

Rice Entrepreneurs Facing Land Constraints : Some Empirical Evidence

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Introduction

Thailand is still an agricultural country with the agricultural sector employing 57% of the labor force. The growth in agricultural production has been mainly due to a rapid expansion of the cultivated land area (2,2% per year over the last decade). This dramatic increase has been possible only at the expense of forest land, which decreased at a rate of 2,1% per year during the eighties. Of a total area of 320 million rai, 200 million rai¹ are at least now being used for agriculture. It is now widely recognized that the nation's land frontier has been approached and that land resources have become increasingly scarce.

This fact has many important ramifications since farmers' relations to the land, its control and use are believed to be essential factors in their entrepreneurial behavior. The agrarian structure and especially land tenure can affect many "farmer-entrepreneur" decisions on farm investment, production techniques, and thus farm productivity and income distribution. Some authors have pointed out that the main effect of lack of ownership and secured land is to cause uncertainty regarding the benefits the farmer can obtain from investment he may undertake. Thus, investment is expected to be negatively related to the level of uncertainty regarding tenure (Feder, 1988; Onchan, 1985). Lastly, disparities in land holdings usually coincide with disparities in incomes and access to other factors of production.

This paper will explore the patterns of land ownership and landholdings among rice farmers, from a survey conducted in 1991 on a sample of 300 rice farms². Moreover, it will discuss many beliefs about these patterns by examining the equality of land ownership, the occurrence of land transfers (rents, sales, purchases) and the nature of landlord-tenant relationships. As far as possible we will provide some insight into the trends of these patterns over time, based on historical series available.

1- One rai is equal to 1600 square meters or 0,16 hectare.

2- The sampling method is given in annex.

1. Population Pressure, Forest Depletion and Land Holding Size

The combination of a rising rural population and a land base naturally limited should lead to a reduction in the average size of holdings. Although the labor force in agriculture grew at a rate of 2,9% per year since 1970, the average size of land holdings has not shown any decrease over time. According to the statistics of the Office of Agricultural Economics, this size varied from 25,6 rai in 1950 to 28,2 in 1990 and the amount of cultivated land per agricultural worker increased until about 1980.

There are two possible explanations for this trend. First, farmers may be able to compensate for the lack of land due to population pressure by partitioning land unequally among their heirs. It seems that common practice in Thailand has been to give equal rights to the land to children, although there are some regional variations and sometimes preference for the child who takes care of the parents (Sanit and Prisana, 1988). But with the gradual end of the land frontier, there is a tendency to give all the land to one child mainly because "farmers are reluctant to divide their holdings below what they consider economically viable sizes" (Mehl, 1986).

This would mean that the "excess" population is forced to migrate to places where there is still some land available or to find wage earning work inside or outside the agricultural sector. There is no clear empirical evidence showing a strong rural exodus nor a dramatic increase in landless farmers (Stifel, 1976; Onchan, 1990). But in many cases the time devoted to non-farm and off-farm activities has been adjusted according to the land available : as farm size decreased, off-farm work (and sources of income) increased.

Migration has occurred on a large scale throughout the country and especially in the Central Plain. It is thus obvious that the main factor that has offset the effect of population pressure on land in the past twenty years is the depletion of forest land. From an area of 190 million rai in 1960, the forest has actually been reduced to an area of 90 million rai, despite repeated measures taken to protect forest. This result is often explained by the lack of coherent land policies and the large number of agencies operating under different laws and regulations (TDRI, 1990). According to the Royal Forestry Department, the annual rate of forest encroachment has slowed down since 1980 to 2,9 million rai compared to 4,5 millions before. This fact arises mainly from the lack of fertile forest land to clear, but also from the strengthening of protective measures.

The massive expansion in the land area under cultivation does not mean that the problem of farm size is not serious in certain areas or for a substantial fraction of farmers. Although the mean size of rice holdings (28,5 rai) is close to the national average, 37% of rice farmers are operating small holdings of 15 rai or less. Marginal holdings (5 rai or less) considered as "near landless" holdings represent 9% of total holdings. Region wise, the Northern region has proportionately larger holdings than the Central Plain and the Northeast. The distribution of land operated is quite unequal : 66% of farms operate only 36% of the land area, while the top 2,3% of farms operate 13,6%.

