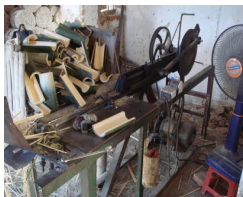


AWARENESS CREATION ON PRODUCTIVE USE OF ENERGY IN RURAL AREAS OF VIETNAM



Report on CASE STUDIES ANALYSIS

HANOI, JANUARY 2009

TABLE OF CONTENTS

A	INTRODUCTION	4
B	CASE STUDIES	5
I	ORGANIZATION OF THE SURVEY	5
I.1	Objectives	5
I.2	Arrangement	5
I.3	Provinces/ Districts/ Communes selected	6
I.4	Methodology for the implementation	6
II	LESSONS LEARNT	7
II.1	Categories of productive activities	7
II.2	Sizes of productive activities	8
II.3	Features of some representative models	13
II.3.1	Production of food and animal feed.	13
II.3.2	Handicraft activities	16
II.3.3	Mechanical/ electric repairing workshops	22
II.3.4	Production of construction materials	24
II.3.5	Other activities	25
III	CONCLUSIONS AND RECOMMENDATIONS	27
C	SOCIAL ORGANIZATIONS AND AWARENESS CREATION	29- 31

ANNEXES

- ANNEX 1. Field research guide for Area 6 activity.
- ANNEX 2. Questionnaires
- ANNEX 2A. Questionnaire for Commune Survey on Productive use of energy;
- ANNEX 2B. Questionnaire for household survey on Productive use of Energy;
- ANNEX 2C. Questionnaire for group of households/ cooperatives on Productive use of Energy
- ANNEX 3. List of productive activities existing in provinces (DOIT statistics)
- List of productive activities in Ha Giang province
 - List of productive activities in Hoa Binh province
 - List of productive activities in Phu Tho province
 - List of productive activities in Quang Nam province
 - List of productive activities in Quang Ngai province
 - List of productive activities in Yen Bai province

ABBREVIATIONS

CPC	Commune People Committee
DDIT	District Division of Industry and Trade
DOIT	Department of Industry and Trade
DPC	District People Committee
MOIT	Ministry of Industry and Trade
NGO	Non-Government Organization
PPC	Provincial People Committee
SIDA	Sweden International Development Cooperation Agency
VSRE	Vietnam Sweden Rural Energy
VND	Vietnam Dong (Vietnam currency)
WB	The World Bank

A. INTRODUCTION

Creation and development of income generation activities is a key for improving living standards in rural areas and overcoming poverty. Promotion of productive use of electricity in rural areas is a logical measure in supporting initiatives which will meet the overall economic development objective.

Many studies show that access to electricity and other forms of clean and efficient energy (e.g. heat and mechanical power) have positive development effects on rural communities. The possibility of using electricity in production will help households diversify and expand their economic activities towards micro/small rural businesses and industries, creating jobs and incomes and thus improving living standards. Access to electricity can help people alleviate drudgery of works, increase productivity, produce goods for trade or even generate significant increases of income if used for productive purposes, e.g. handicraft work development, agricultural products processing, water pumping and irrigation, etc.

The following issues need to be addressed:

- (i) Enhance the recognition of the positive impacts that electricity can bring for micro/small industrial production units in rural areas;
- (ii) Stimulate attention of administrative agencies and social organizations in creating favourable conditions and taking measures to assist the development of micro/small industrial productive activities in rural areas;
- (iii) Encourage financing and programmes from the private sector and international organizations for promotion of rural productive use of energy;

The Vietnam-Sweden Rural Energy Programme (VSRE), based on an agreement between Sida and WB, now extends its activities to Area 6: “ **Awareness Creation on Productive Use of Energy in Rural Areas of Vietnam**”. This one year implementation period is from mid 2008 to mid 2009. The work consists of several activities, among which a case studies survey in six provinces is one component: “*Review of experiences from productive uses of energy in rural areas*”.

During three months, from July to September 2008, the team of Area 6 consultants with the support of local provincial experts, conducted surveys in several villages of the six provinces of Ha Giang, Phu Tho, Hoa Binh and Yen Bai in the Northern region and Quang Nam and Quang Ngai in the Central region of Vietnam. The purpose of the surveys has been to identify and document existing types of productive use of electricity in economic activities. The selected case studies have been studied and analyzed. Examples which are suitable for dissemination will be proposed.

This document presents the report on case studies analysis. The consultancy team of Area 6 acknowledges the support and cooperation provided by the staff and officers of the Departments of Industry and Trade, the Industry Promotion Centers of Ha Giang, Phu Tho, Yen Bai, Hoa Binh, Quang Nam and Quang Ngai provinces, the People’s Committees of the districts, communes participating in the survey, mass organizations (e.g. provincial Women’s Associations, Youth Unions, Farmer’s Associations, etc.), households, cooperatives, enterprises and individuals who willingly provided valuable information and helped in one way or the other in making the survey and this report possible.

B. CASE STUDIES

I. ORGANIZATION OF THE SURVEY

I.1 Objectives

- Identify and collect information on existing types of productive uses of electricity in economic activities in rural areas
- Collect information on the readiness and possibilities of public organizations participating in participating with an awareness campaign and further dissemination of good productive use models;
- Provide inputs to the development of an awareness campaign strategy for promotion of productive use;

I.2. Survey organization

The site survey was conducted according to VSRE Area 6 Work Plan which was approved by MOIT and SIDA. According to this, six (06) provinces were selected for the implementation of Area 6 activities. They are Ha Giang, Hoa Binh, Phu Tho, Quang Nam, Quang Ngai and Yen Bai. They are mountainous provinces and/or provinces facing severe difficulties. Many ethnic minority groups live in these provinces. They face enormous difficulties to develop economic activities in their living areas. At the start of Area 6 activities, an official letter from MOIT was sent to the Provincial People's Committees (PPC) requesting their participation in and cooperation with Area 6 activities. All provinces agreed to join in the project, promised to create good conditions for project implementation and assigned the Departments of Industry and Trade (DOIT) to be the focal points for the cooperation with VSRE consultant team.

To arrange the survey, DOITs of the selected provinces were asked by VSRE office to organise preliminary communication with the District Divisions of Industry and Trade (DDIT) to provide statistics on productive activities existing in the rural areas of the district. A matrix was set up by the team of consultants, showing the name of activities and their corresponding locations. The team of consultants and the provincial DOITs selected the districts to be investigated. The selection included districts located in plains as well as in remote mountainous areas, allowing the coverage of most productive activities existing in the province. In some cases, districts with very specific conditions (e.g. heavily affected by the war) were also selected. Prior to VSRE team mission, the selected districts were informed by DOITs about the plan and purpose of the survey.

The survey team consisting of Area 6 consultants, a local (provincial) expert recruited by VSRE office and a representative of DOIT organised one day trips to each selected district. A meeting with the District People Committee (DPC) was organized to present the purpose of the mission, to gather some overall information on the district and to arrange the trips to the communes. The Chairmen of Commune People Committees (CPC) were informed by phone about the purpose of mission to the commune and the need for information. By DPC assignment, a representative of district administration accompanied the team travel to the communes (usually the chief of DDIT takes this assignment). At commune level, a brief meeting with the Chairman of CPC was organized to select the cases for survey. The CPC Chairman led the mission team to selected households/enterprises introduced the team and the purpose of the survey.

I.3. Provinces/ Districts/ Communes selected for the survey

Based on the discussion with provincial DOIT(s) and guidance from DPC(s), the districts and communes selected for survey included:

Ha Giang province:

- Meo Vac district (Tat Nga/Na Chao commune/village, Meo Vac town-let)
- Quang Binh district (Hong Linh, Hung An, Viet Quang communes)

Hoa Binh province:

- Luong Son district (Luong Son town-let)
- Kim Boi district (Ha Bi town-let)
- Hoa Binh town outskirts

Phu Tho province:

- Thanh Son district (Phu Ha, Xuan Hung communes, Thanh Son town-let)
- Cam Khe district (Huong Lung commune, Cam Khe town-let)
- Thanh Ba district (Do Xuyen, Dong Linh communes, Thanh Ba town-let)

Quang Nam province:

- Hiep Duc district (Tan An, Que Tho/ Mau hamlet, Hiep Duc town-let)
- Dai Loc district (Ai Nghia commune)
- Duy Xuyen district (Duy Phuoc commune)
- Dien Ban district (Dien Phuong/ Dong Khuong I, Dien Quang, Nong Son, Dien Phuoc communes)

Quang Ngai province:

- Tra Bong district (Tra Xuan commune, Tra Xuan town-let)
- Son Tinh district (Tinh Ha, Tinh Minh, Tinh Ky communes, Son Tinh town-let)
- Ba To district (Ba Cung commune, Ba To town-let)
- Binh Son district (Binh Chanh, Binh Trung, Binh Son communes, Chau O town-let)

Yen Bai province:

- Van Yen district (Mo A, Mo Dong communes)
- Van Chan district (Son Tinh, Nam Muoi communes)
- Nghia Lo district (Nghia An commune)

I.4 Methodology for the implementation of survey

In the same village, several households may apply the same productive model. The team undertook the survey by randomly selecting and interviewing entrepreneurs that could represent the selected productive model. Pictures or video footages were taken during and sometimes beside the formal interview.

