

Production and Marketing of Agro-Forest Products in Northwest Upland of Vietnam

(Case study in Tat Village, Tan Minh, Da Bac, Hoa Binh province)

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1. Introduction

After more than 15 years of market oriented transition, Vietnamese agriculture has recorded great achievements. The economy has been transformed to a market mechanism from being oriented to self-sufficiency. However, the transformation has differed among the regions. The Northern Upland Region plays an important role in the development strategy of Vietnam because not only is it the home of minority peoples but it is also the place where many natural resources are found and the poorest region in Vietnam. Thus, the development of social economics in the upland regions, particularly in the Northern Uplands, is an issue of significant concern to the Government.

In the first stage of its entry into the market economy, Vietnam has faced many challenges in all sectors. Therefore, the Government of Vietnam (GoV) has not yet instituted programs of market development in Upland regions. In this context, these regions still have poor infrastructure, low levels of popular education and a complex social-economic situation. Nevertheless, in the past few years, GoV has issued many policies to develop the economy in the upland soils, especially in remote places. Emblematic of this action is the slogan "Uplands keep pace with lowlands". The provinces in the Upland regions have adopted many special policies as part of the national strategy for development, a series of Decrees and Directions have been approved to develop Upland regions and to improve the living standards of minority peoples.

Moreover, understanding the requirements of market development and its expansion in the rural upland regions, GoV issued the Decree No 20/1998/ND-CP on March 31st 1998 to develop businesses in uplands, islands and the regions where minority people live. Many other programs and projects implemented by both the Government and Non Government Organizations in several provinces aim to strengthen the economy in the upland regions and make it more sustainable, gradually reducing the gap between the Uplands and the lowland regions.

Tat is a village in Tan Minh commune, Da Bac district, Hoa Binh province, which belongs to the Northern Upland Region of Vietnam. After more than 15 years following the initial movement from central planning toward free use of market mechanisms in 1986, the market economy has been gradually forming in this village under the conditions of better transportation system and infrastructure. However there is still a lack of market information. The notion of the market has been brought into the minds of the local people and marketing channels have also been formalized in rural areas. This research aims to clarify how market accessibility of local people influences the transformation of production and marketing of agro-forest products, and by extension the income of people in Tat village, moreover, to find out the characteristics of households that lead them to market a greater percentage of their output. The results of the research will also help to identify the factors which have slowed

down the economic growth and the transition to the market economy in Upland regions of Vietnam.

2. Methodology

Data Collection

Data were gathered by two main methods, consultation of secondary statistical data and direct surveys. The latter were conducted by interviewing members of individual households and groups of farmers. Target group interviews were also used to collect the data of how agro-forest products are changing over time. We divided the historical time into two periods: before 1985 (period before renovation) and from 1986 up to now. The later period was divided into the intervals of 5 years to trace the evolution of the supply of agro-forest products. In order to evaluate those supplies, we applied a scoring system of 10 grades with the higher grades indicating a larger quantity of supply.

To explore the impacts of market accessibility, the situation of production and marketing of agro-forest products, we interviewed the households. The number of interviewed households was 38. The collected data from the household interviews will be used to describe the conditions of market accessibility, cash income and marketing of agro-forest products by Tat villagers. The market accessibility is demonstrated by many different conditions such as transportation condition (the length of national roads passing through the village), transportation accessibility (the distance from home to road, market and center of the district, the ownership of motorcycles and bicycles), information accessibility (ownership of television, frequency of listening to radio, watching television, reading newspapers, watching films, the rate of literacy), exchange with outsiders (times people go to market, center of district or province), and the infrastructure for marketing (number of current markets).

Additionally, the survey data was analyzed to describe the cash income, the pattern of the household's cash income and the marketing channel of agro-forest products. The data from interviewing the collectors has clarified the patterns of agro-forest products in Tat village.

Data Analysis

Data analysis was mainly based on such descriptive statistical methods such as tabulation, mean and percentage calculation to describe the research results. Furthermore, in order to determine the relation between market development and the development of production as well as agro-forest product marketing by the farmers in Tat village, we conducted correlation analysis of the relationship between changes in the number of collectors and total outputs of agro-forest products in Tat village over the periods studied. Additionally, multiple regression analysis is also applied to the characteristics of households that lead them to sell the greater percentage of their output.

3. The main characteristics of Tat village

Tat village is located in the Northwest Upland region of Vietnam. It belongs to Tan Minh commune - Da Bac district - Hoa Binh province. This district lies along the border of Phu Tho and Hoa Binh provinces at an elevation of 300 m above sea level. Total natural land of Tat village is 304.29 ha of which 46.4% is forest land. Total population is 475 divided into two main ethnic minority groups: Tay and Muong.

An inter-provincial road passes through Tat village. This is an important road for villagers to exchange goods with neighboring communities. The distance to the center of Hoa Binh is around 47 km.

Average temperature during the year is 23.8°C, humidity is 82.1%, annual rainfall is 1,869 mm/year, but concentrated mainly in the rainy season from May to October, therefore easily causing floods.

The cultivation is a composite swiddening system. The main crops are maize, cassava, upland rice, canna and paddy rice. Moreover, the villagers all collect such forest products as bamboo shoots, broom grass, bamboos and some other medicinal plants.

Table 1: General information of Tat village (2002)

Description	Quantity		Percentage (%)
	Unit	Quantity	
Total natural land	ha	304.29 ¹	100.00
1. Forest land	ha	141.20	46.40
- Natural forest	ha	26.90	8.84
- Planting forest	ha	0.90	0.30
- Recovered forest	ha	113	37.26
2. Fallow swidden land	ha	87.20	28.66
3. Agricultural land	ha	62.62	20.68
- Paddy field	ha	8.40	2.76
- Swidden field	ha	54.22	17.82
4. Resident land & mix garden	ha	9.60	3.15
5. Water surface	ha	0.87	0.28
Specialized land	ha	2.80	0.92
Number of households	hh	104	
Number of persons	pers	475	
Length of inter-provincial road	km	3	

Source : Statistic al data from the Communal People's Committee

4. Results and Discussions

4.1. Market Accessibility

Transportation and personal means

Transport Conditions

Transport conditions are favorable for such means of transportation as bicycle, motorcycle and vehicles. The GoV has allocated a part of its budget to expand and upgrade the transportation system in the Northern Upland region. However, many communities still lack access to roads, this is a constraint for local people to access markets and public services.

The transport condition of Tat village is relatively better than many other communities in the Northern Upland region of Vietnam. In 1970, the inter-provincial road No 423 was constructed for a length of 3 kilometer through this village. This road connected the village with Hoa Binh center and other provinces nearby. In 1980, this road was upgraded by spreading rock to make it more convenient for farmers to deliver the ir goods as well as for

¹ We used these data because it officially published by Communal People's Committee.

traveling and exchanging with outsiders. Moreover, in 2000 this road was further upgraded so it is now asphalt covered and more useful for the vehicles be able to pass through the village.

Transport accessibility is one of the important factors for production and marketing of a household's products. The transport accessibility was measured by the distance from the community to a road for vehicles and household ownership of various means. In Tat village, almost all households are located near the road; the distance to the road is less than 1 kilometer. Before 1990, public vehicles never reached this village; after 1990, one parking place for public vehicles was constructed in the village; thus, every two days one bus goes to Hanoi and many others pass through the village. This is a better condition compared to other villages in the Northern Upland region.