Table 1 : Distribution of Land Holding by Size, 1991.

Size class (Rai)	Farms			Area		
	Frequency	Percent	Cum Percent	Rai	Percent	Cum Percent
< 15	111	36.9	36.9	1053	12.3%	12.3%
16 - 30	89	29.6	66.4	2039	23.8%	36.1%
31 - 50	71	23.6	90.0	2781	32.5%	68.6%
51 - 100	23	7.6	97.7	1522	17.8%	86.4%
101 +	7	2.3	100.0	1168	13.6%	100.0%
Total	301	100.0		8563	100.0%	

Source : CUSRI-ORSTOM field survey : rice farmers.

Table 2 : Frequency Distribution of Land Holdings by Size and by Province, 1991.

Size class	Suphan Buri	Pitchit	Roi Et	Total
< 15	32	19	60	111
16 - 30	42	25	22	89
31 - 50	22	29	20	71
51 - 100	3	20		23
101 +	1	5	1	7
Total	100	98	103	301
Average rai	25.8	41.8	18.3	28.5

Source : CUSRI-ORSTOM field survey : rice farmers.

2. Concentration of Land Ownership : Land Sales and Land Purchases

If the average rate of population growth is the same among large and small landowners, families with initially larger land endowments would be better off than the others. Partitioning by the smallest holders tends to produce holdings too small to provide a living, pushing them into the circle of debt. Some authors have argued that in an economic system based on private property, the demand for credit leads to mortgages and the alienation of land from small cultivators to big landlords and money lenders (Singh, 1988). Thus, disparities in the ownership of land should increase over time, with the main cause of downward mobility being land sales by smaller to larger owners.

The first thing that must be said is that there are actually very few large landowners among rice farmers, and inequality in the distribution of land ownership, though it exists, is quite away from the picture described above. Almost 16% of families own no land at all. Those owning less than 15 rai (36%) account for only 13.3% of the area owned. At the other end of the scale, the 2.7% of households that own more than 100 rai account for nearly 19% of the area owned.

This pattern of land ownership prevails among the three provinces under analysis, though with some variations : 11% of landless households stand in Roi Et against 55% in Suphan Buri. This finding is consistent with the differences in growth of the rural labor population, the lack of free and cultivable land in the Central Plain (Ramsay, 1985) and, accordingly, the price of land. The percentage of large own holdings is the highest in Pitchit : 65% of those who own more than 50 rai.

Table 3 : Distribution of Land Ownership, 1991.

Size class (Rai)	Farms			Area		
	Frequency	Percent	Cum Percent	Rai	Percent	Cum Percent
No land	47	15.6%	15.6%		0.0%	0.0%
< 15	108	35.9%	51.5%	968	13.3%	13.3%
16 - 30	68	22.6%	74.1%	1499	20.7%	34.0%
31 - 50	49	16.3%	90.4%	1939	26.7%	60.7%
51 - 100	21	7.0%	97.3%	1493	20.6%	81.3%
101 +	8	2.7%	100.0%	1355	18.7%	100.0%
Total	301	100.0%		7254	100.0%	

Source : CUSRI-ORSTOM field survey : rice farmers.

Table 4 : Distribution of Land Ownership by Province, 1991.

Size class	Suphan Buri	Pitchit	Roi Et	Total
No land	26	16	5	47
< 15	38	15	55	108
16 - 30	17	26	25	68
31 - 50	12	22	15	49
51 - 100	6	13	2	21
101 +	1	6	1	8
Total	100	98	103	301
Average rai	26	42.5	18.8	28.6

Source : CUSRI-ORSTOM field survey : rice farmers.

