



COPYRIGHT AND USE OF THIS THESIS

This thesis must be used in accordance with the provisions of the Copyright Act 1968.

Reproduction of material protected by copyright may be an infringement of copyright and copyright owners may be entitled to take legal action against persons who infringe their copyright.

Section 51 (2) of the Copyright Act permits an authorized officer of a university library or archives to provide a copy (by communication or otherwise) of an unpublished thesis kept in the library or archives, to a person who satisfies the authorized officer that he or she requires the reproduction for the purposes of research or study.

The Copyright Act grants the creator of a work a number of moral rights, specifically the right of attribution, the right against false attribution and the right of integrity.

You may infringe the author's moral rights if you:

- fail to acknowledge the author of this thesis if you quote sections from the work
- attribute this thesis to another author
- subject this thesis to derogatory treatment which may prejudice the author's reputation

For further information contact the University's Director of Copyright Services

sydney.edu.au/copyright

**Private Investment in the Resources Sector and the Poverty-
Environment Nexus (PEN) in Laos**

Oulavanh Keovilignavong

A thesis submitted in fulfilment of the requirements for the degree of
Doctor of Philosophy

School of Geosciences
Faculty of Science
University of Sydney
2013

To my father, Khansaly Keoviliyavong

Abstract

Poverty-environment discourse first emerged in the 1980s when developing countries' environmental problems first gained world attention. Latterly, the discourse has been referred to as the poverty-environment nexus (PEN). But, the discourse surrounding PEN had its roots in much older debate. Today, in the 21st century, the majority of the developing countries' rural poor rely on natural resources for their survival. But, changes in their resources, either through natural disasters, private investment (often in the form of mining, energy or plantation projects), or their own exploitative activities, are leading to environmental degradation which, by extension, can force the rural poor into even deeper poverty. Many studies have shown that rapid increase in private investment exploits natural resources. Resultant income diversification to non- agricultural practices may result in either harmful or beneficial environmental impacts.

In Laos, private investment has, in some cases, contributed to a degree of poverty reduction and some local livelihood improvement. In others, local villagers, especially the rural poor, have become victims of private investment. This thesis seeks to determine the relationships between investment, resources, poverty and PEN. Particular focus is upon both the negative impacts (the vicious circle) and the positive impacts (the virtuous circle) of PEN.

The thesis makes a methodological contribution through its design and application of a multi-scale research approach. Private investment shows a mixed pattern and uneven distribution. A Geographically Weighted Regression (GWR) technique predicts that additional investment could either reduce or increase poverty and deforestation rates in different regions. The livelihood asset pentagons employed suggested that private investment contributes to poverty reduction and local livelihood improvements. But, local resources continue to be exploited by both the local villagers and the investors. Semi-structured interviews undertaken with local authorities reveal that they recognise both the positive and negative impacts of investment on local resources and livelihoods. But, in the course of their investment management, they confront many challenges and limitations. Due to the volume of investment, and to their low management and decision-making skills, they encounter difficulty resolving these issues. Few among them recognise the relationship between the investment impacts and the complex issues of PEN.

In policy terms, the findings suggest the importance of considering issues related to PEN when formulating investment policy for sustainable development. The study strongly suggests that a more practical and realistic decentralised approach is needed to ensure that in countries like Laos, private investment supports economic growth and poverty reduction. Investment should be appropriate to local conditions so that investments may be effectively managed and issues related to PEN optimised.

Acknowledgements

First of all, I would like to express my deep thanks to my supervisor, Professor Philip Hirsch, for his encouragement and support and the guidelines he demonstrated with endless patience from the beginning to the end of my thesis. Without his critical comments, I would not have been able to shape the ideas of my research topic and complete it on time. I would also like to thank Dr. Peter Messerli, the Director of CDE¹, who helped me to develop my ideas regarding my research topic and for the kind support he offered before I commenced my PhD study; also, Dr. Estelle Dryland, Macquarie University, for her keen editing and proofreading of my thesis. This PhD thesis would not have been possible without the full financial support provided by the Australian Agency for International Development (AusAID); thus, I would like to express my sincere gratitude to the government and people of Australia for providing educational opportunities to me and to other Laotians.

I have undertaken my thesis at the School of Geosciences, the University of Sydney, where I have gained new dynamic knowledge, skills and ways of thinking from many academic people at this school. Among them, I sincerely want to thank the Mekong Research Group (AMRC) team, Dr Yayoi Lagerqvist, Dr Robert Fisher and Natalia Scurrah for their valued encouragement, and my many academic friends including Paula Brown, Nathaniel Butterworth, Phalla Chem, Olivia Dun, Kim Sean Somatra, Nguyen Tuong Huy, Surin Onprom, Rafiuddin Palinrunji, Lada Phadungkiati, Soimart Rungmanee, Ken Serey Rotha, Mattijs Smits, Worawan Sukraroeak, Tubtim Tubtim, Nathan Wales, Liping Yan and Zoe Wang for their dynamic discussions and their sharing of knowledge through various seminars and presentations. Special thanks to Trina Isorena for her kind help in creating maps using ArcGIS software, and to the School staff, Sue Taylor, Nikki Montenegro and Jessica McLean for the administrative assistance they so readily offered when I needed it.

My thesis employed three different levels of data sources. I am deeply grateful to all of the organisations and people who contributed their information and time during the course of my data collection. At the central level, I want to sincerely thank the Ministry of Education for issuing an official letter of authorisation for my fieldwork, also the Ministry of Planning and Investment, the Ministry of Agriculture and Forestry, the Ministry of Industry and Commerce, the Ministry of Energy and Mining, the Lao National Tourism Administration and the National Land Management Authority for providing secondary investment data. At the local

¹ Centre for Development and Environment, University of Bern, Switzerland.

level, special thanks to all of my interviewees from Pek, Houayxay and Bachiang districts and from Xieng Khouang, Bokeo and Champasack provinces for sharing with me their experiences of investment management. More importantly, I am deeply indebted to the people in the six villages of Ban Khou, Ban Nonghen, Ban Hoa, Ban Nadi, Ban Latgnong and Ban Houaysang for their hospitality, time and active participation during my in-depth household interviews.

I would like to thank my parents, sisters, relatives and cousins for their enduring encouragement and their unfailing support for my life and study. Last but not least, I would like thank my wife, Sengmala Bounnasouk, my son, Ketsana and my daughter, Phetjinda Keovilignavong, who frequently give me warm love, encouragement and support, especially when I am at my weakest.

My sincere thanks to all of the people who contributed to my thesis whom I may have not mentioned here. Thank you all.

Table of Contents

Abstract.....	i
Acknowledgements	ii
Table of Contents	iv
List of Figures.....	vi
List of Tables.....	viii
Acronyms	ix
Provincial and administration division map in 2007 of Laos.....	x
Chapter 1: Introduction to the thesis	1
1.1 Introduction to Chapter 1	1
1.2 Background of Laos.....	1
1.3 Poverty issues in Laos	3
1.4 Natural resource issues in Laos	6
1.5 Poverty-environment nexus (PEN) in Laos	8
1.6 Private investment in Laos.....	11
1.7 Research problem	15
1.8 Research objectives and questions.....	17
1.9 Research methodological overview.....	18
1.10 Research framework and thesis outline	18
1.11 Summary of Chapter 1	21
Chapter 2: Building a livelihoods approach to studying the poverty-environment nexus	23
2.1 Introduction and key points	23
2.2 Poverty and sustainable rural livelihood concepts.....	23
2.3 Environment and natural resources for livelihoods	31
2.4 Poverty-environment nexus (PEN) and its issues.....	39
2.5 Private sector, privatisation and investment	46
2.6 Rethinking PEN and private investment.....	56
2.7 Summary of Chapter 2.....	62
Chapter 3: Poverty, environment and private investment studies in Laos	64
3.1 Introduction to Chapter 3.....	64
3.2 Poverty and rural livelihoods in Laos	65
3.3 Resource utilisation, protection and degradation in Laos.....	75
3.4 Studies of poverty-environment nexus (PEN) in Laos	79
3.5 Private investment management and expectations in Laos	84
3.6 Poverty-environmental initiative (PEI) in Laos.....	97
3.7 Summary of Chapter 3	99
Chapter 4: Research Methodology	101
4.1 Introduction to Chapter 4.....	101
4.2 Research questions and approaches.....	101
4.3 Methods for investment patterns and overlaying maps	105
4.4 Methods for spatial regression analysis	110
4.5 Methods for investment assessment on local impacts	115

4.6 Methods for assessment of private investment management	121
4.7 Summary of Chapter 4	124
Chapter 5: Spatial pattern analysis and overlaying maps	126
5.1 Introduction to Chapter 5	126
5.2 Foreign direct investment patterns in Laos.....	126
5.3 Data refinement	129
5.4 Patterns of private companies in the resource sector.....	130
5.5 Distributional maps of private investment in the resource sector.....	137
5.6 Overlaying maps and their spatial relationships.....	142
5.7 Summary of Chapter 5.....	152
Chapter 6: Spatial regression analysis	153
6.1 Introduction to Chapter 6.....	153
6.2 Spatial regression analysis and its models.....	153
6.3 Estimation of Model 1 with OLS and GWR	157
6.4 Estimation of Model 2 with OLS and GWR	163
6.5 Estimated spatial relationships in the PIPEN model	167
6.6 Summary of Chapter 6.....	170
Chapter 7: Assessment of investment impact on local livelihoods and resource usage.....	173
7.1. Introduction to Chapter 7	173
7.2. Review of research methods applied in this chapter	174
7.3. Phu He mining site.....	178
7.4. Nam Kho sand mining site	208
7.5. Summary of Chapter 7.....	230
Chapter 8: Private investment management	232
8.1 Introduction to Chapter 8.....	232
8.2 Reviewing the research method.....	233
8.3 Investment background of provinces and districts	235
8.4 Investment management explored through semi-structured interviews	243
8.5 Summary of Chapter 8.....	254
Chapter 9: Conclusion	263
9.1 Review of research problems and methods	263
9.2 Summary of the main findings	265
9.3 Contributions and implications of the findings	266
9.4 Considerations arising from the research	270
9.5 Research limitations.....	271
9.6 Recommendations for future research	273
9.7 Thesis conclusion.....	274
Bibliography	276

List of Figures

Figure 1. 1: Incidence and Density Poverty Maps in 2005	5
Figure 1. 2: Foreign Direct Investment by Sectors from 2001 to 2009.....	13
Figure 1. 3: Research analytical framework.....	19
Figure 2. 1: UNDP Basic Poverty Definitions	26
Figure 2. 2: IDS’s Sustainable Rural Livelihood Framework.....	28
Figure 2. 3: DFID’s Sustainable Rural Livelihood Framework	30
Figure 2. 4: Simple vicious circle of PEN	40
Figure 2. 5: Relationship of Private Investment and PEN (PIPEN).....	62
Figure 3. 1: Map of 72 districts identified as poor by DoS, MPI.....	71
Figure 3. 2: Maps of incidence of poverty at the provincial and district levels	72
Figure 3. 3: Map of inequality measured by Gini coefficient	72
Figure 3. 4: Map of village level vulnerability to food insecurity.....	74
Figure 3. 5: Poverty-environment linkage of PEI.....	97
Figure 4. 1: NCCR meso-level approach.....	104
Figure 4. 2: Analytical procedure diagram for spatial data analysis	114
Figure 5. 1: Approved FDI and its trend between 2000-10 in Laos	127
Figure 5. 2: Approved and real FDI inflow, Laos, 2000-2009	128
Figure 5. 3: Percentage share of FDI by sectors, 2001-2009	129
Figure 5. 4: Top ten countries’ investment in resource sector and in total FDI	133
Figure 5. 5: Domestic and foreign investment in Laos, 2000-09	134
Figure 5. 6: Map of agriculture and forestry	137
Figure 5. 7: Map of wood industry	137
Figure 5. 8: Map of industry and handicrafts	138
Figure 5. 9: Map of mining and land excavation.....	138
Figure 5. 10: Map of trading in resources	140
Figure 5. 11: Map of tourism and recreation.....	140
Figure 5. 12: Map of hydropower and renewable energy sector	140
Figure 5. 13: Map of total number of private investment at the district level.....	140
Figure 5. 14: Map of total private investment in graduated colours and dot form.....	143
Figure 5. 15: Map of NCCR poverty incidence.....	143
Figure 5. 16: Map of investment promotion zoning in Laos	144
Figure 5. 17: Map of deforestation between 2000 and 2005	145
Figure 5. 18: Overlaying poverty map to deforestation	147
Figure 5. 19: Overlaying poverty map to investment map.....	147
Figure 5. 20: Overlaying investment map to deforestation map	148
Figure 5. 21: Overlaying poverty, investment and deforestation	149

Figure 5. 22: Overlaying investment to promotion zone, poverty and deforestation maps ...	150
Figure 6. 1: Spatial autocorrelation report on OLS residuals in Model 1	158
Figure 6. 2: Map of GWR standardised residuals in model 1	160
Figure 6. 3: Spatial autocorrelation report on GWR residuals in model 1	160
Figure 6. 4: GWR coefficient maps in Model 1	161
Figure 6. 5: Spatial autocorrelation report on OLS residuals in model 2.....	164
Figure 6. 6: Map of GWR standardised residuals in Model 2.....	165
Figure 6. 7: Spatial autocorrelation report on GWR residuals in Model 2.....	166
Figure 6. 8: GWR coefficient maps in Model 2	166
Figure 6. 9: Comparison between investment coefficient maps from Models 1 and 2.....	168
Figure 6. 10: Deforestation and poverty coefficients maps from Models 1 and 2	169
Figure 6. 11: Main results from OLS tool on Model 1.....	172
Figure 6. 12: Main results from OLS tool on Model 2.....	172
Figure 7. 1: Two sites studied and six villages in Pek district, Xieng Khuang.....	175
Figure 7. 2: Map of Phu He site, Pek district	178
Figure 7. 3: Maps of Phu Bia exploration licence and Phonsavan copper project.....	179
Figure 7. 4: Household poverty patterns before and after investment in Ban Khou	182
Figure 7. 5: Household poverty patterns before and after 2005 in Ban Nonghen.....	184
Figure 7. 6: Household poverty patterns before and after 2005 in Ban Hoa.....	185
Figure 7. 7: Asset pentagons of three villages at the Phu He site before 2005	194
Figure 7. 8: Asset pentagons of three villages in Phu He before and after 2005	195
Figure 7. 9: Asset pentagons at Phu He before and after 2005	195
Figure 7. 10: Resource sufficiency and access constraints at Phu He.....	197
Figure 7. 11: Map of Nam Kho site, Pek district.....	208
Figure 7. 12: Household poverty patterns before and after investment in Ban Nadi	210
Figure 7. 13: Household poverty patterns before and after 2005 in Ban Latngon	211
Figure 7. 14: Household poverty patterns before and after 2005 in Ban Houaysang.....	213
Figure 7. 15: Asset pentagons in three villages along Nam Kho before 2005	217
Figure 7. 16: Asset pentagons in three villages along Nam Kho after 2005	218
Figure 7. 17: Asset pentagons in Nam Kho before and after 2005	219
Figure 7. 18: Resource sufficiency and access constraints in Nam Kho.....	220
Figure 8. 1: Map of three districts and provinces	234

List of Tables

Table 5. 1: Number of investment companies in the resource sector, 2000-09	131
Table 5. 2: Home investment country in resource sector, 2000-09.....	133
Table 5. 3: District investment among poor districts and investment promotion zones	136
Table 5. 4: Observed frequency of poverty and deforestation	147
Table 5. 5: Observed frequency of poverty by investment.....	148
Table 5. 6: Observed frequency of investment by deforestation.....	149
Table 5. 7: Correlation matrix among three variables	149
Table 6. 1: Statistical dispersion of investment, poverty and deforestation	157
Table 6. 2: Estimated results from OLS tool on Model 1.....	158
Table 6. 3: Statistical results from GWR tool on model 1	159
Table 6. 4: Estimated results from OLS tool on Model 2.....	163
Table 6. 5: Statistical results from GWR tool in Model 2.....	164
Table 7. 1: Percentages of households accessing sources of human capital in Phu He	187
Table 7. 2: Percentages of households accessing financial capital in Phu He.....	189
Table 7. 3: Percentages of households accessing physical capital in Phu He	190
Table 7. 4: Percentages of households accessing social capital in Phu He	191
Table 7. 5: Percentages of households accessing natural capital at Phu He.....	192
Table 7. 6: Sample calculation of natural capital in Ban Hoa before 2005.....	193
Table 7. 7: Phu He households identifying impacts of PBM	198
Table 7. 8: Percentage of households in ranking environmental indicators in Phu He.....	200
Table 7. 9: Percentage of households blaming local actors in Phu He.....	201
Table 7. 10: Percentages of households accessing human capital in Nam Kho.....	214
Table 7. 11: Percentages of households accessing financial capital in Nam Kho.....	214
Table 7. 12: Percentages of households accessing physical capital in Nam Kho	215
Table 7. 13: Percentages of households accessing social capital in Nam Kho	216
Table 7. 14: Percentages of households accessing natural capital in Nam Kho.....	216
Table 7. 15: Nam Kho households experiencing impacts of sand mining	221
Table 7. 16: Percentages of households ranking environmental indicators in Nam Kho.....	223
Table 7. 17: Percentages of blame on local actors in Nam Kho.....	224
Table 8. 1: Characteristics of the three selected administrations	234
Table 8. 2: Involvement in approval and decision-making	256
Table 8. 3: Recognition of main problems or conflict in investment management.....	257
Table 8. 4: Positive contributions observed by investment authorities	258
Table 8. 5: Negative impacts observed by investment authorities	259
Table 8. 6: Main affiliating organisations with investment management authorities	260
Table 8. 7: Key solutions to negative impacts and investment associated problems	261
Table 8. 8: Understanding key issues of PIPEN and additional comments	262

Acronyms

CPMI	Committee for Promotion and Management of Investment
EKC	Environmental Kuznets Curve
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GoL	Government of Laos
GWR	Geographically Weighted Regression
Laos	Lao's People Democratic Republic
LECS	Lao Expenditure and Consumption Survey
LPRP	Lao People's Revolutionary Party
NEM	New Economic Mechanism
NGPES	National Growth and Poverty Eradication Strategy
NTFPs	Non-Timber Forest Products
OLS	Ordinary Least Square
PEN	Poverty-Environment Nexus
PIPEN	Private Investment and Poverty-Environment Nexus
PPA	Participatory Poverty Assessment
PSD	Private Sector Development
SL	Sustainable Livelihood
SLA	Sustainable Livelihood Approach
UXO	Unexploded Ordnance

Provincial and administration division map in 2007 of Laos

A.2
 ການແບ່ງເຂດການປົກຄອງ
 Administrative divisions



Source: Extracted from Messerli et al. (2008)

Chapter 1: Introduction to the thesis

1.1 Introduction to Chapter 1

The Lao People's Democratic Republic (Lao PDR, hereafter Laos) is a small, poor country in Southeast Asia rich in natural resources. Laos has been confronted with widespread poverty and increasing environmental degradation over the last decades. The Government of Laos (GoL) utilises these natural resources for poverty reduction through the promotion of private investment. It may be foreseen that such utilisation could face many challenges, such as rural poverty issues, local environmental degradation and uncertain investment impacts.

Before I commenced this research, I was aware of earlier studies of linkages between poverty and the environment; however, there was a paucity of studies of interaction between private investment and these linkages, both in Laos and elsewhere. To this end, this study intends to build a better understanding of the complex issues surrounding private investment in the resource sector that supports the achievement of sustainable development in Laos. In particular, it will examine the implications of private investment for poverty reduction and environmental sustainability in relation to linkages of poverty and environmental resources in Laos.

This chapter, which constitutes the introduction to the whole research, starts by providing a background of Laos, and specifying details of the country's current economic and socio-political issues. I then outline the research objectives and questions, the research approaches and the methodology employed. Details of the research framework and the outline are provided in the last part of the chapter.

1.2 Background of Laos

Laos, a small landlocked country in the Southeast Asia mainland, has a total area of approximately 236,800 km², a population totalling approximately 6 million in 2005, and low population density. It shares borders with Thailand to the West, Cambodia to the South, Vietnam to the East, and China and Myanmar to the North and Northwest, respectively. Its overall topography features markedly rugged mountains in the North and along the Vietnamese border, several plateaus in the Central and Southern areas, and alluvial plains from the Central to the Southern areas along the Mekong Valley.

Laos has a long history of warfare. In the 17th and 18th centuries, when it was known as the Kingdom of Lan Xang, Laos entered into armed conflict with its neighbouring kingdoms, subsequently struggling with colonial territorial disputes. In the late 18th century, the Siamese (Thai) ruled many parts of the Kingdom of Lan Xang. During this period, France colonised Vietnam, then replaced the Siamese, and then began to integrate all of the Laos under French colonial administration. In the 19th century, the Franco-Siamese treaty defined the current boundary between Laos and Thailand as a consequence of which Laos became known as the Kingdom of Laos. It entered into new, long war periods, e.g., World Wars 1 and 2 (1914-18, 1939-45), and the Indo-china and Vietnam wars. During the second Indochina war (1954 to 1975), civil war raged between the neutralists allied with the communists who had the support of the Soviet Union, and the rightists who received support from the United States. As a consequence of the civil war, Laos was subjected to almost unprecedented heavy bombing by the United States from the end of the 1960s to the early 1970s. Today, unexploded ordnance (UXO) devices, particularly cluster bombs, remain a major threat to the people of Laos (World Bank, 2006b). In 1975, the Lao People's Revolutionary Party (LPRP, the former Communist People's Party) took control and renamed the country the Lao People's Democratic Republic on 2 December 1975.

After taking power in 1975, the new government of Laos (GoL) imposed socialist policies and central economic decision-making following Marxist-Leninist principles. Under its newly-introduced socialist policies, the government took control of most of the country's economic activities, which became known collectively as state-owned enterprises (SOEs). But, in the early 1980s, the GoL realised that the population's living standards were not improving under the centralised economic policies. Thus, in 1986, it took major steps to reform the country from a central planning economy to a market-oriented economy by announcing the New Economic Mechanism (NEM) (Bourdet, 2002).

After the failure of the socialist regime, in the late 1980s the GoL implemented several policies towards a market economy, among which one of the core implemented policies focused on private sector development (PSD). The first foreign investment codes and legislations were passed in 1988 (UNESCAP, 2005, p. 6; World Bank, 2007, p. 23). This was the first time that private investors and enterprises were allowed to participate in the national economic development after the revolution of 1975; it saw many SOEs privatised, merged or transformed into joint ventures with either domestic or foreign (or both) private investors (Signasith, 1997). In 2004, the GoL's national growth and poverty eradication strategy

stressed PSD as an approach to promoting economic growth, reducing poverty, and maintaining a sound environment (Government of Laos, 2004c). As a result, from the early 1990s on, many economic measures were implemented to promote the private sector in the Lao economy (World Bank, 2007).

1.3 Poverty issues in Laos

Despite undertaking economic reform in 1986, Laos still remains one of the poorest countries in Southeast Asia (Rigg, 2006; World Bank, 2008) with an estimated per capita income of approximately US\$630 in 2007, and with approximately 73.2% of the people surviving on less than US\$2 per day (Sopathilath, 2006; World Bank, 2006a, 2006b, 2008). Since 1971,² the United Nations has included Laos in the list of Least Developed Countries (LDC) based upon its low income, limited human resources and economic vulnerability (UNDP, 2007, p. 1). In the 2006 UNDP report on the Human Development Index (HDI), Laos was ranked 133 out of 177 countries, slightly moving to the Middle Human Development level (Shaw, Cosbey, Baumuller, Callander & Sylavong, 2007, p. 6).

Since the early 2000s, the GoL has put poverty reduction at the top of its socio-economic development agenda. In 2001, it officially defined poverty as “the lack of ability to fulfil basic human needs, such as not having enough food [i.e., less than 2,100 calories per day/capita], lack of adequate clothing, not having permanent housing, not capable of meeting expenses for health care, not capable of meeting educational expenses for one’s self and other family members, and lack of access to transport routes” (Government of Laos, 2004c, p. 20). The official poverty line measurements, which were based on the above definition, were derived to assess poverty in Laos. In 2003, the GoL publicly identified 25 poor districts and 47 poorest districts in the country. Together, these 72 poor districts consisted of 4,126 villages with 160,592 households. In 2008, the World Bank found that the poverty rate had declined but was still high. For example, the World Bank (2008, p. 5) highlighted that, by using the national poverty line, it declined from 45% in 1992/93 to 39% in 1997/98 and to 33% in 2002/03; but, based on \$1.25 a day 2005 purchasing power parity (PPP) of the World Bank terms, the poverty rate declined from 59% in 1992/93 to 49% in 1997/98 and to 44% in 2002/03.

However, based on the official poverty definition, and from a geographic perspective, poverty in Laos still remains high and spatially uneven in both the rural and urban areas. For example,

² For more details, see http://www.un.org/en/development/desa/policy/cdp/ldc/profile/country_103.shtml

the left hand map in Figure 1.1, which shows the incidence of poverty³ and the poor areas in Laos in 2005, suggests that the high poverty areas are in the mountainous parts of the South and along the border with Vietnam, with the low poverty urbanised areas in and around the large towns and provincial capitals along the Mekong River (Messerli et al., 2008). Rural people in the high poverty areas tend to live below the poverty line. They have limited access to electricity and clean drinking water. The rates of illiteracy and malnourishment among children are also extremely high. Furthermore, many women have to work hard to support their families. Rural poor also face a variety of health problems, and especially there are high incidences of women dying during and after childbirth because hospitals are either not available or located some distance away. Within the same definition, the right hand map in Figure 1.1 shows an inverse picture of the density of poverty⁴ or the absolute number of poor. This map suggests that many of the poor are likely to be found in the urban areas, provincial capitals, and along the Mekong valley where the population density is relatively high (Messerli et al., 2008). It also suggests incidence of high rural-urban migration. Urban dwellers who live below the poverty line face urban environmental problems and environmental degradation such as waste, water contamination and air pollution (World Bank, 2006a, 2006b). They are frequently found living in insanitary and poorly drained areas; they rent rather than own their houses and have limited access to medical, educational and other government services. They may be unemployed or working in low paid jobs.

The GoL aims to eliminate poverty in Laos; but, there are many issues inhibiting this task. Bourdet (2002) and St John (2006) claim that poverty reduction in Laos will be difficult because the GoL has a high budget deficit; as well, the country lacks both human and financial capital. The former LPRP Chairman, Khamtay Siphandone, speaking to the Seventh Congress on the subject of the Five-Year economic plan for 2001-05, claimed that: “Domestic factors played a crucial role in the macroeconomic and financial instability that hit the country in the late 1990s. Shortage of skilled personnel, an expensive monetary policy, and corruption among the officials were the problems” (see Bourdet, 2002, p. 110).

To date, some studies have identified the real causes of poverty in Laos. For example, Andersson, Engvall and Kokke (2006), who examined the determinants of income and poverty in Laos employing an econometric model, found poor households were characterised by large household size, large dependency ratio, low levels of human capital, simple

³ The incidence of poverty is defined as ‘a percentage of the population living below the poverty line.’(see Messerli et al., 2008)

⁴ Density of poverty is defined as ‘the number of poor people living in a given area’(see Messerli et al., 2008).

technology, limited access to agricultural input, unfavourable localisation characteristics, limited access to essential infrastructure, limited access to health services, lack of access to certain types of factors of production and surrounding environmental factors⁵. Agricultural technology and infrastructure were the main causes of poverty (2006, p. 36).

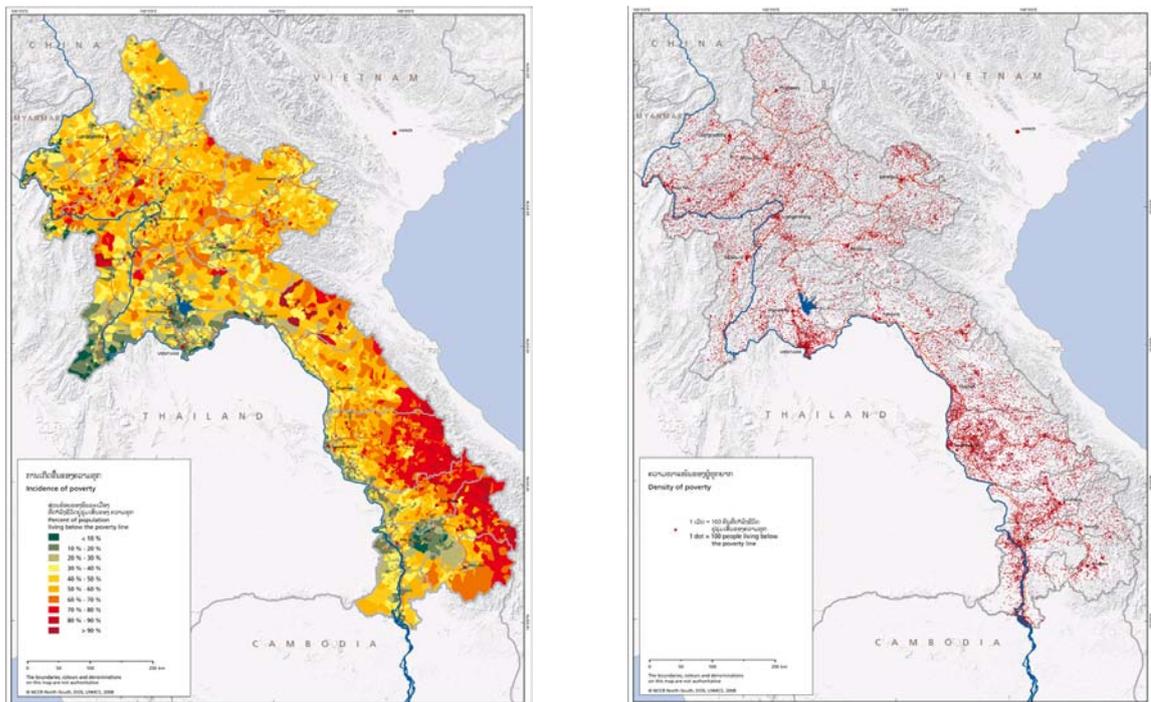


Figure 1.1: Incidence and Density Poverty Maps in 2005

Source: Extracted from Messerli et al. (2008)

Drawing upon the Participatory Poverty Assessment (PPA) undertaken in Laos in 2000 and 2006, Chamberlain (2007) identifies similar causes of the poverty endured by the sample villagers during both periods. In these PPAs, the causes of poverty were related to agricultural factors, such as insufficient land for cultivation, lack of livestock, lack of investment money, natural disasters, inaccessible cultivation and forest land. Chamberlain (2007) argues that the real causes of poverty may have resulted from externalities and development policies that the villagers have been unable to control, such as land forest allocation⁶, village consolidation, opium eradication, eradication of swidden agriculture programs, geographical areas and market access limitations. Overall, these findings suggest a need to further investigate the causes of poverty using different methods and at as many different levels as possible because

⁵ In their study, these environmental factors are intended to capture the effects of infrastructure on household income earning capability, including access to dry season roads, access to all season roads, electricity access and health service access

⁶ This is known as *mob din mob paa* in Lao, a government policy to stop environmental degradation by controlling the expansion of shifting cultivation, particularly in the upland areas. This policy was designed to bring clear and secure property rights that will help to improve the productive use of land in the rural areas (see Fujita & Phanvilay, 2008)

poverty in Laos is particularly complex to study and understand. Recently, some scholars have claimed that Laos' development is threatened by a chain of degradation stretching from deforestation to soil erosion and related down-stream impacts (Lestrelin, 2010, p. 426). These environmental resource issues in Laos will be explored in the next section.

1.4 Natural resource issues in Laos

Laos, which is considered one of the most resource-rich countries in Southeast Asia (Shaw et al., 2007; World Bank, 2006a), has a wealth of various natural resources and endowments that vary geographically. The World Bank (2006a) estimated that forest areas in Laos covered approximately 41.5% of the country in 2004.

Biodiversity areas in Laos are relatively large in Southeast Asian terms with 20 National Protected Areas (NPA) covering 3.3 million hectares or 14% of the country; or, if the Provincial and District Protection areas are included, the figure increases to 5.3 million hectares or 22.6% of the country (World Bank, 2006a). Water sources in Laos are plentiful both at the surface and underground. Rainfall is estimated at approximately 434 billion cubic meters per year with renewable water resources of 190 billion cubes per year (World Bank, 2006a). In addition, Laos has many mineral resources; e.g., copper, gold, iron, coal, oil, tin, gypsum, zinc and salt in many sites in the country. Among these resource sectors, mining industries have recently become major exporters, boosting the Lao economy (World Bank, 2010). Thus, the mining sector will play an important role in the future growth of Laos (UNEP/EAP-AP, 2002). While agriculture is the main economic source, a productive agricultural land in Laos is quite limited, covering only approximately 1.9 million hectares or 8% of the country (World Bank, 2006a).

In Laos, the country's natural resources have played a crucial role in supporting the national economy and local livelihoods. At the national level, prior to 2004, timber and hydropower were the country's main exports, accounting for approximately 70% of foreign exchange earnings (Morris, Hicks, Ingles & Ketphanh, 2004). However, after 2005, the largest proportion of export earnings came from the mining sector, accounting for approximately 45% of total exports in 2009 (Government of Laos, 2011, p. 23). In addition, approximately 80% of the population is engaged in the agricultural areas and directly dependent upon these natural resource bases; and, approximately 300,000 households practise swidden cultivation in the rural areas (Morris et al., 2004, pp. 11-12). At the local level, these resources are important to the rural poor for many reasons. They collect various NTFPs, such as pine resin,

cardamom, rattan, bamboo and yang-tree oil and sell them for their incomes (Morris et al., 2004; UNEP/EAP-AP, 2002). Other NTFPs, such as , forest tubers, bamboo shoots, mushrooms, a range of forest plants, fish, turtles and snails are also collected for the villagers daily food supplies (Morris et al., 2004). In many rural communities in Laos, the forest is a source of medical supplies: wild plants and herbs are collected and made into traditional medicines (Emerton, 2005; Morris et al., 2004).

While these natural resources have many important roles, recently they have come under increasing threat. For example, since the late 1990s, many studies have found increasing environmental degradation in Laos. In 1998, the United Nations Environment Program (UNEP), which identified extensive deforestation and land degradation in Northern Laos, claimed that shifting cultivation was the main cause of land degradation (Giri, Pradhan, Ofren & Kratzschmar, 1998). Similarly, the ADB (2000) reported a number of environmental problems in Laos, mainly related to deforestation. These problems have variously resulted from the commercial exploitation of forests, plans for additional hydro-electric facilities, foreign demands for wild animals, the gathering of non-timber forest products (NTFPs) for food and traditional medicines, and a growing population, all of which have combined to exert increasing pressure on the country's forest resources (ADB, 2000, p. 10). In addition, the ADB also emphasised that the rate of deforestation has accelerated due to unsustainable management of population growth, slash-and-burn (swidden) cultivation and overexploitation of forest products (ibid, 2000, p. 11).

The UNEP (2002) and the World Bank (2006a) reported many factors pertinent to natural resource degradation in Laos. According to their reports, soil erosion has resulted from a high degree of slope in many land areas, shortened fallow periods, diminishing land productivity and high demand for land. Slash and burn cultivation has resulted in the loss of forest land; in addition, the forest mosaic in Laos has suffered high losses as a result of forest degradation and deforestation (Messerli & Heinemann, 2007). Increasing population growth, migration and settlement have impacted upon the protected areas and local biodiversity; as well, expanding agricultural land, illegal hunting, illegal logging and uncontrolled burning have exacerbated the degradation of the lands (Lestrelin, 2010; UNEP/EAP-AP, 2002). But, environmental problems are not peculiar to the rural areas alone. The urban environment as well is subject to pressure on several fronts; e.g., low water supply, problems with drainage and sewage systems, solid waste management, roads and transportation, and cultural

conservation, all of which have contributed to increasing urban air and water pollution (World Bank, 2006a).

Drawing from the above studies, many are likely to suggest that the real causes of resource degradation are attributable to environmental mismanagement; for example, forest resources being sacrificed in the interests of local livelihoods and the national economy. Reductions in the forest areas are considered not only to be due to slash and burn agriculture, but to uncontrolled forest fires and commercial as well as illicit logging. However, some studies have nominated causes other than environmental mismanagement. For example, Chamberlain (2007), arguing that poverty is the key factor of resource degradation in Laos, claims that the country's resources are dwindling due to overexploitation by the poor as they search for food and for cash with which to purchase food and meet expenses associated with health, education and the market (Chamberlain, 2007, p. 75). Hirsch (2000), who has observed forest loss in Laos since the 1960s, attributes its depletion to bombing during wartime, and the implementation of policies to clear the forests for rice self-sufficiency, and logging revenue for provincial budgets. Nevertheless, most of the above studies suggest regarding environmental degradation in Laos that various factors have contributed to the problem. Among the above studies, resource degradation is almost invariably linked with poverty.

1.5 Poverty-environment nexus (PEN) in Laos

The utilisation of natural resources to reduce poverty is closely linked to the concept of poverty-environment nexus (PEN), a concept often expressed in terms of close relationships and/or linkages between poverty and the environment (Chowdhury & Ahmed, 2008; Dasgupta, Deichmann, Meisner & Wheeler, 2003; Jehan & Umana, 2003; Mabogunje, 2002). PEN can occur under a variety of circumstances. For example, poverty reduction activities can have positive impacts on environmental conservation and/or the expansion of environmental resources culminating in positive benefit for poverty reduction; but, such cases are quite rare.

Conversely, many studies of developing countries claim that poverty tends to lead people to degrade environmental resources; in turn, resource degradation forces the poor into deeper poverty (Jehan & Umana, 2003). In some cases, environmental hazards and natural disasters can reduce people to poverty (Mabogunje, 2002). When there are no obvious solutions, such negative relationships become known as "vicious circles" or "downward spirals" (Chowdhury & Ahmed, 2008; Jehan & Umana, 2003; Mabogunje, 2002; Reardon & Vosti, 1995; Scherr,

2000). The issues surrounding PEN are viewed as a wide set of relationships between the rural poor and the environmental natural resources upon which they depend. Where PEN exists, joint solutions on poverty reduction and environmental protection are considered to be highly cost-effective policy options (Dasgupta et al., 2003; World Bank, 2006b). This negative poverty environmental nexus was brought to widespread public attention with the release of the 1987 Brundtland Report (see Brundtland, 1987).

In Laos, PEN – related issues seem difficult to identify and address due to the fact that poverty in Laos has multiple causes including environmental degradation and this degradation has many causes, including poverty. One main interest of this study is to examine more closely where these two have intersected through PEN. For this purpose, in this study I narrow down PEN in terms of any significant interactions between poverty and environmental degradation or between the poor and local resources degradation in particular areas. PEN occurs only where their correlations or interactions are highly significant.

Since the late 1990s, there has been increasing concern over the existence of PEN in Laos. The National Environment Strategy 2003-2020 objective is set to “sustainably utilise natural resources and protect and conserve the environment to ensure the sustainable development of the country while reducing poverty and enhancing the quality of life and health of the Lao people” (Government of Laos, 2006, p. 119). Obviously, this environmental strategy was employed to prevent the emergence of PEN. However, it could prove problematic because, in reality, it may be difficult to reduce poverty without sacrificing resources and practices that have led to the degradation that has been observed in the country. For example, some studies have found that forest areas and some natural resources in Laos have been exploited in unsustainable ways (Hirsch, 2000; Messerli & Heinemann, 2007). In addition, the urban areas, i.e., the provincial capitals along the Mekong valley wherein most of the poor live, along with some rural areas with a high poverty rate in the Northern region, were found to be the most degraded in a study of landscape mosaics and land degradation of vegetative cover in Laos (Messerli, Heinemann & Epprecht, 2009). Rigg (2006), in his rural livelihood transformation study, claims that environmental degradation, government policies and evolving market relations have put pressure on local livelihoods in many of the upland poor areas of Laos. According to the above studies, environmental resources have been degraded in many of the country’s poor regions; thus, attention to PEN–related issues is urgently needed.

The linkages between environmental conservation and poverty reduction have been intensively studied in Laos, mainly by the IUCN.⁷ For example, in 1996, the IUCN conducted a case study of NTFPs management in the poor village of Nam Pheng in Oudomxay province (see Morris & Ketphanh, 2002). The study revealed that Nam Pheng village achieved poverty reduction, food security, child mortality decline, increasing school enrolment and high savings through good management augmented by the collection of bitter bamboo, cardamom and other NTFPs. The Nam Pheng study showed that better local environmental management can play a significant role in reducing poverty and sustaining local livelihoods. Between 2001 and 2003, the IUCN conducted studies of the Nam Et and Phou Loei (NEPL) protected areas located in the north-east of Laos (see Emerton, 2005). In these studies, Emerton quantified the economic value of forest products used by the local poor for income, food, medicine, fodder, house construction and handicrafts, and found its value to be more than \$US1.12 million per year or an average of \$US313 per household per year. These real values differed based on location; e.g., US\$500, US\$270 and US\$160 per household per year for those living inside, along the boundaries and outside of the protected areas, respectively (Emerton, 2005, p. 4). These biodiversity values also directly contributed approximately US\$650 million per year to the national economy, including forest products, wildlife, aquatic resources and agro-biodiversity (ibid, p. 7). Despite the fact that this was not discussed in terms of PEN, the IUCN studies confirmed strong biodiversity-poverty linkages at both the household and national levels.

Some significant studies have been undertaken on PEN in Laos, supported by the World Bank. The first PEN study, which was conducted by Dasgupta et al., (2003), empirically examined PEN in both Cambodia and Laos using geo-referenced indicator mapping and regression analysis with data on absolute poverty and the following five environmental indicators: deforestation, soil erosion, indoor air pollution, water contraindication and outdoor air pollution. After finding strong connections of poverty with five indicators in the lowest and the highest income provinces in Laos, they concluded that PEN existed particularly in the country's north- and north-eastern regions (Dasgupta et al., 2003). Later, this PEN study was restudied to include Vietnam as well; but, their findings on Laos remained the same as before (see Dasgupta, Deichmann, Meisner & Wheeler, 2005). However, the findings of both studies were criticised by the World Bank (2006b), which claimed that the correlations in the regression did not effectively imply the causality.

⁷ International Union for Conservation of Nation (IUCN)

During the second PEN study in 2006, the World Bank supported the National Agriculture and Forest Research Institution (NAFRI) and the Ministry of Agriculture and Forestry's (MAF) qualitative investigation of the roles of NTFPs in poverty reduction (see Sophathilath, 2006). The NAFRI and the MAF, which jointly conducted the study, selected four villages from two of the poorest upland districts, Na Mor and Phouvong, and 20 sample households from each village for interviews. In the course of the study, the NAFRI and the MAF mainly found that the poorer households with a higher extent of upland rice areas gained more benefit from the NTFPs than others; but, these benefits appeared to decrease along with the decline of NTFPs as a result of poor NTFP management, shifting cultivation, increasing market pressure and forest fires (Sophathilath, 2006, pp. 37-38).

Later, the findings from the first and second PEN studies were included in a comprehensive PEN report produced by the World Bank. In this report, the World Bank (2006b) enhanced its study by further including additional environmental issues pertaining to natural resources management and environmental health risks. In the report study, the four poorest rural and upland districts were selected for field surveys, and survey data from provincial to household levels were incorporated as a means of analysing the linkage between poverty and the selected environmental issues. In this report, the World Bank quantified the magnitudes into high, medium and low ranking. It found that the magnitudes of PEN differed significantly among the environmental issues in Laos. For example, PEN had high magnitude with NTFPs, other forestry resources, road access, UXOs, urban and rural water supply and sanitation, medium magnitude with pesticides, and low magnitude with natural disasters, fisheries and urban pollution (see Figure 5.1, World Bank, 2006b, p. 178).

Based on the IUCN and the World Bank studies, and admitting to the limitations of data, information and suggestions for further studies, their findings may be sufficient to claim significant linkages between poverty and environment and the existence of PEN in Laos.

1.6 Private investment in Laos

After the sixth Party Congress in 1996, the GoL committed to pursuing their long-term development objective of removing the country from the list of LDCs by 2020. To achieve this goal, the GoL targeted achieving an annual economic growth rate of 7% over the next decade along with high levels of investment and savings for sustainable growth. This required total investment of 26 to 28% of GDP, estimating investment of 10 to 11% by the public and

16 to 17% by the private sector (Government of Laos, 2004c, p. 45). For this reason, the GoL had to give strong support to the private sector (Government of Laos, 2004c, p. 140).

To achieve these targets, the GoL set up a comprehensive strategic framework known as the National Growth and Poverty Eradication Strategy (NGPES) in an attempt to enhance national growth, development and poverty reduction. Within the NGPES, the GoL prioritised the private sector for country development, describing the roles of private investment as follows:

The private sector, trade and domestic and foreign direct investment (FDI) are expected to be prime factors in driving the economy and every effort must be made to ensure a positive business environment for them... Increased foreign investment in the Lao PDR will contribute to technology transfer and management expertise, as well as export growth; the procedures and incentives for FDI are being given priority attention. Policies and measures to encourage small and medium-sized enterprises particularly adapted to the Lao PDR are also given high priority...(Government of Laos, 2004c, p. 5).

Similarly, the Sixth National Socio-Economic Development Plan 2006-2010 emphasised the importance of private sector investment as follows:

...to make the private sector an increasingly important driving force for accelerating economic growth, generating high-paying jobs, and reducing poverty. Increased private investment will provide new income generating opportunities including many new jobs during the next five years. Private sector investment will also play a pivotal role in increasing the competitiveness of the Lao economy in regional and international markets during the period (Government of Laos, 2006, p. 124).

Private investment in Laos has increased in the resource sectors. According to the investment statistics for the period 2001 to 2009, reported by the IPD⁸ (2010), FDI was classified into thirteen sectors based on their approved values. As shown in Figure 1.2, electricity generation and the mining sectors proved the most attractive to FDI, receiving 34% and 26%, respectively. The service sector attained only 12% during 2001 and 2009. The agricultural and forestry sectors, as the national economic base, achieved only 10% of FDI followed by the industry and handicraft sectors at 8%. The remainder attained less than 3% of the total approved FDI. Figure 1.2 shows that private investment in Laos since 2000 has largely concentrated upon the natural resource sectors. It also reflects the GoL's policy to encourage private investment in the resource sectors. According to the investment promotion rules and laws (see Government of Laos, 1994b, 2004a, 2004b, 2005; 2009; IPD, 2008, p. 2), when

⁸ Investment Promotion Department (IDP), under Ministry of Planning and Investment (MPI).

investors invest in promoted activities⁹ such as the production of exports, agriculture and forestry activities, processing agriculture, forestry and handicrafts, and/or the promotion of zones in poor and mountainous areas, they are entitled to benefit from certain investment incentives, e.g., exemptions from profit tax, minimum tax measures, exemptions from customs duty and import tax, and reductions in the importation of raw materials. These benefits or incentives granted by the government may be seen as the main reasons behind the rapid increase in private investment in the resource sector in Laos.

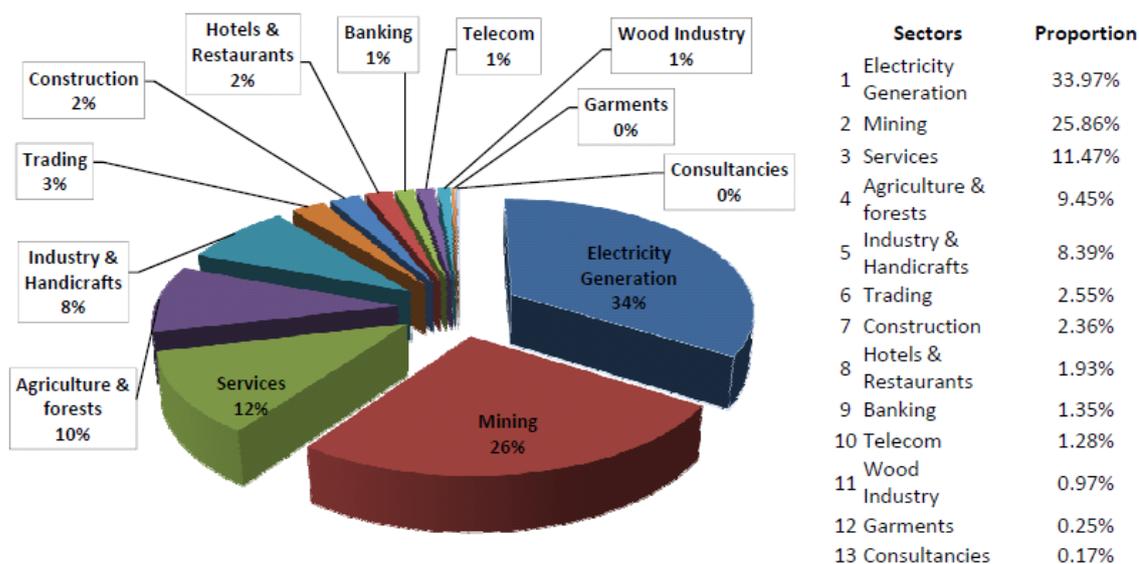


Figure 1. 2: Foreign Direct Investment by Sectors from 2001 to 2009
 Source: Extracted from Report of Planning Strategy and Service Division, (IPD, 2010)

In general, the rapid increase in private investment in the resource sectors has had both positive and negative social and environmental effects in Laos. Because the country lacks financial, human and physical capital, private investment in the resource sectors could positively contribute to development in Laos in many ways. First, it could improve its financial capital and transfer the technology and skills that would facilitate the accessing and extracting of more value added national income from the natural resources. For example, investment in mining exploration, hydropower dams or agricultural processing factories would require both huge capital investment and new advanced technology. Private investors could provide these needs. Second, private investment could prove more capable than the government in converting natural resources into products for domestic consumption and export, and maintaining high productivity. In this view, private investors could improve the quality and quantity of Lao products in both domestic and global market competition. Within

⁹ A list of the promoted investment activities is attached as an Appendix to the Prime Minister's Decree Number 300/PM and 301/PM (see Government of Laos, 2005).

this high productivity and competitiveness, the efficiency of the manufacturers and the factories would be ensured, and wealth would be generated through employment, income generation and local economic stimulation. In turn, these activities would induce increasing tax income for government revenues for pro-poor development. Finally, and most importantly, the high profits generated by private investment would be sufficient to reinvest in or improve the natural resources sectors in order to maintain resource productivity, enhance the local livelihoods, and, most importantly, to prevent the further degrading of resources. In this way, private investment has a significant role to play in Lao development and the potential to reduce PEN-related problems.

On the other hand, private investment in the resource sectors may pose many risks for Laos. First, it is impossible to ensure that it will always be a positive for sustainable development. The Director General of the Agriculture and Forestry Department¹⁰ stated at the annual meeting on 7-9 October 2009 that many development projects, such as hydro-electric dams, mining, ecotourism, rural development and industrial tree plantations have used forest resources and forested areas as potential sources for sustainable development; but, in reality, they have effectively overused forest resources and forest lands. Hence, doubt surrounds whether resource exploration will reduce poverty and create a sound environment. Second, there are limited legal mechanisms in place to ensure that private investors will fully reinvest in and maintain the natural resources that they have depleted through their investment activities. This is a matter of great concern since the rules and laws in Laos are relatively weak and corruption remains rampant (ADB & World Bank, 2007; Stuart-Fox, 2006). Without legal mechanisms, the vicious circle and problems of PEN will be perpetuated in Laos. Finally: the increase in private investment in the resource sectors has proven detrimental for the poor, who rely on natural resources for their livelihoods and survival. Using resources for private investment means that private companies have to compete with the environmental values and resources upon which the poor are dependent. This concern is strongly related to the physical and emotional losses endured by the poor as a result of private investment. Unlike environmental values, compensation values may be seen as insecure in the long term, particularly for those with poor livelihoods.

The increasing private investment in the resources sector in Laos can, to some degree, raise some crucial questions with respect to PEN. Rapid increase of investment has the potential to

¹⁰ Dr Silavanh Savatvong, the Director General of Agriculture and Forestry Department, reported on KPL on Friday 9 October 2009.

create dilemmas for private investors in the resource sectors because such investment can create both wealth and poverty through environmental degradation or increase competition for the resources upon which the poor depend. More than 80% of the population in Laos is still dependent upon these resources, particularly the rural poor (UNDP, 2007). The government's strategy of using natural resources to eradicate poverty may lead to new issues of environmental sustainability and change in the rural dwellers' livelihoods. As suggested above, these livelihoods obviously link to issues of PEN. Lang and Shoemaker (2006) strongly criticise the ADB's plantation project in Laos, arguing that the project has the potential to increase poverty. The rural communities would be unable to access the forest resources and their common lands, leaving private foreign plantation companies free to expropriate forest land resulting in further impoverishment of the local communities. Lang and Shoemaker warn that handing over resources to private companies could undermine people's livelihoods, deepen poverty and pose a threat to the local environment. Some studies have already revealed how private investment in resources impacts on the national economy and on local resources and livelihoods. For example, Kyophilavong and Toyada (2008), who investigated the effects of foreign capital inflows on the Lao economy using a macroeconomic model, found that while capital inflow in the resource sector stimulated economic growth, it increased domestic prices, appreciated the real exchange rate and triggered a decline in exports. They referred to this phenomenon as 'the Dutch disease' syndrome. As regards the Lao economy, it is possible that the issue of Dutch disease may relate to the further issue of 'resource curse', which refers to a country with an abundance of natural resources experiencing poor economic growth. These two concepts are, however, separate issues (more details in Chapter 2) (see Davis, 1995). Based on the issues discussed above, it is crucial to further investigate the impacts of private investment on the resource sectors and examine its implications for poverty reduction vis-à-vis local livelihoods and environmental resource use in Laos.