Questionnaire, recorder, camera were the main tools used during the surveys.

A general guideline of the survey methodology was prepared and thoroughly explained to all members of the survey team prior to the surveys. The interviewee received a short briefing about the questionnaire in the beginning of interviews.

During the interviews, brief notes were taken by the interviewer. The conversation was recorded, some VDO footages of the interview and of the productive use facilities were also taken.

The questionnaires

In order to gather systematic information, a set of questionnaires were prepared. They were part of the guideline of the survey methodology that was submitted to MOIT. Three separate sets of questionnaires were prepared separately for: (1) households, (2) groups of households/cooperatives/enterprises and (3) commune/village representatives. These can be found in Annex 2.

Notes from the surveys

Annex 4 summarizes the information related to the 58 cases that have been surveyed in the 6 provinces: 8 in Ha Giang, 10 in Hoa Binh, 10 in Phu Tho, 9 in Quang Nam, 16 in Quang Ngai, and 5 in Yen Bai. The notes consist of a compilation of information from the three sources, including questionnaires, recorded interviews and VDO footages.

A brief Mission Report (Annex 3) was also prepared and submitted to MOIT and SIDA.

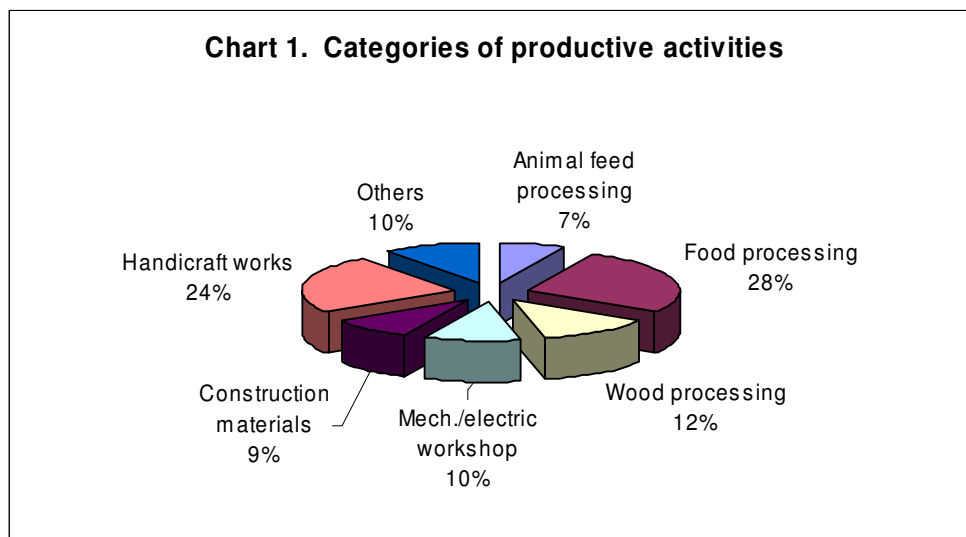
II. LESSONS LEARNT

II.1 Categories of productive activities

The activities were divided into some sectoral categories, such as:

- Food processing;
- Animal feed processing;
- Wood processing;
- Mechanical/electrical workshop;
- Production of construction materials (bricks; rock-cement bricks);
- Handicraft;
- Other activities, including irrigation, production of coal briquettes, ice making, mineral water production, etc.

The 58 productive activities are shown in Chart 1. The figures (%) do not reflect any actual quantitative repartition between existing activities in rural area today. However, the structure shows the relative share between different productive models existing in grid-connected areas. This does not only apply to the investigated provinces, but is also most probably applicable to the whole country. The methodology for site selection ensures that the most representative cases are investigated. The most frequent activities are food processing, handicraft and wood processing. **Food processing**, including the production of rice noodles, vermicelli, bread, tofu, as well as rice and maize milling are the most common activities. Household tea processing is a specific case as it is dependent on local raw material supply from tea plantations in provinces like Ha Giang, Phu Tho, and Yen Bai. . **Handicraft** production is another popular activity. It produces consumables for daily need, e.g. ceramics, bamboo chopsticks, bamboo fiberboards, wooden art pieces, incense sticks; sedge weaving, rattan/bamboo weaving, textile weaving, etc. **Wood processing** activities include furniture and wooden building material production. Other important activities include mechanical/electrical workshops, construction material production and animal feed processing. These activities, to a certain extent, are considered as 'traditional' ones. Beside food for daily subsistence, people need carpenters for building houses, making doors and furniture; blacksmiths for producing tools for household use and/or for farm works; weavers for textile production, etc. As soon as electricity is available, people immediately think about the ways to use electricity for reducing agricultural hard works (e.g. HG3 case of household mechanization in Ha Giang) or starting new businesses. Larger enterprises can be established and contribute to rural industrialization.



The surveyed activities are also analyzed in to other aspects, e.g.

- Size of business (*micro, small, or medium*);
- Investment (*VND 0-5; 5-30; 30-100 or >100 million*);
- Technology (*simple, medium, or advanced*);
- Market orientation (*local, domestic, export*);
- Transport needs (*negligible or need roads for goods transport*);
- Employees (*1-5; 5-10 or >10 workers*);
- Special production conditions (*Whether it needs unique raw material, special skills of workers, key customer, traditions?*).

Table 1 '*Factors for categorization of case studies*' shows the repartition of cases ranked according to the above criteria.

II.2 Size of productive activities

For analysis purpose and better reflecting the present rural conditions, productive activities have been deliberately divided into smaller categories called micro, small and medium sized businesses, though all cases mentioned in this report fall to the official category of micro-enterprises.¹

In this report, micro, small and medium sized businesses correspond to an investment lower than VND 30 million, between 30 and 100 million and larger than 100 million, respectively.

¹ For instance, the Decree 90/2001/ND-CP issued on 23 Nov. 2001 by the Government on "Support in the development of small and medium enterprises" defines the small enterprise as a enterprise which has less than 10 billion investment; medium enterprise is the enterprise which has larger than 10 billion investment but less than 300 labours).

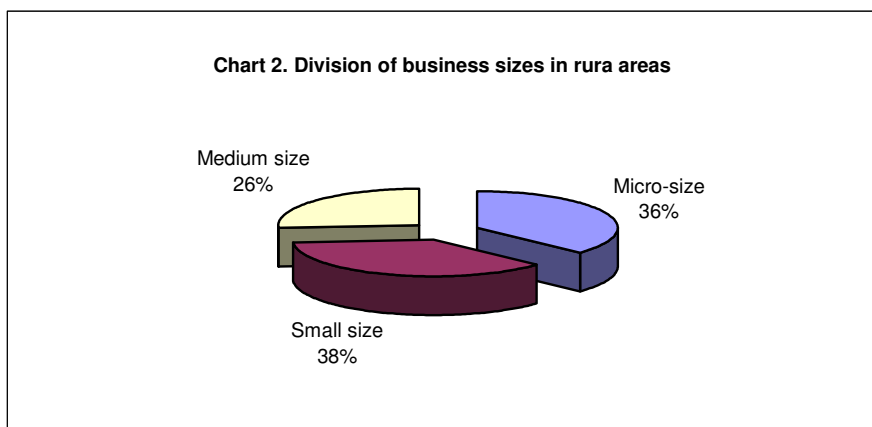
Therefore, micro sized businesses is a household model of production with an investment lower than VND 30 million. No external labour is needed. Members of the family run the business.

Small businesses refer to models with more than VND 30 million investment, and less than 10 external labourers. The business may be managed by one family or a group of households.

Medium sized businesses refer to enterprises which have more than VND 100 million of investment and hire more than 10 labourers. In some cases of the study, though the investment was higher than VND 100 million, the business could still not be considered as large size. Indeed large investment amounts were used for purchasing land rather than equipment and/or used for working capital. The amount of labourers was also limited. These cases can however not be considered as medium sized enterprises.

Larger sized enterprises do exist in rural areas. However, these usually are state or large private companies investments They are not part of this study.

The business size categories of the productive use cases from the six province survey, are shown in Chart 2. Among 58 investigated cases, 43 rank among micro and small businesses (21+22 cases). 15 cases rank among medium businesses. It is clear that the micro/small productive businesses in rural areas are the dominant models.



