Final report

Land Tenure and Food Security

by

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Abstract

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While Thailand is able to produce enough rice to support the population, some vulnerable households have inadequate consumption to meet energy and nutritional needs, particularly in the rural areas. The household food poverty line in 2007 was averaged at 22.58US$/person/month, or 54 percent of the total poverty line. 416,410 people in Thailand, or 0.65 percent of the population were affected by food poverty . The rural poor lived with limited natural conditions and land ownership. More than 400,000 households in the rural area are landless and are the most vulnerable group that affected by food poverty . Moreover, there had been an unequal distribution of land and land rights between small-scale farmers and large scale farmers. Small-scale farmers have insecure rights and tend to rely on crops cultivated on marginal lands. With insecure rights and scarcity of water ,they are unlikely to make their full effort to make long term investment in their cultivated land and hence reducing productivity. These problems of land tenure system in Thailand pose risks to agricultural productivity and exploitation of natural resources and thus the sustainability of food security for all households, especially the poor.

Objectives of study were to explore how differences in land access or land tenure rights affect household's decision to choose crop to produce, farming system and trade off between short-term consumption and long term preservation of land, to analyze impacts on rural livelihood strategies or the way in which assets are used to generate access to food that meets nutrition status, particularly when households face negative shocks under differences in land tenure rights.

Target area was Khon Khen province ,one of the most vulnerable provinces to food poverty. The data used was from the field survey in Khon-Khaen. Three types of land titles were selected: Certificate of Utilization (N.S-3), Title Deed, and Undocumented Land**.**Data are collected through questionnaires.The empirical model was estimated using the choice model. The dependent variables were the decision to invest/ conserve land. The independent variables included major land right variables and control variables such as household characteristics.

Empirical results revealed that more secured land rights induce more food security or, in other words, reduce the vulnerability to be food-poor. Unfortunately, its relative importance is much less than money income. This implied that the observed agriculturalists are market- or commercial-oriented and concern less about being self-sufficient in term of food. Alternatively, liquidity and value mismatch between land and food security could explain this relative less importance of land rights.

Moreover, it was found that rice cultivation caused household to be more vulnerable. This raises our concern on the long-term implication on rice production and widespread food insecurity in Thailand. It is essential for the government to develop a set of policy to assure food security by doing something else apart from securing farmers' rights over their land. Land reform can reduce food vulnerability but money income is more effective. Rice cultivation is apparently under threat since it reduces food security for the household. Revised policy on rice is urgently required. Agriculturalists' behavior on their trade-off between short-term consumption and long-term preservation of land remains to be further examined.

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ในขณะที่ประเทศไทยสามารถผลิตข้าวได้เพียงพอต่อความต้องการของประชาชน แต่ยังมีครัวเรือนที่เสี่ยงต่อการบริโภคที่ได้พลังงานและสารอาหารไม่เพียงพอต่อความต้องการของร่างการ โดยเฉพาะครัวเรือนในชนบท เส้นความยากจนด้านอาหารของปี 2550 เฉลี่ยได้เท่ากับ 22.58 ดอลล่าร์ต่อคนต่อเดือน หรือ 54% ของเส้นความยากจนโดยรวม ประชากร 416,410 คนในประเทษไทย หรือเท่ากับ 0.65% ของประชากรโดยรวมได้รับผลกระทบจากความยากจนด้านอาหาร ประชากร มากกว่า 400,000 คนในชนบทที่ไม่มีที่ดินทำกินและมีข้อจำกัดในความเป็นเจ้าของที่ดิน เป็นกลุ่มที่เสี่ยงต่อความยากจนด้านอาหาร ยิ่งกว่านั้น ยังมีการกระจายที่ไม่เท่าเทียมกันในที่ดินและสิทธิในที่ดินระหว่างเกษตรกรรายย่อยและเกษตรกรรายใหญ่ เกษตรกรรายย่อยที่ไม่มีความมั่นคงในเรื่องสิทธในที่ดิน มักไม่ต้องการลงทุนที่มากนักบนที่ดินทำกินของตนเอง ซึ่งทำให้ประสิทธิภาพการผลิตลดลง ส่งผลต่อความมั่นคงด้านอาหารต่อครัวเรือน

วัตถุประสงค์ของการศึกษา คือเพื่อตรวจสอบว่าความแตกต่างในสิทธิในที่ดินส่งผลกระทบต่อการตัดสินใจเลือกการผลิต ระบบการผลิตอย่างไร และตรวจสอบการเลือกระหว่างการบริโภคในระยะสั้นและการอนุรักษ์ที่ดินในระยะยาว เพื่อวิเคราะห์ผลกระทบต่อวิถีชีวิตจากการใช้ทรัพย์สินของครัวเรือนในด้านอาหารที่เพียงพอต่อความต้องการสารอาหารของร่างกาย บนเงื่อนไขต่างๆของสิทธิในที่ดินทำกิน

พื้นที่ศึกษา คือ จังหวัดขอนแก่น ซึ่งเป็นจังหวัดหนึ่งที่มีความเสี่ยงต่อความยากจนด้านอาหาร ข้อมูลที่ใช้มาจากการสำรวจภาคสนามในขอนแก่นผ่านแบบสอบถาม การศึกษาเลือกสิทธิในที่ดิน 3 แบบ คือ นส.3 , โฉนด และไม่มีเอกสารสิทธิ์ แบบจำลองที่ใช้คือ Choice Model โดยตัวแปรตามคือการตัดสินใจในการลงทุนในที่ดิน ตัวแปรอิสระคือสิทธิในที่ดินทำกิน และตัวแปรควบคุมคือลักษณะต่างของครัวเรือน

ผลการศึกษาปรากฏว่า ยิ่งสิทธิในที่ดินทำกินมีความมั่นคงเพียงใด จะยิ่งนำไปสู่ความมั่นคงทางด้านอาหารเพิ่มขึ้น หรือพูดอีกอย่างคือ จะช่วยลดความเสี่ยงของการเกิดความยากจนด้านอาหาร แต่โชคไม่ดีสิทธิในที่ดินทำกินนี้มีความสำคัญน้อยกว่ารายได้ที่เป็นตัวเงิน กล่าวคือ เกษตรกรให้ความสนใจต่อความพอเพียงทางด้านอาหารน้อยกว่าการผลิตข้าวเพื่อขาย ยิ่งกว่านั้น พบว่า ลักษณะการทำการเกษตรทำให้เกิดความเสี่ยงเพิ่มขึ้น ในระยะยาว รัฐจึงควรพัฒนานโยบายด้านอื่นๆนอกเหนือจากการกำหนดสิทธิในที่ดินทำกินที่ทำให้เกิดความมั่นคงด้านอาหาร นโยบายเกี่ยวกับข้าวควรนำมาทบทวน และพฤติกรรมการเลือกระหว่างการบริโภคในระยะสั้นและการอนุรักษ์ที่ดินในระยะต้องการการตรวจสอบต่อไป

Chapter I
Introduction

1.1 Background and Importance of Problems

While Thailand is able to produce enough rice to support the population, some vulnerable households have inadequate consumption to meet energy and nutritional needs, particularly in the rural areas.[1] In Thailand, the household food poverty line, on average in 2007 was at 779 baht (US$22.58)/person/month, or approximately 54 percent of the total poverty line. Using the official food poverty line, 416,410 people in Thailand, or 0.65 percent of the population were affected by food poverty (Table 1). The problem of food poverty in Thailand is highly concentrated in the rural North and Northeast. Even though the poorest subsistence farmers generally consume more than half of their own production, all their food needs cannot be met by their production[2] (Isavilanond and Bunyasiri, 2009).