1.7 Research problem

The above situation can be condensed into the following research issues. As one of the poorest countries in Southeast Asia, the GoL is working towards removing the country from the list of the world's least-developed countries by 2020. However, many challenging factors have hindered the GoL's efforts to achieve this goal, such as lack of human and financial capital, low technology, high budget deficits, official corruption at the national level, insufficient land for cultivation, lack of livestock, lack of investment money, natural disasters

and lack of access to cultivation and forest land at the local level. In addition, the real causes of poverty are various and associated with uncontrollable externalities such as government strategies, development policies, difficult geographical locations and market access limitations. Laos is one of Southeast Asia's most resource-rich countries. It has large forests and high biodiversity areas, water sources, minerals, and fertile soil for agriculture and forestry activities. These resources, along with timber, hydro-electric power and mining exports, have played significant roles in earning foreign exchange for the national economy, agricultural products for domestic consumption and in providing income, subsistence benefits and food security sources for the rural poor.

Some studies have shown strong linkages between environmental resources and poverty. The former have contributed to poverty reduction at the local level as well as to an increase in national incomes. But, while generating substantial benefit, at the same time environmental resources have been increasingly degraded by soil erosion, loss of forest land and biodiversity, water decline, pollution in rural areas, inadequate drainage and sewage systems, poor solid waste management, air and water pollution, road and transportation problems, and cultural conflict in the urban areas. There are multiple causes of degradation, stemming from different factors, including overexploitation of resources by the poor in search of food and cash for their livelihoods and survival. These are likely to be linked to the issues and vicious circles of PEN.

After conducting three PEN studies in Laos, the World Bank signalled the existence of PEN in Laos. In particular, PEN has strong links with NTFPs, other forestry resources, roads access, UXOs, urban and rural water supplies and sanitation. Based on its findings, the World Bank suggested the urgent formulation of sound policies to address PEN-related issues. In a bid to achieve its goal in 2020, the GoL has continued to promote private investment in Laos in order to achieve 16 to 17% of GDP. While private investment has substantially increased in Laos, focus remains mainly upon the resource sectors, upon which most of the poor in Laos rely for their daily livelihoods. But, such investment tends to deplete the natural resources and impact upon the rural poor in terms of taking their forest and other resources away from them. Thus, in many ways, the GoL's strategy of private investment promotion in the resource sectors risks expansion of PEN-related issues, particularly in rural areas.

When viewing issues such as widespread poverty, increasing resources degradation and uncertain investment impacts, it becomes clear that these problems need to be urgently investigated, addressed and provided with effective solutions. While many studies have

examined the linkage between the private sector and poverty, the private sector and the environment, and poverty and the environment, the interaction between private investment and issues of PEN has not yet been fully explored, neither in Laos nor elsewhere.

1.8 Research objectives and questions

This research aims to investigate the real impact of private investment on resource sectors, poverty reduction and environmental sustainability in Laos. Particular focus is upon the interaction of private investment and PEN-related issues. For this reason, this study considers three aspects of private investment: (1) investment may intervene in the virtuous circle of PEN by lifting the poor out of poverty and reducing their resource destruction for environmental sustainability; (2) while recognising that the poor are dependent upon natural resources and perhaps able to preserve said resources, some forms of private investment, such as mining or plantation companies, will exploit healthy forests and resources, destroy the former, cut off the poor's access to them, or force the poor to burn down trees to make charcoal. In these ways, private investment in the resources sector will inevitably further impoverish the rural poor; and, (3) in some cases, when the poor see affluent private companies destroying their resources, they may start to emulate these private companies' activities. Generally, private investment does well; but, on occasion, the resources sector and the rural poor's livelihoods are badly affected. Hence, it is essential to understand in more depth the intervention of private investment in the context of PEN.

The overall objective of this research is to determine whether, to what extent and in what circumstances intervention by private investment in Laos' resources sector successfully achieves sustainable development. In particular, I seek to examine the implications of private sector investment for poverty reduction and environmental sustainability in relation to PEN in Laos. In order to fulfil this objective, this research will seek to answer in detail the three following questions:

1. What are the patterns of private investment in the resources sector in Laos? And, to what extent are these patterns related to PEN?
2. How does private investment change local livelihoods and resource usage? And, has private investment stimulated PEN at the household level?
3. How has private investment in the resources sector been managed by provincial and district authorities in relation to PEN?

1.9 Research methodological overview

In an attempt to address the research questions from a human geography perspective, this research will be conducted on two levels. The first, the meso-level, involves interaction at the national, provincial and district administrative levels. At the meso-level, the secondary data of private investment companies in the resource sectors in each district will be collated to establish patterns of private investment using a geographic information system (GIS) tool and analysis known as “ArcGIS” software program. At the second level, which is the micro-level, focus will be upon the interaction between the village and household levels. At this level, two investment sites have been selected, and household samples within the sites randomly selected for the interviews. The selected households will be interviewed in depth using questionnaires seeking information about their livelihood changes and local resources use before and after investment. When the household surveys are completed, a qualitative methodology based upon an asset pentagon concept within a sustainable livelihood framework will be applied to analyse any changes and impacts resulting from private investment on local livelihoods and resources use. This information will then be used to explore issues of PEN.

After these level, nine officials either in charge of or engaged in investment management in their areas in three provinces and three districts will be selected to examine their investment management. Representatives of these authorities will be invited to participate in semi-structured interviews focused upon their investment management and issues related to PEN. Each authority will be identified and contacted by official letters from the Ministry of Education prior to his or her interview. The number of offices to be approached for semi-structured interviews will total fifty-four.

1.10 Research framework and thesis outline

The research framework is created from a combination of research questions and methodologies as evident in Figure 1.3. This framework briefly sketches a picture of the overall study, including the levels and analytical methods to be employed during the research study, the methodologies to be applied at each step, the concepts to be employed, and the linkages among said concepts.

The research will commence with analysis at the meso level, including analysis of the spatial patterns, using Ordinary Least Square (OLS), and Geographically Weighted Regression (GWR). Then, a descriptive analysis of livelihood patterns, asset pentagons and local resource

use at the micro level will be conducted. In addition, four concepts at the meso-level, namely, private investment, poverty, environment and their PEN, will be explained in the context of Laos. Concepts at the micro level involving private investment companies, sustainable rural livelihoods, natural resources, and their nexus will be elaborated upon. The arrow lines and the lines in Figure 1.3 indicate the links between these concepts and the degree of their relationships, respectively. This will be followed by qualitative thematic analysis using Matrix Tables based on semi-structured interviews exploring the investment management practices and policies of the fifty-four offices.

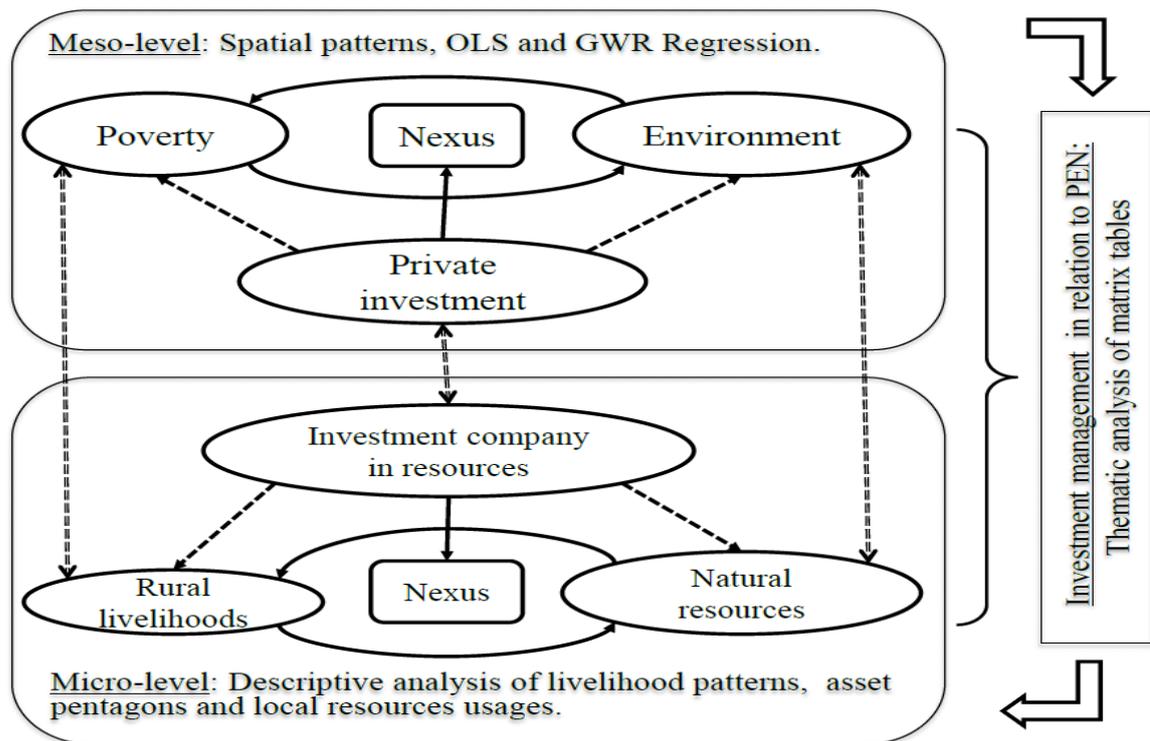


Figure 1. 3: Research analytical framework

Following the research framework and analytical methodologies, this thesis will be organised into nine chapters including this introductory chapter.

Chapter 2 reviews some empirical studies and knowledge pertaining to concepts related to poverty, the environment, private investment at the meso-level, sustainable rural livelihoods, natural resources and foreign private investment at the micro-level. While these concepts are framed in broad terms, Chapter 2 attempts to narrow down their terms to frame the specific issues address in this study. For example, the concepts of poverty and sustainable livelihoods are explored; then, the ways in which the poverty concept is used as a key instrument to create a sustainable rural livelihoods framework are explained.

Chapter 3 reviews the empirical studies addressing the key aspects of Laos; for example, how poverty is linked to the environment and the ways in which the poor have to use local resources and traditional methods to sustain their livelihoods. It also sets out to delineate some of the key factors underpinning the issues of poverty, environment and private investment and related concepts in the context of Laos's development. The gap in the understanding of these issues from empirical and policy perspectives, as a main challenge to the policies and decision-makers, are identified based on the literature review from the GoL's projects, works, papers and reports, and some relevant academic studies in Laos.

Chapter 4 explains the research methodology applied in the three steps setting the framework. In this chapter, a multi-scale research approach is derived and applied to investigate the impacts of private investment on the poverty-environment nexus (PEN) in Laos. In particular, four methods are generated by combining the three research questions with a multi-level approach, which is employed later in Chapters 5, 6, 7 and 8. Throughout this methodology, the relationships between private investment and poverty, private investment and environment, and poverty and environment are revealed.

Chapter 5 reveals patterns and maps of the investments by drawing upon secondary data pertaining to private investment and then examining the above patterns by overlaying them to maps of promotion zoning, poverty incidence and environmental degradation in order to show the spatial relationships between private investment (PI) and the poverty-environment nexus (PEN), or what it is called the PIPEN model, and also to reflect the government investment promotion policy.

Chapter 6 examines the spatial associations or relationships in the PIPEN model, i.e., poverty, deforestation and private investment, using spatial regression analysis and taking into accounts both the spatial dependence and spatial heterogeneity of data. In this Chapter, two models of the PIPEN are generated; and, the procedures using OLS and GWR techniques to run these two models are explored.

Chapter 7 examines the ways in which private investment has changed the local people's livelihoods and resource usage and also the extent to which investment is related to issues of PEN at both the village and household levels in two investment sites. This is achieved by exploring patterns of local poverty, livelihoods and resource usage and then comparing them in two periods before and after investment. To determine causality in the PIPEN model, this

chapter employs the concept of livelihood asset pentagons and narratives of households' experiences.

Chapter 8 investigates the ways in which private investment is managed locally by provincial and district authorities in relation to issues of PEN by examining experiences related to several themes in their daily investment management in the context of PEN. This chapter highlights the investment background of each administration from the local authorities' points of view, employs semi-structured interviews, and applies thematic analysis to evaluate the interview results.

Chapter 9 concludes this thesis by presenting the main findings, contributions and implications of the research. It addresses the limitations of the current study as well as considerations arising from the results and provides recommendations for future research.

1.11 Summary of Chapter 1

Laos, a poor country with a transitional economy, has faced many issues in its development trajectory, including widespread poverty and increasing environmental degradation. Links between the two issues, the vicious circle of PEN, have been found in Laos, signalling that joint solutions are urgently needed to address PEN-related issues. The long term development goal of the GoL is to remove the country from the list of the world's least developed countries by 2020. In a bid to achieve this goal, the GoL has promoted private investment, which has increased but focuses mainly upon the resources sector. Increasing private investment has not only depleted the region's natural resources, but has also impacted upon the rural poor, who rely heavily upon these resources for their livelihoods and survival.

This thesis will examine the implications of private investment for poverty reduction and environmental sustainability in Laos, explore the private investment patterns in the resources sector, and analyse the degrees to which these patterns are related to PEN. At a more detailed level, it will investigate the changes caused by private investment upon local livelihoods and resources use and seek to determine whether private investment is related to PEN at the household level. This study will also examine private investment managed by the provincial and district authorities in relation to PEN.

In the process of analysing these issues, the thesis will employ several methods in order to reach reliable findings, including spatial patterns and regression analysis using OLS and GWR techniques at the meso level. It will further apply analysis of local livelihood patterns and resources use employing the livelihood asset pentagon at the micro level, and thematic

analysis of semi-structured interviews with key actors on investment management issues. By employing the above methods, the thesis aims to provide a better understanding of the interaction between private investment and PEN in Laos. As well, it aims to provide sound, realistic and practical recommendations to other stakeholders who are similarly interested in these issues.

Chapter 2: Building a livelihoods approach to studying the poverty-environment nexus

2.1 Introduction and key points

Chapter 2 aims to review some extant empirical studies and knowledge pertaining to concepts related to the research framework set out in Chapter 1. Included among these concepts are poverty, the environment, the private investment at the meso-level, the sustainable rural livelihoods, natural resources and foreign private investment at the micro-level. Together they will be employed to address issues raised in the three research questions. Since these concepts are framed in broad terms, this chapter attempts to frame the specific issues under this study. Chapter 2, which consists of seven parts, begins by addressing concepts of poverty and sustainable livelihoods and then explains the ways in which the poverty concept is used as a key instrument to create a sustainable rural livelihoods framework. Section 2.3 explores aspects of the environment and natural resources, with a special focus on how these two concepts interact with each other and how natural resources have contributed to rural livelihoods and development in Laos. The linkages between poverty and the environment and their relevance in a development context are described in Section 2.4. Issues concerning the private sector, privatisation and private foreign investment in developing countries are explored in Section 2.5. Section 2.6 provides some reflections on the issues and practical knowledge related to these concepts, and develops some questions for this study. This chapter concludes in Section 2.7.

2.2 Poverty and sustainable rural livelihood concepts

In this section, the focus is upon poverty and its evolution. Since poverty has been conceptualised in various ways and from different perspectives, a clear understanding is crucial to the shaping of this study, especially the links between rural poverty and rural livelihoods. This section starts with a review of the evolution of poverty thinking-related concepts, and of the ways to employ these concepts in the generalising sustainable livelihood approach adopted by rural poverty and livelihood practitioners and many development studies.

2.2.1 Evolution of the poverty concept

Poverty is not a new issue in development concerns. There is evidence of studies dating back well over a hundred years. Kakwani and Silber (2008, p. xiv), citing Charles Booth's "*Life and Labour of the People in London*", state that several surveys of working class life between 1886 and 1903 were undertaken in the 19th century. Seebohm Rowntree's 1901 work titled "*Poverty, A Study of Town Life*" provided a systematic analysis and measurement of poverty. Thus, given the attention it has been afforded over the past three decades (Chowdhury & Ahmed, 2008; Kakwani & Silber, 2008), the concept of poverty has significantly evolved with time (Reed, 2002). I will now briefly present details of the major evolution of the poverty concept in chronological order.

Poverty has been widely defined and refined from various perspectives. Descriptions have ranged from simple descriptions to more complex, multiple dimension perceptions. During the 1960s, poverty was defined in terms of income and/or expenditure, becoming known as income poverty. This simple definition referred to the minimum amount of money required to buy basic needs such as food, clothing and housing (Hagenaars & De Vos, 1988). Poverty was conceptualised in this way because development during the 1960s was understood in terms of economic growth: poverty meant lack of monetary resources (Grima, Horton & Kant, 2003). Another reason is that the consumption of goods and services had gained more favour as a superior poverty indicator (Nunan et al., 2002). During the 1970s, social well-being indicators, including health services, nutrition and shelter, were recognised as crucial for households. During this period, social or so called non-income indicators were incorporated into the concept of poverty. Poverty came to be measured not only in simple dollar terms, but also in terms of the ability of individuals to purchase a basket of goods and services providing required foods and non-food items (Opschoor, 2007; Ravallion, 1996).

Since the early 1980s, Amartya Sen's work has influenced the concept of poverty. Sen (1981) introduced the entitlement concept with its focus on ownership and exchange as a means of ensuring food supplies and other basic needs. Along with other social development scholars, Sen influenced the Human Development Index (HDI)¹¹ of the UNDP. In addition, Sen suggested two further approaches: capability, i.e., what people can or cannot do; and, functioning, which referred to what they are or are not doing (Sen, 1999). Sen's work on material well-being, the entitlement approach, and the opportunities implicit in the capability

¹¹ See Origins of the Human Development Approach, available at <http://hdr.undp.org/en/humandev/origins/>

and functioning approaches culminated in significant modification of the poverty concept (Chowdhury & Ahmed, 2008; Fisher & Hirsch, 2008; Vizard, 2006; Vizard, Fukuda-Parr & Elson, 2011).

In the early 1990s, the concept of poverty became even more comprehensive when many scholars recognised the environmental and political impacts of poverty. Bhatta (2006, p. 73), for example, describes poverty as a lack of access to human, financial and economic, political, physical, natural capitals and security. Similarly, from a human development perspective, Grima et al., (2003) saw poverty as a denial; that is, of present and future generations' lack of opportunity to make social, economic, environmental, cultural and/or political choices. During this time, environmental and political impacts, now recognised as crucial factors influencing sustainable development, were included in the concept of poverty. Mabogunje (2002) claims that globalization, political instability, and regional conflict have been major factors in the deepening of poverty in many developing countries.

Since the 1990s, some studies have conceptualised poverty beyond the environment and politics, adding various factors to the poverty debate. Bhatta (2006), mentioned above, describes poverty in a wide range of circumstances, and associates it with need, hardship, lack of resources to sustain livelihoods, and vulnerability to environmental degradation. Opschoor (2007, p. 6) defines poverty as “a social condition of chronic insecurity resulting from a malfunctioning of economic, ecological, and social systems, and causing groups of people to lose the capacity to adapt and survive and to live beyond minimal levels of their needs and aspiration”. The above quotes suggest that poverty has been defined in a wide range of circumstances associated with need, hardship, resource limitation and vulnerability as well as environmental degradation.

Evolving knowledge of the concept of poverty has allowed many development agencies to generalise their own poverty definitions in their development agendas. For example, in its World Development Report on Attacking Poverty 2001, the World Bank delineates poverty not simply as material deprivation, but also relates it to the broader notions of risk, vulnerability, social inclusion and opportunities (World Bank, 2006b, p. 22). In the joint development report produced by the DFID¹², EC, UNDP and the World Bank (2002, p. 9), poverty is defined as “encompassing both income and non-income dimensions of deprivation-including lack of income and other material means; lack of access to basic social services

¹² The UK Department for International Development (DFID)

such as education, health, and safe water; lack of personal security; and lack of empowerment to participate in the political process and in decisions that influence someone's life.”

In 2000, the UNDP (2000) conceptualised the basic concepts of poverty into two categories, namely income poverty and human poverty (see Figure 2.1). These two definitions, which are distinguished by their means of measurement, have been widely used by many poverty reduction and rural development projects. More recently, many factors considered to be related to the globalisation phenomenon, such as income and social problems, political instability, environmental issues, vulnerability, insecurity and conflict, have been viewed as crucial to the concept of poverty. A combination of these factors has seen poverty as a problem with multiple dimensions or a multifaceted phenomenon (Kakwani & Silber, 2008; Mabogunje, 2002; Opschoor, 2007; Rahman, 2004; Reed, 2002).

Income poverty	Human poverty
<p>Extreme poverty: Lack of income necessary to satisfy basic food needs – usually defined on the basis of minimum calorie requirements. (Often called absolute poverty).</p> <p>Overall poverty is referred to income necessary to satisfy essential non-food needs – such as for clothing, energy and shelter – as well as food needs. (Often called relative poverty.)</p>	<p>Lack of basic human capabilities: illiteracy, malnutrition, abbreviated life span, poor maternal health, illness from preventable diseases. Indirect measures are lack of access to good services and infrastructure – energy, sanitation, education, communication, and drinking water – necessary to sustain basic human capabilities.</p>

Figure 2. 1: UNDP Basic Poverty Definitions
 Source: Extracted from UNDP (2000, p. 20), Box 1.1.

Since the 1960s, the concept of poverty has evolved to a degree that has attracted wide-ranging attention to development, poverty reduction and sustainable development issues. But due to its complex definitions, applying the concept of poverty in reality can prove complicated and challenging, not only for development practitioners, but also for policy decision-makers as well, particularly in their attempt to understand poverty in particular contexts.

In practice, it may be impossible to include all of the abovementioned factors in the complex definitions of poverty given that one can neither observe nor collect all of the data pertaining to poverty indicators, especially in poor, developing countries. Thus, it would be reasonable to select a few or some key poverty indicators only when undertaking working analyses, studies or assessments of rural development projects. In fact, the simple dollar definition of income poverty related to purchasing power can be applied to reveal pictures of poverty in many studies: income poverty has been applied in many poverty debates and practices in developing countries. For example, the World Bank (2008) used a poverty criterion of \$1.25

a day in terms of 2005 purchasing power parity (PPP) to evaluate poverty status in Laos. More importantly, it is useful to listen to the poor because they are the real group experiencing poverty (see Narayan, Patel, Schafft, Rademacher & Koch-Schulte, 2000)¹³. Killeen and Khan (2001) suggest that the poor should play a central role in defining their own poverty models as well as in the planning and implementing of them, a perception closely related to the concept of the sustainable livelihood approach which I explain in the following section.

2.2.2 Sustainable livelihoods approach and rural poverty

The accumulating knowledge of poverty lists many factors that contribute to poverty, factors that can be grouped in terms of lacking various assets, such as financial, human, physical, natural, social and/or political capital. One finds these forms of capital employed as main components of the sustainable livelihood (SL) approach (SLA) in many rural poverty and sustainable livelihood studies. SLA, which is claimed to derive from the modification and evolution of poverty concepts, has been improved upon and practised in various poverty eradication tasks by many development organisations, such as bilateral and multilateral donors, NGOs and research institutions (Brocklesby & Fisher, 2003). This sub-section aims to explain the concept of the SLA, its links to poverty issues and its utilisation as a tool for eradicating poverty.

Many studies regard Chambers and Conway's (1992) concept paper on sustainable rural livelihoods produced for the Institution of Development Studies (IDS) in 1991 as the original concept of SL (see Carney, 1998; Chambers & Conway, 1992; Scoones, 1998). But, some livelihood studies may have been available before that date. Scoones (2009, p. 3) claims that livelihood thought existed more than a half of century ago in a cross-disciplinary form of rural development thinking and practice. In addition, it is argued that notions of SL were discussed in the World Commission on Environment and Development 1987 report on the issues of resource ownership, basic needs and rural livelihood security; but, these studies have proven less popular than those alluded to in the above studies (Brocklesby & Fisher, 2003; Scoones, 1998).

The concept of SL based on Chambers and Conway's (1992) work has been widely accepted and viewed as linked with Sen's concepts of capability, equity and sustainability (Solesbury, 2003). Chambers and Conway define their SL notions as follows:

¹³ One of the World Bank's reports on 'Voice of the Poor'.

A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living; a livelihood is sustainable which 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 short and long-term (Chambers & Conway, 1992, p. 6).

Since the early 1990s, this SL definition has been adapted in many research and development practice. Solesbury (2003) observes that many development agencies, such as Oxfam, CARE International and UNDP, immediately adopted this concept and applied it to their development agendas due to the fact that it was in line with their long-standing commitment to participatory approaches to development, their existing values and beliefs, and their supporting powers in problematic analysis and arguments. In addition, the SL concept presented as a new and rich research issue that attracted international attention to both empirical and theoretical studies (Solesbury, 2003). Building upon discussions conducted in 1997 and modifying the work of Chambers and Conway, in early 1998, the IDS team redefined their SLA as follows:

A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base (Scoones, 1998, p. 5).

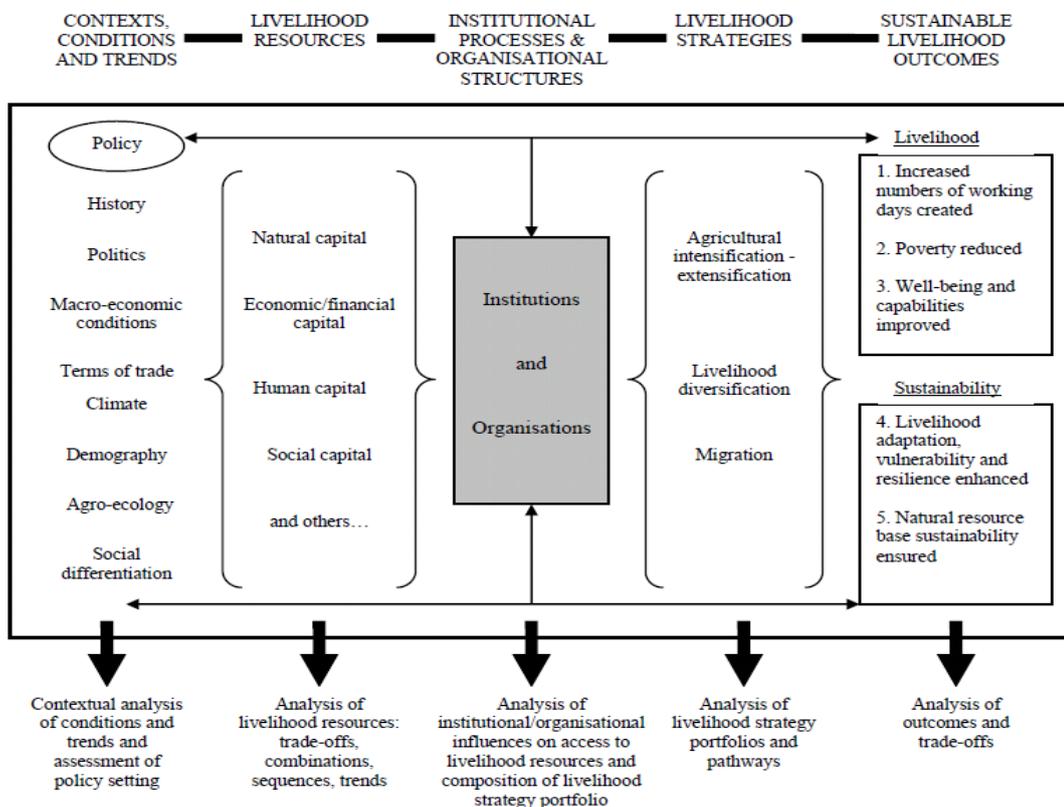


Figure 2. 2: IDS's Sustainable Rural Livelihood Framework

Source: Adapted from Scoones (1998, p. 4), Figure 1.

The IDS's SL definition differed slightly from the last part of Chambers and Conway's requirement to contribute net benefits to other livelihoods at the local and global levels and in the short and long-term so that livelihoods could be considered sustainable. This requirement has been excluded from the IDS's definition (Krantz, 2001). In addition, the IDS created an analytical framework to investigate sustainable rural livelihoods (see Figure 2.2).

According to the IDS's analytical framework of sustainable livelihood, the way to analyse livelihoods is to set key questions in relation to five interacting elements: livelihood contexts; livelihood resources; institutions; livelihood strategies and outcomes. The original key question set by the IDS appears below:

Given a particular *context* (of policy setting, politics, history, agroecology and socio-economic conditions), what combination of *livelihood resources* (different kinds of capital) result in the ability to follow what combination of *livelihood strategies* (agricultural intensification/intensification, livelihood diversification and migration) with what *outcomes*? Of particular interest in this framework are the *institutional processes* (embedded in a matrix of formal and informal institutions and organisations) which mediate the ability to carry out such strategies and achieve (or not) such outcomes. (Scoones, 1998, pp. 3, original emphasis)

In the IDS's SL framework, Scoones defines livelihood resources as "basic materials and social, tangible and intangible assets that people have in their possession, and can be defined as [a] 'capital' base from which different productive streams are derived [and] from which livelihoods are constructed" (1998, p. 7). More importantly, he also offers definitions of four types of livelihood capital with the integration with physical capital, which later was separated out by DFID (see Chapter 4)

- Natural capital – the natural resource stocks (soil, water, air, genetic resources etc.) and environmental services (hydrological cycle, pollution sinks etc) from which resource flows and services useful for livelihoods are derived.
- Economic or financial capital – the capital base (cash, credit/debt, savings, and other economic assets, including basic infrastructure and production equipment and technologies) which are essential for the pursuit of any livelihood strategy.
- Human capital – the skills, knowledge, ability to labour and good health and physical capability important for the successful pursuit of different livelihood strategies.
- Social capital – the social resources (networks, social claims, social relations, affiliations, associations) upon which people draw when pursuing different livelihood strategies requiring coordinated actions (Scoones, 1998, pp. 7-8).

Based on the work of Chambers and Conway (1992) and on the IDS's SL framework (Scoones, 1998), the DFID put considerable effort into refining the latter's framework in order to accommodate its particular concerns and practical objectives for livelihood analysis (Carney, 1998). In mid 1998, a new modified SL of DFID's analytical framework for rural

development was released, which, while sharing some similar features with the IDS framework, was in effect a different version (see Figure 2.3) (Carney, 1998; Solesbury, 2003). The DFID's SLA has been viewed as more closely directed towards the rural poor. Ashley and Carney describe it as 'a way of thinking about the objectives, scope and priorities for development, in order to enhance progress in poverty elimination; [it] also aims to help poor people achieve lasting improvements against the indicators of poverty that they define' (1999, p. 6). Poverty-focused development activities in the core concepts of the DFID's SLA are designed to emphasise people-centred, respective and participatory, multi-level, conducted in partnership, sustainable, and dynamic (Ashley & Carney, 1999; DFID, 1999a).

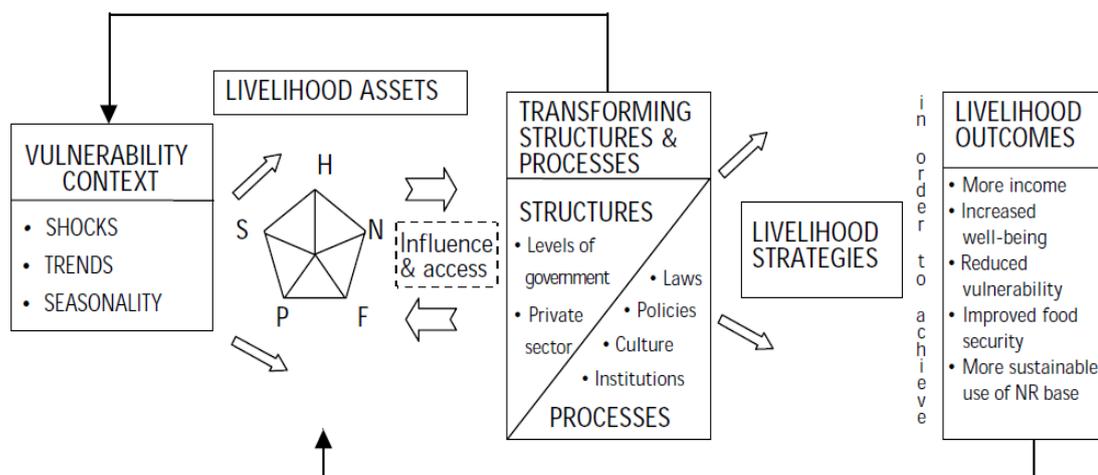


Figure 2. 3: DFID's Sustainable Rural Livelihood Framework
 Source: Adapted from Sustainable Livelihood Guidance Sheets (DFID, 1999a).

Regarding the above framework, it is important to understand the five livelihood components (DFID, 1999b). First, Vulnerability Content suggests that people's livelihoods can be externally affected by shocks, trends, seasonality and other risks. Second, Livelihood Assets are capital needs required to strengthen people's livelihoods. They are presented in a pentagon and consist of human, social, physical, financial and natural capital. This concept of pentagon will be employed as one of the research methods to assess the local impacts of private investment in Chapter 7 of this thesis. Third, Livelihood Transforming Structures and Processes refer to the institutions, organisations, policies and legislation that can shape livelihoods, and underpin their vulnerability context. Fourth, Livelihood Strategies are the choices, opportunities and diversities with which people are confronted when achieving their livelihood goals. Finally, Livelihood Outcomes are the achievements or outputs of livelihood strategies closely linked to the availability of livelihood assets. The DFID's (1999b) SLA

framework has been viewed as a tool to facilitate an understanding of the rural poor by analysing the main factors affecting their livelihoods and relationships among said factors.

Since the late 1990s, many disseminating techniques have been used to promote the implications of the SLA for the DFID in poverty eradication programs. For example, its guidance sheets, training and learning materials are available, have been translated into different languages, and appear in both manuals and on line websites¹⁴. Many regional workshops and conferences have been organised in many places, and distance learning has been set up (see DFID, 1999a, 1999b; Solesbury, 2003). As a result, the DFID's SLA has been adapted to several poverty reduction programs in many developing and poor countries by donor development agencies as well as by research institutions such as NGOs, UNDP, FAO, IFAD, Care International, DFID, SIDA, SDC, Oxfam, the International Institution for sustainable development (IISD), and the Society for International Development (SID) (see Brocklesby & Fisher, 2003; Krantz, 2001; Scoones, 2009; Solesbury, 2003). This current study will also apply this SLA to examine changes in rural livelihoods in Laos related to issues in investment sites. More details will be provided in Chapter 8.

2.3 Environment and natural resources for livelihoods

This section explains the broad concepts of environment and natural resources, their interaction, and the role of natural resources in rural development. The environment terms will be reshaped in the context of natural resources to meet the research questions and framework of this thesis. I will start by reviewing the development of the environment definition, describe its interaction with natural resources, and explore the role of resources in the development process.

2.3.1 Expansion of environment definition

The English word “environment” is said to be of French etymology. In French, it translates as ‘around or round about or to surround or to encompass’; in etymological terms, the word ‘environment’ refers to the total of the things or circumstances around an organism – including humans (Young, 1986, p. 86). Young admits to difficulty in assigning a single meaning to the term ‘environment’ due to its broad terms and many interpretations in different contexts (1986). Peasgood and Goodwin (2007, p. 2), in terms of daily life, environment means different things to different people, define environment as “surroundings

¹⁴For details, see <https://cms.eldis.org/index.cfm?objectid=07E1005A-F839-A014-05BB5E06DF19DA36&flushcache=1&showdraft=1#Distance>

and different things that have different surroundings”; as well, they suggest that it is important to be clear about its meaning when talking about the environment. Starting from this point, more reviews of the concepts of environment are needed in order to understand the various ways in which studies have defined the term ‘environment’ in terms of natural resources.

While environment is broadly defined as everything surrounding us (Peasgood & Goodwin, 2007), studies tend to conceptualise it differently based on their respective disciplines and contexts. For example, in terms of Australian environmental law, based on the Protection of the Environment Administration Act 1991, environment is defined as:

“... components of the earth, including (a) land, air and water, and (b) any layer of the atmosphere and (c) any organic or inorganic matter and any living organism, and (d) hand-made or modified structures and areas, and includes interacting natural ecosystems that include components referred to in paragraphs (a) and (c)” (Farrier, Lyster & Pearson, 1999, p. 5).

In a joint development study undertaken by DFID, EC, UNDP and the World Bank (2002, p. 9), environment is referred to as “the living (biodiversity) and non-living components of the natural world, and the interactions between them that together support life on earth”. The meaning of environment in both cases tends to focus on environmental components and classification. In a study of the link between environment and development, ‘environment’ refers to both natural resources particularly renewable natural resources and nature or the natural environment. The environment is viewed both as a natural resource and an ecosystem: the two are recognised as fundamental factors that sustain the livelihoods of poor people in the world’s poorest countries (Jones & Carswell, 2004, p. xvii). Drawing from these definitions, as the terms ‘natural ecosystems’ and ‘resources’ and their interaction have been frequently mentioned, it would be possible to infer that they are the key terms to explain the meanings of environment in the development context.

Due to this broad definition, many studies have attempted to narrow down the terms of environment to a specific meaning. For example, in an ecologist’s view, environment can be defined as the external conditions and influences affecting the lives and development of organisms including things from 60 km under the Earth to things in the upper atmosphere (Bartelmus, 1986, p. 1). From a natural scientist’s perspective, ‘environment’ may be interpreted in terms of non-human living and non-living, physical surroundings such as ecosystems, biodiversity, air quality, water and soil, and stocks of non-renewable resources (Tellegen & Wolsink, 1998, p. 5). In analyses of environmental impact, environment is often viewed both as green issues concerned with nature, such as pollution control, biodiversity and

climate change, and as brown agenda, such as drinking water and sanitation provision (Chowdhury & Ahmed, 2008; Nunan et al., 2002). The definitions of environment in these studies have been diversified based on their subject studies, and this diversification seems to have crossed over several disciplines in environmental studies to encapsulate the biophysical environment, environmental policy, environmental science, natural environment and social environment.

Poverty and rural development studies have considered environment in terms of natural resources. In a study of rural development and the environment, environment is described in terms of natural ecosystems and resources, with the latter seen as fundamental ingredients in the sustaining of the poor's livelihoods (ADB, 2000; Jones & Carswell, 2004). The joint study undertaken by the DFID, EC, UNDP and the World Bank (2002, p. 9) argues that the environment provides goods (natural resources) and services (ecosystem functions) to support food production, the harvesting of wild products, energy and raw materials. In the human-centred approach to the natural environment, 'environment' is referred to as resources based on what is good for people rather than for the natural environment (Farrier et al., 1999, pp. 14-15). In summarising these concepts, the term 'environment' has been widely reduced to ecosystems and natural resources. This study will follow this interpretation.

Over the last two decades, the environment has become an important issue in both politics and research. In the political economy of the environment, Sachs (1971, p. 47) regarded the environment as environmental concerns, which referred to all the side-effects of economic activities, disregarded by economic agents as well as the economic feedback of environmental change. This field of study views human activities as forms of political, economic, and social decisions, which have a huge impact upon natural resources and creating of environmental issues. Accordingly, many political economy studies have attempted to explore the influence of various actors on environmental problems and policies, such as civil society, government, non-government organizations, development agencies and local communities. In their study of environment politics, Hirsch and Warren (1998) explored several case studies on the growing importance of environmental issues and their relationship to the broader processes of social, political and economic change in Southeast Asia. These case studies have attempted to explain the environmental struggles over large dams, forestry, mining, pollution and tourism as a consequence of the rapid changes in society, politics and the economies in the region.

As environment is related to many study fields, its definition has been expanded to incorporate their own specific meanings. In this way, environment can be widely understood

in these in-depth studies. On the other hand, questions may be raised regarding the usefulness of its expansion, e.g., to what extent these broad definitions can help to address current global environmental problems, including environmental degradation and pollution, climate change and global warming. As environment interacts closely with natural resources, in what ways can these definitions help the poor and the governments of the developing countries to comprehend the use of resources in a sustainable manner. I will examine these issues in the next section.

2.3.2 Interaction between the environment and natural resources

Some of the above studies have regarded ‘ecosystems’ and ‘natural resources’ as the main components of the environment, components often regarded as renewable natural resources such as water, land, forest, fisheries, rangelands, wildlife, air quality and energy in rural development studies (Jones & Carswell, 2004). Sometimes they are considered non-renewable, e.g., as fossil fuel of coal, oil and gas. Resources viewed as everyday resources for general living include fuel wood, medicinal plants, water, bees, rivers and other water-related ecosystems, and rangelands, all of which are contained in urban and rural landscapes (Fabricius, 2004, p. 23). From a development perspective, the above natural resources and ecosystems are often described as goods and services produced by the environment (DFID et al., 2002). These notions have illustrated some causal interactions between natural resources and the environment. The term ‘interaction’ here simply means the ways in which natural resources and environment influence or react to each other. In fact, the environment and natural resources formally interact with each other in many ways: their interaction can be observed in their environmental functions, values and cause-effect relationships.

First, their interaction can be recognised in the concept of environmental functions or in functions provided by the environment. Hueting et al. (1998, p. 31) define environmental function as “any possible uses of the natural, biophysical surroundings that are useful for humans, and can be conceived as consumption and capital goods”. In this view, the environment’s function is to supply natural resources such as forests, soil, water and clear air. For example, green forests function as habitats for organisms, hydrologic flows and soil conservers; they also provide clear, fresh air and timber as raw material for wooden products for human consumption. Good soil also supports food and other biomass production, biological habitats, and is a source of raw materials for people’s living. It provides clean water, bountiful crops and forests, productive rangelands, diverse wildlife and beautiful landscapes. Humans use these resources for consumption and their livelihoods. Any damage

to these resources impacts negatively on the environment and by extension on the human living. The latter is heavily dependent upon the ways in which the natural environment is used as a resource reservoir. de Groot (1987, p. 105) suggested re-defining 'natural resources' as natural functions or goods and services provided by the natural environment, a definition which further implied the level of their close interaction.

Second, their interaction may be derived from the concept of environmental values. Given that the environment provides huge natural resources that sustain humans' livelihoods with satisfactory utility, this provision is recognised as having environmental value (Bergstrom, 1990). Environmental value may be simply defined as a process of assigning human values with respect to the natural environment; or, it may be seen as "an individual and shared community or beliefs about the significance, importance and well being of the natural environment, and how the natural world should be viewed and treated by humans" (Reser & Bentrupperbäumer, 2005, p. 141). The IUCN study undertaken in the Nam Et and Phou Loei protected areas in Laos estimated the environmental values of forest product to be more than US\$1.12 million per year or US\$313 per household (see Emerton, 2005). Elsewhere, environmental value is expressed not only in economic terms, but also from physical-biological, institutional, philosophy, moral social and technological perspectives (Cocklin, 1988). While the environment can be valued in various ways, and many studies have used the concept of environmental values to explain the strong interaction between natural resources and the environment, this study will limit its scope mainly to economic value aspects.

Finally, when the poor have depleted their local natural resources after having drawn heavily on them for their livelihoods, depletion will result in resource degradation of their local areas in the forms of deforestation, soil erosion and biodiversity loss. Degradation will negatively pollute their local environments (see Mabogunje, 2002; Opschoor, 2007; Rahman, 2004; Reed, 2002). In this scenario, the interaction between the natural resources and the environment may be termed a direct cause-effect relationship since resource degradation will immediately cause environmental damage.

Many environmental studies have attempted to explain this cause-effect relationship. For example, in their natural resource and energy study, Kolstad and Krautkraemer (1993, pp. 1219-1220) claimed that the extraction of natural resources from the earth can cause many environmental effects, which can range from the release of short-lived pollutants to irreversible change in the natural environment; inversely, a large proportion of all environmental issues can be traced directly to the extraction or use of resources. They (1993,

p. 1222) also assert that the concentration of pollutants has physical effects such as reducing yields of agricultural crops, soiling and corroding materials, impairing human health, and obscuring scenic vistas. This natural resource and energy study clearly delineates the cause-effect relationships in nature.

Drawing from the above three concepts, it becomes clear that the interaction between the environment and natural resources can be determined by human observation. This means that the existing interaction is dependent upon how humans value environmental functions, and their relationships with nature. In fact, the interaction between these agencies may be viewed in various ways, rather than limiting to environmental function, values and cause-effect relationships. It would be interesting to explore the various forms of said interaction. One way would be to explore how natural resources are utilised for rural development, especially for the rural poor, and the impact of their utilisation on the environment. This topic will be explored in the next sub-sections.

2.3.3 Natural resources benefits, access and degradation

In this section, focus is upon the context of poor households in rural areas, particularly the rural poor. I will argue that while many households in rural areas are poor, not all of them are poor. As ‘the poor, particularly those living in rural areas, often rely on a variety of natural resources, biodiversity and ecosystem services as a direct source of livelihood’ (DFID et al., 2002, p. 11), it may be suggested that there are strong relationships between natural resources and the rural poor’s livelihoods. In order to understand these relationships, the benefits of the resources to the poor’s livelihoods, the constraints on the poor’s access to resources and the impact of resource degradation on their daily lives are elaborated in this section.

Some empirical studies state that natural resources contribute many benefits to the poor’s livelihoods. Vedeld et al. (2007) investigated rural people in developing countries considered dependent upon forest environmental income using a meta analysis of 51 case studies from 17 countries. Their findings revealed that forest environmental income accounted for approximately 22% of the total income of the population sampled, mainly sourced from fuel wood, wild foods and fodder. They viewed this income as important to rural livelihoods in three ways: as a safety net for unexpected income shortfalls or cash needs; as supportive of current consumption; and, as a pathway out of poverty. They also suggested that the income from the forest should not be overlooked in poverty assessments (Vedeld et al., 2007). Cavendish (2000), in his empirical study of the poverty-environment relationship of rural

households located in the Communal Area in Zimbabwe, summarised a number of resources utilised by poor households, which showed that poor households in the areas used a wide range of different resources in different ways for their livelihoods. He categorised the resources into four groups: (1) wild foods and minor uses; (2) the multiuse of wood, such as timber, firewood, construction materials, furniture, household utensils, and agricultural implements; (3) use of grass, reeds, rushes, cane and leaves, such as thatching grass, woven goods and leaf litter; and, (4) other resource utilisation: pottery clays, termitaria mounds, livestock fodder, browse and water (2000, p. 1982). These resources, which were of wide economic use to the households, included consumption goods, consumer durables, production inputs, asset formations and sales (ibid). The above two studies confirm the benefits and importance of natural resources to the rural poor's livelihoods.

Natural resources can provide great benefits to the rural poor. But, the question remains as to whether the benefits can be shared equally among all members of a community. Lee and Neves (2009) claim that even in a country with abundant resources, not all of the people can enjoy or share the resource benefits, particularly the rural poor due to the many constraints that prevent them from accessing said benefits. In this argument, "access" to resources may prove a key point in understanding the benefits that flow from resources. Ribot and Peluso (2003, p. 154) define access as "the ability to benefit from things—including material objects, persons, institutions, and symbols". In addition, they claim that "focusing on ability, rather than rights as in property theory, brings attention to a wider range of social relationships that can constrain or enable people to benefit from resources without focusing on property relations alone" (ibid).

The reality is that many constraints limit the poor's access to their perceived natural resources. In the United Nations guidance note on environmental scarcity and conflict, the UNEP (2010) reveals the various components that underpin restricted and unequal access to natural resources. For example, the poor become marginalised either because they lack rights to the resources upon which they depend for their livelihoods, or they have rights but cannot exercise them. These issues are important to the poor, particularly when the right to access key resources is concentrated in the hands of a single group to the detriment of others (UNEP, 2010, p. 16). This guidance note also suggests that economic development has put pressure on natural resources. Emphasis is upon the poor management of new technologies, the commercialisation of common property resources, creation of protected areas, urban-rural

migration and incentives for economic policies, all issues that have tended to result in restricted or unequal access to natural resources (UNEP, 2010, pp. 19-20).

The Millennium Ecosystem Assessment (2005, p. 62) noted the many changes in the world ecosystems that have benefited some but exacted costs on others, who as a result risk losing access to resources or being affected by externalities. These changes tend in the main to harm society's most vulnerable; for example, the poor, women, and indigenous communities whose livelihoods depend upon resources. The Millennium Ecosystem Assessment also highlighted the many factors that force change, e.g., the privatisation of common pool resources, loss of the poor's right to access resources, growth of vulnerable populations, ecosystems at risk of disaster, inappropriate policies, gender inequality, the diminishing of roles and rights in many societies, and the implementation of inappropriate strategies that exclude the environment's role in poverty reduction. This assessment claimed that the poor have historically lost access to ecosystem services due to the fact that these services have been converted to other uses, that is, for export rather than for local consumption.

Kates and Haarmann's (1992, p. 8) study defines entitlement as "the access enjoyed by a household to needed environmental resources". The authors claim that the poor lose their resource entitlements due to displacement, resource division and resource degradation. They further suggest that the poor are displaced due to development or commercialisation activities, large scale resource investments, legal and illegal wealthier claimants, and limited land and employment opportunities. The poor are likely to divide their resources because of their need to share, or to sell their resources among family members to offset extreme losses like crop failure, illness, death, or of marriage dowries. Their resources become degraded due to excessive or inappropriate usage, failure to restore and maintain their resources, and natural hazards. The combination of these factors can produce a spiral of poverty and resource degradation. The sum of these studies suggests that not only have various constraints reduced the poor's ability to access their resources, but that lack of resource access and degradation of environmental resources invariably hurt the poor.

This brings one to the further issue vis-à-vis the meaning of environmental degradation and how it occurs. Duraiappah (1996) argues that defining environmental degradation is a difficult task because of the large degree of subjectivity on the part of the agents involved or of those who own the resources. He further stresses that these difficulties may derive from different ecosystems as well as from different values placed on environmental resources by different societies (1996, pp. 3-4). Employing an economic explanation based on Neo-classical theory,

the degradation of nature may be expressed in terms of “the overuse of natural resources and waste disposal above the ecosystem’s assimilative capacity” (Adaman & Özkaynak, 2002, p. 111). In his study of environmental management, Barrow (2006, p. 314) views environmental degradation as a worldwide evolving problem, roughly defining it as “the loss of utility or potential utility, or the reduction, loss or change of features or organism which may be difficult, costly or impossible to replace”. Barrow also suggests that there may be difficulties in recognising the degradation as it may be slow and gradual, or take place long after the initial disturbance.

In their study of environmental sustainability, Jha and Murthy (2006, p. 87) suggest that global environmental degradation occurs as “a result of an accumulation of local phenomenon such as: pollution – of various types; destruction of biodiversity, accumulation of toxic and non-toxic waste and the erosion of the natural resource-base due to deforestation, depletion of fresh water resources, paper consumption, etc”. Similarly, the UNEP (2010, p. 11) suggests that there are a number of reasons that can cause the depletion or degradation of a specific resource such as overuse, pollution and violent conflict within the resource itself. In short, many factors contribute to environmental degradation; thus, it is important to identify the main cause of degradation as it can push the poor into deeper poverty and ultimately lead to the vicious circle of poverty and environment described in the next section.

2.4 Poverty-environment nexus (PEN) and its issues

The linkage or relationship between poverty and the environment has long been an issue of debate, particularly in the context of sustainable development. Like the chicken and egg conundrum, core discussion centres on whether poverty causes environmental degradation or vice versa. Thus, in recent times, interest in examining their relationship has significantly increased. This section reviews the academic works and theses exploring the PEN, and the linkage between poverty and the environment.

2.4.1 Concepts of poverty-environment nexus (PEN)

The universal dilemma surrounding the chicken/egg question, i.e., ‘which came first’, may prove a good vehicle for expressing the relationships between poverty and environmental degradation, relationships and/or linkages that are often expressed in terms of a poverty-environment nexus (PEN). In developing countries, the concept of PEN implies that poverty causes environmental degradation and that degradation of the environment, in turn, forces people into deeper poverty or the other way around (Jehan & Umana, 2003; Rahman, 2004).

