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**“Diplomarbeit”**

**Rural Market Structures and the Impact of Market  
Access on Agricultural Productivity – A Case Study in  
Doi Inthanon of Northern Thailand**

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## Chapter Seven

### 7 Summary and Conclusions

#### 7.1 *Background*

In the study area of Doi Inthanon hilltribe farmers have been forced to give up their traditional farming systems because of opium prohibition and forest protection which has jeopardized their income and self sufficiency. The rapidly growing demand for temperate cash crops in Thailand however, opened a new market in which the farmers of Doi Inthanon have a comparative advantage. Therefore, this study focussed on the development of farming systems and the present cropping patterns, the evolution and present structure of markets, the impact of market access on agricultural productivity, and the influence of government institutions on this process of adaptation.

In order to accomplish these changes, farmers need adequate incentives in form of favorable price cost ratio insuring profitability. Markets must be accessible to farmers because access to and participation in agricultural markets can positively influence productivity. In addition, an increase in agricultural productivity can only be achieved through specialization and intensification because of the high population growth and limited agricultural land in the research area. Therefore, many farmers are dependent on a source of income as their degree of self subsistent farming is non-existent or diminishing.

#### 7.2 *Methodology*

The analysis of this empirical study is based on primary and secondary data. The primary data was collected by surveys of farm households, traders, merchants at markets, owners of processing factories and extensionists. In the sample 69 farm households, 8 traders, 20 market merchants, 2 factory owners, and 5 extensionists were interviewed. The household samples were purposely selected from five different villages with varying distances to the central input and output markets. The primary data on farm households were used to perform a partial analysis of variance and a comprehensive analysis, to assess the impact of market access on aggregate

productivity. The remaining survey data was used to explain the market structure in the study area. The survey was carried out from November 1997 to January 1998, covering the 1996/1997 cropping season.

Secondary data played a marginal role in the analysis and were collected from extension services such as the Royal Project (RP), the Public Welfare and Hilltribe Development Center (PWHD), and the Thai and German – Highland Development Program (TG-HDP).

### **7.3 Results**

The results of the study focus on the descriptive analysis of farming systems and marketing structures, the partial analysis of variance (ANOVA), and the comprehensive analysis.

Farming system and patterns are very diversified and cash crops are clustered regionally, because of divergent historical and ethnic background of farmers and the influence of development projects. Out of the sample 28% of the farmers grow fruit, 26% rice, 23% flowers and 19% vegetables and strawberries. Nearly, 100% grow two or more cash crops, peaches, chrysanthemum, and lichi being the three most popular. 47% of the land is used for paddy cultivation, 35% for fruit production, 10% and 8% for growing vegetables and flowers respectively.

The market structures of the study area are very heterogeneous and have three distinguishing characteristics: 1) different cash crops go through different marketing channels until they reach the end consumer. 2) Traders play a key role within the marketing structure and are specialized in selling and buying specific cash crops. 3) Villages with better market proximity give farmers more alternatives to sell their produce. Hmong farmers have the best preconditions for successful marketing compared to the Karen. In addition, Hmong farmers have profited the most from the RP which has had a strong influence on farming systems, improved the infrastructure in the region, and is an important market channel.

The partial ANOVA shows: 1) With exception of vegetables, perishable crops (flowers and fruits) are allocated to land nearest to the output market. 2) Market access

has a **positive impact on the use of external inputs and agricultural productivity**. The use of **mineral fertilizers**, chemical plant protection and the level of productivity per rai increases as the transportation time to the central market decreases. The impact of market access on these variables is significant at a 1% and 5% level. 3) Small farmers use more external inputs, and are therefore more productive than large farms.

The results of comprehensive analysis of the three-stage least square (3SLS) demonstrated that market access has a positive impact on agricultural productivity directly through specialization and indirectly through intensification. Market access is negatively related to dependent variables (aggregate productivity, mineral fertilizer, and pesticide use) with exception of irrigation. Market access has a positive influence on the level of productivity at the 10% and fertilizer use at the 1% significance level.

The elasticities derived from the results of the comprehensive simultaneous equation model proved that market access does lead to specialization effects in the study area. An improvement in market access by reducing the time distance by 1% leads to an increase in productivity through resource re-allocation or specialization of 0.94% and an increase in mineral fertilizer use by 0.53%. In turn, a 1% increase in mineral fertilizer use results in a 0.13% increase in aggregate productivity. In other words, market access does lead to intensification effects by mineral fertilizer use.

The analysis shows a tendency that plant protection is influenced positively by market access, however this does not reach significance. There is a positive relationship between irrigation and market access at the 1% level of significance. The reason for this is unclear and no explanation could be found for this unanticipated result.

The results of the study have rejected the null hypothesis and accepted the following alternative hypothesis:

- i. Market access has a positive impact on the degree of specialization in agricultural production

- ii. Market access has a **positive** influence in intensification of agricultural production

However, the results of the study could not ultimately reject the third null hypothesis:

- iii. The ethnic background of farm households does not have an indirect impact on the level of agricultural productivity.

#### **7.4 Conclusion and Recommendations**

The study implies that an important precondition for agricultural intensification in Doi Inthanon is attractive and secure market access. This is particularly important because intensification requires not only cash outlays to purchase inputs, but also easy access to both input and output markets. The analysis has shown that there is specialization within the villages in certain cash crops and a diversification of cash crop production within the study area. Another positive aspect is that under the influence of the RP, the region has specialized in cash crops for a niche market.

The empirical results summarized above indicate that better market access can promote a more efficient allocation and use of resources leading to increased productivity. This suggests that improvements in infrastructure especially in roads and transport routes will improve productivity and in turn household incomes. However, due to the fact that the study area is in a national park, regulations hinder the improvement of infrastructure (roads and electricity). Nevertheless, the following recommendations can be made. 1) The methods of fruit tree production should be improved to increase the quality of fruit and in turn increase farmers profits. 2) The present institutions in the study area should promote fruit processing within the villages at a commercial level. This would help farmers to increase their profits and hinder future bottle-necks in fresh fruit markets. 3) Governmental institutions in the study area should pay more attention to the remote villages, such as Pha Khaem and Mae Aep Nai because here are the poorest households within the study area. 4) The different institution within the study area should cooperate with each other and discuss their objectives and how they want to achieve them. This will eliminate needless competition and promote synergy effects.

These recommendations are still vague and unlikely to be sufficient to tackle the problems in the research area. More research is needed to lay the basis to achieve the diverse objectives for the research area: to sustain the well-being of hilltribe farmers, to conserve natural resources, and to promote tourism industry.