Personal transportation means

The ownership of personal transportation (e.g. bicycle, motorbikes) captures the transport accessibility. It also is an indicator reflecting the amount of goods that are sent out of the village and of how farmers travel. At present, about 26 percent of households do not own motorbikes, while the percentage of households who own bicycles and/or motorbikes has increased from 17 in 1999 to 74 percent in 2003 (table 2). Almost one-third of all households, due to lack of personal transportation means, have limited access to exchanging and trading with the external market.

Table 2: Number of households own bicycles and motorbikes (number, percentage)

Transportation means	1999 (n = 42)		2003 (n=38)	
	Households (number)	Percentage (%)	Households (number)	Percentage (%)
Bicycle	3	7	15	39
Motorbike	3	7	4	11
Bicycle and Motorbike	1	2	9	24
Total	7	17	28	74

Source: Survey data in January 2004 and in 1999

Electricity consumption

Tat village has been connected to the national electric grid since 2000. However, in 1998 there were still 33 percent of households who were not consuming electricity from the national grid. At present, 95 percent of households consume national electricity (table 4). Nevertheless, the difficulty in Tat is the high price of electricity compared to household incomes. This problem affects how regularly the farmers' listen to the radio and watch television, both of which are the main sources of market and cultural information to the villagers in general.

Table 4: Number of households consumes electricity (number, percentage %)

Source	1999 (n=42)		2003 (n=38)	
	Households (number)	Percentage (%)	Households (number)	Percentage (%)
National electricity	0	0	36	95
Electric generator	28	67	-	-
No electricity	14	33	2	5

Source: Survey data in January 2004 and in 1999

Television and Radio

Television and radio are the main ways for households to access outside information. The proportion of households owning a television and/or radio in 1999 was 86 percent; in 2003 only 4 percent of households live without this equipment (table 5).

Table 5: Number of households owns television and radio (number, percentage)

	1999 (n=42)		2003 (n=38)	
	Households (number)	Percentage (%)	Households (number)	Percentage (%)
Televisions	19	46	20	53
Radio	6	14	4	11
Television and radio	11	26	12	32
Total	36	86	36	96

Source: Survey data in January 2004 and in 1999

Information accessibility also includes public broadcasting such as the public speaker system installed inside the village and public meetings inside the community. These conditions have also been improved. In 1999, Tat village had not yet set up the public speaker system. However, in 2000 this village fixed this system to broadcast the important information relating to production, culture and the life of villagers.

Accessibility to the information

Access to outside information was measured by the ratio of households receiving information through different channels. Among existing channels, meetings, television and radio were considered to be the main stream access sources for local farmers (table 6). The ratio of households who got information from public speakers is still very low. Newspapers and mail are not important channels providing information to villagers. That is because few villagers have much education and it is a challenge to get a newspaper. Table 6 describes the information channels and their accessibility to the farmers in Tat village.

Table 6: Number and percentage of villagers who have used the following channels of information

Channels	1999 (n=42)		2003 (n=38)	
	Number of persons	Percentage (%)	Number of persons	Percentage (%)
Radio	30	71	23	61
Television	36	86	31	89
News paper	11	26	12	32
Public broadcasting	0	0	7	18
Mail	5	12	7	18
Public meetings	34	81	38	100
Agriculture officers	19	45	25	66
Local Markets	0	0	3	8

Source: Survey data in January 2004 and in 1999

Education opportunity

Previously, there was no school in Tat village; however, a new primary school has been built inside the village and a secondary school was constructed in Tan Minh, one kilometer away. Youth, who have not yet finished their secondary school can gain their certificate from the primary school. Therefore, the rate of illiteracy is almost zero. Almost all villagers can speak Vietnamese, thus they can communicate with the outside world to improve their knowledge.

Education level of villagers

The education and literacy levels of householders and adults (defined as those over 17) also reflect the accessibility to information outside the community. On average, the number of years of schooling of farmers in Tat village is 5 years; adults not going to school accounted for 8.1 percent. The persons finishing one to 5 grades accounted for the highest percent (67.7 percents), while persons finishing 10-12 grades accounted for lowest rate (10.1 percent). The highest grade of schooling is 12 years (table 7). Thus, in this village, no one has studied beyond secondary school.

In Tat village, there were no households without education or at least one person can read and write. The rate of illiteracy is 8.1 percent; however, these people are all members of the old-age group.

Compared to previous years, the education of villagers has improved significantly. The rate of illiteracy has fallen and the rate of persons who have finished secondary school has increased. The education level of villagers has been enhanced to increase the accessibility to and understanding of information of science and technology.

Table 7: Schooling years of adults (Number, Percentage)

Schooling years	1999 (n=42)		2003 (n=38)	
	Number of persons	Percentage (%)	Number of persons	Percentage (%)
0	11	9.8	8	8.1
1-5	68	60.2	67	67.7
6-9	27	23.9	14	14.1
10-12	7	6.2	10	10.1
Highest schooling years	12		12	
Average schooling years	4.7		4.8	

Source: Survey data in January 2004 and in 1999

4.2. Transformation of Households' Income and Agro-Forest Production

4.2.1. Major stages in the development process

Period before renovation (Before 1986)

Before renovation, the area of paddy rice was very small; farmers in this village mainly cultivated swidden rice, local maize and canna. Forest activities also played an important role; the wood was exploited freely according to the ability of each household in accordance to the quantity allocated by the district people's committee. All products were sold to the Forest Product Company. The activity of logging had significantly increased during 1978 - 1981.

During 1974-1978, the project of settlement was implemented in all villages. Then afforestation started; the first trees planted in the forest were *Trau* and *bo de*. In 1984, tea was planted but its products could not be sold, thus it could not develop after several years. In addition to those activities, the villagers also hunt for wild animals for home use. In this stage, the infrastructure was almost nothing, there were no roads for vehicles, no markets, the inter-provincial road No 433 had just been covered with gravel, and there were only 2 schools in the whole commune. The life of the local people faced many challenges, every year there were 3 months when they did not have enough food.

Period from 1981-1989

During this stage the contract system was implemented in accordance with the Directive 100/CP in agriculture. According to this policy, households can keep the surplus production after subtracting the amount in the contract. This provided momentum to stimulate the households doing intensive farming to increase the yield and production of rice. Because farmers paid more attention to paddy rice, the swiddening tended to be reduced and the forests recovered. The life of villagers was better, the number of households with insufficient food was less than before, the months when food was not available shorten from 3 to 2 months per year. The income of households was mainly generated by paddy rice, maize, taro, upland rice and cattle. The agriculture collective was dissolved and the role of the village headman started to take effect.

Period from 1989 up to now

This is the stage during which the Government has applied the contract system in accordance to Resolution No 10 enacted by the Politburo (April, 5th 1988). According to this policy, each household is considered to be a self-managing economic unit with land use rights for the long run. In 1993, when the Land Law was promulgated, each individual household was given the rights of exchange, transfer, lease, mortgage, and inheritance. Moreover, they can themselves control their business decisions. Additionally, the GoV has applied many other programs such as sedentary residence, permanent cultivation, extension services, re-planting of forests, seedling support and projects for greening the fallow land and barren hills. Through these programs, many good agriculture practices (GAP) have been disseminated to the farmers, e.g. for the agriculture practices of hybrid maize, fruit trees and timbers.

In 1995, GoV has applied the subsidized policy for construction of irrigation systems and terraced fields (5 million VND/ha). The focus on paddy rice is therefore increasing.

Besides the agriculture development policies of the Government, the effects of markets and the rising awareness of farmers have helped to transform considerably the economics of this village.