The change in the overall degree of concentration is not easy to assess since empirical data are lacking. An interesting work on the Central Plain pointed out that there is no evidence that rural conditions had gravely deteriorated during the twentieth century (Stifel, 1976). The rate of "involuntary turnover" of land has not been high nor the trend worsening. The ownership pattern did not worsen and the rate of land loss caused by mortgages declined.

During the survey, farmers were asked to report about their last land sale and purchase. The distribution of land purchases among classes of land ownership does not highlight any predominance of big owners : 5% of those who own more than 101 rai purchased 16,4% of the total of purchased land, the remaining part being equally distributed between size groups. But in relative terms the largest owners (over 51 rai) reported land purchases more often than those owning small holdings. Not surprisingly, there is a positive relationship between the land actually owned and the average area purchased, those owning more land having purchased the largest areas. This tends to indicate that land purchase is a predominant means of personal farm land enlargement compared to inheritance. There would be thus, a tendency for land to accumulate in the hands of wealthier families more able than others to buy land.

Table 5 : Distribution of Land Purchases by Size of Holdings, 1991.

Area owned (rai)	Average area purchased	Percent area purchased	Frequency	Percent of purchases	Percent of size class
No land	20.0	2.7	4	4.2	8.5
< 15	7.1	4.6	19	19.8	17.6
16 - 30	13.4	13.2	29	30.2	42.6
31 - 50	50.3	37.5	22	22.9	44.9
51 - 100	44.6	25.7	17	17.7	80.9
101 +	96.6	16.4	5	5.2	62.5
Total	30.7	100.0	96	100.0	

Source : CUSRI-ORSTOM field survey : rice farmers.

Land sales were few. Almost 50% were by farmers owning actually no land or less than 15 rai. Thus, land sales are likely to exacerbate landholding inequality. Nevertheless, it is interesting to stress that in relative terms the frequency of land sales is slightly higher for big owners than for small ones. One interesting question that often arises is the reason for the sale of land. Theoretically, sellers of land would only be better off if they could earn a higher return from the proceeds of the land sale than from self-cultivation or land rental. The supply of land for sale will thus be small where non-agricultural investment opportunities for rural residents are limited. In that case, land sales must be limited mainly to distress sales. The Agricultural Land Reform Office (ALRO) reported problems with buying land in the land reform areas due to the reluctance of landowners to sell land (TDRI, 1990). Nearly 65% of land sales in our sample can be considered as distress sales of which 80% were from farmers owning small holdings. The most frequent reason for land sales were loan repayment, and secondly family needs.

Table 6 : Distribution of Land Sales by Size of Holdings, 1991.

Area owned (rai)	Average area sold	Percent area sold	Frequency	Percent of sales	Percent of size class
No land	14.3	13.8	6	16.2	12.8
< 15	11.9	22.9	12	32.4	11.1
16 - 30	19.6	28.3	9	24.3	13.2
31 - 50	23.0	11.1	3	8.1	6.1
51 - 100	12.4	9.9	5	13.5	23.8
101 +	44.0	14.1	2	5.4	25.1
Total	16.9	100.0	37	100.0	

Source : CUSRI-ORSTOM field survey : rice farmers.

It is worth to underline the fact that 27% of those who sold land were transferring it to other family members (close or distant). Conversely nearly 40% of the purchases occurred between relatives and another third between neighbours. This result is consistent both with the pattern of land inheritance and the closing land frontier. When the plot inherited is too small to be efficient, "it is not uncommon for one of the children to buy from the other siblings their fragments of the farm" (Mehl, 1986).

3. Land Tenure : the Role of Land Rental Market

It is often believed that population pressure and concentration of land in a few hands tend to increase the proportion of tenant farmers compared to owner farmers. However, among Thai rice farmers, owners and tenants cannot be identified as mutually exclusive social classes. Landlord-owner farmers refers to those farmers who rent out part of their holding and cultivate the rest themselves, sometimes with rented-in land. Owners are farmers owning all the land they cultivate. Owner-tenants own at least a share of the farm land base while tenants rent in the total amount. Other farmers are those who rent in freely some land from parents or those who rent out freely some land to their children; this was observed in 12 cases and is usually equivalent to inheritance of land.

