

Plugging in micro- enterprises

A study of electricity use as a strategy to address poverty
in rural Vietnam

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The honest poor can sometimes forget poverty.
The honest rich can never forget it.
G. K. Chesterton (1874 - 1936)

Abstract

While not all governments in developing countries seem to acknowledge the importance of the relation between energy and poverty reduction, some do recognize this as an essential link when promoting economic development. However, empirical data or a scientific understanding of the role of energy in poverty reduction is lacking.

This paper will provide empirical data on the link between electricity and poverty reduction applied to the situation of micro enterprises. It will consider the role of electricity in poverty reduction through an assessment of impacts of the acquired access to electricity by micro enterprises and of the impact of those changes in enterprises on the livelihoods of the household. This is described in the problem formulation: *Does acquiring access to electricity have any effect on the viability of micro enterprises (ME)?*

With this problem formulation it seems that the poverty elements are not included in the research. The segregation line between ME's and households in this research is wafer-thin, this makes the difference between ME and the household difficult to distinguish. The viability of the ME has direct impact and influence on the household (and its livelihood) because the household is the ME.

The focus will be on the changes in the livelihood of the ME. Six main assets are identified as important to the livelihood of the ME; human, social, technical, natural, physical and financial assets. They will be studied together with the vulnerability context of the enterprise, the processes and structures that influence the ME and the market situation. This all together will show the impacts that the electricity, and the services that were made possible to use by electricity, have on a ME.

The three research questions that will be answered in this report are What are the direct and indirect changes within the ME after the acquired access to electricity? Which barriers delay or prevent the ME to prosper after acquiring access to electricity? Does the livelihood of the ME before the acquired access to electricity play a role in the intensity of the changes of the ME afterwards?

Preface

Enschede, Augustus 2005

At the beginning of my sixth year of Industrial Engineering and Management it was time at last to start my final project. The previous years have been chaotic, busy, interesting and informative. A one year delay is caused by the fact that I took a trimester off to improve my English in America, and also a result of all the board activities I did, an extra minor in Education Design, Management and Media, the classes I did at the Royal Military Academy and especially because of my passion for my specialisation in Sustainable Development.

The latter inspired me to do several international projects. After a minor in Bangladesh and an internship in South Africa, my faculty and I decided -in cooperation- that an individual research within a current project of the faculty would be a good addition to the already obtained knowledge. That is when I was introduced to the “Enabling Access to Sustainable Energy” (EASE) project. EASE’s mission is to enhance the access of low-income groups to sustainable energy services in rural areas. In other words EASE aims to promote energy itself as a means to address poverty.

After contacting the Vietnamese partner RCEE, it turned out that they were more than happy to host me and my research. This was my challenge for the last eleven months. A challenge, because it was my research, my results and my conclusions, there is nobody else to blame for any mistakes. Also a challenge because of the researched topic, or rather a combination of these topics, that have not yet been elaborated by others. A challenge because the work was done in a different culture and context. I believe I succeeded in this challenge, the results are here!

Dagmar I. Zwebe
Enschede, 2005

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There is no research without a financial side and that is where ETC Energy came –again- into the picture. I want to thank them for the financial contribution.

At the University of Twente there were also several people guiding me through the process. I want to thank Ir. Annemarije Kooijman – van Dijk and Ir. Stephan Maathuis for their comments on my research, for their assistance and support. Last but definitely not least I want to thank Dr. Joy Clancy who has been my mentor for 3 years now, she guided me through 2 internships and my graduation thesis, I learned a lot from her experience and knowledge.

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Glossary¹

Electrified commune	A commune where all people have access to electricity.
Energy poverty	The absence of sufficient choice in accessing adequate, affordable, reliable, high quality, safe and environmentally benign energy services to support economic and human development.
Energy services	An energy service is the function provided through use of energy- usually in combination with an appliance. Examples of energy services are cooking, lighting, processing, communication and transport.
Energy supply	Supply of energy technology, or energy infrastructure (such as the grid). Energy supply does not imply access.
Gender	Gender refers to the socially constructed roles ascribed to males and females and the resulting socially determined relations. These roles are learned, change over time and vary widely within and across cultures. Gender is one of the key entry points for social analysis. It is important to understand the social, economic, political and cultural forces that determine how men and women participate in, benefit from and control resources and activities. A good analysis would highlight gender specific constraints, risks and opportunities.
Household	Social group, which resides in the same place, shares the same meals, and makes joint or coordinated decisions over resource allocation and income pooling.
Livelihood	A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the long and short term.
Micro Enterprise	A small business that produces goods or services for cash income and has less than 10 employees.
Modern energy	A variety of energy carriers including LPG, kerosene, petroleum and electricity, either grid or off-grid electricity (whether generated by burning fossil fuels or by using alternative, renewable sources such as solar, biomass, hydro or wind).
Modern energy services	Energy services provided through modern energy carriers or modern appliances. Often used for services using electricity, whether from the grid or from decentralised generation at any scale, but also including clean cooking fuels such as LPG or biogas, or motive power.

¹ This is based on the glossary used during the EASE project extended with the formulated definitions in this research

P0 headcount ratio	The proportion of people living below the poverty line.
P1 poverty-gap index	It is equal to the incidence of poverty (P0) multiplied by the average percentage gap between the poverty line and the income of the poor. In other words: this is the difference between actual household expenditures and the poverty line, measured in percent of the latter.
P2 severity of poverty	It is equal to the incidence of poverty (P0) multiplied by the average squared percentage gap between the poverty line and the income of the poor. P2 takes into account not just how many people are poor and how poor they are, but also the degree of income inequality among poor households.
Poverty Alleviation	A relief, to any extent; from any of the numerous hardships the poor face.
Poverty reduction	The reduction of the number of people who live below the poverty line.
PPP Purchasing Power Parity	A rate of exchange that accounts for price differences across countries, allowing international comparisons of real output and incomes. At the PPP US\$ rate (as used in this Report), PPP US\$1 has the same purchasing power in the domestic economy as \$1 has in the United States.
Sustainable Development	Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.
Sustainable Livelihoods Framework	A tool to improve understanding of livelihoods, particularly the livelihoods of the poor. It presents the main factors that affect people's livelihoods and typical relationships between these. It can be used in both planning new development activities and assessing the contribution to livelihood sustainability made by existing activities.
Traditional fuels/ energy	Wood, charcoal, bagasse (sugar cane waste), animal and vegetable wastes.

Currency Equivalents

Vietnamese Currency Unit = Dong
 1 US \$ = 15.859 Dong (19 Augustus 2005)
 1 Euro = 19.295 (19 Augustus 2005)

Abbreviations

ABB	Asea Brown Boveri Ltd
AEC	Agriculture Extension Center
CIA	Central Intelligence Agency
DFID	Department For International Development
GSO	General Statistical Office
FA	Farmers Association
HH	Households
IMF	International Monetary Fund
LPG	Liquefied Petroleum Gas
MDG	Millennium Development Goals
ME	Micro Enterprise
MSE	Micro and Small Enterprise
NGO	Non Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
PC	People's Committee
PIP	Policies, Institutions and Processes
RDSC	Rural Development Service Center
SEAF	Small Enterprise Assistance Funds
SL	Sustainable Livelihood
SLF	Sustainable Livelihood Framework
SNV	Stichting Nederlandse Vrijwilligers
UNDP	United Nations Development Programme
VDR	Vietnam Development Report
WHO	World Health Organisation
WU	Women's Union
YG	Youth Group

1. Introduction

Enschede, just a normal winter day
Jan's alarm goes off at 7 in the morning. He gets out of bed, switches on the light and goes downstairs to the thermostat. On the way downstairs he already starts the computer so he can check his email after he showered. He turns the central heating on to 20 degrees and walks to the bathroom for a nice warm shower! By the time he gets out of the shower, the central heating system already did its job and the house starts to warm up. In the kitchen he turns on the coffee machine and puts some bread in the toaster. A nice breakfast is a good start to the day!

This is a good example of normal start of a day in the Netherlands. Not often do people give it a moment's thought how much energy one uses during a normal day. All the underlined things are energy consuming. These are only the energy consuming appliances used in the first 5 to 10 minutes of a regular day by one person in the Netherlands!

1.1 The context

The total world population is more than 6,380 million people (CIA, 2004); about 1,600 million of these people have no access to electricity (ABB, 2003)(Lamech and O'Sullivan, 2001). This is one quarter of the world's population. Around two billion people rely on burning traditional energy sources – such as wood, charcoal, agricultural residue and animal dung – to meet their daily domestic energy needs. This reliance helps perpetuate poverty and is environmentally unsustainable. (www.snvworld.com), (Cecelski, 2000), (Ramani and Heijndermans, 2003). Modern energy is the opposite of traditional energy sources and includes a variety of energy sources, including LPG, kerosene, petroleum and electricity, either grid or off-grid electricity (this also includes innovating sources such as solar, biomass, hydro or wind).

Poverty and energy access; two facts on its own, but is there a relationship? In the beginning of this century energy was mainly seen as an engine for economic and social development, many different people and governments agreed on this point like Lenin, the Government of Bangladesh, the World Bank etcetera (Barnett, 2000). This period was followed by a period in which energy was forgotten as an important factor for development. For example the World Bank's World Development Report on poverty has no mention of energy (World Bank, 2000). The first time it came back into the picture was at the 2002 World Summit on Sustainable Development². Even after that, people might overlook the importance, for example the Human Development Report (UNDP, 2004) did not mention a link between energy and poverty in 2004.

Energy is essential for achieving all the goals set by the world's leaders; the MDG's. This was stated at the 2002 World Summit on Sustainable Development (WEHAB, 2002). DFID joins this opinion in its "Energy for the Poor, underpinning the Millennium Development Goals" (DFID 2000). It elaborates the relation between energy and poverty reduction through looking at the MDG's, a summary can be found in Appendix A. The millennium development goals consist of 8 main targets³ (See box 1). The purpose is to achieve these eight targets by 2015, for some of the poorest countries these targets will seem far out of reach. Energy services, like electricity, can play a variety of both direct and indirect roles in the achievement of the

² United Nations, (2003). <http://www.johannesburgsummit.org/>

³ Many of the targets of the MDGs were first set out by international conferences and summits held in the 1990s. They were later compiled and became known as the International Development Goals. In September 2000 the member states of the United Nations unanimously adopted the Millennium Declaration. Following consultations among international agencies, including the World Bank, the IMF, the OECD, and the specialized agencies of the United Nations, the General Assembly recognized the Millennium Development Goals as part of the road map for implementing the Millennium Declaration.

MDG's, energy contributes to all three pillars of sustainable development; economic, social and environmental (DFID, 2000)

Two examples of how modern energy can contribute towards the MDG's are given here. The first example is the replacement of coal by biogas, LPG or electricity. Coal has one positive side: it is multifunctional; coal can be used for cooking and it heats the room at the same time. The negative aspect of coal is that it results in indoor air pollution and has serious health impacts. It increases the risk of serious diseases (mainly for women) including pneumonia, chronic respiratory disease and lung cancer (WHO, 2000). While modern energy like electricity has no side effects. The second example is the replacement of fuel wood. Fuel wood users are exposed to extremely high levels of particulate emissions from wood smoke, which results in adverse health effects, particularly children with acute respiratory illness are affected. Barnett (2000) points to the conclusion of a research of Smith and colleagues (1999) that cooking with solid fuel (mainly woody biomass) is the third largest cause of death and disease in solid fuel using households in developing countries. Replacing coal and wood in these cases by modern energy would have major positive health impacts on the lives of the users, and would direct help with achieving MDG 4 and 5 (Box 1).

When looking closer at these MDG's and the World Summit on Sustainable Development there is another overlap in means of poverty reduction: (micro and small) enterprises. The first (Eradicate extreme poverty and hunger), third (Promote gender equality and empower women) and seventh (Ensure environmental sustainability) MDG directly mentions the role of energy acquisitions on poverty reduction (DFID, 2000)(Appendix A). The World Summit on Sustainable Development mentioned the same thing many times in this context (United Nations, 2002) (WEHAB, 2002). Productive use of energy in enterprises in developing countries seems to play an important role in poverty reduction. A possible example of this development could be: development of the ME (Measows et al., 2003) as a result of provided electricity access for the micro enterprises (ME). ME's have a positive impact on their community (SEAF, 2004), so developing the ME by means of acquiring access to electricity could result in the development of the community.

At this moment the role of electricity on enterprise development (see also §2.1) is acknowledged by many researchers (Measows et al., 2003) (Barnett, 2000) and the links between energy and poverty (see §2.2.3) are increasingly recognized (DFID, 2000), (ETC, 2002), (Lamech and O'Sullivan, 2001). Nevertheless there is little empirical evidence that there is actually a link between the three subjects: electricity, ME's and poverty. This research will elaborate on the link between these three subjects supported by a case study done in Vietnam, during which poverty is viewed with help from the sustainable livelihoods framework. The problem formulation will therefore be:

Does acquiring access to electricity have any effect on the viability of micro enterprises (ME)?

With this problem formulation it seems that the poverty element is not taken in the research, but because the segregation line between ME's and households in this research is wafer-thin, the difference between ME and the household is difficult to distinguish. The viability of the ME has direct impact and influence on the household (and his livelihood) because the household is the ME.

2. Literature Framework

This chapter provides an overview of the theory behind the different topics, which are discussed in this research. The main attention will be on the three central topics; Electricity, ME's and Poverty. Later on the term livelihood and livelihood framework will be made explicit and the livelihoods framework as used in this research will be presented.

2.1 ME and Electricity

What is a micro enterprise (ME)? There is no definition of ME on which the world agrees. A general definition of ME could be that a ME is a very small business that produces goods or services for cash income (Allerdice and Rodgers, 2000). This definition does not specify the words "very small". Does that mean small, in income, in employees, in workspace or something else? A second definition of ME specifies these words "very small" but lacks to specify the field of activity by using the word "a business"; ME is a business with less than 10 employees (Liedholm, 2002), (EU, 1996). A definition that combines both would be more acceptable and makes it able to actually distinguish the ME's from the small enterprises: "a ME is a small business that produces goods or services for cash income and has less than 10 employees".

In general, ME's in developing countries have only a few employees, limited access to capital and they are often home-based (Allerdice and Rodgers, 2000). Not all ME's are family operated. Within the ones that are family operated, the related employees often do not get paid. ME's usually operate in the "informal sector" or the "semi formal" of a nation's economy. Informal means that they are not paying taxes and they will not be tracked in official government statistics, semi formal means the ME's have to register their business so they are legally recognized, but are not given the same legal status as a formal enterprise. ME's suffer from the same problems households in rural areas are coping with. The most important one is bad or limited infrastructure. This expresses itself in a lack of (good) roads, inadequate water supply, minimal telecommunications and only energy sources in the population centers (Allerdice and Rodgers, 2000).

With choosing the problem formulation as given on page 2, you already demarcate the research to ME's. To some observers, the increasing number of people engaged in micro and small enterprises, is a sign of failure of the economy to provide productive jobs. This way people are forced to take refuge in activities that provide only minimal subsistence support, only to survive (Liedholm, 2002). To other writers, there is a strong positive link between ME and poverty reduction. They see ME's as key factors for lifting people out of poverty, because ME's have a positive impact on their communities (SEAF, 2004). ME's in rural areas can be significant sources of employment, education and income (Lamech and O'Sullivan, 2001)(SEAF, 2004). Both these sources do focus more on small enterprises than ME's. There is not much literature about the actual impact of ME's on the community (Liedholm, 2002).

Vanderschueren et al.. (Albu and Scott, 2001) also mention ME's and small enterprises together, but they do emphasise more the importance of both micro as small enterprises. They claim that manufacturing and processing M(S)E's -the ME's that are studied in this research as well- is one of the key elements to lift people out of poverty, and it could play a major role in poor peoples lives. Their research was focused on the urban areas of southern countries though, while this research will take place in the rural areas of the northern part of Vietnam.

Albu and Scott (2001, pp 5.) agree with Vanderschuren et al.. and say that the social and environmental trends increase the demand for alternative employment and off-farm livelihood opportunities. This is one of the reasons why millions of people start small informal enterprises (i.e. MSEs).

This research does not cover the question if ME's on its own have a positive influence on the commune and households involved. The research is done from the view of the latter group of writers who are positive about the influences of ME's on the community. This is because you can reason logically that electricity could never have a positive influence on the viability of the enterprise and the livelihood of the entrepreneur if the enterprise itself does not have a positive influence on the entrepreneur and his livelihood. Although the problem formulation does not state that the effects of the access to electricity will be positive, neutral or negative for the ME, the researcher does hope for at least neutral or positive effects based on the literature from paragraph 1.1 (that state the positive influence of energy on poverty). In this literature there is only one missing link: the link between ME and electricity is not clear.

Lucas et al. (2001) come up with a hypothesis about a positive link between MSE and modern energy, in this case electricity, for this he introduces the vicious cycle, which is shown in figure 1 The people in this cycle called "energy poor" by Lucas et al.. do not have the means to buy improved energy services like electricity, even if they could have access to them. Furthermore, even people who can afford improved energy supplies, still may not be able to afford the appliances that makes energy useful (a rice mill or sewing machine for example). These writers state; "the vicious cycle of energy poverty will only be broken by combining improved energy services with end uses that generate cash income." When looking back at the definition of ME's used in this research: "*a micro enterprise is a small business that produces goods or services for cash income and has less than 10 employees*" the term cash income is also used. That means that according to Lucas et al. in this cases ME's could be a way to break the vicious cycle of energy poverty. Although this research will take place in a different context -Vietnam instead of China-, the methods and strategy used by Lucas et al. (2001) will be quit similar to the methods and strategy used in this research. Lucas et al. also used case studies to collect empirical evidence in the rural areas of China to prove the linkages between energy, poverty and gender. Because of these similarities, breaking the vicious cycle of poverty with electricity can be made although the context differences have to be acknowledges.

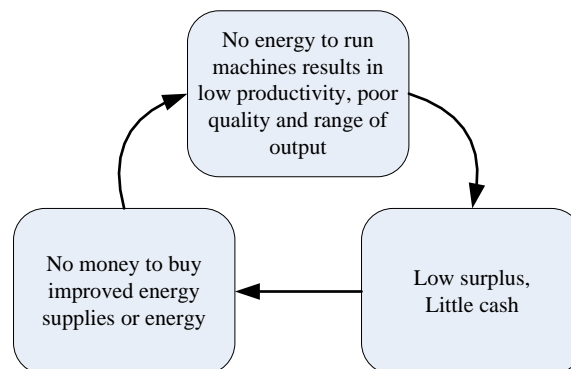


Figure 1 The vicious cycle

Source: Ramani and Heijndermans, (2003).

A good example of the positive relationship between modern energy services and ME's is given by Khan (2001). She found a positive influence of modern energy services on ME's when she did research about the potential for increased income-generation following the introduction of electrical lighting services (using battery operated lamps). She gives an example of tailors who worked four more hours and thereby increased their revenue by 30% , thanks to electric lights. Opening hours for shops were also found to increase by an average of three hours a day and in terms of new businesses, Khan concluded that adequate lighting is a "deciding factor" in whether people opened a home-based business or not. This outcome was nevertheless extra, because the project was not focused on the influence of the lightning on the livelihoods of the entrepreneurs but an experiment intended to support progressive improvement of women's lives, economically, socially and environmentally. The project

trained rural women to produce the lamps in a micro-enterprise manufacturing facility and distributed them through rural markets. Another disadvantage of the outcome of this research is the fact that it is very small scale. It only covers 33 women in Char Montaz, a small island in the waters of Bangladesh. This research will go one step beyond the battery lightning, to the acquired access to electricity.

Lamech and O'Sullivan's (2001) opinion corresponds with Lucas et al. when saying better energy services than used currently by poor ME's (traditional energy services) can enable ME's to produce a wider range, better quality of products and higher productivity. They add to this that modern energy, like electricity in this case, can increase profitability and therefore sustainability by increasing the productivity of the resources involved (labor, capital and raw materials) and can make the ME compete more effectively. This theory of Lamech and O'Sullivan is not based on a case study or research, there is no empirical evidence that it is true.

Electricity on its own is not going to have any influence on the ME at all. First of all it must be realized that the demand for electricity is a derived demand (DFID, 2000) (Lamech and O'Sullivan, 2001). Nobody wants electricity for itself, but because of the things that can be done with it. Secondly, there are other constrains that can slow ME's down in their development or that are needed to increase the development after the acquired access to electricity. For instance this could be the absence of roads, communication, access to market and credit. It is not clear yet at this point what context and environment is necessary for a ME to become more viable after they access electricity. For example many people that were interviewed by Massé (2003) in Sri Lanka stated that they needed electricity to support economic activities (20% of 1013 interviewees), only a few of them actually undertook such activities once they obtained electricity. Massé concludes that the willingness to develop home-based income generating activities and the availability of electricity are not enough to involve rural people in small businesses or allow them to succeed in these. More about these barriers for ME's to develop after acquired electricity access will be discussed in the paragraph 2.2.3.

2.2 Poverty

Before looking at the relationship between energy and poverty, it should first be clear what poverty is in general, and what the relation between poverty and gender is.

2.2.1 Poverty in general

There are many definitions of poverty and many ways to measure poverty (Barnett, 2000) (White, 1999) and it is different in each region and country. The World Bank elaborates a broad description of poverty on its website⁴:

Poverty is hunger. Poverty is lack of shelter. Poverty is being sick and not being able to see a doctor. Poverty is not being able to go to school and not knowing how to read. Poverty is not having a job, is fear for the future, living one day at a time. Poverty is losing a child to illness brought about by unclean water. Poverty is powerlessness, lack of representation and freedom.

This description is not sufficient as a definition for poverty because it is too broad and many examples are used, which cannot be used to measure or indicate poverty. It does not give tangible material with which we can reveal poverty. Other definitions that are better defined than the latter, are "poverty line" definitions of poverty. For example the UNDP (UNDP, 2004) and the World Bank⁴ define the income poverty line as a consumption level below⁵ (At

⁴ The World Bank Group, (2005). www.worldbank.org

⁵ When using these measurements in 2001, 1.1 billion people in the world had consumption levels below \$1 a day and 2.7 billion lived on less than \$2 a day.

1985 international prices (equivalent to \$1.08 at 1993 international prices), adjusted for purchasing power parity):

- o \$1 a day
- o \$2 a day

Besides that they recognize a national poverty line. That is the poverty line appropriate for a country by its authorities. National estimates are based on population weighted subgroup estimates from household surveys.

An advantage of income based measurements is that it makes comparison easier (HDR, 2004) (Barnett, 2000) (White, 1999). Nevertheless income based measurements are insufficient as indicators of poverty reduction, because poverty is a multi-dimensional concept, with income being just one of several dimensions. (Ramani and Heijndermans, 2003) (White, 1999). This makes the definition that the Asian Development bank handles more useful. They divide poverty into three parts, the human, income and absolute poverty.

- o *Human Poverty*: The lack of essential human capabilities such as literacy and nutrition.
- o *Income Poverty*: The lack of sufficient income to meet minimum consumption needs (food and non-food items set on 36\$ per person per month).
- o *Absolute Poverty*: The degree of poverty below which the minimal requirements for survival are not being met. This is a fixed measure in terms of a minimum calorific requirement plus essential non-food components. While absolute poverty is often used interchangeably with extreme poverty, the meaning of the latter may vary, depending on local interpretations or calculations.

This definition is divided in 3 different parts. Poverty occurs when one of these three is not sufficient, or when the total picture is not sufficient (the net value of the three definitions). This definition takes into account the importance of income, but at the same time acknowledges that income is just one part of many dimensions that influence poverty. That makes this model the best model to be used in this research. Only income poverty is easily measurable. The other two have no clear indicators to measure if it is sufficient. That is why the livelihoods method will be used as a way of measurement in this research. The livelihoods method is one way to look at poverty and poverty alleviating, but this method does not give measurable numbers to compare. A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living (Chambers and Conway, 1992). More about this method and the usage of this method later in this research (paragraph 2.4.).

It is important to distinguish poverty alleviation from poverty reduction. These terms are often used interchangeably; this can cause people to overlook the different goals and aims of both strategies. Poverty alleviation is a relief, to any extent; from any of the numerous hardships the poor face. In other words: a lowering of the “intensity” of poverty, improving the living conditions without necessarily releasing them from the state of poor as such. Poverty reduction is the reduction of the number of people that live below the poverty line, poverty reduction will invariably involve productive or *livelihood* enhancements that help people cross the poverty line by raising their incomes. Another term that is often used is “moving out of poverty”, all these terms mean in general just helping the poor and vulnerable in the society to improve their situation and make it less vulnerable. In this research the term poverty reduction is used, because this involves the livelihood of the poor person, which is the way this research looks at poverty.

2.2.2 Poverty and Gender

Nearly two-thirds of the world's poor live in the Asian and Pacific region, like this research area and two-thirds of this region's poor are women (ADB, 1999). It is well known that women and children are often the poorest of the community. Women and men do have different routes into and out of poverty, as women and men do not have the same opportunities because of their culture. What many people underestimate is that women are often the major users and suppliers of energy resources in marginalised communities (Barnett, 2000)(Ramani and Heijndermans, 2003)(Lamech and O'Sullivan, 2001). Women collect much of the biomass used by households and women manage most of the energy used by households. The same counts for ME's, women often participate in energy-intensive ME's (on a seasonal or part-time basis and as an extension of their households) (Cecelski, 2000). This writer also claims that women's work in these industries is nonetheless a critical source of income to their households. Her research is a theory based study with no empirical evidence, only literature is used to answer the rising questions. Although gender is not a main issue in this research, it does have to be kept in mind to be totally aware of the (household) situation.

In ME's women often get a chance to be an entrepreneur although they do face additional obstacles to men. One of the obstacles is the responsibilities and obligations they face. Coming from their culture they might be expected to contribute income or on the contrary they might not be free to move around or take any job. Often they are not educated by the school system, but have a background of traditional ways of doing things and indigenous knowledge of natural resources passed on by their parents. Because many ME's are home based or at their premises, some women are able to work as an entrepreneur besides their household duties. These entrepreneurial activities should be encouraged because this could be a possibility to increase the living standards of women in developing countries (Batliwala and Reddy, 2003) (Cecelski, 2000). Until now nevertheless the women have often a low income because their income is related to household tasks like food processing and/or sewing.

It must be said that the modern energy services, like electricity could have a major negative impact on the gender situation in a certain country. Electricity and other modern energies could replace large number of unskilled often female (home-based) workers. There is already a lack in job opportunities in rural areas. Examples are routine household tasks as weaving, milling or other forms of food preparation (Meadows et al., 2003). One machine could replace many unskilled (traditional) workers while it only creates a few jobs. According to this example electricity would not lead to poverty reduction or development.

2.2.3 Poverty and Energy

As mentioned in the introduction, there are many ways in which energy could contribute to the MDG's. Two examples were mentioned and both were about health issues. When talking about fuel wood, there is besides the health issue also the gathering issue. Most poor people currently meet their demand for energy needs by collecting fuel wood and other biomass. This is done by the women of a household. It costs very little in cash terms, but is hugely expensive in terms of the time (Lamech and O'Sullivan, 2001). An example of this is the pattern of time use typical of South Indian villages. Normal families spend 2-6 hours each day collecting 10 kilograms of wood over distances of 4-8 kilometres (DFID, 2000). Or in South Africa where half of the rural households spend more than 6 hours per week on collecting wood (almost all of it done by women) (WHO, 2000). This could count for ME's as well, things are often done by hand which takes a lot of time, for example tea leave burning, which is done with collected fuel wood and other biomass materials.

The replacement of "traditional sources" of energy as mentioned before (wood, charcoal, agricultural residue and animal dung), with "commercialised" fuels of increasing efficiency like electricity in this case, is known as "the energy transition" (Barnett, 2000). Poor people do want to access electricity, actually they are willing to pay a substantial part of their cash

income to obtain it (Lamech and O'Sullivan, 2001)(Ramani and Heijndermans, 2003) (Saghir, 2002). Energy is not accepted within the development circles as a basic need, like food and water. Although energy provides cooked food, boiled water and warmth, Clancy (2003) recognises energy as one of the most essential inputs for sustaining people's livelihoods in the global context. An example is the potential for increased education as a result of better lighting in schools and improved access to information through radio, television and other Information Technology (Clancy, 2003) (DIFD, 2000) but these examples she gives are based on theories of other international development agencies and are not supported with empirical data/evidence. These examples are also focussed on the gender perspective in relation to the consequences of "improved energy" for women, while in this study the view will be broader, both men as women's sides will be equally highlighted.