Table 1 Numbers of Households affected by Food Poverty (thousands)

Region	Area	1988	1992	1998	2000	2002	2004	2006	2007
Whole Kingdom	*Urban*	*223.5*	*166.7*	*52.7*	*75.6*	*32.1*	*30.4*	*29.5*	*10.9*
	Rural	*2,331.1*	*1,218.4*	*744.3*	*975.8*	*480.2*	*362.5*	*554.1*	*405.5*
	Total	*2,554.7*	*1,385.1*	*797.0*	*1,051.5*	*512.4*	*392.9*	*583.6*	*416.4*
Central	Urban	14.8	10.1	4.1	1.3	3.5	6.3	0.0	0.3
	Rural	144.2	40.4	11.4	35.4	24.2	1.4	26.5	10.1
	Total	159.0	50.5	15.5	36.8	27.7	7.7	26.5	10.4
North	Urban	76.9	25.0	16.2	23.3	10.7	6.3	7.6	1.7
	Rural	611.4	362.1	157.3	130.5	267.8	219.0	197.7	229.4
	Total	688.3	387.0	173.5	153.8	278.5	225.3	205.3	231.1
Northeast	Urban	116.8	112.8	26.4	44.0	12.9	16.9	13.1	8.9
	Rural	1,369.9	598.5	501.0	698.9	151.4	86.9	284.4	127.7
	Total	1,486.8	711.3	527.5	742.9	164.3	103.8	297.5	136.6
South	Urban	15.0	18.8	6.0	7.0	5.0	0.9	8.7	0.0
	Rural	205.5	217.4	74.5	110.9	36.8	55.3	45.5	38.3
	Total	220.6	236.2	80.5	117.9	41.9	56.2	54.3	38.3

Sources: NESDB

Agriculture can play a significant role in enhancing food security as 76 percent of those who affected by food poverty in 2006 were farm operators, farm workers, or those who involves in fishing, forestry, agricultural services.[3] However, agriculture in Thailand has been rooted in the extensive exploitation of natural resources and virtually relied on climate.

[1] The official food poverty line defines as the amount of money this particular household needs to buy foods that give exactly the minimum amount of calories and protein (Jitsuchon *et al*, 2004). The calories and protein requirements are based on differences in age and sex of the household member.

[2] For example, while purchased rice expenditures of the poorest subsistence farmer accounted for 12 percent of total rice expenditures, purchased meat and vegetable expenditures accounted for 92 percent of total meat expenditures and 86 percent of total vegetable expenditures respectively. Overall purchased food expenditures of the poorest subsistence farmers accounted for 59 percent of total food expenditures and 47 percent of the total money income. Where prices of other foods, such as meat increase dramatically relative to staple grains, some farmers cannot afford to purchase what they do not produce.

[3] Computed from NSO data in 2006

Agricultural expansion in Thailand has caused significant deforestation, watershed and soil degradation. In addition, industrialization and urbanization both have also generated toxic wastes that polluted surface and ground water supplies. Both the exploitation of natural resources and environmental degradation will create risks of lower crop production, livestock, and fishery that will further destabilize food security in the long haul.

These will disproportionately affect the poor in rural areas, particularly subsistence agriculturalists as their livelihood depends on agriculture and natural resources.[4] Furthermore, the ability of the poor to secure their basic need for food consumption was limited than the non-poor as they have fewer assets to smooth consumption (Datt and Hoogeveen, 2000). The rural poor lived with limited natural conditions and land ownership, which is the main input of agricultural production. More than 400,000 households in the rural area are landless (TDRI and GMT, 2008). Farm workers who are landless and farm operators who mainly owned land less than 3.2 Ha are the most vulnerable group that affected by food poverty (Table 2). Moreover, there had been an unequal distribution of land and land rights between small-scale farmers and large scale farmers. Land holders for more than 22 Ha represented only 0.5 percent of total land holdings (NSO, 2003). Small-scale farmers have insecure rights and tend to rely on crops cultivated on marginal lands, with insecure rights and scarcity of water (TDRI and GMT, 2008). They are unlikely to make their full effort to make long term investment in their cultivated land and hence reducing productivity. These problems of land tenure system in Thailand pose risks to agricultural productivity and exploitation of natural resources and thus the sustainability of food security for all households, especially the poor.

[4] Computed from NSO data in 2006

Table 2 Numbers of Households affected by Food Poverty 2007

Types of households	Area	No. of households affected by food poverty (thousand households)	% of total population
Non-Agricultural	**Total**	**53.8**	**12.9**
	Urban	2.8	0.7
	Rural	50.9	12.2
Agricultural	**Total**	**362.6**	**87.1**
	Urban	8.1	1.9
	Rural	354.6	85.2
	-Owned Land		
	Less than 1.6 ha	60.6	14.6
	1.6 to less than 3.2 ha	40.5	9.7
	3.20 to less than 6.4 ha	24.2	5.8
	6.4 ha and more	0.0	0.0
	-Rented Land		
	Less than 0.8 ha	46.6	11.2
	0.8 to 3.19 ha	55.6	13.4
	3.2 ha or more	18.5	4.4
	-Fishing, Agricultural services, Forestry	108.6	26.1

Sources: Computed from Socio-Economic Survey, 2007.

The household food security in Thailand cannot be achieved unless the issue of land tenure system (land access, land rights, the use of land in an efficient and sustainable way) has to be analyzed. The linkage between land tenure system and food security has to be analyzed more systematically. Dynamics of food security is also complex – ranging from the simple insufficient land usage and maintenance to the opt-out from the agricultural sector causing a shift in land utilization and reduction of agricultural produces (food produces included). The evolution of food insecurity relies much on behavior of agriculturalists on how they utilize their lands. Initially, it would start with inability to maintain lands for proper production. Reduced productivity results in income reduction causing easier switch to other plants, particularly non-staple food vegetation (i.e. fuel crops). If income from agriculture cannot be sustained, eventually, agriculturalists may decide to abandon agriculture altogether, selling off their lands and new buyers use the lands for alternative purposes. Agriculturalists' food insecurity is two-fold. Remaining in agriculture allows them to grow much of their foods. Being outside agriculture, they need to earn their money to buy foods.

The systematic literature that linked land tenure system and agricultural productivity in Thailand was found in Feder *et al* (1988). Their empirical results showed that variable inputs used per unit of land and crop value per unit of land were higher for legal owners compared to squatters. Feder *et al* (1988) also concluded that the issuing of usufruct certificates to squatters would not have a significant impact on their productivity. Since little systematic empirical study between those issues has been conducted recently, this study will develop a systematically empirical work that investigates relationships between land tenure system and food security.

1.2 Objectives of Research

1) To assess household food security in Thailand and examine the relationship between land tenure and food security.

2) To explore how differences in land access or land tenure rights affect household's decision to choose crop to produce, farming system, and trade-off between short-term consumption long-term preservation of land.

3) To analyze household's coping strategies to generate access to food that meets nutrition status, particularly when households face negative shocks under differences in land tenure rights.

1.3 Scope of Work

Objective 1: To assess household food security in Thailand and examine the relationship between land tenure and food security

The paper assess the household food security for farm operators at the national level based on the socio-economic survey of 2007 using a quantitative and objective measure, known as food poverty.

Objective 2: To explore how differences in land access or land tenure rights affect households' decision and

Objective 3: To analyze household's coping strategies to generate access to food.

The case study of Nakornpanom province in the crop year 2009/2010 is used for the analysis as Nakornpanom is one of the most vulnerable province to food poverty.

1.4 Organization of the Report

The structure of the report is as follows. The next chapter presents literature review. It is followed by the review of land rights in Thailand and the conceptual framework and the methodology.

Chapter II
Literature Review

Literatures in land tenure and food security are expanding very rapidly in recent years. Its initial momentum was gained in the context of poverty in Africa. Land tenure is perceived as a major institutional instrument for encouraging agriculturalists to increase their productivity and eventually relieve themselves from poverty via increase income. The subsequent boost is resulted from global concerns on climate change. Agriculturalists may switch away from their food vegetation, especially staple-food crops, towards more lucrative plants, particularly fuel crops, due to socio-economic constraints. Subsequently, food production would be largely and negatively affected plus the severity of climate change would worsen food security.

Land tenure is an institutional arrangement or framework to administer the access and usage of land and accompanying resources as an essential factor of production (Maxwell and Wiebe, 1998; 1999). Access and usage of land includes the enjoyment from the benefit of land and its complemented resources and the longer term aspect of maintenance and investment.