4.2.2. Transformation of agriculture production and forest products exploitation in Tat village

Located in a valley, Tat village is bounded by the mountains; paddy rice is cultivated at the foot of the mountains. The farming system in this place mainly focuses on composite swiddening.

Crops and animals are relatively diversified. The development of cropping, animals raising and exploiting forest products tends to adjust according to the market mechanism. By scoring the total production of agro-forest products, the largest amount collected and sold

represented by 10 points, then reduced to the smallest amount over the periods, we identified the transformation of agro-forest production and exploitation in Tat village.

Table 8 shows the transformation of agriculture production and forest product exploitation in Tat village. In the last 20 years, many crops that had been considered to be main species before are at present not accounted for in the main proportion in the cropping pattern of Tat village, e.g. for upland rice and slat bamboos. Inversely, many new crops and animals have been put into production to satisfy the market demand (e.g. ginger, ginseng, and goats).

Before 1986, there were 23 agro-forest commodities sold in the market. After 5 years, these were reduced to 15 types (table 8). Some precious products such as *sa nhan* and benzoin (*canh kien*) has disappeared due to lack of market demand. "*Cay Tang*" (local language) which had been used to dye the traditional yellow for textile fabric, at present, is not exploited to sell in the markets. In our opinion, that was because the industrial dye appeared or the local people used the industrial fabric. During 1992 - 1996, the number of agro-forest commodities was still the same as during the previous period but the quantity of products was reduced. The reason for this reduction was that the stock of forest products was gradually exhausted.

In the period 1997 - 2000, 14 agro-forest commodities were exploited by villagers that appeared in the markets.

Some products were reduced due to them being forbidden by government regulation, e.g. timber (go tron). The markets have been recovered for some products but could not be maintained, e.g. for rattan. For some other products such as dried tea, dried cassava, the market has gradually been reduced.

In 2003, there were only 11 commodities sold in Tat village, of which the majority are fresh cassava, canna, ginger and some forest products including fresh bamboo shoots, broom-grass....

According to the assessment of the villagers, the market of forest products has gradually been reduced compared to 20 years ago. The reason for the decreasing quantity of some products is reduced availability of those products in the forests. The villagers now have to go further into the forest to collect those products. Another reason is that some products cannot compete against the similar ones produced in other places, e.g. the tea of Tat against the tea of Thai Nguyen, inversely, new products have appeared in this market, e.g. fresh cassava.

Previously, Tat villagers mainly sold dried cassava before. Nevertheless, due to the development of the processing industry in Ha Tay province, the demand for fresh cassava has significantly increased. Also, due to better transportation, the road now passes through the village, thus, villagers can sell their fresh cassava right after harvesting from the fields. Due to the increased demand for fresh cassava, the production of dried cassava has fallen considerably (table 8).

Broom-grass is one of the products collected in large quantity to generate income for households. However, the quantity has been reduced because swiddening cultivation is less than that in pervious years before. In 1995, GoV applied the subsidized policy for irrigation in terrace fields. Therefore, paddy rice has increased and swiddening has tended to be reduced.

Table 8: Scoring the total production of agro -forest commodities over the periods

Agro-forest commodities	Before 1986	1986-1992	1992-1996	1996-2000	2003
Moc nhi (mushroom)	4	10	3	2	0.5
Dried bamboo shoots	5	10	5	3	2
Fresh bamboo shoots				10	5
Re do (red root)	10	7	5	3	0
Canh kien (Benzoin)	10	0	0	0	0
Sa nhân(bastard cardamon)	10	0	0	0	0
Cu nâu (Brown Tuber)	10	0	0	0	0
Rattan (Day song)	10	0	0	4	0
Moc	10	0	0	0	0
Cu 30(Medicinal plant)	10	7	5	4	3
Co cum (for making hat)	5	0	0	0	0
Cay tang (for dying cloths)	5	0	0	0	0
Day then (for betel chewing)	10	3	2	1	0.5
Dried tea	10	7	6	4	3
Dried Cassava	10	7	5	3	2
Round timber (Go tron)	10	4	2	0	0
Neohouzeaua (Nua cay)	10	10	10	10	10
Neohouzeaua (Nua thanh)	x	0	0	0	0
Bamboo (Giang)	10	10	5	0	0
Buffalos	50	50	50	70	153
Cows	10	10	10	120	300
Pigs	40	60	80	150	363
Chickens	x				
Canna	10	10	10	10	1 (disease)
Groom -grass	0	10	5	1,5	2
Ginger	0	0	0	10	3
Fresh Cassava	0	5	2	10	5
Ginseng	0	0	0	0	New
Cu khuc khac					
Total commodities	23	15	15	14	11
Total collectors	1 (Co-op)	3	4	10	13

Source: Survey data in January 2004

After more than 20 years of development (since the Direction 100/CP enacted) the economy of Tat village has tended to positively develop. The cultivation of paddy rice has become intensive farming. Slash and burning for swidden field development has been reduced. The new varieties such as hybrid of maize, fruit trees and many other trees for reforestation has been brought into production to satisfy the demand of the markets. Not only

the agricultural production has been transformed to a market orientation, but off-farm jobs also have appeared, e.g. for home-made wine, hired labor and motor-taxi. The intensive raising of cows, pigs and chickens also has been done by farmers. Those results have been both gained thanks to appropriate policies of the GoV and changes of market accessibility.

4.2.3. Production of commercial commodities of households

In the last 20 years, the household economy has been improved and developed in accordance to the agro-forest model, VAC model, which is combination of gardening, fish pond and animal raisings, and production of commercial commodities. However, the scale is still small and not concentrated; the total quantity of products is not large. Thus, it is essential to develop strategies for household economy development with increased commercialization.

Table 9 shows that the crops that generate the most income for households are maize, canna, cassava, and soy-bean. The commercialized proportions of those products are 83%, 75%, 45% and 33% respectively. Paddy rice is mainly for self-sufficiency, the quantity sold accounts for one percent only. Upland rice, especially, is not commercialized. Among 31 households producing rice, only 2 sell their rough rice.

Regarding livestock and fish, the biggest share of cash income for households was generated by buffaloes, cows and goats. The poultry farming mainly contributed to home use.

Table 9: Commodities of survey households

Commodities	Quantity of production and sale			Commercial proportion (%)
	Unit	Production	Sale	
Paddy rice	kg	28,315	320	1.13
Upland rice	kg	1,580	0	0
Cassava	kg	58,600	26,260	45
Maize	kg	5,190	4,300	83
Canna	kg	17,100	12,800	75
Soy-bean	kg	210	70	33
Other crops	kg	1,290	280	22
Buffaloes	Head	51	7	14
Cows	Head	100	25	25
Pigs	Head	121	35	29
Chicken	Head	679	104	15
Goats	Head	10	10	100
Ducks	Head	362	59	16
Ducks (Ngan)	Head	54	5	9
Fish	Kg	1,719	610	35

Source: Survey data in January 2004

4.2.4. Cash Income of household

The cash income of each household calculated on average is 3.459 million VND per year, in which the cash generated by agriculture accounted for 34 percent. Cash income, received by hiring out labor accounted for 26 percent, salaried jobs 24 percent, and forestry 17 percent. Regarding the total cash income generated by agriculture, livestock contributed 72

and crops 28 percent. Table 10 shows that the cash income generated by forestry is mainly contributed by bamboo shoots, broom-grass, bamboo trees, palm leaves and *culi* plants. Some other industries exist but have not yet developed into commercial commodities; they have just appeared to use comparative advantage and existing potential resources, including the leisure time of farmers. Hopefully, in the future they will become commercial commodities.

