

# **Determinants of poor farm households' successful participation in transferring advanced agricultural technologies-Case study from the mountainous region of Northern Vietnam**

Dinh Pham Hien<sup>a</sup> (PhD student)

Supervisors: Prof. Dr. Dr. h.c. Franz Heidhues<sup>b</sup> and Prof. Dr. Gertrud Buchenrieder<sup>c</sup>

<sup>a, b</sup> University of Hohenheim, Institute of Agricultural Economics and Social Sciences (490a) in the Tropics and Subtropics (Institut für Agrar-und Sozialökonomie in den Tropen und Subtropen), 70593 Stuttgart, Germany. <sup>a</sup> Email: dphamhien@yahoo.com

<sup>c</sup> Leibniz-Institut für Agrarentwicklung in Mittel-&Osteuropa (IAMO), Abt. für Rahmenbedingungen des Agrarsektors & Politikanalyse, Theodor-Lieser-Str. 2, 06210 Halle (Saale), Germany

## **Abstract**

This paper aims to determine the positive and negative factors that have been affecting the participation of farm households, communities and other relevant stakeholders in the transfer of advanced technologies in agriculture. The logit model, descriptive statistics, and comparative analyses are used to identify those factors. The analysis helps to improve and promote the technology acceptance, participation and poverty alleviation processes more successfully and in a more sustainable way. The data used for this analysis have two sources: primary data and secondary data, both collected in the Cho Don district in 2004. We found that the transferred advanced technologies came from five channels, namely: Government Extension Programs, Research Institutes&Ministerial Programmes, Foreign Aid Organizations, Non-Governmental Organizations, and Government Companies, Enterprises and Plants. These technologies have the potential to bring large benefits to farm households and communities. However, advanced technologies in agriculture are still not widely accepted because the targeted farm households (especially poor households) are insufficiently involved, and the farm households, as well as the communities, do not contribute to technology transfer. In addition, those advanced technologies have not adequately met the real needs of farm households and communities.

**Key words:** Advanced technology, transfer, farm household, community, participation, and poverty.

## **1. Background and objective of study**

The mountainous region of Northern Vietnam (MRNV) is divided into two parts, the northeast and the northwest, and occupies 31% of Vietnam's total natural land area. It is a region with significant potential for crop and livestock

production, as well as forest exploitation. More than 11 million people representing 31 different ethnic minority groups live in this region; there are 1 million Tay; 600,000 Thai and Nung, respectively; 500,000 H'Mong, Muong and Dzao, respectively; and 17 other small groups with a population under 10,000. Each minority group generally has its own distinct customs and traditions, various socio-economic characteristics and community structures that create diverse systems of economics, society and culture in the region (Chung et al., 2003). In the MRVN, however, one also finds the highest poverty rate in the whole country. The poverty rate in 2002 was 43.9% (GSO VHLSS, 2003), 23.5% of Vietnam's poor households were located in this region (National Program on Poverty Reduction, 2003) and over 75% of the poor belonged to the abovementioned ethnic minorities (UNDP, 2000). Poverty reduction in the MRNV is a very high political priority for the Vietnamese Government. Thus, in recent years, many advanced technologies in agriculture have been transferred to households and communities through five main transferring channels. Chung et al., (2003) found that one of the reasons that the effectiveness, efficiency and sustainability of the transfer process have been limited is that farm households were not involved in the transfer of advanced technologies. Especially for the poor, advanced technologies have not met their needs. The overall objective of this paper is to determine the positive and negative factors that have affected farm household and community participation in the transfer of advanced agricultural technologies.

## **2. Methodology**

### **2.1 Study area**

The study was conducted in the Cho Don district of the Bac Kan province. This district enjoyed numerous programs that aimed to transfer advanced agricultural technologies. Several criteria were set up to select two communes: (1) having enjoyed transfer programs of advanced technologies from five channels, (2) One commune is near to and the another is far from the centre of the district, (3) having four representative ethnic minority groups (Tay, Kinh, Dao and Nung). The Ngoc Phai and Dong Lac communes met these criteria and were thus selected.

