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A Case Study of Thailand and Vietnam Agriculture and Farmer Productivity

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Abstract **Original Research Article**

Recently, market requirements have become increasingly higher and regulations of importing countries have become increasingly strict, requiring rice quality to be improved and food safety to be ensured, including minimizing production inputs of chemical origin, production reduces emissions. The overall goal of the project is to maintain high-quality and low-emission rice growing areas associated with reorganizing the production system along the value chain, applying sustainable farming processes to increase price and sustainable development of the rice industry, improving production and business efficiency, income and life of rice growers, protecting the environment, adapting to climate change and reducing greenhouse gas emissions, contributing to implementing Vietnam's international commitments. Interest and intention for farming of farmers are the key factors of adoption SLM (Sustainable land management) practices. Understanding, knowledge and capacity building of farmers about the short-term and long-term benefit of SLM practices is needed. Also, policy supporting the young generation to adopt farming as a life project is needed.

Keywords: Farm structure, Farm management practices, SLM practices; Thailand; Vietnam.

1. INTRODUCTION

Natural resources and climatic factors define the possible farming systems while national policies and institutional changes will continue to determine the socio-economic factors that underscore the continuation of land degradation of alternatively create an enabling environment for SLM to spread. There are many government organizations, universities, and private sector arrange the training to farmers in order to build an understanding of sustainable land management. For government organization such as LDD, agricultural extension office, academic agriculture, rice department, ALRO, etc., these organization work together to support government policies. There are many training courses of SLM technologies and practice have been transfers to farmers.

The results show that farmers are get involved by many ways to reach the information including, the announcement by the head of village and soil doctors, government staffs, by application (line messenger), by calling, by internet, neighbors, and group of farmers. Most of the farmers get the information about meeting and training, but the participation of training depends on the interesting of each farmer. Farmers join the meeting or training because they realize the benefits.

Some of them do not want to join if they do not get any incentive. However, for old farmers, they always face the difficulty to join, e.g., they have difficulties with transportation and busy with their grandchildren or animal raising.

However, for the farmers aging less than 30 or farmers who depend on the head of the household for the farming decision, they do not want to join the training because most of the trainees are old and they feel not confident to join because the numbers of the young in the meeting is almost none. A part of this, the head of the household is the priority to join the meeting or training. Hence, we choose this topic:

"**A case study of Thailand and Vietnam agriculture and farmer productivity".**

2. PREVIOUS STUDIES

We look at below table:

Table 1: Previous studies

Authors	Year	Content, results
Krause *et al.*,	2016	Good agricultural practices (GAP) are quality standards for food safety of on-farm and post-farm activities, including management regulations on producing environmentally friendly and socially acceptable products. GAP are the most crucial standards in global horticulture, and GlobalGAP standards have been a particular focus in the private sector.
Yao *et al.*,	2015	Soil puddlability, a measure of susceptibility of soil to puddling, affects regeneration of soil structure during the rice growth period, but the intrinsic controlling factors are unclear. It was hypothesized that rice straw incorporation and tillage depth influence soil puddlability and soil mechanical and hydraulic properties during the rice growth period as they influence soil organic carbon (SOC) in the plough layer. Using a three-year experiment, the objectives of this study were (1) to determine the effects of rice straw incorporation and tillage depth on root growth traits, sinkage resistance after puddling, and tensile strength, shrinkage capacity, water retention curve and penetration resistance during the rice growth period, and (2) to determine whether mechanical properties from puddling tillage, through the rice growth period, to harvest are correlated with SOC concentration. Rice straw was incorporated partially (C1) and fully (C2) to different depths of plough layer by shallow tillage (ST) and deep tillage (DT). Compared with no rice straw incorporation (C0), rice straw incorporation decreased the sinkage resistance after puddling (C2 < C1 < C0) and increased SOC concentration and aggregate stability. Shallow tillage increased the penetration resistance more than deep tillage irrespective of rice straw incorporation. The difference in tensile strength and total porosity were small among the rice incorporation treatments at the 1st drainage (C2 ≥ C1 ≥ C0), but became more profound with increasing number of drainage because the tensile strength and total porosity decreased in C0, increased in C2, particularly under ST. The root weight was lower, and the root length was longer in C1 than in C2 particularly at the deeper depth of the plough layer under ST, suggesting the impedance of root growth due to higher sinkage and penetration resistances. SOC concentration was weakly correlated with the sinkage and penetration resistances and the tensile strength after the 1st drainage, but not with the tensile strength after the 2nd and 3rd drainages. In conclusion, rice straw incorporation is important to maintain SOC and then improve soil puddlability and the recovery of pore structure during the rice growth period.
Sayamol C *et al.*,	2021	Northern Thailand is the center of a number of controversies surrounding changing cropping patterns, in particular related to deforestation driven by the expansion of maize monocropping by peasant farmers. Growing demand for maize by the global livestock industry has driven the conversion of land from forest and/or shifting cultivation to chemical-intensive maize, with associated environmental (i.e., forest encroachment and annual burning of fields) and social (i.e., farmer indebtedness) problems. Over the years, some of the same farmers have been exposed to 'alternative development' programs and projects, initially motivated by pressure to substitute for illegal crops and more recently by concerns over deforestation and particulate matter air pollution from the burning of crop residues
Krasachat *et al.*,	2021	Technical efficiency analyses have developed significantly due to the presence of a highly competitive business environment that necessitates more rational use of resources. Previous analyses on efficiency and productivity in the agricultural sector have applied two main approaches: parametric and non-parametric methods, with different variations