The range of opportunities and possibilities that electricity can provide is enormous; from cooking and water heating to starting up a business in battery recharging. The choice of services is different per household and is often limited for the poorest. The available technologies to the poorest people are often inefficient or low quality, so they end up paying much more per unit of useful energy service than the rich. An example of this is the kerosene lamp; it costs 70 times more than the equivalent light from mains electricity. Light from a candle costs 150 times more; power from a battery costs 10 to 30 times more than using electricity (DFID, 2000). Unfortunately it is not clear how accurate these numbers are because it was not possible to discover how they measured this.

Previous research already showed that only access to electricity is not enough to stimulate development, there must be complementary inputs as well (Ramani and Heijndermans, 2003) (DFID KAR, 2002). These complementary inputs can be divided into two groups (Ramani and Heijndermans, 2003): Infrastructure and non-infrastructure. Non-infrastructure means products and services that are available in the market and cover economic capacity and know-how. A lack of knowledge and know-how is a major problem to face when talking about poverty reduction, it is recognised by many organisations in different situations. You can give somebody access to electricity, but if this person does not know what electricity is or what can be done with it, there will be no progress in the livelihood of this person. This logical method of reasoning will be tested in this report; because there is no empirical evidence given in the report of Ramani and Heijndermans (2003). Infrastructure is the second complementary input to stimulate development. Physical infrastructures are structures and buildings, like schools and hospitals. Intangible services are a consequence of public policy and investment, examples are markets, qualified personnel, development institutions and the most important one is governance.

Other non-energy related factors that influence ME's, that are only briefly mentioned in the literature review of Meadows et al. (2003), are financial resources, information, security of tenure, location-specific target markets, customers, suitable sub-contracting arrangements, business planning, and besides that availability, affordability and reliability of appropriate equipment, tools and machinery, qualified human resources, markets and institutional support. Because it is a literature review Meadows et al. do not give any supporting empirical evidence with these factors.

Fishbein's *Survey of Productive Uses of Electricity in Rural Areas* (2003) notes that electricity must be seen and understood as an input for income-generating activities. This is only possible if certain conditions are present according to his research. This research is a bit more extensive than the Meadows et al. (2003) research because Fishbein looks at both the literature and at certain projects on energy that are currently in development. He did not conduct any projects of his own and his conclusions are therefore based on surveying other projects in many different contexts. In case of this study, the literature study will be replenished with a case study by the same researcher. The conditions Fishbein comes up with are:

1. Knowledge and skill within ME's on how to use newfound electrical power for profitable enterprise.
2. Availability of a minimum of other complementary infrastructure services, such as transport, water supply and ICT services.
3. A policy and institutional environment conducive to business development, willingness to promote decentralized services, etc.
4. Access to markets for additional or new products produced or services offered as a result of new electrical, heat or motive power.
5. Technical and financial management capacity of ME's, including availability of (micro) credit to finance productive tools and equipment.

As you can see point 1 - 3 (and the second part of 5) are also mentioned by Measow's et al. (2003) and Ramani and Heijdermans (2003). These conclusions can directly be linked to the livelihoods method. As you will see in the next chapter, each one of them presents a part of the livelihood, and Fishbein did not include livelihood in his research at all.

This does not mean that all these factors have to be present if you want a ME to thrive. It just shows that there are so many influences on ME's, that changing one thing (access to electricity) does not mean that everything will change, or that there will be a positive outcome on the livelihood of the entrepreneur.

Concluding you can say that poor people are disadvantaged in many ways. They pay more for the energy they use, because the available technologies are often inefficient or low quality. The energy technologies the poor people do use, are risking the health of the whole family. Time spent on collecting and using the energy sources is a lot more then with the usage of modern energy technologies for both households and MEs. Because the literature is not complete in linking energy, poverty and electricity this research is significant.

2.4 Livelihood Framework

The livelihoods analytical framework is used in this research to look at the situation of the entrepreneur (and his household) of the MEs before and after the acquired access to modern energy. This framework is used because poverty is more than just (a lack of) income; it also includes other factors as education, food, clean water, health care etc. There are some misunderstandings about livelihoods. When thinking of measuring poverty, people often think of money, because money means the ability to buy certain things. So if the livelihood is used to measure or look at poverty people think it is about money. Livelihood, and poverty, is much more than just money. Nevertheless this misunderstanding can be explained when looking up the word "livelihood" in a dictionary. It gives an answer related to money. Cambridge Advanced Learner's Dictionary online⁶ gives the definition:

"(The way someone earns) the money people need to pay for food, a place to live, clothing, etc"

In this research the term "livelihood" will be used in a broader sense. Livelihood is not necessary about work or money. It is a broader definition, where the households have the central focus. In other words, it is the livelihood of the household that must be sustainable for the members of this household to survive. The definition used in this research is in line with the Sustainable Livelihood (SL) definition. Chambers and Conway (1992) have given an often quoted definition of SL which is shown in Box 1:

⁶ Cambridge University Press, (2004). <http://dictionary.cambridge.org/>

Box 1 Definition Sustainable Livelihood (SL)

A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the long and short term.

Source: Chambers, R. and G. Conway (1992). *Sustainable rural livelihoods: Practical concepts for the 21st century*, IDS Discussion Paper 296, Brighton: IDS, pp.7-8

In other words; livelihood is not necessarily the same as having a job (and an income) and does not necessarily have anything to do with working at all. Working and having an income is indeed an important part of the livelihood, but it is not the only aspect that matters. It is possible for somebody with a low monetary income to be better off than someone with a higher monetary income. The poverty lines of \$1 or \$2 referred to earlier, have therefore to be treated with caution. Generally, poor people undertake many activities which gives them access to food, housing, money etc. Examples are the production of crops, livestock, clothing and housing for home consumption. If a household can fulfill his own basic needs with these activities, the livelihood is sustainable.

2.4.1 The composition of the framework

There are many different agencies that developed sustainable livelihood frameworks (SLF), for example CARE (Drinkwater & Rusinow, 1999), DFID (DFID, 2001), UNDP (DFID, 1999) (Liew, 2004) and Oxfam (DFID, 1999). Every method is roughly divided into 6 stages: Vulnerability Context, Assets, Strategy, Structure, Processes and Outcome. All frameworks have their roots in the Chambers and Conway definition, besides that they have the focus on the assets and micro-macro links in common. The framework that will be discussed and constructed is shown in figure 2;

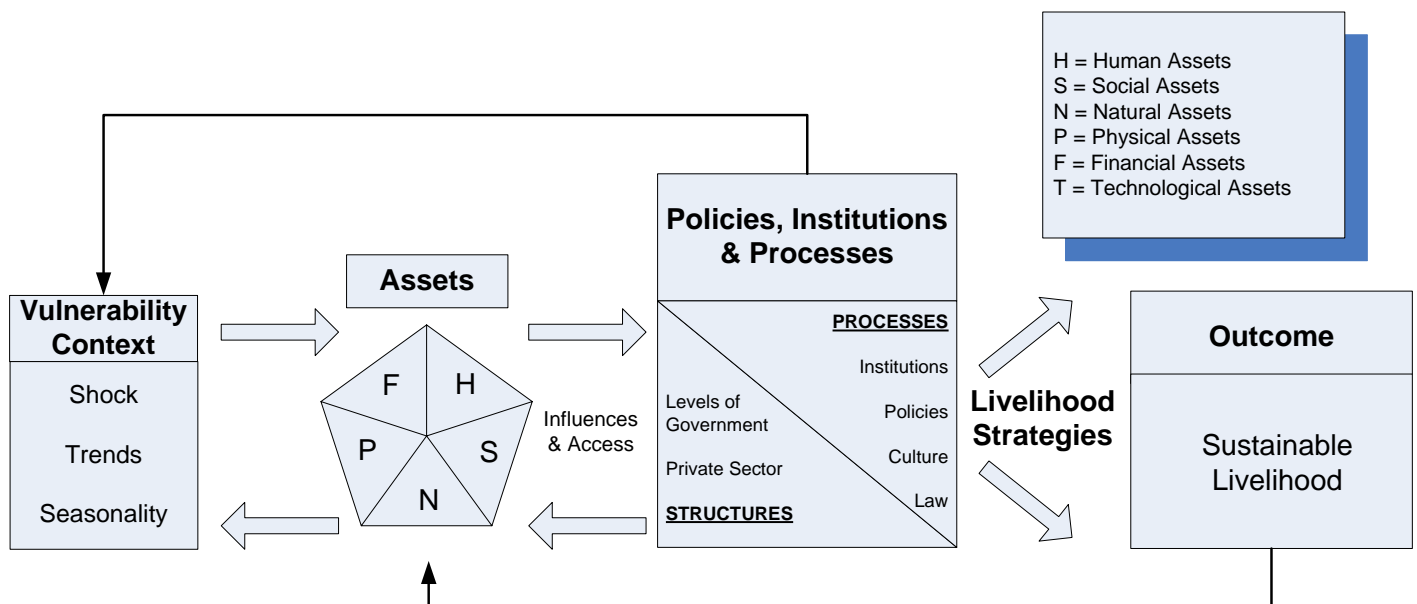


Figure 2 The livelihood framework

Based on CARE (Drinkwater & Rusinow, 1999), DFID (DFID, 2001), UNDP (DFID, 1999) (Liew, 2004) and Oxfam (DFID, 1999).

2.4.2 The Vulnerability Context

The vulnerability context is the external environment in which people live, they encounter external influences from this vulnerability context, things that cannot be controlled. It is important for the sustainability to recognise this stage, a household's livelihood is sustainable when they can cope with these influences from outside. The influences from outside in this research are shocks, trends and seasonality. (Appendix B)

2.4.3 The Assets

The number of assets -which are vital resources in order to achieve a sustainable livelihood (Haan, 2000)- varies between the different frameworks but the most important and relevant ones for this research are the ones mentioned in the DFID framework and Oxfam framework (DFID, 1999)(DFID, 2001) justification of the choices made in this paragraph and the following paragraphs can be found in Appendix B.

- o Human assets: the skills, knowledge, ability to labour and good health important to the ability to pursue different livelihood strategies;
- o Physical assets: the basic infrastructure (transport, shelter, water, energy and communications) and the production equipment and means that enable people to pursue livelihoods;
- o Social assets: the social resources (networks, membership of groups, relationships of trust, access to wider institutions of society) upon which people rely in pursuit of livelihoods;
- o Financial assets: the financial resources which are available to people (whether savings, supplies of credit or regular remittances or pensions) and which provide them with different livelihood options;
- o Natural assets: the natural resource stocks from which resource flows useful for livelihoods are derived (e.g. land, water, wildlife, biodiversity, environmental resources).

It must be taken into account that "assets" does not mean that it has to be a private possession, it means that there is or is not access to this tangible or non-tangible resource when the household wants.

2.4.4 Policies, Institutions and Processes (the PIP - box)

"Structures" is divided into two sections, the public sector and the private sector. Private consists out of commercial enterprises and corporations, NGO's etcetera. Public sector includes the government, courts, and other political bodies and all levels. Without these bodies legislation is meaningless. Because we are talking about rural areas here this will play a big role, because many structures do not reach these areas (DFID, 2001), although more and more NGO's are working in the rural areas now.

The processes are the ones that make the structures explicit, if the structures are the hardware, processes are the software. Policies, legislation, institutions, culture and power relations can be rebuilt or changed by the structures (only culture and power relations is difficult to influence) to help the poor.

It is important to look at the relationships between the PIP forces and the other stages of the LF, because the PIP influences three different stages within the framework (DFID, 2001).

- o There is direct feedback to the vulnerability context. Implemented processes can effect the context direct (for example fiscal policies can influence the economic trend, drought relief policies can influence future shocks) or indirect (for example health policies can influence population trends)
- o Institutions, but also policies, law and culture can restrict the strategies that a person can choose from. If the culture does not allow women to work out of the house, than they cannot choose a strategy that includes working at a workshop.

- o Another impact of the PIP is on the Outcomes. Responsive political structures that implement pro-poor policies, for example extending social services into the rural areas, or social safety nets, can significantly increase people's sense of well being.

2.4.5 Strategy

Choosing a strategy means having choices, opportunities and diversity. Having more choice and flexibility in choosing a strategy means better withstand, adapt to or prevent the external influences like shock and stress. A livelihood strategy means having a detailed plan to achieve livelihood goals (final goal: a SL), this includes the used combinations of activities within this plan, and the choices made to formulate this plan.

In other words a strategy is a detailed plan (which includes making choices and undertakes certain activities) for achieving success, for creating an outcome that will make a livelihood sustainable.

2.4.6 Outcome

The situation that results from your strategy is the outcome. It is the final phase of the whole method. There is a link between the outcome and the assets, the outcome elicits the change of the assets, which make a livelihood sustainable or not. The outcome is one of the major things that will be studied in this research. Electricity is the extra input, which results in an outcome. As discussed in the literature before the outcome that is caused by the change to electricity is not clear, but the outcome that you desire is a sustainable livelihood (UNDP in DFID, 1999).

2.5 Livelihood and Micro Enterprises

In this case ME is seen as a strategy for the household to reach the aim of a sustainable livelihood. Besides that, the choice to access electricity (when available) is also a strategy towards this goal.

2.5.1 Technology as an extra asset

To use the livelihoods framework specifically for a household that chooses a ME as a strategy we have to look at it a little bit closer. There are two gaps in the livelihood framework given in the last paragraph. First of all for producing ME's that use technologies, there is a missing asset. Not one asset covers totally the term production; the effects of the accessed electricity on the production will be studied as well. With production is meant quantity of production, quality of production, diversity of products produced, production techniques, production process and production technology.

When looking at ME's that have no electricity at point x in time, and access electricity, will they start to use technology that uses electricity? If yes, it makes technology and technological capabilities an important factor in this research. At this moment technology is admitted in the SLF in three different ways; 'skills and knowledge' correspond to human assets, machinery and equipment to physical assets, and 'organisation' to social assets (Albu and Scott, 2001). Because of the focus on electricity and possible changes in technology it is better in this case to see technology as a separate asset in the context of this research, like Albu and Scott (2001), to emphasise the importance of technology within ME. Albu and Scott (2001, pp. 3) describe technological capabilities as "a bundle of specific organisational skills and linkages that help to determine ME's abilities to generate and manage processes of technological change".

In other words, technology is only an asset, because people can bring back together techniques, knowledge, organisations and products in appropriate combination. The UNDP framework does recognize technology as important. They see technology as an important mean to rise people out of poverty (DFID, 1999). One of the stages in the UNDP livelihoods approach is the assessment and determination of the potential contributions of modern science

and technology that complement indigenous knowledge systems in order to improve livelihoods.

Albu and Scott (2001) take technology into the SLF as a separate asset. This does give a reasonable link between livelihood and technology. This is based upon a research exercise conducted in Ghana. This exercise was only a minor component of the overall SL study and used a small number of interviews. They do recognize technology as the mechanism that makes people realise the value of their assets by transforming their labour and natural resources into food, shelter, health, income or other desired livelihood outcomes. The importance of technology was also already shown by Fishbein (2003) in the previous chapter.

In this research the technology is placed within the framework as an asset (figure 3). Especially in the case of (producing) ME's with access to electricity technology can play a crucial role in obtaining a sustainable livelihood. Technological capabilities enhance people's ability to generate and manage technological changes, for example the change from milling the rice by hand, to a generator run mill to an electric rice mill.

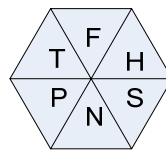


Figure 3 Technology as an extra asset

2.5.2 The Market

The market is one of the things that Hobley (2001) misses in the DFID SLF. The currently used version of the SLF does talk about a "private sector" as part of the structure (paragraph 2.4.1) in the PIP environment, only associated processes like market dynamics have almost no recognition in the current framework. It could be briefly mentioned in the vulnerability context as a general trend (Alby and Scott, 2001). The market cannot be described as an asset, it is an institution, here it will be taken into the PIP-box as a separate item (the Policies, Institutions and Processes – box) (Albu and Scott, 2001), this way it will not be forgotten when analysing livelihoods. Although Albu and Scott integrate the market into the processes box of the livelihoods framework, in this study it will be separate because it will play a very important role in this research (Figure 4). Livelihood strategies for ME's always involve markets one-way or the other (Ramani and Heijndermans, 2003). Fishbein (2003) stated that access to markets is one of the barriers for ME's to thrive, especially newly made products -as a possible effect of the acquired electricity access-. Poor households and individuals adopt livelihood strategies that consist of a variety of market-orientated and non-market orientated activities, so it must be included in the SLF.

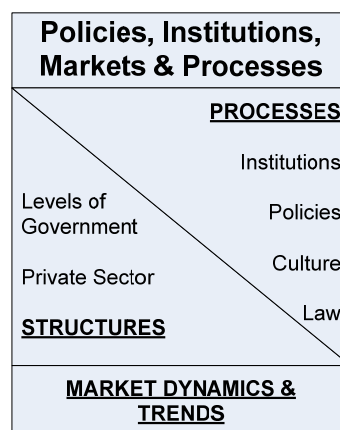


Figure 4 The new policies, Institutions, Markets & Processes box

3. The Research Foundations

3.1 Research Questions

The problem question will fill a small piece of the gap that is left over in the literature framework, the link between electricity, ME's and poverty:

Does acquiring access to electricity have any effect on the viability of micro enterprises (ME)?

The research questions that follow this problem formulation are:

- I. What are the direct and indirect changes within the ME after the acquired access to electricity?*
- II. Which barriers delay or prevent the ME to prosper after acquiring access to electricity?*
- III. Does the livelihood of the ME before the acquired access to electricity play a role in the intensity of the changes of the ME afterwards?*

3.2 Hypotheses

A formulation of hypotheses is necessary, to be able to see at the end of a research, if the research was significant. Testing your hypotheses will give a positive or negative result. This result can confirm or invalidate the hypotheses.

	<i>Hypotheses</i>	<i>Indicators</i>
H1	Acquired access to electricity will change the livelihood framework assets of the entrepreneur.	Human assets Physical assets Social assets Financial assets Natural assets Technological assets
H2	The vulnerability context of the country or sector are a barrier for the ME to become more viable after acquired access to electricity	Cultural aspects Seasonality
H3	The institutions, structures and processes of the country are a barrier for the ME to become more viable after acquired access to electricity.	Governmental programs Layers of government NGO's active Institutions
H4	Acquired access to electricity will improve the market position of the ME.	Market dynamics & trends Increased market opportunities Different market Broader market Number of markets served

Table 1 The hypotheses

The hypotheses are directly linked to the research questions. Hypothesis nr.1 is derived from the first and third research question and the assets from the livelihood framework (figure 5) outlined in the previous chapter. Hypotheses number 2 and 3 are an outcome of research question number 2, which focuses on the barriers for development. The last hypothesis is the result of the second research question, but more zoomed in on a specific aspect -the market-of a producing and selling ME.

3.2.1 Measurement

How will the indicators of the hypotheses be measured? At first the livelihood situation of the enterprise and entrepreneur will be found out, then the current situation of the livelihood assets will be revealed, and this will be compared with the situation before they accessed electricity.

Human assets	the skills, education level, own education in commune or outside commune, knowledge, ability to labour, health, food (meat, fish, tofu), education children, family in commune or outside, hometown, number of jobs
Physical assets	Same for the workers, number, education, hometown, full time job the basic infrastructure: house (mud or brick house), means of transport (motorbike, bicycle, none)
Social assets	the social resources, relationships with neighbors, number of friends, access to the community services
Financial assets	the income out of the enterprise, profit, the savings because of the change, loans (bank or friends), interest,
Natural assets	land for cassava/corn, land for rice, land for other crops, water access, wildlife, biodiversity, environmental resources
Technical assets	number of machines, energy for machines (diesel, man power and electricity), production process, size generator, capacity machines

For the second hypothesis the vulnerability context factors will be studied.

- o Trends for that sector according to the entrepreneurs, the People's Committee (PC) and observations.
- o Season for the enterprise (crop season, harvest, TET holiday, marriage season) according to the entrepreneurs, the NGO's, the PC (Women's Union (WU), Farmers Association (FA) and the Chairman of the commune), the bank and observations.
- o Shocks in these areas according to the entrepreneurs, the NGO's, the PC (Women's Union, Farmers Association and the Chairman) and the available literature.

The third hypothesis, the influence of the PIP box governmental programs and their influence on the enterprise will be studied. Interviews with the different NGO's working in the areas (RDSC, UCODEP, SNV, AEC), the PC's (Women's Union (WU), Farmers Association (FA), youth group (YG) and the Chairman) and the entrepreneurs will secure the validity and reliability of the outcome. Things that will be measured are the number and backgrounds of laws that influence the different ME's, the programs are run in this area by the government and NGO's. The influence of culture on the ME's (minority group or not). In which degree the laws and policies of the government do reach the communes in the rural areas is difficult to measure, but by asking what laws and policies restrict or help the ME's at this moment according to the different sources, it is possible to gather this information.

The market is the last focus, measuring will be done in the following way:

- o Serving local (within the commune), national (more communes, districts, provinces), or international market (before and after acquired electricity access)
- o Access to local (within the commune), national (more communes, districts, provinces), or international market (before and after acquired electricity access)
- o Number of customers
- o Number of products served to the market

3.3 The Research Framework

The theory from paragraph 2.5 asked for adjustments in the framework given in figure 2. These adjustments, the market and the technology as an extra asset are added to this first framework. The figure below (figure 5), displays these adjustments and at the same time it shows where the hypotheses are focused on. The ME is a livelihood strategy to reach the desirable goal, a change in outcome to get a sustainable livelihood. The several factors belonging to the vulnerability context, the PIP box and the outcome are left out for visual convenience, to keep it orderly, these factors are already show in figure 2.

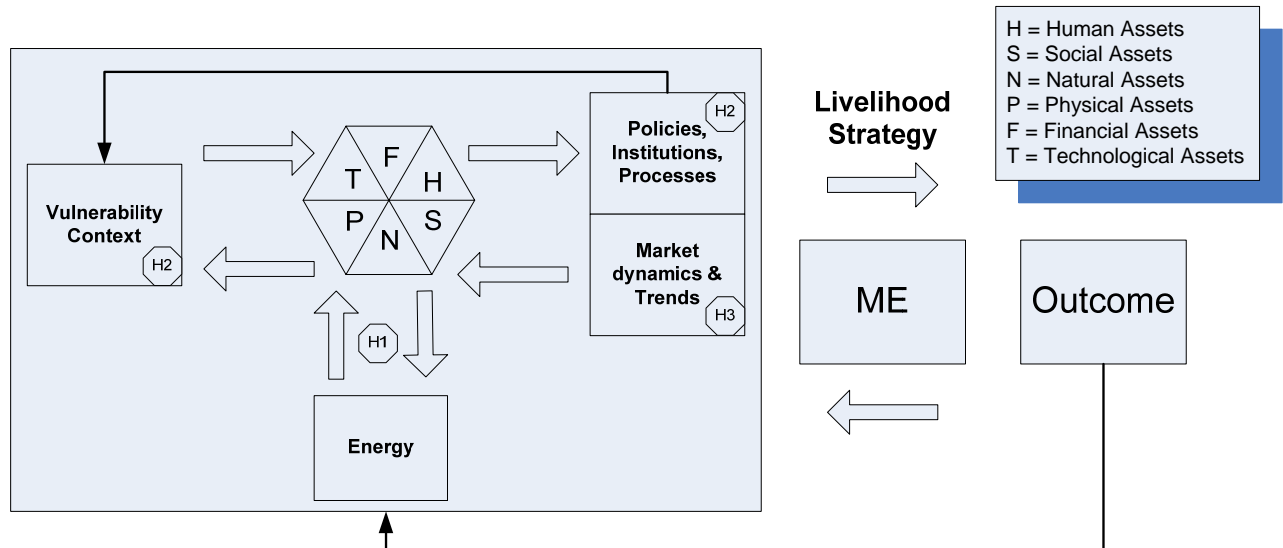


Figure 5 The Research Framework

3.4 Research Strategy

This research is based on multiple case studies. A case study is the preferred strategy when you want to study a phenomenon in its own context and if you want to cover these contextual conditions because they might be of big influence on the phenomenon (Yin, 2003). Where case studies focus on contemporary events, histories (another possible research strategy) focus on historical events, and experiments require control of the behavioral events, you isolate the phenomenon from his context, which in this case is not possible.

During this research several situations will be studied (with/without electricity, with/without access to other forms of energy like diesel), which will be determined in Chapter 3.6, because the situation is different for each sector.

This research will consist out of quantitative and qualitative data. The emphasises will be on the qualitative part of the data, this because of the nature of the problem formulation and research questions. Livelihoods as mentioned in the problem formulation, cannot only be measured in a quantitative way (more information in chapter 2.4). Effects of modern energy services on the livelihood of a ME could not always be expressed in numbers, for example the social effects. The research questions and hypotheses can best be answered with qualitative data, but some quantitative data to back this up makes the research more (internal and external) valid. Qualitative methods can give complex details of phenomena that are difficult to convey with quantitative methods and can uncover and understand what lies behind these phenomenon's (Strauss and Corbin, 1990). Other assessment criteria except validity are reliability, generalisability, objectivity acceptability to responds and costs (Ryan et al., 2001)

When collecting qualitative data a purposive sample method is more efficient then a random sample or a convenience sample. Random sampling gives each member of the population an

equal chance of being included in the sample, in other words they are randomly chosen. Convenience sampling is a sample of people who happen to be handy or easy to survey. It may not be a representative of the population. Purposive sampling is the opposite; this is a type of non-random sampling in which respondents are selected. There are many (16 according to Droogleever Fortuijn, 2004) different ways of purposive sampling, a combination of all will be used during this research (Appendix C). Which ones will be determined during the data collection.

The case studies will take place in the north of Vietnam. The situation in Vietnam can only be estimated based on literature, because the research is done by a non-Vietnamese researcher. That is why the first case study is also an introduction to the context for the researcher. During this first case study the researcher will get acquainted with the Vietnamese lifestyle, developments and habits, and the researcher will determine what kind of enterprises (sector, size, age etc.) are suitable for this study. During the first case study the researcher will develop theories to answer the research question, which will be further explored and replenished during the other case studies.

This method has many similarities with the grounded theory. Grounded theory studies generally focuses on a process (including people's actions and interactions) related to a particular topic, in this case modern energy with the ultimate goal of developing a theory about that process. This way of researching is especially helpful when current theories about a phenomenon are either inadequate or nonexistent and when the researcher is not familiar with the research circumstances (Strauss and Corbin, 1990).

3.5 Vietnam

The case study of this research will take place in the north of Vietnam. Vietnam is located in South East Asia and has a surface of 329,560 sq km (more than 9 times the Netherlands). The country is divided in 59 provinces with major contrasts between North and South Vietnam. It has almost 83 million inhabitants, 85-90% of these people is Vietnamese, the rest are Chinese, Hmong, Thai, Khmer, Cham and mountain groups (CIA, 2004).

The main subjects of interest in this document are energy, poverty and micro enterprises. Vietnam's average electricity access numbers are in the same range of the world's figures. One quarter of Vietnam's rural population has no access to electricity, 20 million people (Green, 2004). In 2000 about 19% of the 9,000 rural communities and 29% of the 13 million rural households in Vietnam had no access to grid electricity. The Government of Vietnam has set a goal of electrifying 90% of rural households through the national grid by 2005 (The World Bank Group, 2004). At this moment Vietnam relies mainly on hydropower for 48% of its electricity generation, with gas turbines accounting for 26% and coal fired power plants 14% (Sian Green, 2004). This is a problem because there is not enough water in the rivers during dry season and the rural areas have limited electricity access to "safe power" for the cities, as for example Hanoi.

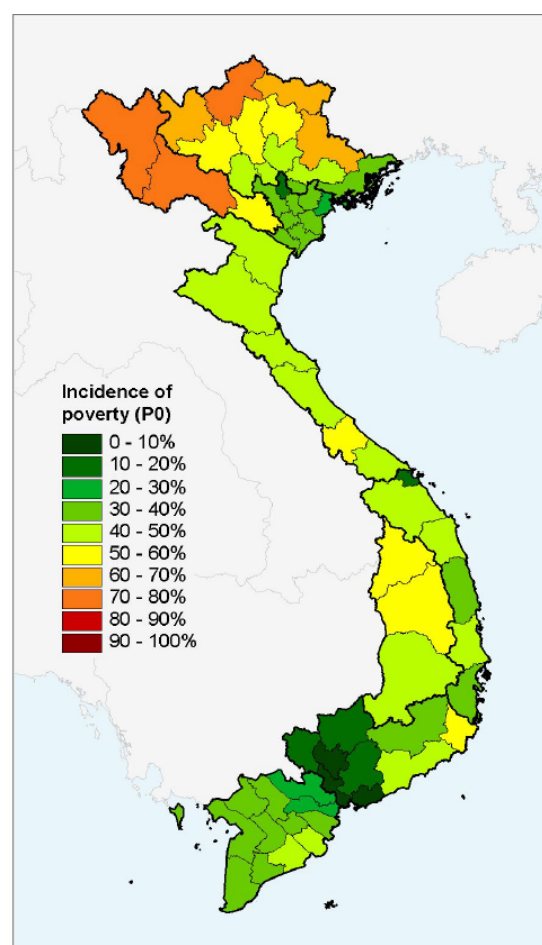


Figure 6 Incidence of poverty (P0) for Vietnam
Source: Minot N, Baulch B, Epprecht M, 2003

When talking about poverty in Vietnam they also calculate in poverty lines, but this is more than just the income/financial situation of a household. The poverty line accepted in Vietnam is the “overall poverty line” (GSO, 2000)(Poverty Working Group, 1999) (Minot, Baulch and Epprecht, 2003)(VDR, 2004). *The poverty line corresponds to the expenditure (including the value of home production and adjusted regional and seasonal price differences) required to purchase 2100 Kcal per person per day using the food basket of households in the third quintile⁷, plus a non-food allowance equal to what households in the third quintile spend on non-food items.*

An example of this is the poverty line used in the *Poverty and Inequality in Vietnam: Spatial Patterns and Geographic Determinants* research (Minot, Baulch and Epprecht, 2003). The poverty line was set at 1,789,871 VND/person/year, but the consumption expenditures in the survey were adjusted, using monthly and regional price indices to compensate for differences in the cost of living over the course of the survey and across regions.