PEN can be attributable to either one or two direction causalities; thus, for this reason, it is often called a two-way relationship (Jehan & Umana, 2003) or twin problems (Mabogunje, 2002). In empirical analyses and studies, PEN, as a significant determinant of the other, implies a causality between the variables of poverty and environmental degradation (Chowdhury & Ahmed, 2008; Dasgupta et al., 2003). These concepts basically suggest that where PEN exists, environmental degradation is significantly high and the area is poor. So, these two problems can be addressed at the same time (Dasgupta et al., 2003). As suggested in Chapter 1, this negative relationship of PEN is known as ‘a vicious circle’ or ‘downward spiral’ if the degradation keeps recurring and obvious solutions to addressing are lacking (Reed, 2002).

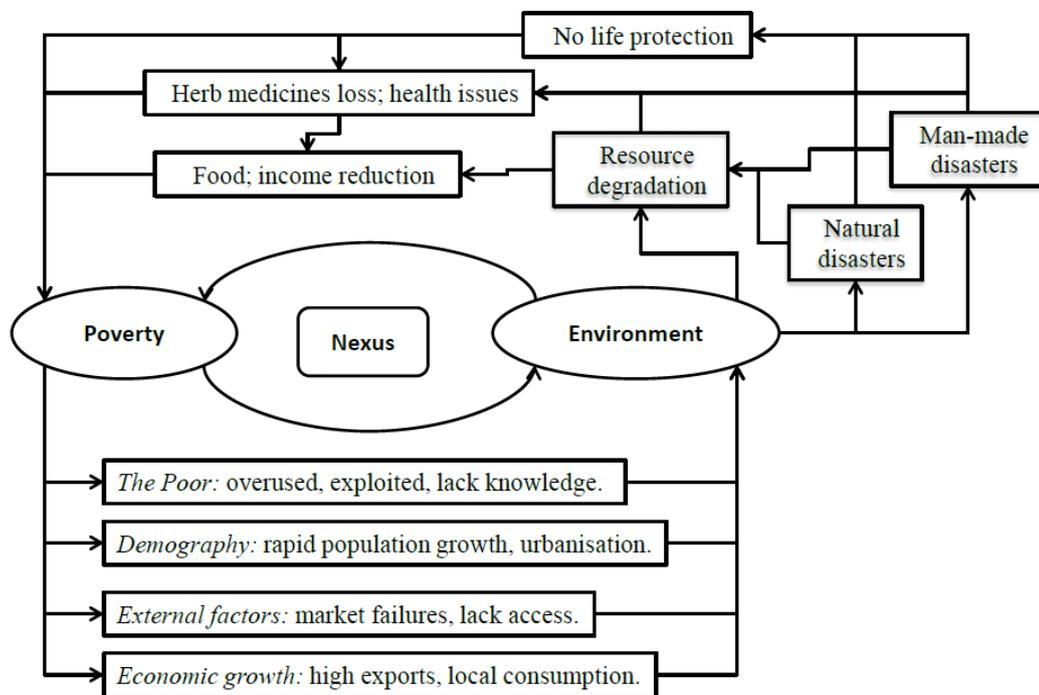


Figure 2. 4: Simple vicious circle of PEN

Conversely, the positive relationships of PEN are referred to as a ‘virtuous circle’. Nadkarni (2000, p. 1188) describes the virtuous circle of PEN as follows: “an improvement in the natural resource environment improves the resource base of the poor and can alleviate poverty, which in turn can strengthen the capability of the poor to enrich their environment”. Nadkarni also supports the possibility that a vicious circle can be turned into a virtuous circle and that the poor can become protectors of the environment in conjunction with the operation of institutional mechanisms that facilitate betterment of the environment and permit sustainable usage. Many of the activities targeting poverty reduction and integrated rural development programs have attempted both to conserve natural habitats and create income

opportunities for the local communities, in the process reducing their dependency and pressure on environmental resources (Angelsen, 1997). For example, in rural development projects, fruit tree plantation can create both incomes and food for the rural poor; at the same time, fruit trees can provide a better environment at local sites. This study will focus on the negative relationships of PEN, which are considered more controversial. The simpler relationships are illustrated in Figure 2.4.

Since the 1980s, PEN, a major global development challenge, has been widely studied in many regions (see Angelsen, 1997; Angelsen & Vainio, 1995). Lufumpa (2005), who investigated the existence of PEN in Africa, explored issues related to deforestation and land degradation, low agricultural productivity, water scarcity as a threat to Africa's biodiversity, and the impact of civil conflict. He found that poverty in Africa was closely interrelated with serious environmental degradation, and that degradation affected economic growth, further worsening the situation of the poor. Bhattacharya and Innes (2006), who undertook econometric analysis of district-level data of rural poverty and vegetation degradation taken from South, Central and Western India, found evidence to support the existence of PEN in rural India. Dasgupta et al. (2005; 2003) and the World Bank (2006b) employed both qualitative and quantitative methods to empirically examine PEN-related issues in mainland Southeast Asia in Laos, Vietnam and Cambodia. These studies confirmed the threat of PEN to sustainable development and urged immediate action to be taken addressing issues related to PEN. In a global environment, and from a development perspective, PEN is likely to exist in poor and developing countries, with environmental degradation a seemingly unavoidable cost to their development; thus, PEN has been viewed as an important issue on the global development agenda (DFID et al., 2002; Opschoor, 2007; World Bank, 2006b). To facilitate an understanding of the relationships of PEN, in the next sub-sections I explain how poverty causes environmental degradation and how, by extension, degradation deepens poverty.

2.4.2 Poverty-related environmental degradation

Conceptually, there are many arguments addressing the ways in which poverty leads to the degradation of environment in developing countries. Listed among them are the poor's practices, demographic factors, economic growth objectives and a variety of extraneous factors.

In the developing countries, the poor are often blamed for their overuse and exploitation of environmental resources for their daily living and survival. A major problem is that they are

blamed for their lack of knowledge critical to maintaining their natural resources and are thus unable to practise sustainable development in their areas (Angelsen, 1997; DFID et al., 2002; Nadkarni, 2000). The resultant dilemma is attributable to the fact that the poor depend too heavily upon natural resources for their livelihoods. Traditional agricultural practices conducted in unsustainable ways include shifting or slash and burn cultivation, which is often viewed as the main cause of natural resource degradation and depletion (UNEP/EAP-AP, 2002). Mabogunje (2002) identifies the causes of resource degradation in developing countries as follows:

...deforestation by extensive and repeated clearing, the burning of shrubs and forests for food crops and firewood; desertification from over-cultivation; overgrazing on marginal lands and the removal of wood for fuel; salinisation of croplands due to poorly managed irrigation; biodiversity loss due to degrading of the ecosystem; soil erosion resulting from over-cultivation and forest clearing; urban pollution due to huge migration of the rural poor to urban areas; water pollution resulting from lack of solid waste management; and, using fertilizers and pesticides to ensure agricultural productivity...(Mabogunje, 2002, pp. 13-14).

These factors have been widely acclaimed as reasonable given that since 2001, more than 1.3 billion poor still rely on fisheries, forest and agriculture for employment, and around 1.1 billion continue to live in extreme poverty (Millennium Ecosystem Assessment, 2005). In this view, exploitation of resources by the poor will inevitably lead to environmental degradation, which in turn will exacerbate resource limitation, further hurting the poor.

Demographic factors, particularly those pertaining to rapid population growth of the poor and urbanisation in developing countries, are debated as negatively resulting from environmental resources (see Angelsen, 1997; Mabogunje, 2002; Nadkarni, 2000). According to this argument, large population growth increases the level of exploitation of limited natural resources as efforts are made to meet the higher demand for—and production of—food and other human basic needs. According to their 2005 prices economic estimation, Chen and Ravallion (2008) found a decline in the poor populations from 1.9 billion in 1980 to approximately 1.4 billion people in 2005; or, one quarter of the people in developing world were living below the international poverty line of \$1.25 per day. But, their results suggested that the developing world was poorer than their expectation: developing countries had failed to reduce the incidence of absolute poverty since the early 1980s. And, while many people had reached the \$1.25 standard, they were still very poor and clearly vulnerable to downside shocks (Chen & Ravallion, 2008, pp. 25-26). As a result, it was reasonable to expect that

environmental resources would become highly overused and degraded as high populations strove to meet their food and other consumption necessities.

High population growth frequently results in the poor migrating from rural to urban areas in search of jobs, incomes and new life opportunities. But, such shifts of population not only create higher poverty levels in the urban areas, but in addition degrade the urban environment by accelerating water pollution, air pollution, garbage and waste accumulation and climate change (Mabogunje, 2002). Urban environmental degradation worsens when the new urban poor cannot find resources to meet their basic needs. Several capital cities of the developing countries have become victims after experiencing environmental problems resulting from rural – urban migration, the reality being that rapid population growth can worsen environmental resources in both quality and quantity resulting in long-term decline in food consumption, human health problems and, ultimately, food insecurity. It thus may clearly be foreseen that a combination of the above factors may lead to the problem of vicious circle or a downward spiral of PEN.

High economic growth in developing countries is often held responsible for environmental degradation and pollution. In the process of achieving a high growth rate, some developing countries tend to overuse their natural resources such as raw materials to manufacture more goods and services for export. As a result, economic growth tends to create environmental degradation and pollution because the production function of these countries likely depends upon the exploitation of their natural resources and endowments for commercial and export-oriented purposes (Chen & Ravallion, 2008; DFID et al., 2002; Kates & Haarmann, 1992). Another impact of economic growth is that people enjoying higher incomes tend to consume more goods and services, thus increasing the volume of manufactured goods. A basic consequence of high incomes is harm to the environment in the form of air pollution, water pollution, and solid waste. The amount of hazardous waste also increases. This process could be subjected to analysis using the concept of the Environmental Kuznets Curve (EKC), which describes the relationship between environmental pollution and economic growth (see Stern, Common & Barbier, 1996). According to the EKC, environmental degradation would initially increase in the country along with economic growth until higher income levels led to higher investment in the environment. This will see pollution reduced (Reed, 2002; Stern et al., 1996), while the trend in the long term is reversed.

Finally, many externalities in special circumstances can be considered the needs or factors forcing the poor or the developing countries to increasingly degrade their environmental

resources. These externalities, which may give rise to uncommon and uncontrollable events, may suddenly occur beyond one's expectations. Events may include failures of market or government policies, lack of access to resources, lack of assets and unclear property rights, increasing corruption and conflict, and natural disasters (DFID et al., 2002; Reed, 2002; UNEP, 2010). They can occur either singly or in a combination of forms. Again, natural disasters may force the poor to exploit more resources than usual to restore their livelihoods; government policy may direct the rights to resource access to the rich rather than to the poor. Corruption, which appears widespread in some developing countries, may increase the wealth of particular groups rather than achieve national economic growth, further fuelling national resources exploitation (Reed, 2002). These externalities are relatively significant in the poverty and environment discussions in some developing countries where the poor are badly-off and the resources have become highly degraded. Thus, consequences of these externalities may be expected; for example, food insecurity, health problems, income reduction, vulnerability and ecosystem loss. Some studies question that while the poor should be protected, should environmental resources be degraded simply because their lives are at risk? (Angelsen, 1997; Nadkarni, 2000). Actors should not lose sight of the fact that externalities force the poor – in some cases – to overuse their resources. From the above reviews, it becomes clear that while poverty can cause environmental degradation in various ways, the environment, in turn, can exacerbate poverty.

2.4.3 Environmental degradation expands poverty

The environment can force people, including the poor, into poverty through various channels. Three channels, namely resource degradation, environmental disasters and man-made disasters, are addressed in this section. First, when an environment does not function properly, it causes resource degradation that hurts the poor's livelihoods by limiting the availability of natural resources to them. A positive environment can provide sufficient amounts of natural resources to sustain the poor, particularly in forms of food and income (DFID, 2002; Jehan & Unmana, 2002). But, as a consequence, the poor come to depend too heavily upon these natural resources. A poorly functioning environment can severely diminish and degrade the resource amounts available. And, as these resources become limited and degraded, the poor suffer due to losing their food, incomes and jobs vital to their subsistence. As a consequence, their livelihoods tend to gradually sink into deep poverty. If degradation is not addressed properly, the poor will continue to degrade the resources and their livelihoods will slip deeper

into poverty. Their problems will become representative of the vicious circles or downward spirals of PEN.

In addition, resource degradation can directly affect the health of the poor (Jehan & Unmana, 2002). In the rural areas, the poor often collect herbs and NTFPs from the forests to cure their illnesses and keep them healthy. In this sense, the forest can be described as the poor's pharmacy. But, as the environmental resources become increasingly degraded, both forest and non-forest products become less and less available, cutting off the herbal medicines from the poor as well as their food supplies and incomes. Consequently, the poor are likely to become unhealthy and vulnerable to various diseases. In the urban areas of developing countries, air-water pollution and bad sanitation harm the well-being of the people, ultimately causing disease, sickness, and often killing people. In an article that appeared in *The Economist* (2008), approximately a quarter of all deaths in the world have some links to environmental factors. Most of the victims are poor people, who are already vulnerable because of bad living conditions, lack of access to medicines, and malnutrition. Among the killers (especially of children) in which the environment plays a role were diarrhoea, respiratory infections and malaria. Therefore, in the interests of both the rich and the poor, environmental degradation and pollution must be reduced.

Second, environmental hazards and natural disasters can have particularly dangerous impacts, forcing vulnerability on both the poor and non-poor, often without warning (Bhatta, 2006; Mabogunje, 2002). Environmental hazards and natural disasters come in many forms, such as heavy rain, earthquakes, droughts, floods, landslides and hurricanes. When they strike, the poor, especially the women and children, tend to be the most vulnerable because they frequently lack protection against hazards and disaster. The poor, in general, tend to be driven into even deeper poverty. Mabogunje (2002) notes that (a) environmental hazards represent ever-present dangers of life-threatening proportions; (b) natural disasters tend to be episodic and of varying duration; and, (c) the poor often live in insubstantial, makeshift, overcrowded conditions in disaster-prone areas. Thus, they are primary victims of natural disasters.

Third, disasters are made not only by nature, but also by human activities, known as "man-made disasters". Park (2011) attributes man-made disasters to human factors such as poor judgment, poor working conditions, poor maintenance of equipment and/or the negligence of the operators. As well, he considers them the cause of catastrophic accidents; e.g., the coal mining accident in Xinxing, China in 2009 and the gas leak in Bhopal, India in 1984.

Nadkarni (2000, 2001), who has observed many impacts of man-made disasters on rural

development, claims that it is relatively easy to blame environmental disasters for causing degradation beyond our control. He (2000, 2001) further claims that many incidences of environmental degradation, such as deforestation, the extension of cultivation on hill slopes without taking precautionary measures for arresting soil erosion, overgrazing and shifting cultivation were created by human activities rather than by natural disasters. Thus, these man-made disasters should be held accountable for at least some of the degradation. In addition, human activity aggravates natural disasters like floods and drought; e.g., deforestation of mountain slopes can increase the flood proneness of areas below and drought may be aggravated by neglect of water provision and soil management resulting in soil erosion, increased vulnerability of crops due to lack of rainfall and increased instability of crop output (Nadkarni, 2000, 2001). From this view point, due to lack of protection, the poor tend to be more vulnerable to both natural and man-made disasters. Such disasters are likely to degrade resources, and to hurt the poor's livelihoods by extension forcing them into deeper poverty.

To sum up, negative environments can affect poverty situations in several ways: by withholding resources that sustain the poor's livelihoods, by affecting their health, and by imposing shocks that increase their vulnerability (Jehan & Umana, 2003). Bhatta (2006) suggests three key linkages between poverty and the environment for deep investigation; namely, natural resources and livelihoods, vulnerability, and health and the environment. He also emphasises that poverty alleviation cannot be achieved without sound environmental management and that improving the state of the environment is not possible without first addressing poverty. Note that in further studies of the close linkages between poverty and the environment, PEN should be recognised as both a "vicious circle" and a "virtuous circle". The positive term "virtuous circle" of PEN can call more attention to further studies, one of which will focus on the role of the private sector, with the expectation that private investment can lead to a virtuous circle. This sector will be discussed in the following section.

2.5 Private sector, privatisation and investment

Governments in developing countries have increasingly included private sector development in their socio-economic development agendas to achieve their development goals. The contributions of the private sector have been recognised as important on several development fronts, particularly in public-private partnerships that aim to reduce poverty, leading to the virtuous circle alluded to above. On the other hand, the private sector can cause many impacts on economies, societies and environment management in these countries. This section aims to explore the private sector's involvement in poverty reduction and the natural resource sector

in the context of the developing countries. This section will explore concepts of the private sector and privatisation, debates on privatisation in developing countries, and foreign private investment in developing countries.

2.5.1 Concepts of private sector and privatization

The private sector is viewed in simple terms as everything that is not formally part of the public sector (Biersteker, 1992). In particular, it is viewed in formal terms as all private actors, ranking from individuals to businesses, that are related to risk-taking activities designed to earn profit and income through market exchange, including actors from smallholder farmers to very large multinational enterprises (Bonaglia & Fukasaku, 2007). The Development Assistance Committee (DAC) (1995, p. 10) has defined the private sector as “a basic organising principle for economic activities where private ownership is an important factor, where market and competition drive production and where private initiative and risk-taking set activities in motion”. In accordance with these concepts, the fundamental meanings and important aspects of the private sector have been highlighted in terms of private ownership, profit earning, competition and risk-taking.

Through its sharing of these characteristics, the private sector can be expressed in several forms. With a view to the market economy, Biersteker (1992, p. 199) notes four different and overlapping identifications and segments of the private sector: e.g., formal and registered profit-making enterprises; informal and largely unregulated profit-making enterprises, ranking from the individual street vendor to large scale and well-organised drug cartels; non-profit and private non-governmental organisations (NGOs); and, private households. The World Bank (2002, p. 17) views development actors, such as religious, NGO-run, community-financed and for-profit institutions as profit makers like other firms; but, they may not have “owners” among whom profits are distributed. Starr (1988), contemplating alternative possibilities for classifying the private sector based on their organisational complexity and proprietary status, suggested that classification of the private sector should rest not only on profit motives, but also on the professional management of organisations. This may be particularly true in developing countries, where the private sector can be formed with different features and/or shared by either private and state as well as by both domestic and foreign investors.

Since the collapse of the Soviet communist regime in the late 1980s, some former communist countries have implemented various policies to move from a central planning to a market-oriented economy (see Nishimura, 2001). One of the more famous policies is known as

'privatisation'. The concept of privatisation, however, is recognised as ambiguous because it covers a wide range of ideas and policies (Starr, 1988). Biersteker (1992) and Nishimura (2001) view privatisation as the transference of assets, service functions, and/or decision making from the public sector domain to the private sector. Likewise, in the context of the poor, developing or third world countries, Hope defined privatisation as the transfer of ownership and control from the public to the private sector, with particular reference to asset sales (1996, p. 156). Biersteker (1992, pp. 197-198) differentiated three forms of privatisation: sales of state-own enterprises (SOEs) to the private sector, the subcontracting of public-sector activities to private-sector entities, and the load shedding or transferring of services or operations from the public sector to the private sector with no reference to the state. According to these concepts, privatisation can be simply understood as any policy to transform or shift activities from the public to the private sector.

The meaning of privatisation is viewed as vague by many in-depth studies. Starr (1988), for example, clarified privatisation by giving it three different meanings. First, privatisation aims to differentiate the public and the private and to shift from the public to the private sector. Second, as theory and rhetoric, privatisation refers to a reassignment of property rights, a relocation of economic functions, community empowerment and a reduction of government overload. Finally, Starr claimed that the nation's position in the world economy would best imply the practical meaning of privatisation. He simplified his argument by stating that privatisation would be treated as a question of domestic policy in wealthier countries and as the denationalisation or transferring of control to foreign investors or managers in the less developed countries. Based on Starr's proposal, there is no single, simple term to conceptualise privatisation. The most appropriate definition would be greatly dependent upon the political systems and national context of each country.

Drawing on the above studies, the term 'private sector' should refer to all enterprises and businesses featuring private ownership, profit earning, competition and risk-taking. In some developing countries, due to the implementation of privatisation policies, ownership of many enterprises and businesses appears to take the mixed forms of private, state, domestic and foreign investors. Therefore, criteria for identifying the real private impacts need to be developed to meet the research objectives.

2.5.2 Debate surrounding privatisation in developing countries

Over the past decades, privatisation has been implemented not only in developed countries (Mehrotra & Delamonica, 2005; Parker & Kirkpatrick, 2005) but also in transitional, developing and poor countries (Biersteker, 1992; Hope, 1996). Perceptions of privatisation in these countries may be different (Parker & Kirkpatrick, 2005). This section highlights the debate surrounding these different perceptions of privatisation mainly in transitional and developing countries as these countries have strategically privatised to achieve development (Nishimura, 2001). Privatisation has been viewed as a mechanism for economic growth and development in many poor developing countries (Bonaglia & Fukasaku, 2007; Development Assistance Committee, 1995; Nishimura, 2001; OECD, 2005). Conversely, it has drawn criticism from many development perspectives (Mehrotra & Delamonica, 2005). I explicate these two opposite perceptions in the section that follows.

Several reasons are provided favouring the implementation of privatisation in the poor, developing and transitional countries. First, following the collapse of the Union of Soviet Socialist Republics (USSR) in the late 1980s, governments of the former socialist countries opted to change their economies from centrally-planned to market-oriented (Biersteker, 1992), change that aimed to approach the basic adjustment mechanism between demand and supply in the free market system. Nishimura (2001, p. 7) claims that privatisation was politically significant in the transition from centrally-planned to market-oriented economies in many of the former socialist countries. Apropos of successful transit to a market economy, Nishimura (2001) suggests that several conditions must be met. For example, economic units must have free right to make decisions, and this right needs to be guaranteed. In order to guarantee this right for each individual economic unit, private ownership must be established. In addition, free competition must be created in the economy so that the market can adjust production and consumption. To create competition, private enterprise, foreign and domestic investment must be encouraged and allowed to easily enter into the market, two prerequisites closely related to privatisation (Nishimura, 2001). Thus, privatisation was seen as a fundamental component in the transfer from central planning to a market-oriented economy in both the former socialist and transitional developing countries (Biersteker, 1992; Mehrotra & Delamonica, 2005; Nishimura, 2001).

Second, the poor performance of the public sector, and various governments' failures to develop economies are viewed as the main reasons for shifting from the public to the private sector in the developing countries (Biersteker, 1992; Boycko, Shleifer & Vishny, 1996).

According to many studies, performance in the public sector has been considered poor when compared to the private sector in terms of higher cost of public services, inferior profitability of state, and less efficient public firms. Efficiency improved after privatisation (Boycko et al., 1996, p. 309). From this viewpoint, the inefficiency of public enterprises may result from putting primary focus on the interests of politicians, such as high employment and expenditure, low tax rates, and corruption among their voters, rather than increasing economic efficiency (Boycko et al., 1996, pp. 309-310). From the economic efficiency perspective, private-sector firms are considered to be more efficient than public firms in terms of gains in allocative efficiency, productive efficiency and nonmarket efficiency (Biersteker, 1992, p. 202; Van de Walle, 1989). Hope (1996, p. 158) maintains that privatisation can cut government expenditure and help in restoring a budgetary balance. Mehrotra and Delamonica (2005) point out three factors that support the private rather than the public sector's roles in health, education and water supply in developing countries: lack of government resources, low-quality public provision, and pressure to liberalise the economy. Their incapability to alleviate these three factors results from many shortcomings, mainly budget deficits and distorted tariff structures (Mehrotra & Delamonica, 2005, p. 143). However, they stress the many forces reinforcing the role of the private sector in social services in developing countries rather than simply meriting the private provision of said services.

Third, some governments of developing countries strategically seek development funds from international donor organisations, for example, the World Bank and the bilateral aid agencies, in a bid to reduce their deficits. But, most of the above donors require recipient countries to privatise their economies and to promote the private sector's key development objectives (Biersteker, 1992; Mehrotra & Delamonica, 2005). In addition, as a consequence of the Washington Consensus of the late 1980s, reform of the state's role in the economic sector of the developing countries is viewed as the key to achieving their economic development goals. Schulpen and Gibbon (2002) argue to the effect that the private sector can stimulate market forces and competition and that these factors are considered more efficient, more productive and more conducive for achieving economic growth for poverty reduction. In the Consensus, the role of government was not completely abolished, but served to facilitate investment environment roles for private business and to ensure growth for poverty reduction. In his development policy study, Hope (1996) claims that the key to successful development policy in the third world is reduced state intervention; and, to the extent that state intervention is necessary, it should be through rather than against the market mechanism. Drawing on these

views, privatisation may be seen as a good policy for poverty reduction. But, the states would need to play their new roles vis-à-vis national laws and regulations supporting the private sector.

Finally, the benefits and gains that accrue from privatisation, particularly increasing private investment, are argued as factors to encourage governments to privatise their economies. Many studies have revealed the benefits of privatisation. For example, Hope (1996, pp. 159-160) emphasised some potential benefits accruing from an increase in foreign and domestic investment; privatisation and private sector initiatives can force the third world into market economies, thus promoting greater choice, competition and efficiency; FDI can effectively benefit a host country in terms of production, employment, access to finance and market, income, balance of payments and general welfare; these capitals can help to modernise factories, create jobs, make available a greater choice of quality goods at competitive prices, introduce new technologies and management techniques, and earn desperately needed foreign exchange for third world countries. These benefits are also claimed by other studies (e.g., Biersteker, 1992; OECD, 2005). Recently, the benefits of privatisation and the private sector were seen as tools to achieve the Millennium Development Goals (MDGs). In the UN Millennium Project (2005) report, a clear framework for private sector growth in developing countries is viewed as essential to their national strategies to achieve their MDGs. This report has highlighted the many ways in which the private sector can contribute to poverty reduction and the MDGs; for example,

...increasing productivity and creating jobs by producing essential goods and services in large-scale production, providing a larger source of tax revenues to the governments, and supporting overall technological advance for the long term driver of economic growth; providing service delivery through public-private partnerships through creating certain conditions for market-based economic activities and ensuring quality service provision of basic social services to the poorest and most isolated communities; ensuring that private sector growth benefits society and protects the environment which is related to the responsible corporate governance and citizenship; and, contributing to policy design for open national processes to develop MDG-based poverty reduction strategies through consultation (UN Millennium Project, 2005, pp. 137-145).

For the above reasons, privatisation is essentially one of the main policies considered for implementation in developing countries. In sum, several arguments can be used to support privatisation in developing countries. In this section, I have explored initiatives of economic transition, governments' failures and inefficiencies, mandates of development assistance and benefits from privatisation, influences that have been widely recognised in the development process in large areas of local to global views. Privatisation is not just a post-socialism policy:

it is a worldwide phenomenon. On the other hand, many scholars have expressed concern over the implementation and impacts of privatisation in developing countries, which are elaborated below.

Unlike in the developed countries, many constraints have challenged the developing countries' attempts to implement privatisation policies. Van de Walle (1989) indicated constraints on the implementation and politics that would consistently undermine privatisation efforts and diminish its impact on economic efficiency. The constraints surrounding the implementation of privatisation could result from several causes in developing countries: such as lack of technical and managerial skills and administrative capacity; political controversy and complex legal issues; and, specific social functions. These issues can affect privatisation and undermine its smooth implementation, due to the limitation of government capacity (ibid, 1989, p. 608). The above political constraints could be attributed to several factors; e.g., favouring certain groups within society at the expense of others groups, losing benefits, employment and labour force concerns, fears that trade union power will be lost in the private sector, political instability, and an imbalance of economic and political power (ibid, , p. 609). Van de Walle suggested that in order to be effective, privatisation should be accompanied by a liberalisation program.

Based on various studies, Parker and Kirkpatrick (2005) list critical differences in privatisation between developed and developing countries. They highlight weak common features peculiar to developing countries as follow:

...imperfectly competitive and incomplete markets, regionalised and sometimes ethnically district labour markets with appointments through connections, under-developed capital markets, management weaknesses and patronage in appointments, poorly protected private property rights and under-developed business codes of behaviours, and relatively low standards of probity in public administration in a number of countries including cronyism and corruption... (Parker & Kirkpatrick, 2005, p. 527).

Building on these features, Parker and Kirkpatrick propose some caution regarding the overall impacts of privatisation. For example, they suggest that the markets in some developing countries may be under-developed, competition less than fully effective and regulatory agencies to tackle abuse insufficient. These shortcomings could lead to significant economic cost in the forms of congestion, discriminatory pricing and a failure to develop economies of scale (ibid, p. 530). In addition, these countries lack the administrative and institutional capacity essential to developing the necessary competitive policies and regulatory agencies, a capacity that would be difficult to build up due to political pressure, possible ethnic and

regional diversity, and subsystem complexity (ibid, p. 531). One possible outcome could be that private property rights would lack protection and this could pose a threat to private investment. Lastly, poor public sector governance, regulatory weaknesses, policy failures, incompetence, corruption and cronyism are viewed as drawbacks to the designing of privatisation in developing countries (ibid, p. 534).

According to these arguments, many developing countries would likely face many challenges and constraints when attempting to implement privatisation. Nevertheless, if developing countries can overcome these constraints, privatisation will contribute to their economic growth and development. But, privatisation in these countries needs to be promoted in line with effective government. In each case, the state should play a role in strengthening private investment laws and regulations. The governments of these countries should be willing to reform their roles and policies and build up their capacity. Achievement of these targets requires close partnership between the public and private sectors in developing countries.

2.5.3 Private foreign investment in developing countries

Since the late 1980s, privatisation has been an essential policy in the promotion of private investment in developing countries. During this period, FDI has steadily increased and received more attention from these countries. Private investment is recognised as a main source of financial capital for creating jobs and incomes; income growth will stimulate both the local and national economies, facilitate poverty reduction, and allow knowledge and technology to be transferred from the developed to the least developed countries (Development Assistance Committee, 1995; Klein, Aaron & Hadjimichael, 2001; OECD, 2005). As regards profit maximisation, private investment may have different impacts in developing countries; hence, it is important to understand the meaning of investment. In economic terms, investment can be defined as:

A decision to forego present consumption opportunities in order to increase future opportunities by increasing the value of existing resource stocks. It is a choice for the future...Investments, whether made by government or private individuals, can create, protect, improve or reduce the value of scarce sources used by people. They can also change value systems and change things in ways that have no relevance to market considerations. Investments influence the level, nature and distribution of the resources and, hence, resource utilisation (Young, 1992, p. 11).

Many developing countries have abundant natural resources, which could be utilised for their poverty reduction and development programs. But, due to inefficiency of financial and human capital, they fail to utilise these resources for their development. One way to achieve this

objective for many developing countries would be to strategically encourage private foreign investment and to utilise their resources as investment incentives. As argued above, private foreign investment in developing countries can prove controversial from various perspectives: it can either reduce or increase the value of scarce resources, a subject I discuss below.

Drawing on many schools of thought, Lall (1974) examined both arguments for and against private foreign direct investment in less-developed and developing countries. He (1974, pp. 43-44) proposed three approaches to support foreign investment. First, based on a business-school approach, the free enterprise system was believed to be moral and practical in assisting distribution of income within and between countries and reducing the economic, political and social effects on the developing countries. By adopting this approach, firms could exercise greater efficiency when linking these countries to the outside world. Second, based on the traditional economic approach, profitable foreign private investment could create investable resources and growth, welfare economics, integrative effects with transmission of tastes, designs, ideas and technology and other benefits of new technology, better management and organisation, superior marketing and cheap finance in the host developing countries.

Lall (1974, pp. 44-46) also proposed three approaches to opposing foreign investment in developing countries. First, based on the nationalist approach, the international free market system in the developing countries could be criticised in many ways. For example, several external effects of foreign investment were claimed to damage the host economies; e.g., suppression of domestic entrepreneurship, importation of unsuitable technology and products, unnecessary product differentiation, the worsening of income distribution, providing expensive consumer goods, high costs due to extracting monopoly profits, utilising superior bargaining power to gain concessions, using unsuitable products, technologies and unfair marketing practices, and unsuitable integration with international trading systems. In light of the above, free trading could hurt rather than benefit economic growth in developing countries. Second, based on the dependence approach, the social, political and economic consequences of capitalist institutions in developing countries were analysed and often criticised on the grounds that real development would not happen in developing countries due to their inherent dependence. In other words, it was dangerous for these countries to depend on foreign investment. Similar to the nationalist approach, the developing countries would need to change both their external relations and internal power structures before contemplating development. Third, the Marxist approach, which was based on neo-imperialism and exploitation argument, attacked the value of the capitalist system in its

entirety. It claimed that foreign investment would create social class conflict, and that foreign investors' intention was to extract economic surplus from the developing countries. Thus, these countries could experience internal revolution and complete rejection of foreign capital.

In addition, common private investment roles in the development process were assumed to bring together capital, technology, entrepreneurial ability and marketing skills, all of which are scarce in the developing countries (Porter, 1971). Porter (*ibid*, pp. 59-61), who opposed these grand contributions from private investment, criticised private investment in developing countries from many perspectives. First, he claimed, employment and income in the important economic sector would be dependent upon foreign enterprises. This could see both public and politicians' destinies move beyond the control of government. Second, private investment would express interest in the unexploited natural or mineral resources in developing countries as a means of maximising profit from their capital investments, e.g., the international oil industry, extractive industries and plantation industries. Third, foreign investment invariably takes advantage of particular resources available in developing countries; e.g., abundant and productive labour and cheap foreign exchange. These policies may be good for the above countries' exports and growth; but, the main danger lies in the fact that employment and income would be dependent upon decisions taken either by the parent company or by particular groups, and this could give rise to political problems. Finally, many developing countries set some policies, such as import substitution policies, to protect and grow their own manufacturing industries. Foreign investment might seek to benefit from these policies in their interests as such policies can reduce production costs and increase profits from investment. In such cases, foreign investment can be risky for developing countries because their profits rely on protective systems rather than on production efficiency. Based on these arguments, Porter expressed great concern for governments encouraging private investment in their home countries.

Drawing on both the pros and cons arguments delineated above, private investment can pose both benefits and risks to developing countries. Hence, it may be suggested that several issues need to be taken further into account when discussing and considering the impacts of private foreign investment on developing countries. For example, four aspects suggested by Lall (1974) might be important for consideration, namely foreign investor–host government relationships, transfer–pricing and export restrictions, technology and cost of foreign investment.

2.6 Rethinking PEN and private investment.

This section aims to reflect on the above arguments, critique current understandings of the relationship between PEN and private investment, and address the realistic issues faced by many developing countries. I start by arguing against poverty as a cause of environmental degradation, and then explore issues between economic growth and environmental degradation, politics of resource use and degradation and, lastly, the many relationships inherent in PEN.

2.6.1 Poverty not the cause of degradation

While many studies have explained the linkages between poverty and environmental degradation in many ways, questions persist regarding degradation of the environment by the poor. While they may pose many threats to environments in developing countries, they are not the only cause of environmental degradation (Pinstrup-Andersen & Pandya-Lorch, 1995). Environmental degradation, especially overgrazing, deforestation, over-exploitation of fuel-wood and water pollution can be attributed to both internal and external factors such as inadequate property rights, inappropriate government policies, lack of access to markets and credit, and inappropriate technology for agricultural intensification; and, these factors allow people who have administrative power and authorities – rather than the poor – to gain benefit by exploiting the resources and then pushing the poor into poverty (Pinstrup-Andersen & Pandya-Lorch, 1995; UNEP, 2010). In an interesting case study of the Bakas in a Congo rainforest, where property rights were low, the rural people felt that they owned the forest and did not want to harm it; but, outsiders came to Bakas and started damaging their livelihoods by destroying the forest and creating environmental degradation and associated risks (see Angelsen & Vainio, 1995, p. 174). Killeen and Khan (2001) question whether the poor should be blamed for environmental degradation because they often prove to be willing to explore and adopt new ideas and ways of organisation and work with the goal of reducing their poverty. Swinton and Quiroz (2003), who empirically applied multiple regression analysis of farm survey data from the Peruvian Altiplano in 1999, suggest that natural resource sustainability did not correlate with the level of poverty; rather, it varied according to management activity.

Many studies have opposed poverty as a cause of environmental degradation. For example, the poor have been viewed as both agents and victims of environmental degradation (Angelsen, 1997); and, while the local people are attributed with having local knowledge of

resource management that will preserve the natural resources in their areas, this traditional knowledge is often undervalued or ignored by top-down organizations (DFID et al., 2002, p. 28). From this perspective, the poor may do even better in the sphere of environmental management, particularly if incentives and information are made available to them. In addition, it is argued that the poor are not the principal perpetrators of environmental damage: the rich are common polluters who render resources scarce for the poor (Jehan & Umana, 2003, p. 61). The non-poor commercial companies, state agencies and the rich are responsible for environmental damage on a broad scale through land clearing, agro-chemical use, water appropriation and waste. As a consequence, the poor become victims of the consumption levels and patterns of the rich. It would thus seem that most environmental degradation is caused by the non-poor rather than the poor (DFID et al., 2002, p. 28).

Population growth may not always degrade environments everywhere: the main causes of degradation may be found in the complex specific social, economic, environmental and governance of population growth currently taking place (DFID et al., 2002). In their recent empirical study undertaken in Pakistan, Khan, Inamullah and Shams (2009) found that population stress had little if any significant direct effect on all aspects of environmental status. They also note that any discussion surrounding the negative impacts of population growth tends to return to the potential dangers of population growth in the late 18th century, to Thomas Robert Malthus' principle of population. Some studies consider population growth as a source of economic expansion, innovation and opportunities leading to greater wealth and better resources management (DFID et al., 2002). Furthermore, by illustrating a comparable case between rapid population growth and sustainable environment management among the Machkoks of Kenya, and drawing on a combination of technological change supported by a conducive policy framework and much local initiative, Jehan and Umana (2003) claim that while population growth may cause degradation at the outset, what happens next is context-specific. Boserup (1965) considered population growth as an independent variable, a major factor in determining agricultural development; e.g., when a population grows rapidly, it encourages a large number of agricultural fields to be cleared or provided with irrigation facilities, thus resulting in two harvests annually rather than one. Therefore, it seems important to emphasise that several factors can affect both poverty and the environment. In the main, the poor strive to preserve their local environment because their livelihoods are closely tied to their natural resources.

2.6.2 Many relationships among growth and degradation

As claimed above, natural resources may be increasingly exploited for export and for meeting local consumption in order to achieve high economic growth. However, this claim describes only one aspect of their relationships. In fact, there can be many relationships between economic growth and environmental degradation, and these relationships can be explained by particular concepts. In this section, I will elaborate upon their relationships using the following three concepts: the curse of natural resources, the 'Dutch disease' and the Environmental Kuznets Curve (EKC).

The first concept is based on the resource curse phenomenon, which emerged in the 1980s to support the notion of an economic curse on natural resources. Auty (1993, p. 1) used this concept to explain the inability of countries rich in natural resources to boost their economies and lower their economic growth compared to how other countries with small natural resources handled their economies. Their inability was caused by many factors, including inefficient government policy and foreign exchange constraints; but, in the case of mining economics, Auty (1993, p. 3) indicated that causes included small linkages with local production, immediate profit flowing overseas, and substantial rents. Sachs and Warner's (1995) study of economies with a high ratio of natural resource exports to GDP confirmed this negative relationship. Thus, based on the concept of resource curse, one may suggest that abundant resources do not always guarantee economic growth: nor do they cause resource degradation.

Similar to the issues of resource curse but from different perspectives, the second concept derives from the 'Dutch disease', which Auty (1993, p. 15) refers to as an economic phenomenon that gains revenues from resource exports, e.g., revenues from the mining sector. It damages a nation's productive economic sectors by causing an increase in real exchange rates and wages (Davis, 1995). The main argument is that high investment and its revenue in the resource sector render a given nation's currency stronger compared to that of other nations. As a result, exports become more expensive for other countries to buy, the manufacturing sector loses its comparative advantages, and economic growth suffers as exports decrease. For example, Kyophilavong and Toyada's (2008) examination of foreign capital investment in the natural resource section in Laos in relation to Dutch disease issues found both positives and negatives vis-à-vis foreign capital inflows and the Dutch disease syndrome in the Lao economy in the long term. Thus, the Dutch disease syndrome tends to suggest that utilisation of resources may harm rather than help economic growth.

Finally, the EKC may explain the above complex relationships. According to the EKC, environmental degradation would initially increase in a country along with economic growth until higher income levels led to higher investment in the environment; then, degradation would reduce (Reed, 2002; Stern et al., 1996). Jha and Murthy (2006, p. 31) describe the EKC as the relationship between environmental degradation and an income level that is non-linear –positive up to a point, and negative thereafter, implying that the income elasticity of demand for the environment is higher than the level of income. The environment struggles to reach economic growth until the average income reaches a certain point over the course of development as an inverted U-shaped curve. Thus, in the long run, economic growth may not degrade the environment. Jehan and Umana (2003) also observe that particular pollutions, such as air pollution, water pollution and solid waste, have been found significantly related to income in the EKC concept while other pollutants from natural resource use or biodiversity, energy, land and resource use may not be related to income levels. In addition, they argue that the EKC can be changed or influenced by government policies and institutions' strategies (Jehan & Umana, 2003). For instance, the removal of perverse subsidies, the internationalization of externalities and the identification of property rights can change the relationship between income levels and levels of environmental degradation. Therefore, the relationships between economic growth and environmental degradation are various and rooted in multiple sources.

2.6.3 Politics of resource use and degradation

Economic growth is often seen as the key policy for achieving poverty reduction in developing countries, growth that can be achieved through the use of their natural resources. The fact that decisions to use these resources for growth are politically researched by their respective governments or states, meaning that the countries' political and economic interests are likely interrelated to shaping sustainable use of their resources. This view is important when considering political intervention in critiques of the relationship between PEN and private investment.

A number of controversies surround the ways in which politics play a role in resource use and degradation. First, politics can influence government decision-making and the policies implemented in developing countries to exploit the local resources in the interest of economic growth and poverty reduction. In this sense, politics may be clearly used to deplete resources as a means of pursuing a country's development programs. At the same time, governments may be requested to implement specific environmental policies to improve resource

degradation and maintain environmental sustainability. If such policies prove successful, the strength of PEN may be either reduced or totally dissipated. However, it is still questionable whether the politics of resource usage and degradation will achieve such positive results because the success of the policy implementation is likely to depend upon many factors such as the ability of governments to enforce their policies, rules and regulations in the wider sphere.

Second, debates surrounds whether the resources in developing countries are politically used to benefit politicians rather than in the countries' developmental interests. In general, government exercise their authority or power to formulate policy, to control, use or conserve the natural resources for their desired outcomes. Peluso (1993, p. 210) argued that "a state generally allocates rights to extract or protect resources in ways that benefit the state itself." If this is the case, politicians can use their authority to exploit the resources in ways that will benefit them personally. In some cases, while the benefits of resource usage may target for a country's development, exploitative politicians can still gain benefits for themselves, especially in the context of political corruption. For example, UNESCAP (2003, pp. 293-294) claimed that massive deforestation in Indonesia during the 1990s was the result of a corrupt political and economic system that regarded natural resources as a source of private revenue.

Finally, variations in property rights and the lack of stability of a political system may result in resource use and degradation. Deacon and Mueller (2004, p. 4) claim that "political institutions affect property rights, and property rights in turn affect resource use." This means that weak property rights to resources may result in weak or ambiguous use or ownership claims to resources, particularly in countries where the rule of law is not well-established. Additionally, the stability of politics directly relates to the use of resources. Deacon and Mueller (ibid, p. 41) argue that "the stability or instability of a country's political system is a specific political attribute that has been shown to have significant effects on natural resource use. Where political systems are volatile, individual ownership claims to the future returns to resource conservation actions tend to be uncertain."

Drawing upon the points listed above, politics can intervene in resource use and degradation in many ways and for different purposes in developing countries. As regards the degradation of resources, political intervention can benefit either the country's development or politicians or both. Nevertheless, to some extent, political intervention needs to be taken into account when considering the relationship between PEN and private investment.

2.6.4 The many nexuses of PEN

Many of the above studies tend to agree that the concept of PEN is rational for understanding issues surrounding development in developing countries. However, some scholars have claimed that the concept of PEN is too simple an explanation of the linkage between poverty and the environment. They further claim that many realistic issues tend to be hidden behind the nexus. For example, Angelsen (1997), who suggested going beyond this simplistic explanation, offered four critical and dynamic viewpoints:

First, one could question whether low income does indeed cause environmental destruction, and – as a corollary to this – higher income (economic growth) will reduce the problem. Second, the relative importance of poverty-driven degradation could be questioned. Should one instead focus on, for example, degradation resulting from exploitation by powerful (rich) groups and misguided government policies? Third, the coexistence of poverty and environmental disruption could be understood as the outcome of the same process and as having similar causes. A key word in this connection is environment entitlements or resource rights. And finally, higher income can both help and harm to the environment, and it is dependent on particular problems and contexts (Angelsen, 1997, pp. 136-137)

Based on empirical studies, Angelsen also provided an insightful argument in his conclusion (1997, pp. 150-151). He saw a strong correlation between poverty and environmental degradation occurring as the poor live in or move into these vulnerable areas because they are poor, rather than causing a linkage between poverty and degradation. It is important to understand the factors creating and maintaining the vicious circles of PEN, which should be seen as the joint consequence of limited opportunities for some groups: uneven progress of development, unequal distribution of rights and power, and misguided policies.

Nadkarni (2000) claims that the vicious circle of PEN is vulnerable to criticism on many counts: these criticisms are summarised below:

First, the simplicity and exaggeration of the vicious circle can be a misleading thesis, particularly in the context of an overall generation. For example, the poor have a concern for the future and are conscious of their take in the sustainable use of their resources, but lack incentives, appropriate institutions and clear property rights. Second, in the vicious circle, not all environmental degradation is due to pressure from the poor; for example, deforestation due to pressure for expanding railway network, wood requirement in urban areas, and the Second World War. Third, not all poverty can be attributed to environmental degradation, but due to a history of colonial exploitation and continuing feudal structures, and corruption on the part of political leaders and officialdom. Finally, in a limited area, the circle of PEN is only one of the multi-fold diversity of patterns and situations. The other patterns may include a trade-off between poverty alleviation and conservation of the environment; necessary conservation which hurts the poor, at least in the short run; development which aggravates both poverty, and

environment degradation; and persistent poverty helping the cause of the environment (Nadkarni, 2000, pp. 1184-1186).

Drawing on the arguments of Angelsen and Nadkarni, one could simply view PEN as a vague concept given that it has presented ambiguous issues surrounding itself and left many gaps in these issues to be further debated. While Angelsen has raised many questions regarding the validity and usefulness of PEN, Nadkarni suggests viewing PEN as a many – patterned nexus rather than as a single perception of vicious circle. Besides identifying PEN as an ambiguous concept, this research will take advantage of the complexity of PEN to further investigate its ambiguity. Focus will be upon Laos, whether PEN exists in Laos, and on internal factors, like private investment in the resource sector, that stimulate PEN. To this end, a nexus describing the relationship between private investment (PI) and PEN will be modelled (PIPEN, see Figure 2.5 below). PIPEN will be the core subject used to further analyse the remainder of this study.

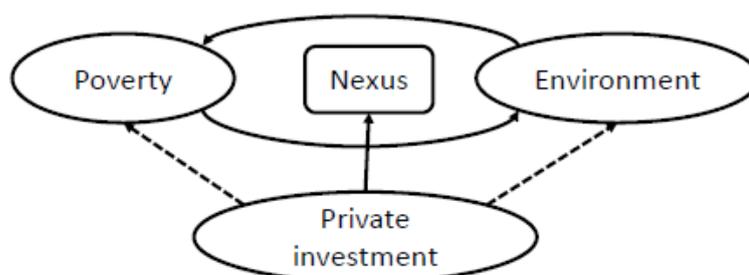


Figure 2. 5: Relationship of Private Investment and PEN (PIPEN)

2.7 Summary of Chapter 2

This chapter has reviewed the key concepts illustrated in the research framework in Chapter 1. In it, I have explained the ways in which poverty has been conceptualised and adapted into rural development works. Particularly, concepts of poverty have been used as a tool to elucidate the sustainable livelihood approach (SLA) and frameworks. Currently, many development organisations have incorporated the SLA into their development programs. The broad concepts of environment have been elaborated and narrowed down to the scope of natural resources. The interaction between the environment and resources has been examined through concepts of environmental function, value and direct relationships in nature. Their interactive relationship is also detailed in terms of natural resource benefits, access and degradation in the context of rural poverty. The concept of PEN is explained in terms of “vicious circles” rather than “virtuous circles” by emphasising how poverty causes

environmental degradation which in turn results in poverty. The concept of a private sector as a potential solution for development in developing countries has been highlighted by stressing the debate surrounding privatisation policies and practical arguments pertinent to private foreign investment in developing countries. Much criticism has been raised regarding the vicious circles of PEN, criticism that has opened the door to further discussion of issues of PEN. For this reason, the rest of this thesis will focus on issues of incorporating private investment in the resources sector into the nexus. This will result in generating a model, the so called interaction of private investment (PI) with PEN or the PIPEN model.

Chapter 3: Poverty, environment and private investment studies in Laos

3.1 Introduction to Chapter 3

In this chapter, I will explore how poverty is linked to the environment in Laos, and the ways in which the poor have to use local resources and traditional methods to sustain their livelihoods. While some of the poor tend to overexploit these resources, most do not. In reality, many external factors, for example government development policies, natural disasters and market access, put pressure on these resources, causing resource degradation and forcing the local people to deplete their resources. Another scenario sees the poor having to degrade their resources because of resource competition with the above external factors.

This chapter sets out to delineate some of the key factors underpinning issues of poverty, environment and private investment (see Chapter 1) and related concepts (see Chapter 2) in the context of development studies in Laos. I aim to identify the gap in the understanding of these issues from empirical and policy perspectives, as a main challenge to the policies and decision-makers in Laos. Acknowledging the paucity of core academic studies pertinent to these issues in Laos, this chapter opts to review key concepts based upon the GoL's projects, works, papers and reports, and some relevant academic studies.

This chapter consists of seven sections, including this introductory section. The next section reviews some studies of poverty and rural livelihoods in Laos. Section 3.3 seeks to examine resource endowments in Laos, the government strategies for utilising these resources for the country's development, and the regulations that protect said resources. Section 3.4 explores academic studies and work related to PEN in Laos conducted by major development agencies, namely the ADB, IUCN, and the World Bank. Section 3.5 addresses the expanding issue of private investment in Laos based on privatisation policies, private sector development, investment promotion and management as well as debate surrounding the contribution of private investment to Laos. Section 3.6 describes the poverty-environment initiative (PEI) programme in Laos and addresses issues of PEN vis-à-vis private investment in the resource sector. In the last section, I summarise the key points of this chapter and emphasise the importance of this study by reiterating its research problems and methodologies.

3.2 Poverty and rural livelihoods in Laos

Rigg (2005) states that Laos is one of the world's poorest and least developed countries and also one of the least understood and studied countries of Asia. This statement is important inasmuch as it calls for more attention to be paid to issues of poverty in Laos. From this viewpoint, the GoL describes many of the country's poverty-related issues as complex, and tends to recognise poverty in terms of families who have been either stricken by misfortune or are the least well-off in a given community (Government of Laos, 2004c, p. 20). Based upon these perceptions, multiple solutions are required to address the issues of poverty in Laos: many solutions are needed to enhance the livelihoods of the poor who live in the country's rural and remote areas with a view to achieving sustainable development. To date, the GoL has implemented many rural development programs aiming to address poverty issues and to improve the rural livelihoods in many areas of the country (listed in Figure 1.3, Rigg, 2005, p. 11). Rather than undertaking a comprehensive review of these works, the focus of this section is upon the ways in which poverty is measured and studied in Laos based on government approaches that I discuss in the following chapters. I also explicate studies of poverty measurements, their mapping methods, and the ways in which these works are related to rural livelihoods in Laos.

3.2.1 Poverty measurements and studies in Laos

The explanations of poverty provided in Chapter 2 suggested various factors that can result in an increase in poverty, such as environmental hazards, poor access to markets and technology, lack of capabilities, political instability and regional conflict. A critical issue is to what extent these factors can be applied to understand poverty in Laos. Rationally speaking, many difficulties can be raised if all of these factors are used to explain poverty. First, the poor may not be able to recognise many of these factors, particularly those related to political and development policy, as main causes of their poverty. In fact, they may consider only a few of them. For example, in both PPAs, the poor suggested lack of physical, financial and human capital including land cultivation, livestock, financial investment and technical knowledge, to be the main causes of poverty (Chamberlain, 2007; Government of Laos, 2004c; Rigg, 2005). Second, while the poor may recognise some of these factors in relation to their poverty, the way they described the contributions of these factors was invariably limited due to their weak understanding. Thus, the additional difficulties would be related to a need for precise methods, time and budgets to collect the poverty data. Third, low technical skills and low number of local government staff may capably obstruct their data collection, analyses and

results interpretation. If they are to carry out these technical tasks and quantify poverty, there is a need to first build up their capacity and technical skills. For these reasons, adding too many poverty factors into their surveys may prove misleading when attempting to ascertain the degree of real poverty in Laos.