Some cases in Tab. 1 (e.g. HB1, HB3, HB6, HB8, HB9, HB10), should be absolutely ranked as big plants or companies rather than small and medium. Removing these cases from the medium sized activities in Tab 1, may give a different picture of the business size division leading to the dominance of micro/small business. A medium household in rural areas can try to invest a small amount of capital in the beginning of its business (less than VND 5 million) to open a micro activity (e.g. rice noodle, vermicelli or tofu making with a small daily amount to be sold on the local market). Larger amounts of capital (around VND 30 million) can be invested by 'richer' families, However, this size of business is not so far from the small size category (e.g. mechanical/electrical workshops producing tools for farmers and/or domestic use, and repairing electric equipment and devices for households; tea processing and dry rice noodle production shops, etc.). Investments of more than VND 30 million or even beyond VND 100 million to small or medium sized business will be put together either by a group of households/cooperative or by a household itself in a later stage, when enough benefits will have been generated from the long time doing with micro/small business. The types of activities are broadened, requiring higher technology levels and skills (e.g. large-scale mechanical workshops which can produce a complete equipment for a whole production line, etc.).

Generally, it could be drawn from the survey that, except for some micro sized activities for daily food production, a minimum investment of 30 plus million VND is necessary for opening a new productive activity in rural areas of Vietnam.

It is also noticeable that, among 21 cases of micro sized businesses, 8 cases have invested less than VND 5 million, while 13 have invested VND 5 - 30 million. These data stimulated some interesting discussions:

(i) Has the mode of productive use of electricity in rural areas changed as a result of rural electrification progress? After almost 15 years, the Vietnam rural electrification programme has been rather successful. Rural electricity networks have been continuously expanded to most rural places. In 1996, the rural population without electricity accounted 30 million people, and 4000 communes (out of a total of 9075) did not have any electricity supply. By the end of 2006, 8732 communes were electrified (96.2%) and 12.441 million out of 13.457 million rural households (91.91%) can access to and could use electricity for domestic and production purposes. After having experienced a reliable access to electricity for many years, more and more households can shift their business from micro to small and from small to larger size enterprises.

(ii) In parallel with the spectacular progress in rural electrification, poverty reduction in Vietnam has also achieved very good results. In rural areas, in 1993, 66.4% of population was living in poverty conditions. The rate was reduced to 22% in 2006. In the whole country, the GDP per capita in 1995 was around 145 USD. It raised to +/- \$700 in 2006. These figures imply that, people have a higher chance to start small businesses. This may explain why 5-30 million investments are in larger numbers than micro ones (with less than 5 million).

(iii) Investment in micro companies is only suitable for very small productive activities like household sized rice noodle production or tofu making. The market for these products is restricted to the village boundary with a limited number of consumers. Therefore, the production is relatively small (e.g. tens of kgs of product per day) and can not be stored for a long time (products must be sold and used within one day). If one or two sellers are trading the same product in the village, they may survive, but if some more people get into the same business activity, the business sustainability may be jeopardised. Hence, simple productive activities (e.g., micro production of rice noodle or tofu) may not always be appropriate for too many households (in the same village) to follow.

The size of rural productive models does not only relate to the size of investment, but also with other aspects which are classified in Tab.1 ('*Factors for categorization of case studies*').

Micro sized activities are mainly focusing on daily food production and animal feed processing which can have the common following characteristics:

- Simple technology. All of 13 surveyed cases use simple technology. Production methods are very traditional.
- The market for the products is at very local level. Usually this means that the producers can sell their products or services in the village or in the nearby villages. This characteristic is both an advantage and a disadvantage as mentioned several times in this report.
- As a consequence, transportation requirements are very limited.
- Skilled labourers are generally not required. The activities can be managed by family members.
- Necessary machinery and equipment are usually available at reasonable prices at the local market (district town-let)

- Investment is not high and can be afforded by a household. Therefore, these models are suitable for dissemination in rural areas due to a relatively small amount of money to be initially invested and reasonable returns on investment.

Most small or even medium sized businesses still use simple technologies. These activities produce a larger amount of products than the micro sized ones. Consequently, they will have other requirements.

Some conditions for the development of such activities are:

- Larger markets need to be taken care of.
- Marketing and transporting of the products are necessary;
- More employees are required with higher skills. They may need to travel and/or receive accommodation;
- Larger investments are required;
- Loans and other credit facilities from financial organizations like banks, donors or NGOs may be needed;
- Cooperation between several families/households as stakeholders in a cooperative or a joint stock company may be necessary;
- The capability to manage the whole business chain from setting up the production to delivering the products and getting the payments require experience and training.
- Reliability of electricity supply and reasonable price of electricity are essential.

Though the small and medium sized productive models in rural areas require larger investments that not every individual household can invest, cooperatives, private companies or large household businesses play a more and more significant roles in rural industrialization. These models will bring new technologies to the countryside and change the face of rural areas by locally producing necessary goods, by creating new jobs, and actively contributing to poverty reduction. Therefore, these models need to be encouraged. But it also requires more attention and support from the administrative bodies for building infrastructure facilities, developing the markets and providing the appropriate financial support.

Market penetration is one of the main weaknesses of most rural productive entrepreneurs. It does not only concern the household micro/small sized production facilities, but also large and well organized handicraft villages. As soon as the production increases, the 'traditional' market becomes too narrow and the owners must seek for larger areas to sell their products. Products have not necessarily been properly promoted and therefore, trading activities are limited. Producers do not know their new potential markets, their new consumer tastes and predilections and are not used to design and label their products in a proper way. In most cases, products are not very competitive. To solve the problem, strong supports from the governmental agencies and social organizations are necessary in providing information, capacity building, creating good conditions for product transportation, establishing the system of sales agents not only in the domestic market but also abroad, when the product can be exported. In the other side, the cooperation between households, cooperatives, traditional handicraft villages in production, creation of stable markets, etc., should be established to avoid unfair competition and ensure a sustainable productive development.

II.3. Features of some representative models

II.3.1. Production of food and animal feed.

Table 1 presents 21 cases of micro businesses, among which 6 cases are making fresh/dry rice noodles (HB5, PT7, QNg5, QNg10, QNg14, QN1), 3 cases making tofu (PT4, PT9, YB4), 2 cases of rice and maize milling (YB2, QNg13) and 2 cases of household processing tea (PT3, YB4). There are two additional cases (1 small and 1 medium sized) which are bakeries (HB8, QNg15). The typical model of household mechanization (HG3) represents the case of a group of household works where people use simple machines driven by motor to replace manual systems and increase the productivity either in the preparation of animal feed or in processing agricultural products (e.g. slicing cassava, etc.).

Production of fresh rice vermicelli/noodles (HB5, QNg5, QNg10, QN1)

The production of rice vermicelli requires a simple technology. After some hour soaking in water, rice is washed and milled in wet condition to make a rice starch. The starch is filtered and poured through a screen to shape the threads which fall into a large boiling water pot to be immediately cooked. White threads wrap up into small “coins” of vermicelli called ‘Con bún’. The coins of vermicelli are collected and dipped into fresh water to make vermicelli harder. Electricity is used for rice milling and noodle pressing by machines. Fresh rice vermicelli is commonly used in Vietnam for daily family meals. These micro businesses require VND 5-20 million of investment depending on the production scale. The largest household production will reach 150 to 200 kg of fresh vermicelli per day. The investment is needed for purchasing the wet rice milling machine and some auxiliaries.

The common characteristics of these models are:

- Low investment,
- Simple technology,
- Low skills labour requirements,
- Immediate consumption in the local market,
- Minimum road transportation.
- Residues from the process will be used as animal feed. Some families (e.g. in cases QNg5, HB5, etc.) have used pig manure to feed into a biogas digester producing enough fuel for cooking.

The constraint of this model is its reliance on a continuous local market availability and demand. As said before, the fresh rice vermicelli can not be stored. The market for this product is restricted to a limited number of consumers. Therefore, the number of producers in one village and their production quantities are limited.

Production of dried rice noodle (PT7, QNg14)

Though the product is also made from rice, it differs from fresh rice noodles. Dry vermicelli threads come from a dry process. Rice is dry milled, mixed with a small amount of water and pressed through an extruder to form dry rice noodle threads. By going through a hot pressing machine, noodles are pre-cooked. Noodles are cut to the appropriate length and air-dried before being packed. Depending on the market demand and timing availability, a family can process 100 kg of rice per day. By this, the family can earn 4-6 million VND/month. Dry rice noodles can be stored for some time. The total investment is lower than VND 20 million (for purchasing, for example, a dry mill with a 10 kW motor, and a pressing machine with a 2 kW motor).

The main characteristics of this model are the same as of fresh rice vermicelli. However, because of the fact that it is a dry product, it can be stored for some months, unlike fresh vermicelli which can only be kept for one day.

The product quality of this business activity is depending on the weather conditions for drying and storing the products. The problem will be solved by a drying facility, but it requires additional technology and investment.

