roots of Thailand's Ecological Food Networks, 2nd International Conference of the Buddhist Economic Research Platform, Ubon Ratchathani University, Ubon Ratchathani, April 2009.

In Search of Alternative Food Systems for Healthy Communities, Humanities and Social Science Conference, Mahidol University, Bangkok, March 2009.

Creating Vibrant Communities through Ecologically Sound Food Production, Ecocities Builders Conference, San Francisco, U.S.A., April 2008.

Applying an Ecological Worldview to Natural Resource Management: A Critical Review 3rd Annual Conference: Gross National Happiness, Bangkok, December 2007.