Traditional careers have not yet developed, and off-farm jobs have developed with difficulty. If these activities cannot generate jobs for farmers, the population pressure of the households on the land will not be alleviated. Thus, sustainable production requires both production of food and commercial product to create more employment for farmers in a context of environmental protection.

Table 10: Share of cash income by farm household

Enterprises generating cash income	Cash income per household (1000VND/household)		Percentage (%)	
	1999 (n=42)	2003 (n=38)	1999	2003
Agriculture	1,457	1,173	45.65	33.91
- Crops	754	346	23.62	10.01
- Livestock	703	827	22.03	23.90
Forestry	1,012	576	31.73	16.65
Hired labor, handicraft & Service	398	888	12.47	25.67
Salary paid by Government budget	324	822	10.15	23.77
Total cash income	3,191	3,459	100.00	100.00

Source: Survey data in 1999 and in January 2004

The economy in Tat village has not yet demonstrated the commercial production; the proportion of commercial quantity of products is still low, and cash income is limited. The causes of this situation are lack of advantage in market access, good roads and transportation means for farmers to travel to markets in order to sell their goods.

4.3. Markets of Agro-forest Products

4.3.1. Production and supply of agro-forest products in Tat village

The market for agricultural products in Tat village has not yet developed. The quantity supplied is not so much as demonstrated by the limited number of producers. Some products such as upland rice have no producers for market. All products of Tat village are mainly produced for domestic markets, and they have not yet reached the export market. Table 11 shows the number of households producing their products for the market in Tat village.

Regarding the number of producers in this market, the commodities supplied by the largest number of producers are cassava, canna, maize, fish, pig, cow, chicken and ducks (table 11). Rice was sold by the lowest number of suppliers; only two of the surveyed households sold their rice. All other forest products are commercial commodities. The forest products sold in the greatest proportion by collectors are broom-grass, small bamboo shoots, firewood and bamboo stems (*Neohouzeaua*).

Table 11: Producers and suppliers of agriculture and forest products
(number of household, percentage)

Commodities	Producers		Suppliers	
	Households (number)	Percentage (%)	Households (number)	Percentage (%)
Paddy rice	34	89.47	1	2.63
Upland rice	19	50.00	0	0.00
Cassava	34	89.47	22	57.89
Maize	25	65.79	12	31.58
Canna	29	76.32	18	47.37
Soya-bean	2	5.26	2	5.26
Other crops	8	21.05	4	10.53
Buffaloes	26	68.42	6	15.79
Cows	23	60.53	9	23.68
Pigs	23	60.53	13	34.21
Chickens	27	71.05	8	21.05
Goats	1	2.63	1	2.63
Ducks	19	50.00	8	21.05
Ducks (Ngan)	3	7.89	1	2.63
Fishes	19	50.00	19	50.00
Woods	7	18.42	7	18.42
Fired wood	17	44.74	17	44.74
Bamboo (Nua)	15	39.47	15	39.47
Big bamboo shoots	10	26.32	10	26.32
Tiny bamboo shoots	21	55.26	21	55.26
Culi roots (Re cu li)	11	28.95	11	28.95
Cay khuc khac	16	42.11	16	42.11
Groom-grass	27	71.05	27	71.05
Wild animals	3	7.89	3	7.89
Other forest products	21	55.26	21	55.26
Home garden (vegetables)	6	15.79	6	15.79
Home garden (fruits)	4	10.53	4	10.53

Source: Survey data in January 2004

4.3.2. Actors in agro-forest products

Many years ago, the villagers had to go to market in Vinh Phu province. At present, an existing market namely Cao Son lies 12 kilometers from Tat. This is favorable condition helps households to increase their commercial commodities. The market for agro-forest products has also appeared at a low level. However, the remarkable issue in this market is the appearance of middlemen in the marketing channels; they act like the collectors, assemblers

and traders. At present, there are 13 households who do this job in this village. These households can be divided into two groups, including traders and collectors.

Traders : They are the persons , who have capital and invest into collecting the agro-forest products from farmers and then sell to other wholesalers from other places such as Hanoi and Ha Tay. Their function is to gather the quantity of products from many collectors into the huge amount, store them for 2 or 3 days and sell them to traders or wholesalers from other provinces in the Red River Delta. In addition to those activities, they are also responsible for transportation of products to other provinces, e.g. for cassava and canna, they have to transport to Duong Lieu - Ha Tay to sell. Two traders presently live in the village.

Collectors: These are the persons hired by traders and paid by commission. They reside inside the village. Many years ago, they had been farmers and mainly cultivated swidden fields. Currently, the active market has attracted them to do business and they have become middlemen, the first actor in the marketing channels. In 2003, there were 13 household doing this job. Their functions are to weigh and to record the amount of products collected and sold by different farmers.

Additionally, some vehicle owners also participate in this market. They buy the products along the road at their convenience.

4.3.3. Marketing of households' products

Buyers (To whom do they sell?)

Almost all the products of households in Tat village were sold through middlemen collectors. Table 12 shows that 68 percent of households sell their products to middlemen collectors, only 5 - 10 percent sell directly to traders. It can be concluded that traders are rarely involved in gathering products directly from farmers.

Table 12 : Households sold their products to collectors and traders
(number of households, percentage)

Commodities	Sell to collectors		Sell to traders	
	Households (number)	Percentage (%)	Households (number)	Percentage (%)
Canna	24	60.53	0	0.00
Cassava	26	68.42	2	5.26
Fresh bamboo shoots	26	68.42	4	10.53
Groom-grass	26	68.42	2	5.26

Source: Survey data in January 2004

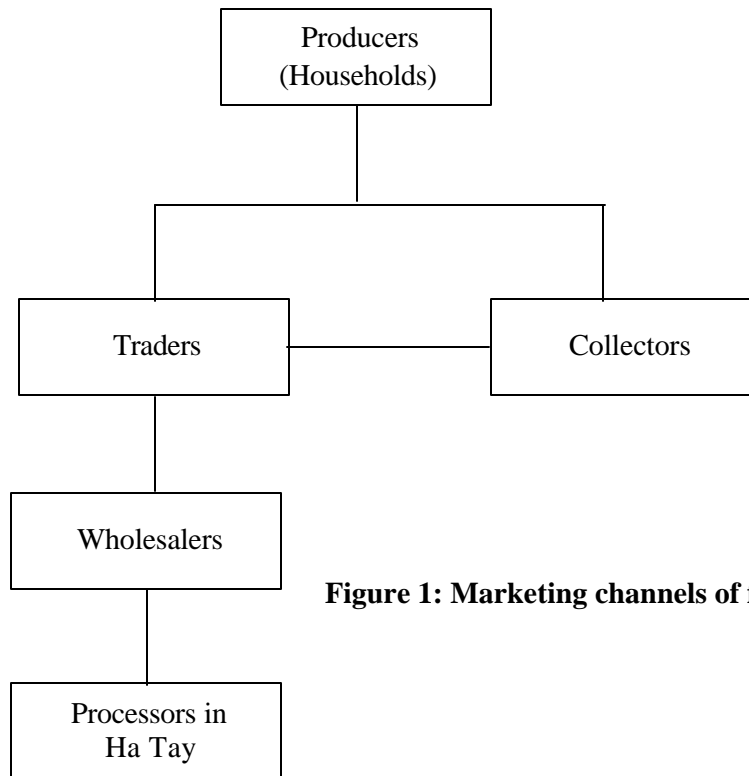


Figure 1: Marketing channels of fresh Cassava

Some products were sold to wholesalers, who came from the lowland region. Some others, such as cassava and canna, were transported to the processors in Duong Lieu - Ha Tay by traders. Figure 1 depicts the marketing channels of cassava produced by farmers in Tat village.

