

An Introduction to an Integrated Model of Ecological Farming and Sustainable Development by Buddhist Peaceful Means: A Case Study of Khok Nong Na Model, Prang Ku, Sisaket¹

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Abstract

Nowadays the productivity in the agricultural sector in Thailand has dropped significantly. Meanwhile there are many Thai farmers who are still struggling with poverty and household debt. Confronting these problems has led to a holistic approach of creating an “*agricultural transformation model*” as discussed in my dissertation. The model is consciously designed to include the idea of sustainability to improve the farming system in Thailand and enhance people’s well-being. What I intend to do in this paper is to apply my several years of research knowledge and experience in the Northeast of Thailand in Sisaket Province to understand, analyse, and recommend remedies for the problems of poverty in the farming communities in the Northeast.

My overall thesis in this paper consists of two parts: Part I, the empirical part with a social science methodology, shows that in practice smart farming can mitigate supply chain problems, and that the Khok Nong Na Model in Sisaket can promote agricultural education, trade, and worldwide distribution of local agricultural products. Part II, the conceptual part with a Buddhist philosophical methodology, shows that in theory Buddha’s principles non-violence, peace, moral development, middle path, heart or mind, and loving kindness can lead to the application of Sufficiency Economy Philosophy (SEP) as envisioned by King Rama IX. As a consequence, Sufficiency Economy Philosophy (SEP) and Buddhist teaching can become powerful tools and guides to solve social problems and build sustainable community.

¹ This paper is based on the author’s PhD dissertation at International Buddhist Studies College, Mahachulalongkornrajavidyalaya University (MCU). It was first presented at the annual meeting in 2021 of Philosophy and Religion Society of Thailand (PARST).

Introduction

In recent years, human beings have been facing challenges unparalleled in human history. Many problems are global in nature, such as a climate change, depletion of fresh water, overpopulation and the corona virus COVID 19 pandemic have occurred.² These problems not only affect the economic system but the social structure as well. In Thailand, two major concerns for the struggling economy are poverty and the problem of inequality which together cause numerous social problems. One of the outcomes of these problems is the brain drain situation in which adolescents leave the country to work for high tech urban companies in Bangkok or overseas.³ This is especially true in the agricultural sector where most young laborers in farming families are looking for better jobs in the cities instead of continuing with the family's pattern of low-income farming.

However, the agricultural sector has contributed mightily to the economy of Thailand for decades. This sector employs around 30 percent of the total labor force covering 6.4 million households of which more than a half are small-scale farms.⁴ These families owned farms that were highly productive, and which solved both the local and regional needs for domestic food and also provided substantial surpluses for export. At the same time, the question remains, why are Thai farmers impoverished and struggling with low-income farming compared to many other countries? How can stakeholders create incentives for farmers and communities so that they can understand the value and application of sustainable agricultural methods for Thailand's farmers in the long term?

Both the concepts of sustainable living and that of healthy consumption have become increasingly popular among Thai people lately, particularly in the area of producing organic products by chemical free processes. According to *Consumer Reports*, people are willing to spend more for organic and local goods even though the cost of those nutritious foods is high, especially for the

² United Nations, "Population growth, environmental degradation and climate change", Department of Economic and Social Affairs, <https://www.un.org/en/desa/population-growth-environmental-degradation-and-climate-change>, accessed January 15, 2022.

³ Varaporn Pothipala, Prae Keerasuntonpong, and Carolyn Cordery, "Alleviating Social and Economic Inequality? the Role of Social Enterprises in Thailand," *Journal of Accounting & Organizational Change* 17, no. 1 (January 2020): pp. 50-70.

⁴ Manop Udomkerdmongkol and Nawarat Chalempao, "Thai Agricultural Sector: From Problems to Solutions in Thailand," United Nations (United Nations), accessed December 1, 2021, <https://thailand.un.org/en/103307-thai-agricultural-sector-problems-solutions>.

millennial generation.⁵ These millennial ones are a majority group that cares about the environment and is willing to spend more for items produced with sustainability in mind.⁶ Additionally, consuming local products have a positive impact on the local economy because doing so both supports local agricultural producers and boosts employment.

I. Empirical (social scientific), education about technology, sustainable practices, GMOs, and Khok Nong Na model

(1) Thailand has supply chain problems which require product development, educational resources, and smart borrowing practices for their solution.