According to WHO (World Health Organisation)[1], food security is defined as a state "*when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life*." WHO furthers that food security consists of three components: food availability (sufficient quantities of food available consistently); food access (sufficient resources to obtain food – through market (e.g. purchase) or non-market (e.g. self-grown/raised) channels); and food use (appropriate consumption of food to meet dietary needs and maintaining sanitation). Food security of an individual does not imply the socially-desirable one without assuming full food availability and properly food distribution for everyone. That is why there is a situation whereby food producers may be food insecure. Socio-economically impaired farmers, for instance, though producing food, might not be able to generate sufficient income from their production to purchase foods for themselves (i.e. there is food availability but no food access). And this could be an initial point for catastrophic sequence on food security. Putting the causes of socio-economic impairment of farmer aside, if farmers do not have access to food due to their insufficient income, they might decide to switch to the alternative breed of the plant or to the other crop that bring more income.

Land, though generally being viewed as private property, could be perceived as a common property or environmental good since economic activities involving it may interact with the environment[2] (Cole, 1999). For instance, Thailand has been relied on extensive deforestation to increase farm lands for long time (Phongpaichit and Baker, 2002); sometimes invasion into national forest, despite illegal, may result in the lawful conversion into some kinds of land entitlement after a considerable time has been lapsed. Therefore, adjusting a set of rights over land can encourage the owner to maximize a particular objective. On one hand, a full entitlement (e.g. title deed) would lead to the profit maximization of its owner and

[1] http://www.who.int/trade/glossary/story028/en/

[2] Probably the most classical example would be raising cattle in the private land may interfere with the global warming phenomenon since cattle are releasing methane – a harmful greenhouse gas – into the atmosphere. For Thailand, the comparable example would be rice plantation where the flooded rice paddies emit considerable amount of methane.

optimal investment of land itself without concerning about externalities that her behavior on that land may cause. On the other hand, once properly designed and tweaked, another set of rights would lead its owner to concern about environment and taking into account her behavior regarding the land in the context of climate change. The former set is believed to be suitable for securing food for its owner but not for the society as a whole because of the strong incentive for private benefit maximization; while the latter may be socially preferable but not for its owner since the incentive has been diluted to accommodate environmental impact on food security. Striking a right balance between livelihood and well-being of landowners and assuring food security for the society is a recent colossus challenge and land tenure is the instrument to achieve that balance. That is how land tenure is linked to the issue of food security.

2.1 Conventional Linkage between Land Tenure and Food Security

Maxwell and Wiebe (1998, 1999) reviewed conventional perspectives on the linkage between land tenure and food security in the following supportive aspects which can be summarized as Figure 1.

Figure 1 Conventional Conceptual Links between Land and Food

Resources (Land) ⇨ *Production/Cultivation* ⇨ *Income* ⇨ *Consumption* ⇨ *Nutritional value*

Source: Maxwell and Wiebe (1999)

First is tenure security and productivity; alternatively, property rights over the resources (land) and productivity. Property rights of land are necessary for internalizing costs and benefits related with economic activities on a particular plot of land and private ownership is viewed as the most efficient way to do so: the land would be properly utilized and properly maintained by its owner (such as Coase, 1960, FAO, 2010). In context of Thailand, Feder *et al* (1988) confirms this view, which is elaborated below.

Farm size and productivity is another chain in the link. There are strong evidences in supporting a negative relationship between farm size and productivity – the smaller the land; the lower the productivity. However, there are some contradictory findings arguing that smaller farms may be more efficient since less supervision and less transaction when working with family members as well as less depending on other factors of production which shall be obtained via market (Maxwell and Wiebe, 1999).

Commercialization in agriculture is extremely essential, especially with the reference to the case of Thailand whereby it triggered rapid expansion of farming for trade (Phongpaichit and Baker, 2002). Maxwell and Wiebe (1999) noted that there are two strands of explanation. On one hand, commercialization of farm produces (including food) resulted in higher vulnerability and food insecurity since agriculturalists would rather produce to sell and earn money rather than growing plants for living. On the other hand, such incentive would improve employment, production, and distribution of farm produces.

Resource conservation and degradation becomes a major concern in recent years. Many lands that made available for access and use under ‘open-access’ without restriction (legally or practically) are quickly degraded and the incentive for conservation is insufficient. And the proper scheme to ensure optimal conservation is private ownership. However, such

institutional arrangement that allows people to freely access to resource is beneficial for poorer households by relieving them from their constraints (Perrings, 1989 and 1998 as cited in Maxwell and Wiebe, 1999). However, degradation of fully-secured resources, especially lands, cannot be avoided because of severe climate change causes land disappearance (FAO, 2008).

Notably, this linkage is rather linear, fragmented, and somewhat overly simplified. There are more literatures trying to reformulate the comprehensive linkage for systematic understandings of both areas.

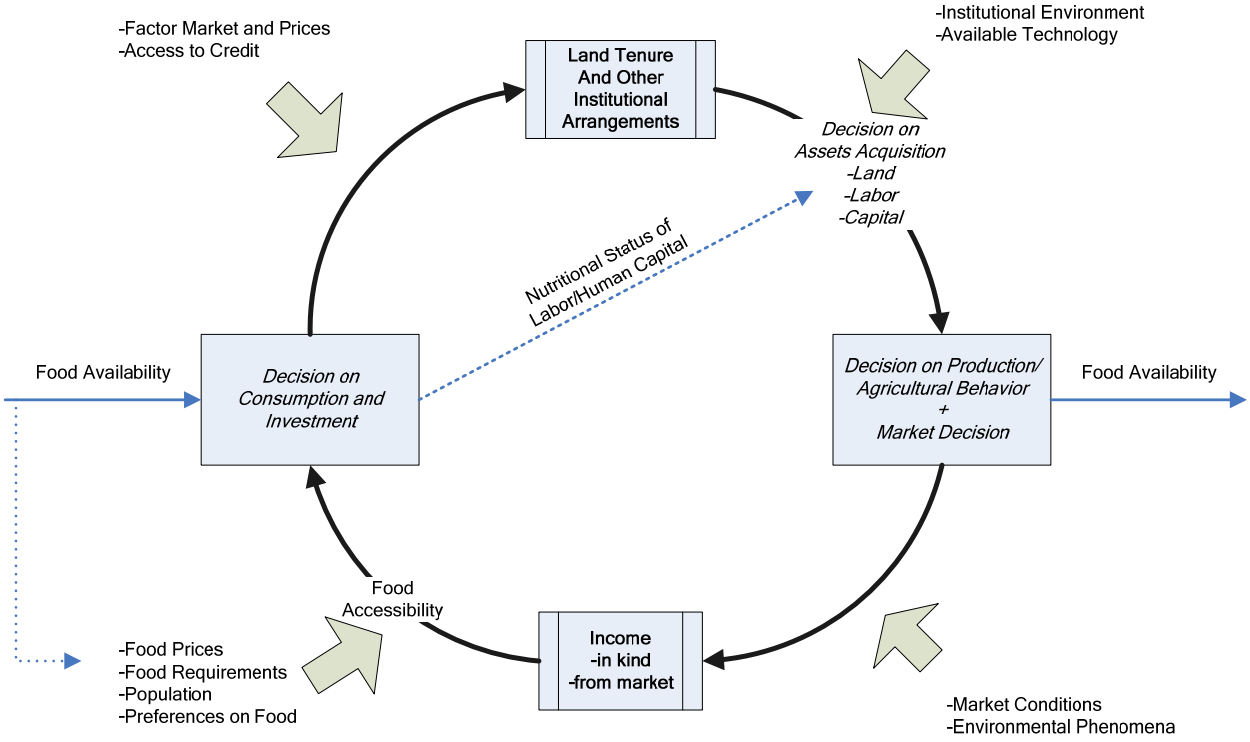
2.2 Reformulated Linkage between Land Tenure and Food Security

As mentioned earlier, interaction between land tenure and food security is complex and dynamic. Both of them are affecting each other, although at different times. Maxwell and Weibe (1998; 1999) argued that there are many recursive relationship and feedback among them. Also, the concept of livelihood is introduced. Livelihood is capabilities, assets in various forms including property rights and access, and activities required for earning a mean of living, within a certain social institution – such as farmers' households, to achieve a certain outcome – namely food, shelter, and health (Chambers and Conway, 1992 and Frankenberger, 1996 as cited in Maxwell and Weibe, 1999).

Nevertheless, if we focus more closely at the agricultural sector, it can be seen that agriculture is very sensitive to environmental changes, particularly the case of Thailand (see above; Thavonryutikarn and Sirasoontorn, 2009; 2010). Thus, the linkage established above it highly sensitive to climate change. Combining the effect of climate change and poverty (or food insecurity), it is quite likely that food security will be rapidly exacerbated.