### **2.2 Data collection and method**

Two types of data (primary and secondary) were collected: Primary Data: (1) 152 households in six villages were interviewed through standard questionnaires. The households were chosen randomly from the six villages of two abovementioned communes. (2) Semi-structured questionnaires were used to collect data from key persons such as the village heads, the heads of the village farmer associations and the village women unions etc. In addition,

participatory rural appraisal (PRA) tools were organized in the villages and communes to supplement the data for the survey. Secondary Data were collected and play an important supplementary role for the primary data.

Analysis methods: Descriptive statistics, comparative analyses and an advanced technologies participation model were established to determine positive and negative factors affecting farm household participation in the transfer of advanced technologies.

### **3. Results and discussion**

#### **3.1 Transfer system of advanced technologies in agriculture**

The transfer of advanced agricultural technologies in the Cho Don was undertaken by:

a. Government Extension Programmes (GEPs): These are conducted by the government extension system. The main contents of the extension programs are: (1) to implement technical training courses on cultivation, livestock, etc., for selected farm households and communities and (2) to organize study tours for farm households and (3) to conduct demonstration models.

b. Research Institutes & Ministerial Programmes (RIMPs): Research results from various institutes have been transferred to farm households. In the Cho Don, the institutes transferred advanced technologies in the form of technical training courses and focused merely on direct sowing techniques for water paddy rice. Besides, two related ministries (the Ministry of Agriculture and Rural Development and the Ministry of Science and Technology) also attend this transfer process. All advanced technologies transferred are through so-called trial models<sup>1</sup>.

c. Foreign Aid Organizations (FAOs): These organizations are constituted by donors from one or several foreign countries. With huge funds, advanced technologies are transferred in the areas of diversification, including (1) the organization of a wide variety of technical training courses for farm households, (2) the arrangement of study tours for selected farm households to visit successful models outside the community, and (3) The organization of workshops: Those workshops involve the participation of farm households and communities.

d. Non-Governmental Organizations (NGOs): Several NGOs participated in the transfer of advanced technologies. The NGOs transfer programs focused on organizing the technical training courses and establishing trial models for water paddy rice.

e. Government Companies, Enterprises and Plants (GCEPs): The GCEPs have been founded and developed since the company and business law was

---

<sup>1</sup> Trial models are models, which are applying participatory approaches in model implementation. Model conductors (farm households) are carrying out models rather than done by the donor institutions.

established. Materials for GCEP production are formed through trial models with farm households. The models are selected by the GCEPs, the GCEPs and the farm households co-invest. The product-buying contract is also signed between both sides. The strong and weak points of each transferring channel displayed in table beyond.

### Strong points and weak points of transferring channels

	<b>Strong points</b>	<b>Weak points</b>
GEPs	<ul style="list-style-type: none"> <li>- Organized from the centre to the commune.</li> <li>- Extension staff is educated.</li> <li>- Financial support from the government, province and other institutions, so transferring programmes are fairly easily implemented.</li> <li>- Large operating area and big benefits.</li> <li>- Good relationships with farm households and communities.</li> </ul>	<ul style="list-style-type: none"> <li>- No district extension station and village extension workers.</li> <li>- Do not focus on extension work due to limitations in extension staff, high workload and low salary.</li> <li>- Should not provide input services for agricultural production, consultation for research institutions on research issues.</li> <li>- Insufficient combination between the production sector and market.</li> <li>- Few participatory approaches, so efficiency and sustainability are limited.</li> <li>- Planning is cumbersome and top-down.</li> </ul>
RIMPs	<ul style="list-style-type: none"> <li>- New advanced technologies transferred. Transferring programmes according to government policies, from ministries to the locality.</li> </ul>	<ul style="list-style-type: none"> <li>- No local extension workers, so less coordination, monitoring, and evaluation.</li> <li>- Difficult for advanced technologies to catch on.</li> </ul>
FAOs	<ul style="list-style-type: none"> <li>- Grass roots extension network established. Using participatory approaches to transfer. Huge funds, diversified and suitable transferring programmes.</li> <li>- Close coordination with local institutions, mass organizations etc.; credit provision for farmers.</li> </ul>	<ul style="list-style-type: none"> <li>- Unsustainable grass roots extension network.</li> <li>- Low participation rate of the poor in advanced technologies.</li> <li>- Some advanced technologies do not meet the real needs of farm households.</li> <li>- Less contribution from participants.</li> </ul>
NGOs	<ul style="list-style-type: none"> <li>- Applying participatory approaches in transfer process.</li> </ul>	<ul style="list-style-type: none"> <li>- No grass roots extension worker network.</li> </ul>