The supply chain problems are the result of insufficient attention to the product development strategy and the lack of pertinent educational resources for sustainable farming necessary for Thai farmers. Thailand is well-known for being the major producer of agricultural products for world consumption. However, many farmers are still suffering from low-income and household debt. Although the government has tried to solve these problems by providing funds to farmers, many financial plans have failed anyway. Lacking sufficient management skills, most of farmers spend their government money on inappropriate things. According to the Thailand Development Research Institute, most of Thai famers spend their money for housing instead of for developing their farm businesses.⁷ Approximately 34 percent of Thai farmers borrow government funds for buying or developing a house, while only 14 percent of them use money for improving the farm.⁸

(2) If Thai farmers will be able to have access to affordable developed internet infrastructure, and training on computers as applied to agricultural technology, then they will be able to manage the supply chain well.

⁵ Tod Marks, "Cost of Organic Food - Consumer Reports," Cost of Organic Food - Consumer Reports, <https://www.consumerreports.org/cro/news/2015/03/cost-of-organic-food/index.htm>, accessed December 1, 2021.

⁶ Iryna Printezis and Carola Grebitus, "College-Age Millennials' Preferences for Food Supplied by Urban Agriculture," *Frontiers in Sustainable Food Systems* 4 (2020), doi:10.3389/fsufs.2020.00048.

⁷ Nonarit Bisonsyabut et al., "Farm Loans: Stepping Stone or Trap? - TDRI: Thailand Development Research Institute," TDRI, August 10, 2018, <https://tdri.or.th/en/2018/07/farm-loans-stepping-stone-or-trap/>.

⁸ Apinya Wipatayotin, "Finding Ways to Beat Farm Debt," <https://www.bangkokpost.com>, November 4, 2018, <https://www.bangkokpost.com/business/1569802/finding-ways-to-beat-farm-debt>.

Another factor involved in this puzzle is the lack of opportunity to access to competitive new technology. After several years of visiting agricultural areas in Northeast of Thailand. I have found that the country has lost its competitive advantage in the agricultural sector. That is because more than 90 percent of upstream products are consumed within domestic midstream industries. For example, Thailand is the world's largest source of natural rubber supplier.⁹ But the export value of raw rubber is gradually decreasing because of a lack of product development. These upstream businesses also include the cultivation and harvesting of agrarian items on plantations. Consequently, local farmers have to deal with many challenging factors, not only unpredictable yield in the face of climate variability and fungus disease, but also low income and crop price fluctuation.¹⁰

On the other hand, our neighbor country, Malaysia, is using the technology advancement to double their natural rubber price by converting natural rubber into finished goods before export. So instead of selling the ribbed rubber smoked sheets (RSS), the midstream to downstream industries will be transforming them into final products such as vehicle tires, gloves, and other high-value items. Therefore, it needs to be noted that product development strategy is one of the most important keys to enhance farmers' income and boost the economy country.¹¹

(3) The practices of using Genetical Modified Organisms (GMOs) caused harm to farmers in the Northeast of Thailand, and they need to avoid cultivation of harmful GMOs manipulated produce, have sustainable outcomes, and practice self-sufficiency.

Foods based on Genetic Modified Organisms (GMO) have played an increasingly important role in the food supply for over two decades now, and their use is claimed to solve problems of food security and malnutrition. Especially in the case of an agricultural food supply that is extremely vulnerable to climate change. An uncertain climate will further increase production risks, GMOs have been developed specifically to enhance farm productivity, insect-resistance, and to help

⁹ Chaiwat Sowcharoensuk, "Industry Outlook 2021-2023: Natural Rubber Processing," *krungsri.com*, <https://www.krungsri.com/en/research/industry/industry-outlook/Agriculture/Rubber/IO/io-rubber21#:~:text=In%202020%2C%20global%20supply%20came,most%20important%20source%20of%20rubber>, accessed January 10, 2022.

¹⁰ CNBC Documentary, "What the rubber 'Apocalypse' means for the U.S. Economy" https://www.youtube.com/watch?v=p_9XvHBb3nw&t=47s, accessed January 10, 2022.