You can divide this in two poverty lines (Poverty Working Group, 1999)(VDR, 2004) see table 2.

- The “*food poverty line*”: the amount of money needed to purchase the basket of food items each day for one year. This poverty line is low because it does not allow for any purchases of non-food items. Also called the “hungry line” in Vietnam
- The “*general poverty line*” for the purchase of non-food items.

1998 (%)	Total Vietnam	Urban	Rural	2002 (%)	Total Vietnam	Urban	Rural
Food	15,0	2,3	18,3	Food	10,9	1,9	13,6
Overall	37,4	9,0	44,9	Overall	28,9	6,6	35,6

Table 2 Poverty incidence 1998 and 2003 (Ministry of Planning and investment, 2002), (VDR, 2004)

As you can see in figure 6 the highest poverty density is in the north of Vietnam. That is why this area is selected for this research. The measurement of poverty that Vietnam generally accepted is often called the headcount ratio (P0), which measures the proportion of people living below the poverty line. Other accepted measures in Vietnam are the poverty-gap index (P1) related to the depth of poverty, and (P2), the severity of poverty all member of a class of poverty measures identified by Foster, Greer, and Thorbecke (Minot, Baulch and Epprecht, 2003). P1 takes into account not just how many people are poor, but how poor they are on average. It is equal to the incidence of poverty (P0) multiplied by the average percentage gap between the poverty line and the income of the poor. In other words: this is the difference between actual household expenditures and the poverty line, measured in percent of the latter. P2 takes into account not just how many people are poor and how poor they are, but also the degree of income inequality among poor households. It is equal to the incidence of poverty (P0) multiplied by the average squared percentage gap between the poverty line and the income of the poor.

As said before, the government is really working to alleviate the poverty in this country. There are many poverty reduction programs at the moment but one plays a role in this research and that is Program 135. This program is active in Phu Tho - Thanh Thuy where one of the case studies took place. Program 135, or the Program for socio-economic Development in Communes faced with Extreme Difficulties was approved in July 1998. Initially, it covered 1,715 communes, of which 1,568 were mountainous and 147 were in lowland areas, including

⁷ Quintile 1 is the poorest and quintile 5 is the richest. Quintiles are defined on the basis of un-weighted per capita expenditures for the 4,304 panel households interviewed in both VLSS93 and VLSS98. A panel household is here defined as a household which was living in the same dwelling in the two surveys.

around 1.1 million households and over 6 million people. It has recently been expanded to cover 2,362 poor and remote communes. With a total investment of more than VND6,000 billion, from 1998-2003, this program has focused primarily on developing village and communal infrastructure as well as inter-communal infrastructure (UNDP, 2004). The communes get their own budget and they can spend this on an infrastructure project of their choice like school buildings, electrification, health center buildings, (drink)water supply, small scale irrigation, roads or a local market place.

After the war ended in 1975 instituted the government a series of domestic policies that brought the country in a recession, and on the edge of starvation. The most significant of these policies was the collectivization of agriculture in the South. This policy proved to be a failure and the profit from crops decreased enormously. The Vietnamese Communist Party (VNCP)(later changed to Communist Party of Vietnam) was willing to change the situation. For this reason, it authorized a series of experiments with semi-private farming in the north in 1984. These experiments proved to be successful and were later implemented on a nationwide scale in 1986 under the banner of "Doi Moi," or reconstruction. This was a point of no return, from that moment on the Vietnamese economic situation changed enormously and Vietnam slowly came to embrace more free market ideas as well as the West. It also changed the situation of the local (rural) people (not only the overall position).

This also had a major influence on foreign investments (Sakai and Takada, 2000). The Asian crises stopped the economic growth and even decreased the investments. Asian countries are looking for policies that enable their economy to grow independently of foreign investments (Sakai and Takada, 2000). One of these areas of interest for a lot of Asian developing countries is micro- small- and medium enterprises. This because they provide many benefits, for example an improved balance of trade as a result of rising exports and import substitutions and increased employment opportunities (Sakai and Takada, 2000). Vietnam is one of them.

Poverty was reduced by a third during the first ten years of the Doi Moi, various health services have become more generally available, an increasing share of the population has access to safe water and sanitation, and primary school enrolment rates have been rising (UNDP 1996).

ME's in rural areas are often informal or semi formal (Pham Thi Thu Hang, 2002). The ME's have to register their business so they are legally recognized, but are not given the same legal status as a formal enterprise. The government of Vietnam does see M(S)E's as a way to develop the economy, especially in these rural areas. Besides the fact that they acknowledge that rural occupations and new job opportunities are required, they also think that a shift from the agricultural labour force into non-agricultural production labour force is necessary (Ministry of Planning and Investment, 2002). Job opportunities for about 1 million people will be the target of their new program, as well as to make the best use of 77-78% of the free time of labour force in rural areas (Ministry of Agriculture and Rural Development, 2004). This is necessary because more than a million people enter an already overcrowded job market each year (Fischel, 2000) (Webster, 1999). The MSE sector is estimated to contribute 33% to GDP and accounts for 89% of private sector employment in Vietnam (Anderson, 2000).

A note hereby is that using the word "enterprises" in Vietnam is very confusing. Both the Vietnamese residents from urban areas as those from rural areas think of big businesses when talking about "enterprises" or even "micro enterprises". This caused many miscommunications and delayed the research. A term used during the research period in Vietnam was "small family businesses" or a long explanation like "an enterprise can also be one person that uses a rice mill or sewing machine".

3.6 Methodology

In total there were 110 interviews with enterprises that were recorded for this research. Some interviews turned out not to be useful, because of several reasons. Reasons like respondents who did not take me or my research serious, or did not have time, or because an enterprise started in the month before the interview. Or just because they did not belong to the target groups, although the on forehand accessed information did impute this. In this chapter it will be explain why these respondents were chosen and how they were chosen.

3.6.1 Research Environment

Because of the rules and regulations in Vietnam there are three layers of approval you have to go through if you want to do your research in a commune. You have to ask permission from the province official, the district official and the commune official. You only get approval if you are introduced by an agency that is already working in this area, a NGO for instance. A lack of contacts in the field caused that the selection of the research areas is both based on the created contacts in the field and on the outcome of previous field studies. Because research areas that are not too similar are preferred, the first selection was based on this. After the selection of areas, contact was made with NGO's working in those areas to ask for assistance. Finally three areas were selected, based on these criteria's;

- o Different poverty levels (P0) below the average of Vietnam
- o Accessed electricity between 0 and 10 years ago, preferably about 5 years ago
- o Micro enterprises are relevant for the commune
- o Rural areas

The selected areas are Phu Tho, Lao Cai and Son La, some important data on which this is based can be found in table 3

Province	Studied communes	Incidence of poverty (P0)	Electricity since	% Rural
Phu Tho	4	0.45	Divers per commune 1999/2003/2004	86,0
Lao Cai	1	0.69	1996	83,2
Son La	6	0.73	Divers per commune 1996 - 2002	88,9

Table 3 Selection criteria

As shown in table 3 Phu Tho was the least poor province of the three studied provinces, Son La is the poorest, this is also visualized in Appendix D. With the system in Vietnam this can be dismantled further in districts and communes. In table 4 are shown which communes and districts are surveyed in this research (in order of the research).

Commune	District	Province	Electricity access	Poverty Rate	Income Million VND p.p.p.y.
Yen Mao	Thanh Thuy	Phu Tho	2003 December	11.6%	-
Tu Vu	Thanh Thuy	Phu Tho	2004 April	10.1%	-
Phuong Mao	Thanh Thuy	Phu Tho	End of 2003	12.6%	540 kg food = 2,2
Trung Nghia	Thanh Thuy	Phu Tho	1999	4.3%	3
Van Hoa	Lao Cai	Lao Cai	1996	9 hh out of 723	4
Chieng Mung	Mai Son	Son La	1996 (not strong)	10.8%	3,8
Chieng Mai	Mai Son	Son La	2 hamlets 2002	12,1%	?
Chieng Ban	Mai Son	Son La	1999 and 2002	3,5%	4
Sap Vat	Yen Chau	Son La	2000	9,3%	4
Chieng Sang	Yen Chau	Son La	1997	4%	2,8
Chieng Khoi	Yen Chau	Son La	1999	2 hh out of 575	4

Table 4 The Research Areas

All communes have the same social groups who play a major role in the daily life of the people. The social groups can help you with getting a loan, or with helping you with your livelihood situation. Most social groups have a small fee, which goes to the poorest of the community. There are also some micro finance funds, because of these fee's and more money people give to the groups.

- Communist Party The political party
- Farmers Association They help with seeds, knowledge and technology
- Group for encouraging education They hand out prizes at school for good performers
- National Frontiers All war veterans that share memories
- Retirement Group Retired people that come together and help each other
- Youth Group They are the herald of the communist party, they do a lot of volunteer work and help other less fortunate people
- Women's Union Protects and helps the women

Thanh Thuy – Phu Tho

Thanh Thuy is a long small district on the riverbank of the Song Da river. Thanh Thuy exists of 15 communes. Within Phu Tho the three poorest communes were selected at first, because the cooperative NGO, RDSC, was working there. Besides the fact that RDSC was working there, all three communes were also part of the governmental program 135 so a fourth commune was selected for comparison. During the research there was one big advantage in Thanh Thuy and that was the helpfulness of the people in Thanh Thuy. I stayed within the commune and transport was arranged, and notifications of my visit were given to the different communes. The main income source in all communes is agriculture; growing rice, cassava and corn. Second income source is livestock.

A general problem in Phu Tho is that the river is “eating” from the district, and this takes land from the inhabitants away. This is the smallest province (3518 km²), the closest to Hanoi. Thanh Thuy has mountains on one border but this is not in their district any more. The PO of this province is 0,45 as shown in the last table.

A big development in this area is the paved road that goes all the way from the north to the south of Thanh Thuy. Furthermore you can say that the more south you go in the district the poorer the people get.

In the table of Appendix G you can see that Yen Mao is the largest commune when looking at the number of people, Phuong Mao is the smallest. In square km Tu Vu is the smallest with only 4,8 km² and Yen Mao it the largest with 13 km² the other two are somewhere in the middle, around 7km². The poverty rate of Thanh Thuy in general is 51,6% (P0) according to the VLSS (GSO, 200) this was in 1999, the poverty rates of the communes divers from 47,5% in Trung Nghia to 66,2 in Phuong Mao according to the same source. Fortunately the community leaders give different numbers for the current situation as shown in table 4, with still a big difference between Trung Nghia (4,7%) and the three others who are all above 10%. The community leaders hold a survey every year about poverty rates, this means the communities have developed in the past few years.

In this area live Muong ethnic people. In the past this population group did not believe in education and this caused arrears in development. Nowadays the children from the Muong people have the same chances as the Kinh (original Vietnamese people) children. As a result of this the Muong people are overall still the poorest in the communes. They have less trade skills and are less educated.

Van Hoa – Lao Cai

In Lao Cai it was only possible to visit one commune due to a lack of contacts in other communes. Lao Cai (which is near the border with China) is a mountainous area very popular with tourists because of Sapa, where ethnic minority groups expose themselves and this generates income. Unfortunately this is not beneficial for the whole province.

Van Hoa is a commune next to the city Lao Cai, they are heavily influenced by Lao Cai. The commune is next to the Red River, and here the river is also eating from the land, people are losing land because of this.

The main income source is agriculture, the hamlet near the city has some small services, but they believe this hamlet belongs to the city now. Furthermore the people sell some vegetables in the city. All the rice, corn and cassava is for own use or for use within the commune.

The road is the main problem at this moment, the hamlet near Lao Cai is easy to reach, but the other hamlets are difficult to reach because the road a dirt road which is very bumpy and in bad shape.

The other problem, which is an advantage at the same time, is that the government wants to turn Van Hoa into a suburb of the city, into an industrial zone. The advantages are that they are working on the roads near the city and that there is more demand for products in this area. Disadvantages are that they are taking land away from the people in the community without giving them anything in return. This makes the lives of the people in Van Hoa very insecure, they can build up new lives, start new enterprises at a different place in the community but they are not sure they can stay there. This did increase the number of enterprises in this commune, because a lack of land stimulates enterprise development.

With 2400 people living in Van Hoa this is the smallest commune surveyed. The area is elongated (about 8 km long) and that is why people live far away from each other (this is also a problem for the children that go to school, there is only one school in the commune).

Mai Son and Yen Chau – Son La

In Son La the cooperation was with SNV Son La and with the Agriculture Extension Centre (AEC). Son La is also a mountainous area, but there are no rivers. More than half of the population there is from an ethnic minority group, mainly Thai. SNV/AEC divided the communes in 3 different groups, group 1 were the poorest communes and 3 the least poor communes. The appeal was to let us visit communes from all three groups, in two different districts. This was not granted because of several reasons. The poorest communes were mainly on the boarder with Laos and foreigners are not allowed in these regions. Some other communes are part of a governmental program that does not allow foreigners to come and visit. All selected communes were from the third group, in two different districts. The influence on these choices was limited because of the dependence on others, although the appealed districts were chosen. Districts that were reasonably good accessible and had options to stay overnight (this is not allowed for foreigners either in some districts). For comparison, these communes from level 3 have the same P0 or are even poorer than the communes in Phu Tho and Lao Cai, so the fact that there are no communes from level 1 will not effect the research.

In general the Thai people are developing the same as the Kinh people in this area, only in the really remote areas they stay a little bit behind. The Chairman of one of the WU give the example that there is still more domestic violence in the really remote areas while in the centre of the communes this is all banished.

The communes surveyed in Son La all had to pay a certain amount for their electricity connection. The amount varies from 200.000 – to 5 million VND depending on the commune

and the distance from the source. Not everybody could afford this, so the government helped with loans without interest. After the deadline not all loans were paid back, but the government is not making a big deal out of it and is just waiting for the money to come.

The electricity access in Chieng Mai – Mai Son is limited, two communes are connected to the grid because the commune gave 38 ha of land to the business Vinaconex, which works on construction and raising animals. Because they provided the land the government provided the electricity for this business and the 2 hamlets around. Having a company in the rural area means a positive influence on this area so this is stimulated by the government. The rest of the commune has to pay for its own grid connection. In the centre this means that each household must pay 2 million VND for a connection. Not every household can come up with this money, the households with an enterprise that I reviewed did say they are willing to pay this money.

Chieng Ban is more developed than the other communes in this area because they have coffee plantations. The government decided after a research that the mountain area in this commune is best qualified for coffee production, so they (through the FA) helped the people in producing, collecting and selling the coffee.

Chieng Khoi and Chieng Mai are both far from the main central road through the Son La district. People discouraged me of going to Chieng Khoi, because it is difficult and dangerous to reach. For the validity of the research it is necessary to go to the off-road villages as well (same as Phuong Mao in Thanh Thuy).

The poverty rates of Yen Chau and Mai Son are according VLLS (GSO, 2000) 67,0 and 70,8% in 1999. Currently the poverty rates (P0) of the communes diver between almost nothing (2/575) in Chieng Khoi to 12% in Chieng Mai (see table 4).

3.6.2 Selection of the ME's

At the start of the first field study in Thanh Thuy there was no knowledge about micro enterprises in Vietnam because of a lack of literature. It became clear during this first field visit that there are a few enterprises that are very common in the rural areas. The first selection of enterprises is based on this known fact, and was done by snowball or chain sampling (appendix C) in combination with typical case sampling. We were lead by a person of the PC who had knowledge about the commune and could point out the “in his eyes useful” enterprises. Rice mills, carpenters, motorbike repair, ice (cream) making, tailors and mechanical workers are selected because (besides their commonness) electricity - if available - could play an important role in these enterprises. To avoid the disadvantage of this technique (remaining within the social network of the informant) we asked for a different guide every day (which was not every time conceded).

After this first selection, intensity sampling was next, in combination with maximum variation sampling, because more basic knowledge was gained about the chosen sectors and in depth collection of information was necessary at this moment. I wanted to gain as much information from as little enterprises as possible (intensity sampling was used for this, main categories on which selected were size, age, different types of energy services and use) and at the same time I wanted a wide variety of the sample to control the reliability, variability validity of the research.

At this time other categories started to play an important role, the first analyses were done and some first theories were formed. As a result of this first analyses in the two other research area stratified purposive sampling, theory-based sampling and sampling of (dis)confirming cases were done. Each field visit is analysed and gaps in the research were revealed.

At the end 110 interviews were conducted that were useful, as said before. They were divided as shown in table 5.

Micro Enterprise	Number of respondents
Tailor	6
Ice (Cream)	7
Mechanical Workers	9
Motorbike Repairmen	18
Carpenters	20
Rice milling and grinding	50
Total	110

Table 5 Number of respondents per sector

3.6.3 Data gathering technique: PRA

Different Participatory Rural Appraisal (PRA) techniques will be used for the data collection for this research. PRA evolved from a series of qualitative multidisciplinary approaches to learning about local-level conditions and local peoples' perspectives. It started as a tool used only for investigative purposes, but developed itself as a tool that involves people in the processes that affect their livelihoods and empower them in dealings with external actors. By inviting community members to facilitate participatory exercises, learning within the community can be maximised (DFID, 2001).

Important when using PRA techniques is sequencing and combining these techniques. The central part of any PRA is semi-structured interviewing (Appendix J), this is interviewing based on a checklist instead of a questionnaire; the checklist will be adapted according to the interview situation. These interviews are therefore more like conversations guided informally by the interviewers. Interviews were conducted with the entrepreneurs, different social groups from the PC (Women's Union, Youth Group, Farmers Association), with the different NGO's (SNV Son la, AEC, UCODEP, RDSC), and the Chairman of each community. These are the key informants (people with specialist knowledge, to gain insight on a particular subject, or people who can represent a particular group or viewpoint). This was a good way of collecting data. I started off with a question format but after a few interviews this was reduced to some keywords to make sure nothing was forgotten. People were very willing to talk to me, if they did not have time or interest I did not talk to them but selected another enterprise. Some people asked for money, but when they heard that I was a student it was not a problem that I did not pay for the interviews. Except in Yen Chai where AEC made me pay for every interview (Financial site of the research is shown in Appendix H). People were very open and willing to talk about their financial situation and problems, this is very common in Vietnam. The financial situation is less a secret as in my home country, the Netherlands.

Participatory Mapping provides information about the physical characteristics of the community and also reveals the socio-economic conditions and how the participants perceive their community. This tool is used to get a (visual) map of the village and the location of its ME's, this could be useful to answer the research questions, because the location of a ME can be of influence on the total picture. It was tried several times (Appendix E – Van Hoa) but not of big influence for the outcome of the research. There was time to spend informally with most of the community leaders and/or other PC (PC) members. I got most information about the physical characteristics of the commune and the socio-economic conditions through informal interviews. Maps were made afterwards in sketch by me.

These informal interviews mentioned above do play a big role in the whole research. I managed to stay with a local family, and later within the district. There were many dinners, lunches and other moments where we had informal contact with the PC members and other community members like police officers. They did give me plenty of information that was useful for this research.

Problem ranking is also used, both for the community as the ME. The problem ranking can be done both energy related and not energy related for the ME. Problem ranking has been done during group sessions (Appendix F) and also individually with respondents and people committee members. It is difficult to come to a strict order on which everybody agrees. Often people cannot choose between the importance of two different problems. For them it all ligatures. This PRA method was not as successful as hoped because of this, but it did give a good understanding about the situation of the commune and the enterprises.

During the interviews I learned that the crop season and TET holiday are very important moments in the Vietnamese peoples lives. Not only for the farmers, but also the enterprises depend on these times. Most farmers can only pay there bills after crop season. For all areas crop seasons are different because of the different climates (and heights) besides the different seasons there are also the different crops that have different times to grow. For example the Chairman of the farmers association says that it takes about 120/130 days to grow rice and corn, while cassava takes about 6 or 7 months. Other crops like coffee or tea might take more or less time. That is why it is not easy to develop one timeline for the north of Vietnam or for the researched areas. It does mean that we do have to be aware of this seasonality and have to keep in mind the importance of TET-holiday (Chinese new year) which is normally in February and the different seasons.

Group interviews are also part of the research. In this case only focused group interviews, because natural group interviews are not allowed by foreigners in Vietnam. You need permission for every interview from the government/police, interviewing people that are gathering at a certain social event or place is unimaginable (Appendix F). Two group interviews took place during my research in Vietnam, in Yen Mao the chairmen of the WU of the different hamlets came together one day and gave me time to talk to them. I also visited a high school in Mai Son to discuss the electricity issues with the oldest children (16-17 years old) of that school. This was very difficult because of the language problem but it was also very interesting and a good addition to the information already obtained from the PC's. The most difficult part here is working with the translator, which will be discussed in the next paragraph. Issues that were discussed during the group interviews were: the problems of the community, micro enterprises, poverty, role of women and mainly the role of electricity in peoples lives.

Observation is after the semi-structured interviews the most important research method used in this research. During the interviews there was plenty of time to observe the respondents, their houses and their workshops (an advantage of working with a translator). Because it is difficult to judge the persons human assets and other livelihood assets observation of their house (brick or non brick), their furniture, clothes and other visual things in and around the house was very important for the outcome of the research.

Photography is the last method that is used for this research. There are at least 2 photographs taken per interview, one of the respondent and one of the business, shop or machines that are used. This makes comparison afterwards easier, and it is a mnemonic device for the researcher.

3.6.4 Validity

There are 4 tests you can use to guarantee the validity of a research; the construct validity, internal validity, external validity and reliability (Yin, 2003). The construct validity exiles the idea that subjective judgements are used to collect data. There are three tactics that can construct validity. The first one is the use of multiple sources of evidence; I used many sources in this research, NGO's, Government (PC), Governmental groups (WU, FA, YG), respondents from different sectors of ME's etcetera (this has already been discussed in paragraph 3.2.1). Chain of evidence is a second tactic, this is also the case with reliability. If another investigator would do exactly the same research, he must end with the same results and conclusions (Yin, 2003). To make this possible all steps and paths that are chosen during this research are reflected in the chapter methodology. What study areas, ME's, techniques and sampling methods are used and why. If another researcher would follow these same steps as rendered here, he would come to the same conclusions. The last tactic is to have your draft of your case study report read by a key informant. Going back to the same research areas to check the results with the PC or other respondents was not possible in this case, except in Thanh Thuy. The temporary short analyses done in between the different case studies are presented at the next case study to test and verify the results.

The internal validity is of importance in this research. It must be sure that the changes studied in this research are changes because of electricity and not because of third factors that influence the studied item. To make sure this is not the case in this research a broad area is studied where more than just the enterprises is studied but also the market, PIP-influences and the vulnerability context are taken into account. This way a possible third factors will come to the surface.

The external validity indicates whether a study's findings are generalizable beyond the immediate case study. Case studies rely on analytical generalisation. The replication logic can test this validity. This means that the same results must occur at one or even two other locations. A multiple case study must be done. This is the case in this research where three different areas are used as case studies and within these areas even more communes. The external validity does limit to the northern areas of Vietnam. The developments in Vietnam do not make it possible to generalize this research on a global level. With developments is meant the major history of Vietnam and its consequences; the government's proceedings and the government's actions to develop the economy in the past 5 to 10 years. The south is already more developed than the north (figure 6) since the two areas were combined after the war. Which makes these results only relevant for the northern part of Vietnam.

Reliability is minimizing the errors and biases in a study (Yin, 2003). By using a combination of the techniques and different sources of information that replenish each other the bias and possible errors are minimized. The fact that I got the same information from different respondents with different positions in the society (from Chairman to farmer) ground this judgment as well. The different sampling techniques as given in the previous paragraph also minimize the bias that can slip into a research.

3.6.5 Working with a translator

During the whole research period a translator was used. This has both advantages and disadvantages. Advantages are for example that the translator is a local person who is aware of the local habits and customs; she can introduce you to these habits and can make sure you will respect these local habits. As a foreigner you might not be aware of the customs and you might insult people without knowing it. She can also inform you about things that are assumed to be normal during the research which are not normal or common for you as a foreigner.

It is a disadvantage that I, the researcher, am not from the country studied. On the other hand it does prevent you from starting off with bias, I started with no idea of the situation and my opinion is based only on the research. This way I can form a realistic and objective conclusion about the case studied.

Another big disadvantage is that you do not have any direct contact with the respondents. It is difficult to interact on the answers people give, especially during the group interviews. When the translator translates the answers, the interest of the respondents easily goes to other things. In a group conversation people start talking to each other and are off subject before I can respond to the answers.

Another disadvantage is the bias of the translator that might come back in the way she translates. Because of the good collaboration and understanding between us there was an environment in which we felt free enough to discuss everything amongst each other. If I had the feeling she translated something wrong, because the respondent gave an long answer for example, while her answer was short, I could ask her this immediately without any consequences. She also translated thing that people told her not to translate, which is very good.

The main advantages were on the practical side of the research, organizational matters and habits that I am not aware of. My conclusion is that because of the good teamwork between my translator and me, there were minimum influences on this side on the outcome of the research.

4. Analysis of the gathered data in North Vietnam

To reject or accept the hypotheses as given before, all different aspects of the livelihood model shown on page 16 (figure 5) have to be analysed. The assets, vulnerability context, PIP-factors and market are the main issues here. The literature given in chapter 2, creates some expectations concerning the first research question that can be summarized as followed:

- Higher surplus (Lucas et al., 2001)
- More cash, higher profitability (Lucas et al., 2001), (Khan, 2001), (Lamech and O'Sullivan, 2001)
- Higher productivity (Lucas et al., 2001), (Khan, 2001)
- Higher quality (Lucas et al., 2001), (Lamech and O'Sullivan, 2001)
- Range of output increased (Lucas et al., 2001), (Lamech and O'Sullivan, 2001)
- Opening hours change (Khan, 2001)
- Starting new, extra businesses (Khan, 2001)
- Compete more effectively (Lamech and O'Sullivan, 2001)

The second research question about the barriers that could delay or prevent the ME to prosper after the acquired electricity, also has some expectations that are based on the literature from chapter 2:

- Electricity and willingness are not enough to develop the ME (Massé, 2003), (Ramani and Heijndermans, 2003), (DFID-Kar, 2002)
- Electricity is a derived demand, you do not want electricity for the electricity but for the services it makes possible to use
- Infrastructure (buildings, schools, health centres etcetera), intangible services (like markets, personnel, governance and development institutions) and non-infrastructural (knowledge and knowhow) complementary inputs are necessary for development (Ramani and Heijndermans, 2003), (DFID-Kar, 2002), (Fishbein, 2003)

Other things that must be available for development of the ME:

- Technical and financial management capacity (Fishbein, 2003)
- Policy and institutional environment (Fishbein, 2003)
- Access to market (Fishbein, 2003)

In this chapter an analysis of the different ME's and a general conclusion will be drawn. Whereupon a cross-sectional analysis will follow, with a retrospective view on the used literature framework. These analysis are more extensively elaborated in appendix I, this chapter is only a short version of the findings. With these expectations kept in mind I shall look at the different sectors and at these together.