The level of tenancy is low : only 14% of households operate as full tenants, more than a half own all the land they farm, about 21% have expanded their farm land base by renting additional land. A few farmers (7.3%) are able to rent out part of the land they own. The average area cultivated is the largest among owner-tenant farmers (39 rai) while the smallest is among tenant farmers (21 rai), but the dispersion is not very high.

Table 7 : Land Tenure, 1991.

	Suphan	Pitchit	Roi Et	Percent	% of area cultivated	Average area	Area rented/ area cultivated
Landlord-owners	12	2	8	7.3	6.5	25.3	53.2
Owners	35	53	74	53.8	49.5	26.2	0.0
Owner-tenants	25	22	15	20.6	28.3	39.0	53.4
Tenants	25	14	4	14.3	10.5	20.9	100.0
Other	3	7	2	4	5.2	37.3	0
Total	33.2	32.6	34.2	100.0	100.0		

Source : CUSRI-ORSTOM field survey : rice farmers.

There is a danger to identify tenancy as an indicator of rural poverty. As noted by Stifel, "the family's demand for land expands as children grow old enough to assist in the farm work (...) and contract in the latter phase of the family cycle as both obligations and stamina decline". Renting land appears as a method of farm enlargement or land access among those who cannot afford to buy land. Conversely the farmer who has "excess" land compared with family labor will find it more profitable to rent out land than to manage a large operation because of the scale of diseconomies arising from the use of hired workers (in the sense that a daily paid worker has no incentive to work hard). Thus, total area cultivated will depend significantly upon the size of the family more than upon the ownership of the land. The rental market of land will tend to transform the pattern of ownership holding into a distribution of operational holdings which more closely correspond to an efficient distribution.

Thus, owners who rent out their land do not necessarily join the ranks of the "unscrupulous absentee landlord" as is often believed. The breakdown of tenancy contracts according to owner's occupation shows that in 38,2% of cases, the class of non-operating owners have non-agricultural occupations. They are usually merchants or civil servants. However, most of these cases concern

Suphan Buri and are of minor importance in the two other provinces. Owners with agricultural occupations represent by far the most important case : 61,8% of the contracts and 63,5% of the land rented in. The largest share of the contracts has occurred between farmers (33%), and represents 26,8% of the land rented. Pure landlords are renting 35% of the land, and the area rented by contract is high. This last class appears to have a limited role for farmers who need to rent some land.

Table 8 : Distribution of Tenancy Contracts by Owner's Occupation, 1991.

	Suphan Buri	Pitchit	Roi Et	Frequency	Percent	Average rai	% of rented land
Merchants	11	7	2	20	18.3	19.3	17.0
Civil servants	11	1		12	11.0	22.3	11.8
Others	2	4	1	7	6.4	17.9	5.5
Non agricultural	24	12	3	39		20.2	34.2
	23.5	11.8	2.9		35.8		
Farmers	11	13	12	36	33.0	16.9	26.8
Landlords	16	10	1	27	24.8	27.4	34.9
Agricultural	27	23	13	63		21.4	61.7
	24.8	21.1	11.9		57.8		
Total	54	36	19	109			
	50.0	34.3	15.7		100.0		100.0

Source : CUSRI-ORSTOM field survey : rice farmers.

As far as landowner-tenant kinship relations are concerned, data in table 9 distinguish between rice farmers who rent in land and rice farmers who rent out land. The results are very similar for these two sub-groups. More than half of the contracts (56%) have been established between family members : 14% between close relatives and 40% between distant relatives. Very few farmers are renting land from acquaintances (13%) or people they do not know. As for land transactions, this pattern of tenancy contracts is explained by the fragmentation of the farm in smaller and smaller plots over time and correlated with the sharp increase of land prices. When purchasing land is too expensive, the siblings who want to work the land rent in the other's holdings.

