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Land Policies and Farm Productivity in Thailand's Forest Reserve Areas

by

Gershon Feder
Tongroj Onchan
Yongyuth Chalamwong

Research Unit
Agriculture and Rural Development Department
Operational Policy Staff
World Bank

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The views presented here are those of the author(s), and they should not be interpreted as reflecting those of the World Bank.

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Gershon Feder
World Bank

Tongroj Onchan
Kasetsart University

Yongyuth Chalamwong
Kasetsart University

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Contents

Land Policies and Farm Productivity in Thailand's Forest Reserve Areas

Historically, all land in Thailand belonged, at least theoretically, to the King. Widespread forest clearing, settlement and cultivation were, however, tolerated with few restrictions and little government control until fairly recent times. Much of Thailand's remarkable agricultural growth until the mid 70's is attributed to the expansion of the cultivated areas, which was obtained largely by clearing forest land. In 1964 a law was enacted declaring vast tracts of land throughout the country as forest reserve lands which were not to be used for agricultural cultivation. However, little effort was exerted to effectively control settlement and exploitation in such areas. In quite a few cases, areas which were declared as forest reserve were already cleared of forest cover and settled by significant numbers of farmers by the time of the declaration.

It is estimated that about 5.3 million hectares of land officially designated by the Thai government as forest reserve land is actually under permanent occupation and cultivation. This amounts to about 21 percent of the land under cultivation, and involves about one million farm households. The encroached forest land is about one-fifth of officially designated forest lands in Thailand, which include gazetted forests, parks, wildlife reserves and pre-reserved forest lands which have not yet been gazetted. Much of the encroached area is in fact suitable for permanent agricultural cultivation, and continued exploitation would not pose environmental risks higher than those characterizing other settled areas which are not considered property of the state. Other encroached areas may not be of high agricultural potential; and continued cultivation and removal of forest cover there poses risks of environmental degradation.

Economic theory suggests that squatters, who lack secure ownership of land, will have less incentives to invest in agricultural activities and in land improvements. Furthermore, because squatters cannot use their land as a legal loan collateral, their access to institutional credit, especially of medium and long term duration, is inhibited. This constraint negatively affects squatters' ability to invest. Constraints on the availability of short- term institutional credit also imply lower use of variable inputs. Consequently, theory suggests that squatters' land will be less productive (Chalamwong and Feder, 1986).

A detailed study of farm productivity and its relation to land ownership security in three provinces of Thailand confirmed the theoretical propositions stated above: It was confirmed that squatters obtain less institutional credit as compared to farmers who have legal ownership (Feder et al., 1986). Squatters invest less in land improvements and in capital formation (Feder and Onchan, 1986). The value of output on squatters' land is lower by 12-24 percent as compared to legal owners, holding other factors (such as land quality and experience) constant (Feder, 1986). Since large numbers of Thai farmers and a substantial land area are affected by the problem of insecure ownership, it is an issue of relevance for policy-makers. A significant gain in agricultural productivity can be realized if appropriate policies are adopted to overcome the constraints limiting the productivity of squatters.

One particular policy which has been implemented in Thailand in recent years is the issuing to squatters in forest reserve areas a document awarding them usufruct rights, subject to certain limitations. These certificates are known by their Thai acronym S.T.K. The rationale behind

these certificates is that they enhance farmers perception of security and thereby may induce more investments. It was also hoped that S.T.K. recipients would gain better access to institutional credit, and that some of the restrictions implicit in the document may be effective in reducing further encroachment on forest lands.

The purpose of the present paper is to analyze the nature of the constraints presently limiting squatters' productivity, and to assess the effectiveness of the S.T.K. program in relieving these constraints and in increasing squatters productivity. Data from a recent farmers' survey in forest reserve areas are utilized for the purpose of this assessment.

The structure of the paper is as follows: The next section summarizes pertinent findings from a previous stage of the study and generates some hypotheses regarding the S.T.K. program . The subsequent section describes the methodology of the study assessing the S.T.K. program's effectiveness. It is followed by four empirical sections, analyzing farmers' perceptions, credit transactions, land values and capital formation. The findings are summarized in the last section and policy conclusions are indicated.

II. Characteristics of Squatters in Thailand

Farmers who occupy land in gazetted forest reserve areas are squatters who cannot claim ownership in a legal sense. In other countries, squatters are frequently being evicted from lands illegally occupied, especially in areas at the urban fringe. This would introduce considerable uncertainty in farmers' perceptions regarding their continued access to the land they occupy at present, and would be reflected in their investment and

land improvement activities. But in Thailand, the socio-political environment until now did not support a consistent policy of eviction and enforcement of forest reserve boundaries. Consequently, the incidence of eviction from forest reserve areas in Thailand has been rather low.

A large sample of forest reserve farmers from four provinces surveyed in a recent World Bank-funded study reported lifetime rates of eviction of squatters in the range 1.7%-9%, as compared to a range 1%-2.4% reported by farmers outside forest reserves (Table 1). The latter figures can be viewed as "normal" probabilities of land loss which is caused due to the state exercising its privileges of "eminent domain" to acquire land for public use (roads, canals, public utilities, etc.). The differential rates of eviction, in the range of 1%-7.6% can thus be regarded as proper estimates of the lifetime probability of eviction confronting a squatter due to his illegal status. These rates are low and would thus exert relatively little influence on farmers' investment decisions.

Indeed, when farmers in forest reserves were asked to indicate the most important aspect of acquiring a proper title document for their land, only a minority suggested protection from eviction as the main benefit, while access to institutional credit was viewed by a majority as the overriding benefit. A similar distribution of opinions was expressed by titled farmers faced with the same question, suggesting that surveyed forest reserve farmers' opinions reflect realistic assessment of the political-economic environment rather than misinformed expectations (Table 2).

Improved access to institutional credit, which is significantly

Table 1: Farmers' Experience with Eviction a/

Province	Lop Buri		Nakhon-Ratchasima		Khon-Kaen		Chaiyaphum	
Farmers' Location	Sample Size	Percent Evicted	Sample Size	Percent Evicted	Sample Size	Percent Evicted	Sample Size	Percent Evicted
Forest Reserve	100	7.0	89	9.0	91	6.6	120	1.7
Outside Forest Reserve	84	2.4	72	1.4	93	2.2	112	0.9

a/ The period of reference is the farmer's lifetime.

Source: Farmer surveys, 1984-1986.

Table 2: Farmers' Opinion of the Principal Benefit of Acquiring Secure Legal Title

Province	Lop Buri		Nakhon Ratchasima		Khon-Kaen		Chaiyaphum	
Principal Benefit	Forest Reserve (N=89)	Outside Forest Reserve (N=106)	Forest Reserve (N=81)	Outside Forest Reserve (N=86)	Forest Reserve (N=74)	Outside Forest Reserve (N=112)	Forest Reserve (N=120)	Outside Forest Reserve (N=112)
	%							
Access to Institutional Credit	74	83	54	49	61	50	80	83
Avoid Eviction	12	4	29	20	19	22	4	5
Minimize Disputes	10	9	21	24	7	17	9	6

cheaper than non-institutional credit, is indeed predicted by economic theory as one implication of secured, legal and documented ownership. This proposition is due to institutional lenders' limited ability to acquire detailed information to assess lending risks to individual farmers, unless extensive (and costly) efforts are devoted to assessment and supervision. Collaterals are a preferred device for reducing loan riskiness by institutional lenders, especially for medium and long-term credit. According to bank managers interviewed in the course of this study, there is rarely a need to actually foreclose on agricultural land pledged as collateral when farmers slip into arrears: the threat of land loss contained in preliminary court notices is sufficient in many cases to induce payment. It is not implied, of course, that farmers in forest reserves are denied any access to institutional credit, but rather, that they get significantly less institutional credit.

An econometric analysis of credit transactions in three provinces (Lop Buri, Nakhon Ratchasima and Khon-Kaen) confirms that the supply of institutional credit is significantly affected by the provision of land collaterals. Group guarantees, which are a form of loan security practiced by the government-owned agricultural bank (BAAC), does not significantly increase farmers' access to institutional credit as compared to no-guarantee in two of the provinces. In the third province land collaterals increase credit availability significantly more than group guarantees. Squatters are thus at a disadvantage, since they cannot provide legal land collaterals. Squatters have equal access to non-institutional credit as other farmers, because non-institutional lenders rarely require legal collaterals, but such credit is three times

more expensive, and in many provinces its quantity is limited (Feder et al., 1986).