Production of tofu (PT4, PT9, YB4)

Tofu is a very popular food used daily in Vietnamese meals. It is very easy to make. The raw material is soya bean. After cleaning and washing, soya bean seeds are ground with water to make soya milk. The milk is boiled up with some liquid yeast, kept some time for cooling and then cast in wooden moulds to form tofu cake. The investment for tofu production is low, definitely lower than VND 5 million.

The characteristics of this model are:

- Simple technology;
- Low initial cost (even with VND 2 million, a family can create initiate the business with one or two family labourers);
- Consumption is immediately in the local market;
- Road transportation for product is minimum. Tens kilogrammes of tofu can be carried by a bicycle to the local market;
- Residues from the process will be used for animal feeding. Building a biogas tank to get fuel for cooking shall be considered;
- It is a good and profitable activity. Entrepreneur can get a profit equal to +/- 25% of the material cost after deducting amortization and electricity expenses. The model is excellent for dissemination to help people start generating incomes (especially in off-grid mountainous areas) and improve their living conditions.

The difficulty for development of this model is the same as for fresh rice vermicelli. Tofu can not be kept for more than a day as it easily turn sour. The market is restricted to the village boundary. So is the number of consumers. Those are the barriers for the development and dissemination of this model.

Rice and maize mills (YB2, QNg13)

This service can often be met in villages. A family will invest about VND 5 to 15 million for a rice mill only or for two mills, one for rice and another one for maize, plus 2 million VND of working capital like in case YB2. Two rice mills driven by 5.5 kW motors will be enough for providing their services to all households in a village of less than 100 households. The work does not require skilled workers as the main actions are filling paddy in the machine, switching on the motor and collecting the milled rice. After that rice and bran are separated by sifting. Usually, the owners of the mills are also rice traders and animal breeders (bran can be used). They will generate incomes from all activities. It is known that rice millers are rarely poor. One or two households in each rural village should be encouraged to develop this service model.

The main features of this business are:

- Investment is not too high;
- It does not require high skilled professionals;
- High demand for that particular service;
- It is independent from the weather conditions;

- Rice bran is a good animal feed..
- It is a good and profitable activity. The millers use electricity for providing their services, collect service fees, without much other extra expenses.

Bakery (HB8, QNg15).

Case HB8, as mentioned in part II.2, is a large plant producing sweet cakes, which should in fact not have been part of this survey. Information on this case is provided in Annex 4 but will not be further analyzed. The case of bread production (QNg15) is a good example of household productive business. It is similar to other household sized food processing cases (rice noodle, vermicelli, tofu, etc.). This model does not require a large investment, external workers (in this case, two workers are relatives) or a high technology level. The raw material is wheat flour (50 kg/day). The main equipment is a bakery oven, a 2 kW motor driven blending machine and some trays and plates. Breads are manually made. The family earns a profit of VND 9,000/kg of flour.

Breads are taken and sold by retail sellers (boys/girls) in town-lets and/or in industrial zones. According to the owners of the bakery, the family can earn around 2 million VND/ month after deduction of all expenses,. The salary of workers is VND 700,000/month (excluding daily meals and accommodation)

This model is mainly suitable for places where enough clients can be found, i.e. near towns or industrial zones.

Household tea processing (HG5, PT3, YB4)

The size of household tea processing is dependent on the investment capabilities of the family. The technology for green tea production is a standard process. Tea leaves are collected from the tea plantations, to be withered either in air or in a simple drying vault at 60-70 °C for 10-15 minutes. They are passed in a crumpling machine to curl up for 5-7 minutes, then dried at high temperature (around 110 °C) in a drum drier for about 10 minutes. After that, tea is sorted out. The best quality tea will be further dried for a few minutes to get its fragrance and then air cooled. Tea leaves originate from surrounding areas, including family plantations. From 500 kg of raw tea leaves/day, the process can produce about 100 kg of processed tea per day. It is estimated that, in average, a household can generate a benefit of VND 5-6 millions/month (2008 price).

The main equipment for tea processing is:

- Drying vault (brick built tunnel with a net in top where tea leaves are laying on. Hot air is blew into the channel under the net);
- Crumpling machine;
- Drying rolling tank (drum);
- Other tools such as sifts and winnowing devices, scale, etc.

The total investment for a small scale tea processing installation is around 20 million VND.

- A drying rolling tank with a motor of 2 kW costs VND 7 million;
- a crumpling machine with a motor of 1 kW costs VND 8 million;
- Other tools such as sifts and winnowing devices, scale cost around VND 1 million.
- The working capital is around VND 4 million.

The model is good for dissemination in the areas where tea is planted. Its advantages are:

- Low investment;
- Small required space, (no land purchase).
- Stable earning.

Mechanization household (HG4)

A household can use machines driven by motors to reduce manual labour and increase household work productivity. These simple machines can be used, for instance, for chopping vegetables or grass, slicing cassava, milling rice and grinding maize, etc... These machines require simple technologies, easy to be purchased on local markets (domestic products or imported from China). A grass chopping machine, for example, costs VND 0.5 million.

II.3.2. Handicraft activities.

The most popular handicraft activities in rural villages are wood processing (HB7, PT6, HG8, QNg2, QNg3, QNg11, QNg12, QN8), rattan/bamboo processing (PT8, HG6, HG7, QNg4, QN3, QN9) and textile weaving (QN7, YB5).

Some special surveyed activities should be mentioned, including incense stick production (QNg 1); sedge mat weaving (QN6) and production of ceramics (HB2).

Handicraft production require investments of 30 to 100 million VND. It falls into the category of small enterprises. Technologies used for handicraft works are generally more sophisticated than in micro enterprises. It requires several skilled workers. In some shops (e.g. wood processing workshops (QNg2, QNg3, QNg11); bamboo processing workshops (HG6, HG7, QNg4, QN3), textile weaving workshop (QN7), etc.), the number of workers is higher than 10 people.

Wood processing activities (HB7, PT2, PT6, HG8, QNg2, QNg3, QNg11, QNg12, QN8)

The model of wood sawing and/or downstream wood processing is quite common every where in rural areas. Depending on the capital availability and/or professional skill, an entrepreneur will develop either wood sawing or for instance, a furniture factory or sometime invest in both processes. Sawing shops require higher investment for purchasing equipment and for the working capital (purchasing wood). In return, this activity does not require highly skilled workers. In the contrary, downstream wood processing workshops do not require large investments in equipment but need skilled workers, like wood carvers.

Usually, a sawing workshop (HB7, PT2, QNg3, QNg 11, QNg12) requires a one band sawing machine and one disk sawing machine, both driven by motors. These machines replace old manual saws. The auxiliaries include a wood feeder, a saw blade sharpener, and some other tools. Products of sawing workshops are boards, and sawn logs, which are delivered to wood workshops (carpentries, etc.) for further processing and producing wood furniture (e.g. case No. HG 8), or boards for parquet (e.g. case No. HG 6), etc. A band wood sawing machine costs around VND 20-60 million depending on the size.

At present, wood supplies become scarce. Wood is now mostly purchased from household planted lands (either private gardens or forest plantation lands leased from the Government), The use of natural forest wood is strictly regulated and even often prohibited. Wood sawing facilities, therefore, can often not operate at full capacity.

Downstream wood processing is a traditional profession in Vietnam which require skill and to a certain extent, talented workers for a variety of refined works. Some villages are famous for their specialization in certain jobs. Some specializes in making frame for traditional wooden houses, others in producing doors and windows, luxury furniture, or even some very sophisticated art pieces. Phu Ha village in Thanh Son district, Phu Tho province (case PT2) is a traditional handicraft village. The village has over 100 households pursuing various professions related to wood processing. Quang Nam province (case QN8) is specializing in wooden art decoration articles used for decorating antique houses, pagodas,

places of worship, etc. Those products are sold throughout the country, mainly in HCM City. Some wood processing professions are based on the local raw material characteristics. It is the case of Quang Ngai province (QNg2), which produces art articles from cinnamon bark. The Lam Yen village in Dai Loc district, Quang Nam province (case QN4) is specializing in drum making. In the first sight, these jobs seem very unique, very specific cases. However, the common 'value' of refined wood processing models can be highlighted

(i) As already mentioned, raw wood supply is a problem. Woods of class 1 (excellent quality long lasting precious woods and valuable wooden products which can only be extracted from deep natural forest) are becoming scarce . Bringing into play alternative local raw materials like in cases QNg2, QNg11, QN4, etc., deserves to be supported.

(ii) Downstream wood processing activities offer many job opportunities: skilled workers, assistants, trainees or simply unskilled labourers. The entrepreneur of case QN8, for instance, usually requires 40 workers, of which 1/3 are on-the-job trainees. Most of the trainees are young students from this area who graduated from secondary schools but failed in examinations for entering universities. 80 others who have been trained in this workshop work independently outside. Training is free of charge and trainees are paid around VND 300,000/month. Their lunches are freely provided. Foremen are paid 1 to 3 million VND/ month. The case shows that, models of downstream wood processing in have a significant role in capacity building and job creation for young people in rural areas and actively contribute to poverty reduction.