In practice, the GoL decided to incorporate some important determinants of poverty into their assessment, emphasising the importance of socio-economic factors to the livelihoods of the poor. Details of these decisions are provided in the NGPES (Government of Laos, 2004c, pp. 20-39). On the formulation of the National Poverty Eradication Programme, the Prime Minister Instruction No.10 dated 25 August 2001 officially defined poverty in Laos as “the lack of ability to fulfil basic human needs such as: not having enough food [i.e., less than 2,100 calories per day/capita], lack of adequate clothing, not having permanent housing, not capable of meeting expenses for health care, not capable of meeting educational expenses for one’s self and other family members, and lack of access to transport routes” (Ibid, p. 20). This definition has been used as an official principle in Lao poverty studies.

Prior to the official definition of poverty, the poverty line was originally defined in Lao Expenditure and Consumption Survey (LECS) II as based on a calorie requirement of 2100 calories per person per day plus an allowance for non-food consumption (Ministry of Planning and Investment, 2010). Kakwani et al. (2001), who provide details relevant to the construction of poverty line measurement in Laos, maintain that people who live below this particular poverty line are considered to be poor. Poverty measurement in Laos follows this official definition. Many approaches may be applied to measure poverty in Laos including income and consumption, anthropomorphic measurements, access to development opportunities and qualitative methods (see Xaovanna, 1999). Poverty measurement combines these methods, then classifies them in both quantitative and qualitative terms (Government of Laos, 2004c). Each term is briefly explained below.

A quantitative approach has been adopted by many studies of poverty measurement in Laos (see Government of Laos, 2004c; Kakwani et al., 2001; Ministry of Planning and Investment, 2010; Xaovanna, 1999), for example, when analysing consumption-based welfare measurement that includes consumption expenditure and other indicators of deprivation such as limited access to healthcare and education. Data used for these analyses were drawn from the LECS of individual, household and village levels conducted every five years. With donor support, the first LECS I survey was undertaken in 1992/93: focus was on consumption and social indicators. This was followed by LECS II (1997/98), which focused on economic

issues, and LECS III (2002/03) and LECS IV (2007/08), both of which focused on household income and consumption and a wide-range of poverty-related issues. In each LECS survey, questionnaires sought detailed information on household consumption expenditure, or known sums of expenditure on food and non-food consumption including cash expenditure and the in-kind value of own-produced items consumed over the previous 12 months. In the last step of quantitative poverty measurement, data from LECS were computed and the results used to compare against the poverty line alluded to above. Those who fell below the poverty line were considered poor.

It is obvious that some expertise is needed when implementing quantitative measurement; otherwise, it may be difficult for the local authorities to understand poverty according to this method. Thus, as suggested in the NGPES, official poverty criteria have been developed to help and enable the local authorities to monitor their local poverty (Government of Laos, 2004c). These poverty criteria have been divided into household, village and district levels:

Households considered poor are households with an income (or the equivalent in kind) of less than 85,000 kip (100,000 kip for urban and 82,000 kip for rural) per person per month (at 2001 prices). This sum allows the purchase of about 16 kilograms of milled rice per person per month; the balance is insufficient to cover other necessities, such as clothing, shelter, schooling and medical costs.

Villages are considered poor if they meet one or all of these criteria:

- Villages where at least 51% of the total households are poor.
- Villages without schools or schools in nearby and accessible villages.
- Villages without dispensaries, traditional medical practitioners or villages requiring over 6 hours of travel to reach a hospital.
- Villages without safe water supply.
- Villages without access to roads (at least trails accessible by cart during the dry season).

Districts are considered poor if they meet one or all of these criteria:

- Districts where over 51% of the villages are poor.
- Districts where over 40% of the villages do not have local or nearby schools.
- Districts where over 40% of the villages do not have a dispensary or pharmacy.
- Districts where over 60% of the villages lack an access road.
- Districts where over 40% of the villages do not have safe water (Government of Laos, 2004c, pp. 30-31).

Based on these criteria, 25 districts were identified as poor and 47 districts as poorest in 2002. These 72 poor districts accounted for of 4,126 poor villages out of the national total of 5,382, and 160,592 poor households out of 318,877 (see Tables 1.3 and 1.4, Government of Laos, 2004c).

Before proclaiming official poverty line, studies were conducted to quantitatively investigate poverty in Laos. For example, Kakwani et al., (2001) note that the World Bank studied poverty in Laos in 1995, followed by Statistics Sweden¹⁵ in 1999, both employing their own approaches; but, their results were mixed and conflicting due to lack of a standardized poverty line. The World Bank applied a head count ratio method with a food poverty line of 2100 calories or approximately 8,558 kip per person per month, and a non-food expenditure poverty line of 11,472 kip per person per month for every individual in each household data during 1992-93. The World Bank found the highest poverty incidence in the South (60%), followed by the North (46%) and the Central region (40%). In 1999, Statistics Sweden's poverty study assumed a norm of 2100 calories per day for every member of the household regardless of age during 1997-98. The study found the North to be the poorest with 54.3% of poverty incidence compared to 48.8% in the South and 36.6% in the Central region. Kakwani et al., (2001, p. 23) claim that these two studies were conflicting and biased in the same way in favour of families with children. Later, they employed monthly food and non-food consumer price indices in 1992-1993 and 1997-1998 to analyse the incidence, depth and severity of poverty in Laos. They found the highest poverty incidence in the North, followed by the South, in line with Statistics Sweden's 1999 results.

Qualitative measurement has been explained in some studies in Laos; for example, by the NGPES (Government of Laos, 2004c), and first PPA (ADB, 2001) and the second PPA (Chamberlain, 2007). Citing from these studies, qualitative measurement relies upon methods of rapid poverty assessment (RPA) techniques developed in 1997 by the State Planning Committee (or currently Ministry of Planning and Investment), and implemented through a number of regional consultation workshops on poverty organised in Laos. The main aim of the qualitative approach is to understand poverty at the grass-roots level, the causation and perceptions of poverty, and the experiences and concerns of the poor regarding reduction of their poverty (ADB, 2000; Chamberlain, 2007). When utilising this approach, it is important to establish how the poor define their poverty, to capture what they experience in their own words, and to determine the causes of, effects and possible solutions to their poverty. Accordingly, questions posed in the assessment must first identify who the poor are; where they live; why they have become poor; what poverty is in their view; and, how they see themselves being lifted out of poverty. The two PPAs were conducted in Laos in 2000 and 2006 by the Department of Statistics (DoS) and financed by the ADB, as detailed below.

¹⁵ Statistics Sweden was a the Lao-Sweden Cooperation Project on Statistics supported by SIDA.

The first survey PPA, undertaken in 2000, began with 84 poor villages from 18 provinces and 43 districts: it extended until 2002. After analysis, many of the key issues appertaining to poverty in Laos were tabled and reported in the NGPES (Government of Laos, 2004c) and the ADB (2001) poverty assessment report. According to these reports, the survey found that most of the poor were ethnic minority swidden cultivators. Apropos of poverty in terms of livelihood, the villagers considered themselves as not poor and not in endemic poverty when they were able to meet their consumption needs. In addition, the PPA found that the poor measured their poverty in terms of rice sufficiency. They claimed that among the causes of poverty were insufficient amounts of land for cultivation and natural disasters. The poor offered many opinions related to their poverty as summarised below.

- The indicator of poverty is rice sufficiency; the indicator of wealth is livestock.
- The main problems (related to rice sufficiency) include reduction of land available for swidden cultivation, livestock disease, ill-health, hiring out labour, lack of necessary technical knowledge, lack of access to roads, lack of clothing, and poor housing.
- The main causes of poverty are [decreasing order of importance]: (i) problems associated with land; (ii) livestock loss due to lack of veterinary services; (iii) lack of cash investment to make livelihood improvements; (iv) natural disasters; (v) environmental problems; and, (vi) lack of water for agriculture (ADB, 2001; Government of Laos, 2004c, p. 29).

The second PPA, which was conducted by Chamberlain (2007) in 2006, selected 95 poor villages in the 47 poorest districts from North to South as samples for data collection and analysis. Of the 95 poor villages, 35 were from the first PPA. Chamberlain (*ibid*, p. 67) found that the villagers' understanding of poverty underwent significant change between 2000 and 2006. For example, they imputed the poverty they endured in 2000 to emotional states associated with personal tragedies or conditions of suffering common to all Buddhists rather than to economic hardship; and, they did not describe themselves as poor. But, in 2006, they described themselves as poor in order to attract outside assistance. In addition, when comparing the first and second PPAs, Chamberlain (2007) reveals many similar findings. For example, limited access to cultivation land for rice production was considered a major cause of poverty. Local development officials were held responsible for this limitation for it was they who had implemented land reform and village consolidation, and ordered shifting cultivation eradication in both PPAs. He also observes that many government programs devised to reduce poverty had adverse effects, for example, on human health, livestock disease, population pressure and scarcity of land resources. The primary causes of poverty identified by the villagers in both periods in each region have remained the same regarding

the agricultural sectors, for example insufficient land for cultivation and lack of livestock in the North, lack of cultivable land and investment money in the East, natural disasters and lack of land in the South, and lack of access to cultivable and forest land in the Central region. Hence, the proposed solutions to their poverty are agricultural activities-related. Chamberlain (ibid, p. 52) claims that these findings are common because most of the villagers are farmers: the real causes of poverty might result from uncontrollable externalities experienced by the villagers, such as government development policies, geographical areas, and limited access to markets. Chamberlain (ibid, p. 75) briefly concludes that poverty in Laos is 'new' because it deals with external factors that are uncontrollable; consequently, poverty is associated with calamity, misfortune, fate, and karma. He suggests that the focus of government assistance should be upon the real problems identified by the villagers; otherwise, it will be difficult to alleviate poverty in any meaningful way.

Drawing from both quantitative and qualitative measurements, it is possible to suggest that poverty in Laos needs to be viewed from multiple dimensions. These are critical issues and challenges to the GoL because dealing with national wide poverty from the North to the South may need more natural resources as well as time to address. At the same time, while the external factors mentioned above continue to impose pressure on the poor, the GoL needs to be more careful when implementing policies related to issues of poverty. When contemplating policy decision makers and studies, more information on poverty drawn from these measurements is needed. Poverty mapping may be seen a tool to facilitate these needs.

3.2.2 Poverty, inequality and vulnerability mappings in Laos

Poverty mapping, as a method of creating maps from poverty data, could become a crucial tool for development planning in Laos, particularly for development organisations like government institutions, policy decision-makers and potential donors. In addition to the LECS, there are various data sources in Lao, such as Economic, Agriculture and Population Censuses; for example, a National Population and Housing Census (Population Census) has been undertaken every 10 years since 1985. By applying these data, poverty mapping in Laos can be done by incorporating it into the official poverty criteria. For example, based on poverty criteria and data from LECS II in 1997/98, and provincial information regarding the number of poor households, the DoS produced an official map of poverty incidence showing 72 poor districts classified into 47 poorest districts and 25 poor districts (see Figure 3.1). This 72 poor district map served as a main source of policy guideline for 2004 NGPES. This map also shows the poor priority districts clustered in the North-west of the country; then, it

follows the districts along the Vietnamese border and the Phou Luang (the Annamite Chain) down to the South-eastern tip. Most of these poor districts are located mainly in the mountainous and highland areas where accessibility is often difficult. Only a few poor districts are found along the border with Thailand.

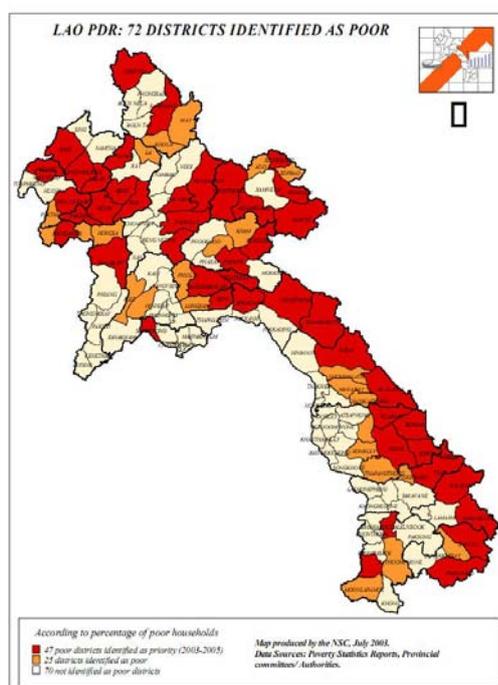


Figure 3. 1: Map of 72 districts identified as poor by DoS, MPI
Source: Government of Laos (2004c)

In recent times, the NCCR¹⁶ and IFPRI¹⁷ have jointly studied poverty and inequality mapping in Laos (see Epprecht, Minot, Dewina, Messerli & Heinemann, 2008; Messerli et al., 2008) by applying data from LECS III in 2003 and the Population Census in 2005. In this study, a method known as “small-area estimation” technique was employed to estimate poverty and inequality at a high level of spatial disaggregation across the country, with special focus on terms of place and people at the village, district and province levels. Some results of their key findings have been applied to establish the incidence of poverty at the provincial and district levels (see Figure.3.2). Poverty maps at the village level are shown in Figure 1.1, Chapter 1. The density map indicates a high number of poor people living in areas with a low poverty rate, mostly in the urban and capital districts. In Figure.3.2, the maps of poverty incidences reveal that the poorest areas in Laos are located in the south-central mountain areas along the borders with Vietnam to the eastern provinces. The maps suggest that the high poverty rate areas often accommodate small numbers of poor people. The poor mountainous areas are

¹⁶ NCCR – Swiss National Centre of Competence in Research (NCCR) North-South

¹⁷ IFPRI – International Food Policy Research Institute

home to small numbers of people, while large numbers are found in the urban areas and along the Mekong valley. Epprecht et al., (2008) claim that poverty alleviation programs concentrating only upon areas with the highest poverty rate may exclude most of the poor people living in the lowlands.

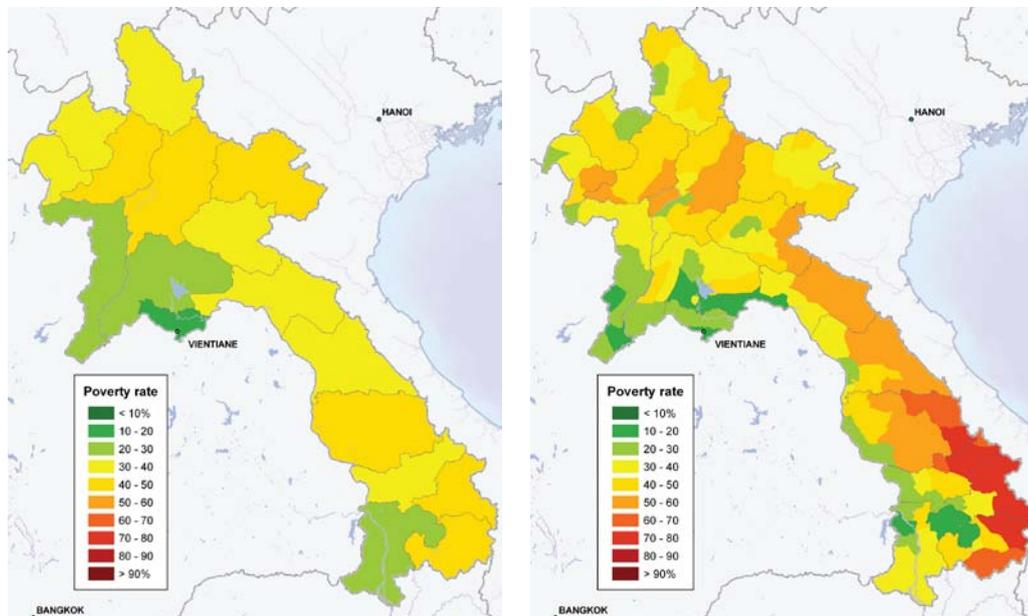


Figure 3. 2: Maps of incidence of poverty at the provincial and district levels
 Source: Extracted from Figures 3 and 5, Epprecht et al.(2008)

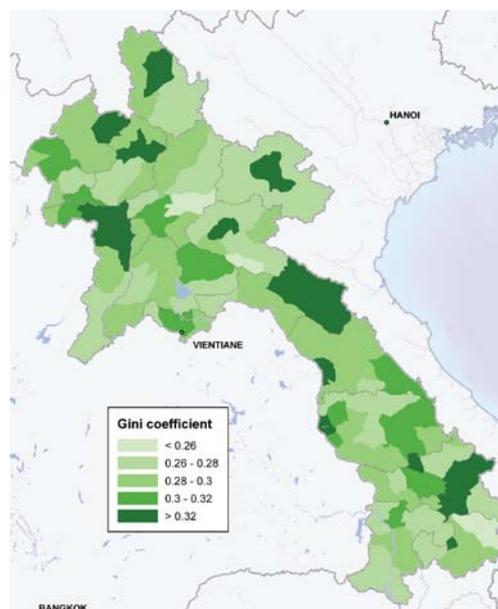


Figure 3. 3: Map of inequality measured by Gini coefficient
 Source: Extracted from Figure 15, Epprecht et al. (2008)

NCCR and IFRI used small-area estimation methods to estimate the district level of income inequality, using per capita expenditure across households to indicate the welfare distribution of an entire population in Laos. Three inequality measurements, namely Theil L index, Theil T index and the Gini coefficient of inequality, were used in this study. But, only the Gini

coefficient method is explained as an example in this section. Details of the others may be extracted from Epprecht et al (ibid, pp. 37-49). The Gini coefficient measures inequality between 0 and 1, and a higher Gini coefficient implies more inequality. Based on the Gini coefficient map shown in Figure 3.3, Epprecht et al. (pp. 80-81) established that inequality was greatest in the urban areas and in the northern highland: it was lowest in the poor south-central highland and in the relatively well-off Boloven Plateau. In addition to poverty and inequality maps, it is important to consider vulnerability maps. Poverty and vulnerability are closely related in the sense that the poor are vulnerable to external factors like natural disasters and resettling government policies. Vulnerable households, when exposed to these factors, easily fall into poverty.

In 2004, the United Nations World Food Program (WFP) created a spatial vulnerability to food insecurity map (see Figure 3.4) in order to determine the real extent of food insecurity in Laos (World Food Program, 2004). Principle Components Analysis (PCA) technique and 14 indicators related to food security from the Population Census in 1995 and the Agriculture Census undertaken in 1997/98 were applied. By applying this method, vulnerable villages are expected to reflect: poor access to agricultural land, low rice production and crop diversity, low levels of livestock, predominantly forested areas, villages located some distance from rivers and roads, low educational achievements (heads of households), high dependency ratio, large numbers of people engaged in agriculture, villages with poor access to safe water, villages at risk of drought or flooding, and villages at risk of UXO (World Food Program, 2004, p. 34). Showing the interaction between all 14 indicators in the villages, the PCA allocated a value to each village. The lower the value, the worse off was the village in terms of food security status. While the vulnerability map is not the same as the poverty map, the current literature suggests that both poverty and vulnerability are closely related to household welfare (Epprecht et al., 2008; World Bank, 2006b); in addition, they can interact synergistically (Bhatta, 2006; Opschoor, 2007; World Bank, 2006b). This vulnerability map shows villages with the highest rates of vulnerability located along the Vietnamese border to the south of the country and alongside large clusters of vulnerable villages in the northern regions, particularly in the more remote inaccessible areas. Importantly, provinces with large numbers of vulnerable villages, for example Phongsaly, Luang Namtha, Oudomxat and Houaphanh, have been identified as having the highest rate of poverty in other poverty analyses (World Food Program, 2004, p. 59).

viewed rice insufficiency as the primary indicator of their poverty, a cause similarly reported in the second PPA undertaken in 2006 (Chamberlain, 2007). Drawing upon these PPAs, it becomes clear that the rural villagers' livelihoods are closely associated with agriculture and the land in Laos. Their findings pertaining to rural livelihoods were linked to agriculture, a fact confirmed by Rigg (2005; 2006), who notes that Lao rural livelihoods were closely related to the country's lowland and upland agriculture systems.

Second, in the context of Laos, Rigg (2005, p. 67) claims that products from forests and wild areas play many important roles in the sustaining of rural livelihoods. For example, he describes their use as both consumption and income sources:

Forests are repositories of village food and wealth, and act as buffers during times of crisis. Game, fish, bamboo shoots, insects, eggs, roots and honey are important elements in many households' diet; fibres such as *khem* grass and paper mulberry are used in local handicrafts; condiments such as cardamom and medicinal and chemical products such as benzoin and damar are consumed and sold; and bamboo, rattan and fuel wood all find their way into the village economy (Rigg, 2005, pp. 67-68).

Any decline in forest and non-forest products can impact upon households' livelihoods, particularly those that rely on local natural resources. If in serious decline, the villagers have to find other ways of maintaining their livelihoods.

The results of both studies show that livelihoods in Laos, particularly of the rural poor, depend mainly upon agriculture and natural resources. However, these resources are vulnerable to many uncontrollable factors, such as disasters and/or external government policies. As a result, the rural poor are equally vulnerable and risk falling into poverty. Issues related to the linkages between local resources and livelihoods are explored in next section.

3.3 Resource utilisation, protection and degradation in Laos

As suggested in section 1.4, Chapter 1, Laos is one of the most resource-rich countries in Southeast Asia. Its natural resources play a crucial role in supporting the national economy and local livelihoods. However, some studies have found increasing environmental degradation, particularly of land and forests, in many parts of Laos. Some studies have highlighted several causes for the degradation, often relating it to issues of poverty. This section aims to look at the factors underpinning resource degradation in Laos. I first explore the strategies the GoL employs to utilise national resources as incentives for the country's development; then, I examine the legal mechanisms in place to manage the utilisation of the country's environmental resources in a sustainable manner; finally, I look at environmental degradation in Laos.

3.3.1 Natural resources for the country's development

Natural resources in Laos are utilised for the country's development in many ways. Utilisation and its results have been discussed in various papers and studies; for example, in many government papers such as the NGPES and the National Development Plans 2006-10 and 2011-15, which suggest utilising the national resources in a sustainable manner with low social and environmental impacts. In these papers, utilisation of natural resources is viewed as a means of reducing poverty, sustaining economic growth, and providing incentives for private investment (see Government of Laos, 2004c, 2006, 2011).

In the NGPES, the GoL expected investment in natural resources to yield substantial revenues that would augment government budgets. Hydropower, mining, tourism and wood-and agro processing industries were identified as the highest priorities for investment leading to economic growth and increased revenues [through royalties and taxes] (Government of Laos, 2004c, p. 5). In this document, the GoL considered that the development of natural resource-based industries would both directly and indirectly create new jobs and income opportunities for the poor in the country's remote areas (ibid, p. 45). From this viewpoint, exploitation of natural resources through investment was clearly considered the way to reduce poverty in Laos.

Similarly, in the National Development Plan 2006-10, Laos' rich natural resources are expected to play a vital role in the country's socio-economic development (Government of Laos, 2006, p. 6). Plans for the exploration and utilisation of the country's rich natural resources in different geographic locations are expected to attract investment; then, the national revenues can be increased through the collection of taxes from these natural resources. In the Seventh National Development Plan 2011-15, the GoL (2011, p. 96) plans to exploit the country's natural resources in the near future in the interests of development by stating that "...[T]he country's resources have not yet been fully put to use, particularly the natural resources such as land, forests, water, the humid weather, quantity of rain, and minerals. Minerals have not been excavated and mined in many locations..."

Since the mid-1990s, natural resources have been largely exploited and utilised for mega investment purposes, such as hydropower, mining and tree plantation projects; and, this utilisation continues. While emphasising the importance of resource utilisation, the GoL claimed that it has national environmental strategic plans in place to protect the environment. However, to date, resource utilisation has created many problems related to environmental

degradation and local livelihoods (see Dwyer, 2007; Lang & Shoemaker, 2006; World Bank, 2006a). Hence, these issues need to be further explored in detail.

3.3.2 Environmental definitions and protection laws in Laos

Environmental degradation is one of the foremost development issues in Laos. In 1999, the Lao government issued the environment protection law to be used as principles, regulations and measures for managing, monitoring, restoring and protecting the environment (Government of Laos, 1999). Similar to the definitions provided in Chapter 2, this law delineates several terms of environment and natural resources in the context of Laos. For example:

[Article 2] Environment means any organic or inorganic feature, existing naturally or created by mankind, and its surroundings ... that have positive and negative interactions with and impact on each other, whether detrimental or favourable to the life, sustainability and development of humans and nature. Environment includes soil, water, forests, plants, animals, bacteria, mountains, cliffs, minerals, [and] air, which constitute the balance of the ecosystem...[Article 11] Natural resources are organic and inorganic objects originating from nature such as land, water, air, forests, biodiversity, minerals, and stones ...are important conditions for the livelihood of the multi-ethnic people and for national socio-economic development (Government of Laos, 1999, pp. 1, 4).

Under this law, the term ‘environmental protection’ refers to “all activities that contribute to the protection of the environment that ensure a clean and pollution-free environment, and that do not cause adverse impacts to the health of humans, animal, plants and to the balance of the ecosystem” (Government of Laos, 1999, p. 2). Under the same law, while the GoL directs and promotes environmental protection, Lao citizens, aliens and foreigners undertaking operations or activities [in Laos] are obligated to protect the environment (ibid). This means that everyone in Laos is responsible for protecting the environment. Furthermore, this law includes several articles relevant to prevention of environmental degradation, pollution control, environmental remediation and restoration, environmental management and monitoring, policies concerned with high achievers and measures to be taken against violators.

Along with highlighting the utilisation of natural resources for the country’s development, the GoL is committed to environmental protection where utilisation is associated with economic growth. For example, in the NGPES, the GoL (2004c, p. 2) stresses that “the country’s development must be balanced between economic growth, socio-cultural development and environmental preservation”. Environmental conservation and natural resource management are afforded high priority given that they are integral to Laos’ poverty eradication plan, an

approach repeated in the long-term National Development Plans. In the National Development Plan 2005-10, the GoL stated that:

[T]he natural resources will be managed and utilised in a reasonable and sustainable manner to ensure high benefit from the use of land, water, forest, mineral resource and biodiversity” and, (to achieve this), “[M]aster plans on the management and unitisation of land, agricultural... and natural sites will be developed...This includes developing master plans on water resources, forests, mineral resources, biodiversity and bio-safe technology and on the prevention and control of adverse impacts from natural phenomena (Government of Laos, 2006, p. 121).

Specific measures and targets have been set out in the National Development Plan 2005-10 as guidelines and indicators to achieve the GoL’s objectives regarding environmental management. In addition, environmental protection, natural resources management and sustainable development are highlighted in the National Development Plan 2011-15. For example, the GoL has instructed that the use of natural resources should strike a balance between socio-economic development and environmental protection (Government of Laos, 2011, p. 171). In addition, the GoL has emphasised that environmental protection should include protecting forests, land mineral resources, water sources, and areas of high biodiversity for sustainable development of the country (ibid).

3.3.3 Resource degradation and local livelihoods in Laos

In tandem with the GoL’s commitment to environmental protection, many different views on environmental issues continue to prevail in Laos. In the Development Plan 2006-2010, the GoL (2006, p. 119) claimed that while the country seems not to have severe environmental problems today, this could change with time as the country develops socio-economically. The expansion of development will see natural resources reduced and waste increase. However, natural resource degradation has been documented in Laos. In 2000, the ADB (2000) reported that Laos suffered from a number of environmental problems, and that deforestation was the most important aspect of these problems. The UNEP/EAP-AP¹⁸ (2002) identified the main environmental issues facing the Lao government’s attempts to manage natural resources as deforestation, land degradation, loss of biodiversity, water quantity and quality, and urbanization. The World Bank (2006a) noted that Laos has had to confront numerous environmental challenges, such as unsustainable exploitation of resources, degradation of land and loss of natural habitats. Messerli and Heinemann (2007), addressing the potential depletion and changes in natural resources in Laos, observe that the forest mosaic has suffered

¹⁸ UNEP/RRC-AP – the United National Environment Programme Regional Resource Centre for Asia and the Pacific.

considerable loss as a result of forest degradation. Chamberlain (2007) argues that the poor have exploited natural resources when searching for food and cash to maintain their livelihoods. Many factors driving this overexploitation can be cited, such as government policies, commercialized agriculture, development policies and local resource competition. In Laos, natural resources are critical to the local livelihoods of the rural poor because they constitute the main sources of their food, incomes and knowledge that together shape their daily lives. Increased resource degradation means that resources available to them are limited, which, by extension, could force them into poverty. The GoL, aware of environmental issues, stated in the NGPES that “the environment and natural resources are the foundation for the livelihoods of most rural people, particularly for the poor and ethnic minorities, and the environmental degradation, such as deforestation and soil erosion, result in natural disasters (floods) and other consequences that disproportionately impact on the poor” (Government of Laos, 2004c, p. 116).

Clearly, Laos has faced problems of environmental management and natural resource degradation, but their causes seem unclear and are often contested. Thus, more in-depth studies are needed to explore said causes and to identify possible solutions. Drawing on the above studies, environmental degradation and poverty, both of which are major issues in Laos, need immediate solutions if the government is to achieve sustainable development. In the next section, I will explore some studies of the linkages between poverty and the environment in Laos. Dwyer (2007) summarises several issues pertinent to resource utilisation and implementation and relevant to various projects in Laos. Dwyer particularly emphasises mismanagement of land concession for private investment.

3.4 Studies of poverty-environment nexus (PEN) in Laos

Because Laos is a poor country, and its natural resources are becoming increasingly degraded, issues pertaining to poverty-environment linkages are seen as a ‘hot topic’ (PEI, 2010). The concept of PEN and its related issues in Laos have been reviewed in Sections 2.4 and 1.5 respectively. In this section, I explore details of studies of PEN in Laos, most of which have been financially supported by development agencies, mainly the ADB, the IUCN and the World Bank. I consider it important to explain these studies and to delineate how they have been indirectly and directly related to PEN.

3.4.1 ADB and IUCN studies of PEN in Laos

The ADB and the IUCN have conducted several studies, the main objective being to address broad development issues rather than focus upon specific issues of PEN. According to the concept of PEN explained in Chapter 2, some of their findings seem only incidentally associated with issues of PEN in Laos. For this reason, the work of these two organisations is considered only indirectly related to the existence of PEN in Laos. Thus, it would be worth reviewing some of their findings from their studies as examples. I will begin with a brief review of the ADB and the IUCN studies, respectively.

The ADB (2001) , which conducted the first PPA in 2000, identified some primary aspects of poverty in Laos as follows: (1) the degree of rice sufficiency and the number of livestock; and, (2) protracted problems associated with land and water affecting rice yields and livestock. In 2006, the second PPA, which was funded by the ADB, revealed similar findings to the first. In particular, it reported that because the poor in Laos were in the main agriculturalists, diminishment of their access to land and natural resources would render them even poorer (see Chamberlain, 2007). Relating these finding to the concept of PEN, it becomes clear that the PPA's findings suggest linkages between the poor and their local natural resources, for example, land and water for rice cultivation. Because they use these resources to sustain their livelihoods, any depletion will result in poverty, indirectly indicating the existence of PEN in both PPAs.

As suggested in Chapter 1, two IUCN case studies have proposed a strong relationship between the rural livelihoods of the poor and forest and non-forest products in Laos. The first study showed an improvement in poverty reduction and livelihoods in Nam Pheng through the conservation and collection of NTFPs and bitter bamboo (see Morris & Ketphanh, 2002). In this case, natural resources areas such as forest are often used by several different communities as a main source of income for entire village households, usage that contributes to the virtuous circle of PEN. For example, conservation activities have proven effective in helping a remote mountainous community to step out of poverty and secure sustainable livelihoods. While identifying many positive results, the study suggested that villagers should diversify their livelihood strategies and maintain staple crops in order to reduce marketing risks. As well, poverty-environment links needed to be appraised at different levels of wealth in order to better understand their relationship (Morris & Ketphanh, 2002). In the second study conducted in 2005, the IUCN investigated the economic links between biodiversity and poverty reduction in Nam Et and Phou Loei (NEPL). The study revealed a strong relationship

between socio-economic statuses and the relative wealth or poverty of individual households, the levels and value of forest use, and livelihood dependence on biodiversity (see Emerton, 2005). Based upon the findings of these two studies, the IUCN raised important points regarding the ways in which the poor have directly benefited from the use of natural forest resources in the NEPL areas to sustain and improve their livelihoods, particularly in terms of the economic value of forest use. These findings should confirm linkages between biodiversity and poverty at both the national and local levels in Laos.

3.4.2 World Bank studies of PEN in Laos

The World Bank has supported three studies directly related to issues of PEN in Laos. The first study, which was conducted by Dasguta et al. (2003), empirically examined issues of PEN in Cambodia and Laos by mapping and regression analysis. They found a strong correspondence between poverty and deforestation, erosion potential, indoor and outdoor air pollution, and contaminated water in the lowest and highest income provinces. They acknowledge the significant existence of PEN in Laos, particularly in the Northern regions (Dasguta et al., 2003, p. 14). Later, employing the same methods, Dasguta et al. (2005) reinvestigated their PEN study to include data from Vietnam. Their findings in relation to Laos were similar to those of the previous study.

On the one hand, their findings may be argued as reasonable for two reasons. First, by including data from the surveys and studies conducted during the late 1990s, their findings seem compatible with other studies that provided similar findings and suggestions regarding development priorities in the Northern regions (see Kakwani et al., 2001). Second, their analytical methodologies are likely to be compatible with definitions of PEN through their overlaying of poverty on environmental maps and then identifying the overlapping region as PEN. Regression analysis was applied to confirm the spatial correlations. On the other hand, their findings (2005; 2003) may be criticised at least for two reasons: first, their regression correlations may not imply any causality of PEN, a criticism levelled by the World Bank (2006b). In this view, both poverty and environmental degradation can cause several externalities, but their study seems not to provide strong evidence of whether these two problems are causal. Second, by taking data at the aggregate level, these results may prove ambiguous when the data are disaggregated. Their findings at the provincial and district levels may not represent the real picture in all regions because issues of PEN may not exist in some local areas like provincial capitals and areas around district and provincial towns.

Nevertheless, these studies have acknowledged this gap and suggest that future studies use disaggregated data.

In second PEN study in Laos, the World Bank supported the MAF and NAFRI¹⁹ to investigate the magnitude of environmental degradation on the poor, with particular focus on poverty and natural resources, and taking NTFP as the case resource (see Sophathilath, 2006); for example, an analysis of two case studies drawn from the poorest districts: Na Mor in Oudomaxay and Phouvong in Attapeu. This second study, which confirmed the existence of PEN, saw NTFP as an important source of food and income for the rural poor, particularly for those engaged in shifting cultivation practices. It saw these resources as playing a major role in the Government's poverty eradication strategies. The study, however, noted the decline of the NTFPs due to various external factors rather than the poor's exploitation, for example the adverse effects of government policies, poor management, land use changes, increasing market pressure and forest fires, rubber plantations in Namo, ongoing logging in Phouvong and new road cuts in both districts (Sophathilath, 2006). The study also maintained that the continuing decline in NTFPs could pose risks to the poor in the near future. Like the IUCN studies, this study suggested the existence of PEN vis-à-vis the way natural resources have helped to reduce poverty due to the benefits of NTFPs.

Overall, this study, which was conducted by the MAF and NAFRI as the main government forest research institutions, observed an interesting finding of exploitation of resources caused by external factors, particularly by some government's development policies such as village relocation, focal zone development, land allocation and land use planning. For example, the rural dwellers in the new villages are increasingly exploiting the resources in their new land areas to maintain their livelihoods, while those remaining in the old villages continue to exploit the local resources at the same level. These findings indicate the various factors that demand further debate and investigation, incorporating issues of PEN in Laos.

In the third study, the World Bank (2006b) conducted PEN studies in Cambodia, Laos and Vietnam, drawing upon results from the first and second PEN studies. In the context of Laos, the study aimed to investigate the magnitude of PEN in two specific areas, namely the linkages between poverty and environmental health issues, including water supplies and sanitation, urban pollution and pesticides, and between poverty and natural resource issues

¹⁹MAF-Ministry of Agriculture and Forestry, NAFRI-National Agriculture and Forestry Research Institution, Ministry of Agriculture and Forestry.

including NTFPs, other forest resources, road access, UXO contamination, natural disasters and fisheries. The third PEN study undertaken in Laos analysed secondary data from national to household levels; as well, it collected primary household data only from the four poorest rural and upland districts of Gnot-Ou, Nanor, Kalum and Phouvong. The study divided the magnitude and severity of poverty and its environmental linkages into three categories: high, medium and low. According to information regarding the spatial distribution of the various issues and poverty, the study found different results related to environmental issues in Laos (see Figure 5.1, World Bank, 2006b, p. 178).

According to this study, natural disasters, fisheries, and urban pollution appear to have a low magnitude of correlation with poverty. Other environmental issues including NTFPs, forestry resources, roads access, UXOs, and urban and rural water supplies and sanitation were found to have a high magnitude of correlation with poverty, a circumstance that can happen in many ways. For example, because NTFPs are considered highly important as income, food and knowledge sources for the poor, their continuous decline will negatively affect the poor's livelihoods; and, while roads have facilitated market access as a means of improving rural incomes and social links for the poor, road construction will inevitably increase natural resources extraction and logging. UXOs, rather than protecting forests from encroachment, cause limited paddy field expansion. In addition, water supply systems that often break down have further inflicted hardship on the poor rural communities. Therefore, based on these findings, this study has suggested joint solutions to poverty reduction and environmental protection in Laos by carefully taking into account geographical targeting and improving the coordination between stakeholders (World Bank, 2006b, p. 116). At the end of the study, phase 3 of the PEN study proposes continuing support for the exchange and monitoring of issues surrounding PEN (ibid, p. 189).

3.4.3 Summary of PEN studies and an alternative approach

The above studies, which provide both descriptive and empirical analyse of PEN in Laos, can be ranked from national to local development contexts. Based on their findings, PEN appears to exist in many forms; but, most of the findings tend to suggest a virtuous circle based on the ways in which natural resources have helped to reduce or stave off poverty in Laos. At the same time, these studies suggest that these resources are becoming degraded, and that the causes of resource degradation are various, due mainly to external factors and partly to resource overexploitation by the poor in their attempts to sustain their livelihoods. Therefore, it is reasonable to claim that PEN exists in Laos; and, that joint solutions to poverty and

resource degradation are needed, even though the studies admit to knowledge gaps due to data and information limitations. These studies also suggested an urgent need for additional research and experimentation in future studies that will produce new and effective knowledge and viable solutions to problems of PEN in Laos.

As an alternative approach to the above studies, the NCCR introduced a meso-scale research designed to study the effect of development intervention disparities on PEN (see Messerli & Heinemann, 2007). This approach, building on the claim that it would be misleading to utilise the results from micro-level case studies for decision-making at higher or macro-levels and vice versa, was conducted in four steps. First, a landscape mosaic of different shares of land cover was generalised to describe the country's agro-ecosystem. Then, a map of poverty and welfare was constructed to explain any social-economic disparities. Next, the poverty map was used to spatially overlay the agro-ecosystem map as a means of depicting the regions illustrating PEN. In the last step, development actors, interventions and institutions were described to facilitate an understanding of the decision-making that led to development interventions in different areas and at different levels. The NCCR has completed the production of some agro-ecosystem and poverty maps that can be used for purposes of analysis (see Epprecht et al., 2008; Messerli et al., 2009). More details on modification and application of this approach to be used in this thesis are provided in Chapter 4.

3.5 Private investment management and expectations in Laos

The GoL has set many long-term objectives to achieve sustainable development by promoting private investment as a key sector. While private investment has rapidly increased and focused mainly upon the resource sector, this increase has had both positive and negative social and environmental effects in Laos as well as affected to many issues related to PEN (IUCN & NERI, 2011a, 2011b). In this section, I explain in detail the factors behind the roles and effects of private investment in Laos. I begin with the needs of privatisation and private sector development in Laos; then, I address the schemes employed to promote and manage private investment in Laos, according to government perceptions. This section also illuminates some of the main debates surrounding private investment and expectations from private investment.

3.5.1 Privatisation and private sector development in Laos

Laos is one among many countries that have implemented privatisation policies and promoted the private sector for national development. In fact, privatisation in Laos is a consequence of

political change. After the establishment of the country in 1975, the GoL introduced socialist economic policies, and it was not until 1985 that the GoL fully realised the difficulties and failures associated with national growth and development under socialist policies (Bourdet, 2002). In 1986, the government announced its NEM that would transform central planning into a market-oriented economy. According to Saignasith (1997), this reform opened up the economy to private enterprise and recognised the potential significance of the private sector to the country's development. As I stressed in Chapter 2, privatisation has been an important policy in Laos' economic transition. Many state-owned enterprises have entered into joint-ventures with private and/or foreign parties or transferred entirely to the private sector. However, many of these objectives were not achieved in the first phase of NEM (1986 to 1988) due to limited knowledge of a market economy, private development and outright privatisation. During 1988-89, the NEM was reviewed. The state's new, modified role veered away from direct intervention in the productive sector of the economy and turned towards regulatory and service roles to ensure efficient operation of the market economy (Signasith, 1997). Since then, many laws, decrees and government strategies for both foreign and domestic private investment have been issued and remodified to encourage investment in and trade with Laos (Gunawardana & Sisombat, 2008).

Academic literature on private studies in Laos is somewhat limited: research revealed that theoretical and empirical studies have received little attention. It may, then, be useful to look at some official government laws, decrees and strategies to understand the concepts and definitions behind private sector development in Laos. For example, the National Development Plan 2006-10 refers to the private sector as "all business types and sizes, both domestic and foreign and both private and joint-ventures investment, such as business investment and private enterprises" (Government of Laos, 2006, p. 125). In the business laws of Laos in 1999, the private sector was related to private investment, enterprises and business. For example, Article 33 of the business law defined private enterprise as "business units established by individuals or legal entities to undertake profit-making activities, and may be established in two forms as a sole trader [enterprise] and a company" (Government of Laos, 1994a, p. 8). 'Private sector' is recognised as smallholders, businesses and enterprises seeking their own benefits and profits; however, the GoL, which was still contemplating the importance of the private sector, emphasised that PSD should be prioritised and supported by both the GoL and international donors.

Clearly, the GoL put PSD at the top of its development strategies for the country's transition to a market economy. In the NGPES, the GoL (2004c, pp. 5, 45) considered promoting the private sector, trade, and FDI not only as prime factors to drive the economy, but also to improve the business environment in areas of information and consultation, legal, regulatory and administrative streamlining, macroeconomic management, and co-ordination and management capacity for the PSD. Similarly, in the National Development Plan 2006-10, the private sector was recognised as “an important driving force for accelerating economic growth, generating high-paying jobs, and reducing poverty” (Government of Laos, 2006, p. 124). In these two plans, many steps need to be taken to reform policies in several areas towards a market economy and to foster regulations, laws and procedures for a more favourable investment environment in order to attract both domestic and foreign direct investment. In 2003, the GoL implemented a decentralised policy that allowed the provincial authorities to approve any foreign investment with value less than or equal to US\$ 1million, increasing the amount to US\$ 3million after 2005. In addition, many laws on investments have been issued to support the PSD as an engine for growth and poverty reduction.

However, in the early 2000s, both the PSD and privatisation progressed slowly. Unsuccessful reforms of the economic and political systems were considered the main factors causing the delay. For example, St John (2006) alludes to the difficulties that accompany change in the economic system without political reform, that is, when real decision-makings remains at the central rather than at the local level. This means that political reform of decentralisation and deregulations policies is needed to bring about real change in Laos' economic and political structures. Bourdet (2002) opines that the real economic and political reforms seem to be struggling due to the one-party socialist political system that continues to hold sway in Laos. St John, criticising the politics of the reform (2006, p. 186), claims that “the sixth party congress reinforces the power of party members advocating a slower reform path with more control over the various effects of reform policy”. While the GoL claims that both internal and external instability are responsible for the delays that have impeded their decision-making, Bourdet (2002, p. 110) argues that the delays were caused by problems in the post-socialism regime regarding shortages of skilled personnel, an expansive money policy and corruption among officials. Yet, many Lao government officials seem reluctant to make their own decisions regarding important tasks without first gaining the advice of their senior authorities. Their understanding of macro development concepts and national planning processes is weak, particularly those who are not members of the LPRP. Thus, insufficient

economic and political reforms and slow decision-making by government authorities have obstructed the PSD and the process towards a market economy in Laos.

Along with the government's strategies, international development donors have supported many programmes aimed at accelerating the PSD in Laos. For example, the ADB donated US\$ 5 million to the first subprogram grant and US\$ 15 million of second special funds resources to the Private Sector and Small and Medium-sized Enterprises Development Program (PSME), which sought to improve key crosscutting issues for the investment environment, regional integration, macroeconomic stability, and good governance in Laos (ADB, 2011). In addition, the World Bank (2007, 2008, 2009) listed several external support agencies and technical assistance for the PSD. For example, the German Agency for International Cooperation (GTZ, or currently called GIZ) donated US\$ 8.9 million from 2007 to 2011 towards a Human Resource Development for a Market Economy (HRDME) Program designed to improve regulatory, institutional and human resource conditions in the private sector, and SME development through vocational training, SME promotion, and streamlining of investment procedures. GTZ has also supported research and public-private dialogues in 4 provinces in Laos.

Between 2000 and 2010, in cooperation with the National University of Laos (NUOL), the Japanese International Cooperation Agency (JICA) provided funding for three projects; first, for the Lao-Japan Human Resource Cooperation Center to improve its main courses and activities for business management; second, for the ODOP (One District One Product) Pilot Project in Savannakhet and Saravanh Provinces in order to raise awareness of and the importance of the ODOP concept, support relevant exciting ventures such as a pilot programme, and to create good practice; and third, for the Preparatory Survey of an Industrial Zone Development project during 2009-2010 to survey a basic conduct plan for the industrialisation of the whole of Laos and a conceptual plan for industrial development in Vientiane, Savannakhet and Pakse. JICA also funded a small project, for example, a Feasibility Study of Vientiane's Industrial Estate. The Netherlands Development Organization (SNV) conducted a Private Sector Development Program to improve market access and create economic opportunities for the rural poor. This programme included access to financial services, value chain development, and the enabling of a conducive environment for business development. The UNDP and UNIDO jointly supported the Promoting Private Sector Development Program, which aimed to strengthen the Lao Chambers of Commerce and Industry and Business Associations, which together support the development of the private

sector, particularly the SMEs. Lastly, the UNDP, the UNEP and the GoL jointly funded the Poverty Environment Initiative (PEI) Program. The aim of this programme is to gain understanding of the key environmental issues affecting the poor, and of the impacts of private investment on the country's social and environmental issues.

Although there has been large support for the PSD, many constraints on business development in Laos remain unresolved. In a joint assessment of the investment climate in Laos prepared by the ADB and the World Bank (2007), poor public-private dialogue, unclear government policies and lack of transparency were reported as fuelling uncertainty surrounding investment. In addition, high taxes and duties, lack of capital, unofficial fees and regulations, and lack of security (corruption) were seen as major problems for business entries. In addition to these issues, the process of implementation of the Lao PSD and privatisation policy was not well understood by many local governments as implementing units. These issues need to be thoroughly addressed if the PSD is expected to become the engine of economic growth and poverty reduction in Laos; otherwise, the PSD may result in inverse impacts.

3.5.2 Private investment development and management in Laos

As suggested above, since the mid-1990s, the GoL had drafted and passed many decrees, regulations, laws and decisions relating to private, foreign and domestic investment; for example, the Laws on the Promotion and Regulation of Foreign Investment in 1994, Domestic Investment in 1995, Business law and Customs Law in 1994, and the Tax law in 1998 (Gunawardana & Sisombat, 2008; UNESCAP, 2005). Both foreign and domestic investment laws were revived and amended in 2004 and 2009 (Government of Laos, 2004a, 2004b, 2009).

Since early 2000, the GoL has introduced several measures to encourage private investment, particularly to improve the investment laws and business climates. The World Bank (2007, 2008, 2009, 2011) has listed a number of these measures. For example, in 2001, websites were used to provide information about the country's legal framework, business and investment-related laws and other services. The Prime Minister's Decree No.46 of March 2001 provided basic guidelines to improve registration, and to reduce approval times from 90-180 days to 45-60 days. In 2002, Decree No.46/PM decentralised governmental policies regarding approval of foreign investments to the provincial authorities. In 2003, the PM's Decree dated 23 April defined the roles and responsibilities of the Chairman of the Committee for Planning

and Investment (CCI) at the central and local levels, and strategically guided the officials in areas such as approval, promotion, management and monitoring of both domestic and foreign investment. In 2004, the PM's Decree No.42 defined the regulations, methods and measures needed to promote and develop Small and Medium sized Enterprises (SMEs). In 2005, a new enterprise law was approved to ease private business licensing and to create a one-stop-shop for business registration; at the same time, a regulation to encourage sustainable private investment in mining was adopted. In 2006, the government met with the private sector working group to discuss and agree upon key issues to be presented at the Lao Business Forum.

However, in 2007, the GoL decelerated the granting of new exploration and production licenses to review existing practices concerning taxation, operational requirements and other contractual terms. In 2008, a new investment promotion law was introduced that combined both domestic and foreign investment laws, and aimed to harmonize investment incentives and to simplify investment procedures for domestic as well as for the new Mining Law. In 2009, a new, unified investment promotion law was approved to replace the two existing investment laws. The Enterprise Law and the law on processing industry have continued to be implemented to simplify business entry. In October 2010, the Stock Exchange opened in Vientiane. The National Trade Facilitation Secretariat was formally established in October of that year to improve trading facilitation and cooperation among border agencies. In 2011, the Lao Business Forum, and Provincial Public-Private Dialogues and direct dialogues between the government authorities and various business associations were organised to identify and address business constraints at both the central and provincial levels. But, despite the number of policies introduced to improve investment, the overall investment climate in Laos is still considered weak due to low transparency and difficulty of doing business (US Department of State, 2011).

Among others, the most important measure related to both domestic and foreign investment laws has been the updating of investment promotions (see Government of Laos, 2004a, 2004b; Government of Laos, 2009; IPD, 2008), which has been crucial given that investment incentives attract both foreign and domestic investors. These promotions and incentives have focused on promoting activities, zones and taxes incentives, all of which are related to issues of natural resources and poverty.

The government defines promoted activities as follows:

1. Production for export;

2. Activities relating to agriculture or forestry, and agricultural, forestry and handicraft processing activities;
3. Activities relating to industrial processing, industrial activities using modern techniques and technology, research and development, and activities relating to the protection of the environment and biodiversity;
4. Human resource development, skills development and public health;
5. Construction of infrastructure;
6. Production of raw materials and equipment to be supplied to key industrial activities; [and]
7. Development of the tourism industry and transit services (Government of Laos, 2005).

The government proposes 3 promoted zones for foreign investment based on geographical location and socio-economic conditions. The zones are as follows:

Zone 1: Mountainous, plains and plateau zones with no economic infrastructure to facilitate investment.

Zone 2: Mountainous, plains and plateau zones with a moderate level of economic infrastructure suitable to accommodate investment to some extent.

Zone 3: Mountainous, plains and plateau zones with good infrastructure to support investment (Government of Laos, 2005).

Foreign investment enterprises investing in activities within the promoted sectors and zones determined by this law shall be entitled to the following duty and tax incentives:

Investment in Zone 1 shall be entitled to a profit tax exemption for 7 years and thereafter shall be subject to profit tax at the rate of ten percent (10%).

Investment in Zone 2 shall be entitled to a profit tax exemption for 5 years, and thereafter shall be subject to a reduced profit tax rate of half of fifteen percent for 3 years and thereafter a profit tax rate of fifteen percent (15%).

Investment in Zone 3 shall be entitled to a profit tax exemption for 2 years and thereafter shall be subject to a reduced profit tax rate of half of twenty percent for 2 years and thereafter a profit tax rate of twenty percent (20%) (Government of Laos, 2004a, pp. 4-6; 2004b, pp. 6-7).

Overall, these investment promotions and incentives have targeted the poor districts under poverty reduction programmes as well as resource utilisation. In addition, a further investment promotion zone known as ‘a special economic zone’ is not mentioned above because it is intended to attract FDI and to boost the local economy by targeting huge investments in casinos, trading centres and industrial development zones rather the investments in the resource sector.

In order to improve the investment environment, a One Stop Service Unit (OSU)²⁰ has been officially designated under these laws to hasten the investment process and to provide a data service related to investment, such as providing investment application forms,

²⁰ Located in Ministry of Planning and Investment, and in each Provincial Department of Planning and Investment.

recommendations and explanations of the procedures and progress of the consideration in each step of the investment approval process (see Chapter 6, Government of Laos, 2009). The OSU also supplies comprehensive information to potential investors regarding customs, taxation, and the importation of raw materials and machinery so that interested parties can make decisions vis-à-vis whether or not to invest. In addition, the OSU coordinates with the relevant government sectors to collect comments faster, to ensure prompt consideration, and to meet the deadline for the approval of the investment. Depending upon the nature of investment activity (see details on IPD, 2008), approval time may take from 15 to 45 days. It normally takes approximately 15 working days to approve the promoted activities listed above and approximately 25 days for open investment activities with conditions²¹. For investment activities that require land concession, the estimated time is approximately 45 days.