Selling places (Where do they sell?)

The households sell their products at their homes, at their fields, at collection places, at markets and other places along the inter-provincial road.

Selling at home: Several products with high value, e.g buffaloes, cows, pig, and substantial amounts of cassava and canna are sold at home. Table 13 shows that 55 percent of households sold their livestock at home, 18 percent sold forest products at home and 16 percent sold their crops at home.

Selling at the field: The quantity of agro-forest products sold in this way was not great. Only several households with fields near the road can sell their products right after harvesting. Products sold at the field were canna, cassava and palm leaves.

Selling at collection places: At present, 5 collecting places have been established along the main road. They gather the products during the harvesting season, when they can get the profits from doing this job. The buying price at different collection places was almost the same. The major part of farmers sold their products at these collection places. According to the survey data (table 13), 53 percent of households sold their harvested crops, 58 percent sold forest products and no household sold livestock at the collection places.

Selling at the markets: At present, there is no wet market in Tat village. Nevertheless, some households owning motorbikes bring their products to Cao Son market to sell at the higher price. Table 13 shows that 11 percent of households sold their harvested crops at Cao

Son market, 5 percent sold their forest products and 34 percent sold their livestock. The marketing of livestock is presently difficult for Tat households due to the great distance of Cao Son market

Selling at other places: These are the small and variable buying places along the road. Products sold are bamboo (Neohouzeaua), bamboo shoots and firewood. About 10 or 20 percent of households sell their products at these places.

The development of the collectors at Tat village is a good sign of the economic transformation to commercial commodities. It creates momentum and better condition for the development of commercial commodities produced by households. However, the scope of collectors' activities has been limited to the purchase of only those commodities found in large quantity. For other products, especially livestock, farmers face the difficulty of bringing them to Cao Son market, far away from the village.

Table 13: Percentage of households sold their products at different places (percentage)

Commodity groups	Selling at home (%)	Collecting places (%)	Selling at the market (%)	Other places (%)
Harvested crops	16	53	11	20
Livestock	55	0	34	11
Forest products	18	58	5	19

Source: Survey data in January 2004

4.3.4. Payment relationship to the buyers

Households who sell their products to collectors or traders can be paid directly by cash or within three days from the day they sell. Normally the traders, who came from other provinces in the delta, come to the village every three days and pay the previous order. Then, the traders or collectors in the village start to distribute the payment to the farmers in the village. Normally, they pay for one hundred percent of harvested crops immediately on the selling day. 74 percent of livestock were paid for right after selling and 26 percent of payments were distributed after several days or weeks.

Regarding forest products, payments tend to be paid after several days (34 percent), the exchanged goods accounted for 17 percent. Immediate payments accounted for only 21 percent. The remaining proportion undergoes other forms of payments.

4.4. Correlations between the development of the market and agro-forest production

“Theoretically, the market is the collection of buyers and sellers that, through their actual or potential interactions, determine the price of a product or set of products. In the market for personal computers, for example, the buyers are business firms, households, and students; the sellers are Compaq, IBM, Dell, Gateway, and a number of other firms” (Pindyck and Rubinfeld., 2001).

In Tat village, the sellers are farm-households who sell agriculture and forest products to middlemen, collectors, traders and wholesalers. While sellers, buyers and products are clearly determined, this market is gradually developing and affected by many external factors.

Table 14 : Number of agro-forest products and number of collectors

	Before 1985	1986-1992	1992-1996	1996-2000	2001-2003
Agro-forest products	23	15	15	14	11
Collectors	1 ²	3	4	10	13

Source: Survey data, 2004

The increasing number of collectors demonstrates that the market in Tat village is developing and more active after each year (table 14). Before 1986, when Vietnam was under a central planning regime, all activities were controlled by the Government through top-down planning. In that regime, all functions of the market such as buying and selling passed through cooperatives. Thus, the market in that period was monotonous with fewer actors in the market and less activity than in latter periods. Aware of the disadvantages of the central planning mechanism, from 1986 to 1992, GoV consecutively designed the legal frame work for many sectors, e.g. Land Law, Foreign Investment Law, and Private Enterprise Law. Notably, the Land Law was enacted to allocate the land to *state owned agriculture farms, forest farms, cooperatives, the groups of agricultural production and forest plantation, enterprises, people arming units, state organizations, social organizations and individuals for permanent and sustainable use* (Land Law 1988). This Law, therefore, directly affected agriculture production by providing Land Use Certificates to the above organizations and individuals. On the other hand, the Private Enterprise Law was promulgated to *apply the development strategies of multiple sector economics, to stimulate the private investment and to protect the legal benefits of private enterprises* (Private Enterprise Law 1991). This Law, therefore, directly affected all activities performed in the market. Throughout the whole country, the number of private enterprises and individual households getting into the market increased steadily. The marketing channels also became more diversified. Specifically in Tat village, the number of collectors increased to 3 persons in this period and 4 persons between 1992-1996. Within this line of growth, development and transformation of economy, GoV has consecutively enforced the development of agriculture through the Land Law enacted in 1993 and the Revised Land Law in 1998. By these Laws, farmers were given the rights of *exchange, transfer, lease, mortgage, and inheritance* (Land Law 1993). In production, the Revised Land Law has stimulated the farmers to work more efficiently. As a result, the growth of output in agriculture reached to 4 or 5 percent per year; since 1988 total production of rice has double d (UNDP 1999)³. Additionally, in terms of market performance, the Enterprises Law enacted in 2000 has clarified the benefits and obligations of both private and state owned enterprises. Individuals doing private business in Vietnam's hotels, restaurants and services (Statistical Book 2002) have increased by 50% from 1,384,000 in 2000 to 2,381,000 in 2002. In Tat village, the increase has been of 30% in the number of collectors, from 10 persons in 2000 and 13 persons in 2003 (table 14).

Thus, the increase number of collectors in Tat village has positively correlated with the development of the national market in particular and the growth of the economy in general. As the market develops, the actors doing business in the market increase, the market will be more active, and goods will be easier to trade and commercialize. Comparative advantage will also become clearer in the economy. Each region, therefore, will focus on

² Before 1985, there was no collector. Farmers in Tat village sold their products to cooperative. Thus, we consider the cooperative during that period as one collector.

³ United Nations "Common Country Assessment of Vietnam" Hanoi, 1999

producing the commodities in which it enjoys a comparative advantage in producing. Other commodities without comparative advantage will gradually disappear from the region. In Tat village, the number of commodities has considerably been reduced from 23 commodities under the central planning regime before 1986 to 11 commodities in market mechanism in 2003 (table 14).

In order to evaluate the relation between market development and the evolution of each commodity in Tat village, we checked the correlation coefficient between the development of the market and increasing quantities supplied of each commodity appeared in Tat village in the period before 1986 up to now. The development of the market was measured by the increasing number of middleman collectors in Tat village over the period. The changes of each commodity were represented by a scoring scheme from 10 to 0 the higher the points, the higher the quantity of that commodity supplied (The scoring method was introduced in part 2 of this paper).