¹¹ Watcharee Veerakachen et. al. "Prototype Development of SMART Agriculture Platform integrating Remote Sensing Technology with AquaCrop Model" *NBTC Journal 4 (4)*. Bangkok, Thailand:155-77..

offset the impact of global warming. However, the use of GMOs and hybrid plants are the main factors that cause high expenditure in farm businesses, and this repeating cycle is actually creating financial and environmental challenges.¹²

Although GM seeds and Hybrid seeds can be saved and replanted,¹³ seed manufacturers are developing and producing sterile seeds to diversify their variety so as to encourage future sales. Hence, the generation of those harvested seeds will not uniformly contain all of the desired genetic traits of the original seed.¹⁴ For instance, even though farmers want to save seeds to regrow for the next cultivation, those modified seeds will revert back to parent plants or become nonstandard. As a result, farmers are mandated to purchase new seeds in every season. This is a business exploitation model of engineered seeds, which those who are in advantage are the seed companies.

Moreover, in the hands of plant breeders, seed price will be controlled and increased by private companies. This means that farmers have to obtain the expensive seeds and herbicides to ensure good production. In the case of crop failure, however, the farmers can become indebted. In developing countries where farmers do not get educated about a long-term side effect of using chemical products, this is the main reason why many of them decide to sell the farm and become landless farmer workers or migrate to urban areas for work.

Thai farmers are well-known for skillfully practicing plant breeding and sharing the results freely. They will collect seeds after the domestication of crops without any plant breeding interruption and practice the “natural-saved seeds methods” which means they will collect the original seed from the previous harvest. This method has several advantages to environmental systems and helps to maintain biodiversity, particularly genetic diversity over time. A main point is that to create a sustainable ecosystem the generation of seed should become a developed capacity to adapt to the changing environment and so become sustainable. So far, the use of GMO seed is not the best option for agricultural problems.

¹² Sandra Young, “GMO and the Nutritional Content of Food,” Discovery Eye Foundation, March 24, 2016, <https://discoveryeye.org/gmo-and-nutritional-content-of-food/>.

¹³ “Monsanto and Terminator Seeds,” Monsanto and Terminator Seeds (University of British Columbia), https://cases.open.ubc.ca/monsanto-and-terminator-seeds/#cite_note-6, accessed December 6, 2021.

¹⁴ American Farm Bureau Foundation for Agriculture, “Can Farmers Save and Replant GMO Seeds?,” American Farm Bureau Foundation for Agriculture, <https://www.agfoundation.org/common-questions/view/can-farmers-save-and-replant-gmo-seeds>, accessed January 2, 2022.

The challenge is of developing environmentally friendly agricultural biotechnology in application to environmental issues. This study shows that the use of genetically modified organisms (GMOs) has an impact on biodiversity and ecosystem as explained in the work of the woman activist Vandana Shiva.¹⁵ According to Food and Agriculture Organization (FAO), 90% of genetic diversity has been lost because of the monoculture farming.¹⁶ This lost diversity includes some important insects that benefit soil health such as earthworms and ground beetles. This occurred ever since farmers switched to the widespread of use of GM crops and herbicides.¹⁷ So instead of allowing plants and seeds to evolve and adapt with environment, the GM seeds are modified to fight against nature. Farmers are unwittingly, over time, supporting a war against nature.

Even though the recent study of Thailand crop protection chemicals market claimed that GMO crops reduce the pesticides use, conversely, the amount of chemical pesticide use in Thailand is actually increasing significantly. So the unintended consequence reduced the expected benefits. According to The Office of Agricultural Economics (OAE) and The Office of Agriculture Regulations (OAR).¹⁸ Thus, the case is not proven, and the question of whether the use of GMOs produces less reliance on chemical pesticides or not, is still unsettled. Additional research is needed in the future about “whether or not GMOs is 100% safe for consumers” is needed to discover the truth of the matter.¹⁹

It is also interesting that nowadays more than 75% percent of our world consumption of food is of GMOs food even though consumers do not know its side-effects and original sources.²⁰ In fact, GM foods are actually combined in the food ingredients in our daily diet, including corn, soybean,

¹⁵ Vandana Shiva, “Rethinking Agriculture: Protecting Biodiversity Amid Climate Chaos,” *Tikkun* 30, no. 3 (August 1, 2015): pp. 24-26, doi:10.1215/08879982-3140308.