Furthermore, the GoL provides some frameworks within which to manage investment in Laos. According to the country's investment laws (IPD, 2008), all private investment has to be approved by the Committee for Promotion and Management of Investment (CPMI). The CPMI, a key government body, must coordinate with other concerned government agencies prior to investment approval and grants investment applications. The CPMI divides them into two levels. First, at the local level, the CPMI is chaired by the Provincial Governor. The Provincial Department for Planning and Investment acts as a permanent office of the local CPMI and also advises the OSU regarding investment applications and approval. Second, the central CPMI is chaired by the Vice-and/or Minister of Ministry of Planning and Investment (MPI). Investment Promotion Department (IPD) in the MPI serves as a permanent office. In addition, the submission of any investment application is dependent upon the investment capital. As stated above, any investment to the value of US\$3 million or less can be submitted to the local or central CPMI; the four large provinces, including Vientiane Capital, Savanakhet, Champasack and Luang Prabang can approve investment to the value of US\$ 5million or less. Any investment activities valued in excess of US\$ 3 million and up to US\$ 20 million must be submitted to the central CPMI, and any investment over US\$ 20 million must be approved by the Prime Minister (IPD, 2008).

Apart from the value aspect, the PM's Decree No. 88 classified different regulatory authorities to approve and manage investment applications based upon land size (see

²¹ Refers to investments related to natural resources and may impose negatives, such as wooden industry, building factories and mining. Some conditions apply.

Schoenweger & Üllenberg, 2009). This Decree states that land size less than 3 hectares (ha) may be granted by the district authorities, while land size between 3 and 100 ha must be approved by the provincial authorities. Large land size must be determined at the national level. For example, the central government and/or the Prime Minister have the authority to grant land size between 100 and 10,000 ha. If larger than 10,000 ha, investment must be approved by the National Assembly. Recently, in accordance with the amended Laws on Investment Promotion (Government of Laos, 2009), foreign investors investing US\$ 500,000 or more in Laos have been allowed to buy land from provincial and capital land management authorities (with a maximum of 800 square metres) to build their houses or office buildings. However, land cannot be bought from any individual Lao citizen or from enterprises. This new law prevents (a) rapid increases in land prices; and (b) foreigners from gaining future profits from the land.

Both domestic and foreign investments are officially managed by three key government bodies, and rights and duties of management of these three bodies are similar regarding investment laws. Some of the rights and duties at each government level are briefly highlighted below. The ‘high level’ refers to the CPMI at the central level that has the following rights and duties in terms of investment management:

- To develop strategies, incentives to promote and attract foreign [and domestic] investments and propose them to the Government for approval;
- To disseminate policies, laws and regulations; provide information and facilitate foreign [and domestic] investors;
- To monitor, inspect, assess and report to the Government on the business operation of foreign [and domestic] investment enterprises;
- To be a focal point in supporting, promoting and solving problems occurring in relation to the business operations of foreign [and domestic] investment enterprises (Government of Laos, 2004a, 2004b).²²

The second level refers to the CPMI at provincial levels, acting as a support mechanism to the provincial governor, the capital city governor, the chief of special zone, and the CPMI at the central level for promoting and managing foreign and domestic investment. In this task, the CPMI at the provincial level has several rights and duties; for example:

- To implement strategic plans and policies to promote and attract foreign [and domestic] investment at their local levels;
- To disseminate policies, laws and regulations, provide information and facilitate foreign [and domestic] investors;

²² See chapter 6 of the promotion of foreign investment law (2004a), and chapter 5 of that of domestic law (Government of Laos, 2004b).

- To consider issuing or withdrawing foreign [and domestic] investment licences within their scope of rights and duties;
- To coordinate with various relevant sectors in implementing the incentive policies within the approved projects and in implementing the decisions, orders, instructions and notifications of the higher level authorities;
- To monitor, inspect, assess and report to the provincial governors, the capital city governor or the Special Zone Head and CPMI at the central level regarding foreign [and domestic] investment;
- To act as a focal point in solving problems related to foreign [and domestic] investment (ibid).

The third level, which is representative of other relevant sectors and sectoral organisations, includes the concerned ministries, ministry-equivalent organisations and other sectoral organisations. They also have rights and duties to promote and manage both domestic and foreign investments. Some of their main rights and duties are illustrated below:

- To coordinate with the CPMI at the central level in drafting laws, regulations, policies and plans in relation to foreign [and domestic] investment;
- To supervise the sectors both at [the] central and local levels in implementing incentive policies and in revising procedures regarding implementation of investment projects;
- To inspect and assess business operations of foreign [and domestic] investment enterprises and partners' business cooperation contracts within their scope of rights and duties and then report to the higher authorities (ibid).

These laws also request administrative authorities and sectors at the local level to coordinate with the CPMI at the local level, utilising the same scope of rights and duties as listed above, in order to achieve better investment management and minimise its impacts.

3.5.3 Debate surrounding private investment in Laos

The GoL has a strategic plan in place to promote private investment that will augment the country's development; but, this plan could face several difficulties due to lack of investment incentives, such as financial, human capital and local infrastructures (ADB & World Bank, 2007). On the other hand, because Laos is a resource-rich country, the GoL has opted to provide incentives to encourage private investment in its national resource sectors (Government of Laos, 2004c; IUCN & NERI, 2011a, 2011b), especially in mining, agribusiness and the hydropower sector (Rutherford, Lazarus & Kelley, 2008). This explains why so much of the private investment has been in the natural resource sector. Consequently, the number of investment projects in the private sector has gradually increased over the last decade (ADB & World Bank, 2007; IPD, 2010). For example, the real value FDI inflow into Laos dropped from US\$ 33.9 million in 2000 to US\$ 4.5 million in 2002. Then, it rapidly

accelerated to US\$ 323.51 million in 2007 and showed a slight decrease to US\$ 318.6 million in 2009 (US Department of State, 2011).

Some studies consider that private investment in the resource sector can contribute to development in Laos to some degree (ADB & World Bank, 2007; Government of Laos, 2004c, 2006, 2011; World Bank, 2010). Based on their views, private investment can provide financial capital and technology that will facilitate access to natural resources. For example, the mining, hydropower and agri-business sectors might require both huge budgets and advanced technology, which are relatively limited in Laos. In addition, private investment may be more capable of converting natural resources into products for domestic consumption and encouraging exports as a means of maintaining its productivity. In this way, wealth can be generated through employment, income and local economic activity; and, tax revenue can be raised for pro-poor development activities. Finally, investors' profits and government revenues accruing from private investment are expected to be reinvested in the natural resource sectors in order to sustain natural resource utilisation and productivity, to improve the quality of local livelihoods, and, perhaps more importantly, to prevent the resources from being degraded.

According to a recent news article published in Laos (KPL on Tuesday 13 October, 2009), the Phu Bia Mining Company has made an enormous contribution to the Lao economy by injecting approximately US\$270 million directly, employing over 1,500 Lao nationals, contributing approximately 30% of the nation's exports by value, and providing US\$300,000 annually for local initiatives in education, healthcare, agriculture, infrastructure, water and business development. This form of support shows that the problems and vicious circle related to PEN can be alleviated through private investment. Another example of private investment has been the Nam Theun 2 (NT2) Hydropower Project. With its construction cost of US\$1.45 billion, the World Bank and the ADB claimed that this project's expected revenue of US\$250 million over a 25-year concession could help the GoL to reduce poverty in Laos: the World Bank also insisted on the provision of a revenue management framework to direct the GoL's NT2 revenue to poverty reduction expenditure, channelled through the Lao Treasury (see Lawrence, 2008). The World Bank has worked closely with the GoL on this project as part of a broader public financial management strengthening program. In addition, according to a recent report (see Gray, 2012), this project has the capacity of 75 MW of electricity for domestic use, and annual revenues to the GoL averaging approximately US\$30 million per year during the first ten years while the commercial debt service is being paid,

thereafter rising sharply to an average of approximately US\$110 million from 2020 to 2034. If “the around US\$2 billion in revenues are spent efficiently, and transparently-in accordance with project agreements-NT2 would provide significant support to Lao PDR’s poverty reduction and environmental management efforts” (ibid, p. 2).

Conversely, private investment in the resources sector can potentially pose many risks for Laos. First and foremost, there is no guarantee that private investment will bring positives to sustainable development in Laos. For example, the Director General of Agriculture and Forestry Department²³ claims that many development projects, such as hydropower dams, mining exploitation, ecotourism, rural development and industrial tree plantations, have nominated forest resources and forested areas as potential sources of sustainable development; but, in reality, they have effectively overexploited forest resources and forest lands. Hence, it is doubtful whether resource exploration by these investments will reduce poverty and promote a sound environment in Laos. Second, as yet there is no proper mechanism in place to ensure that the private sector will fully reinvest their profits in the natural resources sector. This concern is seen as critical since rule and law systems in Laos are considered to be relatively weak and government corruption remains rampant (ADB & World Bank, 2007).

Third, Laos could face both issues of Dutch disease and resource curse in its near future as a result of private investment. As outlined in Chapter 2, Kyophilavong and Toyada’s (2008) study examining foreign investment in resource sectors predicted the Dutch disease syndrome in the Lao economy in the long term and suggested that this syndrome may harm rather than help economic growth in Laos. Recently, the Planning Department of the MPI has reported that Dutch disease has been real and is now shaping the Lao economy in terms of appreciating the value of the Lao kip over the last five years from 10,000 to around 8,000 kip per US dollar, posing challenges for the tourism and garment industries as major foreign exchange earners. And, its impact has been related to the effects of government spending and the prospects for the private sector.²⁴ In addition, according to an Oxford Policy Management study (see Haglund, 2011, pp. 17-20), Lao is one of the most vulnerable countries to the resource curse based on analyses of economic and institutional development dimensions. This study concluded that “the countries are critically reliant on minerals exports for foreign

²³ Dr Silavanh Savatvong, the Director General of Agriculture and Forestry Department, at the annual meeting of the Ministry of Agriculture and Forestry, held 7-9 October, 2009, according to a recent news report from Laos on KPL, Friday 9 October 2009.

²⁴ Ms Phonevanh Outhavong, Planning Department Deputy Director General, said while making a presentation on macroeconomic development in Laos to a group of development partners in Vientiane, according to Vientiane Times, 25 Aug 2012.

exchange earnings and therefore most vulnerable to the vagaries of international commodity markets, and also most severely constrained in terms of economic resources and effective institutions” (ibid, p. 19). Finally and most critically, using resources for private investment means that private companies will have to compete with environmental values and resources upon which the poor are dependent. In particular, this concern is relevant to both physical and mental deterioration among the poor. Taking resources away from the poor will pose severe risks to their livelihoods. In this respect, Chamberlain (2007) claims that all that would be left for them would be hard labour, with no or little accompanying spiritual reward. Such a degree of deprivation could give rise to self-destructive behaviour; for example, alcoholism and suicide, prostitution, depression, destitution, disintegration, and out migration, culminating in the breakdown of their mental faculties.

Studies reviewed by Dwyer (2007) have revealed that Lao land concession programs, with or without payment of low compensation, have hit the livelihoods of the Lao rural poor hard. Without prudent investment and resource management, the environmental resources risk being degraded, pushing the poor into deeper poverty, by extension implying the vicious circle of PEN. In addition, Barney’s study (2009) of the resource frontier and development in Laos claimed that Lao upland resources were available to increase foreign investment in Laos. By incorporating relational concepts, he found that externalities of development mega-projects and state land reform policies resulted in ecosystem changes. These resource transformations and displacements created vulnerabilities, and in turn, resulted in further transformations by the actions of the local people; for example, entering into cross-border wage labour markets and developing new agricultural strategies for rubber crop production. Barney concluded that changes in property rights, landscapes and livelihoods on the Lao resource frontier would eventuate through corporate investment becoming tied with the actions of local people and communities engaging with their environment. It follows that an increase in private investment in the resource sector could prove problematical for Laos since such investment can create both wealth and poverty. Environmental degradation and resource competition could impact severely upon the poor, depriving them of the resources upon which they depend for their survival. Therefore, it is important to pay strict attention to the GoL’s strategy for the PSD, and to study the various impacts of private investment on the resource sector.

3.6 Poverty-environmental initiative (PEI) in Laos

The above reviews suggest that Laos faces at least four key issues pertinent to its current development trajectory, namely widespread poverty, increasing resource degradation, poverty-environment linkages or nexus, and uncertainty surrounding private investment. One may argue that these issues are interrelated because they have occurred during the same period. Addressing these four issues-while essential-is doubtless a difficult task. In a bid to gain an understanding of these issues, the GoL, the UNDP and the UNEP established a joint programme called the “Poverty-Environment Initiative or PEI” in May 2009, the main focus of which is to ensure that the country’s rapid economic growth and flow of FDI into the natural resource sectors will generate sustainable and inclusive development (see PEI, n.d.).

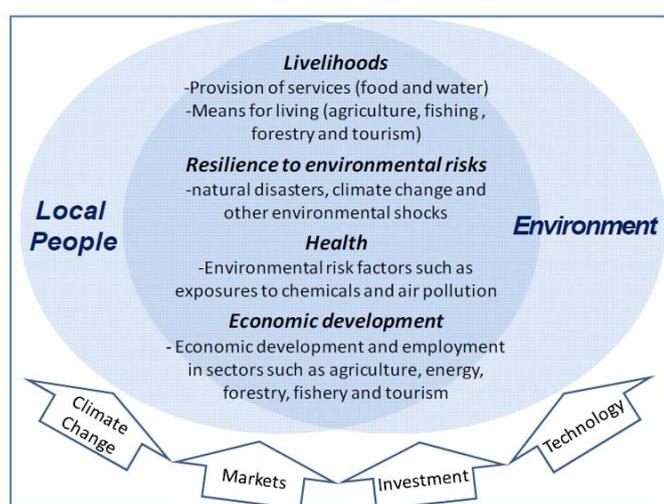


Figure 3. 5: Poverty-environment linkage of PEI

Source: Extracted from Figure 1, PEI (2010)

Within this programme, PEI (2010, p. 2) has viewed PEN in Laos as “a series of mutually reinforcing links between poverty and environmental degradation”. As well, it has considered it as “a hot topic of research over the recent decade and an issue well familiar to [the] Lao PDR”. PEI has constructed a framework of poverty-environment linkages (see Figure 3.5). According to PEI (2010), Figure 3.5 illustrates many dimensions of a poverty-environment linkage which goes beyond the simple relationship of the environment as a basis for livelihoods. For example, the linkages suggest the relationships between the environment and local people in the way that the environmental problems can impact on public health and the poor are often victims of pollution, unsafe water, and exposure to toxic chemicals or environmental hazards. PEI also recognises the importance of rich agricultural biodiversity as a basis for food availability and for increasing resilience to climatic and other changes. In addition, as shown in the Figure 3.5, climate change, markets, investment and technology are

considered factors that render linkages more complicated. Drawing from this Figure 3.5, it becomes evident that rapid economic growth based on natural resources has stimulated the country's poverty-environment linkages.

In line with the PEI programme, some research and case studies have been conducted to determine the impacts of investment and poverty-environment linkages upon Laos. One of the major studies of these issues was conducted by the IUCN and the NERI (2011a, 2011b), who focused on assessment of the economic, social and environmental costs and benefits of investment in Saravan and Savannakhet provinces. Their aim was to review the status of investments, concessions, natural resources and socio-economic development indicators in these two provinces, as well as the capacity of the provincial investment management system to support the work of PEI in these provinces. Coincidentally, the IUCN and the NERI revealed the same findings appertaining to the two provinces studied. Thus, it is well worth reviewing their findings.

These two studies found an increase of investment in Saravan and Savannakhet that mainly focused upon the natural resources sector, particularly on agriculture, forestry, hydropower and mining. These investments have delivered both positive and negative economic, social and environmental impacts to the provinces. For example, from a positive perspective, they have contributed to infrastructure development, job creation and income generation. The studies acknowledged some difficulties in accurately judging their impacts on local level socio-economic development due to the lack of transparency concerning profit, taxes and fees. The studies also acknowledge the indirect economic benefits, the stimulation of growth of the local economies, and efforts to attract more investment.

Conversely, the studies revealed many negative impacts on the two provinces from forms of investment, such as decreased forest cover and quality, conflict over land, declining water supplies and water quality, decreased livestock production, loss of biodiversity and NTFPs, health problems, and a decline in school attendance and quality. In addition, increased debt for farmers, increased criminal behaviour and other social problems, for example, gambling and alcohol consumption, were found in Savannakhet province. These negative effects have proven uncontrollable due to limited capacity and uneven implementation of the province's investment approval and management system. The studies also found that while the local people's household incomes had increased in line with employment, they were also experiencing growing household expenditure. Investment has been linked to the degradation of natural resources and land alienation, loss of agricultural land and forests, and increased

conflict over land. The main findings from these studies were based on the fact of environmental and social problems being associated with certain modes of investment in the provinces; thus, the positive and negative impacts of investments may cancel each other out. The studies observed that the local people in the two provinces are doubtful regarding the investment impacts for while they have received some benefits from the investment in their area, at the same time they have suffered from negative investment' effects. The costs and benefits of investment appear unequally distributed between peoples of the two provinces; for example, one group may disproportionately share in the gains brought by investment, while others bear a greater burden of the costs. Finally, the studies see investment projects facilitating a change in the villagers' traditional livelihoods but not necessarily providing a reliable alternative.

Based on these assessments by the IUCN and the NERI, it is not surprising to find the impacts of investment in the resources sector on local people in both provinces as ambiguous. As stated earlier, the linkages of PEN are related to many complex issues and need to be investigated at as many scales as possible. When the complex issues of PEN and the dilemma of private investment in the resources sector are combined, more research and case studies are needed in Laos in order to understand their particular problems and relationships. This study thus aims to build a better understanding of the complex relationships that obtain between poverty, environment and investment in Laos.

3.7 Summary of Chapter 3

This chapter reviewed works and studies related to many issues addressed in Chapter 1 and to general concepts in Chapter 2. It highlights two methods of poverty measurement in Laos: quantitative measurement indicates the poverty line and poverty criteria are used to identify the incidence and density of poverty. The qualitative method suggests the causes and effects of poverty and possible solutions for the poor based on PPA techniques. Information obtained from these measurements can be used to create poverty mappings and others maps related to inequality and vulnerability issues, tools that are important to development planning. The livelihoods of Laos' rural poor are closely dependent upon local resources and the agricultural sector. Any depletion of these resources will impact adversely upon the poor's livelihoods. A review of government documentation suggests the utilisation of national resources for the country's development through investment. While many laws have been passed to protect said resources, resource degradation over many areas has been detected in many regions in Laos and needs urgent attention.

Both the indirect and direct existence of PEN has been explained through works produced by the ADB, the IUCN and the World Bank, the results of which suggest the existence of PEN. While proposals regarding joint solutions to poverty reduction and environment management are seen as important policies, additional studies of these issues are suggested for Laos. Meso-scale research has been modified as one of the alternative approaches to studying PEN. Private investment has been widely promoted in Laos; the need for privatisation and the delays and the PSD in Laos were reviewed. Some details of the debate surrounding the impact of private investment on the country's resources sector were explored, particularly the negative impacts on the locals' livelihoods. The two PEI case studies in Laos showed both positive and negative impacts of investment on the local people, the ambiguous impact of such investment, and suggested additional studies on the impact of private investment on local people and environmental resources.

Drawing from the studies reviewed, I considered it important to investigate the real impact of private investment on the resources sector, poverty reduction and environmental sustainability in Laos. Given that this form of resource use can lead to new problems related to local resources sustainability, changes in rural people's livelihoods as well as issues related to PEN, particular focus should be upon the interaction between private investment and PEN-related issues. Generally, private investment may do well; but, on occasion, the resources sector and the rural poor's livelihoods are badly affected. Hence, it is essential to gain and promote a more in-depth understanding of private investment in this context in Laos.

Chapter 4 will explain a particular research methodology employed in this study called 'a multi-scale research approach' modified from meso level research. I will begin by explaining the method used to create and analyse investment patterns and the overlaying of maps using secondary data at the district level. Then, the method for spatial regression analysis is described to evaluate their spatial relationships. Next, the method used to assess the impacts of private investment and issues related to PEN at the local level is elaborated. Finally, the steps taken to assess private investment management will be explicated.

Chapter 4: Research Methodology

4.1 Introduction to Chapter 4

The main objective of this study has been to build a better understanding of the implications of private investment for poverty-environment nexus (PEN) in response to government policy to encourage private actors to invest in the resources sector, aiming to reduce poverty in Laos. This aim may sound difficult because it is almost impossible to observe direct relationships between private investment and issues of PEN. One way to view these relationships would be to observe their indirect relationships by quantifying the relationships between private investment and poverty, private investment and environment, and poverty and environment. By drawing from these relationships, it may be possible to achieve the above objective. However, in order to do so, different research methods and steps need to be employed. To this end, this chapter aims to explain a systematic way – that consists of four research methods – of achieving the overall objective. These four methods will be derived from combining the three research questions with a multi-scale research approach: these are then employed later in Chapters 5, 6, 7 and 8.

This chapter consists of seven sections, including this introductory section. In the next section, I will explain the research problem and the approach adopted. Section 4.3 explains the research methods employed to create investment patterns, overlay maps and examine the statistical correlation analysis. Section 4.4 illustrates a complex method of spatial regression analysis. Section 4.5 describes the methods used to assess impacts of investment at the local level through livelihood asset pentagons and narrative approaches. Section 4.6 explains how qualitative content analysis was used to assess local management of private investment by provincial and district authorities. All key points and methods are summarised in section 4.7.

4.2 Research questions and approaches

Drawing upon development issues in Laos, the three research questions that appear in Chapter 1 are revisited. This section explains how to design a reliable research approach in order to provide concrete answers to the research questions. A multi-scale research approach, involving interaction at the national, provincial and district levels (see Chapter 1), is considered appropriate to demonstrate both the concept of PEN and the private investment. In application of the multi-scale research approach to this thesis, I have modified some

components of this approach to suit the objective of my thesis. Accordingly, this research is structured to integrate the research questions and apply the modification of meso research methods. This section starts by reviewing key development issues in Laos and recalling research questions to narrow down the research scope. Then, I explain how I designed the research methods employed in this study.

4.2.1 Reviewing issues in Laos and research questions

As suggested in Chapter 1, Laos faces four key issues on its current development trajectory, namely widespread poverty, increasing resources degradation, the nature of PEN, and the uncertain impact of private investment. Some studies reviewed in Chapter 2 clearly suggest that these issues urgently need to be investigated and provided with effective solutions. In particular, more attention should be paid to the impact of private investment on poverty reduction and environmental sustainability at local investment sites (PEI, 2010, n.d.). While several studies have focused on linkages between private investment and poverty and private investment and the environment, empirical research into interactions between private investment and issues of PEN has not yet been fully explored, neither in Laos nor elsewhere. Recently, the IUCN and the NERI (2011a, 2011b) have undertaken a few initial studies in Laos of assessment of investment impacts on local livelihoods and resource management. While the scope of these studies has been limited to case studies, their real findings have suggested ambiguous impacts of investment on economic, social and environmental development. Therefore, there is a need for further study with a more comprehensive framework to investigate the real impacts of private investment in the resources sector in relation to poverty reduction and environmental sustainability in Laos. Particular focus should be upon the interaction of private investment and issues related to PEN. As suggested in Chapter 1, the overall objective of this research is to determine whether, to what extent and in what circumstances intervention by private investment in the resource sector successfully achieves sustainable development in Laos. In particular, I seek to examine the implications of private investment for poverty reduction and environmental sustainability in relation to PEN. To fulfil this objective, this research seeks to answer in detail the three following questions:

1. What are the patterns of private investment in the resource sector in Laos? And, to what extent or in what way are these patterns related to issues of PEN?
2. How does private investment change local livelihoods and resource usage? And, in what circumstances has private investment stimulated issues of PEN at the household level?

3. How have provincial and district authorities managed private investment in the resource sector in relation to issues of PEN?

To answer these research questions, the research approach is explained in the following sub-sections. The four research methods employed will be clarified in the next four sections.

These are mapped against the four sections below. The first question covers sections 4.3 and 4.4 and relates to Chapters 5 and 6; the second question covers section 4.5 for chapter 7; and, the third question covers section 4.6 for Chapter 8.

4.2.2 From meso to multi-level research approach

The key concepts review in Chapters 2 and 3 suggest some methodological approaches that may be used to answer the above research questions. However, this research study may not be able to pursue these approaches given that they require more time, funds, data, and complex analytical methods. On the other hand, by learning from these approaches, a meso-scale research approach can be usefully applied to this study, at least to some extent.

As shown in Figure 4.1, Messerli and Heinemann (2007) introduced the meso-scale research approach to study the effect of development intervention disparities on the poverty-environment nexus in Laos. Specific features of this approach have been alluded to in Chapter 3. Some features had to be modified in order to apply the meso research approach to this study. For example, use of the agro-ecosystem map in Figure 4.1 may not have been suited to comparing the differences in local resource usage stated in the research questions: the information on the agro-ecosystem map is specific to one period of time only. In addition, while this approach is designed to capture the development actors, for example, those who are involved in decision-making and development intervention in different areas of Laos, this thesis considers only one type of actor, that is, private investment.

Some logics and methods related to this meso-scale research approach are rational and well worth following. For example, it uses a poverty map to explain the socio-economic disparities, and spatially overlays this poverty map to the agro-ecosystem map in an attempt to describe the spatial configuration of the so-called poverty-environment nexus (Messerli & Heinemann, 2007). In addition, all private investment can be grouped as a set development actors or interventions in the model. When slightly modified, this approach can demonstrate the intervention of the private sector in the poverty-environment nexus in Laos.

Up until now, I have posed three research questions; and, at the same time, I need to adapt the above meso-scale research approach. So, I have opted to design a research methodology for

this study that will combine the research questions with modification of the meso research methods, following chronological order of the research questions. By doing so, the analysis will employ a mix of both quantitative and qualitative approaches. As stated in Chapter 1, this research is conducted on two levels. The first, the meso-level, involves interaction between the provincial and district administrative levels by employing secondary data of private investment in each district to create investment patterns for analysis. Based upon concepts of PEN and the meso-level approach, this investment map is overlaid to the environment and poverty maps in an attempt to identify their correlations and development interactions.

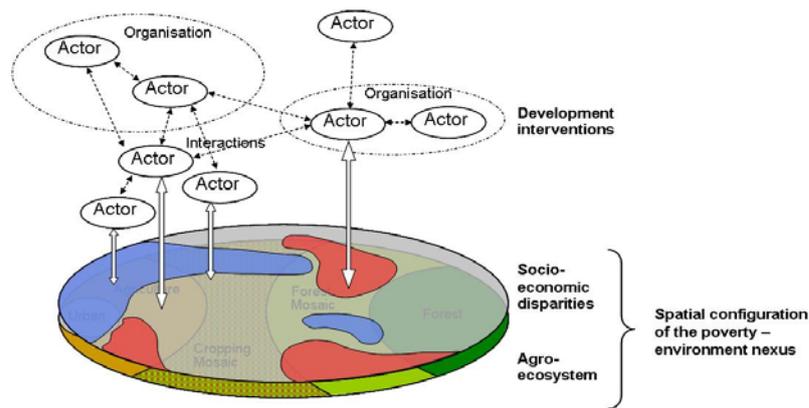


Figure 4. 1: NCCR meso-level approach

Source: Adapted from Figure 2, Messerli & Heinimann (2007)

At the micro-level, the research focus is upon the interaction between the village and household levels. Two investment sites and some household samples in each site were selected to investigate changes in their livelihoods and resource usage before and after investment. Both micro and meso-level were needed in this study because results from the meso-level based on secondary data at the district level, and their spatial findings, cannot fully explain the real impact of private investment at the local level. The results at the meso-level suggest spatial relationships rather than causality; thus, it would need further investigation of these spatial relationships by moving from meso to local analysis. In fact, the findings from these two levels of analysis are expected to suggest the potential effects of private investment from national government policies to changes in local livelihoods and resource usages. These findings will lead to the assessment of private investment management through nine officials in each of three districts along with their equivalent provincial offices either in charge of or

engaged in investment management in their areas. The research thus focused on a total of fifty – four offices.²⁵ In this way, this study employs a multi-scale research approach.

In short, by drawing from development issues in Laos, this chapter addresses three research questions. Based on these questions, the study aims to adapt the meso-level approach into the multi-scale analysis. In addition, the research methodology for this study has been designed by combining these research questions with multi-scale research methods. Based on this combination, four research areas and their methods are identified: (1) investment patterns and overlaying maps; (2) spatial regression analysis; (3) investment assessment of local impacts; and, (4) assessment of private investment management. These research methods are explained in detail in the following four sections.

4.3 Methods for investment patterns and overlaying maps

Following the meso research approach, this section explains the research methods employed to create investment patterns and overlaying maps through secondary data pertinent to private investment, environmental degradation and poverty. The data analysis and findings in Chapter 5 will follow these methods. This section starts with an explanation of the definitions and classifications of some of the common terms used in this research and in the data survey that appears in Chapter 5. These classifications and terms are important inasmuch as they narrow the scope of the study. This section then identifies data sources and collection steps, and explains the spreadsheet formats for data collection and methods used to analyse the secondary data.

4.3.1 Common terms and scope for investment patterns

It is important at the outset to define some common terms in this section for consistent understanding by data providers, due to the fact that some of these terms may have slightly different meaning elsewhere. For example, in this study, the term ‘private investment’ refers to all foreign and domestic private activities, including investment activities, non-profit activities and some forms of feasibility studies. The term ‘meso level’ signifies an administrative unit at the district level; meanwhile, ‘macro’ refers to the national and provincial levels, and ‘micro’ to the village and household levels. By law, private investors must register their investments with either the central or local Committee for Promotion and

²⁵ Nine offices in three districts (27 district offices) and nine offices in three provinces (27 provincial offices), 54 offices in total.

Management of Investment (CPMI): their secondary investment data are important for generating investment patterns in Laos.

Regarding secondary data collection, it is important to create some criteria in order to limit unnecessary data and meet the research scope. First, this study will focus only upon private investment activities that directly use, exploit or interact with one or more local natural resources, including land, water, forest, soil, biodiversity and natural ecosystems. Investment activities such as road construction, school and hospital buildings, information and communication technology, communications and banking and financial investment will be excluded from the data collection because their associated organisations do not directly use the above natural resources. Second, in cases where the investment is a joint venture between private investors and the GoL, selection will be based upon government ownership. Investment will be included only if government ownership is equivalent to or less than 49%; otherwise, it will be excluded. This criterion attempted to avoid issues related to state-owned enterprises. Third, data collection will include only the private investment activities undertaken between 2000 and 2009 and officially registered with either the central or local CPIMs. Fourth, private investment should include minimum information that can meet the nine out of ten headings in the spreadsheet survey form. Data should be available during the collection. Finally, the investment activities can be assigned and fitted in to one or more of the seven resource sectors tabled below.

	Investments in resource sectors	Short-Form
Sector 1	<i>Agriculture and forestry</i>	Agro Forest
Sector 2	<i>Wood industries</i>	Wood
Sector 3	<i>Handicrafts and (other) resource industries</i>	Handicrafts
Sector 4	<i>Mining and land exploration</i>	Mining
Sector 5	<i>Resource trading and commercial enterprises</i>	Trade
Sector 6	<i>Tourism and recreation activities</i>	Tourism
Sector 7	<i>Hydropower and energy</i>	Hydro-Energy

In this section, the resource sector is regarded as a primary sector; that is, as part of the economic sector that has utilised natural resources as raw materials to produce goods and services. 'Environment' in this study is narrowed down to mean natural resources including land, water, forests, soil, biodiversity and natural ecosystems. Private investment in the resource sector using natural resources must be grouped into the seven resource sub sectors listed in the Table above.

4.3.2 Data sources and collection of investment patterns

Secondary data pertaining to private investment in the resource sector are available at several government offices. As suggested in Chapter 3, this is because the investment promotion laws have authorised several departments of the government offices-at both the national and provincial levels-to undertake the granting of permission for private investment. At the national level, most of the investment data are available at the Investment Promotion Department (IPD) of the Ministry of Investment and Planning, which houses the permanent office of the central CPMI. In addition, there are other government authorities that issue joint private investment approval, including the Ministry of Agriculture and Forestry (MAF) for investment data on wood, agriculture and forestry activities; the Ministry of Industry and Commerce (MIC) for trading, handicrafts and other resource-based industrial activities; the Ministry of Energy and Mining (MEM) for hydropower, renewable energy and mining activities; the Lao National Tourism Administration (LNTA) for tourism, recreation and biodiversity activities; and, the National Land Management Authority (NLMA) (which comes under the Prime Minister Office) for investment in land, especially land concessions.

In line with the Prime Minister's Decrees No.300 and 301, the provincial departments were authorised to approve some private investment as well as small and medium enterprises (SMEs). The Prime Minister and the National Assembly can also approve investments of large size and capital values. However, while acknowledging this fact, the secondary data were collected only from the ministerial departments for three reasons: first, it was both time consuming and costly to seek investment data from 18 provincial authorities, when most were available from the ministerial departments. Second, secondary data will be used to create maps of private investment and to overlay with other maps. So, investment data obtained from ministerial departments would adequately serve this aim. Third, data involving large investment projects approved by the Prime Minister and/ or the National Assembly may not be accessible without official affiliation with high government agencies, unlike the databases of the ministerial departments. For this reason, large investment data are also omitted from the data collection. However, by modifying the meso-level approach, the omission of these data may not largely affect analysis of this study; and, the results obtained from the data collection will not be seen as biased for while the full data are unarguably important, it is not necessary to create maps or patterns when using this approach.

Before commencing the data collection, a data format form was created to ensure receiving the same data format from the relevant ministerial departments. In order to do this, a

spreadsheet designed to capture a list of private investments was set up to record information about each private investment. Each ministerial department was required to fill out the spreadsheet based on its records of private investments registered in their offices. This spreadsheet consisted of ten heading columns under which to provide the information about each investment. Each heading was considered important in terms of validity to create investment patterns and maps, and perform basic statistical analyses. Each column is described below.

1. *Year* – the initial year in which the investment commenced operation and was officially recorded.
2. *Company/project name* – the name of the company or project that invested in, organised activities or conducted feasibility studies in relation to the resource sector.
3. *Main investment activity* – a brief summary of how natural resources were utilised or converted into products, goods and services through private investment.
4. *Financial capital register* – the amount of financial capital investment the company registered in the investment application.
5. *Financial capital investment* – the total amount of financial capital the company planned to put into the investment as specified in their investment application.
6. *Main resource sector investment* – assigning only one number between 1 and 7 as representative of the main resource sector (described above) in which the investment was mostly involved.
7. *Influencing resource sector* – assigning one or more numbers ranking from 1 to 7 indicating how each investment could affect or influence one or more resource sectors. If it affected a particular resource sector, ‘1’ was noted for that sector otherwise ‘0’. For example, if a company’s main activities were summarised as ‘agarwood, industrial tree plantation and jatropha to produce bio-diesel for sale and export’, this company would involve at least three resource sectors, for example, agriculture and forestry, the wood industry and renewable energy. Thus, resource sectors 1, 2 and 7 were marked as 1 for this investment.
8. *Investment district* – name(s) of the district(s) in which the investors planned to operate and locate their investments.
9. *Home country* – name of the country from which investment capital would flow.
10. *Remark* – open for additional information not listed in headings 1 – 9.

4.3.3 Data collection procedures and analysis of investment patterns

The first ministerial department I contacted was the IPD wherein all private investment in Laos is documented. At the IPD office, the research objective, methodology and an official letter for data request was presented to the officials, along with a spreadsheet showing data collection. A week later, the data request was followed up. This process was also applied to other ministerial departments, including the Department of Planning; the Department of Agriculture at the Ministry of Agriculture and Forestry; the Enterprise Registry Office (ERO) at the Ministry of Industry and Commerce; the Department of Mining; the Department of Energy Development and Promotion at the Ministry of Energy and Mining; the Lao National Tourism Administration (LNTA); and the National Land Management Authority (NLMA) which came under the Prime Minister's Office. After completing collection, these data were compiled together. Any investments not meeting the conditions set in the spreadsheet were omitted because it was impossible to incorporate them. In addition, if any of the data were duplicated, the duplications were removed from the list following careful cross-checking, thus ensuring that only one entry for each private investment company or project was recorded.

After refining the secondary data, three analytical methods were employed to investigate the investment patterns and maps. First, according to the spreadsheet headings, the distribution patterns of private investment in the resource sector were generated; for example, patterns of investment in the resource sectors, patterns of home investment countries, maps of districts receiving investments from the seven resource sectors and maps showed the total investment. Each of these investment patterns and maps were accompanied by a descriptive analysis based on their insights and features. Second, a map showing total investment was overlaid to the poverty incidence map and investment promotion zone map. This overlay is descriptively explained to reflect the strategies employed by the GoL to promote PSD for poverty reduction and economic growth. In this analysis, the poverty incidence map was based on the work of Epprecht et al. (2008), while the promotion zone map was adapted from the investment guide book (IPD, 2008, p. 1). Apropos of the last method, the total investment map was overlaid to poverty incidence and environmental degradation maps; then, a simple statistic Chi-square (χ^2) test was applied to examine the statistic dependent correlations among the three maps. With regard to this analysis, while the poverty map was the same as above, a map of changes in percentage of forest cover or deforestation between 2000 and 2005 was used as a proxy of the environmental degradation in Laos, produced by the SNV (see Holland & McNally, 2009).

Overall, the research methods described in this section were employed to create national investment patterns by using secondary data relevant to private investment at the district level, collected from various ministerial departments. To achieve this, many terms were defined to fit the study scope. Before collecting the data, data source and survey formats were delivered. After collecting the data, descriptive analysis was applied to explain the investment patterns, the overlaying maps of investment, poverty and the investment promotion zones. The overlaying of the maps of investment to poverty incidence and deforestation was quantified by both descriptive and statistical analyses, which may be considered simple as they revealed only the basic relationships among investment, poverty and degradation. The next section explores the methods used for spatial regression analysis, the aim being to determine their spatial relationships.

4.4 Methods for spatial regression analysis

Following on the above section, a more complex statistical method needs to be employed to spatially testify to the relationships of poverty, deforestation and private investment. Drawing from studies of spatial statistics including Anselin (1992); Fotheringham, Brunsdon, and Charlton (2002); Haining (2003); and Charlton and Fotheringham (2009a, 2009b), spatial regression analysis is seen as one of the more powerful tools by social scientists. Spatial regression analysis is related to the geo-statistical techniques of Geographically Weighted Regression (GWR), which is considered more advanced than the traditional statistical analysis Ordinary Least Square (OLS) given that GWR takes into account spatial locations and spatial attributes of data, and provides more accurate analytical results. Therefore, many academic studies have applied spatial regression analysis with GWR as results from this technique are more reliable and its analytical tools are available in many types of software, particularly the Spatial Statistics Tool in ArcGIS (Charlton & Fotheringham, 2009a).

This section explores the research method of spatial regression analysis, using GIS software application, to examine the association of spatial relationships of poverty and deforestation on private investment. By doing so, it is expected to understand the spatial relationships between private investment and issues related to PEN. The findings from these methods will be elaborated in Chapter 6. In this section, I explain the experiment models and variables employed for spatial data analysis; then, I describe two regression methods, the OLS and GWR techniques, and the differences between them. Finally, I elaborate upon the adopted analytical procedures.

4.4.1 Models and variables for spatial data analysis

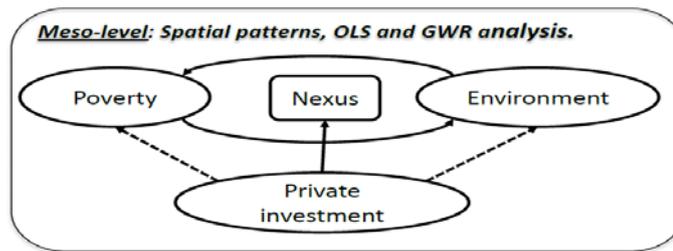
In general, regression is a method for modelling the relationship between a dependent variable (the y-variable) and a set of one or more independent variables (the x-variables, predictor variables, or repressors). A simple linear regression model was constructed in the following form:

$$y_i = \beta_0 + \beta_1 x_i + \varepsilon_i \quad \text{for } i = 1 \dots n$$

Where:

- y_i – dependent variable at location i ;
- x_i – independent variable,
- ε_i – the error term, and
- β_0 and β_1 – parameters or coefficients.

A multiple linear regression, which is simply the expansion of a simple regression, can be written as $y_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{3i} + \dots + \beta_m x_{mi} + \varepsilon_i$ where m is the number of independent variables. This type of model is usually fitted using a procedure known as the OLS (Charlton & Fotheringham, 2009b). The parameter or coefficient $\beta(s)$ is the estimated value(s) to explain the relationship between the dependent and independent variables.



In Section 2.6 of Chapter 6, I have introduced the PIPEN model, which was employed to investigate the spatial relationships of private investment on issues related to PEN. By applying and combining both the linear regression model and the PIPEN model, this study proposes two linear models to investigate the spatial relationships:

$$\text{Poverty}_i = b_0 + b_1 \text{Investment}_i + b_2 \text{Deforestation}_i + \varepsilon_{1i} \quad (1)$$

$$\text{Deforestation}_i = c_0 + c_1 \text{Investment}_i + c_2 \text{Poverty}_i + \varepsilon_{2i} \quad (2)$$

Where:

- Poverty – rate of poverty incidence in each district in 2005,
- Investment – private investment in resource sector during 2000-2009,
- Deforestation – change in percent forest cover between 2000 and 2005,
- ε - the error term, and
- “ i ” – the district location.

In the first model, coefficient b_1 was expected to have negative signs as investment was assumed to reduce poverty; conversely, coefficient b_2 would show positive signs because the

increasing rate of deforestation would determine higher poverty incidence. Similarly, in the second model, c_1 was expected to show negative signs as additional investment would be expected to reduce deforestation: the coefficient c_2 would show positive signs as the poverty rate was predicted to increase along with the deforestation rate. Scrutiny of the two proposed models, coefficients b_1 and c_1 , was expected to suggest spatial relationship patterns of investment in poverty and deforestation, patterns that delineate the magnitude of impact of private investment on the rates of poverty and deforestation. In addition, coefficients b_2 and c_2 would reveal the spatial relationship patterns between poverty and deforestation, signifying district locations of PEN. It is important to note that the coefficients in both models were not implied “causalities” but relationships among the variables. These two models were not linked together.

4.4.2 OLS, GWR and their differences

Various regression techniques can be used to analyse spatial data. In this thesis, focus has been upon experimentation with both the OLS and GWR methods to investigate the above two proposed models. The OLS (known as the linear least square), which is a general form of linear regression, sets out to generate predictions or to model a dependent variable in terms of its relationships to a set of explanatory variables. GWR, a local form of linear regression, aims to model spatially varying relationships. Thus, it is a fitting model to predict the values of one variable response or dependent variables from a set of one or more independent or predictor variables. GWR, one of several spatial regression techniques increasingly used in geography and other disciplines, provides a local model of the variable or process-in order to understand or predict strength of relationship between the variables-by fitting a regression equation to every feature in the dataset (see Fotheringham et al., 2002).

The significant differences that appertain between these two methods are inscribed on their analytical features. For example, the OLS is recognised as a global model: assumed constant relationships between dependent and explanatory variables and its residuals are assumed to be independent and normally distributed with a mean of zero. The OLS holds classical linear assumptions, such as stationary data, none-autocorrelation and normality. The GWR, a local model, depicts different values for different locations within the study region, allows the relationships to vary over space, ignores classical assumptions, and can deal with non-stationary data. Unlike the OLS, the GWR has several special features; for example, it can integrate statistical analyses with geography information, and incorporate spatial localisation of data into the study (see Charlton & Fotheringham, 2009a, 2009b; Fotheringham et al.,

2002). Thus, the GWR results may prove better than those of the OLS. Despite realising this, I will experiment with both techniques in an attempt to explain the complex spatial relationships that distinguish the PIPEN model.

Nowadays, when dealing with a large dataset, both techniques may be manipulated by using statistic soft programmes. One among these programs that is popularly used is the spatial statistic tool ArcMap (ArcGIS Version 10), which has been developed to capture both statistical and geographical analyses at the same time, a process suited to the OLS and GWR techniques. In ArcMap, the operation of OLS is simple like other software because it has few feature commands; GWR, on the other hand, needs to concentrate more on its optional feature commands and may be manipulated in many ways according to the users' choice. Citing from GWR usage description in ArcMap Version 10,²⁶ some of its feature commands are defined and appear directly quoted below.

It is important to note that GWR constructs a separate equation for every feature in the dataset, incorporating dependent and explanatory variables of features falling within the bandwidth of each target feature. The shape and extent of the bandwidth²⁷ is dependent upon user input for the Kernel²⁸ type, Bandwidth method, Distance, and Number of neighbours' parameters. In the Syntax of the GWR method, the **Kernel type** and **Bandwidth method** are important for user selection. Their descriptions appear below.

Kernel type specifies if the kernel is constructed as a fixed distance, or if it is allowed to vary in extent as a function of feature density.

- **FIXED** — the spatial context (the Gaussian kernel) used to solve each local regression analysis is a fixed distance.
- **ADAPTIVE** — the spatial context (the Gaussian kernel) is a function of a specified number of neighbours. Where feature distribution is dense, the spatial context is smaller; where feature distribution is sparse, the spatial context is larger.

Bandwidth method specifies how the extent of the kernel should be determined. When AICc or CV is selected, this option will find the optimal distance/ neighbour parameter for the user.

²⁶ Available online in ArcGIS Resource Center, Desktop 10 from:

<http://help.arcgis.com/en/arcgisdesktop/10.0/help/index.html#/005p00000021000000>

²⁷ The bandwidth is the distance between the data point and the regression point. Or, in statistical terms, the bandwidth is a measure of the distance-decay in the weighting function (see Fotheringham et al., 2002, pp. 44-45).

²⁸ Kernel is a weighting function or a function to weight distance between data point and regression point (see Fotheringham et al., 2002, p. 44)

- AICc —the extent of the kernel is determined using the Akaike Information Criterion (AICc).
- CV —the extent of the kernel is determined using Cross Validation.
- BANDWIDTH PARAMETER —the extent of the kernel is determined by a fixed distance or a fixed number of neighbours.

These feature commands allow users to vary their analytical options. This is why results from the GWR techniques can be readily matched to the reality.

4.4.3 Analytical procedure for spatial regression analysis

When dealing with spatial data, the GWR regression method is often employed to investigate spatial relationships. However, for exercising purpose, this study intends to experiment with both the OLS and GWR methods; then, their results need to be compared. The analytical procedure described in this section will be implemented in Chapter 6 by taking the four model estimations as shown in Figure 4.2 below. The first and second estimations will run the first model using the OLS and GWR techniques, respectively. Then, the third and fourth will run the second model using OLS and GWR.

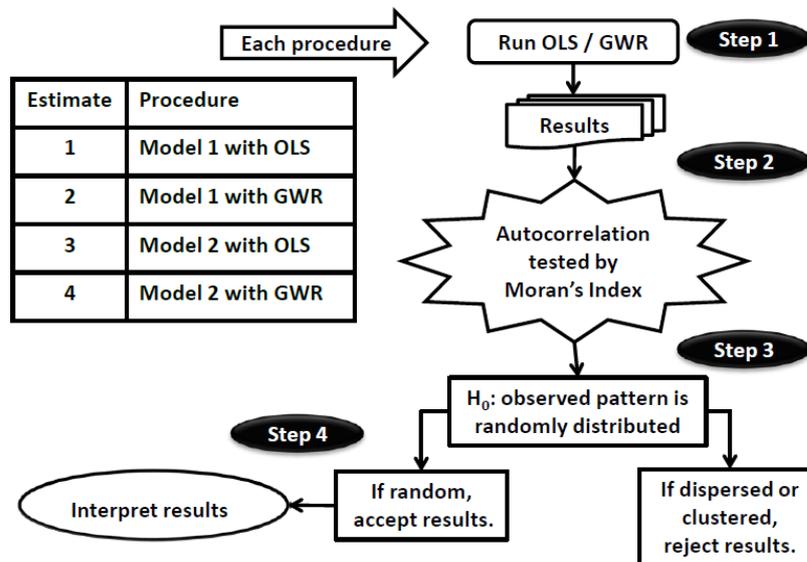


Figure 4. 2: Analytical procedure diagram for spatial data analysis
Source: Created by Author

As illustrated in the Figure 4.2, four steps are taken in each estimation procedure. First, the OLS/GWR in ArcMap tool is run, allowing each model to estimate its spatial relationships. Second, after obtaining the results, autocorrelation will be tested by using Moran's Index (explained below). In this test, a null hypothesis states that the observed pattern is randomly distributed. Third, after testing, if the decision concludes that the observed pattern is dispersed or clustered, then the estimated results from either OLS or GWR are rejected. Alternatively, if

the observed pattern is random, the results are accepted. In the last step, only the accepted results from these estimations are compared and evaluated for better performance by investigating their statistical diagnostics. These steps have been widely used in several empirical studies (see Fotheringham et al., 2002).

In this diagram, it is important to test the autocorrelation to ensure that the residuals are statistically independent from each other. If they are correlated, their results will be unreliable, especially that of OLS as violating its assumption. Moran's Index is considered an appropriate test statistic because it can measure the level of spatial autocorrelation in the residuals and is also available in ArcMap tool (Charlton & Fotheringham, 2009a). More details pertaining to the test will be elaborated in Chapter 6 when the estimated results of the OLS and GRW become available.

4.5 Methods for investment assessment on local impacts

This section explains the methods employed to assess the real impacts of private investment on the resources sector at the village and household levels. To this end, it is important to explore patterns of local livelihoods and resource usage, and then compare them before and after investment periods. It is expected that this comparison will indicate some change in local livelihoods and resource usage and that this change will prompt further investigation into whether, in what circumstances and to what extent private investment is linked to issues of PEN at the investment sites. These methods will be applied in Chapter 7. In this section, I will explicate the procedures used to select investment sites, villages and households for survey and data collection, to construct questionnaires for villages and household surveys, and to analyse the data collected.

4.5.1 Investment sites, villages and household selection

The research method at the micro level began with the selection of two investment sites, the first a foreign investment and the second a domestic investment. This section aims to examine Lao government policy regarding both domestic and foreign investment and to compare the different impacts on the two sites. The site for selection needed to meet three criteria; first, it should have one or more active private investment(s), and that investment(s) should have operated at least since 2005 or before; second, investment(s) in the site must have utilised local resources in the investment activities, resources also used by local people to sustain their livelihoods. This criterion may suggest a source of significant resource competition at the site. Finally and importantly, there would be real (an) issue(s) or controversy surrounding the

linkages between private investment, local livelihoods and resource usage. This information could be obtained from district authorities and at village meetings. The above three criteria were expected to help with the selection of the most interesting sites for this study.

The next step was to select the villages by using the same criteria as the site selection above, with two extra conditions added to choose the right three villages in each site. First, the selected villages had to be located as near as possible to the investment site because they were expected to receive the most impact from the investment. Second, the villages would be recommended by district authorities during the district consultation. Recommendations from district authorities were considered important because district authorities invariably knew their local situations well and were well equipped to suggest the villages that would appropriately meet the village selection criteria and objectives of this study. In addition, it was crucial to follow their recommendations because it would be convenient to work with village chiefs and households at a later stage. In Laos, without this official cooperation, one would experience difficulty working with the local people because the latter often follow the government's horizontal line of administration.

After selecting the villages, sample households are selected for data collection. It was expected that a total of 120 households would be selected for in-depth interviews in three steps. First, the village chief was approached for a short interview on village profiles and presented with a list of all registered households in the village. Second, among the registered households on the list, the names of those recently married and those who had resettled in the village less than five years earlier, were removed from the selection list. Their exclusion was important because only householders with long experience were included in the interviews, their responses based on their real life experiences. Finally, when the household list was completed, a simple random sampling (SRS) method was employed to select approximately 20 sample households in each village. This method was used because each sample household in the list had the same chance to be selected; and, choice was made objectively by random means. After completing the three steps of the household section, 120 sampling households from six villages were identified for recruitment in in-depth household interviews.