It is important to recognize that collaterals affect repayment performance (and are not a mere bureaucratic requirement), since one often hears the suggestion that "the credit problems of squatters could be alleviated by forcing the banks, and especially the government bank, to relax their collateral requirements."

Given the low incidence of eviction in areas where squatters have been settled for many years,[1/] these farmers tended to view their occupation of of the land as permanent, and considered themselves "owners." Local customs and social norms recognized this notion of ownership in transactions among farmers, and survey data show that forest reserve land was being (illegally) traded among farmers at the same extent as legally held private land (Table 3). Furthermore, the survey shows that more than 90% of the farmers in the forest reserve were paying land tax. This could have been interpreted as implicit official recognition of their ownership. There were other forest reserve areas in Thailand, where the power of basic government institutions such as the judicial system was not well established. In such areas influential leaders backed by gangs of gunmen control the system of land rights and farmers were quite insecure in their land ownership. The extent of such conditions declined in recent years, as the power of the government was expanded.

The data thus suggest that most Thai squatters had a reasonably secure status with respect to continued access to the land they occupy and their de-facto ability to transact freely with this land, and it is not

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1/ In the four provinces surveyed under the present study, more than half of the villages in the forest reserve areas were established more than 20 years ago, and less than 20% of the villages were less than a decade old.

Table 3: Proportion of Land Tracts Acquired by Purchase

Province	Lop Buri		Nakhon-Ratchasima		Khon-Kaen		Chaiyaphum	
Land Location	Sample Size	Percent Purchased	Sample Size	Percent Purchased	Sample Size	Percent Purchased	Sample Size	Percent Purchased
Forest Reserve	156	67	163	26	110	63	441	42
Outside Forest Reserve	211	70	247	25	258	45	231	33

surprising that their stated opinion is that the main implication for them of acquiring full legal status will be an improvement in their access to institutional credit. This is borne out by an analysis of land values within and outside forest reserve areas. A hedonic price analysis (Chalamwong and Feder, 1986) established that there is relatively little difference between the price of forest reserve land and undocumented (i.e., not yet legally titled) private land outside forest reserves, but both these types are substantially cheaper than legally titled land (Table 4). The difference between owners of undocumented land outside the forest reserve and squatters is only in the higher perception of security to the former, as there is no state challenge to their ownership, and in due time proper documentation will be secured. Both groups of owners face similar constraints with respect to institutional credit, since they cannot use their land as loan collateral. Owners of legally titled land differ from owners of undocumented land outside forest reserve essentially in their favorable access to credit. It is apparent from the numbers that the

Table 4: Index Numbers for Market Value of Equal Quality Land a/

	Lop Buri	Nakhon Ratchasima	Khon-Kaen
Documented Land b/	100	100	100
Undocumented Land Outside Forest Reserve c/	84	50	57
Land in Forest Reserve	80	43	47

a/ Based on hedonic price analysis in Chalamwong and Feder, 1986, Table 10.

b/ Land covered by N.S.-3 or N.S.-3K document.

c/ Land with S.K.-1, N.S.-2 or no document.

change of land status from forest reserve to private (but not yet documented) land does not change security perceptions by much, as the change in land value is small. The impact of the improved security perceptions of such a change is in fact even smaller than implied by the numbers in Table 4, since the price of undocumented land outside forest reserves capitalizes in part the benefits which will be accrued in the future when the land will be documented.

The preceding discussion suggests that, in Thailand, any land policy addressing squatters which does not change their land rights in such a way as to enable them to use their land as collateral for loans, will not have a significant effect on their performance. However, in 1981, a policy was introduced specifically targeting squatters, which did not address their credit constraints. It was perceived at that time that while the

granting of full formal ownership to squatters (in areas which are suitable for permanent agriculture) is a desired ultimate aim, a useful interim step, would be the distribution to squatters of certificates granting usufruct rights but not ownership. These are known in Thailand as S.T.K. documents. It was expected that these documents will enhance farmers' security of tenure, and would thus positively affect their incentive to invest and their productivity. Some proponents also claimed that institutional lenders may view recipients of S.T.K. as more stable operators, and would be inclined to extend them more credit.

It is the contention of this paper that these expectations are not likely to be realized in most forest reserve areas. This hypothesis is based on the observation above that ownership insecurity is only a minor constraint for squatters who have been long established, and on the observation that the S.T.K. certificates do not change appreciably the squatters' access to institutional credit, since they do not confer legal ownership rights. Without legal ownership, squatters' land cannot be used as a collateral and hence their ability to acquire medium and long term credit, or credit from commercial banks, is severely limited. In addition, the volume of short-term institutional credit which they can obtain is not likely to affected by the granting of usufruct rights.

We argue further that the particular circumstances and conditions under which the S.T.K. certificates are issued may have, contrary to expectations, a negative effect on squatters' ownership security perceptions and on farmers' efficiency and productivity. In order to understand why such an outcome is possible, a closer look at the exact terms and conditions related to the granting of usufruct certificates in Thailand is required.

The S.T.K. certificate, literally translated, confers upon the farmer "temporary occupation status" (see Appendix A). Even though an end date for this status is not indicated, the term "temporary" may not instill in the farmer more security. Furthermore, certificates are issued to cover only holdings up to 15 rai (2.4 hectares). If the farmer owns more than 15 rai, the area in excess of 15 rai is not covered by a document, and there is an intention to view the farmers' possession of up to 35 additional rai as an indefinite lease from the state. However, in many areas, we observed that farmers are not being told clearly what the status of their land in excess of 15 rai is, and considerable uncertainty may ensue with regard to their continued ownership and ability to transfer this land. It should be noted that an average holding in our sample of squatters is in the range 35-50 rai, and more than 75 percent of the farmers own land in excess of 15 rai. Ownership security may thus be reduced (for land not covered by usufruct certificates) as a result of the S.T.K. program as executed, compared to the situation in the past which was characterized by reasonably secured ownership, with negative implications for investment and productivity.

Land covered by S.T.K. certificates can be transferred only by inheritance to direct descendants and cannot be rented, given to others, or sold. These restrictions, if enforced, would reduce efficiency compared to the past when the same restrictions nominally applied but were never enforced. The S.T.K. document lists all of the transfer restrictions and requires farmers to report to the forestry authorities all illegal activities which they observe in areas in their neighborhood. Failure to do so will result, the document states, in revocation of their occupier rights without recourse to appeal and compensation. This threat may

further reduce the sense of security acquired by the squatters after years of very little interference by authorities.[1]

III. Methodology of the Study

The hypotheses stated above, regarding the expected ineffectiveness of the S.T.K. program in areas where squatters have been long established, are supported by indirect evidence, such as farmers' perceptions of the merits of secured ownership and the differential prices of land in and outside forest reserves. In order to gain information dealing directly with recipients of S.T.K. certificates and their economic performance, a special survey was conducted in Chaiyaphum province in 1986. The survey focused on an area (Chatturat district, see Figure 1) where two neighboring forest reserve areas are located. The residents of one of these reserves have been covered by the S.T.K. program since 1982 (on average, recipients in our sample have held the document for 3.5 years). The neighboring reserve has not yet been incorporated in the program, and its residents have not received usufruct certificates. Samples of farmers were selected in each of the two reserves and in neighboring areas outside of the forest reserves (where farmers have legal ownership). A total of about 230 farmers were interviewed in March 1986. The data covered all aspects of farming activities, investments, credit use, ownership perceptions and farmers characteristics.

Chaiyaphum province is situated in the northeastern region of Thailand. It is located about 330 kilometers from Bangkok. Generally, the

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1/ Mehl (1986, p. 48) documents a conversation with recipients of S.T.K. in Petchabun province in which farmers stated that they are more concerned about eviction after receiving the document as compared to the past.

topographical features of Chaiyaphum are plateau lands which slope from the northwest toward the south and the east, with some scattered forests and mountains. The annual average number of rainy days is around 101, while the total quantity of rainfall is around 1,0865 millimeters. It rains mostly in September. Agriculture in the province is by and large rainfed, and as other north-eastern provinces of Thailand, it is frequently affected by droughts. The main crops are rice, cassava and kenaf.

The econometric analysis amounts to a comparison between three groups of farmers: titled (legal) owners, squatters who are recipients of S.T.K., and squatters who have not received S.T.K. The comparison holds various farmers' attributes constant (e.g., initial capital, soil quality) by utilizing regression techniques. Basically, all farmers in the sample operate in a very similar agro-climatic environment, as the areas surveyed are located within a radius of about 20 kilometers. Table 5 describes some basic characteristics of the sample. Clearly, all groups are similar, with one exception: Titled farmers have, on average, larger farms. Nonetheless, squatters in both areas have almost identical characteristics, and since they are the focus of the study, this similarly is an important strength of the analysis.