Investment in wood processing requires an initial investment capital of VND 30 to 100 million). That can not be borne by every household in rural areas. However, some carpenters in rural areas courageously invest their own money (individually or collectively with loans from the banks) to start their enterprises. With electricity supply, they can develop very fast, generate substantial revenues and contribute to the socio-economic development by providing new jobs, stable earnings, step-by-step eliminating hunger and reducing poverty. These models deserve to be promoted.

Rattan/bamboo processing (PT8, HG6, HG7, QNg4, QN3, QN9).

From the ancient time, bamboo is connected closely to people's life in the countryside. Bamboo and rattan is planted in gardens or grow wild in forest. In this analysis focus is on rattan/bamboo processing, mainly production of weaved articles (baskets, bailers, bamboo mats, rattan furniture etc.) for household on domestic or export markets.

Electricity is mainly used in rattan/bamboo processing for large scale mass production. Machines are used for splitting bamboos and rattans in the main shops. The semi-finished products (rattan fibers or bamboo bars) are then distributed to satellite households for processing (polishing and weaving) into final products. Products are then sent to the main shops and sent to sales agents for export or distribution to retail sellers.

Usually, a single household or a cooperative (a group of households cooperating for a common purpose) can act as focal points to receive production orders from sales agents and organize the production process from raw material supply, organisation of work, control of product quality, collection of products from producers, delivery to sales agents and management of payment issues. A rattan/bamboo processing basis can generate job for tens to hundreds of households, who can utilise spare time outside agricultural works to carry out this handicraft work.

Technology of the process as such is simple. It requires mainly dexterous hands. Electricity is used mainly for bamboo/rattan splitting, polishing of fibres and nailing of finished products.

The investment cost for rattan/bamboo processing basis is reasonable low, with less than VND 10 million for purchasing machines. Raw materials are usually paid partially when delivered and the rest after payment is received from sales agents. This mechanism means that the risk is shared by all parties in the production process – raw material suppliers, entrepreneurs and satellite working households, in case sale is being delayed or even worse if products are returned. It is very common that rattan/bamboo processing entities have limited reserves for working capital. Dependence on markets is therefore vital for this kind of economic activity.

The advantages of this kind of activity includes job creation for many people without requirement for special skill, small investment, easily available raw materials and simple technology. The case in Quang Nam province (QN9), for instance, was established by five wounded soldiers and provides work for 60 people. Establishment of this kind of business requires initial training of workers, marketing and market access (e.g. exhibition, seminars, study tours, etc.), help in accessing loan sources (for example from Social Policy Bank), etc.

Case PT8 represents bamboo processing works for construction materials in the form of **bamboo fiberboards**. The size of the boards is usually 2-3 m x 1.2-1.5 m (length x width). There are two kinds of bamboo fiberboards. Though the boards are commonly knitted manually from slender flattened well soaked bamboo bars, one kind of products can be used immediately (for casual works), while another type must be treated with heat and lacquered in a big heated pressing machine. This product can be used for a long time (e.g., for house partition shielding, etc.). Production of later kind of bamboo fiberboards requires investment for machines and higher technology than the first one.

Production of chopsticks (QNg4, QN3, HG6) is a new technology in Vietnam rural areas. The whole process from bamboo cutting to a chopstick size, bamboo splitting to a chopstick shape, chopstick polishing and whitening, disinfestations, heat treating, and packaging is mechanized and requires special machines and equipment. Chopsticks are sold not only in the domestic market, but also exported to other countries in Asia, especially to Taiwan, Hong Kong, China and Japan.

This model is suitable for households of middle class in rural areas. The workshop intensively uses electricity for production. It needs stable electricity supply of good quality. The initial capital can be covered by the family itself, borrowed from relatives or through a bank loan.

A household-size workshop for production of chopsticks can create jobs for several tens of young workers from surrounding area and hence contribute to reduce unemployment for the youth in rural areas.

The production requires a stable market for its output. Local administrations should pay attention in encouraging this kind of such productive activities in rural areas, extension and improvement of local transport conditions, approaching financial sources and providing advice in seeking markets.

Textile weaving activities (QN7, YB5).

Textile weaving wooden looms were very common in the countryside in the past. Weaving and sewing dexterity was a measure of a virtuous woman in the society of former self-supply economy.

Access to electricity means that motors can be used either in wooden looms or for new designed metal looms, to replace labour in operation of weaving process. Secondly, with the progress of mechanization, household operation of small sized textile weaving activities are very rare in modern society, with the exception of ethnic people operating wooden manual weaving looms for making very special brocades. Textile weaving activity is either developed in a whole village (as a cooperative), where textile weaving still remains a traditional profession, or concentrated in a big workshop with several tens to hundreds looms, producing the same kind of textile with the same quality of product. In both cases, individual households can participate in the production process through service to the cooperative or to the workshop, but do not deal with the trading process of production outputs. Promotion of this model is therefore not easy. Conditions are that either a cooperative (case YB5) or a strong entrepreneur must establish and develop the business. Experience in textile production and sufficient money for investments is required in both cases, especially when large-scale business is the objective (case QN7).

The family in case QN7, for example, has 17 years of professional experience in textile weaving when they established the company in 2005. The company covers all processes of textile production, including cotton thread reeling, textile weaving and starching. Cotton is bought from a plant in Nha Trang. The company provides threads to participating households for weaving. Households acquire weaving machines by themselves. The cost of a motor driven wooden weaving machine is about VND 3 million. 50 households in the village work for the company as producers. Total production of the company is 100,000 metres textile/ month (equal to 10 tons) of 1.2 metre width size. Two kinds of products are produced, the thin textile is used for sewing mosquito-nets (and used also for funeral rites) and the thick one is for dressmaking. Products of the company are delivered to and sold in provinces of central Vietnam. Each worker can operate 4-5 weaving machines. A motor driven machine can produce 40 or 60 metres textile/day, depending on thick or thin textile it needs to be produced. Productivity of a motor driven machine is twofold compared with a foot driven loom (which is served by one worker/loom).

Main equipment of the company is:

- + Motor driven weaving machines;
- + Reeling machines;
- + Starching equipment.

A textile weaving company as in case QN7 should pay sufficient attention to the measures for waste treatment, especially regarding dust and waste water, in order to protect health of workers inside the workshop and outside environment .

Model of case YB5 has been developed by Yen Bai Provincial Women's Association in Nghia An commune. This model provides job to about 500 women in the commune and hence contributes to the poverty reduction for women. However, the work is mainly based on embroidering rather than weaving. Several motor driven sewing machines are used for assembling the final products (seat cushions, pillows, traditional dresses of ethnic nationalities, etc.). This entity is located in and serves the Nghia An tourism zone. The importance of market orientation for production output is evident, and needs to be carefully considered whenever launching campaign for promotion and before starting any handicraft production in rural areas.

Special activities of handicraft works (QNg1, QN6, HB2)

Cinnamon incense stick production (QNg 1), sedge mat weaving (QN6), production of ceramics (HB2) are three case studies that have been investigated during the survey. They

are interesting examples of products and they are based on special raw materials and traditions.

The entity with ***cinnamon incense stick*** production was initiated by social organizations as a cooperative, with response from members of the Women's Association in the area. The objective was to reduce unemployment and poverty of women. The project required only VND 15 million initial investment, engaged a large number of female workers beside agricultural activities, and brings in relatively high and stable monthly earnings to the participating women (households). 15 permanent women are involved in the work. It means 15 households behind them that get extra job and earnings.

From the beginning, the Quang Ngai Provincial Women's Association with the cooperation of the Youth Union aimed at initiating a project for poverty reduction for women. A sub-project was implemented in the Tra Xuan commune. Two job training courses were organized for the founding members. The project granted initial investment for equipment. VND 15.5 million in 2003, financed from the project grant;

Raw material (cinnamon powder) is grinded in the main workshop and delivered to households for further processing (manually) into incense sticks. In average, 100 kg cinnamon powder/member/month is provided. Sales volume of the cooperative is 1.5 ton/month. Sales price is VND 25,000/kg of finished products (of which powder cost 5,000 VND, stick 10,000 VND/kg of bamboo sticks; labor 7,000 VND; amortization 500 VND/kg of product).

Earnings: VND 1.5 million/month/member. Additional provision of profit is done yearly.

Main equipment in workshop:

- + Grinding machine (supplier: An Ngai Mechanical Factory – Quang Ngai province).
- + Drying ovens;

Fuel for drying is coal or wood. From technological aspect, a twisting machine for making incense sticks should be designed and supplied to households. In principle, design of the machine may not be too complicated.