¹⁶ “Monoculture Farming Explained: What Are the Pros and Cons?,” Earth Observing System, <https://eos.com/blog/monoculture-farming>, accessed December 29, 2021

¹⁷ Deniza Gertsberg, “Loss of Biodiversity and Genetically Modified Crops,” *GMO Journal: Food Safety Politics*, June 17, 2011, <https://gmo-journal.com/2011/06/17/loss-of-biodiversity-and-genetically-modified-crops/>.

¹⁸ “Thailand Crop Protection Chemicals Market - Growth, Trends, COVID-19 Impact, and Forecasts (2022 - 2027)” (Mordor Intelligence), <https://www.mordorintelligence.com/industry-reports/crop-protection-chemicals-pesticides-market-thailand>, accessed January 2, 2022.

¹⁹ Gilles-Eric Seralini, “Update on Long-Term Toxicity of Agricultural GMOs Tolerant to Roundup,” *Environmental Sciences Europe* 32, no. 1 (2020): 1-7.

²⁰ The Mellman Group, Inc. “Voters Overwhelmingly Support A Labeling Requirement For GE Foods.” Just Label It!, <https://www.justlabelit.org/wp-content/uploads/2012/01/Mellman-Survey-Results.pdf>, accessed February 22, 2011.

processed foods, and animal feed. For instance, a recent study shows that researchers tried to transfer a human protein into plants to supersize them.²¹ Thus, it has become difficult to clarify the boundary between real organic food and GMO foods. Consequently, whether GMOs contribute to global health is still a moot point. We can even say, “case not proven”. So there may indeed be health risks of Genetically Modified foods.

Recently, there is a fierce debate between anti-GMO groups and health experts about whether or not GMOs foods can negatively impact upon consumer health.²² However, this science of genetics is relatively young and can change over time. In my point of view, even though GMOs allow us to produce more food with predictable quality and nutritional needs, this does not mean that the process poses no risk for human health. Additionally, there is no substantiated evidence can guarantee that GMO foods are 100% safe to humans. In this case, consumers must become better informed by having access to informative labelling on all GMOs food items. People are entitled to know what they are eating, since we are what we eat.²³ It is the responsibility of the company that has advertising and packaging capacity to accurately describe the components of foods. For example, when they say it is “organic” what exactly what does that mean?

(4) Khok Nong Na Model - This place can be an educational place for locals to learn to develop their products and also a trade center, education center, and a showroom for them as a distribution center to sell their products worldwide.

The background is that after several years of studying the agricultural situation in Northeast Thailand, particularly in Prang Ku, Sisaket Province, I have found that many remote communities are still struggling with socio-economic agricultural problems. Moreover, up to 80 percent of the villagers are small farmers and they are the majority group that suffers the most from global warming and technology disruption. Accordingly, it is time to rethink how to create a more

²¹ Shi En Kim, “Researchers Transfer a Human Protein into Plants to Supersize Them,” *Smithsonian Magazine*, August 17, 2021, <https://www.smithsonianmag.com/innovation/researchers-transfer-human-protein-plants-supersize-them-180978443/>.

²² Cary Funk, “About Half of U.S. Adults Are Wary of Health Effects of Genetically Modified Foods, but Many Also See Advantages,” *Pew Research Center* (Pew Research Center, July 31, 2020), <https://www.pewresearch.org/fact-tank/2020/03/18/about-half-of-u-s-adults-are-wary-of-health-effects-of-genetically-modified-foods-but-many-also-see-advantages/>.

²³ Meike Henseleit, Sabine Kubitzki and Roland Herrmann, ‘GMO-Free’ labels enhancing transparency or deceiving consumers?, paper presented at Annual Meeting, German Association of Agricultural Economists (GEWISOLA) at Kiel, September 30 - October 2, 2009.

sustainable eco-system in community while reforming the farmers' roles and making food systems more sustainable. Furthermore, it is important to understand local culture, including location, social structure, lifestyle, and the land. Therefore, solutions to the supply chain problems are found in smart farming. These solutions mitigate supply chain problems, and the Khok Nong Na Model at Sisaket Prang Ku Province promotes agricultural education and innovation, trade, and effective worldwide distribution.