Table 5: Characteristics of Sample Farmers, Chaiyaphum Province

Farmer Group / Item	Titled Farmers (N=112)	Squatters	
		Recipients of S.T.K. (N=46)	Non-recipients of S.T.K. (N=74)
Age (years)	47.1	45.1	44.4
Education (years)	3.96	3.76	3.85
No. of years occupy the land	17.99	18.13	17.57
Average holding size (Rai)	44.45	33.12	35.56
Initial land a/ (Rai)	27.99	26.46	28.25

a/ Amount of land owned by the farmer when he became the chief decision maker on the farm.

IV. Farmers' Perceptions

Squatters in the area covered by the S.T.K. program were asked to indicate what (if any) benefits did they perceive in possessing an S.T.K. document. The distribution of results is described in Table 6. It is apparent that a significant number of farmers do not perceive benefits from the program (30 percent). In fact, an additional 15 percent could not point out what benefits are entailed in possessing the S.T.K. document, even though the program has been in progress in the area since 1982. If there were any clear-cut benefits, one would not expect such a response. Thus, almost half of the respondents in the program area could not point out any benefits which were entailed in the S.T.K. document. About 24 percent of respondents expected the document to reduce the incidence of land disputes among farmers. This is apparently due to the fact that in the process of issuing the document some demarcation of boundaries takes place. However, since only a portion of the squatters' area is typically

Table 6: Farmers' Perceptions Regarding Benefits of S.T.K. Documents

Responses	Frequency (%)
Reduces incidence of boundary disputes	24
Reduces the risk of eviction	13
Provides better access to credit	4
No benefits	30
Don't know	15
Other	14
Sample size	46

covered by the document (less than half in our sample area), the probability of disputes is only partially affected. Furthermore, the incidence of land disputes in the province is rather low: a 16 percent probability of land disputes over a lifetime in forest reserve areas, and an 11 percent probability outside of forest reserves. Tracts outside forest reserves are typically demarcated, and it is apparent that the demarcation reduces disputes only slightly.

It is therefore unlikely that the acquisition of a usufruct certificates will have a significant impact through the reduction in land disputes. Only 13 percent of the squatters felt that possession of an S.T.K. certificate reduces their risk of eviction. This apparently reflects two complementary factors: (i) The incidence of eviction among squatters in Chaiyaphum province has been extremely low (only 1.8 percent), making eviction an issue of little concern to local squatters; and (ii) The S.T.K. does not protect recipients from eviction, and in fact, uses the threat of eviction explicitly. Indeed, 15 percent of the respondents in the area covered by the S.T.K. program said that the program entails negative aspects, thus worsening their situation as compared to the past.

V. Credit Transactions

Limited access to institutional credit was pointed out above as the main constraint affecting squatters. While squatters have equal access to non-institutional credit as titled farmers, such credit is very costly: the mean rate of interest on non-institutional credit in Chaiyaphum province is about 50 percent as compared to 14 percent on institutional credit. Furthermore, loans from informal lenders are

typically of smaller volume. Some proponents of the S.T.K. program suggest that provision of the usufruct certificate will positively affect the credit worthiness of recipients, since it may serve as an indication that they are permanently settled in the area and thus they are not transitory cultivators. This is unlikely to be a valid argument in areas such as Chaiyaphum, where squatters have been settled for many years and are part of a stable farming community. In this section we set out to demonstrate that S.T.K. recipients do not possess any advantages in access to institutional credit as compared to other squatters, and that all squatters receive less institutional credit than titled farmers.

Table 7 presents the distribution of sampled farmers according to their borrowing status. Clearly, the percentage of S.T.K. recipients borrowing from institutional lenders is not higher than that of other squatters. The proportion of borrowers is, however, an indicator of limited usefulness because some of the non-borrowers may simply have enough cash from their own resources. The lower panel of Table 7 thus presents the proportion of farmers who would have liked to obtain more institutional credit than they actually did. There are no significant differences in the extent of credit rationing among squatters (with or without S.T.K. certificates), but the proportion of titled farmers who are constrained by institutional lenders is smaller (the difference is significant at the 90% confidence level).

Most of the loan transactions observed in the sample are short-term (91%). However, it is noteworthy that while the sample is split almost equally between titled farmers and squatters, only 1/2% of the squatters received medium- or long-term credit, while 13% of the titled

Table 7: Distribution of Sample Farmers by Borrowing Status

Status / Farmer Group	Titled (N=112)	Squatters S.T.K. Recipients (N=46)	Squatters Non-S.T.K. Recipients (N=74)
Not borrowing	42	52	33
Borrowing from institutional lenders only	36	22	39
Borrowing from non-institutional lenders only	19	22	20
Borrowing from both institutional & non-institutional lenders	3	4	8
Not borrowing, but need institutional credit	15	32	16
Borrowing, but would like more institutional credit	30	24	37
Total supply constrained	45	56	53

farmers received such credit. Inspection of collateral types for loans of different maturity (Table 8) clarifies the reason: Long or medium-term loans require a land collateral. In the case of institutional lenders (who provide 93% of the medium and long term credit in the sample) a land collateral has to be formally registered, and this is possible only if the farmer has a legal title. Squatters are therefore practically unable to obtain such credit, whether or not they possess an S.T.K. certificate.

Even in the case of short-term credit from institutional sources, it is observed in Table 8 that land collateral was utilized in 24 percent of the loans. In fact, when loans are distinguished by type of borrower,

it can be shown that farmers whose whole holding is titled utilized land collaterals in 71% of their short-term loans from institutional lenders, and farmers who have some part of their holding titled utilized land as a collateral in 28% of their short term loans. Squatters (with or without S.T.K. certificates) are obliged to use group guarantees as security in their short-term loans from institutional sources. As will be shown below, the provision of a land collateral increases substantially the amount of institutional credit offered, as compared to group guarantees. The reason is that loans backed by group guarantee have had a poorer repayment record in comparison to land guarantees (Desai, 1983; Feder et al., 1986).

Table 8: Distribution of Collateral Types by Loan Duration and Sector

	Short-Term Loans		Medium & Long Term Loans	
Sector / Collateral Type	Institutional (N=85)	Non-Institutional (N=62)	Institutional (N=14)	Non-Institutional (N=1)
No collateral	0	89	0	0
Land	24	6	100	100
Group Collateral	70	0	0	0
Guarantor	5	0	0	0
Ag. Product	0	3	0	0
Other	1	2	0	0

Note: All commercial bank loans in the sample (6 loans) were backed by a land collateral. The other sources of institutional credit are the government bank (BAAC) and cooperatives.

Table 9 describes the amount lent (per rai of owned land) by different types of lenders, in transactions with differing collateral types. The data indicate that institutional loans backed by land collateral are larger than loans obtained with group guarantees. Similarly, non-institutional loans with a land collateral are larger than loans without a security. It is noteworthy that non-institutional loans are small. Farmers in Chaiyaphum are thus more dependent on institutional credit than farmers in more commercialized areas, where non-institutional credit sources are more abundant.

In order to test in a rigorous fashion whether S.T.K. recipients receive any preferential access to institutional credit, we estimate a supply-demand model of credit along the lines of work reported in Feder et al. (1986). The model specifically allows for the possibility of disequilibrium and rationing, namely, it is not assumed that the observed amount of borrowing is necessarily an observation on both the demand and supply schedules. The estimated system is defined formally as:

(1) $L_1 = \alpha' X + \varepsilon_1$ (supply of institutional credit)

(2) $L_2 = \beta' Z + \varepsilon_2$ (demand for credit)

(3) $L = \min. (L_1, L_2)$ (observed borrowing from institutional lenders)

where L_1 is the amount of institutional credit lenders are willing to provide, X is a vector of farmer characteristics which influence lender perceptions, α is a corresponding vector of parameters, L_2 is the amount of credit the farmer would like to have, Z is a vector of factors determining the farmer's credit requirements, β is a corresponding set of parameters, ε_1 and ε_2 are random error terms which are assumed to be

Table 9: Average Amount of Loan per Rai Owned (Baht)

Credit Source / Collateral Type	Institutional Lender	Non-Insitutional Lenders
Land	319 (34)	104 (5)
Group Guarantee	259 (60)	n.a.
No Collateral	n.a.	72 (55)

Note: Numbers in parentheses represent sample sizes.

normally distributed with mean zero.[1] Consistent with the observation that the transaction costs incurred by Thai farmers requesting institutional credit are low (Feder et al., 1986), farmers are expected to attempt to satisfy their overall credit needs from (cheap) institutional sources first, and only if there is some unsatisfied demand will they approach non-institutional lenders. This implies that information on farmers' transactions in the non-institutional credit market does not affect the estimates of the parameter vectors α and β of equations (1), (2). It also implies that equation (2) represents the farmer's overall demand for credit at the prevailing institutional interest rate.[2] In general, variables that were incorporated in the supply equation are indicators which tend to be relatively easy to observe or to verify for an institutional lender. Demand variables, on the other hand, reflect variables known to the borrower, but not necessarily to the lender. The determinants of institutional credit supply are:

(i) Land Collateral Dummy: The provision of land as a formal collateral greatly reduces the risk to the lender and thus is hypothesized to increase the amount of credit offered, relative to a case where no collateral is provided. Only titled land can be offered as a collateral.