The framework proposed by Maxwell and Weibe (1999) and being modified by authors, is illustrated in Figure 2.

Figure 2 Reformulated Linkages between Land Tenure and Food Security



Source: modified from Maxwell and Wiebe (1999)

Given the land tenure system, as well as other institutional arrangements (i.e. property rights and basic human rights), a farmer would decide whether to continue on agriculture and what is the optimal proportion of different factors of production. If she is a tenant rather than a landowner, she may decide to substitute labor for other factors since labor is more mobile and having less asset specificity. In the next crop year, if she would like to change her occupation to non-agriculture, she needs not to dispose of capital goods that made specific for agriculture. This decision relies on institutional environment and state of technology too. For instance, in rural Thailand, labor, which this farmer needs, may not be available through market mechanism but via social bonding – *loang khaek*.

Then the cultivation takes place. Decision on agricultural behavior is made; such as what plants to cultivate, what specie or variant, amount of fertilizers and pesticides, how to obtain water, and other agricultural technique. Switching between different crops occur at this stage due to feedback from previous crop cycle. This switch influences food security since some plants are non-staple or even non-food (e.g. switching from sugarcanes to rubber trees). Since cultivation involves a certain length of time before harvesting, decision-making on how to solve imminent and immediate problems is also necessary, pertaining to weather and environment. Some decisions are done through market mechanism (e.g. buying more fertilizer or hiring someone to fence the land) and some others are done via non-market channels (e.g. loosen the soil or delaying application of pesticide).

After the end of crop cycle, the harvest unveils. The amount of food produced would be determined at this stage and this is food availability. If the farm produces have gone through the market, its price will be determined depending on its market structure and environmental phenomenon at the time it enters market (e.g. shock from vegetarian period, flood or draught); subsequently, income of the farmer is resulted. Alternatively, if the farm

produces have been earmarked for consumption, it is categorized as income-in-kind (i.e. the farmer is relieved from burden to purchase it in the market and has remaining income to buy something else).

Income may be vulnerable and poverty alleviation may not be possible, despite security of land tenure, because the income has been largely affected by adverse environmental phenomenon (Austin, 2007[3]; FAO, 2008). Insecurity of land tenure can be intensified if the adverse environmental conditions from climate change combined with insufficient property right protection of land by causing migration of rural people to urbanized areas and, subsequently, fiercer land competition (FAO, 2008). Therefore, it is extremely important to strengthen farmer's ability to diversified risk of climate change in order to compensate for attenuated property rights from natural causes by diversifying variety of crops and altering cultivation techniques (FAO, 2008). By doing so, it offers potential carbon reduction and, also, constructive adaptation strategies (Thavornyutikarn and Sirasoontorn, 2010) which shall be supported by the government (Adger *et al*, 2005). Such adaptation would be successful when there are sufficient adaptive capacity in preparation for impacts and accurate adaptive decisions in respond to the impacts (Adger *et al*, 2005).

Incoming earned from cultivation determines food accessibility of a farmer, providing the food prices (resulted from the availability mentioned earlier) and other relevant aspects of food as well as other non-food consumables. Then a farmer has to choose what kind of food and how much she is going to consume. She shall take into account the longer-run effects of her intakes on her health and well-being. Restricted food accessibility would induce her to trade-off shorter-run aspects of her life for the longer-run. For instance, she may consume inferior foods consist mainly of carbohydrates to allow herself to work, instead of consume foods to gain appropriate dietary values.

Anything leftover from food consumption is subject to further consideration of how to maintain or to invest in the land. Full ownership and long-term tenancy may have sufficient incentive for a farmer to invest something in the rented land in order to raise productivity of land. Short-term tenancy may decay such incentive. Limited ownership (see Table 3) may distort incentive to reinvest after a period of time has been lapsed; such as when the farmer holding SPK 4-01 is getting older and all offspring decided not to be agriculturalists anymore.

Access to credit is one of the important concerns of land tenure (Feder *et al*, 1988). Lands with full entitlement can be used as collateral for obtaining loans from financial institutions. A farmer may decide to abandon the land by selling it off or let it to others to raise fund for food or others. Her entitlement or property rights over land would definitely change to a new status and a new cycle begins.

2.3. Necessity of Land Reform

Land reform implies a revamp or readjustment of land tenure in order to achieve a particular objective. It is needed when the socially-desirable objectives on land utilization has changed. Thus, the set of incentives shall be correspondingly changed. Recent threats of climate change and energy scarcity may justify the reform of land tenure. The tenure system

[3] Austin (2007) studies marginalized fishermen. Even the land tenure is secured, the status of their lands becomes insecure because of unusual high tides and rapidly shifting seascapes resulting from climate change.

shall incorporate and balance various goals that the society wants to achieve, in particular efficiency, distribution, and food security.

FAO (2010) emphasize the importance of securing land tenure for vulnerable groups against deepening into poverty and abandonment of agriculture which in turn threatening food security.

However, even with secured land tenure, market forces may threaten food security indirectly by signaling high non-food plants' prices to farmers or non-agricultural alternative uses of land. Farmers, hence, switch to cultivation of non-food crops or switch away from agriculture. Access to other resources, therefore, is necessary and should go hand-in-hand with land reform (FAO, 2008; 2010).

The agricultural sector, in addition, is unique due to its ability to remove carbon dioxide from atmosphere through carbon sequestration and store it in soils and organic matters. Thus, adjusting land tenure to integrate this ability is another source of income for landowners, providing there is a greenhouse gas (GHG) emission ceiling accompanying with carbon tax or carbon offsets (Claassen and Morehart, 2009). On the other hand, deforestation is a significant source of GHG emission. Avoiding deforestation, together with reforestation and proper cultivation of degraded forests, are important climate change mitigation (FAO, 2008).

2.4 Land Tenure and Food Security in the Context of Thailand

Feder *et al* (1988) discovered that both supply and demand side of secured land tenure via holding a registered title deed. More secured property rights over land give rise to the willingness of land improvement because landowners are more certain that they can reap the benefit from such investment in the future. At the same time, the strengthen property rights allow them to use the land for access to other resources by applying for loans using land as collateral. Moreover, Feder and Noronha (1987) explained that both effects induce farmers to invest more in inputs in the short run and more in productive and land-conserving technology which would further leads to higher sustainability of farm production.

Thavornyutikarn and Sirasoontorn (2010) confirmed similar results through different point of view by discovering that agriculturalists who successfully participate in sustainable agricultural techniques – such as organic farming or sustainable agriculture – are relatively more well-to-do than average agriculturalists. Data from Sustainable Agriculture Foundation Thailand (www.sathai.org) reveals that the participating farmers have the average holding of the land at 22.97 *Rai* (3.68 Ha), while the vulnerable group in Table 2 above that generally own less than 3.2 ha and the average land holding of 2.7-3.2 Ha (Thavornyutikarn and Sirasoontorn, 2010). Notwithstanding, the participation of such alternative agricultural technique is partial. Farmers are agreed to partially participate by earmarked 22.47 percent of their lands (i.e. 0.83 ha/holding) while the rest are being cultivated conventionally. Similarly, Claassen and Morehart (2009) discovered that high tenure lands have higher potential for carbon sequestration, more sensitive to financial incentives provided by carbon offsetting, and more willing to adopt agricultural techniques that reduce greenhouse gases (GHGs) than low tenure lands. Thus, agriculturalists under food poverty are very disadvantageous and unprepared for any alternative agricultural techniques.

Chapter III
Land Rights in Thailand

Legally speaking, a system of land tenure in Thailand is governed by the Land Code 1954 (B.E. 2497). There are 6 types of legal entitlement which described in Table 3.