4.1 General Background

At this moment Vietnam is going through many developments. The government is working hard to reduce poverty. How does poverty come into existence according to the respondents? The main reasons for being poor are (according to group interviews, semi structured interviews, NGO's, PC's etcetera):

1. Few possibilities for labour, this means you might be sick, disabled, old, no family, widow etc.
2. Little access to land
3. A low level of skills (people sometimes have no problem with the first two items, but have no skills to develop themselves or to produce or grow anything)

When the poverty level is reduced people will invest in different things, the order of importance is difficult to say, people did not agree on that. The house and furniture are the most important one, on that they do agree. Because of the climate in the north of Vietnam, a good house is very important for a secure and sustainable livelihood. The north can be very

cold and there is monsoon. This requires reliable and robust houses. Other things they invested in are (in almost random order):

- a. food (meat and fish are expensive, tofu is cheap)
- b. the garden and the land
- c. animals
- d. means of transport
- e. assets for the house like TV, radio or DVD player

People are very happy and overall satisfied with their enterprise, the only problem mentioned in the interviews is a lack of money (to buy raw materials, to buy animals, to extend the business etc.). There are only a few people that mention other problems, but these problems are very personal, like disease, age or space for the business. They do not see any energy related problems.

4.1.1 Electricity

The year in which the communes got electricity access varies a lot (shown in table 4). In Van Hoa they were the first in 1996, Chieng Mung also got access but not strong enough for machines, only for lighting. Chieng Mai still has no access, except two hamlets near the factory.

The electricity board has set two different prices for electricity. There is a household price and a production price. This does vary a little bit but the costs for production are 1000 – 1200 VND per kWh and the costs for household is 600 - 700 VND per kWh. Some of the enterprises, especially the ones with only one or two small machines did not register for production electricity, and use the household electricity. The difference is that the electricity for production is stronger so more people can have a machine hooked up without any problems.

In most communes the electricity is still run by the EVN (Electricity of Vietnam), only in Van Hoa and Trung Nghia the electricity distribution and payments are run by a cooperative. They buy the electricity from the government and distribute it in the commune (same price). The only difference this makes is that it employs 6 people from the commune.

A central problem in the rural areas is the power cuts. Half of Vietnams electricity is generated by hydro-electric power plants (EVN website⁸), about 46% in 2003. If there is not enough water in the rivers during dry season, the country has a problem. They cannot generate enough electricity for the whole country then. EVN then schedules power cuts in the rural areas so they can save energy for the big industrial cities like Hanoi and Hai Phong. During this research the water level was very low, they even had to start with power cuts in parts of Hanoi to save enough energy for the industry.

4.2 Tailor

The changes in livelihood are displayed here, but also the things that did not change are of importance to this research. The letters H, P, T, S, N and F relate to the 6 assets of the livelihood framework as mentioned in the previous chapter.

H All tailors started their business because they liked the work. They do courses outside their commune and husband and wife teach each other. The choice to start the business is not electricity related.

Human assets did not change because of electricity, education level, hours of work, stress, difficulty of the work all stayed the same.

T The technical assets did change, all tailors that accessed electricity bought new

⁸ Electricity of Vietnam, (2005) <http://www.evn.com.vn/>

- machines; 2 or 4 new machines depending on the number of workers. All tailors did keep at least one machine that can be used with man power (or a machine that can work with electricity and man power) because of the power cuts.
- F The financial situation became more viable for half of the respondents. The higher productivity caused the turnover to increase, and this was more than the costs for electricity. The other half does not have any changes in income. All tailors have within the household more than one source of income.
- N, The natural, social and physical assets were not influenced by the change to electricity
S in any way. Reputation, friends, access to water, land, biodiversity are all of no
& influence on tailors, and all of them are not influenced when tailors get access to
P electricity. They also do not build any new houses or workshops (P), although they do
intent to do this in the near future (when there is money, place).

The vulnerability context, PIP and market influence the ME and are also influenced by the change to electricity. This is elaborated below.

- Vulnerability Context The context is of little influence on the tailors, TET holiday does give them some more customers, same as the starting date of the school, but this has been the same for many years, and they are used to this. The “land eating” river has no influence on the tailors.
- PIP There are no structures or processes that limit or improve the tailor business. There are no NGO’s or governments interested especially in tailors specific and there are no policies, laws or programs that influence them both positively as negatively.
- Market The demand did not change as a result of the acquired electricity, only because of the change in fashion trends. They serve the same people from the commune as before. The tailors did not have or create any new market opportunities These people do require higher quality materials and work, they require this now from all tailors because it is available. Quality is important when deciding which tailor can make your clothes, now higher quality is available people will not go to the tailors with low quality.

The electricity has positive influence on the viability of the enterprise through changes in the technology, productivity and the financial situation. Electricity did make the ME more viable.

When looking back at the literature the changes are not totally as expected. The productivity, quality and income (partly) did increase, but the other expectations are not met. The opening hours stayed the same; they are open day and night for customers as before. They do not really compete more effectively. They are quicker but because there is not more demand they do not make more items. Even the range of products did not change, this depends on the fashion trends and not on the machines. In this case there were no big changes at all, access to market was already expected to be a barrier for development. They can produce more and quicker, but the market stayed the same as before so the demand stayed the same.

4.3 Mechanical Workshop

All mechanical workers learned their skills in another commune or district. They were able to afford this way of learning, although it does not have to cost that much (estimation by non official respondents is 1 million VND per month). Which shows that people with a better more sustainable livelihood at the beginning of the ME have more opportunities than others. They do not have to borrow from the bank, and they can buy more machines.

- T After changing to electrical machines –all respondents bought new machines, at least 3 and maximum 7- the work got easier and more convenient. Before this they used generators or manpower, which is very labour intensive and hard work (the negative

	aspects of those have been discussed before). Machines on electricity eliminated the disadvantages of generators.
	They can make more different products now, “bigger” products as they describe it themselves, like gates because of the electric machines.
	With the new machines the quality of the products is better, there are less mistakes and the products are more robust.
H	At the same time they also had to hire more workers; the demand increased and the
&	range of products changed. They can produce more different kind of products. They
T	save time with the higher productive machines and can use this extra time to make other
	products. Although they still sell these products to the same market, the local market.
N	The natural and social assets were not influenced by the change to electricity in any
&	way. Reputation, friends, access to water, land, biodiversity are all of no influence on
S	MW, and are all not influenced when MW access electricity.
P	They get their half products from the bigger towns (main city in district or province).
	They do want to have more raw materials, and bigger raw materials, but this is not
	always available or affordable. Furthermore there are no changes in the physical assets
	like house and so on.
F	40-60% of costs for energy is saved because electricity is much cheaper than diesel and
	the costs generator repairs are gone. This is used on the things stated in the general
	analysis like house, furniture, children etcetera.
Vulnerability	The context did create an opportunity for this sector; the trend of window bars
Context	and gates increased the demand for the mechanical workers. People want
	window bars and gates. Now the welfare increased they have more valuables,
	they want to protect their valuables, house, property and most of all their
	family.
PIP	There are no governmental rules or laws concerning mechanical workers, no
	structure or procedures are of direct influence on the mechanical worker’s
	business. The market developments are a consequence of earlier mentioned
	general PIP influences like agricultural programs in the previous paragraph.
Market	They only serve the local market, there were no new market opportunities
	created or chosen. The trend is that more people want to secure their house as
	also mentioned with the vulnerability context, there is more demand and more
	MW come into existence.

The livelihood situation of every entrepreneur in this sector improved after getting connected to the grid, they can produce more (different) products and make more profit, in combination with more demand, it gave a positive result.

In this case most of the expectations are reached. They make more products (bigger products), they have more profit, higher productivity, better quality (fewer mistakes). They would also compete more effectively if the other competitors would not have changed to electric machines, but all competitors did change to electricity as well.

There are no real barriers that hinder this ME from developing. The market is growing (but still only a local market). There are not more complementary inputs necessary for this enterprise to develop.

4.4 Motorbike repair

Besides a few people that mention a lack of (money for) raw materials as a problem they feel very satisfied, especially as most of them started this work because they liked it (as a hobby). In the future almost all motorbike repairmen want to grow bigger, but they do not know if there are enough customers. They think customers will come automatically or spontaneously.

The electricity is not of major influence on the enterprise, almost all respondents say that at least once.

- H They all learned their skills from others (friends/family) or in job training centers, these skills did not have to change because of the new machines. A remarkable fact is – compared to all the other respondents who are married- that a quarter of the respondents is still single, it is a profession that is popular among young people.
- S Reputation is very important in this job and the reputation is influenced by electricity, the work is done quicker and with higher quality.
- P The road did improve the market. There are new roads in several communes, which makes it easier –less bumpy- and more useful to have a motorbike. The electricity did not change the physical assets.
- F The machines on electricity are cheaper than the same machines on diesel, the work is more productive and the range of tasks that can be done increased so they can earn more money. At the same time the number of customers also increased, which means more sales and more income.
- T Electricity is of influence on the technological side and the way they do their work. New machines (between 3 and 8) are purchased which work quicker than when the same work is done by hand. Nevertheless is the more income is a result of the increased demand (which is a result of the overall developments in Vietnam) and not the electricity or technology.

They can do more specialized work now with the new machines. Before they had to send customers to competitors in the city for these tasks because they could not perform these specific repairs themselves due to a lack of tools.

When trying to figure out if the respondent is better off than others with a farm because he has a motorbike repair shop he laughs and says:
“I only see more traffic”

- Vulnerability Context Some respondents say that the harvest is a limitation to their work, although this is not influenced by the electricity. People do wait with repairing their motorbike until they have money (after the harvest). Nothing changed after the acquired electricity access.
- PIP Only one respondent mentioned the influence of the government on his shop. He used to have a shop in Yen Chau (the city near Sap Vat). The people there are so afraid of the police that they do not use their motorbikes that much. To afraid for tickets or fines. That is why he moved his shop to Sap Vat, so he could serve the people that travel from the communes to the city.
Other respondents do not see any restrictions or limitations thanks to the governmental or NGO policies or programs.
- Market Most respondents say the number of customers increased. There are more motorbikes (from China) and people have more money to spend (one person said it stayed the same). They all still serve the same local market, with now and then somebody that passes by (being on the main road is important).

The expectations as sketched in the beginning of this chapter are almost all reached in this case study of the motorbike repairmen. The opening hours stayed the same together with the business, there is no new business created since the electricity came. The range of output on the other hand did change; much more is possible with the new machines. These new machines (change of technology) also caused a positive change in profitability, together with the productivity and quality.

There are no barriers that stop or slow down this sector from developing. More motorbikes and better roads did increase the opportunities for motorbike repairmen. In this case the

complementary inputs as mentioned in the literature as barriers -when not available- are present and do stimulate the development.

4.5 Carpenter

Electricity had a major impact on the carpentry business.

- H The work became more convenient, easier, less hard and therefore healthier. In the past the work was very labour intensive, hard physical work. Now machines replace this. They work the same hours as before and are able to serve more customers (and there is more demand than before) in this same amount of time.
- P The physical assets stayed the same, the improved roads or other physical assets are not of influence on the carpenters.
Housing, furniture etcetera did not change, it is not different in comparison with other ME's, it did not change after the electricity came.
- T Everybody buys a sawing machine and one or two other small machines, after they acquired electricity. Without the usage of these machines there would not have been any changes. With the machines the work is done quicker, and the productivity increased. For example doors take 40% less time (according to two respondents) when made with machines and a bed takes 60% less time.
- S Reputation is again an important factor in the whole process, reputation can be improved by the usage of electric machines.
- N The carpenters depend on the wood that comes from other places than the forest since the wood laws and policies of the government, people's back yards for instance. This source is limited and makes the work of the carpenters difficult and expensive.
- F If there were no laws about wood cutting, the profit would have increased. The carpenters do not make more profit per product but the productivity will increase so much that they can handle more demand and sell more products. Now the turnover did increase, but so did the costs. If they did not start to use machines the damage of the wood cutting legislations would have been worse than it is now, because the turnover would not have changed.

Electricity made the home situation much better for my whole family. My wife and children are always very tired when they come back from the field. Because the carpentry work is so much quicker with electrical machines, I have time at the end of the day to make hot water for my family and help preparing the meals.

A carpenter from Chiang Sang

Vulnerability Context	The weathering of the soil in the woods was indirect of big influence on the carpentry business. This was the reason for the government to start with the new wood cutting policies. That increased the price of wood and made wood scarce.
Market	The carpenters serve the same local market, but they can serve more people now thanks to the higher productivity. The demand did increase and the number of customers served increased. In the past some carpenters could not handle the demand, and had to send customers away to competitors. With the electric machines (and if there is enough access to wood) they can handle the demand easily.
PIP	The wood price increased as a consequence of the wood policies (more information in Appendix I) of the government. This caused that none of the carpenters has more profit. The extra income is withdrawn by the extra costs for wood. In total nothing changed for the carpenters; the electricity intervention and the wood restriction happened approximately at the same time.

It must be said here that if the electricity intervention did not take place, the situation of the carpenters would have become much worse. Now they can handle more demand since the increase of efficiency. The income stayed the same because of this after the price of wood increased. Otherwise the income would have decreased and the carpenters would have been worse off. Overall the electricity did have a good influence on the ME.

The range of output did change, they can make the current products more beautiful, this way they can distinguish themselves from others. The opening hours did not change, although they can work at any time a day now, also in the evening –although only a few respondents say they like to spread the work-. A higher profitability would be the case if the other factors (the wood price) would have stayed the same. The wood price did increase and the profitability stayed the same. For the carpenters the final changes are in the human assets.

In this case, in this sector the barriers as described in the literature are applicable. The policy and institutional environment did slow down the development of the ME after they acquired electricity through the laws and policies the government introduced.

4.6 Rice milling and grinding

The entrepreneur does two phases of the rice milling (appendix I). Besides that they grind corn and cassava that is used as animal food.

- H Most effects that electricity had on the rice milling business and grinding is on the human assets. Working with electricity is healthier, easier, more convenient, quicker and the quality of the product is better. There are not more skills required than previously with generators or when working by hand. The disadvantages of the generator apply here as well.
- The living situation changed, before the husband used to work in the morning or afternoon on the machines. Nowadays with electric machines, anybody (male, female, children) can work easily on the machines at any time a day because you can switch it on and off. While before one of the big disadvantages was the difficulty of turning the generator on, women and children could not do it alone.
- T The brands of the machines are not important and of influence on anything at all. Both electric machines as generator brands are not of any interest. Most people do not know the brand at all.
- The work is quicker and results in higher quality because 2 phases can be done with the electric machines, while with the generator only one phase was done.
- F (& H) There is no link between increasing/decreasing numbers of customers and the fact if people borrow money from the bank to change to electricity. The livelihood is not of influence on the number of customers. The income does not change much after the change to electricity which was caused by market changes and the cost of diesel and electricity. The electric milling and grinding machines use a lot of electricity, which makes it almost as expensive as diesel. The same applies to people that borrow the whole amount of money from the bank, nothing much for them changed because of the interest costs connected to a loan.
- S A few (3) respondents state that their relationship with the neighbours became better since the electric machines; it reduced the noise and the pollution.
- P Half of the respondents have more animals now they use machines for milling, but this does not really change after the electricity came. The electricity does influence the “living assets”, soft couches are only seen at households that use a machine on electricity for milling. And people with electricity access have more brick houses than people with no electricity access (appendix I)
- N Land (fertility) of the family and of other families is important, but not influenced by the electricity intervention.

Vulnerability Context	The context is hardly of influence on the rice milling business, only the river that “eats” from the land could influence the milling business a little bit, because that means less land to grow crops, but this influence will be minimal.
PIP	There are no policies, laws or other processes or structures that have any influence on this micro enterprise than the ones already mentioned in the general analysis.
Market	There is a big boom of rice milling enterprises in the north of Vietnam, which is a disadvantage for many people. The number of rice milling services increased, the demand –more crop per square meter is cultivated- increased less than the number of rice millers. So the average customers per rice miller decreased.

Most of the expected outcomes are valid in this case, the productivity is higher, the quality is better, the opening hours changed, they are now the whole day available instead of only a few hours a day, and they compete more effectively compared to people with rice mills on diesel. Unfortunately most people changed to electricity, so they all have these advantages, and because the number of rice milling entrepreneurs increased so much the demand per rice mill decreased. In this case the financial situation did not improve (as expected); the market collapsed and the cost of the electricity used is similar to the cost of the diesel used before. The main barrier is the market as sketched before.

4.7 Ice

In this case there are no changes because these ME's came into existence after the electricity became available in the commune. This case is used to focus on the influence of the livelihood at the start of the ME on the developments of the ME after they accessed electricity. When talking about change, the situation before the ME was started is compared with the situation after the ME started.

The more sustainable the livelihood of the household is when they start the business, the more chances they have for a good education for developing the required skills. A man who hired a “teacher” from Hanoi also had a separate shop for selling the ice at the back of his house near the school and his property for living is (visual) bigger than the other properties. The producer who taught himself the skills had to borrow all the money from the bank while all the others had some own money to invest in the purchase of the machine. This conclusion is also based on the fact that all ice producers used to travel outside their commune because of work (trade or drivers) or because their family lives elsewhere. The people that can afford to travel have a higher opportunity to gain ideas and information about starting their own business.

People who start a ice (cream) business have in general already a more sustainable livelihood than the other entrepreneurs, brick houses (all except the one poor man) more than one job, more than one income source, selling ice is just extra on what they used to have to make their livelihood sustainable.

Investing in an ice making enterprise is very positive for the sustainability of the livelihood of the household. This is indirect a result of the electricity, because it could not be possible without electricity. The financial situation improved after starting an ice business.

Socially nothing changes because most customers are children and there is no extra contact with neighbours or others. There is no union or group for ice makers, like the FA. The land, biodiversity and environmental resources are not influenced by this business and are not of influence on this business. The ice makers are all in their first or second year (besides in Trung Nghia) of ice making, nothing changed yet for their physical assets.

Market is local, only within the commune. There is no PIP-influence on this ME (see appendix X). The vulnerability context is of influence, when there is a long hot summer, they have a longer period in which they can produce and sell. This means that long and hot summers are good for the viability of the ME.

4.8 Cross sectional

In this chapter a cross sectional analysis will be done whereby the different outcomes of the different sectors are considered and general conclusions are drawn.

4.8.1 Livelihood Changes

Asset	Change
Human assets	There are no changes in skills or knowledge because of the change within the enterprise from handwork or diesel generators to electricity. The access to television and the agricultural channel changed the knowledge of all entrepreneurs in general. The TV increased this knowledge. The newly acquired knowledge improved the farming and business skills, which makes the households and enterprises more viable through increased farming and ME output.
	The health of all entrepreneurs improved because of the electricity, the work is less hard, especially the work that was previously done with a generator (rice milling, mechanical work) or by hand (carpenter, motorbike repair). Besides that working with electric machines is cleaner and less polluting for the whole household than working with diesel generators. This gives the entrepreneurs (both male and female) more time to do other tasks or jobs like more farming, keeping more animals or starting a small grocery shop at the same time.
	The opening hours of the shops did not change, but the entrepreneurs do state that it is easier now to scatter the different tasks over the day. Because of the electric light, it is also possible to do work in the evening, which relieves the pressure during the day.
While there were hardly any expectations (besides opening hours) about the change in human assets mentioned in the literature, these do change. Most people even mention this as the most important change since they accessed electricity.	
There were expectations that a lack of knowledge and know-how could be a barrier for ME's to develop after they acquired electricity. It turn out that this is not the case here. The businesses studied all require high craftsmanship skills and low education (school) skills. The craftsmanship skills did not have to change after they acquired electricity, the work stayed almost the same (except for ice cream making which was not possible before the electricity).	
Limited ideas for new businesses are found as a barrier for development. People copy from one another and have difficulties with coming up with new ideas. Even when the market is satisfied, they will still try to sell the same products as a neighbour or family member.	
Social assets	Relationships within the commune have always been a big influence on the peoples lives. Everybody is in a different way active and dependent on the different social groups like the WU and the FA, but these relationships did not change as a consequence of the electricity usage.
	Changing from generator to electricity did influence the neighbourhood; people complain less about the smog/air pollution and the noise.
	Reputation is an important factor within the communes, which influences

	the enterprises. The usage of electricity and the work with the machines improves the reputation of the entrepreneur and this makes the enterprise more viable. The demand will increase if your reputation (in combination with the price) is better than the reputation of other entrepreneurs.
	Social assets were not expected to change, as said in the literature in chapter 2. This is true in a certain degree, although there are some small changes in reputation and contact with neighbours; this is almost negligible compared to other changes.
Physical assets	<p>The physical assets did change but not because of electricity. Indirect you can reason that the general developments in the communes -which include the enterprise development due to electricity- caused that people were able to buy a different way of transport (bus, bicycle versus motorbike) and other things like TV and DVD players.</p> <p>The only physical asset that did influence the enterprises direct (and influenced the whole commune) is the TV as a communication medium. The access to the newest information on agriculture, machines and business is now available for these people. This is a consequence of the electricity, not explicitly for the people that have a ME, but for all people.</p> <p>Infrastructure (roads) and other physical assets of the commune are not influenced by the acquired access to electricity. They stayed the same because the people cannot easily change this, only the government can.</p> <p>Another indirect consequence of the change to machines on electricity is the increasing number of animals people possess. The accessibility and usage of rice mills and grinding machines has improved now with electricity. This makes it easier for people to buy one, which gives improved accessibility to food for animals, and this means people can keep more animals. This results in more work, but also more profit. The machines have a higher productivity than doing things by hand or with a generator, this means more time left to spend on the animals. The animals are often taken care of by the women, while other corporal heavy work (farming tasks or tasks around the house) is done by men.</p> <p>The physical assets are changing; this is not directly as a consequence of the electricity. There are only indirect changes, as a result of the electricity together with other changes as for example the economy. This is also as expected; the literature did not mention many changes in physical assets, besides starting a new business. This is of course the case in the whole ice (cream) making case study.</p>
Financial Assets	<p>The access to financial resources stayed the same. In Thanh Thuy there is a bank nearby and this makes money more accessible than in other districts where the bank is further away. Indirect the electricity does influence this, if the enterprise is running well (thanks to electricity for example) it is easier to get a loan at the bank to extend⁹.</p> <p>If all circumstances stayed the same (or improved), if all factors - vulnerability context, market and PIP- would stay the same (or improved), the turnover and profit would increase because of the electricity intervention (productivity is higher, costs are over all lower). The turnover and profit of the enterprises heavily depends on the market situation.</p> <p>Ice is a newly started business since the electricity, they only have turnover and profit extension. Mechanical workers, motorbike repair, carpenters and tailors have increased turnover (per unit of time). The carpenter and tailor did not increase their profit because of the market obstruction (tailor) and the new laws and policies concerning wood.</p>

⁹ it is not possible to get a loan if you still have a loan)

	The rice milling business would have the same income because the costs of diesel and electricity are more or less the same. But because of the competitions they have a decrease in profit.
	The financial assets did improve according to the expectations, but the situation is not that simple because many things influence the income of an enterprise, especially the market. The general developments in (the economy of) Vietnam made the market develop and this stimulated the positive influence of electricity on the financial side of the ME. Without the market developments the positive effects of electricity on the finances of the ME would be substantial less. Not in all cases did the finances become more viable, this depends as said before on other factors and the usage of different machines.
Technological assets	All respondents do agree on the point of the technological side, electrical machines are more convenient, easier to use and more productive. The production process is the same as with a generator and machines, but the electrical machines can do more, like for instance 2 phase rice milling.
	All respondents that did acquire electricity changed to machines on electricity or want to change to new machines because of all the advantages. The number of machines increased except for rice and tailor business. Mechanical workers, carpenters and motorbike repairman doubled it at least and it goes up to 8 machines (all small scale).
	A key finding of this research is in the technological assets. All respondents that did have access to electricity had a change in technology, they bought new machines. Electricity is a derived demand, it is the services and technology that can be used now with electricity that makes a difference.
Natural assets	Natural assets have no influence on anything besides the carpentry business; where access to wood -in every possible place- is getting important since the policies and laws on wood collections. In all other businesses the natural assets like biodiversity, water and wildlife do not influence the electricity usage.
	The only thing that plays an indirect role is the accessibility to land. The main reasons to start/develop a business is the amount of land gotten from the family when getting married, the number of brothers and sisters and the government that can take the land away. This causes that people want to succeed even more in their business, they do not have many other opportunities and possibilities.
	The natural assets do not change since the accessed electricity. This is as expected, the literature did not mention many changes here either.

4.8.2 The Vulnerability Context

The vulnerability context is important to the ME's in different ways, but it is not a crucial factor. Only three things are worth mentioning here: TET holiday, harvest and the river. With TET holiday, the Chinese New Year, the whole country stops working for one week, so before and after this week there will be more demand, while there is a demand stop in the middle. This is not influenced by the electricity access, and is a definite moment in time every year.

The harvest has major influence on everything in the rural areas of Vietnam. Without harvest there is no money and no food, and sometimes no work (rice milling/grinding). Personal loans are provided on daily basis by all the ME's. People have to wait until after the harvest, only then they are able to pay the money. People also wait with for instance motorbike repair until after the harvest, so they can afford it. This does limit their mobility during the harvest, the motorbike will not function.

There are no natural disasters or anything, only the river “eats” from the land in Thanh Thuy and Van Hoa, which decreases the land access of some people that live near the river.

4.8.3 The PIP-Box

The processes and structures are not of influence on the changes after the acquired electricity. There are some programs that do influence enterprises positively, as discussed before, the WU’s programs on gender and poverty, the FA’s program on seeds and agriculture and the 135 program of the government. There also was one commune where just started ME’s did not have to pay tax, or the license, but this is only for the first year and not energy related. None of the respondents, the PC, the WU, FA, police or entrepreneurs see any law or regulation related to electricity or even just for ME that impede ME’s in any way. There is one exception, and that is the wood industry. The recent policies and laws on wood chopping did reduce the positive influence of electric machines on the viability of the ME.

The open door policy, in combination with the agricultural program and the 135 program of the government, the new seeds, fertilizers and training did increase the productivity of the land enormously (examples are given in Appendix I - AI.1.2 PIP-box). This increased the welfare of the people in all communes. This increase of welfare expressed itself in many things; a better house, furniture, food, garden and land, animals, means of transport, assets for the house like TV, radio and DVD player. The different kinds of transport caused a boom in motorbike repair shops. The different kinds of houses and the access to more valuable things cause a boom in mechanical workshops. More money also caused a demand for ice, which created the ice making shops.

The literature suggested that the processes and structures could be a barrier for the ME to prosper. In this case study, the PIP does not have a big negative influence in the past 5 to 10 years. The carpentry business shows that one policy or program can change the situation of the ME. This means that the case studied in this research does not have to say anything about the future PIP influences on the ME’s.

4.8.4 The Market dynamics and trends

The market turns out to be of influence on the total outcome. You can change the input of a ME with for example electricity. If the market does not co-operate or even collapses, then there will be no difference in output. Of course the market is different for every sector, but there are some general similarities. The market in the North of Vietnam is developing as said in the previous chapter. Thanks to the governmental programs, the Doi Moi, the NGO’s and the work of the inhabitants the livelihoods have changed in the past 5 to 10 years. This influenced the market; there is more demand, in every sector.

Respondents from all sectors state that they only serve the local markets. All communes are more or less self sufficient. Farmers start to trade their “left over” rice or corn with others that have something else “left over”. They have no ambition to serve another market than their local market. They do not know how to serve a different market, and there also is the transport problem for them. Most enterprises do not have products that can be served on different markets. Rice milling and motorbike repair are typical enterprises that serve on the spot. Tailors, mechanical workers and ice makers could serve a different market if they want and if there is demand. Because the people serve their own markets in all communes studied, I may presume that this is the case in all communes, so there is no market for these products outside the commune. The entrepreneurs should come up with other products if they want to serve a different market.

The market is acknowledged in the literature as one of the things that could be a barrier for development of the ME. In Northern Vietnam, the market (the demand) developed in the last 5 years thanks to the governmental policies in agriculture as mentioned earlier. In this case the market increased the positive developments that were caused by the acquired electricity.

Examples are that the change in demand asks for more mechanical workers, ice makers and motorbike repairmen. The electrical machines can produce more effectively and quicker, but if the demand would have stayed the same they could not increase sales.

Nevertheless the rice milling business shows us that the market can also be a barrier for development and that the market highly depends on the sector it is in. In case of the rice milling business, so many people enter the market since the electricity intervention took place that the market collapsed and it negatively influenced the businesses.

4.8.5 Additional Findings

The livelihood of the entrepreneur at the start is important for the viability of the enterprise in the future. It is said in the past paragraphs that people who had the chance (both financial as personal) to travel between different districts and communes had more opportunities to start a business because they see how more developed communes work and produce. It is said earlier that imitation is the main way to start a business. You can access electricity but if you are not aware of the options you have with this newly acquired asset, you will not change the livelihood situation of your business. The knowledge they gained during these trips to other communes can be converted in a better livelihood by imitation, and by introducing new products (like ice) to the market that is satisfied for the products now produced.

People are very happy and satisfied overall with their enterprise, the only problem that is mentioned in the interviews is a lack of money (to buy raw materials, to buy animals, to extent the business etc.) There are only a few people that mention other problems, but these problems are very personal and not general, like disease, age or space for the business.