Table 15: Correlation Coefficient between development of market and each commodity

Commodity groups	Commodities	Correlation Coefficient	Sig. (P-value)
Forest products	Moc nhi	-0.900	0.019
	Dried bamboo shoots	-0.821	0.044
	Fresh bamboo shoots	0.783	0.059
	Red root (Re do)	-1.000	0
	Canh kien (Benzoin)	-0.707	0.091
	Sa nhan (Cardamom)	-0.707	0.091
	Cu nau (Brown Tuber)	-0.707	0.091
	Rattan (Day song)	-0.447	0.225
	Moc	-0.707	0.091
	Cu 30 (Medicinal plant)	-1.000	0
	Co cum (for making hat)	-0.707	0.091
	Cay tang (for dying cloths)	-0.707	0.091
	Day then (for betel chewing)	-0.900	0.019
	Groom-grass	0.1	0.436
	Round timber (Go tron)	-0.975	0.002
	Neohouzeaua (Nua cay)	-	-
	Neohouzeaua (Nua thanh)	-0.707	0.091
Bamboo (Giang)	-0.949	0.007	
Livestock	Buffaloes	0.894	0.02
	Cows	0.894	0.02
	Pigs	1.000	0.001
Crops	Canna	-0.707	0.091
	Ginger	0.783	0.095
	Dried tea	-1.000	0
	Dried cassava	-1.000	0
	Fresh cassava	0.667	0.109

Note : "-": No relation with the development of the market

Table 15 demonstrates the relation between the evolution of the market and each commodity produced and exploited by Tat villagers over the study periods. According to the results in this table, almost all forest products are negatively correlated to the number of collector middlemen in Tat village. This reflects the fact that the supply of forest products has gradually declined since 1986 while the number of middleman collectors increased from 1 in 1986 to 13 in 2003.

Since 1986 when the Government of Vietnam (GoV) started to apply policies to transform its economy from central planning to market mechanism, the number of collectors, private enterprises, wholesalers and retailers has significantly increased. The commodities in the market also have diversified and are of a larger quantity. The development of the external market has partly affected agro-forest product markets in Tat village. Specifically, the diversity of industrial commodities such as textiles and industrial dye has replaced many forest products that the Tat villagers used to exploit to satisfy the demand of their households and community. Those products are benzoin (*canh kien*), cardamom (*sa nhan*), brown tuber (*cu nau*), rattan (*day song*), *moc*, *co cum* and *cay tang*. At present Tat villagers do not go to the forest to exploit these products. Regarding timber, and bamboo stem (*nua thanh* and *giang*), there are fewer exploiters than during the previous stages. The quantities of timber (*go tron*), neohouzeaua (*Nua thanh*), bamboo (*giang*), benzoin (*canh kien*), cardamom (*sa nhan*), brown tuber (*cu nau*), rattan (*day song*), *moc*, *co cum* and *cay tang*, therefore, are negatively correlated to the number of collectors in Tat village market. In the exceptional case of neohouzeaua stem (*nua cay*), the survey data in 2004 shows that this product is still exploited by farmers but it seems to have no relation to the fluctuation of the market because it probably is not affected by the changes of the market. For the forest products, the Tat villagers presently focus on gathering several products including broom-grass and bamboo shoots. Concerning the bamboo shoots, the villagers can sell their fresh bamboo shoots at Tat village right after collecting from the forests thanks to the active market created by the development of external market and internal infrastructure. Thus, in Tat village market, the quantity of fresh bamboo shoots has gradually substituted the dried bamboo shoots. The villagers processed the dried bamboo shoots for the consumption of their own family only, then the quantity of dried bamboo shoots sold in this market has reduced constantly. The relation between bamboo shoots and market also is clearly depicted by the correlation coefficients of which dried bamboo shoot is (-0.82) and fresh bamboo shoots is 0.78 at a 95 percent significance level. Thus, in terms of forest protection, the development of the market has partly restrained the exploitation of forest products particularly at Tat village.

Moreover, the credit policy and the development of the market has positively affected the livestock produced and sold by the households. The correlation coefficients between the quantity of buffaloes, cows, pigs and the number of collectors in the market are positive with 95 percent of significant. Moreover, the value of these coefficients is larger than 0.9, it reflects that the development of market has positively and closely correlated to households' animal husbandry.

Regarding crops, farmers consume a part of the harvest and sell the remainder on the market to increase their income. Thus, the production of crops is partly affected by fluctuations of market price. Nevertheless, crop supply additionally depends on the natural conditions including weather, pests and diseases. On the other hand, production for market is limited by the amount of land allocated to each household. Taking canna root as an example, the survey data in 2004 show that both canna and cassava are two main commodities sold in Tat village market; therefore, they could be positively affected by the development of the

market. However, in 2003, canna was affected by disease and its yield fell considerably; therefore, the correlation coefficient between total physical production of canna and the number of middleman collectors bore a “minus” sign, implying negative correlated to the development of the market. Thus, due to a disease affected the crop an error in the analyzed relation between the market and canna production in Tat village may occur. The relationship between the development of market and the production of other commodities such as dried cassava, fresh cassava, ginger and dried tea are evident from table 15. Under the development of the market, dried cassava and fresh cassava have become substitutes. Before 1986 when there were only a few collectors in the market, fresh cassava was often dried and stored to be able to be used over a longer period. Since 1986, because of increasing numbers of collectors, the villagers can sell their cassava whenever they want within the harvest season or when they can get a good price. Because the villagers have no longer produced dried cassava, the quantity of dried cassava is negatively correlated to the number of collectors in Tat village market. Inversely, the quantity of fresh cassava sold in this market is positively correlated to the number of collectors in the Tat village market (the correlation coefficient is 0.67 at significant level of 0.1). In other words, the development of the market has positively affected the supply of fresh cassava and reduced the quantity of dried cassava produced by Tat villagers.

Additionally, production of dried tea was also strongly affected by the development of the market. During the central planning regime, when the commodities produced could only be sold through the cooperative, the farmers in Tat village planted tea, dried the harvested tea and sold to the cooperative. However, since 1986, the marketing of commodities has developed, products are delivered easier, and products within the same commodity group are more competitive. The dried tea produced in Tat village can not compete with the tea produced in Thai Nguyen in terms of either quality or packaging. The quantity of dried tea in Tat village, therefore, has significantly declined since 1986. According to the assessment by farmer groups in Tat village, the score of this reduction is from 10 before 1985 to 3 in 2003 (table 8). At present, Tat villagers produce dried tea for their own consumption only but not for sale in the market. This relation is clearly depicted by the negative correlation between the quantity of dried tea and the number of collectors in Tat village market in table 15 ($r = -1$; significant level of 99 percent). Thus, the development of market in Tat village in particular and external markets in general has reduced the quantity of dried tea produced by Tat villagers.

Examining the correlation between the fluctuation of market and the quantity of each commodity over the periods shows that development of the market has affected some agro-forest products positively, some negatively and some others have no significant relationship.

5. Marketization

The results presented so far have shed light on the several dimensions of marketing but have not led to overall policy recommendations as to how to increase overall “marketization”, defined as the *percentage of the total output value of goods produced by a household that its members decide to sell*. This important measure of economic modernization is of strategic importance to Vietnam, whose leaders are promoting, among other ideals, “industrialization” and “globalization”; for without a greater flow of goods onto markets, neither will be possible.

Our goal in this section is therefore to find out the characteristics of households that lead them to market a greater percentage of their output. Once these factors are identified, the

government can put into place policies (such as subsidies, investments, or promotion campaigns) for helping new households put those positive factors into place. Similarly, if some household characteristics are negatively correlated with marketization, the government can *tax or otherwise discourage* those latter elements.