My current interest is to design the Khok Nong Na Learning Center as a space for villagers to learn a variety of skills related to sustainable farming and business (**See Appendix A**). This ongoing process will be finished in 2023. Previously, in Prang Ku community, Venerable Hansa Dhammhaso, the director of International Buddhist Studies College (IBSC) and the PhD student team in which I participated already took the first step to set-up a project called Moo Baan Chor Sa-ad (Peaceful Village) which is a role model of Khok Nong Na Learning Center. While the Anti-corruption network is created by the cooperation between Mahachulalongkornrajavidyalaya University, and the Office of the National Anti-Corruption Commission (ONACC) to create campaign of raising the standard of morality and ethics in society.²⁴

Thus, my research is only a part of a much larger effort that belongs to people of the communities dedicated to benefiting the land in the broadest sense. As Gary Snyder said “the mirror of truth” was given to writers and artists to bear witness, to help us see things as they really are (*yatha bhutam* in Buddhism). That is, in this case it helps one to see clearly the destruction of nature” that is really happening. Also “the heart of compassion” was given to writers and artists, which is to say the ability to feel and know the pains and delights of other people, and ‘to weave that feeling into their art’.²⁵ The projected outcome will be that this pattern of living at Sisaket will be a model to replicate elsewhere in the country in order to create sustainable ecosystems.

Therefore, smart farming borrowing practices can manage supply chain problems, problems of traditional farming which cause poverty to arise among Thai peasants can be mitigated by providing educational resources and the opportunity for them to learn product development based on

²⁴ National ANTI-CORRUPTION Strategy Phase 3 (2017 - 2021),” Office of The National Anti - Corruption Commission (ONACC), <https://www.nacc.go.th/english/categorydetail/2019122712514151207005112EK12853/30040de6da64ed2ef24b045e2a763598>, accessed January 2, 2022

²⁵ Gary Snyder, “Writers and the War Against Nature” in Melvin McLeod (ed.), *The Best Buddhist Writing 2007* (Boston: Shambala Publications, 2007), pages 28-29.

technology, internet infrastructure, and sustainable practice in farming, and Khok Nong Na Model can promote agricultural education, trade, and worldwide distribution.

[By (1), (2), (3) and (4)]

II. Conceptual (philosophical), Buddhist teaching, the middle path, and Sufficiency Economy Philosophy (SEP)

(1) Buddhist principles of non-violence, peace and moral development can be effective concepts to guide the individual minds to create a peaceful community.

One of the most important principles for having sustainable living and peaceful community is that they must start with self-development. This is where the basic Buddhist teaching has been brought to guide individual minds to see the real-life value of self-development, sustainability, and peaceful community. In this case, the Buddhist teaching of middle path and the concept of moderation can minimize greed by helping society not focus just on “feelings of I and mine”, possessiveness, and profit without heart, but instead on the whole ecological community of humans, animals, insects, plants, water, and the land. As Buddhists believe that humans have the potential to flourish and become noble beings through training and advancement. Thus, whenever one develops a virtuous life through skillful actions, so too skillful consequences spread through and in the environment, family, and biological community at large.

(2) The Buddhist principles at (1) promote the middle path by cultivating the right mindset toward the sustainable outcomes mentioned in (1).

Since global warming began, Thais were forced to understand the food supply chain, environmental impact, and sustainable living. Many of Thais started to bring back the basic principle of living with nature and developing healthy minds. One of the most successful theories that has been used is Sufficiency Economy Philosophy (SEP) of the King Rama IX.²⁶ The core value of SEP is related to Buddhist teaching of mindful practices with moderation and caution.²⁷ In Buddhism it is called *Ariya Atthangika Magga* (“the noble eight fold path”) that focuses on the

²⁶ Nantichas, “Philosophy of Sufficiency Economy,” The Chaipattana Foundation - Concepts - Sufficiency Economy & New Theory, <https://www.chaipat.or.th/eng/concepts-theories/sufficiency-economy-new-theory.html>, accessed December 1, 2021,

²⁷ Rachroat Punyaboon (2014). Sufficiency Economy: An Innovative Method of Buddhist Development Economics. *Journal of Humanities and Social Sciences, SRU*, vol.3 (2), 33-54.

individual's development and divides into three areas for training: ethical conduct (*sīla*), concentration (*samādhi*), and wisdom (*paññā*).²⁸ In my view, the development of mindfulness is more important than routine work, the reason is that development of mindfulness can affect the experienced quality of routine work.

(3) The teaching and practices of King Rama IX can help farmers in Northeast of Thailand to practice self-sufficiency.