All the respondents want to extend their business, especially now the work has become so much easier and more convenient because of the electricity and the electric machines that go with it. They think that more customers and demand will come automatically when they extend. The fact that they are now already worried about the lack of demand, or decreasing demand in some sectors does not stop them from these future plans.

The electricity is not of big influence on the gender issues in Vietnam. The government started a gender program about 5 years ago in which they promoted the equality of men and women, this was a success. According to the WU's, YG and several respondents women are now on the same level as men. This almost changed over night because of the trust in the government at that time. Only in the extreme remote areas -like up in the hills in mountainous areas- there are still some inequalities regarding men and women (example given in the Son La area description). The government is divided in many different small groups like the WU, FA, YG etcetera and it is difficult for these groups to reach the remote areas and the people there.

Electricity caused that women can do the same things as men now if they wanted. Generators are difficult to crank up, many women could not do that alone, with electricity the machines are easy to turn on and off, just a matter of a switch. Other jobs that were physical very difficult for women -like mechanical work, carpentry business and motorbike repair- are possible now, if women wanted to do this job. During this research I did not find any females that were doing these jobs.

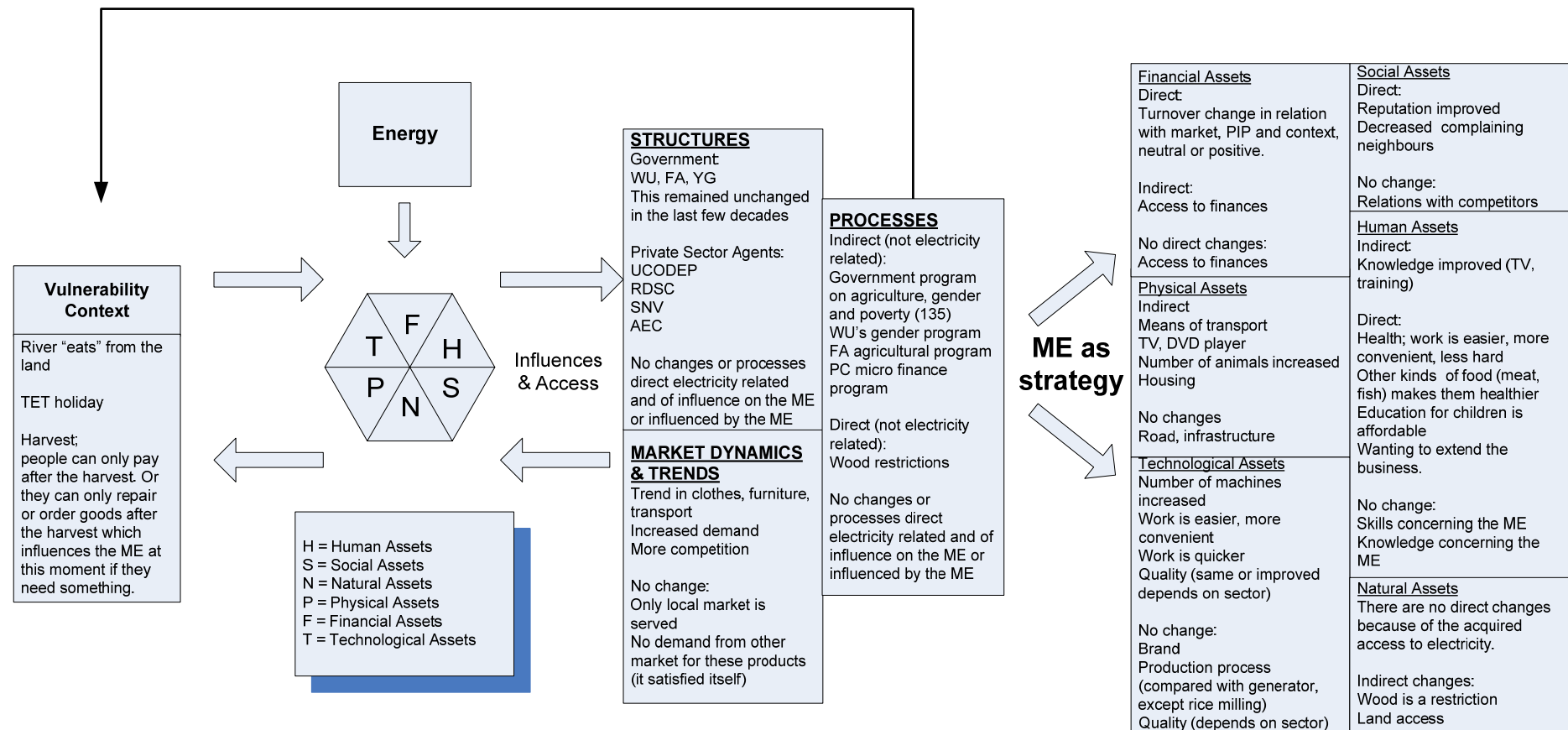


Figure 7 The Research Framework after analysis

5. Reflection on the methods and results

A reflection on the used theory, used framework and methods is necessary to improve these if possible. This chapter will discuss the expectations that are raised in the literature that is discussed in chapter 2. The livelihoods framework that is used during this research will be questioned and the additional changes made to this framework will be reviewed.

5.1 The livelihood method

The livelihoods analytical framework is used in this research to look beyond the normally used poverty line or financial side when studying poverty. The two key findings are the change in physical effort and the change of use of technology/machines which are both not on the financial side of this story. This shows that it is good to look beyond the financial aspects in the situation in Vietnam. Financial changes -after the acquired electricity- did occur, but they were not the most important finding during this research. The livelihoods framework covers almost all factors that influence or could influence the household of the entrepreneur and its ME. It can be discussed that things are missing or not complete, and on the other side it is over-complete in this case. This will be discussed here.

5.1.1 Vulnerability Context

As is shown during the analysis (Chapter 4) the influence of the vulnerability context is negligible. If the same research or a follow up research would be done in northern Vietnam the vulnerability context could be left out of the framework. If the research would differ from this research, throwing out the vulnerability context might be a bit rigorous. You do not know what you come across in the future or in different areas. So in this case it is better to emphasize less on this vulnerability context. The vulnerability context does not have to be included in the hypothesis in future similar research.

5.1.2 The assets

The asset that was added to the original framework was “technological assets”. There is overlap between physical assets and technical assets. A machine can be seen as both a physical asset and a technical asset. At the same time the skill of working on the machines can be seen as a human asset and a technical asset. It was already said in 2.5.1 that the technological asset is added due to the estimated importance of technology in the producing enterprises. This expected importance of technology turned out to be reality, one of the key findings was related to the technical assets. In other words, in this research it was very relevant to have the technical asset as a separate asset. This way you emphasise this assets. During the research it turned out that many of the other assets changed not directly due to the electricity, but because of the technology that is used on the accessed electricity. The importance of the technology made that, in a continuing or similar research, I would centralize (emphasise on) the technologic asset. This can express itself by putting the technological assets in the centre of the assets box, this way it shows that all assets could be influenced by the technological asset. This is visualized in figure 8.

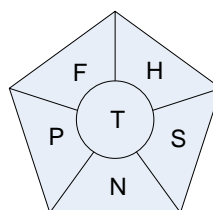


Figure 8 The adjusted asset box

A disadvantage of the LF method of poverty analyses is that there is no awareness or focus of a sequence of asset assimilation. In case of North Vietnam it is discovered in this research that

a robust, brick house that survives the changing climates, is most important to a household. This information came mainly from informal conversations, and the group discussions. This information was obtained because questions and discussions outside the framework were held. If the framework is followed literally this information would have stayed hidden. It has to be assimilated in the framework if there is a certain sequence of assets that people obtain after a positive change in their livelihood.

A big disadvantage of the livelihood framework -compared with monetary methods to study poverty- is that the assets are difficult to measure. First of all it can be subjective, it differs a lot for each country or region and it is difficult to make comparisons. The subjectivity can be explained as followed; a foreign researcher has a different view on the poverty level than local people. In Vietnam almost every household has a TV and DVD player -which surprised me- I thought this was an important sign of the level of poverty. It turned out not to be that important, because karaoke is one of the only hobbies Vietnamese people have. Everybody will buy a karaoke machine irrespective of their level of poverty (except the extreme poor people). Secondly what this commune sees as an important asset, for instance a rice mill, might not be important to the other commune where coffee drying is more in favour for instance. Of course these differences are even bigger for different regions or even countries. This also explains the third disadvantage; the difficulty to compare assets.

5.1.3 The PIP-Box and Market box

The market dynamics and trends are added as a separate item to the PIP-box. If this was a useful supplement could be a discussion point. The market turned out to be important. If the market develops during the period that the grid is accessed, it stimulates the developments caused by the electricity. More and different demand means more (positive) changes for the ME. The market can also have a negative influence on the ME, if too many competitors enter the same market, the market can become saturated, or even collapse. Like for example with the rice milling market. I would almost say it is indifferent in this case to leave the market as a separate box or to remove it. Because the market can be unpredictable, it might be important to leave it in the framework. In every sector the market options and possibilities are different and influenced by other factors. The market was separated from the rest because of the estimated importance during the research. It was expected to be a barrier for development. This turned out to be the case, which is another reason to leave it as a separate box.

In the 2.5.2 it is said that poor households and individuals adopt livelihood strategies that consist of a variety of market orientated and non market orientated activities. It must be said that many decisions made by the ME are not decided with the awareness of the market. Some cases are exceptions, especially in the ice cream industries. Overall the people make decisions about their enterprise because they see other people doing the same thing, so they assume there is a market. When asking about the future plans, about half of the people said they want to extend their business. While some of them were complaining about a lack of customers a few minutes ago. They assume that more customers will come if they extend their business, more employees, and more machines. This assumption is not based on experience or theory but on a feeling of the entrepreneur.

5.1.4 The strategies and outcome

These turned out exactly as presented in chapter 2. The main strategy of the interviewed households to survive is the micro enterprise, although this is still in combination with being a farmer. Only a few individuals were not a farmer at the same time, because there is no land for this person. The desirable outcome of the people is to survive and have a sustainable livelihood.

A criticism on the SLF is that it creates the idea that the individual or household has a range of options from which it can choose rationally to design his own sustainable livelihood, to get the preferred outcome. It has to be acknowledged –and is acknowledged in this research- that

it is not the matter of making a rational decision for the individuals and households involved. Often choices are limited and decisions are less black and white than the framework seems to reflect.

5.1.5 Additional criticism

Things that turned out missing or incomplete in the framework were first of all the history. In the past the government changed some rules and policies, for example the Doi Moi, which were of major influence on the overall developments of northern Vietnam and on the households and ME's (thing of the production of crops per square meter). There is no place where this fits in the framework. The policy change and governmental programs could be part of the PIP box, but this is more related to current changes that directly influence the household.

Two other things that cannot precisely be place within the framework are cultural factors and gender issues, two things that play important roles in development countries. It is not that important in Vietnam where –for example for cultural issues- most people (80%) have no religion or is a Buddhist (9%) (CIA, 2004) and where the gender issues are limited due to the government programs (also history). In another context where these issues are more actual it is important to acknowledge these and add it to the framework.

During this research and others (Barrett and Swallow, 2003) livestock turned out as an important factor when talking about poverty. You can see this as a physical asset, as is done in this research, but it might be of interest in future research to emphasize on this.

5.1.6 Conclusion

Although there is some criticisms on the used model, there still are many advantages of this same model too. The weight of the disadvantages is less than the advantages. In future similar research this does ask for some adjustments and at the same time some things that you want to keep exactly the same. History, cultural factors and gender must be added to the framework because these are now separate from the rest of the framework. More focus can be on the livestock and sequence of asset assimilation in future research. It must be acknowledged that the strategy is not just a case of choosing the right option from a list. And it must be acknowledged that it is difficult to compare and measure the assets.

The technological asset is added to the framework and was a successful addition on the existing framework. Strategy and outcome are formulated well, just like the feedback lines. PIP and market box were also well defined, depending on the research I would keep the market apart from the PIP in the future. The vulnerability context depends on the similarity of future research. If the same research will be done I would not take it within the hypothesis or the framework.

5.2 The retrospective view on the expectations from the literature

Most expectations from the literature are positive changes, they are summed up at the beginning of chapter 4. This research observed only positive and neutral changes. The neutral changes (in total no changes) are because other factors changed at the same time and had a negative influence. Higher surplus, more cash, higher profitability, higher productivity and better quality are the expectations that were fulfilled in this research as well. The extend in which these things take place depends upon the sector of the ME. For example the quality stays for tailors and carpenters more or less the same while the rice milling quality improved. This has been discussed in chapter 4.

The other expectations like the increased range of output, changed opening hours, starting new, extra businesses and compete more effectively are questioned here. The range of output only changed for the motorbike repairmen, the carpenters and the mechanical workers. The others, tailors and rice millers (ice making is not relevant here it is a new product) did not

have a different range of output because the machines they use on the electricity cannot perform any other tasks than the tasks they were doing before with the other machines or by hand. The range of output depends on the machines that are bought by the entrepreneur, this is why earlier (paragraph 4.8.1) the technical assets are already mentioned as a key result in the outcomes of this research.

There was no change in opening hours detected; before the electricity came the entrepreneurs also helped the customers whenever they came to the shop or house. Only with the rice millers who used a generator before this changed, before they used to use the generator at a certain moment in the day, mainly the afternoon after they got back from the land. Now they can use it whole day long. The general policy is that they help customers and work whenever there is demand does not matter what time a day it is.

There are no extra businesses started besides the ice making and an individual that start something new. This does not happen on a regular basis. None of the enterprises competes more effectively now, because the grid reaches most household. Everybody has the advantage of the electricity usage. Only the number of machines could make a difference.

The most important change that we can add to the list of positive changes found in the literature is that less physical effort is necessary since electricity reached the ME's. Work is easier, more convenient and therefore healthier. The reputation is also something that is positively influenced by the electricity, together with the technology (sort and number of machines). Things that did not change after the electricity are the skills, education level, physical assets (not because of the electricity direct) and natural assets. A summary of all these positive and neutral changes that were found is given in figure 7.

The barriers that were predicted by the literature were partly found in this area and some things were not relevant in this case. Electricity and willingness are not enough to develop the ME can be combines with the fact that electricity is a derived demand. It is found that only electricity will not change an ME even if the entrepreneur really wants it to change. If there is no (extra) demand (tailors), if the entrepreneur cannot buy any machines (rice mills that stay on diesel) or if there are other factors (like wood laws for instance) that restrain the enterprise from change into a positive direction, the situation will stay the same.

Infrastructure and non-infrastructural are also seen as an important factor and possible barrier for development. In this case the knowledge is not a barrier for development. Know-how is a detected barrier, people have no idea how to enter a new market and no creativity to develop or start making a new product. Good infrastructure does stimulate and help development of ME's in this case study, but it is not crucial for the development, although the development does go quicker if they are present (for example good roads stimulate motorbike usage).

The technical and financial management capacity that is mentioned turned out not to be that relevant, because all enterprises were as big as one household. The new machines are easy to use and financial management is not really an issue because of the small amounts of money, they use the money to survive.

The last barriers that were predicted by the literature are both already discussed in the last , access to market and PIP influences in 4.8.3 and 4.8.5

6. Conclusions

First of all it is necessary to say again that this research is only valid for the northern areas of Vietnam. The general developments in Vietnam do not make it possible to generalize this research on a global level. With general developments is meant the major history of Vietnam and its consequences, the government's proceedings and the government's actions to develop the economy in the past 5 to 10 years. The south is already more developed than the north (figure 6) when the two areas were combined which makes these results only relevant for the northern part of Vietnam.

In this chapter a retrospective view on the hypotheses sketched at the beginning of this report are given. The hypothesis will be rejected or accepted on basis of the findings of this research.

6.1 Hypothesis

6.1.1. Acquired access to electricity will change the livelihood framework assets of the entrepreneur

In general, when talking about all 6 different assets together, this hypothesis is accepted. Yes, electricity does have influence on the assets of the entrepreneur. To be more accurate, electricity has positive and neutral –nothing changed- influences on the livelihood framework assets, and no negative influence. When there only is a change from manpower/generator to electricity, the work will be done quicker, the productivity increases, the quality is better (or the same, depends on the sector) and the work is easier and more convenient. In case of the sectors that used generators before the costs will decrease as well, so there will be more profit (except rice milling machines where the cost stayed the same).

6.1.2 The vulnerability context of the country or sector is a barrier for the ME to become more viable after acquired access to electricity

This hypothesis is rejected. The vulnerability context has such a small influence on the ME's in this case study that it is negligible. TET holiday has been a tradition for many years and will be a tradition for the upcoming centuries. The dependence on the harvest could be a problem because everybody has to wait for his money. The entrepreneurs do not really see this as a big problem because finally they always get their money from the customers. They are more or less indifferent about the moment in time when they get their money. The context is no threat for the ME's to become more viable.

6.1.3 The institutions, structures and processes of the country are a barrier for the ME to become more viable after acquired access to electricity.

The institutions, structures and processes of Vietnam can be of big influence on the ME's. In the past 5 to 10 years the government has been working on the development of the country. The agricultural, gender and micro finance programs have really changed the whole situation and put the Vietnam (north) economics in an upward spiral. This intensifies the small changes that electricity makes. If Vietnam was not developing as fast as it is doing at the moment, the influences of the impact of the change to electricity would have been less than it is now. An example of this is the higher productivity per square meter of land, and the different crops people grow now. This created more work for the rice millers and grinders. If they buy an electric rice milling machine in this upcoming extended market they will have two times as much advantage as before (advantages machine and advantages growing market). In this case the hypotheses will be rejected because the PIP is definitely no barrier.

At the same time the institutions and structures could be a barrier for development of ME's and their livelihoods. Except in one sector which will be discussed in the next subsection, there is only one problem mentioned and that is the bureaucratic way and payment (1 million VND for license and 50.000 VND for tax) of registration. Although the people see this as a disadvantage they do not mention it as a reason not to start or develop their business. It is worth paying the money, and if they think it is not worth it, they just do not pay and find

excuses for themselves why not to pay. The influence of this problem is minimal and not strong enough to see it as a barrier for development of the ME's.

In the wood industry the governmental policies did create a major barrier for development. By doing a good thing for the future, a good thing for the biodiversity and protecting the land against weathering, the government restrained the carpenters from developing after they acquired electric machines. This would have been a major development for the carpenters because of the growing demand and the productivity they can now reach, but the wood cutting policies increased the price of wood.

In this case the hypotheses can be rejected for 5 of the 6 sectors that were researched. Only in the carpentry sector the policies, processes and structures hinder the development of the ME's and its livelihood.

6.1.4 Acquired access to electricity will improve the market position of the ME.

The reputation, price, productivity and speed of the work made that this hypothesis is accepted. If other people would not use the electrical machines the ME would definitely have an advantage and would improve its market position. In the case of Vietnam, almost all competitors did gain access to electricity (few exceptions, especially with rice milling) which caused that nothing really changed for the market. The competitors are in an identical situation in comparison with each other.

Acquired access to electricity does give the ME's the opportunity to extend the number of products they make, but all communes are self-sufficient so there is no real market to sell these products too besides the local market. The local market did develop thanks to the PIP influences as mentioned previously and not because of the electricity.

6.2 Research questions

The answer on the first two research questions; *What are the direct and indirect changes within the ME after the acquired access to electricity?* and *Which barriers delay or prevent the ME to prosper after acquiring access to electricity?* come straight from the answers on the hypotheses. Things that changed directly can be summarized as the turnover (depending on the ME's sector), the number of machines increased, the kind of machines, the physical labour necessary to do the work decreased, quality (not in all sectors), reputation, health and more different kinds of food (see figure 7).

Indirect changes were access to finances, means of transport, household appliances like rice cooker, DVD player and TV, number of animals, knowledge, access to wood.

The third hypothesis needs some more clarification; *Does the livelihood of the ME before the acquired access to electricity play a role in the intensity of the changes of the ME afterwards?*

The livelihood of the entrepreneur at the start is important for the viability of the enterprise in the future. The more viable the livelihood of the ME is at its starting point, the more chances they have to have a successful business as a result of the knowledge, financial recourses, education opportunities etcetera. People that have a less sustainable livelihood, have more difficulties to survive or improve their situation. This is seen in Van Hoa where the livelihood is more secure because they are extending the industrial zone. Also with rice milling machines it is shown in appendix I that people that have a better house (brick) more often change to electric machines from diesel machines, or that buy machines more often than people with a non-brick house. A last example is the ice cream making where (except one) all people that started this business used to travel and have one or more other enterprises on the side. They are able to learn the skills from others, while the one man that started with a

second hand machine in a non-brick house had to teach himself which caused a lot of money, time and effort.

Does acquiring access to electricity have any effect on the viability of micro enterprises (ME)?

Deducted from the previous paragraphs I can answer this question with a yes. In this case study in the northern part of Vietnam the access to electricity does have an effect on the viability of the ME, to be more specific; a positive effect or a neutral effect –things changed but because other non electricity related factors changed as well the total effect is neutral-. There were no negative effects discovered during the research. The most important to the people in Vietnam was the fact that the work got so much easier and more convenient, less physical labour was necessary to carry out a task. The local people do not realize that this thing that is for them so important is not a direct result of the electricity, but a result of the machines they bought since they accessed electricity. There is a change observed in technology, all enterprises that accessed electricity changed to more or different machines. The turnover did increase or stayed the same in all cases, the profit unfortunately did not increase or stayed the same in all cases because of the market and the PIP influence.

7. Recommendations and future research

This research is not all-embracing. There are several points on which further study would be useful for the overall knowledge level on electricity, micro enterprise and livelihood.

- ✓ If you want to make the outcome of the research more general acceptable, further research in Southern Vietnam or other countries is necessary. The outcome of this research is based on the general developments in the country studied, in this case Vietnam. Vietnamese general (economic) developments have been dynamic in the past 5 to 10 years. For the reliability and acceptability of the outcomes it would be important to compare the outcome of this case study with the outcome of a similar case study in another country that did not develop as much as Vietnam in the past few years.

7.1 Electricity related recommendations and future research

- ✓ Electricity does have positive influence on the ME's in rural areas. It is of great importance that the government and NGO's keeps on extending the grid to the remote areas.
- ✓ NGO's or government groups (WU, FA) should supply information about how ME's could extend their business and also serve other/new markets after they accessed electricity. People want to extend now, the productivity increased and the work got easier. Respondents want to enter other markets, or produce other products but they have no ideas how to pull this off.
- ✓ When starting a business or changing from manpower/diesel to electricity, people only copy from each other. There is no creativity or knowledge to help them develop their ME or to make it more viable. They look at other entrepreneurs and base their survival plan on the ideas of others. This research shows that this does work, because the ME's do become more viable. The (positive) changes could be more intensive if the government would support the enterprises during this period with information about possibilities and options how they can distinguish themselves from other similar enterprises.
- ✓ The TV access changed a lot for many people in Northern Vietnam. The agriculture channel that shows 24 hours agricultural tips and news has increased the knowledge in these areas a lot. A research about how to utilize the medium TV the best way, so that people can gain more (business) knowledge, would be of great interest here. There is more possible with this medium than how the government now uses it.

7.2 Not electricity related recommendations and future research

- ✓ It turned out that the people who were able to travel to/from their family, or to other communes for education had more ideas and business skills than the other entrepreneurs due to what they witnessed in the different communes (which might have already had electricity for a long time). These entrepreneurs that got their ideas during travelling might be of interest in studying micro enterprises and their developments, or with further studies about the influence of energy on ME's.
- ✓ The relation between the education level and the influence of the electricity could be studied more in depth. During the group interview at the high school it turned out that not many children that were able to get this far at school want to become a farmer -just one boy out of 10 children- they said this was the average in their grade. The children at this moment have more opportunities to get education than the entrepreneurs I interviewed. This will change the overall situation in the future, so it would be interesting to do a similar research again in 10 years time, within other communes that did not access

electricity, to look if the influences of electricity depend on education level. In this research it was difficult to distinguish the differences in education, because most respondents only finished secondary school, and a few finished high school.

- ✓ At this moment the entrepreneurs only serve the local market. At the same time they indicate that many buyers often only pay their “bill” after the harvest. Is this a reason to stay only on the local market? Is the local market better to control than a broader market?

7.3 Changes on the livelihood framework in (similar) future research

- ✓ History, cultural factors and gender must be added to the framework
- ✓ More focus on the livestock
- ✓ More focus on a possible sequence of asset assimilation
- ✓ Acknowledge that the strategy is not just a case of choosing the right option from a list
- ✓ Acknowledge that it is difficult to compare and measure the assets

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Appendix A Importance of energy to achieve the MDG's

from DFID (2000). *Energy for the Poor*, underpinning the Millennium Development Goals, Department for International Development

Goal	Directly contributes	indirectly contributes
1) Extreme poverty and hunger energy services		
To halve, between 1990 and 2015, the proportion of the world's people whose income is less than one dollar a day	<ul style="list-style-type: none"> o Access to reliable enables enterprise development o Lighting permits income generation beyond daylight hours o Increased productivity from being able to use machinery o Local energy supplies can often be provided by small scale, locally owned businesses creating employment in local energy service provision and maintenance fuel crops etc. 	<ul style="list-style-type: none"> o Modern energy supplies are necessary for economic growth, supply must be pro-poor in design and inclusive of the rights of people in the design of their basic services o Efficient energy systems reduce costs, help create sustainable businesses/jobs and economies and underpin the social fabric of a region o Privatization of energy services cab help free up government funds for social welfare investment o Clean, efficient fuels reduce the large share of household income spent on cooking lighting and keeping warm (equity issues – poor people pay proportionately more for basic services)
To halve, between 1990 and 2015, the proportion of people who suffer from hunger	<ul style="list-style-type: none"> o The majority (95%) of staple foods need cooking before they can be eaten and need water for cooking o Improving productivity throughout the food chain (in tilling, planting, harvesting, processing, transport etc. o Reduction of post harvest losses through better preservation (for example, drying and smoking) also through chilling/freezing 	<ul style="list-style-type: none"> o Energy for irrigation helps increase food production and access to nutrition. Clean water helps improve health. Increased health and nutrition open up opportunities for employment and income generation. o Chemical fertilizers are a form of captured energy, particularly ammonia-based ones where natural gas is the feedstock – indirect use of gas increases crop yields
2) Universal primary education		
To ensure that, by 2015, children everywhere will be able to complete a full course of primary schooling	<ul style="list-style-type: none"> o Energy can help create a more child friendly environment (access to clean water, sanitation, lighting and space heating/cooling) thus improving attendance at school and reducing drop out rates. o Availability of modern energy services frees children's 	<ul style="list-style-type: none"> o Access to energy provides the opportunity to use equipment for teaching (overhead projector, computer, printer, photocopier, science equipment) o Modern energy systems and efficient building design reduces heating/cooling cists and thus school fees,

	<p>and especially girls' time from helping with survival activities (gathering firewood, fetching water); lighting permits home study</p> <ul style="list-style-type: none"> o Lighting in schools allows evening classes and helps retain teachers, especially if their accommodation has electricity o Electricity enables access to educational media and communications (ICTs) in schools and at home that increase education opportunities and allow distance learning 	enabling poorer families greater access to education.
3) Gender equality and women's empowerment		
Ensuring that girls and boys have equal access to primary and secondary education, preferably by 2005, and to all levels of education no later than 2015	<ul style="list-style-type: none"> o Availability of modern energy services frees girls' and young women's time from survival activities (gathering firewood, fetching water, cooking inefficiently, crop processing by hand, manual farming work) o Good quality lighting permits home study o Electricity enables access to educational media and communications (ICTs) in school and at home that increase education opportunities and allows distance learning 	<ul style="list-style-type: none"> o Lighting in school allows evening classes and helps retain teachers especially if their accommodation has electricity o Street lighting improves women's safety o Reliable energy services offer scope for women enterprises.
4) Child mortality		
To reduce by two-thirds, between 1990 and 2015, the death rate for children under the age of five years	<ul style="list-style-type: none"> o Indoor air pollution contributes to respiratory infections that account for up to 20% of the 11 million deaths in children each year (WHO 200, based on 1999 data) o Gathering and preparing traditional fuels exposes young children to health risks and reduces time spent on child care o Modern energy can be safer (fewer burns, accidents and house fires) 	<ul style="list-style-type: none"> o Provision of nutritious cooked food, space heating and boiled water contribute towards better health o Electricity enables pumped clean water and purification o Cold chain provision allows access to vaccinations
5) Maternal Health		
To reduce by three-quarters between 1990 and 2015, the rate of maternal mortality	Energy services are needed to provide access to better medical facilities for maternal care, including medicine refrigeration, equipment sterilization and operating theatres	<ul style="list-style-type: none"> o Excessive workload and heavy manual labour (carrying heavy loads of fuelwood and water) may affect a pregnant woman's general health and well-being o Energy can help produce and distribute sex education

		<ul style="list-style-type: none"> literature and contraceptives o ICT's for long distance learning and 'distance medicine' requires a power supply o Provision of nutritious cooked food, space heating and boiled water contributes towards better health and all need energy
6) HIV/AIDS, malaria and other major diseases		
<ul style="list-style-type: none"> o By 2015, to have halted and begun to reverse: o The spread of HIV/AIDS o The scourge of malaria o The scourge of other major diseases that afflict humanity 	<ul style="list-style-type: none"> o Electricity in health centers enables night availability helps retain qualified staff and allows equipment use o Energy for refrigeration allows vaccinations and medicine storage for the prevention and treatment of diseases and infections o Safe disposal of used hypodermic syringes by incineration prevents re-use and the potential further spread of HIV/AIDS 	<ul style="list-style-type: none"> o Energy is needed to develop, manufacture and distribute drugs, medicines and vaccinations. o Electricity enables access to health education media through ICT's
7. Environmental sustainability		
<ul style="list-style-type: none"> o To stop the unsustainable exploitation of natural resources; o To halve, between 1990 and 2015 the proportion of people who are unable to reach or to afford safe drinking water 	<ul style="list-style-type: none"> o Increased agricultural productivity is enabled through the use of machinery and irrigation, which in turn reduces the need to expand quantity of land under cultivation, reducing pressure on ecosystem conversion. o Energy can be used to purify water or pump clean ground water locally, reducing time spent collecting it and reducing drudgery. o Traditional fuel use contributes to erosion, reduced soil fertility and desertification: this can become more sustainable through substitution, improved efficiency and energy crops. o Using cleaner, more efficient fuels will reduce greenhouse gas emissions, which are a major contributor to climate change 	<ul style="list-style-type: none"> o Clean energy production can encourage better natural resource management, including improved water quality. o National sustainability aided by greater use of indigenous renewable energy sources instead of imported fossil fuels as economy grows. o Rural energy services enable non-farm-based enterprise and processing of non-timber forest products. o Efficient use of energy helps to reduce local pollution and improve conditions for poor people.