In addition, information collected from these 120 households provided data at the village level. In the last step in this stage, another 10 households in each site were selected in order to investigate particular details of investment impacts on the five different groups. In this way, I aimed to conduct a qualitative assessment of local explanations and interpretations of relationships between investment, environmental degradation and poverty provided by

different groups. As well, I sought to achieve an understanding of how the above were experienced subjectively by people from different groups. Upon screening the household data received, I selected one out of three villages in each investment site, then 10 households representing the rich, the poor, men, women and ethnic households. This meant that each group had two households, and their selection was finally decided through careful discussion between the researcher and the village chief.

4.5.2 Village surveys and household questionnaires

After selecting the two investment sites, six villages and 120 households based on the criteria, the next step was to plan the data collection, which was conducted through one village survey and two household questionnaires. Regarding the village survey, each village chief was contacted and details sought vis-a-vis their particular village profile. The aim of this interview was to understand the general information gained about their respective villages. For this interview, I used a simple and quick survey form for village profiles in Laos compiled by Dirk Van Gansbergh (see NAFRI, NAFES & NUOL, 2005, pp. 249-251). This survey form consisted of eleven headings on village information: general details; health; water; education; others [referring to local infrastructure]; crops; livestock; fisheries and aquaculture; forestry, agro-forestry and NTFPs; main reported problems and priorities for development; and additional useful information, remarks and comments. This survey form was deemed suited to my purpose because it was structured to gain a variety of information about the villages.

The main part of the micro analysis was highlighted in the way in which the household questionnaire was constructed. The information obtained was expected to reveal the real livelihoods and resource usage in each investment site. Thus, it was important to construct the household questionnaire in a realistic and considered manner. To this end, I decided to employ the concept of livelihood asset pentagon in SLA developed by DFID (1999a, 1999b). As suggested in Chapter 2, DFID developed the SLA framework as a tool to understand poor livelihoods based on the works of Chamber and Conway(1992) and the Institution of Development Studies (IDS) (Scoones, 1998).

SLA has many important components and features. This study has focused only upon the features of livelihood asset pentagon, a pentagon expressed in five capitals that enable people to pursue different livelihood strategies and their livelihood objectives. It suggests thinking holistically rather than sectorally about the basic elements of people's livelihoods (Carney, 1998, p. 7). The asset pentagon was used to compare local livelihoods and resource usage

before and after investment. As partly provided in Chapter 2, full definitions of five capitals as key elements of the asset pentagon are repeated below.

Human capital - skills, knowledge, ability to labour and good health. *Social capital* - the social resources upon which can be developed through networks and connectedness, membership of more formalised groups, and relationships of trust, reciprocity and exchange. *Financial capital* - financial resources such as saving, stocks and regular inflows of money. *Physical capital* - the basic infrastructure and producer goods needed, such as roads, buildings, irrigation canals, tools, machines and so on. *Natural capital* - natural resource stocks from which resource flows and services useful for livelihood are derived (DFID, 1999b).

To meet the objectives of this section, an easy and answerable questionnaire for an in-depth household survey was designed based upon these five capitals' definitions of the livelihood asset pentagon, and it took about 1-2 hours for each interview. The household questionnaire consisted of six parts. The questions in the first part focused upon general information, a brief history and the poverty status of each household. The salient point in this part was that the village chiefs, households and researcher would classify the poverty level of each household according to their own perceptions (for more details, see Chapter 7). The second and third parts addressed household livelihoods and resource usage. The relevant questions were derived from definitions of the five capital definitions of the asset pentagon. Each question in these parts aimed to understand how each household saw their access to the five capitals in the period before and after investment, and what factors they saw as contributing to the causes of change. The questions in the fourth part underlined both the positive and negative impacts of private investment on their livelihoods and resources usage. The questions in the fifth part emphasised issues related to poverty and the environment based on observation of each household over the last five years, particularly on deforestation, land degradation and soil erosion, and water pollution and decline. The last part left a space in which each household could provide their general comments and discussion, if any.

The last stage of data collection at the household level was in narrative form through in-depth interviews targeting 10 households in each site. These interviews focused on the ways in which the villagers understood their experience of resource degradation, and the new livelihood opportunities associated with the resource investments. Employing a narrative method, each household was requested to tell their observations and experiences of their daily lived reality, particularly events related to resource degradation, impacts on and changes in their livelihoods after private investment, and other issues related to PEN.

In addition to these interviews, the researcher applied informal observation methods through a transect walk and rapid rural assessment survey in each village to gain additional information about the village. In short, the village and household data in Chapter 7 were obtained via village chief interviews, formal household interviews and informal researcher observations.

4.5.3 Data analysis of investment assessment of local impacts

After completing the data collection, three data sets were compiled for analysis. These data are descriptively analysed into eight sections in Chapter 7. The first describes the background of each investment site and the nature of investment activity, descriptions that highlight the geographical and historical features pertinent to investment activity. In the second, aspects of village profiles and poverty are explained by emphasising how the village chiefs, households and the researcher viewed livelihood development and poverty in each village. Third, access to five capitals before and after investment are compared and explained. Fourth, drawing from access to these capitals in two periods, asset pentagons of three villages in each investment site were generated. Any differences in the shape of the asset pentagon imply changes in the livelihood patterns. In the fifth section, factors relevant to both sufficient and constrained access to local resource usages are revealed in each investment site. Next, the impact of the investment activities on local livelihoods and resource usage in each site are assessed. Seventh section describes the linkage of PEN. Each sample household was requested to rank a five point scale on the environmental indicators; and, there were asked to stipulate who should be blamed for the resource degradation, whether they themselves had degraded their resources, and whether degradation would make them poorer. In the last section, information from narrative interviews are elaborated with a focus on how different groups of householders understand their experiences of PEN in forms of local impacts, benefits, local conflict, action and solutions.

4.5.4 Researcher positionality

It is important to both receive and assemble accurate data. Many factors can shape or are associated with data accuracy: one of them is researcher positionality. Hopkins (2007, p. 391) describes two aspects of researcher positionality, namely identity including race, class, gender, age, sexuality and disability, and personal experience including research training, previous projects worked on, and the philosophical persuasion of the researcher. In accordance with Hopkins' views, this sub-section describes my positionality in relation to my fieldwork.

I begin with aspects of researcher identification. I am one among many Laotian scholars, who have been awarded an AusAID scholarship and study in a well known university in Australia. We are likely to be afforded high respect in Laos. This scholarship renders me eligible for an official letter from the Cabinet officer of the Ministry of Education in Laos, which can be forwarded to other government agencies requesting them to cooperate with my data collection, especially when I am conducting my fieldwork. However, this letter can be used only at ministerial departments or at a lower level. As a PhD student – recipient of an AusAID scholarship-I used this letter to request secondary private investment data from eight departments at the national level involved in investment approval (for details, see Chapter 5). Moving from the national to the local level, after completing my own survey, I opted to conduct two case studies at two investment sites in Pek district, Xieng Khouang province. Having obtained the official letter from the Ministry of Education, as a PhD research student I could contact and consult with the Cabinet officers in Xieng Khouang and Pek District Governor Offices, and request them to provide me with local official letters so that I could work with six Village Chiefs during my fieldwork (for details, see Chapter 7).

While in the villages, in addition to my research and fieldwork objectives, I introduced myself as a Lao student living in Vientiane Capital; but, the village chiefs often added my study at ‘PhD level in an Australian university’ as stated in the provincial and district official letter. Accordingly, many villagers viewed me in different ways, some as an ‘expert’ because I was studying for a PhD. In addition, during the interviews, because my questionnaire asked them about many aspects of their poverty and livelihoods, they described me as a ‘developer’, someone they expected could help them to improve their livelihoods. Some villagers saw me as a ‘detective’ because some parts of my questions investigated the ways in which they destroyed the local resources and engaged in illegal activities. But, I tried to convince them of my real status as a research student rather than as a detective. In two out of six villages, many households paid little attention to my interviews because they were busy with their businesses and income earning activities. In all of the villages, after finishing my interviews, many of the elderly, as well as the village chief, called me ‘Luuk’, meaning that they would treat me kindly as one of their children. Overall, the ways in which the villagers read and interpreted me were reflected in their responses to the interviews. In some cases, I sought to turn their suspicion into pleasure by talking about and re-explaining my project to them.

As regards other aspects of positionality, before conducting this PhD research, my educational qualifications were related to rural development, environment and the economy. Among my

working experience, I had earned expertise in rural development projects, become familiar with work on rural development projects, with many stakeholders from vulnerable households, and with provincial decision-making authorities in local areas. My educational qualifications and work experience, particularly in the spheres of applied research, analytical skills vis-à-vis data collection and analysis, interaction with stakeholders, poverty reduction and land resource management in Laos, had provided me with the knowledge crucial to undertaking village surveys and household interviews.

But, my qualifications and experience threatened to give rise to bias when it came to assessing investment and resultant local impacts. For example, my knowledge suggests that in the main, private investment can help to improve local livelihoods and resource usage; but, the key factors that hurt these two activities may result from poor or weak management, rules and regulations imposed by government authorities, and greediness on the part of some private investors. In addition, my experience suggests that information from some households or authorities may not be fully reliable because participants may intentionally provide misleading statements or information. This can happen because they may not know the answers or they may know but are unwilling to tell the truth. As these experiences became part of my psyche, they may shape my study in biased and prejudicial ways.

I had to consciously control this bias during my fieldwork by excluding any personal ideas, suggestions or assumptions regarding the answers provided by the households and authorities during the interviews. In addition, I had to strictly follow the principles set out in the research methods, such as random sampling methods. Data based on my own observations will serve as reflections on the research findings in the final chapter.

4.6 Methods for assessment of private investment management

This section aims to elaborate upon the analytical methods employed to assess provincial and district authorities' management rights and duties regarding private investment in relation to issues of PEN in Laos. As argued in Chapters 2 and 3, private investment can contribute both positively and negatively to the development of a host country like Laos. The UNDP and UNEP (2011) report that addresses issues on managing private investment in natural resources is a key to achieving pro-poor growth and environmental sustainability. While promoting private investment in economic growth and poverty reduction, the GoL is aware of these issues and has formulated many laws to manage investment projects and reduce their negative impacts (see Chapter 3). However, some recent assessments have alluded to the

ambiguous impact of investments and the weak capacity of the local authorities to manage and monitor investment activities. They also suggest the need for additional studies concerning these matters (see IUCN & NERI, 2011a; IUCN & NERI, 2011b). In this section, I aim to describe a method combining thematic analysis with semi-structured interviews in order to assess the investment management capability of said authorities. I will begin by sequentially explaining the details of combination of thematic analysis and semi-structured interviews, criteria for selecting districts and provinces for data collection, the formats employed for data collection, and data analysis procedures. This will enable me to provide an understanding of the real situation of investment management in Laos.

4.6.1 Method combining thematic analysis and semi-structured interviews

Braun and Clarke (2006, p. 79), who define thematic analysis “as a method for identifying, analysing and reporting patterns (themes) with data”, provide an outline guide through the six phases to conduct thematic analysis (pp. 86-93). Following these phases, text descriptions of rights and duties assigned to the local authorities in the investment law were analysed and extracted into some themes related to investment management. These themes will be explored in Chapter 8. To understand how both provincial and district authorities have managed private investment in their areas in relation to issues of PEN, semi-structured interviews will be undertaken conducive to the extraction themes based on local authorities’ experience of their daily investment management tasks.

This method was considered appropriate for two reasons. First, thematic analysis has many advantages. For example, it is flexible and free from the constraints of theory, can usefully summarise key features of a large body of data, and can deal with unexpected information (Braun & Clarke, 2006). Second, semi-structured interviews are flexible and allow additional questions to be included during the interviews in response to interviewee comments. So, by using this method I was able to explore more questions relevant to the set themes. This method was particularly helpful because information from provincial and district authorities regarding their investment management duties were expected to be drawn from various sources; thus, I risked receiving unreliable and questionable information. For these reasons, this combined method was considered appropriate for this study.

After extracting the themes and conducting the semi-structured interview, results from the interviews will be consolidated into matrix Tables according to the themes. The content of each matrix should both correspond to and be relevant to authorities’ experiences of their

investment management. In this thesis, the term ‘management’ refers to the processes and techniques used by relevant authorities, according to their rights and duties assigned by law (see Chapter 3), to handle investments.

4.6.2 Selection criteria and data collection of investment management

Three districts, along with their respective provinces, were selected as samples to assess investment management for this study. District selection criteria needed to be established to identify the correct districts. First, the districts were required to have a high degree of private investment in their resource sectors. Second, they had to be categorised in the list of investment promotion zoning either as 1 or 2, not zone 3. Third, these districts had to be rich in natural resources: their local governments had to have a strategic plan in place to utilise these resources to promote private investment. Finally, if applicable, poverty, categorised in 2003 by the DoS of these districts, would be different. It was expected that poverty difference would be further analysed when the results of their investment management became available.

After identifying three sample districts and their provinces, semi-structured interviews were conducted to collect information on investment management. Prior to conducting these interviews in each district and each province, nine offices or official representatives, who expected to become involved in investment management, were contacted via official letters requesting interviews. These nine offices included the Governor Office (GO), Planning and Investment Office (PIO), Agriculture and Forestry Office (AFO), Industry and Commerce Office (ICO), Mining and Energy Office (MEO), Tourism Authorities Office (TAO), Land Management Authority (LMA), Labour and Social Welfare Office (LSW) and Lao Women’s Union (LWU). The number of interviewing authorities totalled fifty-four offices.

During each interview, open-ended questions were used: I expected to ask these officers various questions to determine how they managed private investment and exercised their rights and duties. In particular, the semi-structured interviews mainly focused on their official roles and experiences of investment management in relation to issues of PEN in their local areas. The interview text focused on two parts. The first part constituted as an overview of the backgrounds of the investments: it included the main policies used to promote private investment in their areas; tactics using local resources for the investment; and, the degree of formal and informal investment in their local areas. The second part of the interviews was linked to assessment of the seven key themes of investment management associated with: (1) involvement in approval and decision-making; (2) problems and conflict in investment

management; (3) positive contribution; (4) negative impacts assessed by investment authorities; (5) main affiliating cooperation related to investment management; (6) solutions to negative outcomes and problems; and, (7) recognising issues related to PIPEN and their additional comments.

Regarding data collection during my fieldwork, four methods were used to obtain data as quickly as possible. First, the field notes recorded the key information. Second, audio recording was used to capture the whole interviewing process, but only with the permission of the interviewees. Third, and only if applicable, annual progress reports and work plans of their offices were requested after interviewing for additional information regarding their implementing tasks. Finally, some photos were taken at each site as primary information to assess the real investment impacts on local resources and local livelihoods.

4.6.3 Data analysis of assessment of private investment management

After completing the semi-structured interviews, the interview information from the note taking were summarised into key information. The audio recordings of the interviews were transcribed into text and combined with the notes taken. Then, the information was ready for analysis. I began by shortening each interview to deal only with the themes suggested above. Then, the texts of each theme were extracted from each interview and brought together under the heading for that particular theme. After this, the text was divided into specific units referring to idea units, keywords or phrases; then, these meaning units were condensed, abstracted and labelled with a code. Finally, each theme was allocated various codes summarised and condensed from the texts of the semi-structured interviews. In Chapter 8, these codes are presented in a Table for each theme, to analyse and explain the investment management practices of these authorities.

4.7 Summary of Chapter 4

This chapter explains the research methodology applied to achieve the overall objective of the thesis and to answer the three research questions. This research methodology has been derived from a combination of the research questions with a multi-level research approach, modified from the meso-level approach. Four research methods and their areas have been presented and explored in this Chapter. The first aimed to create investment patterns and maps by collecting secondary data appertaining to private investment in several resource sectors from seven ministerial departments to create the investment map, and to overlay this map to poverty and

environment maps. This method responds to the first half of the first question on patterns of private investment in the resources sector.

The second method, which focused on statistical models and variables for spatial regression analysis, employed data from the district level and the OLS and GWR analytical techniques. This method sought to answer the second part of the first question. In other words, it will reveal the extent of private investment pattern related to issues of PEN by proving their spatial relationships in the PIPEN model. The third method was used to assess investment impact at the local level by employing the livelihood asset pentagon, thus responding to the second research question. The third method saw two investment sites, along with 6 villages and 120 households, selected for case studies. Village surveys and household interviews were conducted for data collection, and descriptive analysis applied to reveal the investment impacts. The last method, which aimed to assess private investment management, was based upon semi-structured interviews with 54 official authorities from three districts and three provinces, by applying qualitative thematic analysis of the interview text methods. This method replied to the third research question regarding the assessment of investment management by provincial and district authorities in relation to PEN. The next chapter (Chapter 5) will illustrate spatial pattern analysis, the overlaying of maps and their findings.

Chapter 5: Spatial pattern analysis and overlaying maps

5.1 Introduction to Chapter 5

Since 2000, there has been a massive increase in private investment in the resources sector in Laos. As suggested in Chapters 1 and 3, this increase has resulted at least in part from government policy on investment promotion for economic growth and poverty reduction. The government works on the assumption that poverty reduction will also reduce pressure on the environment resulting from unsustainable practices on the part of the poor. However, the impact of the increase in these investments has yet to be fully investigated; thus, it is important to examine whether private investment has accords with to the government's assumptions, policies and objectives. This chapter aims to reveal some patterns and maps of these investments by drawing upon secondary data pertaining to private investment and then systematically examining the above patterns. In particular, the investment map drawn from these data will be overlayed to maps of promotion zoning, poverty incidence and environmental degradation in order to show the spatial relationships between private investment and the poverty-environment nexus (PIPEN model, see Chapter 2), and the government investment promotion policies (see Chapter 3).

This chapter consists of seven sections including this introductory section. In the next section, I explicate FDI in Laos. Section 5.3 reviews the procedure adopted to refine data for analysis in this chapter. Section 5.4 displays and describes four different patterns related to private companies in the resource sector. Section 5.5 explains the distributional patterns of investment at district level among the seven resource sectors. In section 5.6, I describe the procedures used to derive data and construct maps, the overlaying of them, and the interpreting of their results in relation to the PIPEN model and investment promotion policies. This chapter is summarised in section 5.7.

5.2 Foreign direct investment patterns in Laos

The period from 2000 to 2009 saw private investment in Laos increase sharply; but, most of this investment focused on the resources sector. As stated in Chapter 3, the GoL has promoted both foreign and domestic investment by introducing promotion investment zones and tax incentives; for example, investors are entitled to business tax exemptions and low tariffs if they invest in promoted activities and poor zones (see Gunawardana & Sisombat, 2008). It is obvious that the GoL expected these investments to positively contribute to both national

economic growth and rural poverty reduction. As a result, post 2000, the volume of foreign and domestic investment has continually increased. For example, the World Bank (2004, p. 18) observed remarkable growth in actual FDI in Laos of more than 30% per year during FY 2000/01-2003/04. When comparing 2003/04 with 2002/03, FDI was estimated to have increased by almost 20% from US\$150 million to US\$180 million in the actual amount or from US\$466 million to US\$503 million in the approved amount. However, promotion of private investment may face many difficulties due to limitation of financial and human capital in Laos and lack of basic infrastructure (Andersson et al., 2006). Additional constraints, including relatively weak legal foundations, may hinder both the interests and confidence of investors in Laos (Gunawardana & Sisombat, 2008; UNESCAP, 2005).

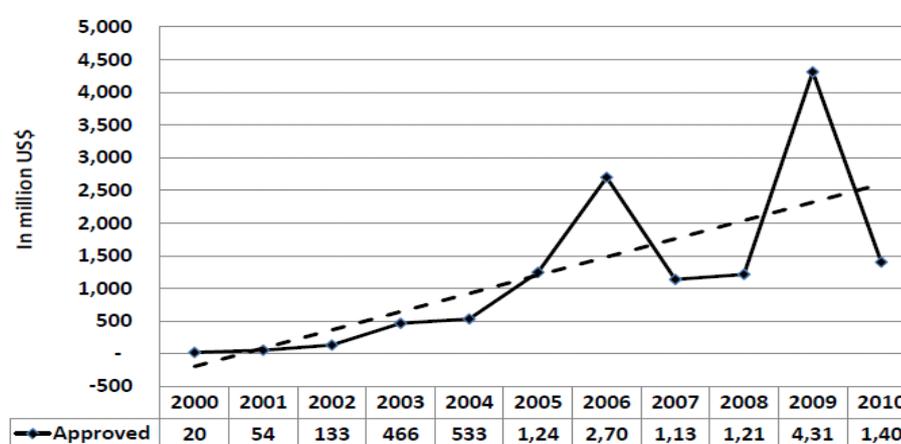


Figure 5. 1: Approved FDI and its trend between 2000-10 in Laos

Source: US Department of State (2011) and Investment Promotion Department (2010)

Despite the above difficulties, the trend towards approved FDI has shown considerable increase. According to investment reports from the Investment Promotion Department²⁹ (IPD, 2010) and the US Department of State (2011), the number of FDI approvals has grown significantly since 2000. For example, Figure 5.1 shows an increasing trend in the approval value of FDI from US\$ 20 million in 2000 to US\$ 533 million in 2004. It rapidly reached its first peak of US\$2,700 million in 2006; then, its value appeared to decline to approximately US\$ 110 million between 2007 and 2008 due to the government’s decision to review the previous granting investment licences in 2006. Notwithstanding, the value went up again and reached its second peak of US\$4,313 million in 2009 before its second decline to US\$1,402 million in 2010 due to the global financial crisis. Nevertheless, the overall trend of approved

²⁹ The Investment Promotion Department (IPD) operates under the Ministry of Planning and Investment (MPI), administers foreign investment systems and reviews investment applications in accordance with the Investment Promotion Law.

FDI in Laos was positive during this period. There were various reasons for this investment growth, one of them definitely attributable to government policy regarding investment promotion in the resources sector.

While recording a large approved amount of FDI, a gap between the approved and real inflow amount of FDI through the Bank of Laos in each year has been identified (see US Department of State, 2011). As shown in Figure 5.2, the real FDI inflow was higher than its approved amount only in 2000: the rest was lower. For example, while its approval amount was recorded as increased, the real FDI inflow declined from US\$34 million in 2000 to US\$5 million in 2002, remaining less than US\$28 million until 2005. The real FDI inflow reached its peak in 2007 at US\$324 million: its approved amount declined to US\$1,137 million in same year.

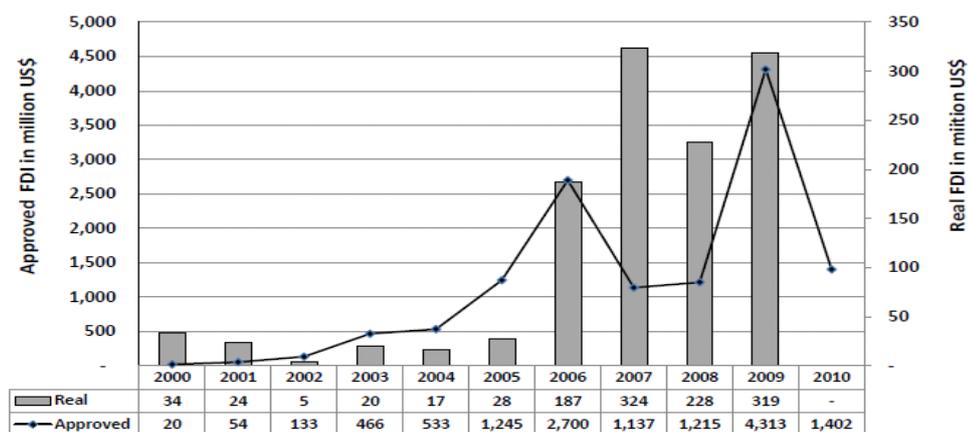


Figure 5. 2: Approved and real FDI inflow, Laos, 2000-2009

Source: US Department of State (2011) and Investment Promotion Department (2010)

If one calculates a ratio of the real inflow to its approved amount of FDI, the ratio grows smaller every year. This diminishing ratio can result from many factors. For example, some investors may withdraw their investments after the approvals, whereas those who have carried out their investments might put only a small amount of their financial investment into the bank rather than the initial large amount stated on the application. In addition, some investors preferred to import tools, equipment and machines directly from their home countries or overseas in order to benefit from exemption or the low tariffs and importing taxes specified in the government investment incentives. As stated below, the electricity and mining sectors have captured most of the FDI. Investors in these sectors may import their physical rather than financial capital for their investments.

Most of the FDI inflows invested in the resources sector between 2001 and 2009. According to a statistics report issued by the IPD (2010), the Planning Strategy and Service Division classified these investments into thirteen sectors (see Figure 5.3). Based on their percentage shares of approved values, electricity generation and mining were the most attractive sectors to FDI, receiving 34% and 26%, respectively. The service sector obtained only 12%. The agriculture sector, as the main sector in the Lao economy, achieved only 10% of FDI followed by industry and handicrafts at 8%. The remainder attained less than 3% of the shares of total approved FDI. The same as Figure 1.2, the pie chart in Figure 5.3 confirms that most of the FDI were interested in the resources sector in Laos.

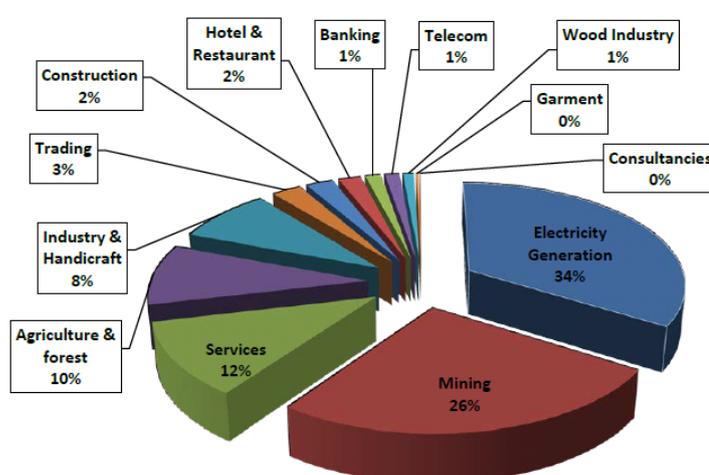


Figure 5. 3: Percentage share of FDI by sectors, 2001-2009
Source: Planning Strategy and Service Division, (IPD, 2010)

Drawing from the rapid rise of FDI, it becomes clear that private investment in Laos has been massive and mostly concentrated in the resource sector. To meet the objectives of this chapter, these investments are viewed at different scales and employed different methods with particular focus on the resource sectors. In the next section, I describe some of the methods employed to refine the data after completing collection.

5.3 Data refinement

I have explained the data collection procedures for investment data in Chapter 4. The first ministerial department to contact was the IPD. Data Obtained from this department was not in the same format as requested (explained in Chapter 4). After reviewing its available data, many items were found to be missing, especially the financial capital registers and real financial investments. The IPD had recorded each set of data using a simple system and with little information. The IPD staff suggested that I might find the missing data at other ministerial departments. Thus, using the same process applied to the IDP, seven ministerial

departments were contacted. Data regarding their private investment approvals within their ministries was requested. After submitting requests to these departments, private investment data were obtained from five departments with the exception of the Lao National Tourism Authority (LNTA) and the National Land Management Authority (NLMA). Data received from these departments were found in different formats rather than in the format given. Similar to IPD, much information was missing, particularly the values of financial registers and capital investment.

After completing the data collection, complications arose regarding the joining of these data. First, as each department used their own formats, any different information among them had to be omitted; otherwise, it was impossible to join the data. Consequently, some important information including the values of financial investments, capital investment and village locations was lost. Second, most of the data were written in the Lao language and needed to be translated into English before joining. Translation helped to improve the quality of the data entries and their original meaning; but, translation was time-consuming due to the large amount of Lao jargon, technical words and abbreviations. Third, after translation, it was found that many of the companies/projects in this ministerial data had been duplicated. For example, some applications had been recorded more than once by the same department; and, different departments had used slightly different names for the same company. So, any duplication had to be removed. Removal had to be done carefully and cross-checked in order to maintain only one entry for each private company or project.

In this section, I explain the procedures used to refine the data. Many complications occurred due to unsystematic data formats from ministerial departments. As a result, some important data from each investment company had to be dropped in order to merge their data together. In the next section, I explain the analytical methods used and the findings from these data.

5.4 Patterns of private companies in the resource sector

After refining the data, foreign and domestic private investments in the resource sector were combined, excluding their financial values or land concession sizes. This financial information, while unarguably important, had to be dropped because most were either not available, confidential or restricted to the public. Thus, it was impossible to differentiate between small and large investments unless details were released by high government authorities. Nevertheless, the complete data list could be used to create patterns of private investment at the district level. While some may question whether the district is a sufficiently

fine spatial unit for the task in hand, it is the finest level I can provide. If data were available at finer levels, then analysis could produce more nuanced results. These patterns explored four different themes: investment resource sectors, home investment country, domestic and foreign investment, and district receiving investments. Each of these themes is explained below.

5.4.1 Patterned by resource sector

Based on the extant data, a total of 816 investment companies drawn from seven resource sectors between 2000 and 2009 were compiled and shown in Table 5.1. In fact, the number of private companies should have been greater than this, approximately by two times, had the data been more systematically recorded by the relevant departments. Nevertheless, on the basis of the data achieved, some pattern analysis will be performed in later sections.

If the data in Table 5.1 are divided into two periods, 2000-04 and 2005-09, a significant increase in the number of companies across the seven resource sectors is found. For example, the wood industry sector increased 5 times from 37 companies during 2000-04 to 187 during 2005-09. Similarly, the agro-forest and mining sectors rose by 3.5 times, the handicrafts sector by 2 times, and the trade and hydro-energy sectors by 3 times during these two periods. Tourism increased from 1 in 2000-04 to 11 in 2005-09.

Table 5. 1: Number of investment companies in the resource sector, 2000-09

Resource sector	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	n/a³⁰	Total
<i>Agro Forest</i>	17	4	5	3	19	20	29	45	45	28	14	229
<i>Wood</i>	4	6	4	11	12	24	39	53	40	31	44	268
<i>Handicrafts</i>	n/a	n/a	3	2	2	2	1	3	9	n/a	n/a	22
<i>Mining</i>	6	1	9	7	25	18	30	16	40	64	7	223
<i>Trade</i>	1	n/a	1	n/a	1	n/a	1	6	1	1	1	13
<i>Tourism</i>	n/a	n/a	n/a	1	n/a	5	1	1	2	2	n/a	12
<i>Hydro-Energy</i>	1	1	3	1	6	4	11	6	10	6	n/a	49
Total	29	12	25	25	65	73	112	130	147	132	66	816

Source: Compiled by Author.

The significant increases in these investment companies may have resulted from various factors, one of them being government policy to promote private foreign and domestic investment in Laos. Prior to 2005, most investors made their investment decisions based on the 1994 Investment Law. This law contained certain conditions, restrictions and prohibitions, factors that may have affected investor confidence in investing in Laos (Gunawardana & Sisombat, 2008). The amended investment laws in 2004 may have created more confidence in

³⁰ Data is not available

the investors. Many new investment rules and regulations, promotion activities, and investment promotion zoning and incentives providing exemption and/or low tax were introduced to both domestic and foreign investors.

In 2003, the GoL (2004c) promoted private investment in the resource sector as a strategic plan to reduce poverty and economic growth. However, investment in support of poverty reduction tended to be unequally distributed. For example, Table 5.1 shows that the wood industry and the mining and hydropower sectors received most of their interest from private investors; but, investment in these sectors tended towards exploiting natural resources on a large scale. Irrespective of whether or not they contributed to poverty reduction in Laos, investment in these three sectors often gave rise to many concerns regarding local livelihoods and national resources. Lang and Shoemaker (2006), for example, criticise the private foreign plantation companies' taking over of additional forest land in Laos, while further impoverishing the local communities. In addition, many environmental and social impacts, such as fisheries losses, increased flooding, water quality problems, soil erosion, loss of riverbank gardens, and destructions of the livelihoods of upstream and downstream villagers were seen to have resulted from hydropower projects in Laos (see Lawrence, 2008).

Table 5.1 shows that investment in agriculture, handicrafts, tourism and the NTFPs trading sectors attracted little interest. Investments in these sectors took the form of pro-poor activities in terms of raising the incomes and of enabling market access for the rural poor, with a low level of resource exploitation (Emerton, 2005; Morris et al., 2004; Morris & Ketphanh, 2002). Therefore, it seemed appropriate to review private investment in the resource sectors as such investment tended to exploit the natural resources rather than support pro-poor activities. Regarding the issues surrounding private investment (see Chapter 2), the figures in Table 5.1 indicate that private companies chose to invest in sectors from which they could maximise profit rather than in sectors best suited to reducing poverty or maintaining a sound environment in Laos.

5.4.2 Patterned by home countries

The data collection suggests that the private companies operating in the resource sector during 2000-09 came from the 27 countries listed in Table 5.2 in alphabetical order. By dividing these countries into Asian and non-Asian categories, the different features that distinguish them can be observed. For example, while investment companies from non-Asian countries were small in numbers, most of their projects operated on a large scale

and were long term processes. They provided large financial and human investment capital such as mining, industrial tree plantations, hydropower and renewable energy development. In contrast, where the number of investment companies from Asian countries was high, most of their investment projects focused on small and medium scale in terms of financial and human capital; for example, agriculture and forestry businesses, wood industries, fruit tree plantations, and surveys of mining and renewable energy projects.

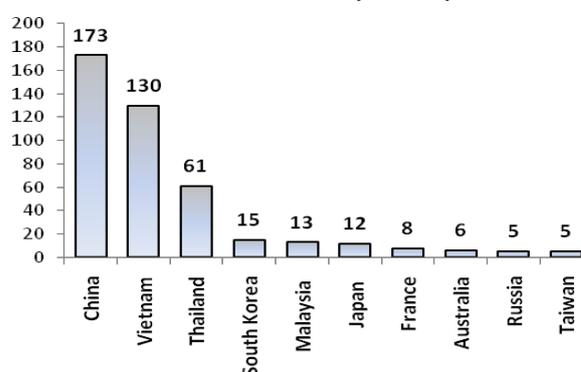
Drawing from these home countries, the top ten countries that invested in the resource sector were extracted and compared to the top ten countries in total FDI. As evident in the two bar charts in Figure 5.4, Panel A shows the top ten countries that invested in the resource sector during 2000-09: Panel B shows the total FDI projects during 2001-09. Despite the difference in timeframe, it would be meaningful to compare these two patterns.

Table 5. 2: Home investment country in resource sector, 2000-09

Country	# Company	Country	# Company	Country	# Company	Country	# Company
Australia	6	Iceland	1	Netherlands	1	Sweden	1
Canada	3	India	3	Norway	1	Taiwan	5
China	173	Italy	2	Poland	1	Thailand	61
Cambodia	1	Japan	12	Russia	5	UK	3
France	8	Macao	1	Singapore	4	USA	4
Germany	2	Malaysia	13	South Korea	15	Vietnam	130
Hong Kong	3	Myanmar	2	Sri Lanka	1		

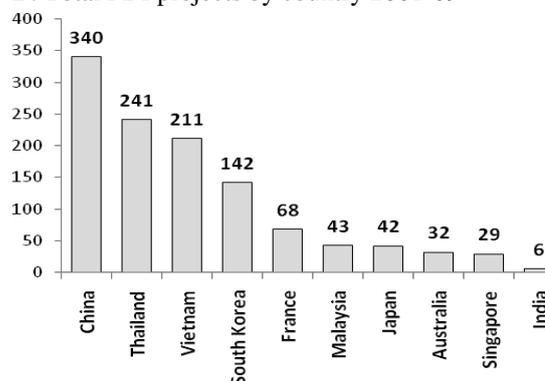
Source: Author's data collection

A. Investment in resource sector by country, 2000-09



Source: Author's calculation

B. Total FDI projects by country 2001-09



Source: IPD (2010)

Figure 5. 4: Top ten countries' investment in resource sector and in total FDI

In Panel A, China and Vietnam were the first and second largest investors in the resource sector during the period (173 and 130 investment companies, respectively). Their investment activities were mainly related to the agriculture and forestry businesses, the wood industry and the mining sector. Thailand was the third with 61 investment companies concentrating on agriculture and forestry activities, the wood industry, mining, and the energy sector. When comparing Panel A to Panel B, their investment patterns were quite similar. Panel B shows that China had the largest FDI during 2001 – 09 with 340 investment projects: second and third were Thailand and Vietnam with 241 and 211 projects, respectively. South Korea, France, Malaysia, Japan and Australia appeared in both panels with a small number of investment projects. Drawing from these two charts, the neighbouring countries dominated both investment in the resource sectors and the total FDI projects in Laos.

5.4.3 Patterned by domestic and foreign investment

As suggested above, both domestic and foreign investment increased: their data were used to create the pattern shown in Figure 5.5. In this Figure, the pattern of domestic investment companies in the resource sector tends to closely relate to the pattern of foreign investment companies. While both foreign and domestic investment trends dramatically increased during 2000-09 (as shown in Panel A, Figure 5.5), the number of foreign companies was higher than that of the domestic companies every year. However, the difference between them varied during the period shown in Panel B in Figure 5.5. The difference in their patterns gradually increased from 2000 to 2005 and rapidly in 2006. After 2007, the difference sharply fell: it was almost the same as in 2008; but, then it increased slightly in 2009. The change in pattern after 2007 suggested a significant increase in domestic investment companies.

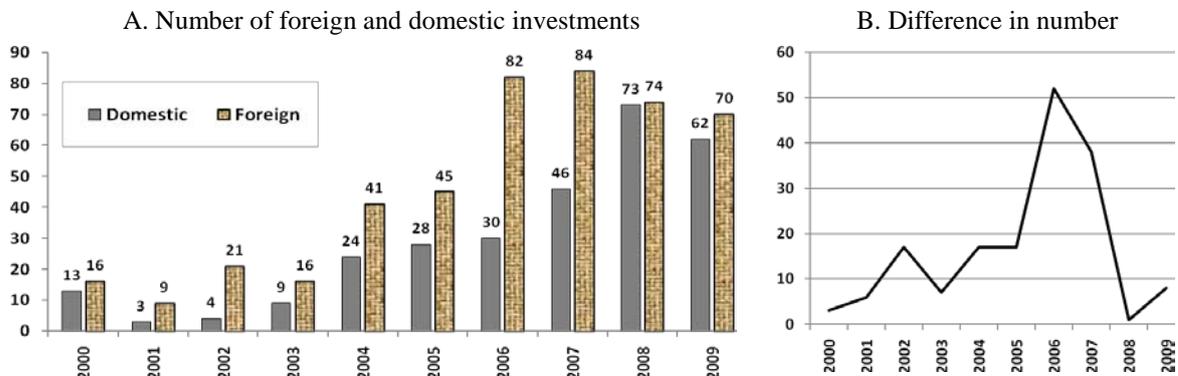


Figure 5. 5: Domestic and foreign investment in Laos, 2000-09

Source: Author's calculations

There were perhaps at least two reasons for the increase in number of domestic investment during this period. First, many had operated in the forms of small and medium enterprises (SMEs) and individual businesses. Most of them had invested in relatively small scale activities, such as family businesses and farms, agribusiness trading, small-holder plantations, sawmill services and furniture factories. However, even these investment activities were small in scale; by law, investors had to register their investments with either the central or local CPIMs. Second, the increase may have been a consequence of the previous investment laws that posed many conditions and restrictions on foreign investors (as suggested above). For example, many foreign investors were not allowed to occupy either the land or the buildings of their investments; thus, most of them opted to collaborate with local investors and partners, or to register under the names of Laotians if they wanted to operate their investments. Hence, a combination of factors saw the number of Lao investment companies in the resource sector constantly increase.

However, after 2004, many laws improved the promotion of both domestic and foreign investments, such as the Law on the Promotion and Management of Foreign Investment in 2004, the Law on Domestic Investment in 2004, the Enterprise Law in 2005, the Customs Law in 2005, the Tax Law in 2005, and the new Investment Promotion Law in 2009 (IPD, 2010). As a result, many of the constraints on private investment were removed and foreign company were allowed to operate in Laos. Recently, foreign investors have been allowed to occupy land (see Article 58, Government of Laos, 2009). As a result, a vast number of both domestic and foreign private companies in the resource sector have occupied the FDI in Laos.

5.4.4 Patterned by district receiving investments

The data suggested that many investment companies have operated their investment activities in one or more districts. At the same time, a single district appears to have received one or more investment companies. Accordingly, it is important to consider the total number of companies invested in one district, a number that I will term 'district investment' in this study. District investment refers to the total number of different companies that invested in one particular district. It helps to create a private investment map that serves many purposes for analysis; for example, to investigate the relationships of variables related to the PIPEN model, and government investment policy on poverty reduction and investment promotion zonings. District investment can be simply calculated by adding together the number of different private companies in each district. For example, when one company invests in one

district, it is counted as one district investment. If two or more companies invest in that district, they are counted as two or more district investments, respectively.

Table 5. 3: District investment among poor districts and investment promotion zones

	<i>No. of District Investments</i>	<i>Districts out of 140</i>	<i>Number of districts</i>			<i>Number of districts</i>		
			<i>Non poor</i>	<i>Poor</i>	<i>Poorest</i>	<i>Zone 1</i>	<i>Zone 2</i>	<i>Zone 3</i>
<i>Agro Forest</i>	242	69	39	12	18	29	37	3
<i>Wood</i>	321	88	42	17	29	45	40	3
<i>Handicrafts</i>	24	20	14	5	1	6	11	3
<i>Mining</i>	294	85	40	13	32	45	37	3
<i>Trade</i>	14	11	7		4	4	7	
<i>Tourism</i>	12	11	10	1		1	8	2
<i>Hydro-Energy</i>	62	44	20	6	18	23	20	1
<i>Total</i>	969	122						

Source: Author's calculation

In the previous sub-section, while data collection indicated a total of 816 private companies in Laos, 969 district investments were recorded throughout the country between 2000 and 2009, suggesting that some companies invested in the resource sector in more than one district. As illustrated in Table 5.3, a total of 969 district investments were allocated across seven resource sectors in 122 out of total 140 districts, some in poor and non-poor districts, and in the investment promotion zone. In this Table, the wood industry sector showed the highest number with 321 district investments operating in 88 out of 140 districts. This was followed by the mining sector with 294 district investments operating in 85 districts. Then, the agro-forestry sector with 242 in 69 districts; the handicrafts, trade and tourism sectors had relatively small district investment (24, 14 and 12, respectively). In addition, the Table showed that the non-poor districts received the highest number (59) of district investments, following by the poorest and the poor districts with 40 and 23, respectively. In terms of investment promotion zoning, there was a high number of district investments in zones 1 and zones 2, with fewer in zone 3.

This section has generated tables and charts of investment companies in the resource sector based on refining secondary data from ministerial departments. According to these patterns, the wood industry and the agro-forest and mining sectors received the highest number of investment projects but the size of investment was relatively small scale. On the other hand, the hydro-energy sector received fewer but its scale was large. Most of these companies were recipients of investment from neighbouring countries, including China, Vietnam and Thailand, whereas domestic investment increased along with the number of foreign

companies. It was also found that 122 out of 140 districts received at least one private investment in the resource sector. In the next section, I explain the investment distribution of each resource sector using maps.

5.5 Distributional maps of private investment in the resource sector

This section employs the data pertaining to district investment from the previous section to create an investment map in the seven resource sectors. By applying ArcMap tools in ArcGIS, the number of district investment in each resource was used as inputs to create its map; then, Spatial Autocorrelation was applied in order to specify its pattern, that is, whether it was clustered, dispersed or random. I am using maps to explain the investment distribution across the country.

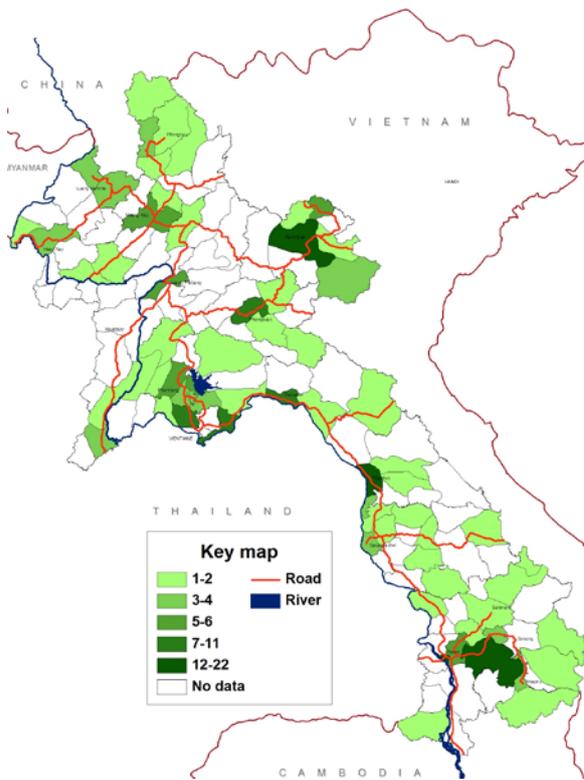


Figure 5. 6: Map of agriculture and forestry

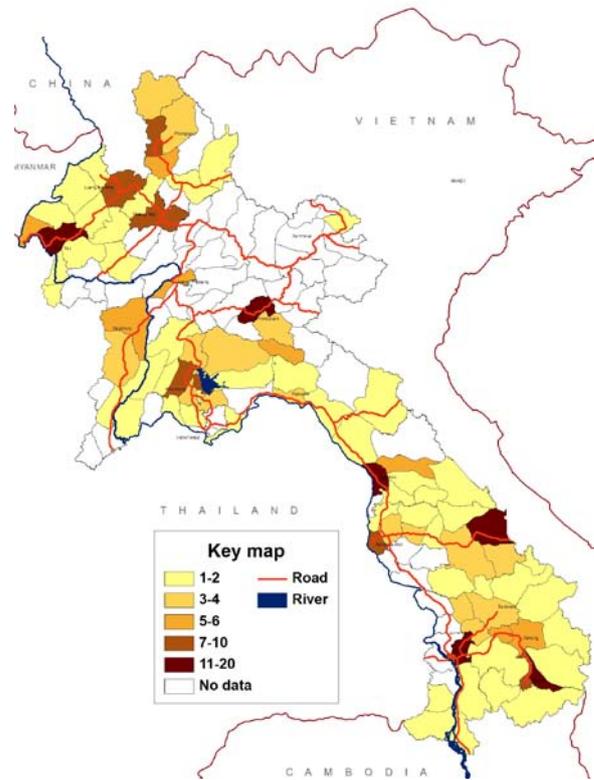


Figure 5. 7: Map of wood industry

Figure 5.6 shows a map of 242 district investments in the agriculture and forestry sectors during 2000-09, investments distributed throughout 69 districts. Spatial Autocorrelation suggests that this pattern was neither clustered nor dispersed but random, inferring that the investments were randomly located across the country. This map shows that location and soil quality were the main factors influencing investors’ decision in this sector. Pakxong, the most fertile soil district in the South, received the highest investment number, with most of its investment activities related to fruits, crops and farming plantations for export, such as coffee,

tea, rubber and organic vegetables. Xamneua, a northern district with a good climate for agriculture, received a relatively high number of investments, most of which focused on agricultural products for export and domestic trading, such as NTFPs, orchid flowers, tea, fruit crop plantations, corn, beans and sesame contact farming. The investments in this sector were grouped into 39 non-poor and 30 poor districts, that is, 29 districts in Zone 1 and 37 districts in Zone 2.

Figure 5.7 shows a map of 321 district investments in the wood industry distributed throughout 88 districts. Its pattern is clustered with 5% significance. Investment in this sector focused on various activities such as industrial tree plantations (rubber, golden teak, agarwood and eucalyptus), wood trading and exporting (furniture products, timber and chipboard), and wood services (sawmilling and processing and wood exploration projects). The investments in this map are clustered in districts from North to South, particularly in the Southern provinces, and excluding districts in the North-East provinces due to the high mountainous and national protected areas Nam Et and Phou Loei in Houaphan and Laung Prabang. High investment in this sector is likely to be found in districts that share borders with other countries; for example, Houayxai with Thailand, Xepone with Vietnam, and Namtha and Boun Neua with China. Investment in the wood industry was found in 45 districts in Zone 1, 40 in Zone 2, and 3 in Zone 3, corresponding to 42 non-poor, 17 poor and 29 poorest districts.

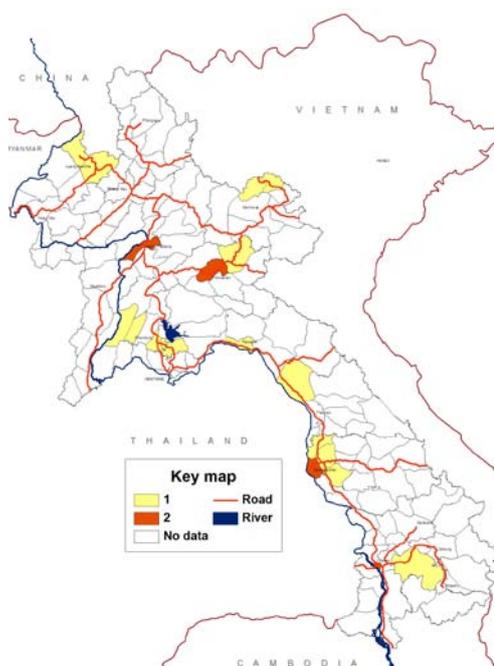


Figure 5. 8: Map of industry and handicrafts

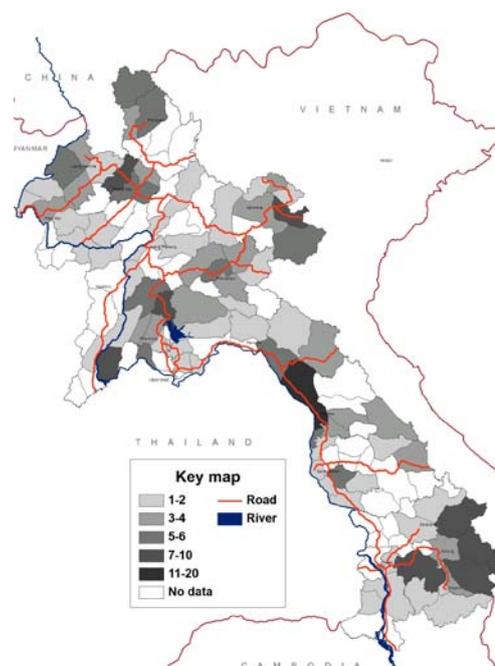


Figure 5. 9: Map of mining and land excavation

Figure 5.8 shows a map of 24 district investments in the handicrafts and industry sectors in 20 districts. Its pattern tends to be random. Most of the investment activities in this sector were involved in trading raw materials such as paper, sugar cane, tobacco, seaweed, corn and nuts, processing these materials in factories and manufacturing them for domestic consumption and export. Many of the investment activities in this sector were likely to be located in districts with borders where convenient roads were available and shipment easy, such as Kaisonpomviharn, Pakse and Sing districts. This was interesting in the sense that agricultural products are a main sector in the Lao economy; but, its trading activities can attract only small private investments. The investments in trading raw material potentially contribute to reducing poverty in the country's rural areas; but, provide relatively low returns on agriculture and/or to the smallholder pattern of farming. Most agricultural enterprises are at the family rather than company level, except for industrial plantations which count as a different sector. Among them, only 6 investments were located in the poorest and poor districts and in Zone 1. Thus, more attention to this sector is needed.

Figure 5.9 illustrates 294 district investments in mining and land excavation activities distributed throughout 85 districts from North to South. The result of Spatial Autocorrelation suggests that this pattern is clustered. Main investment activities in this sector can be classified into two groups. The first, mineral mining activities included lead, tin, zinc, coal, bauxite, alluvial gold, gold, copper, and iron surveys, prospection and explorations. This ground was mostly invested in by large foreign companies with relatively large financial capital, technical knowledge and long term commitment. The second involved land excavation activities, for example, stone and sand extraction and services. Investment in this group required lower financial capital and knowledge than for the first group. The second group has been mostly operated by domestic investors. District investment in this sector was located in 45 poor districts and 45 districts in Zone 1. Hinboon and Thakhek districts received the highest investment in this sector. Most of their activities related to clay, gypsum, limestone, lead, tin and iron survey, prospection and exploration.

Figure 5.10 shows 14 district investments in the resource trading sector distributed throughout 11 districts. Surprisingly, Spatial Autocorrelation reported its pattern as clustered, even as having a small number. Investment in this sector was located only in the 4 poorest districts and 4 districts in promoting Zone 1. Pakxong, Xamneua and Samakkhixay received the highest number (2 investments) while the rest received only one investment. Most of these investments were directly associated with agriculture businesses, such as agricultural

products, fruit crops, NTFPs and wild fruits trading and exporting. These investment activities were likely to be located in lowland areas and accessible districts, where it is convenient to trade on agricultural products and plantations with the local people.