(ii) Other Collaterals: A few observations in the sample had a third party guarantee or some other unspecified security. These are grouped together and are assigned a dummy variable. Observations

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1/ To the extent that there are unobserved variables which affect both supply and demand, the error terms could have a non-zero correlation. Estimates of the model while allowing for correlated errors produced essentially the same results as the model with zero correlation.

2/ See Bell and Srinivasan (1985) for a similar model formulation.

which did not have a land collateral of "other collateral" had a group guarantee. Since the specification estimated omits a dummy for group guarantee, the parameters of the two dummy variables listed above (land, other) measure the increase in credit supply which will take place if borrowers provide any of these two collateral types rather than a group guarantee.

(iii) Land Value: Land is usually the most valuable asset owned by the farmer, and as such it can serve to generate cash by sale if cultivation revenues are not sufficient. In addition, land is a productive factor which generates cash income. Land value summarizes information pertaining to the land's productive potential, such as quality of soil, location with respect to markets, the extent of land improvements which increase productivity, etc. (Chalamwong and Feder, 1986). It is thus expected that farmers who own more land and higher quality land (i.e., higher total land values) will be offered more institutional credit.

(iv) Capital: Farm capital is both an indicator of the farm's productive capacity and an asset with cash value which can serve as an implicit collateral. Farmers with more capital (measured in current value) are expected to be offered more credit.

(v) Liabilities to Formal Lenders: Farmers' outstanding debt to institutional lenders is a drain on their cash resources and is therefore expected to negatively affect the amount of credit they are offered. Debt to informal lenders is not easily observable or verifiable to formal lenders, and is therefore not included as a

factor affecting the supply of institutional credit.

(vi) Past Default Dummy: If the farmer has defaulted in the past on payments to institutional lenders, his credit worthiness is expected to be negatively affected, and hence also the supply of institutional credit available to him.

(vii) Formal Liquidity: Farmers with more liquid assets are less likely to default since they can use their liquid resources in order to generate the cash required to repay a loan, rather than incur the costs of default (e.g., being cut-off from future institutional credit). However, most liquid assets (.e.g, stores of not-yet-sold produce, jewlery) are not easy to observe or verify for the institutional lender. The present study defines only outstanding deposits in financial institutions as indicators of liquidity observable to institutional lenders, and these are expected to increase the supply of credit.

(viii) Experience: The number of years a farmer has acted as farm manager is expected to increase his productivity and thus to exert positive influence on a lender's assessment. However, this variable is highly correlated with age. If younger farmers are perceived as being more innovative, the effect on credit supply will be negative.

(ix),(x) Title Dummy, S.T.K. Dummy: Essentially, the credit advantages of owning titled land are already reflected in the land collateral variable and in the land value dummy variable (only titled farmers can provide collateral, and their land value is much higher). However, since a test is to be performed in order to check whether

S.T.K. recipients receive more credit, ceteris paribus, than other squatters, it is necessary to specify a dummy variable for both titled farmers (title dummy) and S.T.K. recipients (S.T.K. dummy). The S.T.K. dummy measures credit advantages (if any) to its holders as compared to other squatters. Because of the overlap between the title dummy and the land value variable, the latter's parameter may lose significance and magnitude.

Demand Variables

(i) Number of Adults: The number of working age adults (ages 14-65) in the household represents a fixed endowment (in the short-run), which reduces the need for cash for hired labor. However, this variable is also an important determinant of consumption requirements, and, could thus affect positively the demand for credit. The final effect on demand is thus undetermined.

(ii) Education: The number of years of formal schooling is an indicator of human capital, which affects positively efficiency. 1/ Higher human capital increases the marginal productivity of variable inputs, and thus increases the demand for inputs and the derived demand for cash.

(iii) Experience: The number of years of practice as farm decision maker is an indicator of human capital, and would thus be expected to have an effect qualitatively similar to that of education. However,

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1/ For this reason, education would also be an indicator of credit-worthiness, and would affect the supply of institutional credit. However, sample farmers have had only a few years of elementary schooling, and it is difficult for the lender to verify that the reported number of school years is indeed accurate.

given the high correlation between this indicator and age, and the possibility that higher age is related to lesser innovativeness, the ultimate effect on credit demand may be positive or negative.

(iv) Title dummy: It has been argued that possession of a legal title increases ownership security, and thereby increases the incentive to invest in capital formation and land improvement (Feder and Onchan, 1986). The higher demand for investment translates into higher demand for credit, and it is thus expected that the possession of title will positively affect credit demand.

(v) S.T.K. Dummy: If recipients of usufruct certificates perceive more tenure security, their demand for liquidity for the purposes of investment may be enhanced.

(vi) Capital: The effect of the farmer's stock of capital on credit demand is complex, and there are several counterveiling effects. A higher stock of capital increases the marginal productivities of variable inputs (when production complementarity exists), and would thus induce a higher derived demand for credit. But the availability of more family-owned machinery and animals reduces the need to hire machine and animal services, and thus reduces cash needs. The net effect on credit demand is thus ambiguous.

(vii) Owned land, adjusted for quality: Land is a major determinant of the farmer's productive potential and of his scale of operation. With larger amounts of land owned, the farmer's total demand for variable inputs will be higher, and hence the demand for credit. The productivity of land differs among farmers due to the diversity of land characteristics. As higher quality land increases the

marginal productivity of variable inputs, the amount of land owned needs to be adjusted for quality differences. This is achieved through the utilization of a land quality index which is derived from a hedonic price analysis of land values (Chalamwong and Feder, 1986). The index gives premium to better soils, favorable location, land improvements, etc. (Appendix B)

(vii) Net liquidity: The farmer's liquidity, including certain liquid assets not easily observable or verifiable to formal lenders, such as a products not yet sold, will have a negative effect on the farmer's demand for cash. However, since not all assets are equally liquid, there may be a counterveiling effect. Some assets can be converted into cash easily (e.g., product stores), but with some loss if not sold at the right time. The farmer may thus prefer to keep these assets for later sale, or as a reservoir of liquidity, while obtaining cash through a loan. At the same time, with a higher reservoir of potential liquidity, the farmer faces a lower risk of costly default, or distress sales of fixed assets to avoid default, which entail a very high transaction cost. the possession of substantial imperfectly-liquid assets thus can have a positive impact on credit demand.