Table 3 Legal Entitlement of Land according to Land Code 1954 and other Land-related Legislations

Type of Entitlement	Rights for Disposal	Restrictions on Transfer	Rights to leave the land unattended	Collateral for loans from financial institutions
Title Deed	Transferable except restrictions imposed	5 and 10 years	10 years	Yes
NS 3 (Land Utilization Certificate) incld. NS 3 K and NS 3 Kh	Transferable except restrictions imposed	5 and 10 years	5 years	Yes
NS 2 (Certificate of Temporary Occupation)	Non-transferable except by inheritance	Restricted	No	No
NG 1,2, and 3 (Permission to utilize land within Self-established Community)	Non-transferable except by inheritance	Restricted/after 5 years for NG 3	No	No/Yes after 5 years for NG 3
KSN 5 (Permission to utilize land in Cooperative Community)	Non-transferable except by inheritance or transferring to cooperatives	Restricted	No	No
STK 1 and 2 (Access Permission to Land within National Forest)	Non-transferable except by inheritance	Restricted	No	No
SPK 4-01 (Entitlement of Land Reform for Agriculture)	Non-transferable except by inheritance or transferring to agricultural institutions or Land Reform for Agriculture Office	Restricted	No	No
SG 1 (Certificate of Land Possession)	Not an entitlement	-	-	-

3.1 Property Rights: Formal and Legal Land Entitlements

According to Land Code 1954, there are two major types of secure land documents: legal possession and utilization. Legal possession is documented in a full, unrestricted, title deed. This document enables the owner to sell, transfer and legally mortgage the land. The documents related to the utilization are "certificate of use" such as NS 3 or NS 3K. These documents certify that the occupant has made use of the land for a prescribed period of time. The law allows sale, mortgage and other transfer utilizing these documents to record the transaction. A problem with the NS 3 title is the lack of an accurate surveyed boundary, which often leads to boundary disputes during the notification period required when selling or upgrading such land, and possible hostile possession (claims over the land by someone else not registered as the person who has the right to the land).

There are several other documents which may provide evidence supporting claim of ownership, but do not amount to a document certifying secured ownership. These are as follow:

NS 2 – this document authorizes temporary occupation of land. The land is described by meters and bounds. The certificate is not transferable except by inheritance and therefore is not accepted as a legal collateral.

SG 1 – this document was not defined in Land Code 1954, but was issued during the process of implementation of the code. It allowed for a claim to be made in a specified period after the enactment of the code, by any person who had possession and had made use of land prior to the effective date of the law. The document is convertible to a certificate of utilization or to a title deed. These NS 2 and SG 1 documents can be issued only in lands which are not designated officially as forest reserves, national parks, etc.

In addition, there are several documents issued by various government departments which confer some rights to land within the context of specific settlement of welfare program, but which usually do not grant full ownership. These include the NG documents distributed by the Public Welfare Department to selected beneficiaries in 3 series. The NG 1 and NG 2 are not transferrable except by inheritance. The NG 3 can be transferred or used as collateral five years after its issuance. SPK Documents are issued by the Land Reform Office to beneficiaries of the program. While the documents issued by the Public Welfare Department and the Land Reform Office are confined to relatively small areas and small numbers of farmers, a document similar in nature has been distributed since 1981 by the Royal Forestry Department to large numbers of squatters in forest reserves (STK documents).

3.2 Contractual Rights

Moreover, many agriculturalists are tenants on rental basis, not landowners. They do not have the property right but have the legal access to use the lands without interference from landlords in exchange of rents. It can be seen that renting lands pertains a set of rights which is quite similar to non-title-deed entitlements, particularly on access and utilization of lands. The difference would be the rent. By obtaining non-transferable entitlements, a possessor needs to pass through predestined steps and requirement which can be consider as a cost. But this cost is

one-off unlike rent which is required every certain period. Rent can be paid off in both pecuniary and non-pecuniary forms.

3.3 Informal and Relational Rights

Non-formal relationships between tenant and landowners are worth considering. In Thailand, access to land and its utilization go beyond contractual relations and legal entitlements. It might be considered as a relational contract whereby an established contract is not legally recognizable because costly verifiability by third parties but enforceable by informal institutions (e.g. social sanction and communal pressure) (Gibbon, Baker, and Murphy, 2002). People living in the same community may have stronger pressure to enforce informal obligations since they would enjoy the longer term benefits from their relationships outside that particular informal contract. Moreover, some tenants and landowners are hereditarily related with no formal contract and no pecuniary rent because they are trying to avoid high transaction costs of market mechanism and also unsecured land tenure; thus, they prefer to arrange the utilization and access of land by non-market mechanism (i.e. family linkage) (Yi and Tao, 2009). This kind of relationship extended further to complement market relationships too. Farmers are informally related with agricultural suppliers and wholesale buyers (most of the time they are the same) by establishing the relationship which is similar to contract farming and giving credits (Thavornyutikarn and Sirasoontorn, 2010).

These informal relationships, on one hand, provide cushioning effects for farmers against negative shocks from environment. But, on the other hand, it may have adverse effects making farmers more and more relying on others rather than themselves and build the barrier against changes.

Chapter IV
Conceptual Framework and Methodology

4.1 Food Security

Food security exists when all people, at all time, have access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (World Food Summit, 1996). The multi-dimensional components of food security defined by FAO include food availability, food access, food stability and food utilization.

Food Availability is defined as the availability of adequate quantities and appropriate quality of food, supplied through domestic production or imports. Food security is not only depending on food availability but also on food access and the distribution of food. Food access is the access by individuals to adequate resources/entitlements in order to acquire appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic and social arrangements of the community in which they live (including traditional rights such as access to common resources). Access to food involves entitlements for producing or acquiring food, particularly, access to productive natural resource, including land, access to knowledge and access to markets in which fair prices and stable contracts can be obtained (Slgih and Chrisman, 2007).

To be **food secured**, individual must have access to adequate food at all times. They should not risk losing access to food in the course of imminent economic or natural distress. Climate change would further aggrandize impacts on crop yield and fluctuation and make the matter of food security more susceptible.

Food Utilization is referred to as the utilization of food all the way through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met.

4.2 Land Tenure System and Food Security

Land can be considered as one of the resource requirements for food production. Maxwell and Weibe (1998) showed that the conventional linkage between land and food can be illustrated as a linear causal relationship among access to resource, production, income, consumption and nutrition status (Figure 1 above). Literatures supported this view argues that increasing tenure security in productive resources enables more efficient and profitable agricultural production (Platteu, 1992; Feder *et al*, 1988). This would generate a greater income and access to food. Feder *et al* (1988) provided a conceptual framework that links tenure security and agricultural productivity in Thailand through demand and supply. On the demand side, greater tenure security of ownership would increases demands for investment and for variable inputs. On the supply side, increasing tenure security will increase supply for credit through provision of collateral. Both will lead to increases in long-term investment and the use of variable inputs, enhancing agricultural productivity and income.

Maxwell and Weibe (1998), however, argued that this simple linear framework does not fully capture the interrelationships among consumption and investment decisions, household endowments, production and exchange decisions and household entitlement. A

more comprehensive model illustrates a dynamic relationship among tenure institution and asset markets, environment impact and redistribution of wealth. In Figure 2, households face two choices, decisions to produce and exchange, and decisions to consume and invest. With the initial endowment of assets (land and natural resources, labor and capital), tenure institutions such as property right, market conditions, and technology constraints are factors that determine decisions for resource allocations, including agricultural production, trade, and off-farm employment. Those decisions along with environmental and market outcomes generate household access to food and household entitlements, including cash and income in-kind. Income determines decisions to consume and invest. Tenure institutions and asset markets are also major factors that affect decisions to invest in physical assets, which affect resource endowments in the next cycle.

According to this dynamic link above, tenure institutions, such as property right, are factors that determine decisions for resource allocations. In addition, tenure institutions linked with credits affect decisions to consume and invest in physical assets. Moreover, the vulnerability to food security depends on the ability of the households to secure their basic need for food consumption in respond to negative shocks.

Agricultural households face negative shocks including ecological shocks (such as drought, crop pests, and soil erosion), economic shocks (such as a sharp decline in output price or a substantial increase in input price), health shocks (such as illness and accidents), and social shocks (such as thefts of crops).[1] In prior studies, the choice of coping action to counteract negative shocks depends on types of shocks and household characteristics, such as household resources/assets, diversity and stability of household income, education of household head (Rashid *et al*, 2006). This study will add the land right as the factor that determines the choice of coping action.

4.3 Research Methodology

(1) Assessment of Household's Food Security at the National Level

This paper assesses household food insecurity using a quantitative and objective measure, known as food poverty, and provides prevalence estimates by geographic area and socio-economic condition, including land ownership.