	<b>Strong points</b>	<b>Weak points</b>
	<ul style="list-style-type: none"> <li>- Big funds, leading to widened and suitable advanced technologies</li> <li>- Good relationships with local institutions, mass organizations.</li> </ul>	<ul style="list-style-type: none"> <li>- Lacking coordination with other transferring organizations in the locality.</li> <li>- Low participation rate of the poor in advanced technologies.</li> <li>- Less contribution of participants.</li> </ul>
GCEPs	<ul style="list-style-type: none"> <li>- Coherence between production sector and market. Participants' high contribution.</li> <li>- Good relationships with farm households.</li> <li>- Well-paid extension staff, so high responsibility.</li> </ul>	<ul style="list-style-type: none"> <li>- Focusing too much on the products.</li> <li>- Sometimes it is very difficult to control the product contract's implementation.</li> <li>- High risk of having market-related problems.</li> </ul>

### **3.2 Farm household and community participation in the transfer of advanced technologies in agriculture**

- Participation in training courses: the technical training courses is an important method of quickly and efficiently transferring advanced technologies. Therefore, a wide range of training courses is held, including crop, livestock, aquaculture, fruit tree, forestry, sloped land cultivation, credit, extension approach and others. The rate of farm households that attended the training courses was high at 83.6%, of which participation in crop, forestry and livestock training courses were fairly high (65.1%, 59.9% and 43.4%, respectively). The others occupied very small shares. One finding is that, with plenty of funding, the FAOs have dominated in the training courses. The FAOs appeared in most of the training courses carried out in the Cho Don, except for aquaculture. Some training was even funded and organized uniquely by the FAOs, such as training on fruit tree, credit, the extension approach and others. In addition to the FAOs, the NGOs were notable for funding the training courses. NGOs training courses focused on crop, livestock, aquaculture and sloped land cultivation. Especially the training courses on aquaculture were funded the only by the NGOs. Because of budget constraints, the GEPs, RIMPs and GCEPs merely funded for limited training courses, concentrating on one or two subjects. For instance: + The GEPs dealt with both crops & livestock. + The RIMPs dealt only with crops. + The GCEPs focused on crops & forestry.

- Participation in study tours: in the Cho Don, the study tour covered livestock, fruit trees, forestry, sloped land cultivation, and others. However, farm households' participation was still low at 24.3%. Only the FAPs, NGOs and GEPs were involved in the study tours, of which the FAOs dominated more than the others.

- Participation in workshops: the workshop contributes slightly to the transferral process. Two workshops (forestry and sloped land cultivation) were funded by the only FAOs, but the number of participants was low (2%).

- Participation in models: The models (trial and demonstration) are seen as an essential method of the transferral process. The models include crop, livestock, forestry, fruit tree, and sloped land cultivation. Farm households' participatory rate was quite high at 65.1%, of which forestry models occupied the largest share at 52.6%, and the others were small percentages. As is common, the FAOs contributed the biggest portion of funding because they participated in almost all the models except crop and sloped land cultivation. The NGOs funded the models on livestock, fruit trees and sloped land cultivation. The GEPs' models covered crop and livestock. The GCEPs aimed to address crop and forestry models. Lastly, the RIMPs dealt with fruit tree and sloped land cultivation.