To cover working capital, each member of the cooperative has borrowed VND 5 million from the budget of the Women's Association for women poverty reduction. Interest rate is 0.65 %/month. The loan was totally repaid after 3 years (2006). A second loan of VND 25 million for 4 years was borrowed from the Social Policy Bank with 0.65 % interest/month.

Management staff of the cooperative must manage market contacts, consign and sell products in several dealers within the province. The market has been stabilized after two years of operation. It also means that after 2 years of operation the cooperative began to generate profit. The difficult two first years resulted in the loss of membership of the cooperative from 50 members in the beginning to 15 at present.

Incense sticks are widely used in society, for worships, spiritual rites, festivities, etc Cinnamon plants are planted in several places in Vietnam, of which Tra Bong (Quang Ngai) is very famous. Cinnamon barks have very warm, appealing scent, which develops a good feeling when incense sticks are burnt. However, cinnamon bark is not the only material for making incense sticks. In other places, people make them from sawdust of any wood mixed with aromatic spices. It is not important which material that is used for production, but the concern is how the material is processed. In this case, motor driven grinding machines are used instead of man force driven ones or even stone mortars. Electricity in this case significantly alleviates the hard work of women and increases productivity. This model should be considered for dissemination to other places.

Production of sedge mats is a traditional profession in Duy Xuyen district, Quang Nam province. However, the application of motor driven machines in sedge mat production is still not common and the case investigated (case QN6) seems unique in this area.

Moving from hand-loom to motor driven looms, the household in case QN6 has used weaving machine since 2005. Cost of the first machine was VND 28 million. In 2006, the second machine was acquired at a cost of VND 25 million and assembled by local technicians. For comparison, a wooden hand-loom costs 300,000 VND.

Sedges are split and dyed red, green, violet ... colours or kept white according to the flowers designed in mats. Instead of two people serving a wooden hand-loom, where one worker puts sedge fibres to the loom and the other weaves it by hand, the sedge weaving machine requires only one worker who provides fibres to a 'robot' hand and the machine can weave itself. One machine (one worker) can make 6 mats (1.5 x 2.0 m²) a day. The hand-loom with two people can make 4 mats of the same size a day.

Sedge cost is 7,000 VND/kg. One mat requires 4 kg of sedges. Mat sales price (in Da Nang) is 30,000 VND (hand made mat) and 60,000 VND (machine made mat)

Nga Son district in Thanh Hoa province has also a long tradition in sedge mat weaving and machines are already commonly used, while sedge mat production by machine in Duy Xuyen is still in experimental stage. According to Duy Xuyen DOIT, sedge mat production in Nga Son and Duy Xuyen has some variations, due to specific conditions of localities, which should be paid due attention when a certain successful model from this area is considered for dissemination to other places:

- + From technical side, two ends of Nga Son sedge trunks are each other equal while the sedges of Duy Xuyen have bigger roots and smaller tops. It does not seem suitable to bring a splitting machine from Nga Son to work in Duy Xuyen.

- + In Duy Xuyen, the enterprises which take the role of sales agents provide raw material (sedges) to households, while in Nga Son, enterprises only order products from households and the households buy themselves raw material.

- + Sedge mat make in Nga Son is professional production while Duy Xuyen people make mat in free time after field works. Probably because of this, weaving machines are still not used in Duy Xuyen mat production. The cost of manual weaving loom is much lower (~ VND 300,000) compared with the cost of machine loom (VND 25 million). The price of Nga Son sedge mats is lower than that of Duy Xuyen. It's because of higher productivity in Nga Son compared to Duy Xuyen and, as Duy Xuyen DOIT explains, salaries for labour in Duy Xuyen are higher than that in Nga Son.

Depending on taste and living conditions of consumers and given region, sedge mats produced manually or by machine will be preferred in this market but may not be in others, regardless the price. Dissemination of sedge mat production (made by machine in particular) should pay attention to this feature.

Ceramic production (case HB2) is a specific activity that requires certain conditions which cannot be matched everywhere, e.g. special clay source, know-how on enamel making up, skilled workers on ceramics, etc. Information of the case is available in Annex 4.

II.3.3. Mechanical/ electric repairing workshops (PT1, YB1, YB3, HG4, QNg6, QN2)

Forges and blacksmiths are common in most rural areas of Vietnam since olden times. A mechanical shop usually cannot be without a forge. Products of mechanical shops in rural areas are mainly farming tools, e.g., ploughshares, rakes, hoc blades, sickles, knife blades, exe-heads, bush-hooks, etc., (case QNg6, QN2). Some shops specialize in making simple equipment (case YB3, for example) like cassava slicing machines; iron ploughs, buffalo carts, etc. Mechanical shop in Ha Giang (case HG4) is specializing in production of whole equipment for household sized tea processing entities. Other products of mechanical shops are flower-shaped window bars, iron gates, fences, etc.

Products of mechanical shops are sold mainly in the villages and surrounding areas. The forging shop in Quang Ngai province (QNg6) specializes only in production of exe-heads and bush-hooks which are delivered to and sold in neighbouring western high land provinces (e.g. Dac Lac, Lam Dong, Gia Lai, etc.) for mountain field works of ethnical minority people.

Investment for a mechanical workshop is in average VND 50 million excluding working capital (for buying raw materials). Mechanical shop in Ha Giang (case HG4) stands in the middle of a real mechanical plant and a mechanical shop and had more than 100 million VND of investment. Depending on the size of work, a mechanical workshop needs two, five or more hired workers with a salary around 1.5-2 million VND/month. A small shop (case YB3, for instance) can earn 6-8 million VND/month.

Besides the complete machines commonly used like iron sawing/cutting machines, electric welding machines, drilling machines, or even lathes, the improvement of forges and installment of **forging machines** should be mentioned. Formerly, blacksmiths used man force for forging works. Thanks to electricity, in many forging shops, motor driven forging machines were installed. A machine replaces at least two workers and hence increases remarkably blacksmith productivity.

Forging machines are assembled in the local mechanical shops using salvage materials for some parts. These machines are not in mass production, but can be assembled by order. The cost of such machine, including (~ 3 kW) motor and foot driven mechanism of hammer blow frequency, is around VND 1-2 million. This amount is usually raised by the blacksmith household itself. Meaning of the case is that, by replacement of traditional anvils and hammers by very simple motor driven machines, blacksmiths can significantly alleviate their hard work and increase their productivity.

Electrical equipment repair shop in Yen Bai province (case YB3) is a special model, where an invalid successfully manages his productive career. Mr. Dinh Xuan Yen, 1964, is disabled from childhood and can move only with difficulty. He went through many businesses, e.g., tea and cinnamon bark seller, rice trader, buffalo cart driver, etc. He has striven for study and graduated class 12/12 of secondary school and took the training course on electrical good repairing at Vocational Training Center in Hoan Kiem district of Hanoi. In 1995, he started his own business with the electrical repair shop. Equipment

comes to his shop for repair, e.g. small electric motors, radios, TV set, fans and other products. Volt meter, soldering metals, rewinding device, etc., are the main tools and materials for his job. The initial investment cost of the business was around VND 10 million, of which half was for instruments and half for working expenses (buying, for example, electrical copper wires, varnishes, etc.)

Five members of a rattan art cooperative in Quang Nam province (case QN9) have the similar circumstances. They are invalids – wounded soldiers – but with the assistance of friends, they formed a cooperative which produces rattan art articles for export. These cases are good examples for invalids, who try to overcome their severe fortune and by steady will, can stand firmly in life. The right selected productive activities can actively help them to better living conditions.

II.3.4. Production of construction materials (HB4, HB9, HG2, QNg16).

Production of rock-cement bricks (case HB4, HG2) is springing from the actual needs of mountainous districts. Abolition of temporary houses built by bamboo and thatch in rural areas is an urgent requirement today. However, the cost of clay refined bricks is very high in mountainous areas (bricks must be transported from plain provinces), meanwhile, production of rock-cement bricks doesn't need any scarce clay but rock is abundant there.

Raw materials are rock grinded and cement. Rocks are exploited and grinded in site to stones of 0.5 mm size. Stones are blended with cement and water, and then pressed in moulds to brick shape.

Total production, for example in case HG2, is 900,000 bricks/ 5 years, of which during the first 6 months of 2008 the sales volumes was 95,000 pieces. The production cannot meet demand at present. Products are sold at the site and delivered to homes within 20 km distance.

Products: brick size is depending on localities, it is $40 \times 15 \times 17$ (cm³) = 7 clay refined bricks (case HG2), or $18 \times 12 \times 30$ (cm³) = 5 pieces of normal red bricks (case HB4) .

Land for workshop house and rock exploitation field is usually rented from local inhabitants. The cost is around VND 20 million/ year. In dry season, it is also necessary to buy water for production (one worker is in charge of carrying water in dry season). Resource tax and environmental fees total VND 300,000/ year (2000 VND/m³ of exploited rocks) is paid.