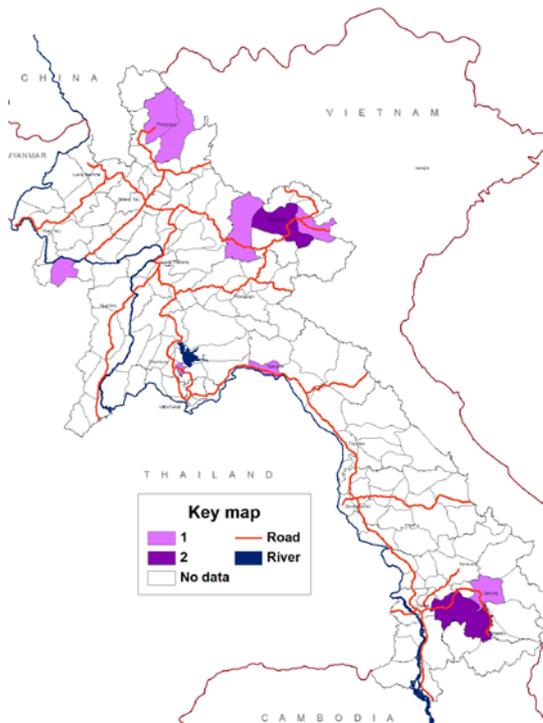


Figure 5. 10: Map of trading in resources

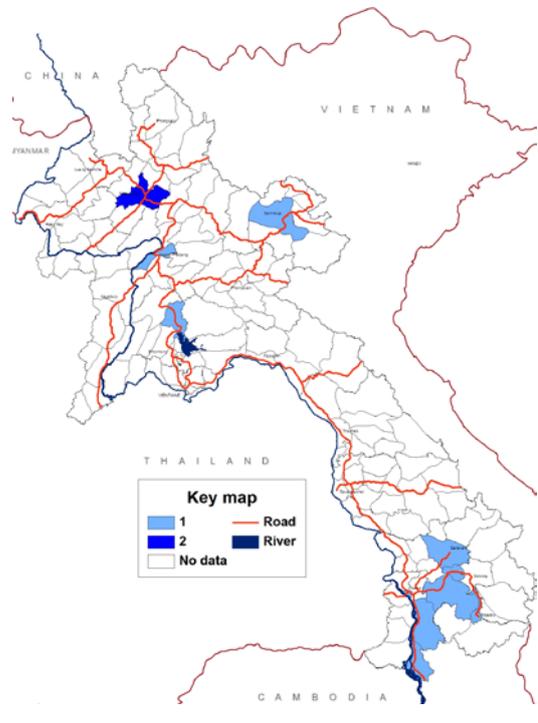


Figure 5. 11: Map of tourism and recreation

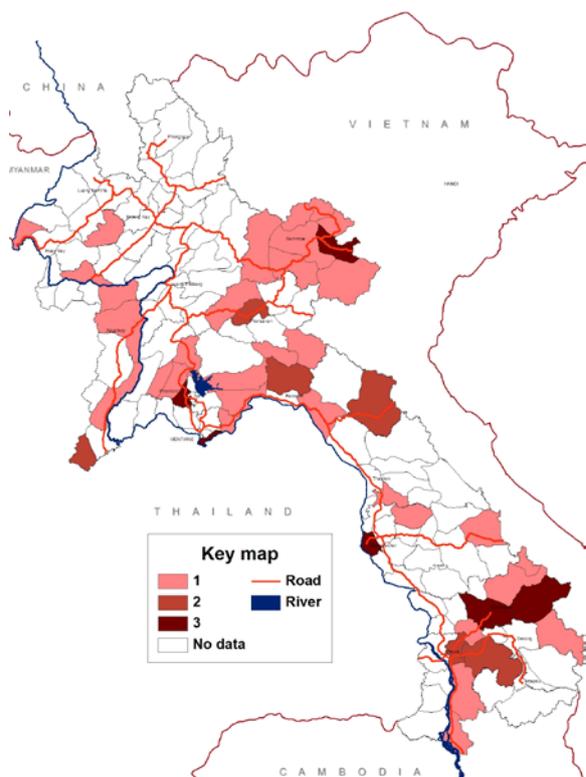


Figure 5. 12: Map of hydropower and renewable energy sector

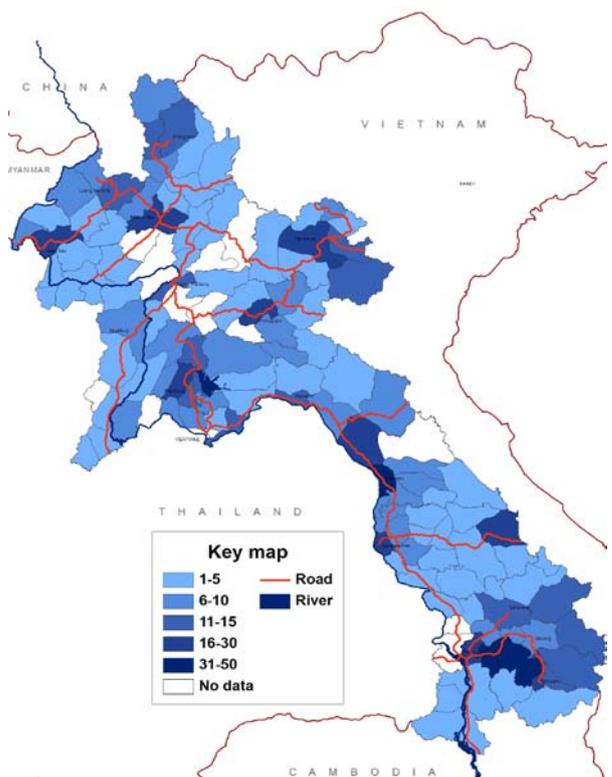


Figure 5. 13: Map of total number of private investment at the district level

Figure 5.11 presents 12 district investments in tourism and recreation activities in 11 districts. Spatial Autocorrelation featured its pattern as random distribution. Investment in this sector aimed to provide services related to integrated tourism activities, building resort sites and eco-tourism businesses, most of which were located in districts where historical images, natural landscapes, and sightseeing and leisure activities were available; for example, Tad Lok waterfall in Saravan district, Namnao waterfall in Xamneua, and zoo and tourism sites development in Khong district. Investment in this sector was relatively small because many attractive tourism sites have yet to be discovered and those discovered cannot be accessed as they are located in mountainous areas with poor road conditions. While there were some established tourist sites, most had been operated or owned by local tourism authorities. Private investment in this sector was found in non-poor rather than in poor districts as well as in promoting Zone 2 rather than in Zone 1. So, private investment in this sector still needs more development and to be privatised.

Figure 5.12 illustrates a pattern of 62 district investments in the hydropower and renewable energy sector, distributed in 44 districts throughout the country. This number may be different from reports elsewhere due to different methods of data collection (see Chapter 4). The Spatial Autocorrelation suggested that this pattern appeared to be significantly random. Investment in this sector included three investment types. The first consisted of 21 hydropower projects including dam construction for electricity. The second referred to 10 projects, that is, hydropower feasibility studies and surveys for their potential to develop hydropower in Laos. The last 31 projects were renewable energy investments in palm and jatropha plantations, the aim being to produce bio-diesel for domestic sales and export, and oil and gas prospection and exploration. Among these 44 districts, the major investments were located along the Mekong River and its tributaries, and fell into 23 districts in Zone 1 and 20 in Zone 2, corresponding to the 18 poorest districts, 6 poor and 20 non-poor districts.

Figure 5.13 reveals a pattern of 969 district investments across seven resource sectors in Laos during 2000-09. These investments were located in 122 out of 140 districts throughout the country. The remaining 18 districts are represented with no data, which can be attributed to selection criteria (see Chapter 4) or missing data. Spatial Autocorrelation suggests that this pattern is clustered with a significant level of 10%. The overall pattern of this map shows private investment distributed from North to South. Most of these investments seemed to operate in non-mountainous and non-poor districts where convenient infrastructures and road accesses were available. As shown in Table 5.3, these investments were located in the 40

poorest, 23 poor and 59 non-poor districts, corresponding to 63 districts in Zone1 and 56 districts in Zone 2.

This section has illustrated eight maps of private investment distribution responding to seven resource sectors and total investment. These maps may be used as an important source for any decision-making and discussion regarding private investment in development in Laos.

Overall, these investments have been distributed unevenly throughout the country. This may have been due to many factors such as mountainous geography, the resource sources, and accessibility. When comparing these maps, it is important to question whether and to what extent government policy on private investment in the resource sector-as an engine for sustainable growth and poverty reduction-has been achieved. In the next section, I address some points relevant to this question.

5.6 Overlaying maps and their spatial relationships

This section spatially overlays the total investment map to other maps including poverty incidence, environmental degradation, and promotion investment zoning in Laos. The overlays of these maps seek to analytically investigate spatial relationships among mapping data in relation to the PIPEN model and government investment promotion policy. This section begins with identifying data to generate maps; then, the maps are overlaid. After overlaying, frequency observations and the Chi-square (χ^2) test are applied to reveal the basic correlations.

5.6.1 Generating maps

In order to obtain this section's objectives, data on total investment, poverty incidence, promotion zoning, and environmental degradation were revised and used to create maps. This subsection explains these procedures and begins with mapping private investment, poverty incidence, promotion zoning and environmental degradation, respectively. These maps are overlaid and analysed in the two following sub-sections.

A. Total private investment maps

Based on investment data collection, explained in the previous section, the number of total private investments in the resource sector in each district became available and ready to be mapped as shown in Figure 5.13. These numbers were reached through selection criteria and data collection. According to Spatial Autocorrelation techniques, this pattern was significantly clustered at 10%, meaning that it was significant enough as a distributed sample to perform

spatial pattern analysis of private investment in the resource sector in Laos. For this analytical purpose, it was necessary to transform this map of total investment from graduated colour to dot density by assigning one dot equivalent to one district's investment. Having done so, a dot density map of private investment in each district appears in Figure 4.15 on the right-hand side.

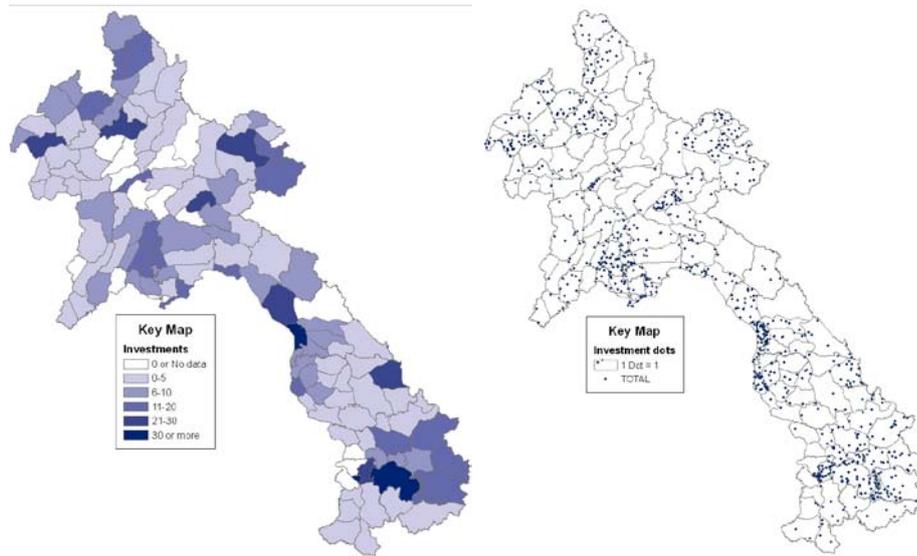


Figure 5. 14: Map of total private investment in graduated colours and dot form

B. Poverty incidence map

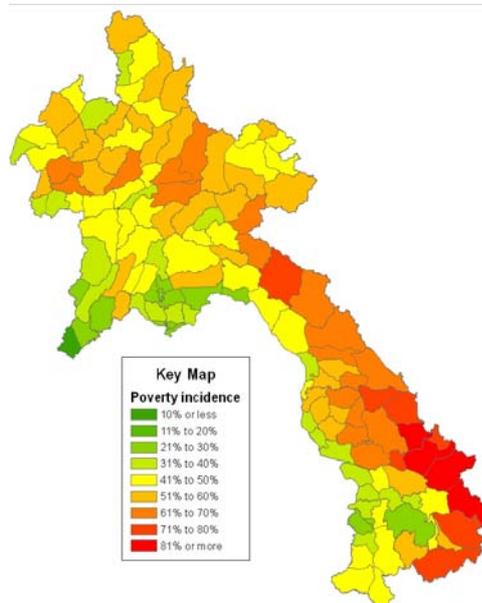


Figure 5. 15: Map of NCCR poverty incidence
Source: Epprecht, et al., 2008; Messerli, et al., 2008.

To derive a poverty map, this study employs the concept of poverty incidence, defined as a percentage of population living below the poverty line. One of the most recent poverty

incidence studies in Laos is available from the Swiss National Centre of Competence in Research (NCCR) North-South in their study of the geography of poverty and inequality in Laos (see Epprecht et al., 2008; Messerli et al., 2008). Following the concept of poverty line in Laos (see ADB, 2001; Kakwani et al., 2001), the NCCR computed a map of poverty incidence by applying a method known as ‘small-area estimation’, a method based on data drawn from the Lao Expenditures and Consumptions Survey (LECS) 2002-03 or LECS 3 and the Population Census of 2005 (for more detail, see Epprecht et al., 2008, pp. 95-98). Therefore, similar to the right map in Figure 3.2, Figure 5.15 shows the most reliable and accurate ratio of poverty incidence for each district in Laos from the estimation. In this Figure, the darker green sections represent the lower percentage of poverty incidence: the darker red sections indicate the higher poverty incidence percentage. In this map, districts with high poverty incidence are likely to found located along the mountainous parts from the Central to the South along the Vietnamese border and in some districts in the northern uplands. Districts with low poverty incidence are found in urbanised areas in and around the largest towns as well as in districts along the Mekong River valley (Epprecht et al., 2008; Messerli et al., 2008).

C. Investment promotion zoning

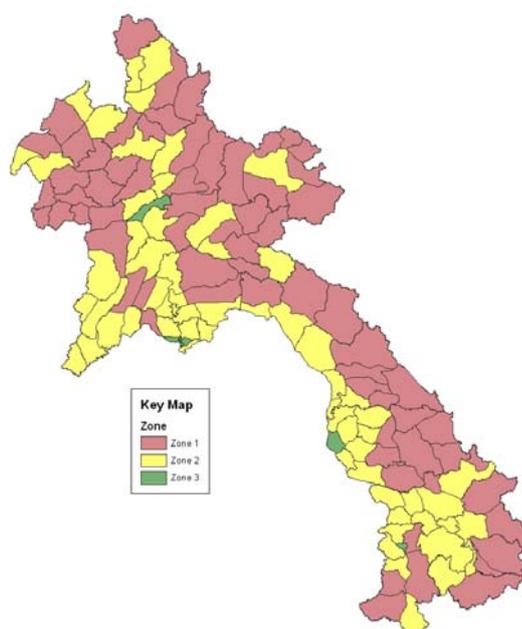


Figure 5. 16: Map of investment promotion zoning in Laos
 Source: Government of Laos (2005) and IPD (2008)

In the Prime Minister’s decree on domestic investment number 300/PM, and the decree on foreign investment number 301/PM (see Government of Laos, 2005; IPD, 2008), three investment promotion zonings are classified, and each district was classed into one of the

three zones. The district names in each zone are listed in the appendices of these decrees. Details of each zone classification are provided in Chapter 3 of this thesis. Based on this list, a map of investment promotion zoning has been created and appears in Figure 5.16.

D. Deforestation map

As suggested in Chapter 2, an environment is degraded when its values and functions become reduced or damaged. This can happen through habitat destruction, lost biodiversity, natural resource depletion and deforestation. ‘Environment’ in this section refers to environmental degradation, which can be caused by various factors including natural or human activities, such as natural disasters, poverty, power, greed and/or institutional and market failure (see Duraiappah, 1998). Thus, it is important to pay attention to environmental degradation in Laos. Because information regarding environmental degradation in Laos is often limited, this sub-section will employ the change in forest cover – or the deforestation rate – as a proxy for environmental degradation. Based on a project undertaken by the SNV³¹ in Laos (see Holland & McNally, 2009), data appertaining to forest cover in 2000 and 2005 became available and can be used to compute the rate of deforestation for this study.

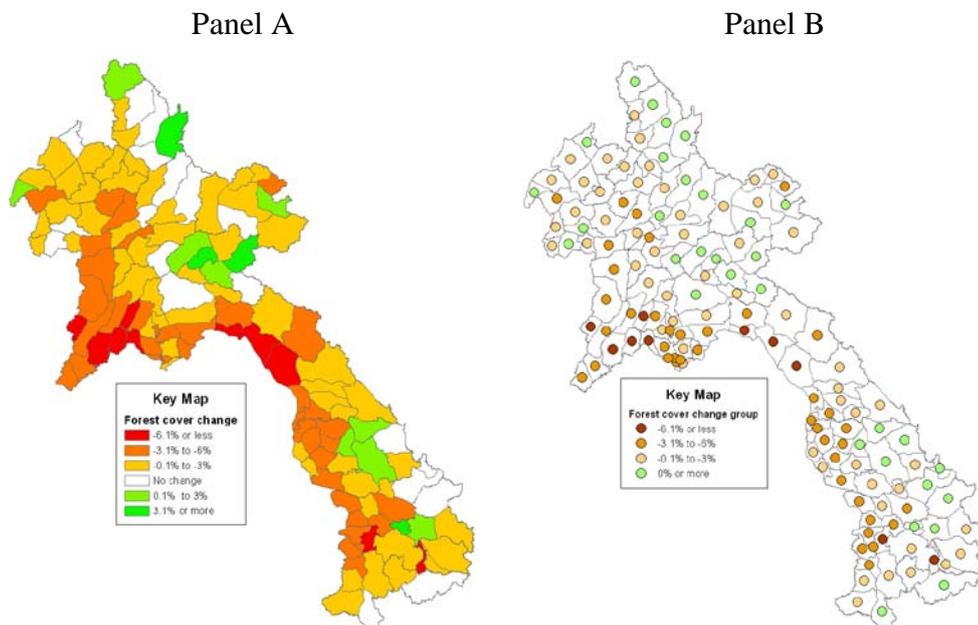


Figure 5. 17: Map of deforestation between 2000 and 2005
Source: Adapted from Holland and McNally (2009).

In their SNV project titled ‘Reducing Emissions from Deforestation and Forest Degradation (REDD)’, Holland and McNally (2009) produced data and maps of forest cover, forest cover change and forest carbon density in 2000 and 2005. For the purposes of their work,

³¹ SNV-Netherlands Development Organisation

information on forest cover was collected from Vegetation Continuous Fields (VCF) produced by the Global Land Cover Facility, a work which is internationally recognized. Drawing from VCF forest cover data images, they created a map of forest cover change between 2000 and 2005 by simply subtracting the percentage cover in 2000 from the percentage cover in 2005 (see Figure 5.17). This change in forest cover was presented in absolute rather than in relative terms. For example, if the area had 20% of forest cover in 2000 and 10% in 2005, then that area would have a 10% reduction in forest cover (20% minus 10%), not a reduction of 50% (for more details, see Holland & McNally, 2009)

Deforestation as change in percentage of forest cover between 2000 and 2005 is shown in Panel A in Figure 5.17. The darker red represents the higher percentage decrease in forest cover or deforestation: the darker green suggests the higher percentage improvement in forest cover. The white indicates no change in these covers. In Panel A in this Figure, 107 out of 140 districts are determined to have undergone deforestation between 2000 and 2005. While these districts are dispersed from north to south, they are more likely to be clustered in the west, south, and central parts of the country, particularly along the Mekong valley. Panel B shows the same information as Panel A; but, this information is different as it is in dot form with four assigned values and colours.

5.6.2 Overlaying maps to reflect issues related to PIPEN

This section aims to investigate the spatial relationships in relation to the PIPEN model by overlaying three maps of investment, poverty and deforestation. While the three maps may be overlaid singly, I have opted to overlay them in pairs in order to first investigate their bilateral relations. Then, I will overlay the three maps later. By doing so, each overlay will provide 140 combinations of information and it will be less than meaningful to explain each combination. Each data map will be classified into 3 or 4 groupings that will be defined below.. After overlaying, observed frequency across a pair of two groups is explained instead of each combination. Chi-Square (χ^2) test was used to confirm the results of the observed frequency. For analytical purposes, the data for each of these maps are divided into groups. The rate of deforestation is grouped into four categories as illustrated in Panel B (Figure 5.17). The high deforestation group percentage is -6.1% or below, the medium group between -3.1% and -6% , the low decreasing group between -0.1% and -3% , and the last group shows no deforestation as its percentage is zero or positive. Similarly, the data pertaining to the total investment map is divided into three categories. High investment is classified as 26 or more,

and medium between 11 and 25; otherwise, it indicates the low investment group. Similarly, the high poverty group is classified as 51% or more, the medium between 36% and 50%; otherwise, it indicates the low poverty group. The Chi-square test for independence was applied to evaluate the significant relationship between the two variables.

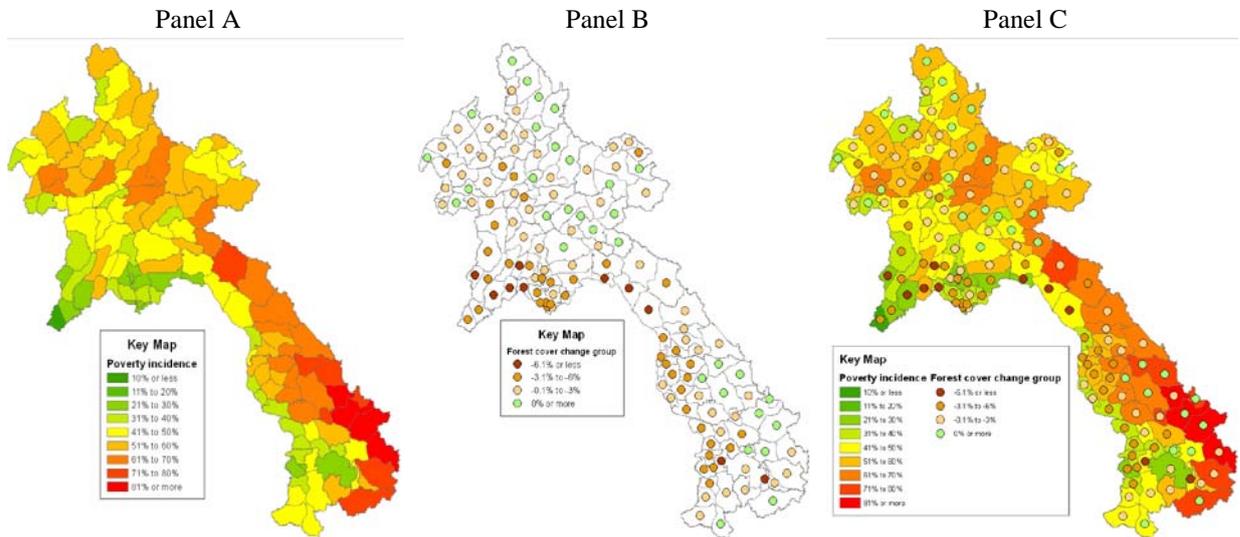


Figure 5. 18: Overlaying poverty map to deforestation

Table 5. 4: Observed frequency of poverty and deforestation

	<i>High poverty</i>	<i>Medium poverty</i>	<i>Low poverty</i>
High deforestation		3	7
Medium deforestation	3	12	26
Low deforestation	14	25	17

$\chi^2=14.89, p<0.01$

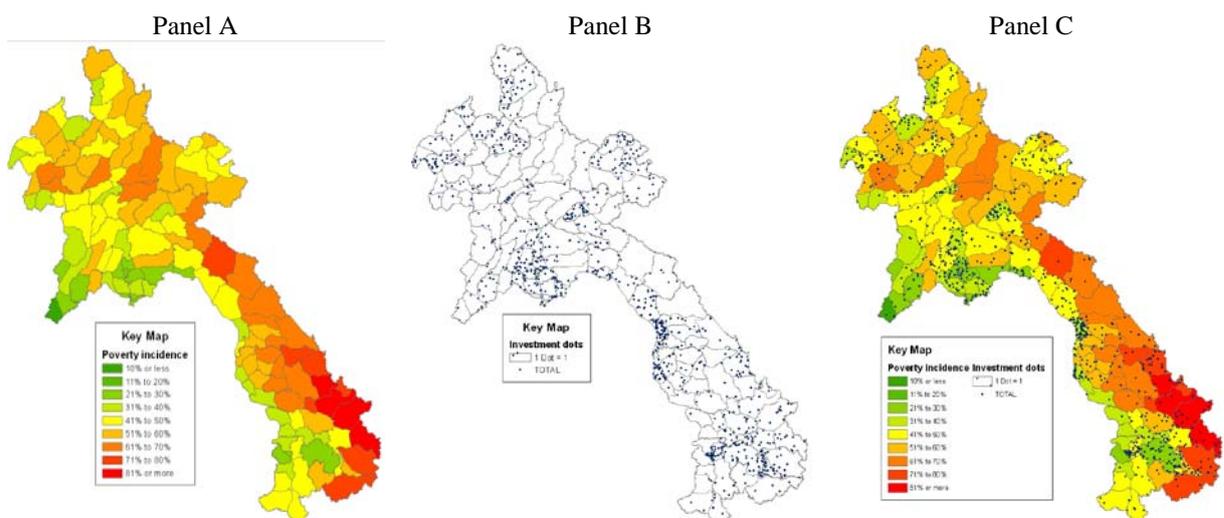


Figure 5. 19: Overlaying poverty map to investment map

Figure 5.18 depicts the overlay of poverty to deforestation. The overlay map in Panel C in the Figure shows 140 combinations of poverty and deforestation responding to 140 districts.

After grouping the data, Table 5.4 shows the observed frequencies of poverty to deforestation in 9 outcomes of coordinates. In this Table, two high frequencies occur at 25 coordinates of medium poverty and low deforestation, and 26 coordinates of medium deforestation and low poverty. No coordinate of frequency of high poverty and high deforestation suggests that poor people opt not to inhabit in districts with high deforestation. The high Chi-square value suggests a significant relationship at 99% confidence level of coordinates between poverty and deforestation in Table 5.4.

Table 5. 5: Observed frequency of poverty by investment

	<i>High poverty</i>	<i>Medium poverty</i>	<i>Low poverty</i>
High Investment			5
Medium Investment	4	11	19
Low Investment	25	41	35
$\chi^2=12.38, p<0.05$			

Figure 5.19 illustrates the overlay of poverty to investment map. By following the same procedure as above, I found high frequencies at 41 coordinators between low investment and medium poverty and 35 coordinates between low poverty and low investment. There was no coordinate on frequency between high investment and high poverty. As expected, the high poverty district received low investment: the low and medium poverty districts received more investment. The Chi-square value suggests a statistical relationship of the coordinates between poverty incidence and total investments in Table 5.5 at 95 % confidence level.

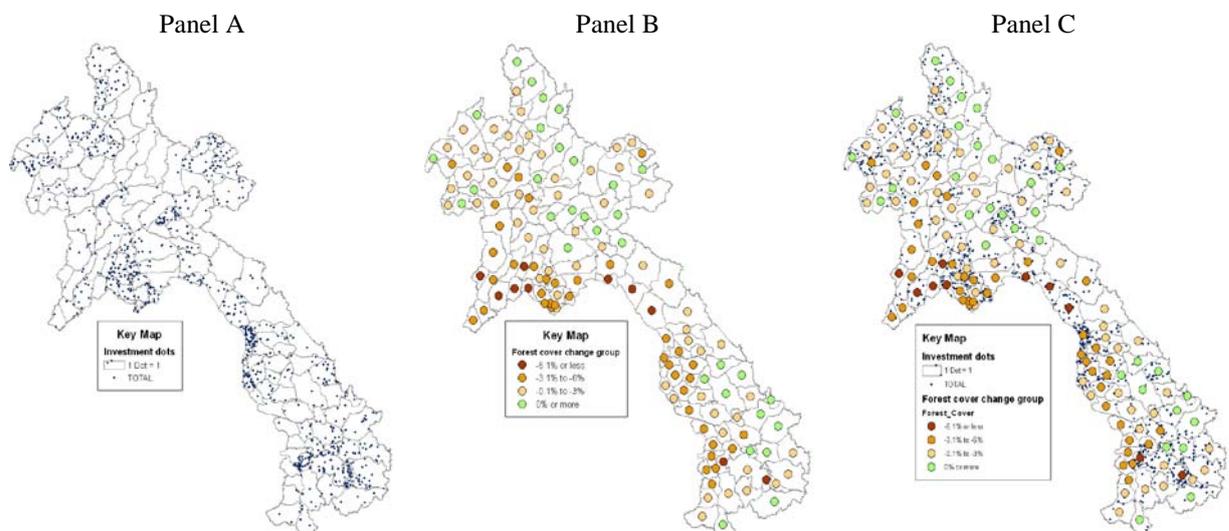


Figure 5. 20: Overlaying investment map to deforestation map

The last pair to be overlaid was the investment and deforestation map. This overlay is shown in Panel C (Figure 5.20). Similar to the above explanation, Table 5.6 reveals high frequencies at 41 coordinates of low investment and low deforestation, and 33 coordinates of low

investment and medium deforestation. One again, there is no frequency observed in the coordinate of high investment and high forest decrease districts. This suggests that districts with high deforestation attract low investment. The Chi-square value suggests a 5% statistical relationship between the coordinate of investment and deforestation in Table 5.6.

Table 5. 6: Observed frequency of investment by deforestation

	<i>High Investment</i>	<i>Medium Investment</i>	<i>Low Investment</i>
High deforestation		6	4
Medium deforestation	3	5	33
Low deforestation	1	14	41

$\chi^2=12.16, p<0.05$

Finally, three maps related to the PIPEN model were overlaid and appear in Panel C (Figure 5.21) by combining two maps: poverty and deforestation in Panel A and poverty and investment in Panel B (Figure 5.21). Similar to the above overlays, its overlay pattern is mixed and difficult to identify; and, unlike the above overlays, simple observed frequency is not applicable in this case because it cannot capture three variables at once. While the previous statistical method revealed the pair’s spatial relationship and not their correlations, I will now analyse their correlations to determine how these three variables have moved together. The correlation matrix of the three maps is shown in Table 5.7.

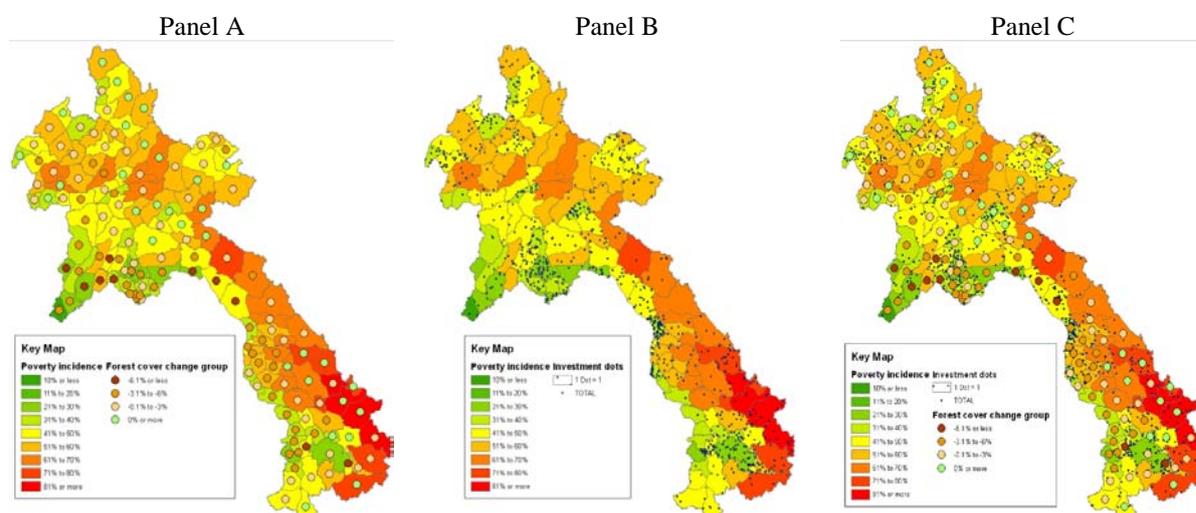


Figure 5. 21: Overlaying poverty, investment and deforestation

Table 5. 7: Correlation matrix among three variables

	Deforestation	Poverty	Investment
Deforestation	1		
Poverty	0.38	1	
Investment	-0.10	-0.21	1

Table 5.7 demonstrates that investment has a negative spatial correlation with deforestation and poverty. This negative sign suggests that if a district receives a considerable number of investments, the rate of deforestation and poverty in that district tends to decline. This correlation may be useful to support the strategies that the GoL has employed to promote private investment to reduce poverty and maintain a sound environment. In other words, it may be suggested that the additional investment may be predicted to reduce poverty and deforestation. However, more analyses are needed to qualify this statement. Raising the possibility of correlation does not imply causality; and, even if there is causality, there is no way of knowing from which direction it occurs.

Poverty has a positive correlation with deforestation. This suggests that the increased rate of poverty in the district tends to be associated with the increased deforestation rate of said district. This correlation may suggest a vicious circle of PEN: in other words, poverty may cause environmental degradation, and vice versa. However, these correlations are representative of a first experiment only: they have resulted from simple statistical methods. In order to arrive at more robust results, Chapter 6 will further investigate their relationships by employing spatial regression analyses.

5.6.3 Overlaying maps to reflect government policy

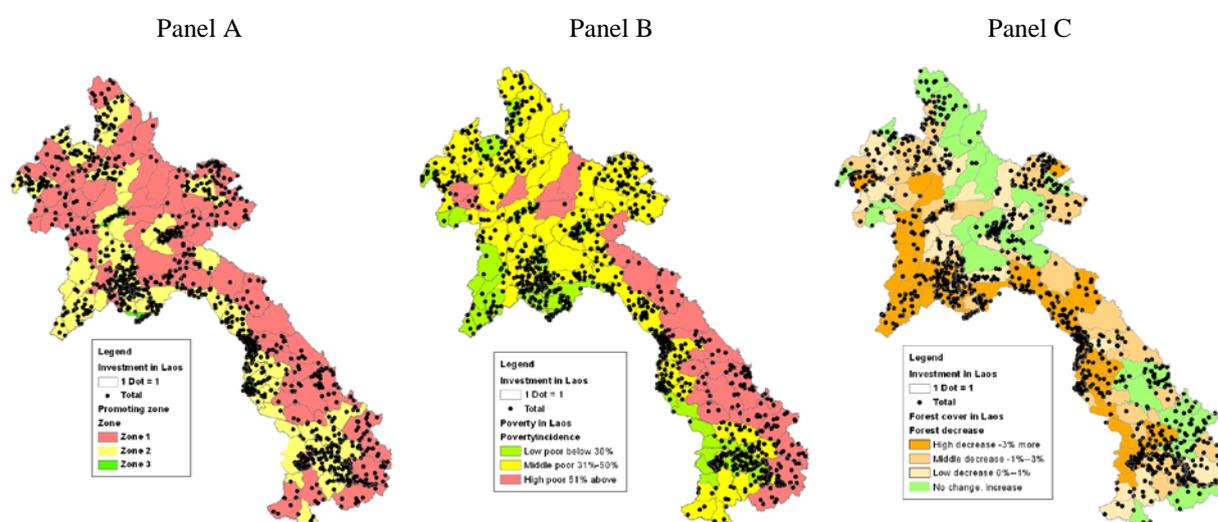


Figure 5.22: Overlaying investment to promotion zone, poverty and deforestation maps

Source: Author's calculation

The overlaying maps in the previous sub-section reflect the spatial relationships related to the PIPEN model. In this sub-section, I will overlay the investment map to promoting zones, poverty and deforestation maps reflecting the GoL's strategies for private investment promotion. Employing the maps and the same procedures as above, Figure 5.22 shows the

overlay of total investment map to three maps: promotion zone in Panel A, poverty incidence in Panel B, and deforestation in Panel C. Note that these overlaying maps suggest only the locations of the absolute number of private investment in these maps rather than their correlations or causalities.

Panel A (Figure 5.22) reveals that most of the investors were interested to invest their capital in promotion zone 2 with sound incentives, even though the GoL has targeted them in zone 1 with higher incentives. This map suggests that investors may consider lowering their investment costs by opting for districts in zone 2 which have moderate levels of economic infrastructure and are suited to their investment rather than investing in zone 1 which lacks economic infrastructure, despite the high incentives. This could infer that investors prioritise their own profits ahead of contributing to the development goals of Laos. If so, conflict of objectives in use of natural resources among the GoL, private investors and the people living in the affected areas is likely to occur.

In Panel B, most investors are likely to invest in districts with medium poverty and fewer in high poverty districts. But, incentives offered in the poorest districts often prove more attractive; investors can avoid high risks and costs to their investment operations in the poorest districts, such as inaccessibility, geographical difficulties and the high cost incurred by operating activities. In Panel C, most investment is likely to occur in districts with high and medium rates of deforestation. While the decrease in forest cover in Laos may be attributable to several factors, private investment in the resources sector can account for its decrease as well. For example, investment projects involving mining, agricultural crop expansion and tree plantation can destroy forests (see Lang & Shoemaker, 2006). Thus, the above three maps suggest that increasing private investment in the resources sector may present both new opportunities and challenges to development in Laos, particularly in relation to the complexities and dilemmas associated with private investment in the resources sector. These maps also indicate unclear impacts of private investments on poverty and environmental degradation. For this reason, the scale of analysis needs to be scaled down from meso to micro analysis in order to understand the real impact of private investment. An assessment of local impacts will be conducted in Chapter 7.

This section has generated four sets of maps: investment, poverty, deforestation and a promotion zone map. These maps were overlaid in pairs to reflect the spatial relationships related to the PIPEN model and to the government investment policies. Regarding the PIPEN model, the three overlays suggest that high frequencies have occurred only in districts with

low investment, low deforestation and a low rate of poverty. The results of the simple correlation analysis suggest that Investment has a negative spatial correlation with Deforestation and Poverty, while Poverty has a positive correlation with Deforestation. Thus, these spatial correlations need to be further examined. With reference to the investment promotion policies, most investments were located in zone 2 rather than in zone 1, in low and medium rather than in high poor districts and in districts with medium and high rates of deforestation, districts that were not highly prioritised. It is important to narrow down the scale of the study to the local level to understand the real contribution of private investment. An assessment of the real impacts of private investment at the village and household levels at the investment sites appears in Chapter 7.

5.7 Summary of Chapter 5

This chapter explored the patterns of private investment in the resources sector, responding to the first research question. It reveals rising FDI trends as well as the massive increase in private investment in Laos, investment that has concentrated mainly on the resources sector. By drawing on secondary data sources and using ArcGIS software, several patterns of private investment in the resources sector have been revealed, namely private investment companies, foreign and domestic investment, and districts receiving investment. From these patterns, it becomes clear that the wood industry, agro-forest and the mining sector received the highest number of investments; but, their investment scales were small, unlike the hydro-energy sector. Most of the investment companies were from China, Vietnam and Thailand; and, domestic investment increased in tandem with these foreign companies.

The mapping of these investments indicated that investment was distributed unevenly, as located in the 40 poorest and 23 poor districts, corresponding to 63 districts in promotion zone 1 and 56 districts in promotion zone 2. The overlaying of maps of the investment, poverty, deforestation and promotion zoning maps in pairs suggested high frequencies only in districts with low investment, low deforestation and low poverty, suggesting that most investments were located in low rather than in high poor prioritised districts. While these findings are grounded in simple statistical methods, it is important to further investigate using a more complex analytical method. Once again, the findings in this chapter prove that while the district data level is sufficiently accurate for spatial analysis in Laos, the availability of data at finer levels could yield better results. The next chapter will employ spatial regression analysis to investigate the spatial relationships among variables associated with the PIPEN model.

Chapter 6: Spatial regression analysis

6.1 Introduction to Chapter 6

In this chapter, I continue the analysis in Chapter 5 that examines the spatial relationships in the PIPEN model. In Chapter 5, after overlaying poverty incidence, investment and deforestation maps in pairs, simple statistical methods were used to quantify their relationships to the PIPEN model. In particular, high frequencies of each pair were noted in districts with low investment, a low deforestation rate and a low poverty rate. This result merely indicated their spatial relationships in terms of overlaying maps and location, not spatial associations. To better understand their spatial relationships in terms of spatial association, it was deemed necessary to further investigate using other methods. Spatial regression analysis was considered appropriate because it takes into account the locations and spatial attributes of the data. This analysis was considered more advanced than traditional statistical analysis due to the way in which it takes into account both spatial dependence and spatial heterogeneity (Anselin, 1992; Fotheringham et al., 2002; Fotheringham & Rogerson, 2009).

This chapter aims to examine the spatial associations or relationships in the PIPEN model consisting of poverty, deforestation and private investment, using spatial regression analysis. The term ‘spatial relationship’ in this chapter has been applied to locations in which investment is predicted to be associated with poverty and deforestation rates at the district level; and, to shed light on the nature of PEN in different parts of Laos where virtuous and vicious circles are anticipated to happen. To attain this aim, this chapter consists of six sections, including this introductory section. Section 6.2 explains spatial regression analysis and modelling, particularly concepts of spatial data analysis and the application of spatial regression to analyse spatial relationships in the PIPEN model. Sections 6.3 and 6.4 explore the procedures using OLS and GWR techniques in Models 1 and 2 and their findings. Section 6.5 reveals the key findings on estimated spatial relationships in the PIPEN model. This chapter is summarised in section 6.6.

6.2 Spatial regression analysis and its models

This section briefly describes the backgrounds and some components related to the concepts of spatial regression analysis. I explicate the ways in which spatial regression analysis was applied to quantify the spatial relationships in the PIPEN model.

6.2.1. Some terms related to the concept of spatial data analysis

According to Fotheringham and Rogerson (2009, p. 1), *spatial data* are different from other data in that they contain ‘locational information as well as attribute information’; or, in other words, they are recorded at different locations which are coded as part of the data. In this sense, it is important to take into account spatial distribution in these data. *Spatial analysis* is ‘one of the techniques using this locational information to better understand the processes generating the observed attribute value’ (ibid). Haining (2003, p. 4) defines spatial analysis as ‘a collection of techniques and models that explicitly use the spatial referencing associated with each data describing the spatial relationships or spatial interactions between the cases’. He describes the three main elements of spatial analysis as follows:

... [F]irst, it includes *cartographic modelling*. Each data set is represented as a map and map-based operations (or implementing map algebras) generate new maps...[S]econd, it includes forms of *mathematical modelling* where model outcomes are dependent on the forms of spatial interaction between objects in the model, or spatial relationships or the geographical positioning of objects within the model...[F]inally, it includes the development and application of statistical techniques of the proper analysis of spatial data which, as a consequence, make use of the spatial referencing in the data. This is the area of spatial analysis that we refer to as *spatial data analysis*... (Haining, 2003, pp. 4-5, original emphasis).

A useful study of spatial data analysis in the social sciences was conducted by Anselin (1992). According to his study, location has two spatial effects³², namely spatial dependence and spatial heterogeneity. Building upon Tobler’s first law of geography, which states that “everything is related to everything else, but near things are more related than distant things”(1970, p. 236), Anselin, who refers spatial dependence to spatial autocorrelation or association, claims that similar values of a variable tend to occur in nearby locations, leading to spatial clusters. Spatial heterogeneity infers regional differentiation as each location has its own intrinsic uniqueness. To this end, Anselin suggests treating the crucial role of location for spatial data in both an absolute sense (coordinates) and a relative sense (spatial arrangement, distance) when conducting statistical analyses. Otherwise, the results of data analyses may prove invalid.

Following Anselin’s study and departing from standard assumptions of independence and homogeneity, special techniques relating to three features, e.g., rubrics of spatial statistics, geostatistics and spatial econometrics are needed. Anselin considered ‘*spatial statistics*’ the most general among the three. During the 1980s, spatial data analysis was not commonly

³² More details of these two spatial effects are explained in Anselin’s study (1992).

undertaken even though its techniques were considered important. Omission was due to the lack of operational software used for spatial data analysis. However, subsequently, many attempts were made to add features for spatial analysis to many of the existing data analysis software packages. Later, these techniques became widely applied by social scientists (see Anselin, 1992).

According to Anselin, spatial data may be dependent on its neighbours; for this reason, it may be wrong to use the ordinary regression model to analyse spatial data. Fotheringham, Brunson, and Charlton (2002, p. 21) note that approaches attempting to generate a regression framework taking into account spatial dependency are referred to as 'spatial regression models'. Fotheringham et al., (2002) introduced the GWR technique that incorporates spatial data into models based on the traditional regression framework and by incorporating local spatial relationships into the regression framework in an intuitive and explicit manner. Charlton and Fotheringham (2009a, 2009b) have applied statistical methods to GWR in an attempt to capture both spatial dependence and spatial heterogeneity. Both of these methods are described below.

The OLS and GWR techniques are used to generalise coefficients to predict the relationships between dependent and explanatory variables; but, as suggested in Chapter 4, these two techniques are different spatial data analyses (see Fotheringham et al., 2002). On the one hand, the OLS is treated as a global model because the predicted coefficients between dependent and explanatory variables hold constant for an entire study. Its residuals are assumed to be independent and normally distributed with a mean of zero. This is because OLS holds classical, linear regression assumptions and with data stationary, which may not be realistic in reality. On the other hand, the GWR is viewed as a local model because it can depict different predicted coefficients for different locations within the study regions. The GWR does not hold classical assumptions and can deal with non-stationary data which is more realistic (see Chapters 1 and 2 in Fotheringham et al., 2002). More importantly, the single predicted coefficient of each explanatory variable in the OLS cannot be mapped; but, the various coefficients in the GWR can be mapped to show the pattern of each coefficient in the Model. While acknowledging their differences, it can be useful to experiment with both techniques to understand the various analytical methods employed in this chapter.

In studies dealing with spatial data, Charlton & Fotheringham (2009a, 2009b) and Fotheringham et al., (2002) explain both OLS and GWR to investigate spatial relationships. They initially estimate the OLS first in order to understand the predicted values in the model;

after that, analysis shifted from the OLS to the GWR, incorporating an account of locations and spaces into the model. The results of these two methods were compared and evaluated when searching for a better performance by investigating their statistic diagnostics. Recently, these methods have been widely used in several empirical studies (see Charlton & Fotheringham, 2009a; Fotheringham et al., 2002). Both the OLS and GWR tools have been developed and incorporated into many geostatistical software programs like ArcGIS with more convenient application (Charlton & Fotheringham, 2009a). As suggested in Chapter 4, this chapter (Chapter 6) will follow these methods to quantify the spatial relationships in the PIPEN model.

6.2.2. Spatial regression of PIPEN modelling

In line with the research analytical framework in Chapter 1 (see Figure 1.3), a model has been constructed to investigate the spatial relationships of private investment (PI) with PEN. As shown in Chapter 2 (see Figure 2.5), this model is named ‘PIPEN’. To estimate the spatial relationships of this model, two relevant equations were modelled and named Models 1 and 2, respectively (see Chapter 4).

$$\text{Poverty}_i = b_0 + b_1 \text{Investment}_i + b_2 \text{Deforestation}_i + \varepsilon_{1i} \quad (\text{Model 1})$$

$$\text{Deforestation}_i = c_0 + c_1 \text{Investment}_i + c_2 \text{Poverty}_i + \varepsilon_{2i} \quad (\text{Model 2})$$

In Model 1, the coefficient b_1 is expected to be negative as additional investment is assumed to reduce the poverty rate. Based on the vicious circle concept of PEN, the coefficient b_2 is expected to be positive as additional deforestation rate is predicted to increase the poverty rate. In Model 2, the coefficient c_1 is expected to be positive as added investment is assumed to increase the deforestation rate. Similarly, the coefficient c_2 is expected to be positive as additional poverty rate would associate with increase in the deforestation rate. Drawing from these two models, it may be said that the two estimated coefficients b_1 and c_1 will reveal the spatial relationship patterns of investment on poverty and deforestation. The two estimated coefficients b_2 and c_2 will represent spatial relationships and locations of PEN. It is important to note that these coefficients are not implied ‘causalities’.

When applying GWR techniques, it is important to carefully select the spatial options in the ArcGIS tools to meet the study objective. Many options for geographical weights are available in its tools. In this chapter, the GWR dependent and explanatory variables are the same as the OLS. But, for the geographical weight options, as stated in Chapter 4, the

ADAPTIVE method was chosen for the ‘Kernel Type’ and the corrected Akaike Information Criterion (AICc) was selected for the ‘Bandwidth method’ in the interests of simplicity.

To support the estimations of the above two models, statistical dispersion of the three map data sets related to the PIPEN model is provided in Table 6.1 as measurements of data variation. For example, investment as in numbers of district investment shows large data range with a mean value of 6.92, median of 4.00, standard deviation of 7.81, and minimum and maximum value of 0 and 50, respectively.

Table 6. 1: Statistical dispersion of investment, poverty and deforestation

	Mean	Median	Std Deviation	Min	Max
Investment	6.92	4.00	7.814	0	50
Deforestation	-0.02	-0.02	0.027	-0.087	0.055
Poverty	0.38	0.38	0.147	0.064	0.752

ArcGIS software version 10 was employed. The OLS and GWR for modelling spatial relationships were employed, both of which are available in ArcToolbox under ArcMap. The next section starts with estimating regression of Model 1 with OLS, then GWR tools, the aim being to generalise the coefficients to predict the relationships between the dependent and explanatory variables in the above two Models.

6.3 Estimation of Model 1 with OLS and GWR

This section starts with OLS regression in Model 1 defining poverty as a dependent variable, and investment and deforestation as explanatory variables. The OLS tool in the ArcToolbox, was run: the key OLS results are illustrated in Table 6.2 while its full results are displayed in Figure 6.11 at the end of this chapter. In this Table, the coefficient of investment b_1 was negative and statistically significant at 5%, while that of deforestation b_2 was positive and significant at 1%. These two coefficients were likely suggested that for each additional district investment, the predicted rate of poverty would reduce by 0.32% on average, *ceteris paribus*. Likewise, each increasing percentage of deforestation predicted an increase in the poverty rate by approximately 2%, *ceteris paribus*. In addition, the small value of the variance inflation factor (VIF), which was less than 7.5, indicated that the explanatory variables were not redundant in the model.

In the OLS statistical diagnostics, the adjusted R^2 was relatively low at 0.16, signifying that it accounted for approximately 16% of variation in the dependent variable. This low performance may suggest that some variables were missing from the model. The significance of the F–Statistic and Wald Statistic indicated a robust overall model. Moreover, the

insignificances of the Koenker (BP) Statistic and Jarque-Bera Statistic suggested that the OLS standard errors were unbiased and that its residuals did not deviate from a normal distribution.

Table 6. 2: Estimated results from OLS tool on Model 1

Variables	Coefficient	t_Statistic	Prob
Intercept	0.4413	25.8112	0.0000
Investment	-0.0032	-2.1791	0.0310
Deforestation	1.9631	4.6465	0.0000

AICc	-160.6960	Wald-Prob	0.0000
R ²	0.1727	K(BP)	0.5022
Adjusted R ²	0.1606	K(BP)-Prob	0.7780
F-Stat	14.3019	JB	2.1288
F-Prob	0.0000	JB-Prob	0.3450
Wald	39.5685	Sigma2	0.0182

Source: Output from ArcMap, computed by Author.

However, the OLS full results in Figure 6.11 showed a warning sign; that is, autocorrelation as the residuals could be spatially autocorrelated as a result of spatial dependence. Thus, it was deemed important to test whether spatial autocorrelation was present in the residuals. If present, then the results of the OLS technique should be considered unreliable. To construct this test, the use of Moran's Index as a measure of the level of spatial autocorrelation in the residual was advised (see Charlton & Fotheringham, 2009a). Its tools are available in Spatial Statistics Tool located in the ArcToolbox. As noted in Chapter 4, the null hypothesis of this test stated that the observed pattern was randomly distributed.

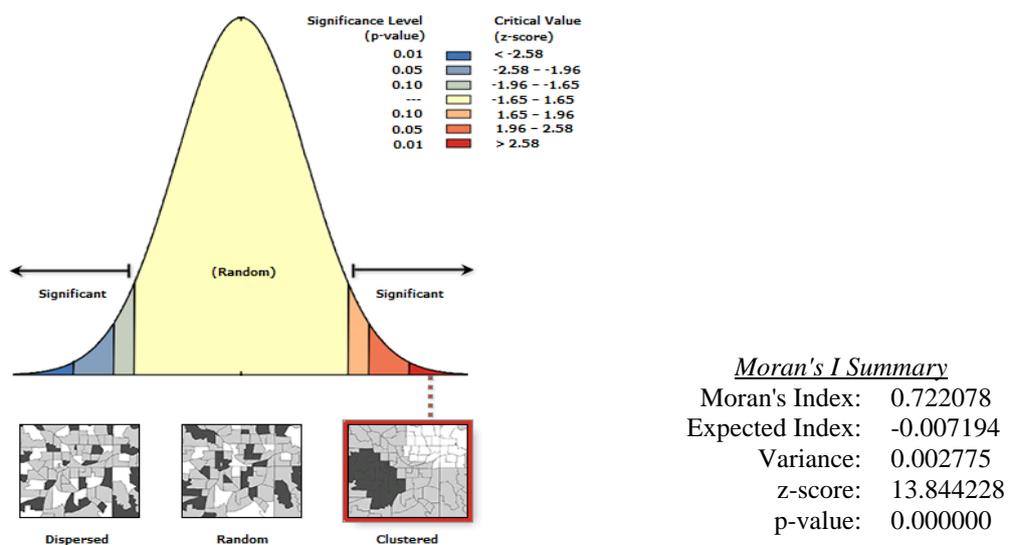


Figure 6. 1: Spatial autocorrelation report on OLS residuals in Model 1

Source: Output from ArcMap, computed by Author.