The first step of this search involves comparing the relative variability of all characteristics across households. If some characteristic, such as years of education, is virtually constant, while marketization is quite variable, we may predict that education will not be a key explanatory variable to account for why some households are currently marketing only three of their output value, while others market a full 100 percent, with a mean of 33.7% (top line, Table 16). The remaining rows in table 16 therefore list a sample of the most and least variable factors in our 38 household population.

We find, at the bottom of the list, several variables whose coefficients of variation (standard deviation divided by the mean) is less than that of marketization (77.3%). We may thus predict that, for example, the total value of all crop and livestock products, distance to market in minutes, age of the household head, and marketized percentages of corn and cassava might seem strong candidates for explaining marketization, they do not vary enough to become a good candidate for explaining variations in marketization. We may therefore eliminate them.

On the other hand, the top of the table show some variables with great variability. These include owning cassettes, radios and televisions; the marketization percentage of all livestock, the gender of the household head, and the total value of forest products sold, and. These will likely become key explanatory variables that government policies can try to promote as it encourages marketization.

The next step is to seek the variables which are most highly correlated with both overall marketization and the marketization of individual commodity groups: crops, livestock, fruits, etc. While in statistical analyses of other economic relations, such a correlation matrix often is very helpful in selecting variables for subsequent regression analysis, Table 17 shows that only four variables seem to have a direct and highly significant individual correlations to marketization. These are the marketized percentage of all livestock, and the the marketized percentage of all crops (both with a positive influence); and owning a television and paddy land per capita in both 1999 and 2004 (negative influence). The first two variables suggest that the major commodities soled are livestock and crops, rather than forest products. It makes sense that the more paddy land one has, the less one has to sell other crops to buy rice. But the negative sign on television ownership is counter-intuitive; because we have seen that televisions are a key source of information for economic planning in general and marketing in particular.

Table 16: Descriptive statistics and the coefficient of variation

Descriptive Statistics	Minimum	Maximum	Mean	Coeff. Variation
Marketization	3	100	33.7	78%
Off-farm income	0	13200	2077.6	154%
Own cassette	0	1	0.3	153%
Own radio	0	1	0.3	153%
Read newspapers	0	1	0.3	147%
Motorcycles per capita	0	0.33	0.1	146%
Hog numbers (head)	0	20	3.3	141%
Sold quantity of cassava (kg)	0	4000	709.7	140%
Own motorcycle	0	1	0.4	137%
Percentage crop sales in all sales	0	1	0.1	128%
Agricultural officer contact	0	1	0.4	122%
Gender of household head (1=female)	0	1	0.4	116%
Marketization percentage of all livestock	0	0.92	0.2	114%
Percentage of crop value in total hh income	0	52.49	9.7	106%
Total wealth per capita	0	3666.67	987.4	104%
Paddy land per cap in 1999	0	1000	204.6	93%
Percentage of livestock value in total hh income	0	93.05	30.8	92%
Own television	0	1	0.6	88%
Percentage livestock sales in all sales	0	0.93	0.4	86%
Total value of forest products sold	0	5420	1561.8	85%
Percentage of forest product value in total hh income	0	86.99	31.7	85%
Own bic ycle	0	2	0.8	84%
Paddy land per cap in 2004	0	1000	244.1	77%
Marketized percentage of all crops	0.03	1	0.3	71%
Percentage forest product sales in all sales	0	1	0.5	71%
Child and aged members of household	0	9	3.3	70%
Extension officer contact	0	1	0.7	69%
Total value of all crop and livestock products	2782	51195	16589.0	68%
Distance to the nearest market (minute)	10	180	47.7	60%
Watch films	0	1	0.8	49%
Percent sales income in total income	0.03	1	0.7	43%
Marketized percentage of cassava	0.06	1	0.8	42%
Watch television	0	1	0.9	35%
Number of members in household	2	9	4.7	35%
Age of interviewee	25	83	43.4	30%
Marketized percentage of other crops	0.57	1	0.9	21%
Marketized percentage of corn	0.56	1	0.9	18%

Table 17: Correlation matrix

		Marketization	Marketization percentage of all livestock	Marketized percentage of all crops	Marketized percentage of cassava	Marketized percentage of corn	Marketized percentage of other crops
Marketization	Pearson Correlation	1	.712(**)	.702(**)	0.122	0.146	0.688
	Sig. (2-tailed)	.	0	0	0.597	0.634	0.199
	N	37	36	31	21	13	5
Marketization percentage of all livestock	Pearson Correlation	.712(**)	1	0.314	-0.258	0.244	0.519
	Sig. (2-tailed)	0	.	0.091	0.273	0.445	0.37
	N	36	36	30	20	12	5
Marketized percentage of all crops	Pearson Correlation	.702(**)	0.314	1	0.275	0.219	0.091
	Sig. (2-tailed)	0	0.091	.	0.228	0.473	0.884
	N	31	30	31	21	13	5
Marketized percentage of cassava	Pearson Correlation	0.122	-0.258	0.275	1	0.42	1.000(**)
	Sig. (2-tailed)	0.597	0.273	0.228	.	0.226	.
	N	21	20	21	21	10	2
Marketized percentage of corn	Pearson Correlation	0.146	0.244	0.219	0.42	1	0.737
	Sig. (2-tailed)	0.634	0.445	0.473	0.226	.	0.263
	N	13	12	13	10	13	4
Marketized percentage of other crops	Pearson Correlation	0.688	0.519	0.091	1.000(**)	0.737	1
	Sig. (2-tailed)	0.199	0.37	0.884	.	0.263	.

		Marketization	Marketization percentage of all livestock	Marketized percentage of all crops	Marketized percentage of cassava	Marketized percentage of corn	Marketized percentage of other crops
	N	5	5	5	2	4	5
Marketized percentage of spring rice	Pearson Correlation	.(a)	.(a)	.(a)	.(a)	.(a)	.(a)
	Sig. (2-tailed)	.	.	.	.	.	.
	N	1	1	1	1	0	0
Marketized percentage of summer rice	Pearson Correlation	.(a)	.(a)	.(a)	.(a)	.(a)	.(a)
	Sig. (2-tailed)	.	.	.	.	.	.
	N	1	1	1	0	1	1
Agricultural officer contact	Pearson Correlation	-0.205	-0.064	-0.166	0.073	0.094	-0.21
	Sig. (2-tailed)	0.223	0.711	0.372	0.753	0.76	0.735
	N	37	36	31	21	13	5
Dependency ratio	Pearson Correlation	-0.172	-0.034	-0.225	-0.171	0.234	-0.071
	Sig. (2-tailed)	0.31	0.846	0.224	0.458	0.441	0.91
	N	37	36	31	21	13	5
Extension officer contact	Pearson Correlation	-0.122	-0.178	-0.109	0.19	0.253	.(a)
	Sig. (2-tailed)	0.471	0.299	0.561	0.41	0.404	.
	N	37	36	31	21	13	5
Gender of household head (1=female)	Pearson Correlation	0.266	0.143	0.273	0.195	0.127	0.21
	Sig. (2-tailed)	0.111	0.407	0.138	0.396	0.679	0.735
	N	37	36	31	21	13	5