Finally, data on the location of the owners of land compared to the location of the land (thus of the tenant) provide evidence that absentee landlords has been limited in extent. More than half of the owners live within the same district as the tenant they are involved with. Only two owners live in Bangkok. This seems to support the conclusion that Thailand does not have an urban rentier class, and consistent with the view that land has been of minor concern among the traditional elite because of the very favorable land-to-people ratio (Kemp, 1981).

Table 9 : Distribution of Tenancy Contracts by Owner-Tenant Relation, 1991.

	Farmers renting in				Farmers renting out			
	Frequency	Percent	Average rai	% of rented land	Frequency	Percent	Average rai	% of rented land
Close relatives	17	15.6	22.7	17.4	2	9.1	40.0	16.1
Distant relatives	42	38.5	21.3	40.3	11	54.5	19.1	46.2
Neighbors	33	30.3	18.0	26.8	7	31.8	24.6	34.7
No relation	15	13.8	19.8	13.4	1	4.5	15.0	3.0
Other	2	1.8	23.5	2.1				
Total	109	100.0		100.0	21	100.0		100.0

Source : CUSRI-ORSTOM field survey : rice farmers.

Table 10 : Distribution of Tenancy Contracts by Geographical Distance between Landowner and Tenant, 1991.

Owner-tenants and tenants	Farmers renting in		Farmers renting out	
	Frequency	Percent	Frequency	Percent
Same sub-district	43	39.4	5	22.7
Same district	15	13.8	6	27.3
Same province	17	15.6	4	18.2
Same region	6	5.5	5	22.7
Different regions	26	23.9	2	9.1
Bangkok	2	1.8		
Total	109	100.0	22	100.0

Source : CUSRI-ORSTOM field survey : rice farmers.

4. Land Prices : an Absolute Constraint to Land Property

Theoretically, the price of land is related to its productive potential over a long horizon. From a practical point of view, the value of land is obviously related to a wide range of factors : productive quality, availability of water, distance from market, title status, etc. During the survey, farmers were asked to assess the market value of the land they own. It is implicitly assumed that land owners are accurate in assessing the value of the land they own. This is true when the land market is sufficiently active, as is confirmed in the case of rice land.

Tables 11 and 12 record the mean prices of land. The data are broken down by district and by registration status. Land prices are indeed prohibitively expensive : the estimated value given by farmers of their own land range from 61,000 baht per rai in Suphan Buri to 35,000 baht in Pitchit and 10,500 in Roi Et. Of particular interest is the effect of suitability of land for other crop cultivation on the price of land. Anthropologists argue that farmers give their paddy land higher values than land devoted to other crops because the central role of rice in Thai cultural and social life (Mehl, 1986). This seems to hold true only for the two tamboens in Suphan Buri where rice land is worth more than a mix of rice land and upland, but in Pitchit and Roi Et the opposite relation is true. These findings are consistent with the fact that land values reflect the economic benefits which are generated by land, since crops like sugarcane, cassava, maize, and fruit trees are highly profitable. In Suphan Buri, the higher value of paddy land derives from year-round irrigation allowing double-cropping and avoiding the risk of water shortage.

Table 11 : Distribution of Land Value by Secondary Activity (Bath per Rai), 1991.

Province	Suphan Buri		Pitchit		Roi Et	
	Yan Yao	Kraseaw	Tayeam	Taluang	Mava	Pajao
Rice only	62381	79286	22429	30048	9963	10233
Frequency	21	7	7	21	27	45
Rice and other crops	59409	55087	32865	52500	12389	11250
Frequency	22	23	26	21	9	10
Total average	60860	60733	30652	41274	10569	10418
Frequency	43	30	33	42	36	55

Source : CUSRI-ORSTOM field survey : rice farmers.

Table 12 : Distribution of Land Value by Type of Document (Bath per Rai), 1991.