Appendix B The choices made in the livelihood framework.

Assets

The different frameworks acknowledge different assets.

CARE

- o Human Capital: Livelihood Capabilities
- o Social Capital: Claims & Access
- o Economic Capital: Stores & Resources

DFID (DFID, 1999)(DFID, 2001)

- o Human capital: the skills, knowledge, ability to labour and good health important to the ability to pursue different livelihood strategies;
- o Physical capital: the basic infrastructure (transport, shelter, water, energy and communications) and the production equipment and means that enable people to pursue livelihoods;
- o Social capital: the social resources (networks, membership of groups, relationships of trust, access to wider institutions of society) upon which people draw in pursuit of livelihoods;
- o Financial capital: the financial resources which are available to people (whether savings, supplies of credit or regular remittances or pensions) and which provide them with different livelihood options;
- o Natural capital: the natural resource stocks from which resource flows useful for livelihoods are derived (e.g. land, water, wildlife, biodiversity, environmental resources).

OXFAM does not describe how they see the capitals exactly in the available literature but they do acknowledge exactly the same capitals as in the DFID framework: Human capital, Physical capital, Social capital, Financial capital, Natural capital

UNDP

- o natural/biological assets land, water, common-property resources, flora, fauna
- o social assets community, family, social networks
- o political assets participation, empowerment
(sometimes included in the 'social' category)
- o human assets education, labour, health, nutrition
- o physical assets roads, clinics, markets, schools, bridges
- o economic assets jobs, savings, credit

The UNDP/OXFAM opinion about assets is accepted in this research. Assets that are not taken in the livelihood framework of this research are economic assets, political assets and biological assets. Economic assets, which is mentioned in the Care and UNDP framework is in this framework included in financial assets (savings, credit, income, access to loans etc.) and a little bit in Human assets; having a job, or being able to find a job. Biological assets (from the UNDP framework) is included in natural assets. Political assets, also from the UNDP framework, are included in the social assets, which the UNDP (DFID, 1999) (Liew, 2004) already indicates in his own text. All these assets are not taking into this framework because it has too much overlap with other assets.

Context

The context only differs a little bit in every framework.

- o Care talks about natural resources, infrastructure, economic, cultural and political environment and shocks and stresses.
- o DFID distinguishes shock, trends and seasonality.

- o Oxfam joins DFID's opinion (or visa versa) and only adds to this that these things must be seen from its nature & environment, markets and politics (war).
- o The UNDP does not really define its context it only mentions short-term coping mechanisms, in response to shocks and stresses (Liew, 2004)

Shocks, trends and seasonality are accepted in this research as the context. The environment as said in the CARE framework is already included in the assets. CARE only has three assets in its framework, human capital, social capital and economic capital, that is why they take environmental aspect as the context. UNDP also talks shocks and stresses, in this research shock and stress is combined and not enough as the context, trends and seasonality are not seen anywhere else in the framework and are obviously in the context, when using the definition as used here for context. The context is the external environment in which people live, they encounter external influences from this context, things that cannot be controlled. It is important for the sustainability to recognise this stage, a household's livelihood is sustainable when they can cope with these influences from outside.

Strategy

Choosing a strategy means having choices, opportunities and diversity. Having more choice and flexibility in choosing a strategy means better withstand, adapt to or prevent the external influences like shock and stress. A livelihood strategy means having a detailed plan to achieve livelihood goals (final goal: a SL), this includes the used combinations of activities within this plan, and the choices made to formulate this plan. None of the frameworks really formulates what a livelihood strategy is or can be on household level.

- o CARE mentioned 3 different activities that are together the strategy on household level.
Producing and income activities
Processing and exchange activities
Consumption activities
- o DFID formulates strategy like this (DFID, 2001); it is a dynamic process in which "they" combine activities to meet their various needs at different times. A common manifestation of this at the household level is 'straddling' whereby different members of the household live and work in different places, temporarily (e.g. seasonal migration) or permanently. DFID chooses for transforming structures and processes as the strategy.
- o OXFAM is the framework that really formulates some point on which you could base your livelihood strategy, livelihood strategies of social actors (male, female, household, community, etcetera), or natural resources based, and / or market based, diverse, survive or sustain.
- o UNDP is the only framework that sees technology as a mean to help people rise out of poverty (DFID, 1999). The UNDP chooses adaptive and coping strategies.

Because all the strategy formulations are more or less the same but all a bit vague, strategy will be redefined as a detailed plan (which include making choices and undertake certain activities) for achieving success, for creating an outcome that will make your livelihood sustainable.

Outcome

The situation that you pursue with your strategy is hopefully the outcome. It is the final phase of the whole method. There is a link between the outcome and the assets, the outcome elicits the change of the assets, which make a livelihood sustainable or not.

- o The CARE framework mentions these as the most important outcomes:
Security of food nutrition, health, water, shelter, education and community participation and personal safety
- o DFID is more specific with its definition of outcome

More income, increased well-being, reduced vulnerability, improved food security, more sustainable use of natural resources

- OXFAM defines his outcome as follow: more income, increased well being, reduced vulnerability, improved food security, improved social equity, more sustainable environmental resources, non-use values of nature secured
- UNDP only mentions Sustainable Livelihood as the outcome in the available literature.

The situation that results from your strategy is the outcome. It is the final phase of the whole method. There is a link between the outcome and the assets, the outcome elicits the change of the assets, which make a livelihood sustainable or not. The outcome is one of the major things that will be studied in this research. Electricity is the extra input, which results in an outcome. As discussed in the literature before the outcome that is caused by the change to electricity is not clear, but the outcome that you desire is a sustainable livelihood. So at this point I agree with the UNDP framework that the Sustainable Livelihood is the outcome. This covers all the things mentioned by CARE, DFID and OXFAM and is more complete or integral than the other definitions.

Policies, Structures and Processes

We cannot forget the influence of the government, culture, institutions, NGO's etc. on the livelihood of the household.

CARE places less emphasis in its framework and approach on structures and processes and macro-micro links. This is not to say that it ignores institutional or organisational factors but that as an NGO it is less involved in the micro-macro issues that are a key feature of agencies such as UNDP and DFID. In the organisational realm, CARE's work has been largely limited to local matters (e.g. community mobilisation).

DFID acknowledges the Transforming Structures & Processes. These are the institutions, organizations, policies and legislation that shape livelihoods. They determine:

- Access (to various types of assets, to livelihood strategies and to decision-making bodies and sources of influence);
- The terms of exchange between different types of capital; and
- Returns (economic and otherwise) to any given livelihood strategy.

As structures they distinguish: levels of government and the private sector

As Processes: laws, policies, culture and institutions

OXFAM acknowledges something similar. They mention as Transforming Structures & processes:

- at different levels of Government: laws, public policies, incentives, regulation
- private sector policy & behavior
- civic, political & economic institutions (markets, culture)

UNDP formulates it a bit different they only distinguish 2 categories and see them as drivers:

Policy (macro-micro, cross-sectoral)

Governance (local government, CSOs, empowerment)

In this research the DFID definition is used because it is the most extensive, it includes both the two categories of the UNDP framework and it is almost the same as the OXFAM framework.

Appendix C Sampling

From: Droogleever Fortuijn, E., SAMPLING IN QUALITATIVE RESEARCH PROJECTS, April the 15th, 2004 CERES Orientation Programme P8-9

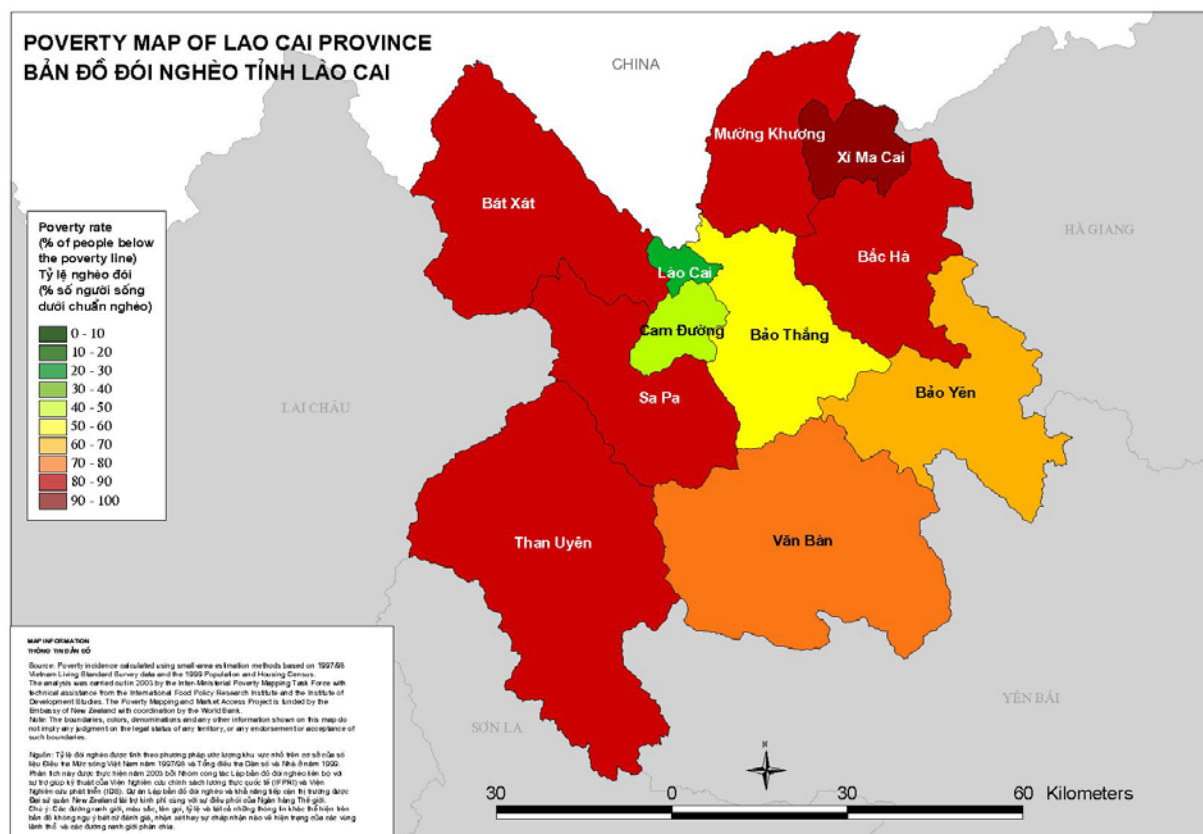
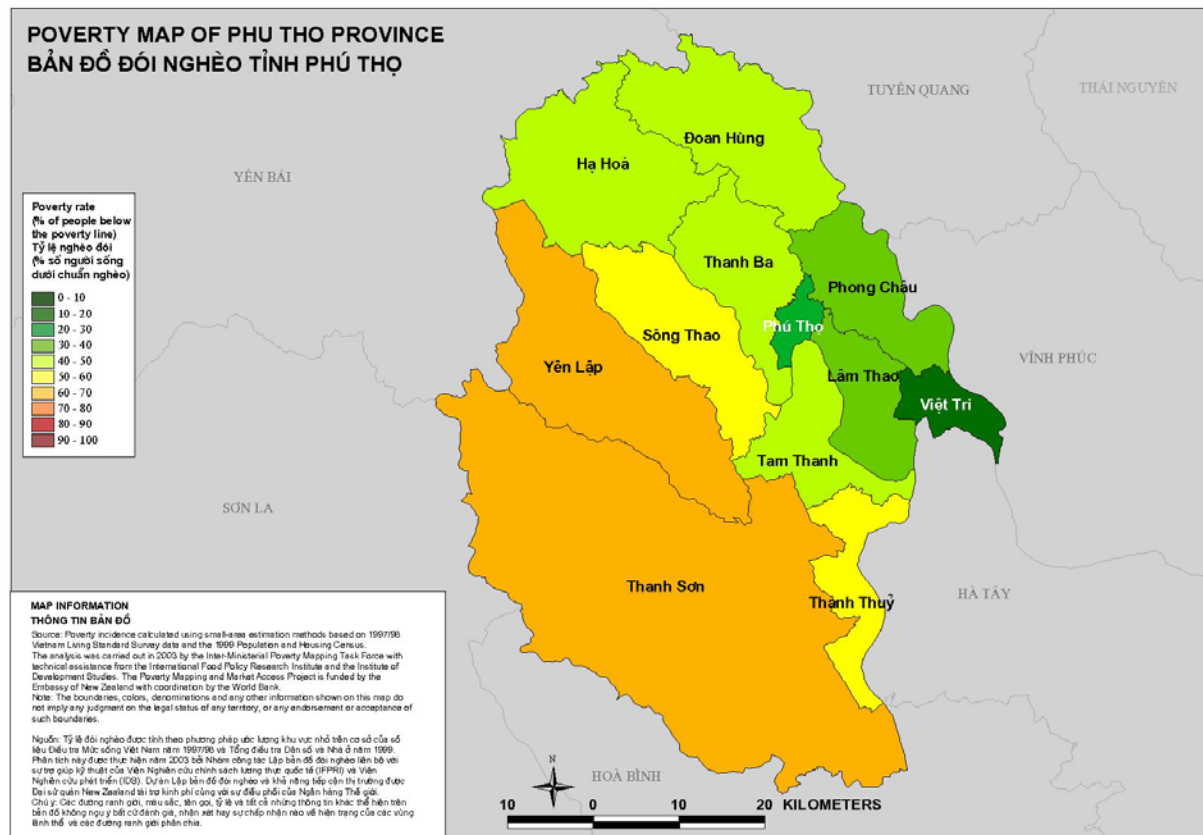
If one is primarily interested in theoretical rather than statistical representativeness, a random sample is not the most efficient sampling model. Much smaller samples will suffice – even a sample of 1 case may be sufficient, provided that the case chosen represents the theoretical concept very well (e.g. this is a very typical fishing community, of a very good example of a public bureaucracy). Purposive samples always should be composed on the basis of a plausible, possibly theoretically founded, reasoning and look for the selection of information-rich observational units to be studied in depth, intensively and within its social context. The purpose should always be related to the research problem. Patton (1990: 182-183) gives a large number of considerations that may be used in the building of such an argument:

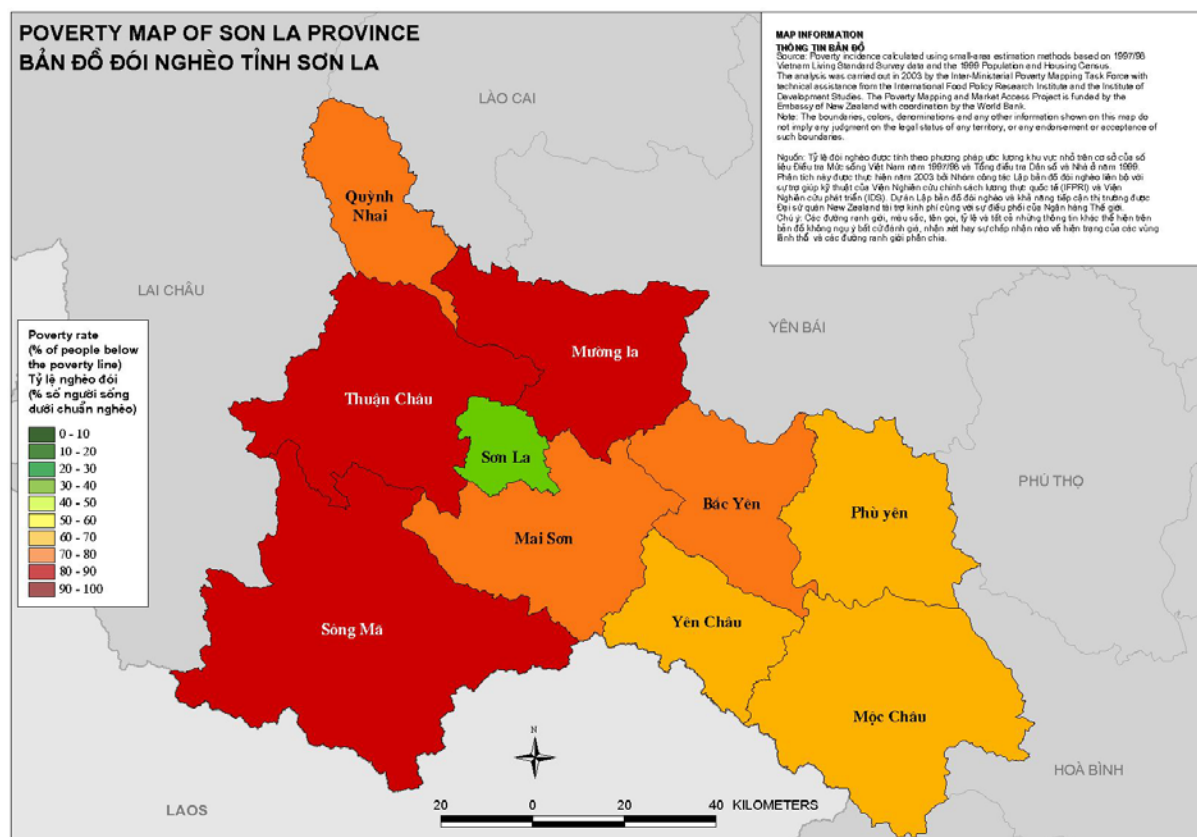
	Sample name	Explanation
1.	Sample of extreme or out-lying cases	very unusual manifestations of the phenomenon under study can be very enlightening (e.g. great successes or total failures of a policy programme; very good pupils or drop-outs, crises, exotic cases)
2.	Intensity sample	selection of information-rich cases that manifest the phenomenon of interest intensely, but not in extreme degree (good/poor students, rich/poor farmers, profit-making/loosing firms)
3.	Maximum variation sampling	selection of as much varying cases as possible, to document unique or different adaptations to different conditions
4.	Homogeneous sample	focuses, reduces variation, simplifies analysis, facilitates group interviewing
5.	Typical case sample	illustrates or highlights what is typical, normal, average
6.	Stratified purposive sample	facilitates comparisons, illustrates characteristics of particular subgroups
7.	Critical case sample	permits logical generalization and maximum application of information to other cases, because if it is true for this one case, it's likely true of all other cases
8.	Snowball or chain sample	identifies cases of interest from people who know people who know what cases are information-rich; good introduction to new interview subjects. Disadvantage: risk of remaining within the social network of the first informant (gate keeper)
9.	Criterion sample	picking all cases that meet some criterion relevant to the research question (e.g. all immigrant students in sixth form of the gymnasium, all boys sexually abused by priests, all herdsmen that kept some flock after the drought)
10.	Theory-based or operational construct sample	looking for manifestations of a theoretical construct of interest so as to elaborate and examine that construct
11.	(Additional) sample of confirming and disconfirming cases	elaborating and deepening of initial analysis, seeking exceptions, testing variation
12.	Evolving sample	following new leads during fieldwork, taking advantage of the unexpected; gives flexibility to sampling strategy

13. Random purposeful sample (still small sample size)	adds credibility to the sample when potential purposeful sample is larger than one can handle. Reduces judgment within a purposeful category (not for generalizations or representativeness)
14. Sample of politically (un)important cases	attracts attention to the study (or avoids attracting undesirable attention by purposefully eliminating from the sample politically sensitive cases)
15. Convenience sample	saves time, money and effort, but is the poorest rationale lowest credibility, yields information-poor cases
16. Any combination of the above, for reasons of triangulation, flexibility and multiple interests and needs.	

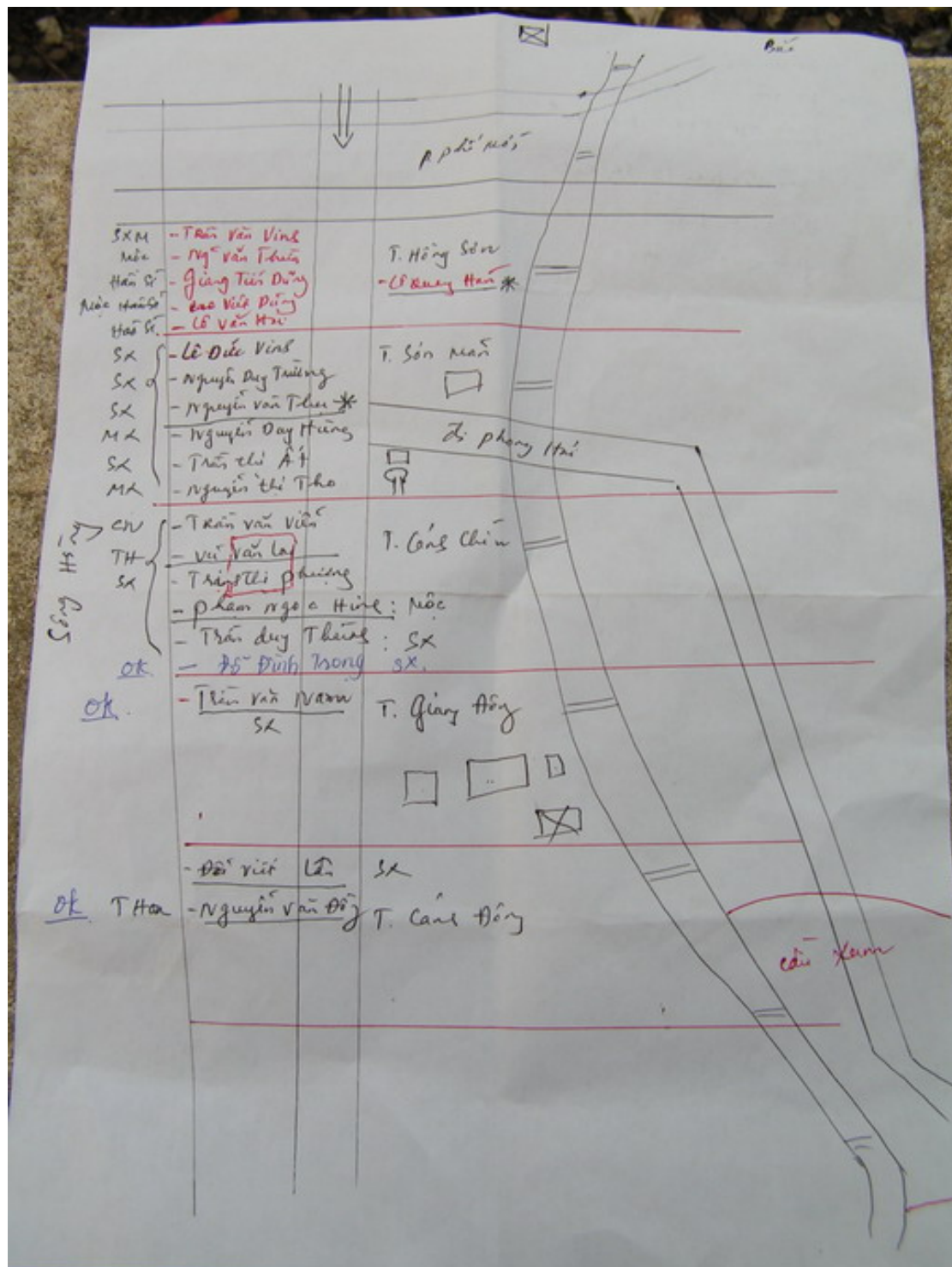
In all these cases the logic of reasoning is different from random sampling, and based on an informed choice and plausible arguments, not blind trust in the law or large numbers. The choice can be better if one knows more on the population. This asks for a sampling model that evolves gradually, during the collection and provisional analysis of some data: the parallel implementation of research design, sample design, data collection and analysis.

Appendix D Poverty Maps (P0) of the selected areas





Appendix E The Participatory Map of Van Hoa



Appendix F Group Meeting Women's Union Yen Mao

Khu 12
 1. Nguyễn Thị Phương 41 ^{years} tuổi ^{hamlet} Khe Lũ
 Xã Yên Mao.
 Husband farmer Lâm Nông
 2. Ông: Nguyễn Bá Đăng 48 ^{years old} tuổi (L. N)
 + Ở Khu: Đường liên thôn chưa
 phát triển được còn gặp khó khăn
 về vốn đầu tư: ^{commune road}
 + Về chương trình chăn nuôi: chưa ổn
 định: ở các hộ gia đình ^{lack of money}
^{for animals}



Họ và Tên: ^{name} Ng. Thị Anh : Tuổi 32 ^{age}
 Nghề Nghiệp: ^{job} Lâm Nông ^{farmer}
 Địa chỉ: ^{hamlet} Thôn 2 - Xã Yên Mao
 + Trong Khu còn khó khăn về công trình đường liên
 thôn - công trình vệ sinh chưa có nguồn nước sạch
 như giếng Bể - ^{sanitation} ^{clean water}
 + Về hệ thống kênh mương ^{cage for animal} còn thiếu nước tưới
 Tưới cho đồng ruộng. ^{water for agriculture}
^{channel}

Appendix G The commune information given by the Community leaders

Commune	District	# people	#hh	Ethnic	Income Million VND p.p.p.y.	land	Poverty Rate now	Poverty Rate 5 years ago	Electricity since
Yen Mao	Thanh Thuy	4136	901	60% Muong	-	different per hamlet	11.6%	-	2003 December
Tu Vu	Thanh Thuy	2800	590	50% Muong	-	800 m2 per person	10.1%	25%	2004 April
Phuong Mao	Thanh Thuy	2760	610	80% Muong	540 kg food 2,2	360 m2 per person	12.6%	28%	End of 2003
Trung Nghia	Thanh Thuy	3605	804	10% Muong	3	436 m2 per person	4.3%	20%	1999
Van Hoa	Lao Cai	2400	723	11% Mainly Dao, Day	4	216m2 per person	9 hh	27hh	1996
Chieng Mung	Mai Son	8113	1781	60% Thai	3,8	1600m2 per person	10.8%	24%	1996 (not strong)
Chieng Mai	Mai Son	3821	833	80% Thai	1	different per hamlet	12,1%	33%	2 hamlets 2002
Chieng Ban	Mai Son	5657	1281	72,6% Thai	4	2000m2 per person	3,5%	15%	1999 and 2002
Sap Vat	Yen Chai	3500	780	80% Thai 15% Mong	4	500m2 agricultural 300m2 rice	9,3%	25%	2000
Chieng Sang	Yen Chai	3900	780	70% Thai	2,8	300m2 rice 2000 corn/cassava	4% (WU = 12%)	?	1997
Chieng Khoi	Yen Chai	2715	575	100% Thai	4	300m2 rice 1700 corn/cassava	2 hh	6 hh	1999

Appendix H Research Planning and Costs

Bat Trang		Field study costs	
Fuel	75000	Bat Trang	183000
Food	100000	Phu Tho	1915000
Parking	8000	Lao Cai	1246000
	183000	Son La	5776000
			€ 456,00
			VND 9.120.000
Phu Tho			USD 400,00
Food	878000	House Hanoi	6280000
Bus (long distance)	350000	Fieldwork	9120000
			USD 500,00
Bus (city bus)	5000	Translator	7850000
motor taxi	305000	TOTAL	VND 23.250.000,00
Phone	27000		
Money for community	20000		
Fuel money police	30000		
Sleeping	300000		
	1915000		
Lao Cai			
Train	600000		
Food	27000		
Parking	4000		
Hotel	600000		
Motor taxi	15000		
	1246000		
Son La			
Bus	657000		
Food	1395000		
Motor taxi	349000		
Hotel	2080000		
Interviews	475000		
PC	120000		
AEC	700000		
	5776000		

Planning		Background Information	Interviews	#
		Yen Mao Community Leader	Yen Mao	15
Week 2	Arrival and introduction	Yen Mao, biogas 01	Tu Vu	14
Week 3	Literature	Yen Mao, biogas 02	Phuong Mao	17
Week 4	Meetings with NGO's	Yen Mao, Electricity board	Trung Nghia	13
Week 5	Bat Trang	Yen Mao, Group meeting Women	Van Hoa	11
Week 6	Public Holiday	Yen Mao, Women Union	Chieng Mung	6
Week 7	Bat Trang	Tu Vu, Electricity board	Chieng Mai	9
Week 8	Phu Tho - Yen Mao	Tu Vu, Community leader	Chieng Ban	4
Week 9	Phu Tho - Tu Vu and Phuong Mao	Tu Vu, Women's Union	Sap Vat	6
Week 10	Phu Tho - Phuong Mao and Trung Nghia	Phuong Mao, Community Vice Chairman	Chieng Sang	8
Week 11	Analyses	Phuong Mao, Community Chairman	Chieng Khoi	6
Week 12	Analyses and Son La government trip	Phuong Mao, Electricity board		
Week 13	Lao Cai - Van Hoa	Phuong Mao, Women's Union		
Week 14	Analyses	Trung Nghia, Electricity board		
Week 15	Son La - Mai Son	Trung Nghia, Rural Development Bank		
Week 16	Son La - Mai Son and Yen Chau	Trung Nghia, Vice Chairman		
Week 17	Son La - Yen Chau	Trung Nghia, Women's Union		
Week 18	Analyses	Hanoi, UCODEP		
		Van Hoa, Community Leader		
		Van Hao, Electrician		
		Van Hoa Women's union		
		Van Hoa, flower growing		
		Van Hoa, wood selling		
		Hat Lot, AEC Chairman		
		Chieng Mung, wood selling		
		Chieng Mung, Community Leader		
		Chieng Mung, Corn Drying		
		Chieng Mung, Youth Group		
		Chieng Mai, Community		
		Chieng Mai, Youth Group		
		Chieng Mai, Farmer's association		
		Chieng Ban, Community		
		Chieng Ban, Corn Drying		
		Chieng Ban, High School		
		Chieng Ban, tailor (not useful)		
		Chieng Ban, Women's Union		
		Chieng Ban, Youth Group		
		Sap Vat, Community Leader		
		Sap Vat, Farmer's Association		
		Sap Vat, Women's Union		
		Chieng Sang, Community Leader		
		Chieng Sang, FA (not useful)		
		Chieng Sang, Women's Union		

Appendix I Analysis Elaborated

The literature as stated above applied on the case in Northern Vietnam and the results are described in this appendix. A general analysis is given, followed by a separate analysis of each sector.