The results are presented in Table 10. It is evident that a land collateral affects the supply of institutional credit significantly more than a group guarantee. The results also indicate that there is no significant difference between squatters who are recipients of S.T.K. and other squatters in either the demand or the supply. There is thus no evidence that provision of a usufruct certificates confers any credit

Table 10: Supply and Demand for Institutional Credit

Supply (N=92)		Demand (N=92)	
Variable	Coefficient	Variable	Coefficient
(i) Land Collateral	1.7287 (2.129)	(i) No. of Adults in Household	-0.0197 (-0.098)
(ii) Other Collateral	0.2623 (0.802)	(ii) Education	0.1255 (1.382)
(iii) Years as Decision Maker	0.0894 (1.323)	(iii) Years as Decision Maker	-0.1343 (-0.501)
(iv) Land Value	-0.0212 (-0.930)	(iv) Amount of Land Owned (adjusted for quality)	0.2541 (1.529)
(v) Capital	0.0076 (0.234)	(v) Capital	0.0314 (1.018)
(vi) Institutional Liquidity	-0.0142 (-1.015)	(vi) Total Liquidity	0.1104 (0.696)
(vii) Title Dummy	0.2346 (2.976)	(vii) Title Dummy	-0.1266 (-0.587)
(viii) S.T.K. Dummy	-0.0574 (-0.490)	(viii) S.T.K. Dummy	0.0103 (0.031)
(ix) Debt to Institutional Lender	0.0103 (1.545)	(ix) Constant	7.2180 (5.184)
(x) Default Dummy	0.4708 (1.740)		
(xi) Constant	8.9606 (25.062)		

Likelihood Ratio Statistic 40.14

Note: Numbers in parentheses indicate asymtotic t values.

benefits. Possession of title, however, implies a significantly larger supply of institutional credit, even if a land collateral is not pledged. Estimation of the probabilities of supply rationing indicates that close to half of the farmers were supply-constrained in the institutional credit market. This is compatible with results reported in Feder et al. (1986) for three other provinces in Thailand, where a majority of the farmers had a high probability of being credit supply-constrained. 1/

The evidence presented in this section thus does not support the claim that provision of S.T.K. certificates to squatters improves their access to institutional credit.

VI. Land Values

Economic theory postulates that land values reflect the productive potential of land. Tracts of land which, for agronomic or institutional reasons, are capable of producing higher net income, will fetch a higher market price. In particular, titled land in Thailand was shown to be significantly more valuable than squatters' land, mostly because it enables better access to institutional credit, but also because it is free of eviction risk (Chalamwong and Feder, 1986). If land covered by an S.T.K. document implies any amenities (either in access to credit, or in an enhanced ownership security perception), it should be valued higher

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1/ Estimates of the supply and demand equations were also obtained with an alternative specification whereby the demand variables which are endogenous in a long-run sense (e.g., capital, liquidity) are replaced by initial endowments (initial land, initial capital, etc., see Feder et al., 1986, for detailed discussion). Results do not differ significantly with this alternative specification.

in the land market, as compared to other squatters' land. Our contention is that no difference in value should be expected between different types of squatters' lands (with and without S.T.K.), because, as noted above, there are no credit advantages, and there are no significant changes in farmers' ownership security.

There is some difficulty in testing the above proposition, because land covered by S.T.K. cannot be legally sold, just like any other squatters' land which is formally state property. The fact is, however, that all lands, including squatters land, are freely (though not legally) being traded in Thailand (Lin and Esposito, 1976; Chalamwong and Feder, 1986). Even land covered by S.T.K. certificates is being bought and sold without formal registration (Mehl, 1986). A relevant issue is then the extent to which any benefits implicit in the fact that a tract of land was covered by an S.T.K. certificate will be retained once an illegal transfer took place. However, the values of land recorded in our survey reflect not actual transactions; rather, they reflect the asking price of the owner. If an owner of an S.T.K. plot perceives any benefits in the status of the plot, this will be translated into an asking price higher than that of a plot not covered by an S.T.K. document.

Our sample contains tracts of land of four legal types: (i) Titled land (land registered with the Land Office, and covered by N.S.-3 or N.S.-3K documents) which can be legally traded and mortgaged. (ii) Untitled land which is not yet registered, but is not within the forest reserve domain. There are only 5 such tracts in the sample. (iii) Forest reserve tracts covered by an S.T.K. document. (iv) Forest reserve tracts not covered by an S.T.K. document. We hypothesize that type (i) land will

be more valuable, ceteris paribus, than type (ii), and type (ii) will be more valuable, ceteris paribus, than types (iii) and (iv). If the S.T.K. does not confer any benefits to the owner, than land types (iii) and (iv) should not differ significantly in value, holding other land characteristics constant. A simple comparison of mean land prices (See Table 11) confirms these propositions for uplands and lowlands.

Table 11: Price of Land, Chaiyaphum Province
(Baht per rai)

Land Type \ Land Document	Titled (N.S.-3 N.S.-3K)	S.T.K. Document	No Document
Lowland	3675 (62)	2244 (46)	2326 (85)
Upland	2547 (68)	1786 (50)	1847 (153)
All	3085 (130)	2005 (96)	2018 (238)

Note: Numbers in parentheses indicate sample sizes.

In order to derive a more rigorous test, a hedonic price equation was estimated, where the following land attributes (other than the legal status) are included so as to control for differences between tracts:

a. Natural attributes

(i) Soil type (black, not black) (+)

(ii) Slope (flat, not flat) (+)

(iii) Lowland/upland (+)

(iv) Irrigation (year-round irrigation, seasonal irrigation, rainfed) (+, +)

b. Land improvements

(i) Bunds (+)

(ii) Land levelled by farm machinery (+)

(iii) Cleared of tree stumps (+)

(iv) Fruit trees present on the land (+)

c. Location and transportation

(i) All-weather road to the nearest market (+)

(ii) Time required to reach the nearest market (-)

(iii) All-weather road to the village (+)

(iv) Time required to reach village (-)

Most of the variables listed above affect the productive potential of the land or the cost of cultivation (e.g., slope, bunds), and hence are related to land profitability and the value of land. Fruit trees provide an additional source of income. Favorable location increases the farm gate price of output or reduces the effective cost of inputs. The sign in parentheses indicates the direction of the effect which the variable is expected to have on land value.

The first three types of legal status of land are represented by dummy variables. The fourth type, namely, squatters' land without S.T.K. document serves as a reference, i.e., the parameters of the first three types measure the difference in the value of these types of land as compared to the fourth type.

The results of the regression are presented in Table 12. It is evident that titled land is significantly more valuable (by some 54%) than squatters' land. Untitled land outside of the forest reserve is significantly more valuable than squatters' land (at a 90% one-tailed

Table 12: Hedonic Price Analysis of Land Values, Chaiyaphum Province

Variable	Coefficient (t value)
Land Status Dummies	
(i) Title (D)	.4342 (8.051)
(ii) Untitled, outside of Forest Reserve (D)	.2990 (1.496)
(iii) S.T.K. (D)	.0100 (.170)
Natural Attributes	
(i) Soil type (D)	.2052 (3.513)
(ii) Slope (D)	.0945 (1.904)
(iii) Lowland (D)	.1028 (1.979)
(iv) Year-round irrigation (D)	.3688 (1.090)
(v) Seasonal irrigation (D)	.2216 (1.374)
Land Improvements	
(i) Bunding (D)	.1391 (2.661)
(ii) Land levelled (D)	.0068 (.102)
(iii) Cleared of stumps (D)	.1918 (1.411)
(iv) Fruit trees on plots (D)	-.0393 (.432)
Location and Transportation	
(i) All-weather road to market (D)	.0137 (.198)
(ii) Travel time to market (minutes)	-.0863 (2.044)
(iii) All-weather road to home (D)	-.0185 (.407)
(iv) Travel time to home (minutes)	.0060 (.223)
Constant	7.3375 (33.829)
R^2	.243
F-value	8.92
Number of Observations	461

Note: D denotes dummy variables. All continuous variables (including the dependent variable) are expressed in natural logarithm.

confidence level), but the difference between such land and fully titled land is not significant even though the coefficient is smaller as suggested by theory. Most relevant for the present discussion is the result that there is practically no difference in value between squatters' land with and without an S.T.K. certificate. The numerical difference is 1%, and it is statistically insignificant. This is compatible with the proposition that the S.T.K. does not have an economic impact at the farm level.

Results for other variables in the land price equation are mostly reasonable. Of thirteen coefficients estimated, seven are statistically significant (at 90% one-tailed confidence level) and three of the remaining coefficients have the expected sign.

VII. Capital Formation and Land Improvements

As indicated by the analysis of the preceding sections, the possession of a usufruct certificate in Thailand does not significantly affect ownership security perceptions (and hence, investment incentives), neither does it improve access to cheaper and/or longer term institutional credit. There is no reason therefore to expect that investment (either in the form of equipment and animals, or in the form of land improvements) would differ among squatters with and without S.T.K. documents. Table 13 presents data on capital ownership by the sampled farmers. As one would expect, capital stocks of titled farmers are higher than those of squatters. The capital stocks of S.T.K. recipients are lower than those of other squatters. The mean values thus do not indicate any superior performance for squatters covered by the S.T.K. program. However, a simple comparison of means does not amount to a rigorous test of this paper's

Table 13: Value of Capital (Baht)

Farmer Group / Item	Titled Farmers (N=112)	Squatters	
		Recipients of S.T.K. (N=46)	Non-recipients of S.T.K. (N=74)
Capital value per household	29,292	15,717	20,135
Capital value per rai of owned land	738	676	705

a/ Amount of land owned by the farmer when he became the chief decision maker on the farm.

propositions, since farmers may differ in their initial positions or in other attributes which affect capital formation. We thus proceed to formulate a regression model where the present stock of capital owned by a farmer is a function of a set of initial conditions and other attributes (see Feder and Onchan, 1986, for a rigorous model underlying this specification).