A household is defined to be in food poverty when the total consumption expenditure is inadequate to purchase a basic, nutritionally adequate, diet. In other word, it is defined to be in food poverty if the total consumption expenditure is less than food poverty line. The official food poverty line defines as the amount of money this particular household needs to buy foods that give exactly the minimum amount of calories and protein (Jitsuchon *et al*., 2004). The calories and protein requirements are based on differences in age and sex of the household member (see Appendix Table A1 and Appendix Table A2).

(2) Empirical Linkage between Household Food Security and Land Ownership/Sizes of Land Holdings

The quantitative approach is used to test whether land ownership and sizes of land holdings affect food poverty. The hypothesis is that land, particularly land ownership, is the

[1] Adapted from World Bank (2006).

entitlement to provide food, thus preventing a household's food poverty for farm operators. In addition, the sizes of land holdings also affect food poverty since the larger plot sizes provide more food. The control variables such as household size, money income, income in-kind from unpaid food and beverage, types of farm are included.

As the food poverty rate in Thailand as a whole is relatively low, less than one percent, a binary probit model cannot be estimated. To avoid the distortion caused by the estimating technique, we use the vulnerability measure of food poverty, defining as the percentage of expenditure a household has below the household food poverty line as a dependent variable. Higher value of this measure implies more vulnerability of a household to food poverty. The model is estimated using a linear regression model as follows:

$$FGAP_i = f(OWNLAND_i, PLOTSIZE_i, INCOME_i, INKIND_i, SIZE_i, RICE_i)$$

$FGAP_i$ = Vulnerability measure of food poverty

$OWNLAND_i$ = Dummy for owned land (equals 1 if household owned land and zero otherwise)

$PLOTSIZE_i$ = Areas of land used in agriculture

$INCOME_i$ = Money income

$INKIND_i$ = Income in-kind from unpaid food and beverage

$SIZE_i$ = Household size

$RICE_i$ = Dummy for rice farming (equals 1 if household engaged in rice farming and zero otherwise)

The model is estimated using the log-linear model.

(3) Empirical Linkage between Secure Ownership and Household Decision to Improve Land and Coping Decision

If a household improves land, the productivity will increase. This will increase household income and increase the food security. Additionally, if a household undertakes actions to counteract negative shocks so that it does not have to reduce food consumption, a household will be more food-secured.

The quantitative approach is used to test whether secure ownership of land has affected decision of household to improve land. Our hypothesis followed Feder *et al* (1988) that households who have secure ownership would have better incentive to invest and better access to investment credits due to the ability to use land as collateral for loans. The decision to improve land is also affected by initial endowment of land and plot specific variables such as plot sizes, number of years since the plot was acquire, plot types (lowland or upland), and land quality. An access to credits is affected by the value of land as land is the most valuable asset owned by farmers and land value reflected quality of soil. It is expected that farmers who have higher land values will have more access to long-term credits. Access to credits will also be affected by household's characteristic such as experiences of farmers. Regarding the decision of coping activities, it depends on the security of land ownership, access to consumer credits, types of shocks, severity of shocks, household characteristics, and stability of income sources. The model is, therefore, as follows.

$$CREDITINV_i = f(COLLAT_i, LANDVALUE_i, TITLE_i, EXP_i)$$

$$LAND_i = f(TITLE_i, EXP_i, CREDITINV_i, FATHERLAND_i, PLOTTYPE_i, PLOTSIZE_i, YRPLOT_i)$$

$$COPE_i = f(CREDITCON_i, TITLE_i, EXP_i, INCOME_i, SHOCK_i, SEVERE_i)$$

$CREDITINV_i$= Access to credits for investment in agriculture

$COLLAT_i$= Land collateral dummy

$LANDVALUE_i$ = Value of Land

$TITLE_i$ = Land Title dummy equals one if majority of land classified as title deed and equals zero otherwise.

EXP_i = The number of years of being a farmer

$LAND_i$ = Decision to improve land which equals one if households invest in land improvement and equals zero otherwise.

$FATHERLAND_i$= The amount of land owned by the farmer's father

$LAND_i$ = Decision to improve land which equals one if households invest in land improvement and equals zero otherwise.

$PLOTTYPE_i$ = Dummy for types of plot. It equals one if the type of plot is lowland and equals zero otherwise.

$PLOTSIZE_i$ = The size of the plot.

$YEARPLOT_i$= The number of years since the plot was acquired by the present decision maker.

$COPE_i$ = The dummy for coping actions. It equals zero if households respond to shocks by reducing food consumption that meet nutrition status. It equals one if households undertake actions to counteract negative shocks so that they do not have to reduce food consumption.

$CREDITCON_i$ = Access to credits for buying consumption goods

$INCOME_i$ = Per capita household income

$SHOCK_i$ = Dummy for types of shock. It equals one if households faced ecological shocks and equals zero otherwise.

$SEVERE_i$ = The severity of shocks measured by income losses from negative shocks.

The model is estimated using the binary response models (probit and/or logit).

4.3.2 Qualitative Approach

The in-depth interview will be used to analyze how differences in land tenure rights influences cropping decisions including choices of farming system, and coping actions by shocks.

4.3.3 Data Collection

The data used for the analysis to assess household food security at the national level are from the Socio-economic Survey of 2007. The data used for the analysis to link the security of land ownership and household decisions are selected from the panel of household survey in Nakornpanom province in Northeast Thailand under the Project "*Assessment of Vulnerability to Poverty of Rural Households in North-Eastern of Thailand*." The data covered 3 waves of the period of crop year 2009/2010. Moreover, the in-depth interview using the same set of household will also be conducted. The selected study area is shown in Figure 3. Households are selected based on types of land documents. The panel household survey categorized types of land document into 4 groups:

- Group 1: Title Deed, Certificate of Utilization NS 3, NS 3K, NS 5
- Group 2: Document land SPK 4-01, NG, STK, KSN, PBT 5
- Group 3: Document land NS 2, SG 1
- Group 4: Undocumented Land

★ Areas of study

Chapter V
Empirical Results

This chapter assesses household food security for farm operators in Thailand using a quantitative and objective measure, known as food poverty, and provides prevalence estimates by geographic area and socio-economic condition, including land ownership.

5.1 Household Food Access in Thailand

Considering only households who are farm operators, producing food for consumption, some vulnerable agricultural households do not have adequate consumption to meet energy needs. In Thailand, the food poverty line for agricultural household, on average in 2007 was at 780 Baht/person/month or approximately 60 percent of food poverty line. Using the official food poverty line, 251,000 people in Thailand, accounted for 0.86 percent of Thai population engaged in agriculture were affected by food poverty (Table 4). The problem of food poverty in Thailand is highly concentrated in the North and Northeast (Table 4). Five provinces that are the most food insecure in terms of high rates of food poverty include Mae Hong Son, Nan, Pattani, Srisaket and Nakorn Panom (Table 5).

Table 4 Food Poverty of Farm Operator Households by Regions, 2007

Region	Number of people affected by food poverty (thousand)	Food Poverty Rates
North	140	2.26
Northeast	95	0.63
South	15	0.40
Total	251	0.86

Sources: Computed from Socio-Economic Survey, 2007.

Table 5 Food Poverty of Farm Operator Households, by Provinces, 2007

Provinces	No. of people affected by food poverty (thousand)	Food Poverty Rates	Provinces	No. of people affected by food poverty (thousand)	Food Poverty Rates
Mae Hong Son	79	36.65	Phetchabun	6	0.99
Nan	21	5.73	Loei	5	0.98
Pattani	12	5.16	Amnat Charoen	4	0.83
Si sa ket	37	2.93	Lamphun	1	0.80
Nakhon Panom	11	2.64	Lampang	3	0.76
Sukhothai	7	1.88	Ubon Ratchathani	8	0.71
Phrae	4	1.87	Buriram	8	0.70
Mukdahan	6	1.84	Songkhla	3	0.70
Chiang Rai	11	1.47	Roi et	7	0.63
Chiang Mai	7	1.39	Chaiyaphum	2	0.25
Kalasin	7	1.02	Sakon Nakhon	0	0.06

Sources: Computed from Socio-Economic Survey, 2007.