AI.1 General Background

At this moment Vietnam is going through many developments. The government is working hard to reduce poverty. How does poverty come into existence according to the respondents?

The main reasons for being poor are as followed:

1. few possibilities for labour, this means you might be sick, disabled, old, no family, widow etc.
2. not much/little access to land
3. a low level of skills (people sometimes have the first two, but have no skills to develop themselves or to produce or grow anything)

When the poverty level is reduced people will invest in different things, the right order of importance is difficult to say, the respondents did not agree on that. Only the most important one they agreed on, and that is the house, and the inside (furniture). These are very important for a secure and sustainable livelihood. Especially the different seasons and the monsoon ask for reliable and robust houses. Other things they invested in are (in almost random order):

- food (meat and fish are expensive, tofu is cheap)
- the garden and the land
- animals
- means of transport
- assets for the house like TV, radio, DVD player

People are very happy and satisfied overall with their enterprise, the only problem that is mentioned in the interviews is a lack of money (to buy raw materials, to buy animals, to extent the business etc.) There are only a few people that mention other problems, but these problems are very personal and not general, like disease, age or space for the business.

AI.1.1 Electricity

The year in which the communes got electricity access varies a lot (shown in table 4). In Van Hoa they were the first in 1996, Chieng Mung also had access but not strong enough for machines, only for lighting. Chieng Mai still has no access, except two hamlets near the factory.

The electricity board has set two different prices for electricity. There is a household price and a production price. This does vary a little bit but the costs for production are 1000 – 1200 VND per kWh and the costs for household is 600 - 700 VND per kWh. Some of the enterprises, especially the ones with only one or two small machines did not register for production electricity, and use the household electricity. The difference is that the electricity for production is stronger so more people can have a machine on it without any problems.

In most communes the electricity is still run by EVN (Electricity of Vietnam), only in Van Hoa and Trung Nghia the electricity distribution and payments are run by a cooperative. They buy the electricity from the government and distribute it in the commune (same price). The only difference this makes is that it employs 6 people from the commune.

A central problem in the rural areas is the power cuts. Most of Vietnam's electricity is generated by Hydro power according to the EVN website¹⁰, about 46% in 2003. During dry season, if there is not enough water in the rivers the country has a problem, because then they

¹⁰ Electricity of Vietnam, (2005) <http://www.evn.com.vn/>

cannot generate enough electricity for the whole country. They decide that they will schedule power cuts in the rural areas so they can save energy for the big industrial cities like Hanoi and Hai Phong (up north). During this research the water level was so immensely low that they even had to start with power cuts in parts of Hanoi to save enough energy for the industry.

AI.1.2 PIP-box

Since 1999 (although the opinions are diverse) the government started a central agricultural program. They spread new seeds for rice and crops together with new information about the best ways to be a farmer and to grow crops and rice. This information was distributed in different trainings for different groups of people, for instance women or farmers. This improved their skills and technology. This was done by the Farmers Associations of the different communes, they got the new seeds and information (and training) from the province and distributed it in the commune.

	New	Old
Rice	Nhi Uu 63, 64	Bao Phai
Corn	919 9999 Lai 10	Mehico

Table 6 The new and old seeds used in Sap Vat

The government studied which seed was best for which commune or district. In table 6 is shown which seeds are best for Sap Vat, but it is different in each district (or commune).

This had major positive consequences for the communes. Main development was that the productivity increased. Some different examples are:

- In Tu Vu they had a production of 1.000.000 kg in 2003 and 1.150.000 in 2004, that is 15% increase in output.
- In Phuong Mao they grew in the past 120 kg product on 360 m² land, nowadays they grow 180-250 kg of product.
- Sap Vat; before -about 5 years ago- the productivity was 3,5 - 4 ton rice and corn per Ha now it is 6,5 ton rice per Ha and 5 ton corn per Ha.

They did not force or oblige the people to use this new seeds, but they grew some crops and rice on a piece of land with the old and the new seeds, then they showed the people from the commune the difference. Because they saw it with their own eyes they believed it and started using the new seeds. Only some of the minority people with their own belief and methods did not start to use the new seeds and technologies. This is why they stayed a little bit behind in their developments. The government did finance many of these changes, so the people could actually afford to change seeds.

Besides the new seeds for crops, the government also promoted to grow more crops than just one. In the past the people only grew one crop besides rice. Now they grow more crops, crops that grow in different seasons. This way they generate more income, more equally divided over the whole year. They do not depend any more on just one crop, and this way they can use their land the whole year.

Another positive change is the use of fertilizers that were also put at disposal by the government. A negative thing is the payment of all these things. At first the government helped out financially. At one point in time the people had to pay for these things themselves. It started in a way that people have to buy the fertilizer and seeds in advance while they can only pay this after the crop season. This leaves a gap in the middle where they cannot pay. They now made a deal with the subcontractors that the PC is the warrant for the people from

the commune. So the people from the commune can pay after the crop season, and the PC promotes the subcontractor that this will happen. The case is that this always happens. The people in Vietnam are very proud and do pay their loans back (also at the bank), but they are not always able to pay it in time, especially when there is a disappointing harvest.

These developments in agriculture, in combination with the infrastructural developments due to the 135 program, caused a major economic boom. The situation in the communes has improved a lot in the past 5 years. The livelihood of the households and entrepreneurs improved as well. In some cases during this research it is difficult to separate the developments because of the electricity and because of the general developments. A good example of the improved livelihoods is transport, before people could not transport themselves at all, all households had a bicycle and that was it. Nowadays all households have at least one motorbike.

Officially every enterprise has to register with the government. Remarkable was that in Yen Mao and Tu Vu this registration is not taken that seriously, while in the other communes all enterprises registered their ME. If the government does come and check the registration, the enterprise can be closed. Overall about 75% of for instance the rice mill enterprises did register, most entrepreneurs who did not register had a still a generator or not that many customers. The main reason not to register is “the business is only small, it is just the family”. Having your enterprise registered has no advantage for the business. They have to pay tax (50.000 VND yearly) and they have to pay a registration fee from about 1 million VND. The government did have some programs to stimulate enterprises and then they do not have to pay tax in the first year after they started. But these programs stopped already.

Background is important, according to everybody here the ethnic people have less education and business skills. In the past they did not think education was important, but this changed. Nowadays all children go to school, ethnic or non-ethnic. Of all respondents that I asked the background of (82 because Yen Mao and Tu Vu are missing) 50% is Kinh, that means the “normal” Vietnamese background. 15% of the respondents are in a mixed marriage, or the husband or the wife is from an ethnic background (mainly Muong and Thai) and 35% is both from an ethnic background. Remarkable is that almost half of the rice mill owners is from an ethnic background (47%) and another 16% is in a mixed marriage. This is more than the average and supports the thought that ethnic people are still more involved in agricultural activities. While in a “fashion” job like motorbike repairman only 20% is mixed, 20% is from an ethnic background and 60% is Kinh.

AI.1.3 Context

TET holiday (Chinese New Year) and harvest time are two things that influence the lives of the communes a lot. During TET holiday nobody works and everybody parties in his or her way. After crop season people pay off their bills and purchase new goods.

AI.1.4 Livelihood (changes)

H Almost none of the respondents have any form of education. The education level in general is really low in North Vietnam. Some finished secondary school and a few finished high school. It is the same for both man and women. Nowadays the government emphasizes more pressure on the importance of education. The developments in income increased the past 5 years as discussed, so there is more money to spend on education by the parents. Only the specific jobs require education, tailor, ice cream making, mechanical work, motorbike repair, this will be discussed at the specific chapters.

The electricity did have an effect on the knowledge and developments in the communes. There is one TV channel (out of 3 in the rural areas) that broadcasts 24 hours per day

agricultural programs and news. According to an unofficial source 90% of the people bought a TV after they accessed electricity and 80% bought a DVD player (except older people). This source is not 100% reliable, but based on what is noticed during the research the number could be quite accurate. This TV channel is well viewed and people acknowledge that they learn a lot from these programs and trainings.

Farming is often not seen as “a real job”, they say that starting the enterprise gave them a real job, before they were “only” farmers. Farming is seen as a secondary job, it is hard work for relatively not much income.

There is no creativity; they start a business after they saw somebody else doing it. They make the same products as somebody else, they almost never start because they think it is needed or they see demand. That is why there are only about 8 different enterprises found in the rural areas (and some trading).

P: A better viable ME due to electricity makes that people invest and change their physical assets, most important for Vietnamese people are the house (this is most important to a family) and furniture, but also TV and DVD player, which you can find in every house now there is electricity.

This is very important of course, with the 135 program and with local money the communes are already working on the development of the infrastructure. Phuong Mao for instance is less developed, there is no paved road. The same situation is in Van Hoa which can only be reached by a 5 km long bumpy road. People say this is a big disadvantage.

Access to the different/other districts is important according to the different Chairman's, and definitely not all communes have access to different districts.

T: Before they accessed electricity some of the respondents used a generator. The opinions about the generator are identical (except a man who still worked with a generator and saw no disadvantages at all).

Brands of machines (generators, appliances) are not important to any of the respondents; almost nobody knows the brand without looking it up. It does not matter what energy source they use or used. The Chinese brands are cheaper, there is a German brand that a few people have and there are Vietnamese machines. People chose a certain brand because it was or the cheapest or it qualified for the required wishes. The entrepreneurs often just go to the shop and let the salesmen inform them about the possibilities and options. They make a decision based on this information.

There are no exceptions in the opinions about the electrical machines they were able to use after they accessed electricity. The productivity of the machines is much higher than with the machines on a generator. Everybody said that the work got easier and more convenient when using electric machines instead of manpower, diesel (generator) or other sources. With the exception of the rice mills, the usage of electricity is much cheaper than diesel as an energy source.

The disadvantages of the generator are of big influence on the people's lives, almost everybody agrees on the following disadvantages.

- The smoke, noise and dust that come from a generator are very unhealthy and annoying
- As said before, diesel is very expensive and was until recently not that easy to access in every commune. Some respondents had to go far away to collect the diesel (by bicycle).
- A generator often breaks down, and reparation is expensive and time consuming
- It is hard to turn on, especially in winter when everything is very cold. People mention that they often are already tired of turning on the generator before they start working.

- Women can often not work with the generator because they cannot turn it on easily
- Thanks to the aforementioned it is almost impossible to work at any moment you want. People had to save work they wanted to do on the generator, and do it all together after they turned it on.

S: Although people never come up with this themselves, if asked about the social changes they say they have more friends since they opened a business. This is not influenced at all by the electricity access.

Having good social relations is of big importance, when starting a business or buying a new (electrical) machine. If you are able to borrow money from your friends (or relatives) it can be much cheaper than if you borrow it from the bank. Friends are as important as the bank, maybe even more important especially in Son La where they have difficult access to the bank. With a bank the family needs deposit, which families with a non sustainable livelihood often do not have. With friends/relatives this is not necessary.

N: Having not much land is a reason to start an enterprise according to most people. Especially after marriage, when people start their own life and do not get much land of their parents. That is one of the main reasons to start an enterprise, with a new marriage comes children and they need a secure sustainable livelihood to grow up in. The land is divided by the government. Most communes just equally divide the land over their inhabitants (the ones that are born in this commune). Some communes divide the land different in every hamlet.

Commune	land
Yen Mao	different per hamlet
Tu Vu	800 m2 per person
Phuong Mao	360 m2 per person
Trung Nghia	436 m2 per person
Van Hoa	216m2 per person
Chieng Mung	1600m2 per person
Chieng Mai	different per hamlet
Chieng Ban	2000m2 per person
Sap Vat	500m2 agricultural, 300m2 rice
Chieng Sang	300m2 rice, 2000 corn/cassava
Chieng Khoi	300m2 rice, 1700 corn/cassava

Table 7 Land ownerships

Another reason to start an enterprise also has to do with land. The number of children in a family are of big influence. Families with many children do not want to divide their land over all their children, this would mean that all children get next to nothing, and not enough to be self sufficient. So often the younger one, but sometimes just the ones that do not want to be a farmer have to start a business to make a living. Normally the whole family helps with subsidizing the study costs of the person who gets no land.

In Van Hoa there is another reason to start an enterprise. The government is making Van Hoa into an industrial zone they are taking away land from the inhabitants and not returning anything to them. Other inhabitants are also not sure about there future. The people who used to be farmers do not have access to land any more and have to create a new job to reach a sustainable livelihood, they start a micro enterprise.

There are wood cutting restrictions that are very important to the carpenters, but this will be discussed in a later paragraph. For the rest the natural assets are not of much influence on the enterprises.

- F: At first when the people opened a business this had enormous changes on their financial situation. Changing to electricity from other sources (diesel, manpower) has positive effects on the turnover, because the costs of electricity is less than that of diesel and it has higher productivity. Other factors decrease the turnover though, after they have accessed electricity. Examples are decreasing number of customers because more competitors (market) or high costs for raw materials like wood.

Borrowing money is difficult in some situations. When people want to borrow money from the bank they have to come with a proposal. The proposal must state the amount they want to borrow and the purpose. After that somebody from the bank will go and check out the house, land and other assets of the person. They will look at the proposal and decide how realistic this plan is. (For example when they want to borrow money for a rice mill they will go and see how many other rice mills there are in the neighborhood). It is easier to get a loan since 1990 that is when the policies of the government changed. Before each bank had different policies.

If the loan is less than 10 million VND for agriculture you do not need any deposit, if the loan is more than 10 million VND you need deposit. This can be land ownership or the house. The house is valued by general standards. A friend or relative can also hand in deposit for the loaner. For other loans –non-agriculture- it totally depends on the proposal and the circumstances.

There are two kind of loans, short and long term. Short term is 12 months long term is 48 months (4 years). The people do pay back the loan on time most of the time, when they cannot pay back on time this is because of accidents. For example they borrowed money to buy an animal and it dies. When they are not able to pay back on time the people from the bank will visit the family and discuss the options, often they get longer time (until for instance after the harvest).

People that do not have enough assets will not be able to get a loan and to improve their livelihood situation with help from a loan. People with big loans but small companies, like a rice mill, often have trouble with paying back the loan and the interest (between 0,5 and 1,5% per months) each month, the bank is very flexible with this.

AI.2 Tailor

Six tailors are reviewed, in two different districts. All tailors were on the main road in the village. They say that for their job as a tailor it is not a big deal to be on the main road, the products are not difficult to transport and they can work anywhere. Only when people have to chose between different tailors they will chose the one that is the easiest accessible. All tailors started at least 5 years or longer ago.

AI.2.1 Electricity

Two tailors do not use electricity for sewing, there is no electricity available (Chieng Mai) or she cannot afford to buy an electric sewing machine (>1 million VND).

Two tailors used coal for ironing before they accessed electricity, they did not experience this as a negative thing. The costs for this were very low (one got it for free) and they did not complain about any health impacts.

AI.2.2 Gender

Of all respondents 3 were husband and wife that were doing the work together and 3 were women. Of this latter group the man had other work.

AI.2.3 Livelihood (changes)

The livelihood situation before and after the acquired electricity will be reviewed here.

H All tailors had education in tailoring before they started the business and their skills and education level did not change due to the electricity access. The only reason they had to change their skills is because of the fashion trends (context), people want different kind of clothes and higher quality.

The change to electricity from coal for ironing and from manpower had no health impacts. Two tailors do mention that working in the evening is more convenient now, before they worked with light from a paraffin lamp, which is not as good for the eyes. They can plan their different kinds of work over the whole day now, since it is possible to work in the evening.

The time they save now since they use electricity and sewing with electricity is quicker than sewing by hand, is used on more work like more clothes making, animals or the shop. None of the tailors works more hours a day though. One tailor says he uses the extra time to relax, because he already worked 10 hours a day.

There are not many external workers involved in the tailor business, it is family business. Only one enterprise has workers and they did have to fire one worker after they accessed electricity. Three other tailors mention they sometimes hire extra workers during busy times (like TET holiday or before the new school year), but this was the same before the electricity.

Only one tailor has a separate shop to work in, but she claims this was made only for 100.000 VND because she had some friends and a three and they made it very cheap from that wood. But she does want a new shop if she can afford it. All the other tailors have their shop within their house (one even has it within the shop). Three out of 6 want a new shop, 2 that have a house made of other materials than brick and one has a grocery shop and tailor shop in one tiny little space.

F It is difficult to live only from being a tailor, all tailors have another business within the household, shops, bee keeping and farming for example. Having electrical machines did increase the income of the tailors, the productivity went up and the quality of the clothes increased so they can ask higher prices.
The expenses did increase because of the electricity costs (between 80.000 and 150.000 VND), but the extra income is more than the extra costs.

T There are 4 choices for the tailors although one is never used, nobody had no machines at any point of time. Furthermore you can have electric machines, man



Picture 1 A tailor - Tu Vu

power machines (with propulsion from the feet) and machines that run both on man power and electricity, those are the industrial machines and are twice as expensive.

All tailors that accessed electricity bought new machines, they bought 2 or 4 new machines depending on the number of workers. All tailors did keep at least one machine that can be used with man power (or a machine that can work with electricity and man power) this because of the power cuts. Besides that they can hire extra workers in busy times that can work on the non-electrical machines if necessary, but this does not happen often.

The tailor that did not access electricity yet -it is not available- does have an electric/manpower sewing machine already, so he can start using it as soon as they can access electricity.

S Nothing changed in their social assets, they do mention that reputation is very important in this business. The number of friends, social resources all stayed the same.

P & N Same counts for access to water, land, biodiversity, house, roads etcetera, they are all of no influence on tailors, and are all not changed after tailor's access electricity. They also do not build any new houses or workshops (P), although they do want to.

AI.2.4 PIP-box

There are no processes or structures that limit or influence the tailors directly. Tailoring is a simple and not that popular profession in Vietnam. At this moment there would not be any reason for the government or the NGO to start a project in stimulating tailoring. There are no laws or policies regarding tailoring. The tailors with a real shop are all registered (5) the one tailor that has it as a extra income and does not work that much is not registered with the government.

AI.2.5 The context

The trend does influence the demand, but the changes that come with this are not electricity related but fashion related. Again TET holiday and harvest time are of influence the most. Also the beginning of the schoolyear is of influence on the demand for clothes, but all non energy related.

AI.2.6 Market

The market position of the enterprises did not change as a result of the accessed electricity. They only serve the local market, the people from their own commune. There are limited number of tailors in each commune, 5 out of 11 communes had an "official" tailor (which does not mean registered, see next section), other communes do have people that make their own clothes but no educated tailors who sell to others for profit. There are not many tailors (on average 1 or 2 per commune) so there are enough customers, and this stayed the same (1) or increased (3) in the past years.

AI.3 Mechanical workshop

Nine mechanical workers were reviewed in 3 different districts and 7 different communes. Seven of the respondents say that they started the business to make a income or to make more income. Other reasons were that there was nobody else yet but there was a demand, one wants to help to develop the commune. Having no or little land for agriculture is a big reason to start a mechanical workplace; people have to find an other source of income to secure their livelihood. Ethnicity does not play a major role in this (3/6 were from a ethnic background). All respondents were male, no exceptions. Women were farmers or housewife (depending on the income of the mechanical worker and the access to land).

AI.3.1 Electricity

Only 4 out of the 9 respondents started their business before the electricity came, they all used a generator. At the moment all respondents use electricity and none of them still uses a generator.

AI.3.2 Livelihood (changes)

H: Seven out of nine mechanical workers learned their skills in another commune, or district like Ninh Binh or Hanoi. One of them even went to Germany with an exchange program (he has the most machines without a loan) and started afterwards his business in Trung Nhia his home town. The other two entrepreneurs learned their skills from friends. The skills did not change after they accessed electricity, where they learned the skills they already had electricity and they all knew how to use this.

Three enterprises that used a generator before had changes in employees after they accessed helectricity. (The forth one did not have any employees before or after). Two doubled the number of employees (4 and 2) and one entrepreneur has to ask the help of his 2 brothers in busy times while he never had to do that before. Some of the workers had the skills before other learned the skills in the business. Almost all respondents with mechanical workshops have had trainees in the past, people that come and work for you to learn the skills. The workers do work full time with the enterprise, only with power cuts and during harvest they often have some free time, in the last case to help their families with the harvest.

The extra time that is saved with using faster, more productive equipment is used for more work by three of the entrepreneurs. One says he uses the extra time to relax because he already worked 10 hours per day before.

Using electricity gets rid of all the disadvantages of generators, the smoke, noise, costs hard work and diesel. The workers and entrepreneurs feel much healthier.



Picture 2 A mechanical worker - Phuong Mao

T: All workshops bought new machines after they access electricity or when they started their business (with electricity). Electricity had a major impact on the usage of technology. With the new machines like a grinding, cutting, welding, drilling, air pumping, they can make higher quality products, they make less mistakes and bigger products, like gates. Before on the generator they only had small tools like soldering.

The number of machines varies between 3 and 7, the 3 respondents with the most machine (7, 6, 6, and 5) and the 2 with the fewest machines (3 and 4) did not have to borrow any money to start the business and/or to buy the machines.

The bigger products could have been possible on a generator as well, although when they started their business many years ago there was not much demand for these big products like gates etcetera. The living standards were much lower than. They only bought small generators for small machines. If you have a working generator, it is not likely (none of the respondent with generators in the whole research) to change this generator for a bigger one.

F: After using electrical machines the financial situation of the enterprises and entrepreneurs improved a lot. Electricity is much cheaper than diesel, they save about 40 to 60% now they use electricity. Besides the costs they save on electricity there are also the reparation costs for the generator that can be very high because they break down often. The new products (big) they make are also more profitable than the smaller products. And the work with electricity is more productive than with generator.

It was not easy for all mechanical workers to get a loan, this is dependent on the number of assets, house and property that somebody has. Some mechanical workers complain about a lack of money to buy more machines.

The extra money that is earned is spent on the same things as with all the enterprises that are studied, although there is one difference. Mechanical workers also invest the extra money in raw materials besides the standard things as extra food (meat and fish), furniture and education for children.

N & S The natural, social and physical assets were not influenced by the change to electricity in any way. Reputation, friends, access to water, land, biodiversity are all of no influence on tailors, and are all not influenced when tailors access electricity.

P They get their half products from the bigger towns around (main city in district or province). They do want to have more raw materials, and bigger raw materials, but this is not always available and affordable. Furthermore there are no changes in the physical assets like house and so on.

AI.3.3 PIP-box

There are no governmental rules or law concerning mechanical workers, no structure or procedures are of direct influence on the mechanical workers business. Even the NGO's do not support the mechanical workers. It is a fact that in the more developed communes/hamlets there are more mechanical workers. In Van Hoa where they are close to the city Lao Cai, and where people had to start a new business because the government took away their land there are more mechanical workers than in the other communes.

AI.3.4 The context

The context did create an opportunity for this sector; the trend of window bars and gates increased the demand for the mechanical workers. People want window bars and gates now, since the welfare increased they have more valuables and they want to protect their valuables, house, property and mostly their family.

AI.3.5 Market

The four entrepreneurs that had a generator before do say that the number of customers increased, the opinions about why are divided. One says people realize since they have electricity how important their house and property is and want gates and window bars to protect their things, an other respondent says that the living standards increased since the open policy of the government (see earlier chapter). The other 5 entrepreneurs that started off with electricity also state that the demand keeps on growing. No complains about to little customers.

They all serve only the local market, especially in communes where people live far away from each other, and if there is no centre it is difficult to start up because of the distance. like in Phuong Mao. They do produce more different products now they have electricity but this did not change the market, the demand also changed. All competitors acquired electricity, this did not change the competitors situation.

In Tu Vu there are relatively more mechanical workers than in the other communes. The center is really developed already for a number of years. It is on the border with the province south of Thanh Thuy and traffic that goes through Thanh Thuy to Hanoi goes through Tu Vu's center.

AI.4 Motorbike repair

Eighteen motorbike repair shops were interviewed. One of them still uses manpower, one respondent uses diesel and electricity (he said he thinks using electricity for some of the equipment is very dangerous, he could get a shock and die, so he uses the generator for some appliances like soldering) and one respondent still uses a generator on diesel because there is no electricity available. Only 5 out of the 18 enterprises used to have (or have) a generator, 4 from Thanh Thuy and one from Yen Chau - Son La.

Most motorbike repairman say they wanted to do this job because they really like this work. Other reasons are; family business, they did not want to be a farmer (they do not see that as a "real job" it is hard work and does not give much profit) or they are with many people at home and there is not enough land to divide so they had to find another job.

Being on the main road is very important for this profession according to many respondents, many customers are just people that drive by on their way to the city or even Hanoi. Thirteen respondents have their shop on the main road, of which 3 had to borrow money and 2 had own money to start their business. These enterprises all except one have brick houses, so there is not a big visual livelihood difference between the ones on the main road and the enterprises of the main road.

AI.4.1 Electricity

Four motorbike repairmen had a generator before they had electricity; all of those were in Thanh Thuy. Eight motorbike repairmen started after the electricity came, and they mention electricity as one of the reasons to open the business. Other reasons why motorbike repair is so popular (and why more and more shops open) at the moment is because there are more and more motorbikes, where 5 years ago every household had one or 2 bicycles, nowadays every household has at least 1 motorbike. This changed because of the change in living standards (earlier mentioned) and because there are now many motorbikes imported from China and these are much cheaper than the ones from Vietnam (5 million VND for a Chinese motorbike, Vietnamese are at least double the price).

Two respondents say that they already had electricity but they did not use it. They could not afford new machines. They kept on using manpower and the generator.