Equipment: Chinese or domestic equipment is used

- + Stone raker (engine 20 Hp)
- + Stone grinder (11kW)
- + Blending machine (7kW)
- + 2 press machines (6 kW each)

Spare parts must be bought from China or domestic suppliers (moulds – replaced every two years, chains, gears, pinions, etc.).

This model is good for dissemination to other places, especially in mountainous areas.

Mountainous districts are very interested in this activity that could contribute to the programmes on assisting ethnic communities in moving out from temporary houses. Using rock-cement bricks, the construction cost for new houses will be reduced. Demand of products is considerable and market demand is expected to be stable.

The model requires a larger working area and needs support from local government. The model would be suitable for the areas near to stone mines. That can reduce the cost for transportation.

For dissemination, it is necessary to introduce the information about equipment producers and sellers to help people in seeking appropriate equipment.

Production of clay refined bricks as in case QN16 or HB9 is not new though the kiln technology for brick burning today is improved very much with different designs. This aspect, however, is not a subject to be analyzed in this study. Interesting in brick production process today probably is the use of machines in the step of making raw brick from a heap of mud to unburned bricks. Instead of manual making individual brick, today in many brick-kiln machines driven by electric motors replace man force to continuously push out the raw unburned bricks which then by conveyor are moved to drying yard. Mechanization increases many times the productivity of raw brick production. Production of clay refined bricks, however, is not advisable to be decentralized in individual localities due to environmental issues. Soil degradation and dust and CO² emission are the main impact of brick-kilns into environment.

II.3.5. Other activities (HG1, HB6, QNg7, QNg8, QNg9, QN5)

Other activities, including coal briquette production, ice making, mineral water production, crop field irrigation system. Two cases (HG1, QN5) deserve to be introduced in detail.

Production of coal briquettes has taken place for many years when electricity and gas fuel was not sufficient for household cooking and many collective kitchens. At present, the production of coal briquette will be a good model for dissemination in many mountainous areas, where mostly ethnic groups are living with fuel shortage.

The model of coal briquette production which had been surveyed is a cooperative established by a young man (Mr. Hac, 1975) in Jan 2008, based on the document proposing for 'The establishment of cooperative involving in processing odorless coal briquettes,' which was submitted to and approved by the DPC of Meo Vac district, Ha Giang province (case HG1). Meo Vac is the one of most northern mountain district of Ha Giang province. The suggestion of odorless coal briquette production is responding to the provincial campaign on reduction of deforestation and environmental protection in Ha Giang province. The cooperative involves 7 members who have contributed with capital for the cooperative establishment. 8 other workers (young persons) are hired from the nearby area.

To produce coal briquettes, Mao Khe mined dust coal (low quality coal No. 6) mixed with peat and mud and pressed by machine to bees' nest shape briquettes. Coal is bought from Vinh Phuc province (~ 400 km to Meo Vac district), 30 tons of dust coal and peat are used per month, of which, more than 30,000 odorless coal briquettes (1 kg/piece) are produced.

Coal briquettes are sold to restaurants, boarding-schools, army kitchens, etc., (collective kitchens) and households in Meo Vac district. The DPC of Meo Vac has a regulation to communes, schools in the district to contract with the cooperative for buying briquettes. Besides that, coal briquettes are transported by contracted dealers to different places in and outside the district for sale.

Main equipment for production is:

- + Blending machine to mix coal, peat and mud (5,5kW motor)
- + Presser (7,5 kW)
- + Conveyor for briquette getting out to drying yard.

Equipment is purchased from nearby Thai Nguyen province. Equipment producer is also the supplier of spare parts. Cooperative can carry out equipment maintenance itself with negligible expenses.

As reported by the head of cooperative, total investment for this basis was of VND 280 million, of which 180 million was for building infrastructure and purchasing equipment, 100

million for working capital (for buying coal). Among 180 million for real asset, 95 million was for construction and land and 85 million for equipment.

Capital sources:

- Loan from Agribank: VND 100 million. Interest rate: 0.65 %/month. Subsidy from district for 50% of interest;
- Contribution of cooperative members;
- VND 30 million from district R&D fund;
- 50 million from provincial industrial promotion fund.

Briquette sales price is 1,500-1,800 VND/piece (labor+ Amortization+ electricity cost total VND 40/piece). Coal price is 650,000 VND/ton of Mao Khe dust coal, 780,000/ton of Quang Ninh peat.

Earnings are VND 1.5 million/month/member. Additional provision of profit has been done yearly. Salary of workers is around 800,000 VND/month. These figures are good for such very remote mountainous area.

Success of the model springs from the good will, good idea of the initiator, conformability with local needs, and support from local government. Chairman of the cooperative is an enthusiastic and whole hearted man. The mountainous districts are interested in this model which will contribute to the cause of reducing deforestation for collecting fuel woods. Demand of fuel in the place is considerable, and market demand expected to be stable for many years.

Building electric network used by farmers for irrigation of cash crop lands (non-rice fields) is an interesting case.

The model is commonly applied for communes participating in the implementation of the project so called "Irrigation of cash crop land" in Dai Loc and Duy Xuyen district, Quang Nam province (case QN5). The project is supported by Quang Nam Provincial People's Committee through the Industrial Promotion Programme implemented by district Departments of Industry and Trade.

In Dai Loc, for example, 60 % of cash crop land has been irrigated by this project (1134 ha of 13 communes out of total 1875 ha of 16 communes in the whole district). The project was commenced in year 2000. Total investment was estimated at VND 18.7 billion (including the investment for installation of low voltage electricity transformers and lines, boring wells, irrigation channels where water is taken from rivers, etc.). The financing came from JBIC (87.44% = VND 16.336 billion), and local people contribution (12.6% = VND 2.35 billion).

Though, the investigated areas are located along Vu Gia, Thu Bon, Con and Quang Hue river basins, they are usually suffering drought (especially heavy from March to September) and flood (in October), while the cash crops may be cultivated only from December to October next year. Hence, farmers formerly might cultivate only an unreliable crop a year. Crops were usually short. Poverty rate of households was high. The investigation of underground water in these alluvial grounds along the rivers, however, shows that spring water is discovered in very shoal levels, 6-8 metres from land surface. To implement the project, low voltage fishbone electricity lines spreading over the fields were built. In the electric network poles, meters with attached sockets for individual households are installed. In each 2000 m², there were 5 wells bored. Households buy themselves small pumps, bring them to their fields, attach to the well mouths, plug to the sockets and switch electricity on to sack water from well for irrigation. After that, pumps are removed and brought home.

By implementing the project, cash crops have increased to three-four times a year. Passing this area in the dry season, people can now see the green vegetation covered everywhere

instead of the white sanded colours in the past. Income of crops increases up to VND 100 million/ ha/ year, efficiently contributing to hunger elimination and poverty reduction in these rural areas. The project is planned to be extended to other areas in Quang Nam province, not limited only in Dai Loc district (e.g. Duy Chau, Duy Phuoc in Duy Xuyen and Dien Quang in Dien Ban districts where the same model has been applied).

The model can be studied and applied in other areas, which suffer from drought but where water sources are available either from rivers, streams or underground springs.

III. CONCLUSIONS AND RECOMMENDATIONS.

1. The survey has identified interesting examples on productive use, divided into the following categories:

- **Processing of food and animal feeds:** Production of rice vermicelli, dry rice noodles, tofu; bread, rice and maize milling; ice and ice-cream production; household tea processing and preparation of feed for cattle, pigs, poultry and fish.
- **Wood processing**
- **Mechanical and electrical repair shops**
Production of construction materials: Mechanization of brick production in the plain regions and a special model of rock-cement brick production for mountainous districts.
- **Handicraft activities:** Wood sawing and; bamboo/rattan weaving and chopstick production; textile weaving; sedge mat weaving and some special works like incense stick production.
- **Other categories:** Production of coal briquettes for mountain areas and field irrigation system for drought suffering regions are the two of the models under development with promising results.

Activities are plentiful. The success of long time implementation of rural electrification programme in Vietnam has brought to people the opportunities for development of different productive activities which electricity can actively facilitate.

Most cases introduced in the survey are meritorious and appropriate to be disseminated through the awareness campaign on productive use of energy to all rural areas of Vietnam.