		Marketization	Marketization percentage of all livestock	Marketized percentage of all crops	Marketized percentage of cassava	Marketized percentage of corn	Marketized percentage of other crops
Listen to local broadcasts	Pearson Correlation	-0.257	-0.147	-0.007	-0.02	0.287	0.343
	Sig. (2-tailed)	0.125	0.392	0.97	0.93	0.342	0.572
	N	37	36	31	21	13	5
Listen to the radio	Pearson Correlation	-0.262	-0.242	-0.076	0.224	0.092	0.84
	Sig. (2-tailed)	0.118	0.155	0.686	0.328	0.765	0.075
	N	37	36	31	21	13	5
Motorcycles per capita	Pearson Correlation	-0.178	-0.026	-0.187	-0.082	-0.028	0.343
	Sig. (2-tailed)	0.292	0.881	0.313	0.724	0.927	0.572
	N	37	36	31	21	13	5
Off-farm income	Pearson Correlation	-0.233	-0.123	-0.156	0.297	0.28	0.061
	Sig. (2-tailed)	0.164	0.476	0.401	0.191	0.354	0.923
	N	37	36	31	21	13	5
Own bicycle	Pearson Correlation	-0.12	-0.03	0.007	0.314	-0.106	0.086
	Sig. (2-tailed)	0.48	0.862	0.97	0.166	0.731	0.891
	N	37	36	31	21	13	5
Own cassette	Pearson Correlation	-0.216	-0.255	-0.158	0.017	-0.538	.(a)
	Sig. (2-tailed)	0.199	0.133	0.397	0.94	0.058	.
	N	37	36	31	21	13	5
Own radio	Pearson	-0.054	0.11	0.082	0.002	0.449	0.56

		Marketization	Marketization percentage of all livestock	Marketized percentage of all crops	Marketized percentage of cassava	Marketized percentage of corn	Marketized percentage of other crops
	Correlation	0.752	0.522	0.659	0.992	0.124	0.326
	Sig. (2-tailed)						
	N	37	36	31	21	13	5
Own television	Pearson Correlation	-.411(*)	-0.137	-0.283	0.131	0.237	-0.84
	Sig. (2-tailed)	0.011	0.424	0.123	0.571	0.436	0.075
	N	37	36	31	21	13	5
Own motorcycle	Pearson Correlation	-0.224	-0.057	-0.225	-0.102	-0.024	0.343
	Sig. (2-tailed)	0.182	0.742	0.223	0.661	0.937	0.572
	N	37	36	31	21	13	5
Paddy land per cap in 2004	Pearson Correlation	-.468(**)	-0.177	-.475(**)	-.537(*)	-0.066	-0.219
	Sig. (2-tailed)	0.003	0.301	0.007	0.012	0.831	0.723
	N	37	36	31	21	13	5
Paddy land per cap in 1999	Pearson Correlation	-.405(*)	-0.166	-.421(*)	-.586(**)	-0.032	-0.16
	Sig. (2-tailed)	0.013	0.333	0.018	0.005	0.917	0.797
	N	37	36	31	21	13	5
Read newspaper	Pearson Correlation	0.049	0.196	0.153	0.183	0.195	-0.21
	Sig. (2-tailed)	0.775	0.253	0.411	0.428	0.522	0.735
	N	37	36	31	21	13	5
Send and read mail	Pearson Correlation	-0.248	-0.162	-0.08	0.152	0.194	.(a)

		Marketization	Marketization percentage of all livestock	Marketized percentage of all crops	Marketized percentage of cassava	Marketized percentage of corn	Marketized percentage of other crops
Up land per capita in1999	Sig. (2-tailed)	0.139	0.345	0.67	0.511	0.525	.
	N	37	36	31	21	13	5
	Pearson Correlation	-0.115	-0.251	-0.002	0.166	-0.239	0.22
	Sig. (2-tailed)	0.497	0.14	0.991	0.471	0.432	0.722
	N	37	36	31	21	13	5
Watch films	Pearson Correlation	-0.147	0.001	0.068	0.351	-0.173	-0.21
	Sig. (2-tailed)	0.386	0.997	0.718	0.118	0.572	0.735
	N	37	36	31	21	13	5
Watch television	Pearson Correlation	0.027	-0.159	0.153	0.419	0.42	.(a)
	Sig. (2-tailed)	0.874	0.353	0.411	0.059	0.153	.
	N	37	36	31	21	13	5

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

a Cannot be computed because at least one of the variables is constant.

We must therefore go directly to the final step, and include all the likely variables from steps one and two into a regression equation to explain percentage marketization. The results of the most satisfactory equation resulting from this process are listed in table 18.

This equation has important policy and strategic implications for market development. If the government, community organizations, university research groups or NGOs wish to stimulate marketization, they need to promote the following positive factors: *marketization percentage of all livestock, total value of forest products sold, female-headed households, reading newspapers, have contact with extension officers, owning cassette-players, and owning televisions*. Negative factors are the amount of paddy land or upland per capita (reducing the need to market to obtain food), the number of people in household (reducing the post-consumption product available for sale), watching films, sending and reading mail, and owning a bicycle. These results imply that a *population control* policy, and the introduction of more *educational content* on television and radio seem good ways to promote marketization.

Table 18: Positive and negative determinants of the degree of marketization

	Regression Coefficients	t-statistic	Sig. level (chance of error)
<i>(Constant)</i>	34.5	4.2	.000
<i>Marketization percentage of all livestock</i>	63.5	7.6	.000
<i>Total value of forest products sold</i>	-011	5.9	.000
<i>Paddy land per cap in 2004</i>	-.03	-2.7	.012
<i>Up land per capita in 2004</i>	-.008	-2.6	.015
<i>Gender of household head (1=female)</i>	6.0	1.7	.096
<i>Number of members in household</i>	-3.3	-2.4	.024
<i>Watch films</i>	-26.8	-3.0	.007
<i>Send and read mail</i>	-12.4	-1.8	.088
<i>Read newspapers</i>	9.3	1.7	.100
<i>Extension officer contact</i>	9.5	2.0	.053
<i>Own cassette</i>	12.7	1.9	.069
<i>Own television</i>	20.6	2.7	.012
<i>BICDUMMY</i>	-7.7	-1.7	.100
<i>F-value</i>		16.537	.000
<i>Adjusted R Square</i>		0.852	

Dependent Variable: *Marketization*

6. Conclusions

After studying the market accessibility and agro-forest product marketing in Tat, we have concluded the following:

- Market access of Tat villagers has improved over the years. However, that improvement has not yet satisfied the demands of agro-forest production and livelihood standards of farmers. The roads in the latest five years have not changed. Transportation accessibility has remained limited due to the little public transportation and personal transportation means; given the great distance from Tat village to the center of district, the province and cities. Transportation is the dominant factor which affects the goods exchanged and marketing of products produced by Tat villagers.

- Agriculture production of this village still focuses on self-sufficiency with small quantities of commercial commodities, especially rice and small animals.

- The dominant commodities in this village are cassava and canna, which can be taken into the planning of the specialized production region attached to the small processors at the household level to promote the comparative advantage of those products and to change the custom of self-sufficient production of these villagers.

- In one hand, it is necessary to promote the following positive factors: marketization percentage of all livestock, total value of forest products sold, female-headed households, reading newspapers, have contact with extension officers, owning cassette-players, and owning televisions. On the other hand, a *population control* policy, and the introduction of more *educational content* on television and radio could be the good ways to promote marketization.

- In general, the conditions or factors of market accessibility have not yet strongly affected production decisions or marketing at household level. This confirms that the market accessibility of the farmers in this village is still limited. Access should be improved by development of the road system, an increase of public transportation services and personal transportation means and a raising of the education level of the local villagers. The factors related to infrastructure and information should be promoted to make the markets work better for the farmers of Tat as well as in Northern Upland Region.

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