Surprisingly, while Thailand is a world leader in rice exports, a significant proportion of the Thai population among farm operators affected by food poverty depend on rice farming (Table 6).

Table 6 Food Poverty of Farm Operator Households, by types of farm occupation, 2007

Type of farm occupation	No. of people affected by food poverty (thousand)	Food Poverty Rate
Rice farming	203	1.11
Other crops farms & vegetables	36	0.92
Livestock	10	0.51
Fruit, permanent crops and shrub crops	2	0.03

Sources: Computed from Socio-Economic Survey, 2007.

Among agricultural households in rural areas, higher food poverty rates are found when farm operators rented land (Table 7). The farm operator, who mainly rented land less than 0.8 ha were the most vulnerable group affected by food poverty (Table 8). The food is more secured as the average size of land holding, both owned and rented land, increased. It is also found that the sizes of owned and rented land of poor farm operators poor are lower than that of non-poor. On the other hand, the sizes of public land of poor farm operators poor are higher than that of non-poor (Table 9). This preliminary data have shown that land ownership and land size are crucial in explaining food poverty.

Table 7 Food Poverty of Farm Operator Households, by land ownership, 2007

Type of land ownership	No. of people affected by food poverty (thousand)	Food Poverty Rate
Rented Land	121	2.60
Owned Land	129	0.53

Sources: Computed from Socio-Economic Survey, 2007.

Table 8 Food Poverty of Farm Operator Households, by average size of land holding, 2007

Average size of land holding	No. of people affected by food poverty (thousand)	Food Poverty Rates
Farm Operators, mainly owned Land		
Less than 0.32 ha	11	0.70
0.32 to 0.79 ha	28	0.94
0.80 to 1.60 ha	23	0.45
1.60 to 3.19 ha	42	0.58
3.20 to 6.39 ha	24	0.44
6.40 ha or More	1	0.05
Farm Operators, mainly rented Land		
Less than 0.8 ha	47	6.78
0.80 to 3.19 ha	56	2.92
3.20 ha or More	18	0.90

Source: Computed from Socio-Economic Surveys, 2007

Table 9 Average Area of Land used in Agriculture (hectare), by status of food poverty, 2007

Area of land used in agriculture	Status of food poverty		Total
	Non-Poor	*Poor*	
Total area of land used	*2.94*	*1.68*	*2.93*
-Owner (include land owned by parents and relatives)	2.27	0.98	2.26
-Land rented from other person	0.61	0.29	0.61
-Public land and other	0.06	0.41	0.07

Sources: Computed from Socio-Economic Survey, 2007.

Among 10 deciles group of population ranked by per capita income, food poverty rates are inversely related to per capita income (Figure 4). As expected, the food poverty rates are highest for Decile 1, or first 10 percent of population with lowest per capita income (Decile 1). The opposite relationship was also noted with household size from one to ten persons (Figure 5). Households of ten persons had the highest rate of food poverty, 5.7 per cent, while one person households had no food poverty.

Figure 4 Food Poverty Rates by Deciles of Per Capita Income

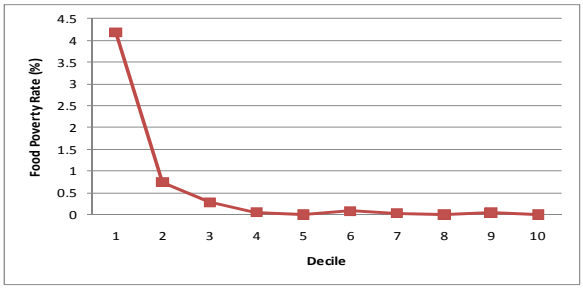
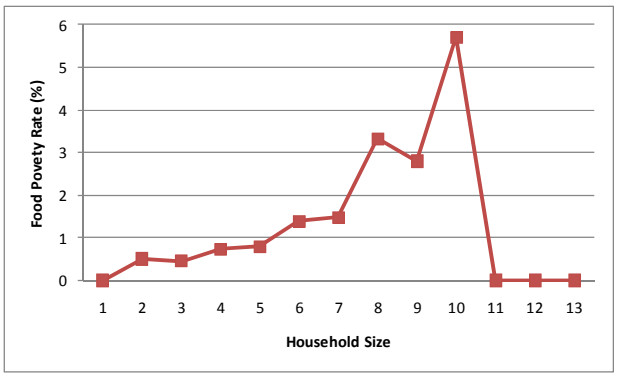


Figure 5 Food poverty rates by household size



Regarding the structure of household income, the poor households have higher proportions of farm income and those of income in-kind from unpaid of food and beverage than non-poor households. On the other hand, the non-poor households have higher proportions of wage and salaries, net profits from business and income from money assistance than poor-households (Table 10).

Table 10 Structure of Household Income (per cent), by status of food poverty, 2007

Area of land used in agriculture	Status of food poverty		Total
	Non-Poor	*Poor*	
Wage and salaries	19	8	19
Net profit from business	10	3	10
Net profit from farming	29	32	29
Income from money assistance	12	6	12
Income in-kind from rental estimated of free-occupied house	12	14	12
Income in-kind from unpaid of food and beverage	13	30	13

Sources: Computed from Socio-Economic Survey, 2007.

Regarding food, the total food expenditures of the poor households accounted for 59 per cent of total consumption expenditures. Despite overall purchased food expenditures of poor households accounted for 27 per cent of total food expenditures, the expenditure for purchased food is 61 per cent of total money income. Particularly, most of the meat and poultry expenditure are paid in cash. When prices of meat increase dramatically, the risk of food insecurity increased.

Table 11 Structure of Household Income (per cent), by status of food poverty, 2007

Expenditure Items		Status of food poverty		Total
		Non-Poor	*Poor*	
Food and Beverage	*Total*	*47*	*59*	*47*
	Cash	33	27	33
	In-Kind	13	32	13
Grains and cereal product	*Total*	*10*	*18*	*10*
	Cash	3	2	3
	In-Kind	7	16	7
Meat and poultry	*Total*	*6*	*8*	*6*
	Cash	6	6	6
	In-Kind	0	1	0
Fishes and seafood	*Total*	*5*	*6*	*5*
	Cash	3	3	3
	In-Kind	2	3	2
Milk, cheese and eggs	*Total*	*4*	*5*	*4*
	Cash	3	2	3
	In-Kind	1	3	1
Fruits and nuts	*Total*	*2*	*2*	*2*
	Cash	2	1	2
	In-Kind	0	1	0
Vegetables	*Total*	*3*	*8*	*3*
	Cash	2	2	2
	In-Kind	1	6	1
Prepared food	*Total*	*4*	*3*	*4*
	Cash	4	3	4
	In-Kind	0	1	0
Food away from home	*Total*	*5*	*3*	*5*
	Cash	4	1	4
	In-Kind	1	2	1

Sources: Computed from Socio-Economic Survey, 2007.

5.2 Land Ownership, Land Size and Types of Farms

According to Table 12, among households owned land less than 0.32 Ha, 51 percent of those choose livestock as major activities and 9 percent of those choose fruits, permanent crops and shrub crops as major activities. When the size of owned land is larger, a smaller proportion of households choose livestock as major activities and a larger proportion of households choose fruits, permanent crops and shrub crops as major activities. The same stylized facts are found among households rented land. However, the pattern to choose rice farming and other crop farms and vegetables as major activities are not related with land ownership or land size. This may partially imply rice plantation as an important and integrated to Thai culture and it is not a matter of choice by culturally obliged.

Table 12 Proportions of Households engaged in Different Farming Activities, by average size of land holding (per cent), 2007

Average size of land holding	*Farming Activities*			
	Rice Farming	**Other Crop Farms and Vegetables**	**Livestock**	**Fruits, Permanent Crops and Shrub Crops**
Farm Operators, mainly owned Land				
Less than 0.32 ha	12	17	51	9
0.32 to 0.79 ha	56	11	8	23
0.80 to 1.60 ha	68	7	4	21
1.60 to 3.19 ha	70	10	4	15
3.20 to 6.39 ha	68	13	3	15
6.40 ha or more	56	22	3	18
Farm Operators, mainly rented Land				
Less than 0.8 ha	49	25	12	5
0.80 to 3.19 ha	64	24	5	4
3.20 ha or more	71	22	2	4

Source: Computed from Socio-Economic Surveys, 2007

5.3 Land Ownership, Land Size and Cropping System

A majority of food production is intended for sales under land ownership (Table 13). For the crop production, as the size of land holding is larger, either owned land or rented land, a smaller percentage of value of crop production distributed for home consumption. In contrast with the livestock production, as the size of land holding is larger, either owned land or rented land, a smaller percentage of value of crop production distributed for sale.