2. The fields of productive activities are widening not only by categories but also by *sizes*. In the beginning, some micro-sized activities were initiated, springing from very familiar traditional jobs in rural villages such as rice noodle and/or tofu making, with very small investment. The activities can be done by only family members as so called auxiliary jobs. With time, the *money* can be more agglomerated, that conditions entrepreneurs in further development of their businesses, either by widening sizes of the existing activities or investing to new jobs. The survey shows that, in average, an investment of VND 30 million plus would be required for new productive initiatives being realized in rural areas at present (e.g. for initial small sized handicraft activities). Severe competition in markets requires entrepreneurs either associating their family works into group productions (model of household group production or cooperatives) or a family alone investing to bigger productive basis. The activities also could not limit only in the old familiar jobs like micro sized food processing, but need to be extended to other 'real' businesses, seek for wider markets. In all cases, the scope of productive activities must naturally extended and big investments, more advanced technologies would be required. In return, from social aspect, more jobs are

created for labours in rural areas, especially for the youth. It can, in its turn, actively reduce the jobless in rural areas and contribute to the cause of poverty reduction. In the other hands, it should be also mentioned that, the Government Programme on hunger elimination and poverty reduction in Vietnam has gained a great success and it positively affects in the development of productive activities in rural areas, brings to the people conditions for choice of the suitable job to be pursued.

3. Market is the weakness and headache issue of all productive activities in rural areas. Products have not been well propagandized, popularized, therefore, the promotion of trading activities is limited. Entrepreneurs are short of accurate market information, constricted in analyses on consumer tastes and predilections, poor in designs and labels. For the most cases, products are less competitive. In most cases, productive bases in rural areas must entrust their products to agents for sale in both domestic markets as well as for export.

4. To successfully disseminate productive activities from area to area, in some cases, the conditions of localities should be paid due attention. Not every model successful in this area can get similar results when it being transferred to other place (lesson learnt from the case of mass production of rice noodles in Binh Chanh Commune, Quang Ngai province, or splitting machine applied for Duy Xuyen sedges). Special attention should be paid also in cases of food processing, though these models (rice noodle or tofu making, etc.) are very attractive for dissemination due to low investment, simple technology, necessary high skilled labours, etc., but it could **not advisable** to be more than few people doing the job in a village. Market restriction, products could not storable for more than one day, limitation of consumers, etc., are the reasons to naturally screen the number of entrepreneurs in doing this business in villages.

5. For starting jobs, though families can cover a main part of investment, in most cases, entrepreneurs still need to borrow capital. The sources will be from friends, relatives, familiars, but micro credits from banks, social organizations or government projects are vital.

The survey shows that, for small productive activities, the loans from Social Policy Bank with low interest (0.65%/month), from the Programme on poverty reduction for women of Women Association (0.65%/month interest) or grants from provincial projects on rural area industrial promotion of the Provincial Industrial Promotion Centers are always important which have contributed a significant assistance in their development.

In order to promote and support productive activities in rural areas, the following recommendations are made:

1. **Reliable and affordable electricity supply:** Electricity supply must be reliable, with adequate quality and appropriate price. Low quality of electricity supply and unpredicted electricity cut-offs are the main complains of entrepreneurs whenever asked about their aspirations for improving businesses. In some places, electricity must be bought through intermediate consumers with prices increasing to unacceptable levels. Direct electricity supply from power companies is preferable rather than through electricity trading groups or intermediate sellers, as long as no price competition exists.
2. **Sustainable support and dialogue:** Experience from international studies shows that sustainability is a key success factor for successful promotion of productive activities. Short-term and project related activities tend to be less effective. Continuous presence and dialogue with households and other investors and entrepreneurs is required to

generate concrete and measurable effects in terms of new enterprises and/or development of existing ones to upgrade production or reach new markets.

3. **Concrete measures:** Dissemination of information materials is not sufficient to meet the target regarding tangible and sustainable results. Concrete measures regarding micro-credit programmes, training courses, seminars on productive use knowledge, productive experiences, management skill and technologies are also needed.
4. **Support for market access:** Local administrations should pay due attention to market development and market access for outputs of local production activities, facilitating market penetration for local entrepreneurs, assisting enterprises in introduction of their products by marketing means, e.g. show rooms or exhibition centers.
5. **Cooperation, coordination and finance:** In order to succeed in developing economic activities in rural areas, concrete and efficient cooperation must be established between responsible authorities. Authorities in central ministries, provinces, districts and communes, public organizations such as Women's Associations, Farmers' Associations and Youth Unions, foreign donors, NGOs and development organizations all have important roles in initiating and implementing measures for improvement of conditions for establishment and development of economic activities in rural areas. These groups can provide policy measures, micro-financing programmes, training, infrastructure improvements, facilitation of market access, mentorship and advisors for enterprises, etc. The experience of NGOs is notable and should be used in this context. It is also noticed that rural economic development is a priority of most donors in their revised policies for foreign development aid.

C. SOCIAL ORGANIZATIONS AND AWARENESS CREATION

During the survey in the six selected provinces, the consultancy team visited and met with provincial social organizations in five of these provinces, e.g. Women's Associations, Youth Unions and Farmers' Associations to discuss possible participation in the coming campaign of awareness creation on productive use of energy.

These organizations, together with the War Veterans' Associations, are the strongest social organizations in Vietnam with their vertical structures from the central level to provinces, districts, communes and villages. It implies that any policy decision, project activity, etc., originating from the higher level will be communicated with subordinate levels of the organizations. They are therefore suitable for launching any campaign related to social movement, such as awareness creation on productive use of energy in rural areas.

The organizations have experience with information and communication activities. They have qualified staff and regularly organise training courses, during which relevant information related to an intended campaign can be distributed.

Findings of the meetings (except the Hoa Binh province, where meetings could not be arranged by DOIT) with relevant organizations are as follows:

The Ha Giang Women's Association has participated in several projects sponsored by international organizations, e.g. the OXFAM Quebec project on 'Cross border trafficking of women', the Sida project on 'Genders and acts of violence', the Finnish project on 'Promotion of floating raft for fish breeding', etc. Beside organisation of campaigns and implementation of projects, the association has provided guarantees to its members for loans from the Social Policy Bank for construction of micro hydropower stations and

development of productive activities. Usually a loan of VND 6 million is provided by the Bank with 0.65%/month interest, of which 2 million is for electricity supply and 4 million is for production development. A poor household can borrow 5-7 million. Maximum loan is 15 million which has to be approved by DPC.

The Phu Tho Youth Union organized about 30 trainings, seminars in 2008 for its members. Topics of the activities are 'Breeding of garden chickens', 'Goat's breeding', 'Protection of Hung's Temple environment', 'Forest protection against fires', etc. Financial sources were provided by the Central Union (VND 120 million), GEF fund (VND 700 million for Hung's Temple protection, used for seminars, raising awareness, establishment of volunteer youth force for propaganda against forest fires, etc.) and NGOs (for the project of Hung's Temple protection).

The Phu Tho Women's Association has a staff of 3,000 promotion campaigners in all levels, of which 1000 are in charge of working with communes. It has a bulletin called 'Women Information' issued quarterly with 4,000 copies of 36-38 pages. Activities of the association, new policies and campaign subjects are all informed in the bulletin. Depending on needs, some issues will be reserved only for special subjects. The bulletins are delivered to all cells of the association.

The Quang Ngai Women's Association organized several trainings, seminars for its members on Energy savings, launched a survey on 'Public awareness on Energy savings' in 2007 at several communes of the province. It also launched a marketing campaign on the use of compact lamps, solar water heaters. An interesting comment of the Women's Association is that compact lamps are not as effective and economic as information, since the electricity voltage in Quang Ngai province is below standard and supply is unstable.

The Quang Nam Farmers' Association also organized many training seminars such as 'Preventive measures against HIV/AIDs', 'Safety in traffic', 'Environment protection', regular festivals of competition on 'Good farmer in work', etc.

The Yen Bai Youth Union publishes bulletin 'The Youth of Yen Bai' as a means for education and propaganda to the youth of the province. Outstanding events of the recent years were the campaigns on traffic safety, health of family, preventive measures against HIV/AIDs, against cross border trading in women, etc. The Union organized 70 'volunteer sparrows' teams, comprising the young members who go to rural villages and do 'three together' with households, especially with ethnic people (live together, eat together, and work together). By doing that, the 'volunteer sparrows' contribute to building new life in rural areas, especially in mountainous villages.

The organizations indicate appreciation and support for VSRE's task to promote awareness creation on productive use of energy in rural areas. They express willingness to participate in the implementation of activities in districts, communes and villages. Staff can deliver and disseminate relevant documents produced by VSRE on productive use of energy to households.

The means for dissemination and the awareness campaign implementation have been discussed. Seminars and trainings can be organized for the staff (training of trainers in provincial level) and then extended to districts, communes and villages. In commune and village levels, festivals of awareness competition can be organized (for women, young people, farmers, etc.) to raise awareness of people on productive use of energy. This approach had success in other similar campaigns in the countryside. Special issuances of association's/union's bulletins can be published with the content related to productive of energy.

Operations of the organizations are financed through allocations from the state budget. Work plans for the next year were defined and submitted to the Government already in September 2008, requesting budget allocations for next year. Hence, in order to implement additional activities such as the campaign suggested by VSRE the organizations would depend on funding from external sources.