The training courses, study tours and models help farm households to increase yield and productivity of crops and animals, develop forestry, and improve knowledge and skills. Farm households that are involved in these programs have an income that is obviously higher than that of non-participated households. The number of animals in participated households is also higher than in non-participated households. However, some problems occurred: the adoption rate after the training courses and study tours was not very high; due to budget constraints, the number of study tours was still limited. As for the market: some models, especially forestry, are developing very well, but households still worry about the market for their products in the future. The GCEPs' model provided very high profits for the farm household, but after one year, the GCEPs had market problems, so they declined to buy the products. Therefore, farm households stopped or destroyed the model. The model on water rice variety is not strengthened and sustainable because the government provides subsidies for Chinese hybrid rice varieties and hybrid maize. Lastly, the poor's participatory rates are still quite low and shortage of farm households' contributions.

### **3.3 Determinants of farm household and community participation in the transfer of advanced technologies in agriculture**

Logit models (on training, study tour, model), descriptive statistics and comparative analyses are used to identify the positive and negative factors affecting farm household participation in the transferral process. The results are:

- Transferring channels for advanced agricultural technologies play a crucial role in farm household participation. Those channels offer training, study tours and models to draw farm households' participation.

- A farm household head's gender and ethnicity negatively affect farm household participation because males occupy a more advantageous position than females; Tay groups dominated other groups in participatory process.

- Farm households' economic ranking also negatively affects participation due to limitation of the poor in the transferral process.

- A household head's education, training courses and study tours positively affect the participation of farm households. These factors count for much regarding farm households' participation in the transfer of advanced technologies.

- The village heads and the farmer association heads are another crucial factor regarding the success of the transferral process because they are a bridge connecting the five transferral channels to farm households and they also contribute to the success of the transferral process (See table beyond).

### **Positive and negative factors affecting households and communities' participation in the transfer of advanced agricultural technologies**

Factors	Training		Study tour		Models	
	Affect	Sig.	Affect	Sig.	Affect	Sig.
Gender of household head	-	0.016				
Ethnic of household head	-	0.024				
Education of household head	+	0.003				
Economic ranking of households	-	0.164			-	0.083
Farmer association member	+	0.023	+	0.806	+	0.284
Information provider <sup>1</sup>	+	0.000	+	0.000		
Participation in model			+	0.035		
Forestry land area					+	0.254
Training courses					+	0.000
Study tours					+	0.029

Note: + Positive affect; - Negative affect

<sup>1</sup> Village head & village farmer association head

## **4. Conclusions**

Advanced technologies were mainly transferred through five organizations: The GEPs, RIMPs, FAOs, NGOs, and GCEPs. Of these, FAOs were predominant. The technical training courses, study tours and models can be used to transfer advanced technologies that allow farm households to increase knowledge, skills and incomes, as well as yield and productivity of crops and animals. However, the efficiency and sustainability of some advanced

technologies are limited. In addition, participatory rates of the poor, as well as females, are still low. In order to increase the efficiency and sustainability of advanced technologies, a participatory approach is needed to identify the needs of farm households as well as identify farm households' contribution in the transfer of advanced technologies. Additionally, an increased participatory rate of the poor, and of females, is needed in the transferral process.

## **5. References**

- Adujna, T and Heidhues, F. (1996): A simultaneous-equation approach to the analysis of factors influencing the adoption of agricultural innovation: The case of inorganic fertilizer: Food Security and Innovations-Successes and Lessons Learned: International Symposium.
- Chung, D. K. and Research Group (2002): Assessment on existing status of the transfer of advanced technologies in agriculture in the Mountainous Region of Northern Vietnam: a case study in Son La, Bac Kan and Ha Giang province, Vietnam: A research topic at ministerial level funded by Ministry of Agriculture and Rural Development, Vietnam, 2002.
- Cuc, M. T. (2002): Community participation in the smallholder Forestry Development Project in Luc Ngan district. Bac Giang, Vietnam. Philippines: PhD Thesis at University of the Philippines Los Banos.
- Dufhues, T., G. Buchenrieder., Heidhus, F., and Dung, P.T.M (2003): Towards demand-driven financial services in northern Vietnam: A Participatory Analysis of Customer Preferences: Discussion Paper No 01/2003.
- Lan, D.N. (2005): Forest land allocation to households in Northern Vietnam: Process, perception of the local people and the use of forest land: PhD Dissertation at Uni-Hohenheim, Verlag Grauer-Beuren, Stuttgart, Germany, 2005.