(Source: author synthesis)

3. METHODOLOGY

Authors mainly use quantitative analysis combined with qualitative analysis (synthesis and inductive methods).

4. MAIN FINDINGS

4.1 SML practices with a case in Thailand

SLM Practices Promoting in the Study Areas

In the study areas, saline soil, sandy soil with soil fertility depletion is the majority problems of farmers, and these soil are reaching a critical level according to the interview with LDD staffs.

Several SLM practices are promoting to help farmers to manage/mitigate their land constraints and increase productivity while improving the environment. According to LDD staffs and field survey, there are 11 SLM practices and technologies have been transfers to farmers for different interests and benefits. For optimized soil fertility management, an integrated nutrient management system must be introduced. This section

will build an understanding of each SLM practices promoting in the study areas.

We see:

Farm & farming household	Variable	Constraints & Benefit seeing
1. Farmers' characteristic	Gender	Men show interesting in adopting SLM more than women. This can lead to men having a chance to participate in the training more than women since most men are named as head of household.
	Age	Aged farmers see more constraints than young farmers in adopting SLM practices. The more farmers are old, the more they are lack of power to learn. However, the resulted showed that old farmers are interesting in adopting organic farming; this can lead to a health concern.
	Education	Education showed the positive benefit of adopting SLM. In other words, farmers who less education see more constraints to adopt SLM. The reason may lead to the ability to learn and understand of SLM.
	Experience	Farmers experience showed benefit in many SLM practices. In some practices, we see farming experience showing as constraints, this may lead to once farmers adopt the practices, but they are given up by many constraints in the farm such as drought problem, labors shortage, and time constraints, etc.
2. Farms' characteristic	Land ownership	Farmers who have land tenure security see more benefit of SLM adoption while land tenure insecurity is one of the major constraints seeing by most farmers.
	Farm size	Big farm size of land can be both benefit and constraints that shoed in the result. For instant, adopt of animal manure, the big farm is seen as constraints in term of labors and time needed while big farm for special plant is seen as a benefit.
	Number of plot land	The number of plot seeing as a benefit for SLM practices since some plant are required special plot for producing such as vegetables. Also, if farmers want to try to implement SLM practices, they try in a small plot of land first for seeing if the practices give them cost-benefit satisfaction and as a reason of small plot is easy to manage.
	Mono-cropping	Mono-crop farming sees as constraints of SLM adoption. If farmers practices monocrop, they are less interested in adopting SLM practices. Mono-crop practices usually spend less time and skip many complicated of the farming process.
	Vegetable	It showed benefit of adopting many SLM such as compost, bio-fertilizer.
	Pond	Since the areas are rain-fed agriculture, having farm pond see as the benefit of SLM adopting. Farmers who have pond see less constraints of implementing SLM less than farmers who have no farm pond.
	Livestock	Livestock producing showing benefit of SLM adoption. Having livestock can lead to the interesting of doing farming. Livestock not only give animal manure but farmers can sell in case need urgent money.
		Engage in the second job is the main constraints of SLM. Farmers spend less time

Fig 1: Benefits and Constraints of Adopting SML Practices
(Source: Phastraporn Salaisook, Thesis 2019)

So which are reasons for farmer to adopt SML practices?
We will analyze in the continuous below table:

Costs	Benefits
-However, SLM practices are not wildly adopted by farmers especially in the Northeast region of the country. The main constraints of doing this practice according to farmers who adopt and adopt-non adopters is the digestion of rice straw which bring about insect destroyed product in the field. Also, if they do it more than one time, it increases production cost. Some of them give up to adopt - this practice requires specific knowledge and have to buy some raw materials, require more time/labors for implementing, and take time to see the good results. **(source:** Phastraporn Salaisook *et al.,* 2024)	- According to LDD staffs and field survey, there are 11 SLM practices and technologies have been transfers to farmers for different interests and benefits. For optimized soil fertility management, an integrated nutrient management system must be introduced - There are many training courses of SLM technologies and practice have been transfers to farmers.