The King Rama IX is a very good example of promoting self-sufficiency.²⁹ He visited communities all across the country to enhance local living by teaching villagers how to do sustainable farming and become free from poverty. For instance, he encouraged villagers in Northeast Thailand to grow more valuable and worthwhile crops instead of planting opium. The King Rama IX showed virtuous example as a middle path of stimulating the production of high paying crops instead of either harmful opium cultivation on the one hand or the use of low paying crops on the other hand.

For King Rama IX, country is like his family and practicing Buddhism he has shown loving kindness. Many of the King's projects have been highly successful. Such as the Royal Rainmaking Project to solve the drought problem caused by climate change, and The Klang-Din Project to solve the problem of acidic soil.³⁰ We then must accept that practicing his Sufficiency Economy Philosophy (SEP) is a powerful way to incentivize local farmers and villagers so they develop self-reliance, and resilience.

As explained by Thailand International Cooperation Agency, that Sufficiency Economy Philosophy (SEP) means "An approach for sustainable development which espouses moderation, reasonableness and prudence as development framework based on knowledge and virtue."³¹ All these main concepts moderation, reasonableness, prudence, and virtue" can be found in Khok

²⁸ Somdet Phra Buddhaghosacharya (P.A. Payutto, *Characteristic of Buddhism* (Bangkok: Chareondeemankong CDMKprinting, 2015), p.53-55

²⁹ *Understanding the Philosophy of the Sufficiency Economy* (NBT Channel, 2016), <https://www.youtube.com/watch?v=3vns5eyNEg8>.

³⁰ "Royal Theory on Reactivation of Acid Sulfate Soil (Klang - Din Project)," Klang-Din Project (Department of Land Development), accessed December 5, 2021, https://www.idd.go.th/EFiles_html/main%20page/Ea0300.htm.

³¹ <https://tica-thaigov.mfa.go.th/en/content/tipp-theme-sufficiency-economy-philosophy?page=5f4e1d96fdf0d627941cb8c2&menu=605b13b274ddd251292abaf2>, accessed June 29, 2022.

Nong Na model. What the justification is for relating the Sisaket model to King Rama IX's model, is that people develop their own ability to solve problems in agriculture economics and related fields.

The idea of this sustainable farming model is very popular and has been used widely in Northeast of Thailand. According to my research, Khok Nong Na is a set of applied theories from Sufficiency Economy Philosophy by the late King Bhumibol Adulyadej (King Rama IX) and Buddhist Peaceful Means.³² A primary practical aim is to improve the farming system by focusing on water management in view of the drought climate that prevails in northeast Thailand. While one needs to be trained in their mindful-development to have a balance moral state of mind.

In summary, being frugal does not mean that one has to live below a decent living standard, but instead it means being virtuous by resting content with what one already has. For example, farmers in Sisaket can develop their farms and make them more specialized. Then these traditional farmers are empowered to turn their farms into learning centers in which young farmers learn collaboratively how traditional farming works with modern techniques. Thus, this ecological model of farming can be both the space in which ecological thinking is practiced and the training ground for making Buddhist virtue a reality.

Therefore, the concepts of Sufficiency Economy Philosophy (SEP) and Buddhist teaching, are powerful tools that provide guidance to solve social problems and build sustainable peaceful community; Buddhist principles of non-violence, peace, moral development and the middle path will lead to a self-sufficiency economy.

[By (1), (2), and (3) in part II]

Conclusion

The overall conclusion following the empirical social scientific methodology in **Part I** and in the conceptual philosophical methodology in **Part II** is as follows:

³² Boonyawisit P. W. (2019). "Middle Path and Sufficiency Economy of The King Rama IX." *MCU Haripunchai Review*, 3 (1), 67-77.

Part I, the empirical part, shows that smart farming can mitigate supply chain problems, and Khok Nong Na Model can promote agricultural education and innovation, trade, and effective worldwide distribution.

In Part I it is argued that:

- (1) Thailand has supply chain problems which require smart farming and business solutions in product development, educational resources, and low debt borrowing practices for their solution.
- (2) Elimination of large debt with continuous use of GM seeds may be achieved if Thai farmers will be able to access resources and technologies and developed internet infrastructure.
- (3) The teaching and practices of King Rama IX helped farmers in the Northeast of Thailand to avoid cultivation of harmful produce, sustainable outcomes, and practice self-sufficiency like in the Khok Nong Na Model in Sisaket Prang Ku Province.
- (4) Khok Nong Na Model - This place can be an educational place for locals to learn to develop their products and also a trade center, education center, and a showroom for them as a distribution center to sell their products worldwide.