The explanatory variables are:

(i) Amount of initial capital: Since farmers in the sample are at different phases of their life cycle, they may not have reached a steady state level. The initial volume of capital should be positively related to the present level of capital. Figures have been adjusted for differences in cost of living using CPI.

(ii) Initial amount of land: As with the case of capital, the initial amount of land owned by the farmer when he became farm decision maker is an indication of the initial wealth a farmer had, and is expected to exert a positive effect on the amount of capital owned at present.

(iii) Father's land: Parental wealth may have an impact on a farmer's capital accumulation, through provision of intra-family credit and the availability of reserve liquidity enabling the undertaking of investments. The amount of land owned by a farmer's father is taken as an indicator or parental wealth.

(iv) Number of years the farmer has been decision-maker: This variable represents both the number of years the farmer has been accumulating capital, and some measure of experience as farm manager. More experienced farmers will be more productive, ceteris paribus, and will generate higher incomes, facilitating more investment. Both aspects thus have a positive impact on the present level of capital.

(v) Education: More educated farmers are expected to be more productive, as demonstrated by Jamison and Lau (1982) for Thai farmers. Higher productivity leads to higher income and more investment.

In addition, two dummy variables specify the legal status of lands owned by the farmer: One variable denotes whether the farmer has titled land. Farmers with legal title are expected to have accumulated more capital, ceteris paribus. The other dummy variable indicates whether the farmer has land covered by an S.T.K. certificate. If such a certificate entails benefits either with respect to credit or in the form of enhanced security perceptions, the amount of capital accumulated should be higher, ceteris paribus, for recipients of the certificate. Since farmers accumulate over time not only capital, but also land, we estimate similar equations for the amount of land owned 1/ and for the capital/land

1/ The amount of land owned is adjusted for differences in natural attributes and location by using a quality index based on the coefficients of the hedonic price analysis reported in the preceding section. Details are described in Appendix B.

ratio. The regression results are reported in Table 14. It is evident that titled farmers accumulate significantly more capital and land, ceteris paribus, and have higher capital/land ratios than squatters (difference significant at a 96% one-tailed confidence level). However, no significant differences in capital and land accumulation and in capital/land ratios are observed between squatters who hold S.T.K. certificates and other squatters.

Accumulation of equipment and tools is only one form of farm investment. Another type of investment is land improvements. Land improvements are land-embodied investments which enhance the productive capacity of land, or maintain its productive capacity by preventing erosion or moisture loss. Our data cover two major types of improvements: (a) bunding (dividing the field into sub-plots by raised earth walls, thus allowing better water control and moisture retention); (b) clearing of tree stumps (facilitating better and faster land preparation utilizing mechanized power).

The analysis focuses on those forest reserve tracts which in 1980, before the S.T.K. program was initiated in one of our study sites, were still unimproved. Logit analysis is used in order to test whether the probability that a tract of land was improved by 1986 is significantly affected by the fact that the owner of the tract has been provided with a usufruct certificate. However, plots may differ in a number of important respects (other than their document status), which can have an effect on the land improvement decision. Similarly, differences among owners may also affect the adoption of land improvements. Thus, in analogy to the regression equations of capital stocks, logit estimates are obtained of the

Table 14: Regressions of Capital, Land and Capital/Land Ratios

Dependent Variable / Explanatory Variable	Capital Stock	Land Owned (adjusted for quality)	Capital/land Ratio a/
Land Status Dummies			
Title dummy	.7780 (2.060)	.2373 (2.906)	.4357 (1.627)
S.T.K. dummy	-.1098 (.279)	-.0243 (.286)	-.1284 (.469)
Initial capital	.0693 (1.596)	.0248 (2.641)	.0680 (1.527)
Initial land	.02315 (1.465)	.1423 (4.164)	.1290 (.658)
Father's land	.0684 (.571)	.0390 (1.507)	.1601 (1.028)
Years as decision-maker	.8644 (2.927)	.3718 (5.823)	.4720 (2.210)
Education (years)	-.0137 (.082)	-.0602 (1.663)	.0388 (.331)
Constant	4.7008 (3.581)	1.6173 (5.698)	3.6578 (4.226)
R^2	.095	.293	.050
F-value	3.354	13.257	1.666
Number of Observations	232	232	232

a/ Continuous explanatory variables in this column are expressed in per-acre terms. Regressions are specified in double-log form.

coefficients of variables affecting the adoption of land improvements. Logit analysis is analogous to regression analysis in the simple binomial case, except that the dependent variable (the probability of adoption of land improvements by 1986 on plots which were unimproved in 1980) is not observable ex-ante, and thus the ex-post probabilities (zero to one) are used in a maximum likelihood estimate of the coefficients of explanatory variables.

In addition to farmer characteristics utilized in capital accumulation analysis, several plot-specific variables are incorporated in the analysis as explanatory variables. First, the size of the plot is expected to be positively related to land bunding, either due to technical incentives (larger plots gain more from bunding than smaller plots since unequal water retention is more prevalent there) or due to economies of scale. The effect of plot size on stump clearing is expected to be negative, since cultivable area on a larger plot is bigger, and less clearing is required. The overall productive quality of the plot is expected to have a positive effect on the incentive to invest in land improvements, since the return to the improvement is higher. We therefore introduce a plot-specific quality index which accounts for attribute such as soil type, slope, availability of irrigation and location (see Appendix B). In addition, bunding is more likely on lowland plots, which are suitable for paddy. We therefore introduce a dummy variable for lowland plots in the bunding equation.

Estimated coefficients are presented in Table 15. The results show that the probability that a plot will be improved by bunding is not significantly affected by whether the plot has an S.T.K. certificate or not. In fact, in the case of stump clearing, the S.T.K. dummy variable has

Table 15: Logit Estimates of the Probability of Land Improvement

Explanatory Variable \ Improvement Type	Bunding	Stump Clearing
Constant	-1.9658 (.870)	1.7010 (.634)
Education	.0362 (.1632)	.0705 (.1743)
Father's land	.2576 (.914)	-.3096 (1.506)
Initial capital	-.0630 (.818)	.0006 (.0082)
Initial land	-.2588 (.979)	-.2350 (.908)
Years as decision-maker	2.1686 (3.454)	-.3243 (.745)
Plot quality index	-.5515 (.221)	-3.6684 (1.719)
Plot area	1.8244 (2.990)	-.6377 (1.224)
Lowland dummy	1.8870 (1.948)	n.a.
S.T.K. dummy	.2540 (.300)	-1.1235 (1.452)
Likelihood Ratio Statistic	29.46	11.70
Number of Observations	134	93

a negative coefficient, but it is not significant at a 95% confidence level. Most of the other coefficients are not significant, except for "years as decision maker," plot area, and the lowland dummy variable.

The results of this section thus confirm the hypothesis that possession of an S.T.K. certificate does not induce more investment. This is compatible with the earlier observation that squatters' ownership security perceptions are not significantly affected by this certificate, neither is credit availability improved.

VIII. Conclusions and Policy Implications

Empirical analysis in the preceding sections has shown that almost half of the sampled squatters who received usufruct certificates (S.T.K.) did not perceive benefits generated by their new status. Those who perceived benefits pointed out aspects which have not posed significant problem in the past (disputes, eviction). Fifteen percent of the recipients thought the S.T.K. program worsens their situation compared to the past. It was established that S.T.K. recipients did not have any advantages in access to institutional credit as compared to other squatters, and both groups received significantly less institutional credit than did titled farmers providing a land collateral. In particular, access to medium and long-term credit was equally and severely limited for both types of squatters.

The value of land owned by S.T.K. recipients is practically the same as that of equal quality land of other squatters, and their capital formation and extent of land improvement do not differ significantly. The empirical results of the study thus confirm the central hypothesis of the

paper, namely, that the provision of usufruct certificates to squatters in Thailand, in areas where they are well established, is not an effective policy tool to bring about an improvement in their economic performance.