AI.4.2 Gender

All respondents were male, and this is the only sector where some of the respondents said they started to do this work because they liked doing it. It is like a hobby that turned into their work. In general motorbike repairmen are male all over the world.

AI.4.3 Livelihood (changes)

The livelihood situation before and after the acquired electricity will be reviewed here. That means that only the 7 enterprises that existed before the electricity came will be reviewed.

- H: All respondents learned their skills from others (friends/family), possibly in a different commune, in "work and learn" programs or trainee ships in other workshops. Distance differs from 1 to 400 km (Hanoi). They did not need to learn any new skills after they started to use electrical machines.

Three of the seven enterprises have employees, and these (in two cases: two, once one) employees are trainees they only stay for a certain period of time before they go and work somewhere else or start their own business. This did not change due to the electricity, this did not change at all in the past few years.

It is remarkable that with this profession 5 out of 18 respondent are single (all respondents are male), especially the newly started enterprises are often run by young man in the beginning of their twenties.

All respondents say that working with electricity is more convenient and easier, better for their health. Sometimes you are already tired after only turning on the generator.

Nobody started to work more hours after using electricity; they work 8 hours a day. If there is no work (in the past or present) they stay in the shop and do nothing.

P: In Thanh Thuy they improved the road that goes all the way from north to south into a paved road. This is not a change due to the electricity, this is a result of the governmental program 135. This does influence the usage of motorbikes, it is more convenient now.

S: Reputation as a motorbike repairman is very important; it is mentioned several times by different respondents. Using electrical machines has a positive impact on the reputation of the motorbike repairman, the quality and speed of the work will increase.

F: The income increased since the electricity came for the ones that used to use a generator, the costs for diesel were much higher and it does increase the productivity, although at first they did have to invest in new machines. One said that the costs stayed the same, before he only used the generator a few hours a day, it was too expensive to use any time a day. When changing from diesel (if you use it every time you need it) to electricity you can save 70-80% of your costs. The costs for electricity are between the 20.000 and 200.000 VND depending on the size of the enterprise and the number of machines used.

The only problem that is mentioned by some of the entrepreneurs is that there is a lack of money to buy more raw materials or machines. Now they cannot fix all problems because they do not have the machines (especially the smaller ones) and they have to send their customers to others or even to the city.

T: The number of machines increased since they accessed electricity and varies between the 3 and 8 (the one that possesses 8 machines is a family business that also has a fuel station and work



Picture 3 A motorbike repairshop - Van Hoa

shifts with 3 brothers).

With the new machines the work is easier and the production processes became quicker and more convenient, less heavy and with a higher quality. The productivity is a lot higher.

N: The natural resources are not at all of influence or influenced by electricity and are not of influence on the ME.

AI.4.4 Market

Six out of the seven respondents say the number of customers increased because of the reasons mentioned at the beginning of this paragraph, there are more motorbikes (from China) and people have more money to spend (one person said it stayed the same). All the six respondents say that the increasing numbers of customers has nothing to do with the acquired electricity. This does result in more and more motorbike shops. In Son La there are more and more motorbike repair shops opening in the last few years. Seven out of eleven just opened enterprises are from Son La.

They all still serve the local market. Maybe once in a while they serve people that drive by from other communes and need maintenance on their motorbikes, but no regular customers.

Only one respondent complains about a lack of customers, he only works 4 days a week, the other days he works on the land to help his wife. This is in Phuong Mao where there is the lowest income per person per year, and there are 3 motorbike repair shops in this small commune.

AI.4.5 The context

Trend is that people want their motorbike to be repaired quicker, when they wait or at least within the day. So they have to adapt to this wish. Electricity does make this possible.

Another trend or change in environment is the import of the Chinese motorbikes that in combination with the increased welfare made it possible for more and more hh to change from a bicycle to a motorbike.

The season is also of influence it occurs that people wait with paying until after crop season. They do not use the motorbike, or they leave it at home if it is broken until they have money to get it fixed or to get fuel.

AI.4.6 PIP-box

Only one respondent mentioned the influence of the government on his shop. He used to have a shop in Yen Chau (the city near Sap Vat) but the people are so afraid of the police that they do not use their motorbikes that much. That is why he moved to Sap Vat, so he could serve the people that travel from the communes to the city.

As said before, in Thanh Thuy the governmental program 135 had as a result that the roads became much better accessible, which does positively influence the usage of motorbikes.

AI.5 Carpenter

Twenty carpenters were reviewed in all communes (11) in all the districts (4). Carpentry is a traditional profession and often goes from father to son (6x), or they learn it in other workshops (8x) but there are also some people that learned it from friends (1x), taught themselves (4x) or went to a job training center (1x). Thirteen carpenters started their business more than 5 years ago, it has been a popular business for a long time.

Eleven carpenters are not on the main road, but everybody says this is important because of transport of the products and transport of the wood.

AI.5.1 Electricity

Twenty carpenters were interviewed of whom 2 still use a generator on diesel (this was in Chieng Mai where there is no electricity available) all the other carpenters changed to electricity from hand work.

We can divide the respondents in 4 different categories, three different cases. Case 1 is the group that started after they accessed electricity (5 respondents from 4 different communes in all provinces), so they had electricity since the beginning of their shop. Case 2 is the group that used hand power before and now uses electricity (10 respondents from all districts). Case 3 is the group of respondents that used a generator before (maybe hand power before that) and uses electricity now (3 respondents from Thanh Thuy and Yen Chau). And then there is Case 4 the two respondents that still use the generator.



Picture 4 A carpenter - Van Hoa

AI.5.2 Gender

All respondents are male, carpentry is a traditional profession, in the past when there were no machines it contained handwork. This includes carrying and sawing the wood, which is a very hard work. That is why carpentry is from origin a man's job.

AI.5.3 Livelihood (changes)

Changes in the livelihood of the entrepreneur are studied here.

H: Nine of the families have no brick house, of which six are from Son La province. The one from Phuong Mao is a family that just got married and had their first child, that is why she cannot work and the father has 2 or 3 different jobs to earn enough money for the family, they are with many children so there is not much land for them and they had to find another way to make a living besides agriculture.

In Van Hoa the livelihood is not secure because of the plans of the government to turn Van Hoa into an industrial zone. People are not sure about the house and the ground they are living in, the government could take all that away in no time and with little things to return. So there is no immediate need to built brick houses (even if there is money), it might be that they have to move again.

As said before, carpentry is a traditional skill, they learn it from family most of the time, or friends. Many people changed from house carpentry to furniture, they had to improve their skills for this. The change from handmade to machines did need new skills but these were not difficult and they taught themselves.

The workers are family and friends. Some carpenters move to a different commune, they saw a market there and not in their own hometown. Friends from their hometown move with them to work for them. In case of case number 3 the number of workers stayed the same or decreased, there were no people fired but people that leave are not replaced. The electricity makes the work faster, more productive.

Carpentry is not a healthy profession, the dust of the wood goes in eyes, lungs and moth etcetera. The negative health impacts are reduced due to the electricity. People have more machines now, so the work is less hard. One carpenters wife said that her husband was always

really tired in the evening so he could not work that late, now he has more energy and can help with housework, the new baby or do more work.

Most carpenters have more than one income source, most of the time the wife works in agriculture. It is difficult to live of carpentry alone.

The number of hours the carpenters work a day did not change due to the electricity. They work faster now and can handle more demand, they make more products. Only two carpenters mention that they work more hours now, the machines make them less tired in the evening and the light in the evening now makes that they can work then as well.

S: A reputation is really important in this business. Reputation in combination with the price is mentioned as the main reason why people buy the product from that shop.

T All carpenters bought a sewing machine (small) and most of them bought at least one or two other small machines, grinding and one for the edges are the most popular.

Changing from diesel to electricity did not cause any changes for the production process. Quality and productivity stayed the same. The number of machines did increase after they accessed electricity. The electricity did have a positive influence on the costs of the product.

F: Changing from diesel to electricity had a positive influence on the costs of the product, this went down, and electricity is so much cheaper. These reduced costs increased the income.

One of the main problems is a financial problem. Many people cannot pay until after the crop season. The carpenter keeps his debt and has his expenses but there is no money coming in. Some people even end up never paying, but the carpenters can only mention one or two cases in their whole career when that happened.

P The physical assets stayed the same, the better roads or other physical assets are not of influence on the carpenters.
Housing, furniture etcetera did not change, and is not different in comparison with other ME's and it did not change after the electricity came.

N The carpenters now depend on the wood that comes from other places than the forest, people's back yards for instance. This source is limited and makes the work of the carpenters difficult and expensive.



AI.5.4 Market

There is more market in Son La, thanks to the Thai community there. The houses are still made of wood which creates a lot of work for the people. In the other communes the house carpentry is a dead end, nobody has houses of wood anymore, all the carpenters had to start making furniture as well.

The demand did increase, the general living standards of the people increased. People buy more products now, especially the half size closet that is also an altar, and the full size closets that give space for a TV and DVD player. Other popular items are a bed, tables and couches. People also demand a higher

Picture 5 Two workers sawing - Chiang Mai

quality product, due to the usage of electricity.

Only a few (2) people complain about the market, but this has to do with the quality of their products and the price. These are the people for whom it is difficult to get wood for a cheap price, so their products are expensive or there are competitors in the neighbourhood that make products with a higher quality. Electricity does play a major role in this since the electric machines make the quality of the products much higher. People prefer a product made with electrical machines than one made by hand.

If people have more money to spend they will spend it on the house first (trend), a good house with furniture is very important for Vietnamese people. More people order the half size and full size closets and nice benches/couches for the “living room”.

AI.5.5 The context

There are no shocks of influence on the carpentry business direct, but indirect yes, the governmental policy is the result of a natural disaster. Too many people cut down too many trees, which caused weathering. When the government saw what the weathering meant for the country they developed the new laws and policies.

AI.5.6 PIP-box

The biggest problem of all carpenters is the wood, the government has this new law to protect the forests of Vietnam. It is not allowed any more to cut just any tree from the forest. Most carpenters do not exactly know how, why and what that law is, some of them thought the government just used it for something else. The wood sellers I interviewed in Van Hoa and Chieng Mung could give more information about this. The heavy rainfall makes it important that the mountains keep their trees otherwise all the soil will be washed away. In the past people just randomly cut the trees from the forest and the mountains lost a lot of soil. Nowadays the government put a few households near the forest in charge of planting and keeping the trees. This law was established just a few years ago (the actual date differs in each area according to the respondents, from 1999-2003) and they are still growing the trees now. This caused a shortage of wood for carpentry and other things. This results in an increased wood price, the price is more than double at the moment compared to 5 years ago. This is of influence on the carpenters, they often cannot afford to buy wood to make products. The deposit of the buyers is often not enough to finance the wood, so they have to borrow from others to pay for the wood. If the buyer then waits a long time with paying –because there are no strict rules about this- it could cost the carpenter a fortune.

Some people (2) in Son La started a new system as a solution to the wood problem. The buyer of the furniture supplies the wood himself, and the carpenter does whatever necessary with it. This way the carpenter does not have to borrow money. Others –in Van Hoa and Thanh Thuy- try to get wood from the commune, from peoples back yards or illegally.

The context here is also of great influence; appearance and security is very important to Vietnamese people the trend is that more and more people order nice furniture. As soon as people have “enough” money they want their house to be in order, they will invest in a brick house and in furniture.

Enterprises do have to register with the government, but most of the small carpenters did not register with the reason “it is only a small shop”. They do not see any advantages of registration and they feel not obligated to register. This could have as a consequence that if governmental people come for surveillance they will be closed down (this chance is really small).

AI.6 Rice Milling and grinding

Fifty rice milling and/or husking enterprises are interviewed. Although they themselves do not see this as an enterprise, it is “just work”. Rice milling/husking always goes together with corn/cassava grinding, so in the rest of this analyses when talking about this enterprise it also includes corn/cassava grinding.

People from all communes were interviewed. Generators on diesel have been in the communes for a long time. Before the Doi Moi (open door policy of the government) they worked in cooperation’s of the government, and they also had a cooperation that did the rice milling for the commune. After 1986, the Doi Moi, there were a few people that lived to far away from a rice mill and had to do it by hand, and especially in the really remote areas. This was mainly in Son La, nine of the enterprises mention that they did do it by hand before, of which 6 enterprises were from Son La province.



Picture 6 An entrepreneur grinding corn - Van Hoa

AI.6.1 Electricity

The respondents can be divided into three groups, case 1 the long existing enterprises (over all) that used a generator before and are now using an electric machine (25), Case 2 are the 16 enterprises that started after the accessed electricity (the newest enterprises), and Case 3 are the 9 enterprises that still use diesel machines.

A bit more than 5% of the entrepreneurs waited with changing from diesel to electric machines, they had a working machine, or they could not find a buyer for the machines, so there was no money and no reason to buy an electric machine.

A huge advantage of working with electricity instead of a generator with diesel is the fact that you can work whenever you want. You only have to turn on the switch and the machine does the rest. When working with the generator they saved all the work and did it at one moment during the day.

AI.6.2 Gender

The rice milling business is something that is done by whole families, often including children that still live at home. The person that is at home when the customer comes will handle the job. This did change due to the electricity intervention. Before –with generators– the women had difficulties with working alone because they could not (easily) turn on the generator. Some women say they had to stop people on the street and ask them if they could help them. One lady’s husband said she was very strong and was able to turn it on herself. It was the husband who used to stay home to work on the machines in the afternoon, now it can be all family members, it is just a switch that has to be turned on or off.

AI.6.3 Livelihood (changes)

H As said in the general analyses not many people have any form of education after secondary or high school. For a rice milling, grinding and husking business you do

not need any form of education. All respondents have a agricultural activity next to the rice milling machine, most of them are farmers for rice and corn/cassava themselves or have a rice (paddy) business or corn/cassava selling business. Nobody lives only of the income of the machine.

The generator plays a major role when discussing the influences of electricity on the enterprises that do rice milling and husking. The advantages and disadvantages of the generator are discussed in an earlier paragraph and will not be repeated here.

None of the businesses have employees but they do make use of the whole family. A big advantage of the electric machines is that the children and women can also use it. There is no strength required any more in the process.

The living situation did change because of the electric machines. Before they only worked in the morning or in the afternoon on the machines. So they only had to turn it on once a day. Nowadays normally one person stays at home so they can help customers any time a day. This way the person that stays home can also open a shop or have more animals. They do work harder than before. It also has positive influence on their income. It is equally man and women that stay home, they even change this, it often depends on the work necessary on the land. If strength is required on the land the wife will stay home.

T The work with the electrical machines goes quicker; you can do both phases at once. First you take the husk of the rice and than you take the bran out. With the generator you can only do the first phase, take the husk of and the second phase still has to be done by hand (picture 9). The quality of the rice is not as good as the quality of electrical husked and milled rice.



Picture 7 Phase 1, 2 and 3 of rice processing

F There is no link between the increasing/decreasing numbers of customers and the fact if people borrow money from the bank to change to electricity. It is verified that people in Thanh Thuy borrow more often money than people in Son La. This is without a doubt because there is a rural development bank in Trung Nghia which is relatively easy to access for all inhabitants of Yen Mao, Tu Vu and Phuong Mao. While the people from Son La have to go all the way to Son La city to be able to get a loan, and not everybody there is aware of the fact that they can get a loan form the bank in Son La.

The income of the entrepreneurs does not increase much if they change from diesel to electricity. The machines use about as much electricity (in VND) as they do diesel. They do safe a little on the reparation costs. Besides that earlier was mentioned that some entrepreneurs (7) have more customers now than when they had a generator. 20% of the respondents from Case 1 spend the more income partially on the education and development of their children, while only 2 out of the other respondents (8%) give this answer.

For the people that buy a machine in general the financial situation does improve. It is not the extra income they make from the increased number of customers they serve, but because they

can have more animals now. Having a machine means being able to make more food (grinding corn and cassava) and having more bran to feed the animals.

For the people that borrow the whole amount for a machine from the bank, nothing much changed. The extra income they have is in general enough to pay the interest and some extra things for the household (mainly food related) but it is not enough to really save money and pay back the loan.

S Electricity has little impact on the social assets of the entrepreneur, although 3 respondents say that the neighbors used to complain about the noise and smoke. Now they use electricity the relationship with the neighbors is better. The noise decreased, the customers and entrepreneur can talk to each other during the work.

P An additional effect of buying a rice mill, grinding and husking machine is the growing number of animals¹¹. Changing to electricity as an energy source does not have more effect on this growing number than a diesel machine or starting off with electricity. Eleven (44%) Case 1 respondents say their number of animals increased since they started the business (from 5x until 3x as many animals as before) and 11 (44%) Case 2 (50%) and 3 (33%) respondents say the number of animals increased after they bought the machines.

Most (76%) people from case 1 have a brick house, and the soft couches (who are a sign of welfare) are only seen at this group of respondents (3x). The people that are in case 3 live in Thai houses or non brick houses. In case 2 the people live in brick houses but still 31% lives in non brick houses. This implicates that modern energy services, like electric machines for rice milling and grinding, are available for people that already have a more secure livelihood. It also implicates that on the long term a micro enterprise is a good strategy to make your livelihood more sustainable, only 12% of the Case 1 respondents still live in a non-brick house.

N water is mentioned as an important natural factor for the rice milling business, without water there is no rice, corn or cassava to mill. But this is not influenced by the acquired electricity access or by any other thing in the past.

AI.6.4 The context

Only the river that “eats” from the land could influence the milling business, it means less land to grow crops, this influence will be minimal.

The general development of the increased productivity per square meter also increased the rice milling business.

AI.6.5 PIP-box

There are no other policies, laws and other processes and structures are not of any influence on this micro enterprise than the ones already mentioned in the general analysis. The agricultural policies that increased the productivity were of course of major influence.

AI.6.6 Market

There is a big boom of rice milling enterprises in the north of Vietnam. People copy each other, they see other people making money with a rice mill and they want these themselves. People did not buy a generator earlier because of two reasons. The disadvantages of the generator, its inconvenient and hard work, stop people from buying a rice mill on a generator.

¹¹ For example selling 20 pigs will bring in about 10-15 million VND (depends on size and health etcetera). Buying 20 new small pigs will cost you about 5 million VND. The raising period of small pigs is 3-4 months.

Secondly the living standards of the communes were not so good in the past, so they could not afford to buy the generator. Now the electricity eliminates the disadvantages of a generator and the people's living standards (financial situation) improved more and more people buy the machines. This is a disadvantage for many people. 14 people (56%) from the Case 1 complain about the decrease of customers and 3 of the respondents from Case 3 complain about this. The respondents from Case 2 all agree that the number of customers stayed the same (two exceptions).

The trend and development of the productivity per square meter influenced the rice milling business as well, there are more crops and more kg of crops that have to be milled, so there was more demand, more market. Still this market is only within the commune.

Seven respondents from Case 1 (28%) say that the number of customers increased, the prices are cheaper with machines on electricity so people change from the diesel machines to these new machines. The prices for milling and husking 10kg rice with electricity is between 500 VND and 1200 VND, the average is 700 VND. This is on average about 100 VND cheaper than with diesel. For corn and cassava the prices are higher. It takes more energy, 10kg of corn/cassava costs between 1000 VND and 2000 VND with an average of 1500 VND for diesel, with electricity this price drops to 1000 on average but sometimes even less.

The people say that this boom, and the electricity had a positive influence on the livelihood of the whole commune. People do not have to wait for hours or days anymore before their rice or corn/cassava is done. Besides that it is cheaper, so they save time and money for other things.

AI.7 Ice (cream)

In this case there are no changes because these ME came into existence after the electricity was available in the commune. This case is used to focus on the influence of the livelihood before the ME came into existence on the ME. When talking about change, the situation before the ME was started is compared with the situation after the ME started.

Eight ice (cream) enterprises are visited in 4 different communes in 1 district. All ice (cream) enterprises came into existence after the household accessed electricity, it is not possible at all to make ice (cream) without electricity access. Before some households did buy ice in different communes to sell it in their own commune. There are 2 kinds of ice, ice cream that is water ice with different flavours and "normal" ice to keep fish fresh or to put in your drink.



They all got the idea of making ice (cream) from other communes with electricity. All "ice entrepreneurs" are people that use to travel outside their commune because of work or family. So they gained more information than others that only stay in the commune.

AI.7.1 Electricity

Electricity is necessary if you want to produce ice, all enterprises do have access to electricity. Some people even bought the machine (2) before the electricity came, they knew electricity was coming and they wanted to use it

Picture 8 An ice cream maker - Yen Mao

from the start, they knew it could give them a lot of profit.

AI.7.2 Gender

Five respondents were male, 2 were both man and wife. All respondents did say that both the husband as the wife was working on the machines. Especially when talking about normal ice making. Ice cream is a difficult skill, and in 3 families only the husband did acquire these skills and the wife was working on the land.

AI.7.3 Livelihood (changes)

H: When looking at the human assets of ice (cream) making I discovered that making ice cream requires high skills. Otherwise the ice cream will be tasteless. The ice cream prices therefore differ a lot from each other, between 100 and 1000 VND. The one respondent that was visible less fortunate than the others (mud small house, second hand furniture) taught himself these skills, the others that make ice cream learned these skills from a friend and one man hired somebody from Hanoi to teach him these skills.



Picture 9 an ice making machine

All the ice (cream) makers have this as a second or third job, although it is the main source of income in the summer. The ice (cream) machines are seen as an extra job and extra income. They were doing other jobs before which they have not stopped doing. They keep on working in agriculture (3x), shops (2x) or their restaurant (1x). This causes that the number of hours they work increased a lot after buying the ice cream machines. Making normal ice does not require that much effort, you put water in the machine and 3 hours later it is ready. The ice cream making requires somebody at the machine the whole time. The ice cream is often made in the evening and during the night. It depends on the harvest or the other jobs and on the power cuts. Some of the ice cream makers say they work full time on the machine, almost 24 hours a day during the season.

F & The income increased enormously for all producers since they started to make ice.

T: The profit is between 1 - 1,5 million VND. Costs were the same for all producers, in the season, obviously the summer are the costs 1 million VND.

The man who taught himself the skills had no profit in the first year of his production, he was still learning (and his second hand machine broke down and had to be repaired).

Buying an ice (cream) machine depends on what the machine can do, machines that are made for “normal” ice are cheaper, about 5 million VN, than ice cream machines. Ice cream machines are between 10 - 12 million VND. As said before some people bought the machine (2) before the electricity came.

P, N & S These did not change at all, number of friends did not change; most customers are children. There is no union or group for ice makers, like the FA. The relationship with neighbors is also unaltered. The land, biodiversity and environmental resources are not influenced by this business and are not of influence on this business. The ice makers are all in their first or second

year (besides in Trung Nghia) of ice making, nothing much changed yet for their physical assets.

AI.7.4 PIP box

None of the entrepreneurs, or the PC or the other respondents acknowledged any influence from any of the processes, policies and structures. Half of them are registered with the government for their business; the other half does it as a side job (especially making “normal ice”) and just started so sees no reason to register with the government.

AI.7.5 The context

The context is of influence, because of the seasonality the ice making is only done 6 to 7 months a year. The income is in that period enormously, but in the other 6 – 5 months there will be no income out of ice making at all.

AI.7.6 Market

They only serve a local market, in the village and some shops around (for whom this seller is the nearest by). In Trung Nghia they were the first to have electricity and the people there used to have a bigger market, they used to sell also in Tu Vu, Yen Mao and Phuong Mao. Since these communes have got electricity as well, this market is served by their own people. The Trung Nghia producers did create their own market by going to other villages and promoting their ice (cream) and searching for customers. One producer had 2 machines, he sold one to somebody in Yen Mao, there were not enough customers.

Appendix J The Checklist

Basic information	
1.	Name Respondent
2.	Age Respondent
3.	Gender Respondent
4.	Position of respondent in enterprise
5.	Name owner/manager ME (if not the same)
6.	Age owner/manager ME
7.	Gender owner/manager ME
8.	Date/year ME started
9.	Main enterprise activity/activities
10.	How did enterprise start? (when, who, why? which products?)
11.	What kind of village is it?
12.	Is the ME registered as a business?
13.	Is the ME registered for production electricity (for the ME's that have access to electricity) or only household electricity).
Energy supply	
14.	Modern energy access since (date/year) (LPG, Diesel, Electricity, renewable energy)
15.	Which energy sources are available for the ME? (Wood, residues, electricity, paraffin) And what do you use regularly?
16.	How did the ME get the energy service and what did it cost? Accessibility (only for rich people?) (government, private company, installation costs, extra costs)
17.	Energy supply, where does it come from (wood from the forest? Diesel from the city?)
18.	What are the energy related problems of the ME (Power cuts, money etc.)
19.	Which energy consuming appliances does the enterprise have currently and what source does it use?
20.	What appliances did the ME buy since they accessed modern energy services? Why did they buy these appliances?
21.	How much do they use the appliances, how much energy do they use, Any changes over the years? In the weekends? Seasonal? Why? (number of hours per day, or liters diesel etc)
22.	Energy costs per energy source or appliances per unit (year/seasonal/month/week)
23.	Why did they want modern energy services in the first place? Was this fulfilled?
24.	What do they want to change (energy related) for the future?
Technology (only for producing enterprises)	
25.	What is the development in terms of machines? (Number of machines, energy source, when was it bought, why was it bought, for which product, machine type/brand, usage)
26.	What is the development in use of technology/process? (Production technologies and processes used, did it change, when adopted)
27.	Are other enterprises using same machines- if so before or after this enterprise
28.	Did the quality of the production line change over time? Why (not)?
29.	Did the diversity of products produced by the enterprise change over time? What products are produced currently? When did new products came into existence and why?
30.	Did the quantity of the products produced on the production line change over time? Why (not)?
Employees description and development (Situation before/after the access to modern energy)	
31.	Did anything change after the ME accessed modern energy services concerning

	employees? Why and how?
32.	Number of employees and gender employees (now and in the past) Is this seasonably dependent? How many part time?
33.	Number of family members working at ME (now and in the past)
34.	Knowledge/skills of employees, education level, courses in the past (energy related?)
35.	Stress for employees, hours of work per day, risks, salaries (based on production/goods sold or hours worked?)
36.	Knowledge/skills of manager/owner, education level, courses in the past (energy related?)
37.	Stress of manager/owner Number of employees, quality employees, financial pressure
38.	What is the development of the sales over time? (More products, Different products, more/less stock, different brands).
39.	What is the development of customers over time? (number of customers, gender, age, buying more/less products, buying products elsewhere)
40.	If there were any changes in sales or customers, why did these things change?
41.	Did anything change within the purchases the enterprise does (half products/building materials). Why and how much did this cost/save?
	Market
42.	Can you give me a description of market situation (where are you selling, how far away, number of markets served) and the (possible) market changes you had in the past, why did anything change?
43.	How many competitors are there on this market(s), is this in- or decreasing?
44.	Are there any other markets you could enter, why did you not enter (yet)?
45.	Did the market opportunities increased since you accessed modern enterprise services. If yes in what way?
46.	Are there any changes noticeable in the relationship between the ME and its competitors (envy, Cooperation/collaboration)
47.	Did the number of competitors change over the years (energy related, seasonal, financial reasons?)
48.	Is there a change in social contact between neighbour shops?
49.	If customers do not by their product from this enterprise, what is most likely that they would by it from? Do some customers go already elsewhere for this product(s)? Why?
	Finances / Money
50.	Is there a development of the financial situation of the ME? (Sales, profit, salaries, costs)
	Rest
51.	Are there any governmental or NGO programs that influence the ME?
52.	Are there any laws or policies that restrain the ME in working
53.	Any other changes that they can think of since they accessed modern energy services (windows, furniture etcetera)
54.	Indicators of enterprise formal/informal status (legal position, office, own site, condition of buildings/equipment)
55.	Are there any natural aspects useful for the enterprise? Like water (power/irrigation), wood, wildlife etcetera.
56.	Did the electricity change the access to the natural aspects mentioned in the previous question?
57.	Are there any changes noticeable in the relationship between the ME and its neighbours (envy, cooperation/collaboration, arguments)
58.	Main problems in enterprise Vulnerability/risks
59.	Future prospects (opportunities)

Observations:

Interior, Outside (house front), Condition of machines, Cleanness, Clothes workers, Decoration

Soon the Checklist became like this:

Topic	Questions
General	House Education Date started Reason started Products Legal Status Hours of work (before/after)
Machines	How many What Brand Production process
Energy	Choices How much energy they use (kg/liter/kWh) Where did they get it Who financed Season
Employees	Full time Hours of work More jobs/farmer? Education
Sales	How many products Increased benefits Customers Half products
Governmental/NGO	Laws Projects Policies
Market	# of competitors Market (local, national, international)
Financial changes	
Other changes	Building Health
What is living standards?	
Main problems	
Future	
Observations	Furniture (1/2 closet, full closet, prayer table, couch (soft, hard, chair) House (brick/mud) Clean Other