Therefore, smart farming can mitigate supply chain problems, and problems of farming which cause large debt to arise among Thai farmers can be mitigated by providing education about technology and sustainable practices in agriculture, and Khok Nong Na Model can promote agricultural education, trade, and worldwide distribution. [By (1), (2), (3), and (4)]

Part II, the conceptual or philosophical part, shows that Buddha's philosophy and Rama IX's practices of educating the hill tribes did contribute to the development of ecologically friendly biotechnology as in the present-day Khok Nong Na Model at Sisaket.

- (1) Buddhist principles of non-violence, peace and moral development can be guiding concepts for individuals and the whole community to create sustainable outcomes.
- (2) Sustainable outcomes may be had when the Buddhist principles at (1) promote the middle path by cultivating the right mindset.
- (3) Following the middle path, farmers can avoid cultivation of harmful produce, have sustainable outcomes, and practice self-sufficiency and prudent borrowing practices.

Therefore, concepts of the Buddha and specifically those in (1), (2) and (3) above can be guiding concepts that are logically compatible with the ideas of ecologically friendly biotechnology based on sustainable outcomes, self-sufficiency philosophy, and prudent borrowing practices. [By (1), (2), and (3)]

EPILOGUE

Statement of the problem: This paper has focused on the problems of traditional farming which causes poverty to arise among Thai farmers. The widespread use of Genetic Modified Organism (GMOs) is claimed to be the world solution to food security and global warming. However, instead of being a solution it is just a debt trap for farmers. Year after year, Thai farmers are induced into purchasing more and more GMOs seed and going into debt. In years of draught when there is a poor harvest, the consequences can be devastating. It is a debatable question whether the GMO way must be the only way to farm in Thailand.

Statement of the solution: The practical aspect of my two-part thesis is that an alternative solution to the widespread use of GMO in agriculture is available and is already being tried as a pilot project in Sisaket. **(See Appendix A Pilot Project)** The conceptual or philosophical aspect of my thesis is about Rama IX's idea of Sufficiency Economy Philosophy combined with Buddhism. It consists in practicing Self Sufficiency Economy as exemplified by Rama IX's activities for farmers in the Northeast, guided by the Eightfold Noble Path and other Buddhist ideas. This means minimizing greed, creating debt free, sustainable, resilient, flourishing farming communities.

It involves a component of mindfulness development among the community members through Buddhist meditation that is already known in villages. Meditation will allow individuals to develop their peace of mind and decrease insomnia problems. Practiced regularly it can develop mindfulness and thereby increase domestic harmony and work effectiveness through concentration. Success in school, in dealing effectively with the health system, and in business all depends on inner peace. Buddhists believe that from inner peace, comes outer peace, and eventually world peace.

On the basis of this study, it can be realistically hoped that the ideals behind the Khok Nong Na model can be extended all over Thailand and lead to the well-being and flourishing of agricultural communities. By contrast, Gary Snyder said actually, "What is happening now to nature worldwide, plant life and wildlife, oceans, grassland, forest, savannah, desert----all spaces and

habitats----the nonhuman realm of watersheds and ecosystems with all their members, can be likened to *a war against nature.*" (Snyder: 2007, 27).³³

APPENDIX A: Pilot Project in Sisaket

This is an actually existing site in Prang Ku, Sisaket Province, where the project I described has been accomplished. My project I am writing up and have contributed to is a project initiated by Venerable Hansa Dhammhaso, the director of International Buddhist College.



1. Parking Area
2. Pool
3. Mound (Kok)
4. Channel (Klong Sai Kai)
5. Pathway
6. Café
7. Learning Center
8. Wash Room
9. Orchard
10. Vegetable Garden
11. Herb Garden
12. Lotus Pond
13. Dhamma Ground (Larn Dhamma)
14. Rice Field 1 "View Point"
15. Rice Field 2 "Eco Bamboo houses"
16. Rice Field 3 "Eco Bamboo houses"
17. Earthen Dyke "Khan Na Thong-Kham"
18. Small Waterhole

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³³Gary Snyder, "Writers and the War Against Nature" in Melvin McLeod (ed.), *The Best Buddhist Writing 2007* (Boston: Shambala Publications, 2007), p. 27

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