The issuing of usufruct certificates, maintenance of the records and supervision of recipients' compliance with the various conditions entailed in the program are costly. No economic benefits accrue directly to recipients as has been shown above. There is therefore no direct gain to society as there is no increase in agricultural output. One must look for other, indirect benefits to society if the public expenditure on such a program is to be justified. Proponents claim that the provision of S.T.K. certificates will reduce the incidence of further encroachment on the remaining forest lands in Thailand. Since the preservation of virgin forests is a desired national objective, success on this front could be an argument worthy of consideration. However, the likelihood that provision of S.T.K. certificates will, by itself, reduce encroachment is negligible. The root cause of the steady decline in forest areas in Thailand is population growth in rural areas, and this dynamic process will not be arrested by usufruct certificates. The various limitations which forbid recipients to engage in further encroachment and which require them to report encroachment by others have been part of the law even before the program. The limitations were not effective in the past because of limited budget, manpower and political ability for enforcing forest reserve regulations. The same ingredients are necessary to enforce the present conservation-inspired limitations entailed in the S.T.K. If these ingredients (resources and political backing) were made available, then there is no need for usufruct certificates per se (and the extra resources

for their issuance), as resources will be allocated directly to the enforcement of forest conservation.

One of the claims made by those who support expansion of the S.T.K. program inspite of its lack of direct production impact, is that it will secure the permission of the authorities in charge of forest reserves to allow the provision of development services to squatters (e.g., extension, roads) and these will have an economic pay-off. The fact is that many forest reserve areas already have development services at levels similar to other areas. In principle the economic viability of providing infrastructure development services to squatters in forest reserve areas should be judged in separation from the S.T.K. program, and the benefits of such investments should not be attributed to the S.T.K. program.

While our study focused on areas where squatters are well established and have been settled in permanent villages for a length of time, special consideration is appropriate in the case of frontier areas, where encroachment has been relatively recent. In such areas, it is argued, squatters' land rights are less secure, and provision of official recognition in the form of usufruct certificates may enhance their perception of security more significantly than in other areas. The main reason for farmers' insecurity in the frontier areas of Thailand is the lack of effective government presence, which gives rise to the emergence of local informal systems of land rights enforcement. The expected positive impact of S.T.K. documents in such areas is therefore conditioned on an effective assertion of government presence and control, rather than on the mere issuance of certificates. It is thus arguably unnecessary to spend public resources on the provision and administration of usufruct

certificates. Rather, the focus of policy with respect to frontier areas should be enhanced government control through extension of the legal and administrative infrastructure. Such a policy would increase security perceptions without the need for usufruct certificates and the associated costs of issuing them.

The findings of this study are of relevance in examining another public policy concerned with land rights in Thailand, namely, the land reform program. Under this program, public land which is released from the status of forest reserve ("degazetted") is given by the Land Reform Office to eligible recipients. Most recipients are, however, being issued a "user certificate" (ALRO 401) which is similar in many respects to the S.T.K. certificate. Recipients are clearly benefitted by the transfer of user rights to land which they did not have before, although in many cases part of the land "given" (or other land in the forest reserve) has already been de-facto owned by them. Productivity would, however, be increased if proper ownership rights are given to land reform beneficiaries, since in that case they will have better access to institutional credit. The extent of potential credit constraints among land reform beneficiaries is currently masked by the fact that they are eligible to special institutional credit programs which are not open to other farmers. However, the availibility of such special credit programs over the long run is not certain, nor is it desirable. Thus enhancing land reform beneficiaries' access to credit in non-preferential markets will become necessary.

Provision of full ownership rights to squatters in agriculturally suitable areas which are not expected to be reforested is a logical policy

in Thailand. As we have argued elsewhere (Feder et al., 1986) the effectiveness of such a policy — if it adopted on a large scale — would require some complementary policies affecting the aggregate supply of institutional credit to agriculture. Environmental aspects should be carefully coordinated. Similarly, measures to ensure that equity considerations are reflected should be introduced, otherwise, the legitimzation of squatters' rights may provide an opportunity for land grabbing by the wealthy and powerful. Thus, the socio-political implications of land policy need to be borne in mind when the policy is designed and implemented. The pay-off in terms of increased productivity is likely to be substantial in many areas of Thailand, making the policy economically viable.

References

Bell, C. and T. N. Srinivasan. "Agricultural Credit Markets in Punjab: Segmentation, Rationing and Spillover," World Bank, RPO-671-89 Working Paper No. 7, June 1985.

Binswanger, H.P. and M.R. Rosenzweig. "Behavioral and Material Determinants of Production Relations in Agriculture," Journal of Development Studies, forthcoming, 1986.

Chalamwong, Y. and G. Feder. "Land Ownership Security and Land Values in Rural Thailand," World Bank Staff Working Paper No. 790, 1986.

Desai, B. "Group Lending in Rural Areas," Chapter 33 in J. Von Pischke et. al., 1983.

Dorner, P. and B. Saliba. "Interventions in Land Markets to Benefit the Rural Poor," Discussion Paper, Land Tenure Center, University of Wisconsin, September 1981.

Feder, G. "Land Ownership Security and Farm Productivity in Rural Thailand," World Bank Agricultural Research Unit, Discussion Paper No. ARU-51, April 1986.

Feder, G. and T. Onchan. "Land Ownership Security and Capital Formation in Rural Thailand," World Bank, Agricultural Research Unit Discussion Paper No. ARU-50, February 1986.

Feder, G., T. Onchan and T. Raparla. "Land Ownership Security and Access to Credit in Rural Thailand," World Bank, Agricultural Research Unit, Discussion Paper No. ARU-53, April 1986.

Jamison, D. and L. Lau. Farm Education and Farm Efficiency. Baltimore: Johns Hopkins University Press, 1982.

Kemp, J. "Legal and Informal Land Tenures in Thailand," Modern Asian Studies 15 (1):1-23, 1981.

Lin, S. and B. Esposito. "Agrarian Reform in Thailand: Problems and Prospects," Pacific Affairs 49 (3):425-442, Fall 1976.

Mehl, C. "Social and Cultural Aspects of Land Transactions in Rural Thailand, " World Bank, Agricultural Research Unit, Discussion Paper No. ARU-52, June 1986.

Ratanakhon, S. "Legal Aspects of Land Occupation and Development in Northern Thailand," in Kundstader, et al. (Eds.), Farmers in the Forest. Honolulu: East-West Center (University of Hawaii), 1978.

Von Pischke, D. Adams and G. Donald (Eds.). Rural Financial Markets in Developing Countries. Baltimore: The Johns Hopkins University Press, 1983.

Williamson, Ian. "Cadastral Survey Techniques in Developing Countries — With Particular Reference to Thailand." Mimeo, World Bank, Washington, D.C., 1983.

PERMISSION

Temporary Utilization Authorization in Forest Reserve Area (STK 1)

Forest Code Land #

Page District

Director-General of Forestry Department through authority of Ministry of MAAC authorizes Government of the Province to issue this Permission (STK 1).

to _____ Age _____ Child of Mr. _____

Family Name _____ Mrs. _____ Family Name _____ Address

House No. _____ Tambon _____ District _____ Province

The officer has investigated and approved that the recipient is indeed occupying this land in forest reserve area.

According to Minister's rule ( ) is permitted occupation within _____ years until _____

	Measured Meter	Neighbor's Land
North		
East		
South		
West		

(Drawing of Plot)

The holder of this permit was granted temporary permission to utilize or to occupy land in the forest reserve area by following the national forest reserve rules and regulations of 2507 and the conditions indicated on the back of this document.

Governor

CONDITIONS

The recipient of this STK 1 cannot share or transfer the ownership or rent to others this land covered by STK 1 except to direct legal descendants by inheritance under the approval of the Forestry Department.

The recipient must agree to allow the forestry officer to inspect compliance at all times.

The recipient of this STK 1 must carefully observe that there will be no encroachment on neighboring land or at the boundary of this STK 1 land. If there is any illegal action or violation of the rules in this said area the recipient must immediately report to the forestry officer.

If the recipient does not comply with the above conditions the Governor of the province will cancel this permit (STK 1) and the recipient cannot appeal for any compensation under any circumstances.