Table 13 Distribution of Production (per cent) 2007

Average size of land holding	Crop		Livestock	
	Sold	*for Consumption*	*Sold*	*for Consumption*
Farm Operators, mainly owned Land				
Less than 0.32 ha	61	31	25	2
0.32 to 0.79 ha	44	44	19	3
0.80 to 1.60 ha	50	37	15	3
1.60 to 3.19 ha	57	30	14	2
3.20 to 6.39 ha	66	21	14	3
6.40 ha or More	80	11	12	5
Farm Operators, mainly rented Land				
Less than 0.8 ha	46	37	26	2
0.80 to 3.19 ha	61	22	16	4
3.20 ha or More	77	10	17	5

Source: Computed from Socio-Economic Surveys, 2007

5.4 Land Ownership, Land Size, and Ability to Borrow Money for Farm Operation

Farm operators who owned land have higher ability to borrow money for operating farm as the proportion of households who can borrow with all purposed money is higher for land owners. This might be due to the ability to pledge land as collateral for loans. Nonetheless, when the size of land holding, either owned land or rented land is larger, a higher is the proportion of households who could borrow with all purposed money (Table 14).

Table 14 Proportion of Households and Ability to Borrow Money (per cent), 2007

Average size of land holding	Could not Borrow	Borrowed Some	Borrowed with all purposed money	No Need/ Wouldn't Borrow	Total
Farm Operators, mainly owned Land					
Less than 0.32 ha	7	12	56	25	100
0.32 to 0.79 ha	4	17	59	19	100
0.80 to 1.60 ha	2	15	66	17	100
1.60 to 3.19 ha	2	14	70	15	100
3.20 to 6.39 ha	2	10	75	13	100
6.40 ha or More	1	9	75	16	100
Farm Operators, mainly rented Land					
Less than 0.8 ha	8	20	47	24	100
0.80 to 3.19 ha	3	20	63	14	100
3.20 ha or More	3	13	73	12	100

Source: Computed from Socio-Economic Surveys, 2007

5.5 Determinants of Food Poverty

The model discussed previously in Section 4.3 is estimated. The vulnerability measure of a household is a dependent variable. Independent variables are ownership of land, a size of land, household size, household monetary income, income-in-kind, and whether the observed household engages in rice farming. The estimated results are reported in Table 15. All independent variables are significant at 95 percent. The empirical result has shown that the household owning land, the increase in size of land holdings, the increase in money income and the increase in income in-kind will decrease the vulnerability of being food-poor. Moreover, the increase in household size and the household whose activities are rice farming will increase the vulnerability of being food-poor. Comparing the standardised coefficients, the money income is the most significant factor in reducing the vulnerability to food poverty; meanwhile the ownership of land is the least significant factor in reducing food poverty. This means that land ownership itself cannot reduce the vulnerability to food poverty sharply, it has to be combined with other appropriate set of policies to further reduce the vulnerability. It is noteworthy the significance of the constant term which implies the inherent risk of being in food poverty of the observation. Further and detailed studies on how we can specify the vulnerability of food poverty are vital for better understanding.

Table 15 Estimated Model on the Vulnerability to Food-Poor

Independent variables	Coefficient	Standard Error	Standardised Coefficient
Dummy for owned land	-0.024**	0.022	-0.016
Log(Average size of land holdings)	-0.022*	0.003	-0.053
Household Size	0.506*	0.009	0.397
Dummy for rice farming	0.1278*	0.008	0.112
Money income	-0.310*	0.004	-0.578
Income in-kind from unpaid of food	-0.032*	0.004	-0.059
Constant	1.14*	0.04	

Adjust R-squared = 0.4128
Number of observation = 11,783
F Statistics = 1380.01, Prob >F = 0.0000
Notes: *significant at 99 per cent
**significant at 95 per cent

Land ownership, according to the estimated model, is indeed reducing the risk of being food-poor since lands are long-term assets which can be used widely to support the household well-being including as collateral for loan. However, land is rather illiquid and transforming it into food is somehow a mismatch – the land value, if sold, is much higher than the shortage of food that needs to be rebalanced. Also, farmers are adhering to their lands for spiritual and sacred reasons. This is why its standardised coefficient is much lower than the standardised coefficient of money income which has the highest liquidity.

However, this may indicate that the observed agriculturalists are doing their farming for commercial purpose. Another interesting finding is a significant positive effect on food poverty

of rice-farming dummy. Rice is a staple food for Thais. In addition, most farmers always have, at least partial, rice cultivation in their land to preserve long tradition and household consumption. In fact, cultivating rice should reduce the likelihood of being food-poor. Effects of rice-farming dummy, in theory, should be the same as income-in-kind. Rice cultivation, therefore, is at risk. Rice farmers are more exposed to food poverty which, if continue in the longer term, would induce the shift towards other crops. Food poverty could possibly be spread over from the reduction in rice production.

The effect of household size on food poverty is apparently positive. This is contradictory to the old belief that the larger household bring more labour to work on farming and producing more foods. An increase in the household size means more people are ‘consuming’ resources that land produces only rather than consuming and producing (as labour in the agricultural sector) like in the old days. The implication of this finding is household members are no longer farmers by default anymore. They do have choices in a vast labour market and thus making themselves more vulnerable as their headcounts increase.

Chapter VI
Conclusion

This study investigates the relationship between food security and land tenure to see whether secured rights of land have any implication on being food-poor. Empirical results reveal that more secured land rights induce more food security or, in other words, reduce the vulnerability to be food-poor. Unfortunately, its relative importance is much less than money income. We can preliminary imply that our observed agriculturalists are market- or commercial-oriented and concern less about being self-sufficient in term of food. Alternatively, liquidity and value mismatch between land and food security can explain this relative less importance of land rights.

Moreover, there are some interesting findings from our empirical study. Rice cultivation causes household to be more vulnerable. This raises our concern on the long-term implication on rice production and widespread food insecurity in Thailand. Household members' occupations are changing too. It can no longer assume that newer generation from agriculturalists' household would carry on farming.

Since the secured rights of land is a relative unimportant determinant of food security, it is essential for the government to develop a set of policy to assure food security by doing something else apart from securing farmers' rights over their land. Land reform can reduce food vulnerability but money income is more effective. How we can design the policy in such a way that it allows farmers who already have secured rights to generate more money income or, if not, engaging in food-securing behaviour/activities (including rice cultivation). Rice cultivation is apparently under threat since it reduces food security for the household. Revised policy on rice is urgently required.

Agriculturalists' behavior on their trade-off between short-term consumption and long-term preservation of land remains to be further examined.

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APPENDIX

Table A1 Minimum calorie and protein requirements of a typical Thai in 2003 (g/day)

Minimum calorie requirement of a typical Thai(g/day)			**Minimum Protein Requirement a typical Thai (g/day)**		
Age group	Male	Female	Age group	Male	Female
Less than 1 year	800	800	Less than 1	16	16
1-3	1,000	1,000	1-3	19	19
4-5	1,300	1,300	4-5	25	25
6-8	1,400	1,400	6-8	28	28
9-12	1,700	1,600	9-12	42	42
13-15	2,100	1,800	13-15	61	57
16-18	2,300	1,850	16-18	62	48
19-30	2,150	1,750	19 and over	57	52
31-50	2,100	1,750			
51-70	2,100	1,750			
71 and over	1,750	1,550			

Source: Nutrition Division, Department of Health, Ministry of Public Health, 2003.

Table A2 Average Food Poverty Line, 2007

Region	**Municipal**	**Non-municipal**	**Total**
	Average Food Poverty Line (baht/person/month)		
BMR	782.0	-	782.0
Central plain	742.7	723.7	740.8
North	740.8	740.6	740.6
Northeast	768.5	778.0	776.4
South	762.6	792.5	785.2

Source: Jitsuchon *et al.* (2004).