Costs	Benefits
	- Many farmers learned from the training and believed that this practice would improve soil quality and reduce the cost of fertilizer

Fig 2: Thailand agriculture
(Source: Phastraporn Salaisook, Thesis 2019)

Our result confirms these studies above and in line with the study of Mariano *et al*., (2012), that positive factors influencing farmers' adoption of modern rice technologies and good management practices in the Philippines are education, machinery ownership, irrigation water supply, capacity-enhancement activities, and profit-oriented behavior while soil and nutrient deficiencies are impediments to their adoption. Extension-related variables have the biggest impact on technology adoption.

According to Asrat and Simane (2017), plots with SLM structure have to maintain at least 6 years for positive increasing of production at the end of the 6th year, while plot that implements the practices recently or plot that lacked of continuous maintenance do not show statistically significant increase productivity. Thus, the marginal benefit of sustaining the SLM practices increases over time at an increasing rate and SLM measures and maintenance of the structures are crucial to reap benefits from the practices. However, SLM practices implementation is labor intensive, and there is a trade-off with other agricultural activities.

Therefore, policy measures are required to incentivize implementation and maintenance of the SLM structures.

These challenges highlight the need of increasing the resource use efficiency and sustainability of production by improving practices which can reduce costs and increase profit while convincing the willingness to implement the package of SLM practice technologies of farmers by developing large scale farming project which the benefits are replicable over large areas. The development of these practices can lead to a more economically, environmentally and socially sustainably through an increase in income and a reduction in inputs and negative environmental impacts.

4.2 SML practices with a case in Vietnam

Specializing in high-quality and low-emission rice cultivation associated with green growth in the Mekong Delta region targets that by 2030, the added value in the rice chain will increase by 40%, and the profit margin for rice growers will reach over 50%. . The overall goal of the project is to form 1 million hectares of high-quality and low-emission rice growing areas associated with reorganizing the production system along the value chain, applying sustainable farming processes to increase prices. sustainable development of the rice industry, improving production and business efficiency, income and life of rice growers, protecting the environment, adapting to climate change and reducing greenhouse gas emissions, contributing to implementing Vietnam's international commitments.

The project is implemented in two phases in 12 Mekong Delta provinces. Phase 1 (2024 - 2025), focuses on consolidating the existing areas of the sustainable agricultural transformation project in Vietnam (VnSAT) of 180,000 hectares, including training, planning, and construction. Building a measurement-reporting-verification (MRV) system, counting and piloting carbon

credits for qualified rice areas, strengthening cooperatives, maintaining a number of projects and preparing plans plan for the period 2026 - 2030.

Phase 2 (2026-2030), specifically identifies the focus area to establish an investment project to develop a new high-quality, emission-reducing specialized rice area outside the VnSAT project area and will expand an additional 820,000 hectares. This phase will focus on main activities such as investing in completing infrastructure for new areas, reorganizing production, building value chains, perfecting the MRV system, while maintaining sustainable production in the project areas in the period 2024-2025.

The project also offers four priority task programs including capacity building programs for cooperatives and businesses participating in the project; Credit program to support links in production, processing and consumption of high-quality and low-emission rice products between cooperatives and businesses; production infrastructure modernization program for 1 million hectares of high-quality rice and a carbon payment pilot program.

The project aims to reduce the amount of rice seeds sown to less than 70kg/ha, reduce the amount of chemical fertilizers and pesticides of chemical origin by 30%, and reduce the amount of irrigation water by 20% compared to traditional farming. 100% of the area applies at least one sustainable farming process such as 1 must 5 reduction, sustainable rice production standards, alternate dry irrigation and good agricultural practice standards certified and granted codes planting area. (Sourcce: quocphongthudo.vn)

5. CONCLUSION

Moreover, Recommendations as below:

Interest and intention for farming of farmers are the key factors of adoption SLM practices.

Since nowadays, farming is mainly for old people and the young generation do not interested to adopt or adopt less farming in their career. This is the main causes of an agricultural labor shortage that becoming the major constraints of reducing the motivation, intention and important of farming. On the other hand, economic, environmental and social factors have been changed farmers' livelihood and the way they farm by generating 3 main characteristics of farm structure and farm management practices as mentioned above. These findings lead to a number of policy recommendations for increasing SLMs adoption rate of the region and/or the country. We highlight the essence of the effectiveness of agricultural extension system as a fundamental base of SLMs implementation. Besides that, the agricultural sector needs restructuring, in response to the changing in farm structure and management practices.

This needs policies to increase the agricultural labor force and increasing efficiency of SLMs practices, and developing standard SLM practices model of consult and farmer's model is required for being a model of learning for many farmers.

Moreover, promoting land tenure security is theoretically contributed to improved land productivity and soil conservation. Likewise, increasing water accessibility, encouraging cattle and pig raising, and improving the education of farmers are also beneficial to agricultural innovation adoption. Understanding, knowledge and capacity building of farmers about the short-term and long term benefit of SLM practices is needed. Also, policy supporting the young generation to adopt farming as a life project is needed.

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