List of Transfers

Appendix B

Land quality, as defined in this paper, pertains to soil characteristics and other physical attributes of the land which make one plot more productive than another. The index of quality utilized in the present paper incorporates the following attributes:

(i) soil (black, not black)

(ii) slope (flat, not flat)

(iii) whether land is upland or lowland

(iv) access to irrigation (year-round, seasonal, rainfed)

(v) availability of all-weather road to market

(vi) travel time to nearest market

(vii) availability of all-weather road to village

(viii) travel time to the village

The weights required to combine these attributes into a composite index were obtained from the hedonic land price analysis reported in Section IV, where the above characteristics were introduced as factors affecting the price of farm land. The quality index of a plot is a weighted sum of the indicators listed above. Multiplying the quality index of a plot by the area of the plot, and summing over all the plots owned by a given farmer provides the areas of land owned, adjusted for quality.

Figure 1

CHANGWAT CHAIYAPHUM

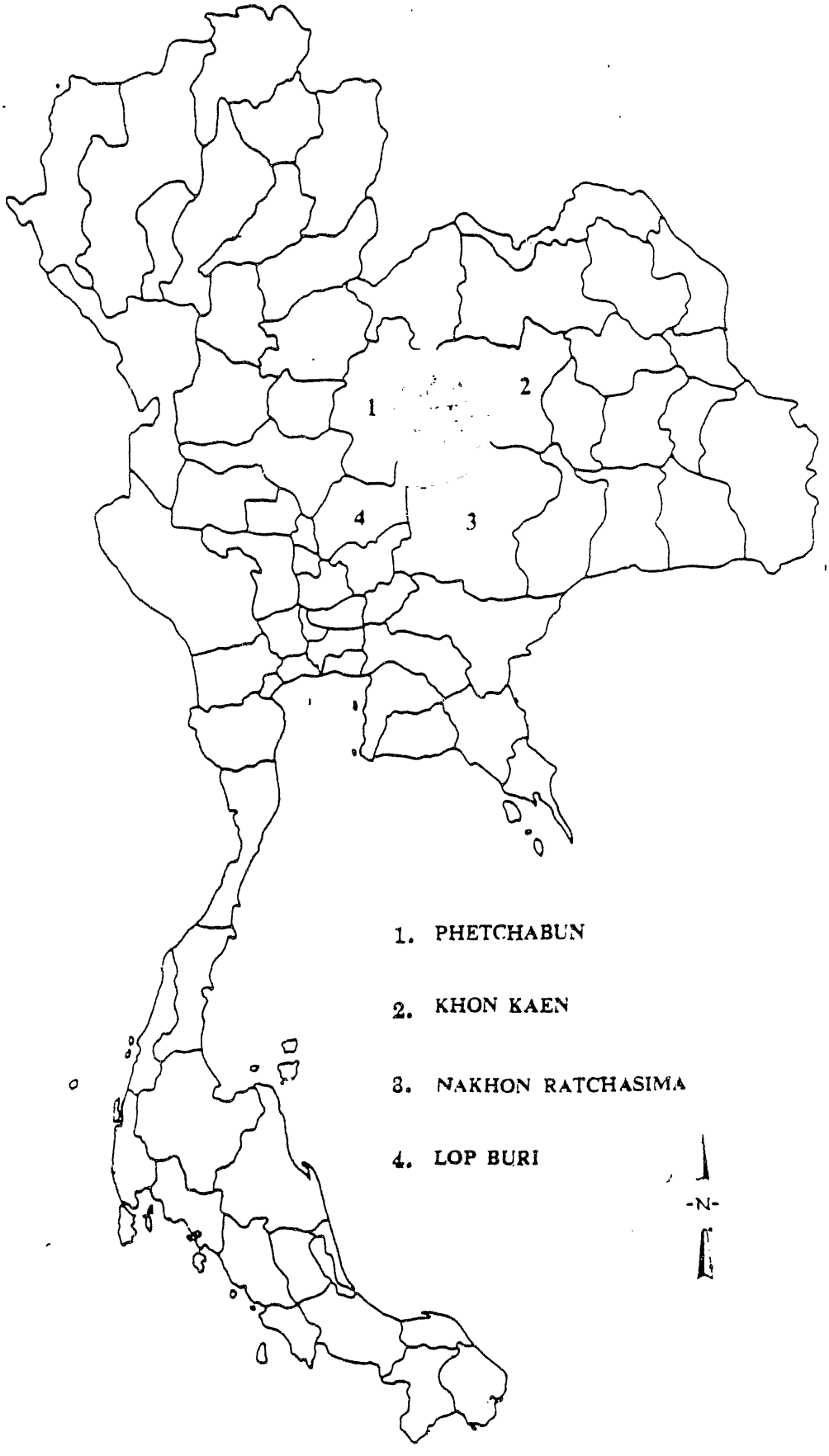
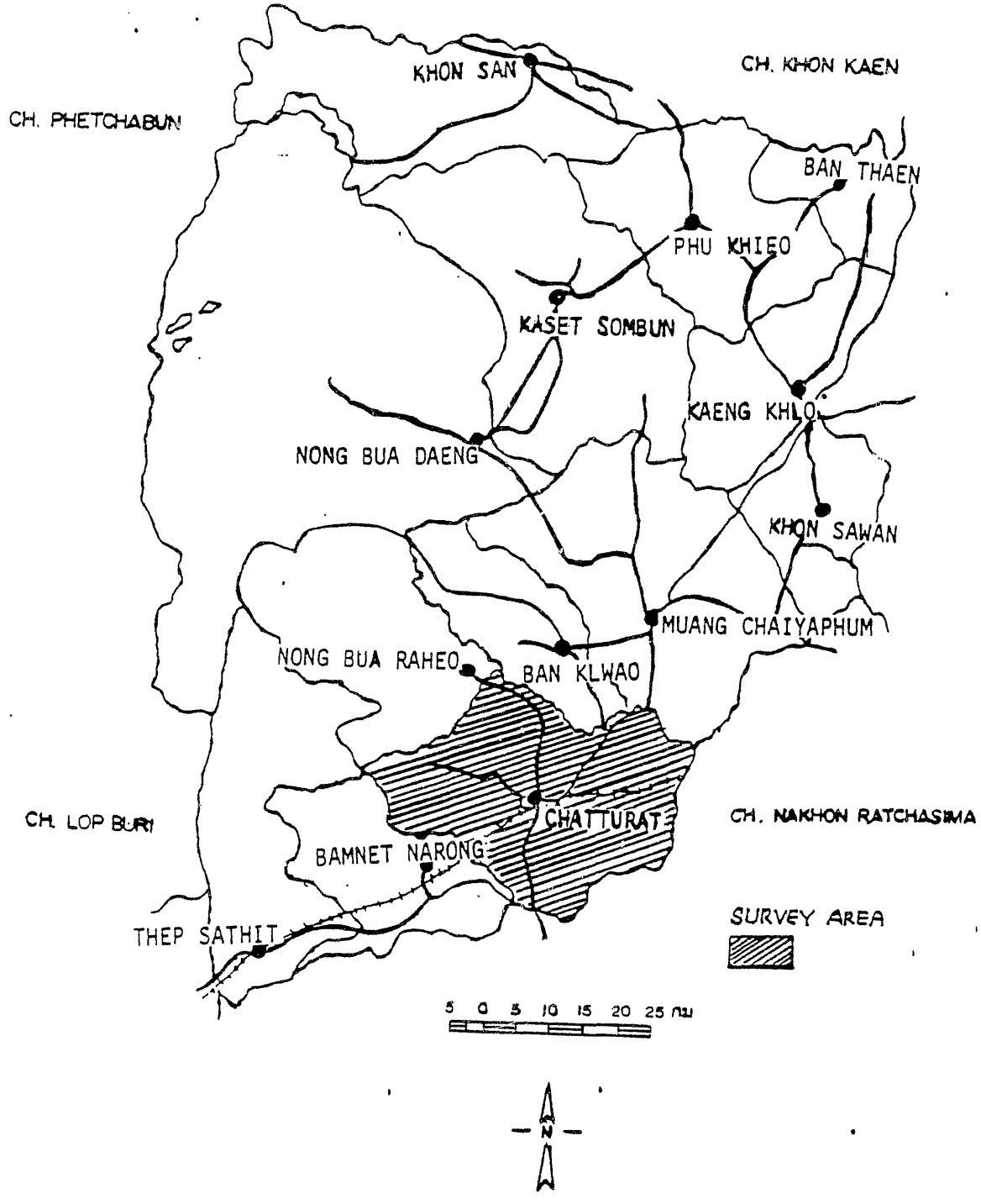


Figure 2

CHANGWAT CHAIYAPHUM



SOURCE : DIVISION OF REGISTRATION, DEPARTMENT OF LOCAL ADMINISTRATION, MINISTRY OF INTERIOR.

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