Province	Suphan Buri		Pitchit		Roi Et	
	Yan Yao	Kraseaw	Tayeam	Taluang	Mava	Pajao
Secure title	62122	60733	31143	43346	10682	10643
Frequency	41	30	28	39	33	42
Unsecure title				18500		10000
Frequency				2		1
Untitle	35000		27900	6000	9333	9667
Frequency	2		5	1	3	12
Total average	60860	60733	30652	41274	10569	10418
Frequency	43	30	33	42	36	55

Source : CUSRI-ORSTOM field survey : rice farmers.

It is eminently clear that legal title is an important factor explaining differences in land values. In each tamboen, land with secure title (Chanot, Nor Sor 3, Nor Sor 3 Kor) is in some cases two to three times more expensive than land with insecure title (Baichong, Sor Kor 1) or without any document proving ownership of land. It is now widely recognized that ownership security enhances capital formation by providing better incentives to invest and improved access to credit both from

institutional and informal sources. The most important benefit of having a title is its use as collateral for loans, since the incidence of eviction of squatter farmers in forest areas has been quite infrequent. Conversely, title insecurity causes lower farm productivity due to lack of investment incentives and limited access to credit (Feder and Others, 1988). Thus, as farm productivity is related to land ownership security, titled land must have a higher price than untitled or unsecured titled land even if "land markets tend to over-estimate the social value of titled owned land while they under-estimate the social value of untitled land (Chalamwong and Feder, 1985).

As direct access to land comes about through individual ownership, the arrangements under which land is rented define the conditions (thus the price) of indirect access to land for those owning no land or too small pieces. Rental agreements vary according to individual circumstances and the major form of tenancy contract is fixed-rent in kind. Fixed-rent in cash is more common in Pitchit than in any other province. Actual rents are determined by a large number of factors, including the quality and productivity of the land, the availability of irrigation facilities, etc. Not surprisingly, land rentals are higher in the Central Plain than in the Northeast. The average rental in cash is around 400 baht per rai and per season with a relatively high degree of variation between provinces from 560 baht in Suphan Buri to 250 bath in Roi Et. The average rental in kind amounts to 165 kg per rai, ranking from 182 kg in Suphan Buri to 111 kg in Roi Et.

Table 13 : Land Rentals by Province, 1991.

Province	Kind				Cash			
	First crop		Second crop		First crop		Second crop	
	Frequency	Average rent	Frequency	Average rent	Frequency	Average rent	Frequency	Average rent
Suphan Buri	44	182	33	181	13	559	11	565
Pitchit	3	125			27	344	5	158
Roi Et	12	111			5	254		
Total	59	165	33	181	45	396	16	437

Kind : kg per rai

Cash : bath per rai

Source : CUSRI-ORSTOM field survey : rice farmers.

Dry season rental rates are, on average, not very different from rainy season rates even though the rainy season crop may have higher profit potential than the dry season crop. As far as the owner's occupation is concerned, there is no evidence that landlords exploit their tenants (who in many cases are relatives and friends) by charging rents above competitive norms compared to other owners. Rentals in cash are more expensive when the land is rented in from farmers, but rentals in kind are the lowest. As expected, agreed rentals are lowest under contracts established between close relatives and the highest in case of no relationship especially when the rent is paid in cash.

Table 14 : Land Rentals by Activity of the Owner, 1991.

	Kind				Cash			
	First crop		Second crop		First crop		Second crop	
	Frequency	Average rent	Frequency	Average rent	Frequency	Average rent	Frequency	Average rent
Non agricultural	22	167	14	190	18	424	7	494
Farmers	19	149	7	184	12	426	3	392
Landlords	14	190	10	175	12	351	6	394
Unknown	4	139	2	141	3	294		
Total	59	165	33	181	45	396	16	437

Kind : kg per rai

Cash : bath per rai

Source : CUSRI-ORSTOM field survey : rice farmers.

Table 15 : Land Rentals by Relationship between the Farmer and the Owner, 1991.

	Kind				Cash			
	First crop		Second crop		First crop		Second crop	
	Frequency	Average rent	Frequency	Average rent	Frequency	Average rent	Frequency	Average rent
Close relative	7	143	5	150	8	309	1	500
Distant relative	24	173	16	172	14	318	4	251
Neighbor	17	171	9	214	14	445	8	430
No relation	11	162	3	200	9	509	3	730
Total	59	165	33	181	45	396	16	437

Kind : kg per rai

Cash : bath per rai

Source : CUSRI-ORSTOM field survey : rice farmers.

Conclusion

Land is the central factor of production in agrarian economies like Thailand : the entire rural population (81% of total population) makes its livelihood from it. Hence, the income of this population depends not only on the efficiency with which the land is used, but also on the distribution of the land. There is thus a question of how the limited land is distributed among different groups of the population. The objective of this paper was to examine the nature and the distribution of land ownership among a sample of rice farmers and how they have changed over time.

It has been shown that inequality in the distribution of land ownership, though significant, does not support the hypothesis that land is concentrated in the hands of a few wealthy landlords. Rather, a continuous spectrum of peasant subclasses was found, ranging from full tenants to landlord-owners.

Although big farmers may have been acquiring more land for cultivation, there is still no proof that land markets have strongly worked against small and marginal farmers rather than in favor of them. There was no empirical evidence showing that a large number of farmers "had been pushed into the ranks of the rural proletariat because of seizure of their land by unscrupulous landlords or speculators" (Singh, 1988). Clearly, conversion of forest areas into agricultural areas have helped to overcome the strong population pressure on land.

Where tenancy is concerned, it is argued that this is a socially useful market response which provides opportunities for a more efficient employment of family resources. Those owning "excess" land compared to family labor will rent out land to those lacking land or enough land to earn an adequate livelihood. There is thus a potential market for the rental of land, which would tend to make operational holdings more equal and closer to optimal operational size than ownership holdings. This does not mean that, on an individual basis, tenancy is a panacea and has nothing to do with poverty. Land which is not owned tends to produce less income mainly because the access to credit, especially from institutional lenders is impossible. Yet in the absence of land rental markets, the members of households who cannot afford to buy land would be driven into the classes of landless laborers.

Whichever way the country is developing, land will continue to be a fundamental factor. Both population pressure and the closing land frontier will continue to alter the agrarian structure, probably toward a more inequalitarian pattern. When new land was continuously being brought into cultivation this helped both to reduce the incidence of poverty and to sustain agricultural growth. Since vacant land will no longer be available, the comparative advantage of agriculture will decline unless new technology is brought in. If Thailand resists moving from an agricultural to an industrial base, the supply of land will be exhausted and the economy will come up against grave difficulties to follow a sustainable path of growth.

ANNEX

Selection of the sample.

The sampling design of the survey proceeded from three guidelines.

First, the probability of learning anything about rice farmers' behavior is higher in those regions with the highest percentage of domestic production. An examination of regional rice production shows that over the ten year period of 1980 to 1990 the region of North-East and Upper Central accounted each for 33% of total rice production, the region of North for 28%.

Second, what works in one location may not work in another, even in the same country, because the ecological setting is different or because farm households face different constraints on their decision-making. We tried to find representative agroclimatic zones that are reasonably consistent internally and have significantly different cropping patterns from zone to zone to capture all the diversity the analyst can hope to cope with. Each of the three provinces selected are in different agro-economic zones defined by the Ministry of Agriculture: Suphan Buri in Central Plain (rice, sugarcane), Pitchit in the North (rice, soybean, groundnut, corn, mung bean) and Roi Et in the Northeast (rice, cattle, buffalo, kenaf, silk, cassava).

Third, sample size didn't have to be too large because of limited resources available. As a result, the spatial focus of the study has been restricted to one province in each region. Therefore, a pragmatic trade-off was made by which the most northern and northeastern sectors of the three regions were discarded, as well as some provinces with specific characteristics.

Districts and villages were selected with the help of the provincial Department of Agriculture to ensure that the zones of survey had not been affected by bad climatological conditions for the year considered. A random sample of 300 farm household was then constituted according to the lists of farmers available at the Department of Agriculture. The total sample divide into approximately equal sized sub-samples of 100 farm household in each of the selected provinces.

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