Following this advice, the testing report for the OLS spatial autocorrelation was obtained from the ArcMap as shown in Figure 6.1, where it was also found that the value of Moran' Index was 0.72 with a Z score of 13.84, and that the p-value for the hypothesis was significantly different from zero. The Bell – shape in Figure 6.1 indicates that there was less than 1% likelihood that this clustered pattern was the result of random chance. In other words, this report confirmed that spatial autocorrelation was present in the residuals; thus, the OLS results detailed above could not be trusted.

Therefore, it was necessary to further investigate the spatial relationships in Model 1 by employing GWR techniques. After running the GWR tool for modelling spatial relations in ArcToolbox with the options mentioned above, the statistical results were reported in Table 6.3. Before identifying the spatial relationships in this model, the statistical diagnostics of the GWR results needed to be investigated in four stages. First, it seemed useful to start with comparisons, that is, to compare the GWR results with those of the OLS techniques in terms of the model fitness of their adjusted R^2 and AICc. The adjusted R^2 was increased from 0.16 in the OLS to 0.67 in the GWR results, which suggests that the performance of the GWR was better than that of the OLS. In addition, the decrease in AICc from –161 in the OLS to –239.72 in the GWR was strong evidence of improvement in the fit of the model to the data in the GWR (the smaller AICc being the better of the two).

Table 6. 3: Statistical results from GWR tool on model 1

Variable Name	Variable	
Neighbours	21.0000	
Residual Squares	0.6168	
Effective Number	52.5613	
Sigma	0.0840	
AICc	-239.7220	Results from OLS
R^2	0.7952	-161
Adjusted R^2	0.6745	0.17
		0.16

The GWR tool generated the values of its standardised residual (*StdResid*): these values were mapped to distinguish the districts in which the Model was under –or over –predicted. The GWR standardised residuals were mapped and appear in Figure 6.2. This map suggests that overall the GWR model was well predicted. However, the map shows only one under predicted district, Xaiphouthong in Savannakhet province with a StdResid less than –2.5, where low poverty with low investment and deforestation was observed. In addition, Karum and Dakchung districts in Sekong province were over-predicted by the Model: their StdResid

were greater than 2.5 where the poverty rate was high but where investment and degradation were relatively low.

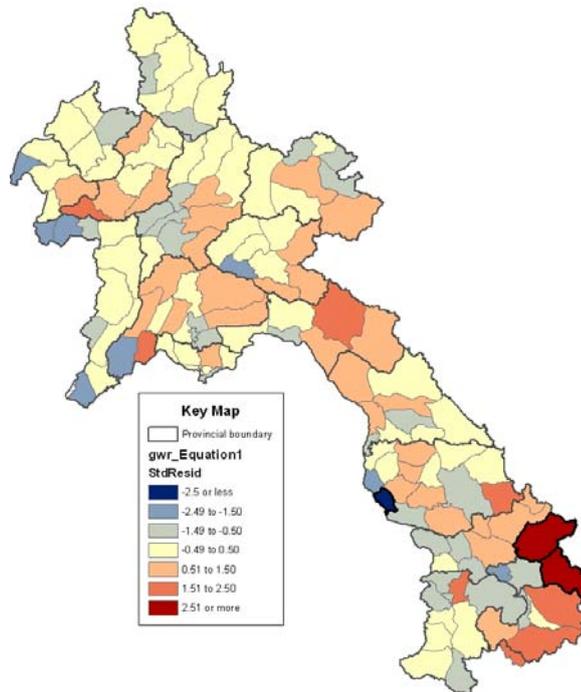
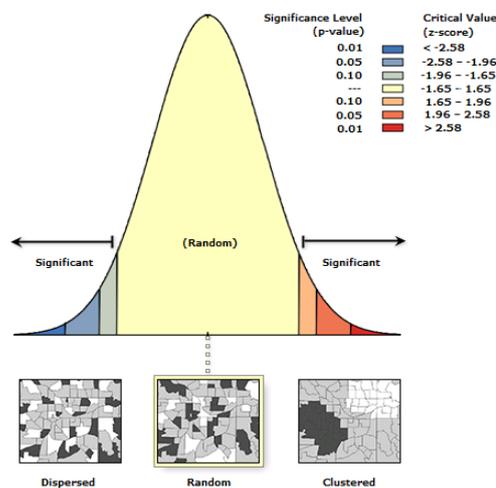


Figure 6. 2: Map of GWR standardised residuals in model 1
Source: Output from ArcMap, computed by Author.



Moran's I Summary

Moran's Index:	0.040481
Expected Index:	-0.007194
Variance:	0.002756
z-score:	0.908126
p-value:	0.363812

Figure 6. 3: Spatial autocorrelation report on GWR residuals in model 1
Source: Output from ArcMap computed by Author.

Following the same process as the above OLS, the residuals in the GWR results also needed to be tested in order to detect whether spatial autocorrelation was present in its residuals, and its null hypothesis was stated the same as above. If so, this suggested that the GWR results were not reliable. After running its Moran's Index tool, the spatial autocorrelation of the

GWR results were reported in Figure 6.3, which shows that Moran’s Index of the residual was 0.04 with a p-value of 0.36 and the z-score of 0.91. Thus, the pattern did not appear to be significantly different from random. In other words, this result suggested that spatial autocorrelation was not present in the GWR residuals; thus, the GWR results were reliable. Finally, after all of the statistical diagnostics confirmed the reliability of the GWR results, the next interesting part of the GWR technique was to interpret the values of the coefficients in order to understand their estimated spatial relationships among variables in the PIPEN model. Unlike the OLS, the GWR techniques in this model had created two sets of coefficients. This means that each district had two coefficients, representing the predicted association of additional investment and deforestation with the poverty rate. These two coefficient sets are displayed in two maps in Figure 6.4. Each map in this Figure displays 140 coefficients classified into seven ranks marked by three different colours from the darker green indicating high prediction of decrease in the poverty rate to the darker red indicating high prediction of increase in the poverty rate. The white colour signals insignificant prediction of change in poverty.

Panel A: Investment coefficient, b_1

Panel B: Deforestation coefficient, b_2

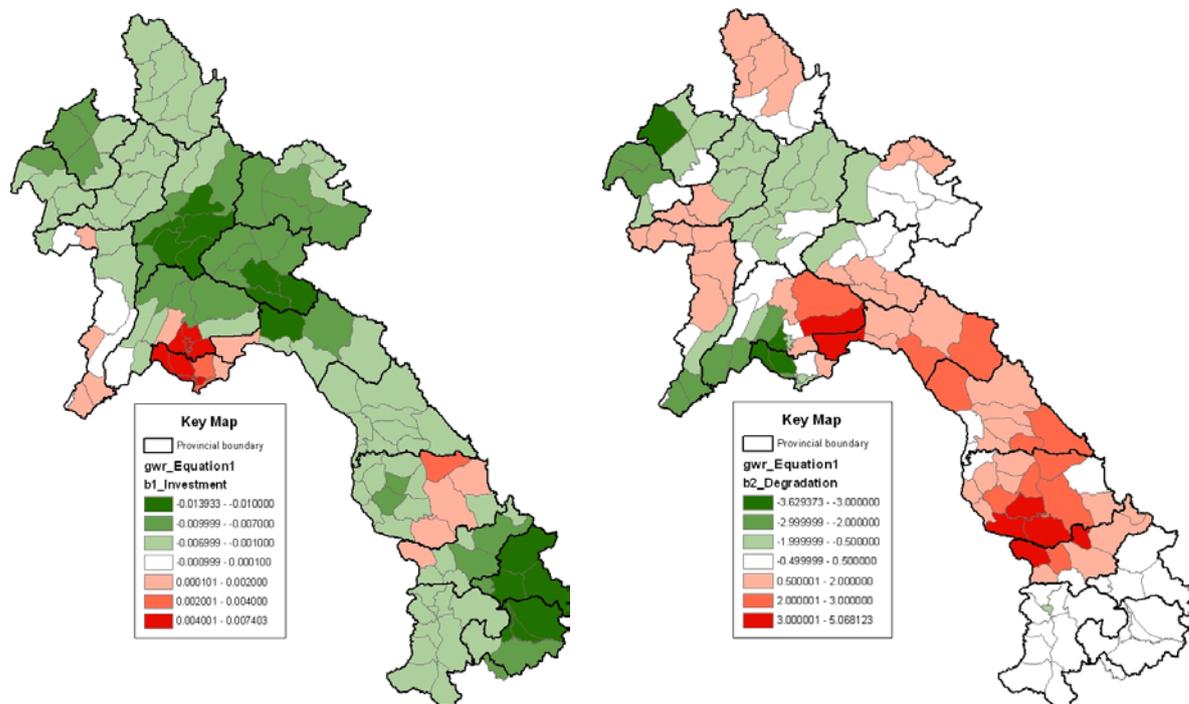


Figure 6. 4: GWR coefficient maps in Model 1
Source: Output from ArcMap computed by Author.

Panel A in Figure 6.4 shows the map of 140 investment coefficients b_1 , varying from -1.4% to 0.74% , and representing estimated values of the poverty rates in each district for each percentage increase in number of district investments. Panel A shows most of the districts

from North to South in green, meaning that the poverty rate is predicted to decline when these districts receive additional investment. Their prediction degree may be different according to their values and colours. For example, the colour dark green signifying many districts in Luang Prabang, Xieng Khuang, Huaphanh, Sekong and Attapeu provinces, is used to indicate that the poverty rate in these districts predicts to decline when they receive additional investment. The red and white colours that appear in Panel A, showing districts including Vientiane Capital, Vientiane, Xayabury and Savannakhet province, suggest that any additional investment is estimated to have less impact on—even might raise—poverty rates in these districts. Note that the red colour in all of the districts in Vientiane Capital is attributable to the fact that Vientiane Capital, as the capital city of Laos, has no private investment in the resources sector in those districts.

Panel B in Figure 6.4 shows 140 coefficients b_2 of deforestation on the poverty rate: these coefficients varied from -3.63% to 5.07% . Similar to the above, the darker red indicates the higher prediction of increase in the poverty rate due to additional deforestation rate: the darker green signifies high estimation of reduction of poverty rate; and, the white suggests insignificant impact of deforestation on the poverty rate. In this map, the red colour is highly evident in most of the districts in the central provinces including Vientiane, Xieng Khuang, Borikhamxay, Khammuane, some districts in the Southern provinces of Savannakhet and Saravane, as well as some northern districts in Xayabury and Phongsaly provinces. The poverty rate in these red districts is predicted to increase in tandem with the additional deforestation rate. In addition, all of the districts in the far southern provinces, including Champasack, Sekong and Attapeu and some dispersed districts in the northern province of Huaphanh, are depicted in white to imply insignificant predictions vis-à-vis deforestation and the poverty rate. Several districts in the Northern provinces appear in a mix of light and dark green. These contrasting colours suggest that in some districts in Luang Prabang, Bokeo, Luang Namtha, and Oudomxay, and in some districts in Xayabury and Vientiane province, the poverty rate is estimated to decrease in line with the additional deforestation rate.

Drawing upon the two maps of GWR coefficients based on Model 1 that appear in Figure 6.4, the different values of the coefficients imply that the poverty rate in each district will be determined by the different degrees of investment and deforestation across the country. Note that unlike other maps of data set, the two maps intend to indicate regional patterns of coefficients in Laos as outcomes from mathematical modelling (see the three main elements of spatial analysis above). Thus, it is useful to view the colours and values assigned to the

seven ranks in each district to ascertain whether their patterns are dispersed, clustered or randomly scattered.

6.4 Estimation of Model 2 with OLS and GWR

Following the same analytical methods applied in the previous section, this section estimates the spatial relationships in Model 2, described above and in Chapter 4. This model treats deforestation as a dependent variable, and investment and poverty as two explanatory variables. Similar to the estimation of Model 1, Model 2 was estimated by first running the OLS and then the GWR tools, respectively. After operating the OLS tool, the results were compiled in Table 6.4. Full results appear in Figure 6.12.

Table 6. 4: Estimated results from OLS tool on Model 2

Variable	Coefficient	t_Statistic	Prob
Intercept	-0.0464	-6.9317	0.0000
INVESTMENTS	-0.0001	-0.2604	0.7949
POVERTY RATE	0.0693	4.6465	0.0000

AICc	-628.7307	Wald-Prob	0.0000
R ²	0.1445	K(BP)	9.0274
Adjusted R ²	0.1320	K(BP)-Prob	0.0110
F-Stat	11.5678	JB	2.8360
F-Prob	0.0000	JB-Prob	0.2422
Wald	37.9261	Sigma2	0.0007

The key OLS results from Model 2 in Table 6.4 revealed that the investment coefficient c_1 was insignificantly different from zero, indicating an ambiguous relationship between investment and deforestation. But, the coefficient of poverty c_2 was highly significant and its sign was the same as expected, possibly implying a significant spatial relationship between poverty and deforestation. If so, this would suggest that for any additional poverty rate, the deforestation rate is predicted to increase by 0.07%, *ceteris paribus*. Among other statistical indicators, a low value of the variance inflation factor (VIF), less than 7.5, suggested that the explanatory variables were not redundant. In addition, the OLS diagnostics showed a low fitness of OLS regression as its adjusted R² was only 0.13. The statistical significance of F-Statistic and Wald Statistic indicated the overall robustness of the model. However, like the previous OLS results, this OLS result in Figure 6.12 was identified as a warning sign regarding spatial autocorrelation in the residuals. This meant that the Moran's Index was needed to test them.

The results of Moran's Index tool on the OLS residual that appear in Figure 6.5 reveal the value of Moran's Index of 0.3 with its Z-score of 5.92 and significant p-value. These results suggested that there was less than 1% likelihood that this clustered pattern was the result of random chance. As in the previous section, this means that spatial autocorrelation was present in the residuals, and, by extension, that OLS results in Model 2 were unreliable. Next, the GWR technique was applied to examine the spatial relationships in Model 2. In the GWR tool, the options for the geographical weights were selected the same way as in the Model 1. After running its tool, the GWR statistical results of Model 2 are reported in Table 6.5.

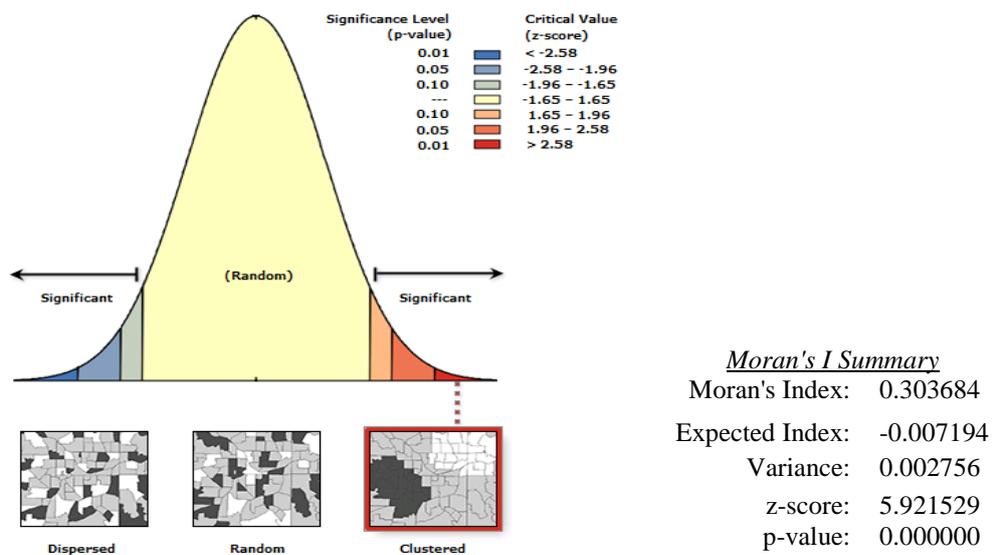


Figure 6. 5: Spatial autocorrelation report on OLS residuals in model 2
Source: Output from ArcMap, computed by Author

Table 6. 5: Statistical results from GWR tool in Model 2

Variable Name	Variable	Results from OLS	
Neighbours	25.0000		
Residual Squares	0.0336		
Effective Number	44.0587		
Sigma	0.0187		
AICc	-672.6812		-628.73
R ²	0.6736		0.14
Adjusted R ²	0.5271	0.13	

As with the above, the statistical diagnostics of the GWR results in Model 2 were investigated in four stages beginning with comparing the adjusted R² and AICc of the GWR to that of the OLS in order to identify the model performance. As shown in Table 6.5, the adjusted R² increased from 0.13 in the OLS to 0.53 in the GWR model, while the AICc decreased from – 628.73 in the OLS to –672.68 in the GWR. These two sets of statistics confirmed that the GWR model performed better than the OLS in Model 2. Second, the standardised residual

(StdResid) generated from the GWR tool indicated whether the model was either under-predicted or over-predicted. The StdResid of the GWR results are mapped in Figure 6.6. Overall, this model was expected to predict well as most of its values of standardised residuals fell between -2.5 and 2.5 . However, the StdResid on the GWR results map showed one under – predicted for Champasack district in Champasack province with its StdResid value of -3.25 . In addition, it also showed one over – predicted for Thateng district in Sekong province with its value of 3.445 .

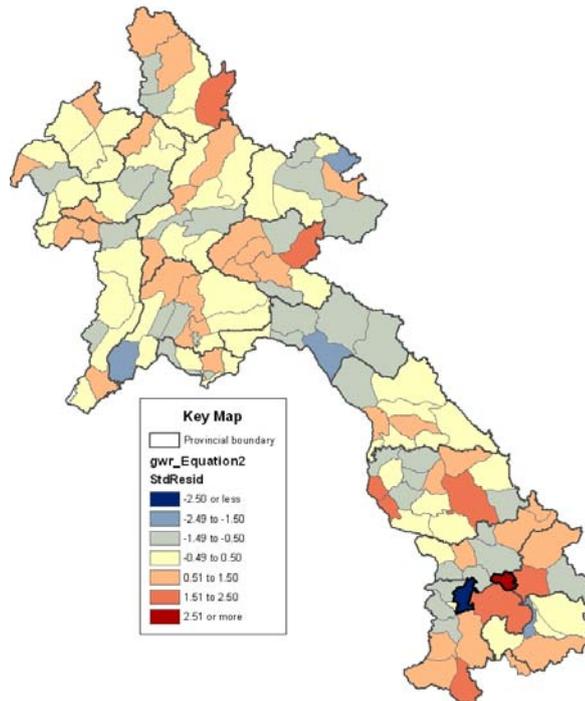
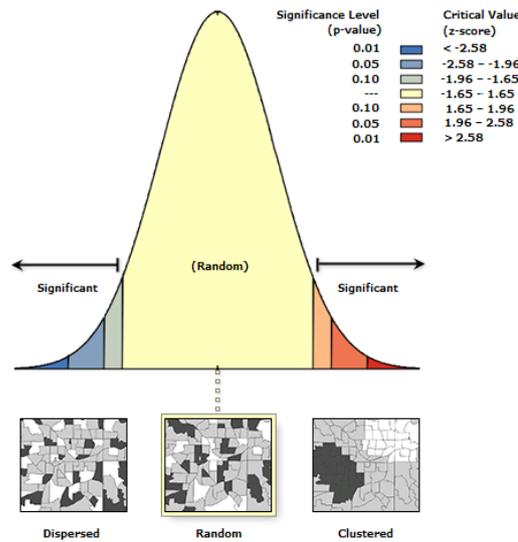


Figure 6. 6: Map of GWR standardised residuals in Model 2
Source: Output from ArcMap computed by Author

Even though the GWR results in Model 2 did not show a warning sign regarding spatial autocorrelation in the residuals, it seems important to further examine whether or not the GWR results were reliable. Using Moran’s Index tools, the results of spatial autocorrelation of the GWR that appear in Figure 6.7 show the Moran’s Index value of 0.018 with Z-score of 0.474 and insignificant p-value of 0.635 . These results suggest that the pattern did not appear significantly different from random. In other words, spatial autocorrelation was not present in the residuals, confirming that the GWR results may be considered reliable.



Moran's I Summary
 Moran's Index: 0.017693
 Expected Index: -0.007194
 Variance: 0.002756
 z-score: 0.474108
 p-value: 0.635423

Figure 6. 7: Spatial autocorrelation report on GWR residuals in Model 2
 Source: Output from ArcMap computed by Author

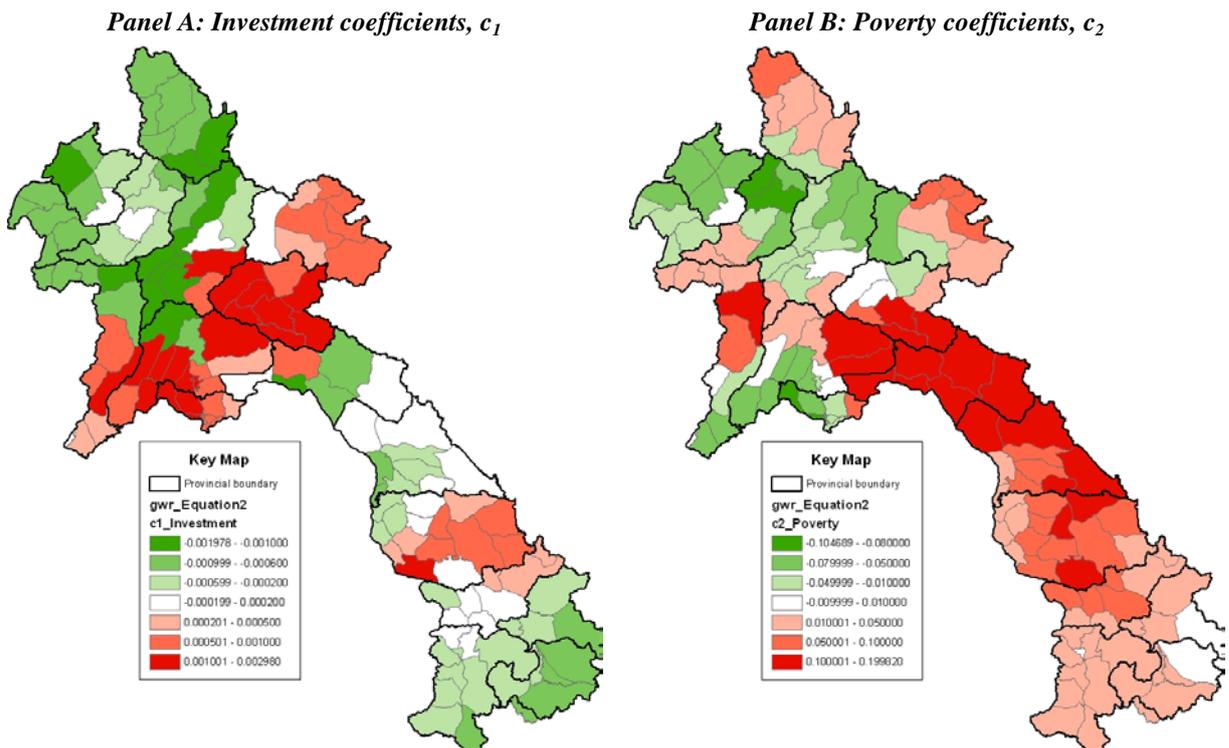


Figure 6. 8: GWR coefficient maps in Model 2
 Source: Output from ArcMap, computed by Author

Finally, coefficients of investment c_1 and poverty c_2 generated from the GWR tool in Model 2 were mapped (as shown in Figure 6.8). In each map, the 140 coefficients were classified into seven ranks with different values and colours. Note that the values assigned to each rank between the two maps are also different. The ranks are represented by colours from dark

green to white and to dark red. The dark green shading indicates low prediction of deforestation rate: the dark red shows the high prediction of deforestation rate; and, white suggests insignificant prediction of any relations to deforestation rate.

Panel A in Figure 6.8 shows the estimated 140 coefficients of investment c_1 on deforestation in a mixed pattern: the coefficients varied from -0.2% to 0.3% and were classified into seven categories signified by different colours. The majority of the districts in the Northern provinces including Phongsaly, Luang Namtha, Borkeo, Oudomxay and Luang Prabang, and in many southern districts in Champasack, Sekong and Attapue provinces, are marked green indicating that the deforestation rate is predicted to decrease concomitant with additional investment in the districts. The model tends to predict low or no impact of investment on deforestation in most of the white-coloured districts in Khammuane province and in some districts in Savannakhet and Saravan provinces. On the other hand, several districts in the Eastern and Western provinces appear in red indicating that the deforestation rate is predicted to increase concomitant with additional investment in the districts, including Huaphanh, Xieng Khoung, Vientiane Capital and provinces, as well as some districts in Xayabury, Saravan, and Savannakhet provinces.

Panel B in Figure 6.8 shows a map of 140 coefficients of poverty c_2 resulting from deforestation with their varied values ranking from -0.1% to 0.2% . Using the same colours as above, green, which indicates low prediction of deforestation rate for additional poverty rate, is applicable to some districts in some north-west provinces including Luang Prabang, Oudomxay, Laung Namtha and Borkeo, and to some districts in Xayabury, Vientiane provinces and Vientiane Capital. However, districts marked red, indicating a high prediction of deforestation for additional poverty rate, are found in most districts from the Central to the Southern provinces. In particular, the darker red areas are concentrated in some districts in Vientiane province and in all districts in Borikhamxay, Khammuane and Savannakhet provinces. As suggested above, this map shows the coefficient pattern of poverty on deforestation as outcomes from mathematical modelling in GWR tools; thus, it is useful to consider the colour and its assigned value for each coloured district. This coefficient pattern is likely to suggest strong evidence of poverty-environment nexus (PEN) in Laos.

6.5 Estimated spatial relationships in the PIPEN model

As stated in sub-section 6.2.2, two assumptions have been met in the PIPEN model. First, the estimated coefficients b_1 and c_1 revealed the spatial relationship patterns of investment on

poverty and deforestation; and second, the two estimated coefficients b_2 and c_2 presented the spatial relationships and locations of PEN. In this section, I will explore these assumptions of spatial relationships in the PIPEN model, compare the two assumptions, and then present the main findings.

Drawing from the GWR results of Models 1 and 2, the coefficients b_1 and c_1 were generated to predict the coefficients of investment on poverty and deforestation rates, respectively. Thus, it is interesting to view these two maps side by side as shown in Figure 6.9. While some aspects of these two maps have been explained above, Panels A and B in Figure 6.9 indicate that additional investment is predicted to reduce both the poverty and deforestation rates in districts marked green, to increase the two rates in districts marked red, and to have insignificant impact on districts marked white. Overall, by holding other factors constant, the pattern of investment coefficients on poverty (b_1 map) has been spatially solid in the green districts; based on this pattern, it is possible to predict that the increase in investment has generally been associated with poverty reduction. However, in Panel B in Figure 6.9, the pattern of investment coefficients on deforestation (c_1 map) appears as a mix of red, white and green. Thus, it may be suggested that the increase in investment would have associated with both reforestation and deforestation in Laos.

Panel A: Investment coefficient on poverty, b_1

Panel B: Investment coefficient on deforestation, c_1

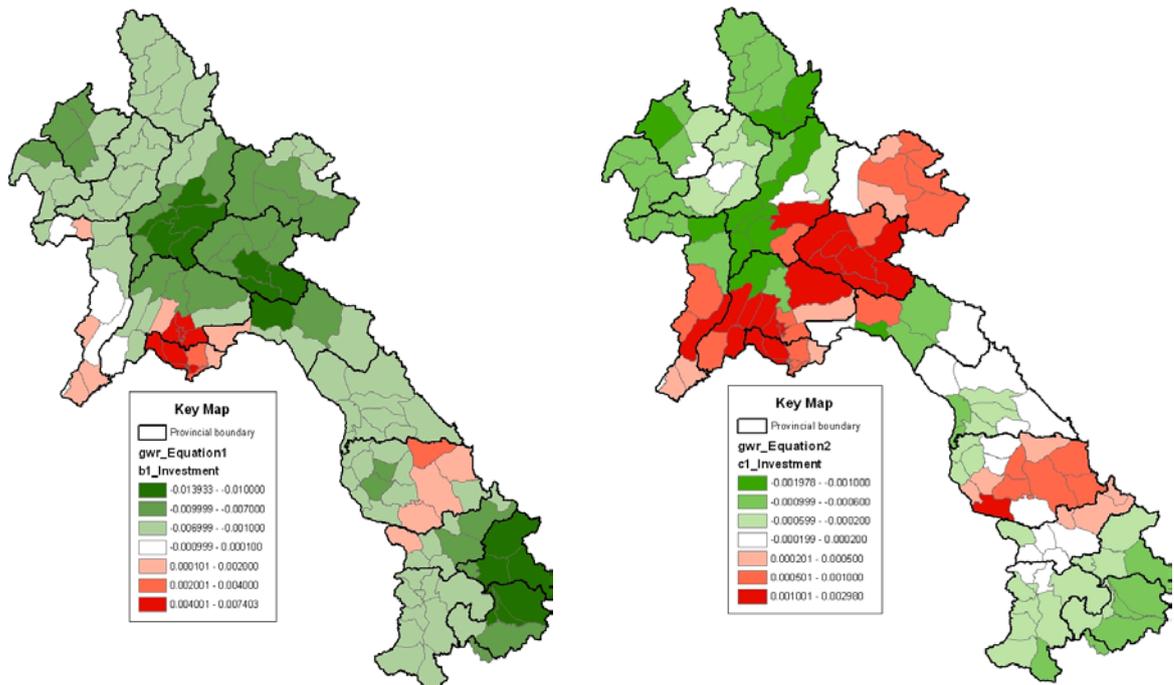


Figure 6. 9: Comparison between investment coefficient maps from Models 1 and 2
Source: Output from ArcMap, computed by Author

After taking the investment factor into account, the spatial relationships of PEN have been revealed in the coefficient b_2 and c_2 maps shown in Figure 6.10. Comparison of these two maps suggests that (a) the virtuous circle of PEN may be associated with reforestation. Poverty-reduction reforestation can be predicted to occur in districts marked green in both maps; and (b) the vicious circle of PEN may be associated with deforestation- related deepening poverty estimated to occur in districts marked red. Taken as a whole, most of the districts in the central and southern provinces are likely to experience a vicious circle of PEN (see pattern clustered in red). Most of the districts in the Northern provinces showed a mixed pattern of spatial relationships of PEN. The three colours that represent these districts indicate both virtuous and vicious circle of PEN in the north.

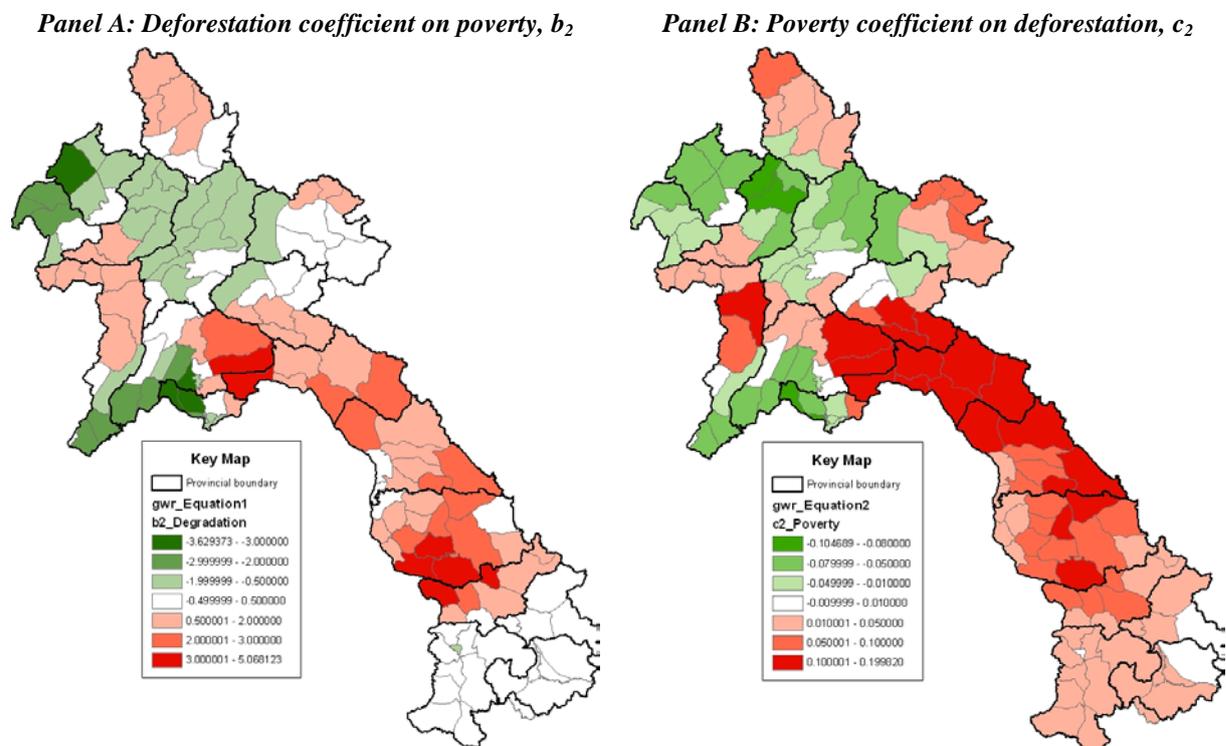


Figure 6. 10: Deforestation and poverty coefficients maps from Models 1 and 2

Source: Output from ArcMap, computed by Author

Sketching the main findings from the four maps in Figures 6.9 and 6.10, the data at district level could prove useful for creating spatial patterns for analysis; but, more varied and relevant types of data are needed. These analyses have used only three variable maps of data set; thus, the relatively low adjusted R^2 in the GWR results may suggest adding more variables. When dealing with spatial data, the OLS techniques become less effective due to presenting autocorrelation. The GWR can be used as an alternative, as practical for spatial data analysis. Drawing on the GWR results in this study, investment can be predicted to relate to reduction of both poverty and deforestation rates in many districts, but not all.

By employing spatial regression analysis, 140 estimated coefficient maps from GWR technique have been created. These maps suggest the existing pattern of PEN in some districts in the North and in many areas in the Central and South of Laos; but, this pattern has been mixed. Through estimation using the GWR technique, the estimated coefficient maps have implied 'spatial relationships' rather than 'causality' in the two models at the district level. But, it would be wrong to interpret these estimate coefficients for their spatial relationships at the local level. Therefore, there is a need to further investigate the spatial relationships between private investment and PEN by moving from district to local analysis. In this way, different aspects and issues related to the PIPEN model will be additionally investigated at the household level.

6.6 Summary of Chapter 6

This chapter examines the spatial relationships in the PIPEN model, consisting of poverty, deforestation and investment variables. By employing spatial regression analysis, the PIPEN was broken into two sub-models, and each model was estimated by using the OLS and GWR techniques. In the OLS result, statistical diagnostics are mostly significant; but, the presence of spatial autocorrelation suggests that their results are unreliable. After running the GWR techniques and taking into account both spatial dependence and spatial heterogeneity, the performance of the GWR statistical diagnostics was better than those of the OLS. Due to the non-existence of spatial autocorrelation, the GWR results were reliable and interpreted.

By holding other factors constant or *ceteris paribus*, the GWR predicted that while additional investment could reduce the poverty and deforestation rates in the districts marked green, it may increase the two rates in districts marked red, and could have less impact on districts coloured white (see both maps in Figure 6.9). As the pattern of investment coefficients on poverty has been spatially solid in green, investment was predicted to associate with poverty reduction. On the other hand, the investment coefficient pattern on deforestation shows a mix of red, white and green, suggesting that additional investment is predicted to relate to both reforestation and deforestation in Laos.

In addition, taking investment factors into account, the spatial relationships of PEN have revealed both virtuous and vicious circle of PEN in Laos. The virtuous circle of PEN is predicted to occur only in some 'green' districts in the Northern provinces, while the vicious circle of PEN is estimated to be present in almost all of the districts marked red in the Central and Southern provinces (see both maps in Figure 6.10).

Due to using secondary data at the district level, these spatial findings cannot fully explain the real impact of private investment at the local level. The GWR techniques suggest spatial relationships rather than causality; thus, it seems imperative to further investigate these spatial relationships by moving from district to local analysis. Exploration of different aspects and issues related to the PIPEN model and the impact of private investment at the local investment sites will be needed to further investigate at the village and household levels. In the next chapter (Chapter 6), particular focus will be upon the assessment of investment, changes in local livelihoods and resource usage in the two investment sites.

Figure 6. 11: Main results from OLS tool on Model 1

Variable	Coefficient	StdError	t-Statistic	Probability	Robust_SE	Robust_t	Robust_Pr	VIF [1]
Intercept	0.441336	0.017099	25.811250	0.000000*	0.015569	28.347673	0.000000*	-----
INVESTMENTS	-0.003206	0.001471	-2.179085	0.031027*	0.001522	-2.106446	0.036983*	1.009747
DEFORESTATION	1.963055	0.422482	4.646480	0.000009*	0.429708	4.568345	0.000013*	1.009747

OLS Diagnostics			
Number of Observations:	140	Number of Variables:	3
Degrees of Freedom:	137	Akaike's Information Criterion (AIC) [2]:	-160.695981
Multiple R-Squared [2]:	0.172725	Adjusted R-Squared [2]:	0.160648
Joint F-Statistic [3]:	14.301924	Prob(>F), (2,137) degrees of freedom:	0.000002*
Joint Wald Statistic [4]:	39.568452	Prob(>chi-squared), (2) degrees of freedom:	0.000000*
Koenker (BP) Statistic [5]:	0.502181	Prob(>chi-squared), (2) degrees of freedom:	0.777952
Jarque-Bera Statistic [6]:	2.128842	Prob(>chi-squared), (2) degrees of freedom:	0.344928

Notes on Interpretation

- * Statistically significant at the 0.05 level.
- [1] Large VIF (> 7.5, for example) indicates explanatory variable redundancy.
- [2] Measure of model fit/performance.
- [3] Significant p-value indicates overall model significance.
- [4] Significant p-value indicates robust overall model significance.
- [5] Significant p-value indicates biased standard errors; use robust estimates.
- [6] Significant p-value indicates residuals deviate from a normal distribution.

WARNING 000851: Use the Spatial Autocorrelation (Moran's I) Tool to ensure residuals are not spatially autocorrelated.
 Writing Coefficient Output Table...
 F:\1_GIS_Regression\ols1\co1_ols_poverty.dbf
 Writing Diagnostic Output Table...
 F:\1_GIS_Regression\ols1\Diag1_ols_poverty.dbf
 Completed script OrdinaryLeastSquares...

Figure 6. 12: Main results from OLS tool on Model 2

Variable	Coefficient	StdError	t-Statistic	Probability	Robust_SE	Robust_t	Robust_Pr	VIF [1]
Intercept	-0.046412	0.006696	-6.931681	0.000000*	0.005354	-8.668857	0.000000*	-----
INVESTMENTS	-0.000073	0.000281	-0.260418	0.794936	0.000351	-0.208460	0.835179	1.044228
POVERTYRATE	0.069349	0.014925	4.646480	0.000009*	0.011262	6.157838	0.000000*	1.044228

OLS Diagnostics			
Number of Observations:	140	Number of Variables:	3
Degrees of Freedom:	137	Akaike's Information Criterion (AIC) [2]:	-628.730708
Multiple R-Squared [2]:	0.144475	Adjusted R-Squared [2]:	0.131985
Joint F-Statistic [3]:	11.567769	Prob(>F), (2,137) degrees of freedom:	0.000023*
Joint Wald Statistic [4]:	37.926140	Prob(>chi-squared), (2) degrees of freedom:	0.000000*
Koenker (BP) Statistic [5]:	9.027426	Prob(>chi-squared), (2) degrees of freedom:	0.010958*
Jarque-Bera Statistic [6]:	2.835988	Prob(>chi-squared), (2) degrees of freedom:	0.242199

Notes on Interpretation

- * Statistically significant at the 0.05 level.
- [1] Large VIF (> 7.5, for example) indicates explanatory variable redundancy.
- [2] Measure of model fit/performance.
- [3] Significant p-value indicates overall model significance.
- [4] Significant p-value indicates robust overall model significance.
- [5] Significant p-value indicates biased standard errors; use robust estimates.
- [6] Significant p-value indicates residuals deviate from a normal distribution.

WARNING 000851: Use the Spatial Autocorrelation (Moran's I) Tool to ensure residuals are not spatially autocorrelated.
 Writing Coefficient Output Table...
 F:\1_GIS_Regression\ols1\co1_ols_forestcover.dbf
 Writing Diagnostic Output Table...
 F:\1_GIS_Regression\ols1\Diag1_ols_forestcover.dbf
 Completed script OrdinaryLeastSquares...

Chapter 7: Assessment of investment impact on local livelihoods and resource usage

7.1. Introduction to Chapter 7

This chapter aims to examine the ways in which private investment has changed the local livelihoods and resource usage in Laos and the extent to which investment is related to issues of PEN at investment sites. Here, issues related to PEN are referred to either as virtuous or vicious circles of PEN. Drawing upon the research methods specified in Chapter 4, this chapter seeks to explore patterns of local poverty, livelihoods and resource usage. Then, I compare them in two periods before and after the investment. Later, I investigate whether and to what extent private investment has impacted on local poverty, resource usage and issues of PEN at both village and household levels. The findings from this chapter aim to answer the second research question: how does private investment change local livelihoods and resources? And, has private investment stimulated PEN in one direction or another at the household level?

This chapter is built upon the premise that private investment can both benefit and negatively impact on local livelihoods and resources (UNDP & UNEP, 2011; World Bank, 2010). As stated in Chapter 2, private investment may support local livelihoods in terms of enhancing employment opportunities, income generation and local economic stimulation. But, at the same time, investment may negatively affect the environment, create social problems and distort local livelihoods. In Chapter 3, initial assessments of private investment at the local level in rural Laos revealed ambiguous results, suggesting the need for additional studies. In addition, Chapter 6 of this thesis has investigated spatial relationships of private investment (PI) vis-à-vis issues related to poverty-environment nexus (PEN) using aggregated data. However, the analytical results proved useful only for identifying broad patterns from the national to district levels rather than at the village and household levels. In other words, they showed only associations, not causality. To understand causality requires a study of processes, which in turn necessitates a detailed study of private investment. Therefore, I consider it important to study private investment based upon disaggregated data at the village and household levels. This may also reveal the experiential dimension of PEN; that is, how local people at the village level experience the interaction between poverty and environmental change which results from private investment.

This chapter consists of five sections including this introductory section. Section 7.2 provides the site selection results and details local data collection and analysis. Sections 7.3 and 7.4 examine two site studies, namely Phu He gold mining and Nam Kho sand mining. Their structures are the same: there are nine subsections in each. I start by providing the backgrounds of the sites, the investment, and the village profiles and poverty patterns. Then, patterns of livelihood assets and pentagons are examined. Next, I describe natural resources usage and the impact of investment on local livelihoods and resources. Then, issues of PEN are investigated and narratives of household experience are analysed. Each site is summarised in subsection 9. Section 7.5 concludes with the key messages from this Chapter.

7.2. Review of research methods applied in this chapter

7.2.1 Site, village and household selections

According to the site, village and household selection criteria in Section 4.5, Chapter 4, two investment sites, Phu He gold mining exploration and Nam Kho sand mining, as shown in Figure 7.1 located in Pek district, Xieng Khoung province, were selected after preliminary field visits. Phu He mining site (Phu He, hereafter) was selected because Phu Bia Ming (PBM) Company, an Australian investment, has operated mining exploration in Phu He since 2005. The PBM obtained a large land concession from the GoL irrespective of the fact that local people have used this forest land for their livelihoods. After starting its activities at Phu He, many issues involving investment companies, local livelihoods and resource uses have arisen. The other site, the Nam Kho or Kho River sand mining site (Nam Kho, hereafter), has experienced both legal and illegal sand mining and service activities by local or domestic businessmen since the 1990s. Sand mining businesses have not only exploited Nam Kho in an unsustainable manner, but have also threatened local resources and livelihoods along and downstream of Nam Kho.

After consultation with the Pek district authorities, three villages at each site were selected as shown in Figure 7.1: Ban Khou, Ban Nonghen and Ban Hoa in Phu He, and Ban Nadi, Ban Latngon and Ban Houaysang in Nam Kho. After selecting these villages, each village chief was approached for interviews regarding village profiles; then, 20 households in each of these villages were contacted for in-depth interviews. In addition, I also applied informal observation methods, such as transect walks and rapid rural assessment, to obtain additional information about each village during my village surveys. In short, information for local analysis was based on two investment sites (including six villages and 120 households), and

sought through formal interviews with village chiefs, household questionnaires and informal observation techniques.

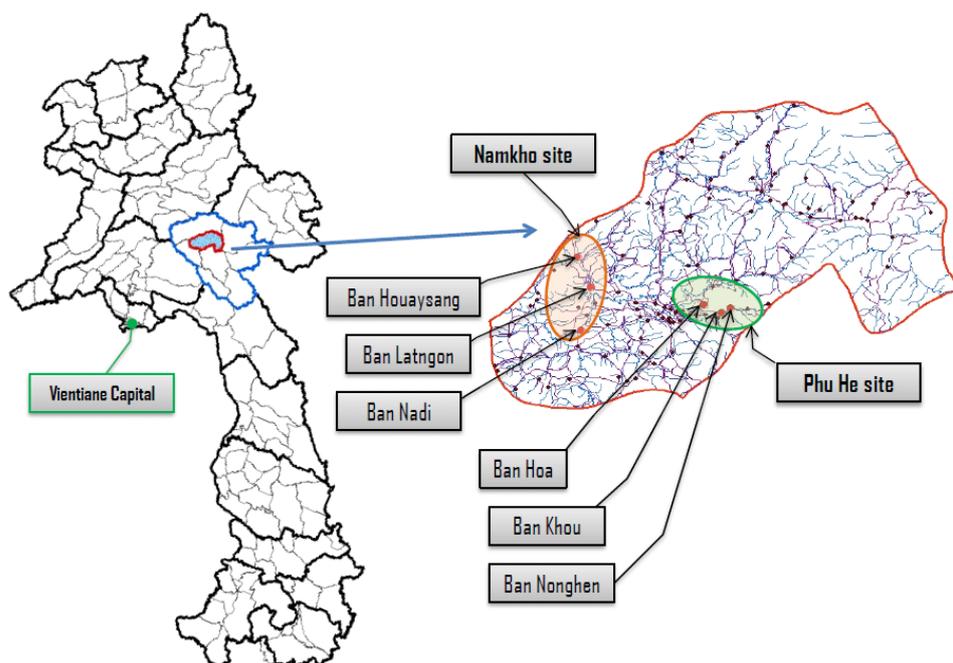


Figure 7. 1: Two sites studied and six villages in Pek district, Xieng Khuang
Source: Lao National Geography Department, PMO, and Author

7.2.2 Local data collection and analysis

In order to obtain data on local livelihoods and village resource usage, I conducted my local fieldwork from December 2010 to March 2011 at two sites. During the fieldwork, I learned that PBM commenced its mining activities at Phu He in early 2005. The local people of Nam Kho started their sand mining activities using simple tools in the late 1990s, graduating to machinery, water pumps and excavators between 2004 and 2006. In light of this information, I considered the year “2005” as a significant line cutting the two periods before and after investment in both sites. During the household interviews, I referred to the “first period” or “before 2005” as the time between January 2000 and December 2004. Similarly, the “second period” or “after 2005” extended from January 2005 to December 2010.

I focused on obtaining village profiles (see Chapter 4) in the belief that local people would have better knowledge of their poverty than others. I aimed to determine the poverty patterns in each village based on their local perceptions. This was achieved in three simple steps: first, each village chief provided a list of targeted households for in-depth interviews; second, five ranks to determine poverty, namely very poor, poor, non poor, low rich and rich, were set up; third, village chiefs (VC), the researcher (RS) and members of each household (HH) were

requested to allocate each of the listed households into one of five poverty ranks in two periods of time, before and after 2005, and to provide reasons for their allocations. For the purpose of this allocation, I, as the researcher, followed the government definition of 'poor household'. It was expected that the VC and the HH might determine differently as their determinations were locally and subjectively-based. For their part, the poverty pattern would be based upon local perceptions.

After obtaining village profiles and poverty patterns, information from each village site was analysed in three stages. First, patterns of livelihoods and asset pentagons before and after 2005 were constructed for each village and then compiled for each site. Importantly, these pentagons were used to identify any changes in access to the five resource capitals of local livelihoods at the village and site levels, respectively. To achieve this, resource accessing indicators were set by modifying the definitions of five asset capitals in SLA of DIFD (1999b) as indicated below:

- Human capital indicators: whether any members of each household attended primary school (Grade 1-5); vocational school after high school; accessed a hospital when ill; received any training from professionals; had permanent jobs; and/or had any knowledge of recent government investment policies.
- Financial capital indicators: whether each household gained income from selling agricultural products; received additional income from off-farm activities; any regular income from other sources; implicit expenditure other than consumption; and, any regular savings.
- Physical capital indicators: whether each household owned their permanent houses; vehicle, motorbike, truck or car (other than a bicycle); any agricultural tools; accessed the market; or, had their own agricultural land.
- Social capital indicators: whether any members of each household were regularly invited to participate in village meetings; became or used to be a member of the village development committee (VDC); regularly offered ideas pertinent to their village development plan; regularly participated in any meetings regarding investment; and, ever participated in investment surveys and/or activities.
- Natural capital indicators: whether the household could maintain productivity of their paddy land; of their vegetable garden land as their main income source; sufficient

water for cultivation; firewood and NTFPs collection. Natural capital was important to local livelihoods mainly in terms of food, income and medicines.

Second, by drawing from pentagons, sufficient and constrained access to resource usage in two periods in each site were created; then, these patterns were compared to determine any changes in access to resources. Thus, both positive and negative impacts of investment activities on local livelihoods and resources were investigated. In the next step, the information gathered from household interviews was used to analyse the linkages of investment to issues of poverty-environment nexus (PEN). At this stage, each household was requested to rank a five point scale on ten environmental indicators regarding degradation and to identify the first and second local actors responsible for said degradations, particularly deforestation, land degradation and water decline/pollution. The term 'local actor' refers to companies or businesses, local people, local government, and natural disasters. In addition, each household was requested to evaluate the impact of investment on issues related to PEN at the two sites by posing two questions: (1) whether and to what extent investment has encouraged them to degrade environmental resources; and, (2) whether and to what extent the degradation of these resources has rendered them poorer.

Finally, in order to understand the ways in which investment has changed local livelihoods and resources at the household level and how members have experienced such change, ten households in one village from each site were selected for in-depth interviews, the transcripts of which were interpreted through narrative analysis. This was undertaken to determine how different groups of households experienced investment impact and resource degradation pertinent to PEN. As regards the various definitions of narratives as "accounts of personal experiences or the experiences of others, to fictional accounts, such as stories, myths, folktales and fairy tales", Smith (2000, pp. 327-328) suggests that there is no agreement on narrative analysis. Accordingly, for the purposes of this thesis, simple thematic narrative analysis was employed, a method that emphasises the content of a text, for example of "what" rather than "how", it is said or told by the households. Then, interview texts were analysed and interpreted by themes (Riessman, 2008, pp. 53-54) in an attempt to ascertain how investment changed local livelihoods and resource usage and to what extent investment has been locally linked to issues of PEN at the household level.

7.3. Phu He mining site

7.3.1. Phu He background and the Phu Bia Mining Company

Phu He (meaning ‘mineral mountain’ in the Lao language), which is located approximately 5–7 km east of Phonsavan town in Xieng Khouang province, is marked by a number of villages on its foothills. Viewing from the town, Phu He shows a beautiful landscape with dense green forest cover. Not only it is a main source of water supply to most of the residents of Phonsavan town, but it is also home to much natural biodiversity, wildlife and non-timber forest products (NTFPs). Over time, most of the local people have accessed these resources to maintain their livelihoods. A recent report compiled by PanAust (2005) suggests that the ground beneath Phu He contains several types of mineral deposits, such as gold, silver and copper, minerals great in both quantity and quality. However, the real value of this site is as yet unknown.

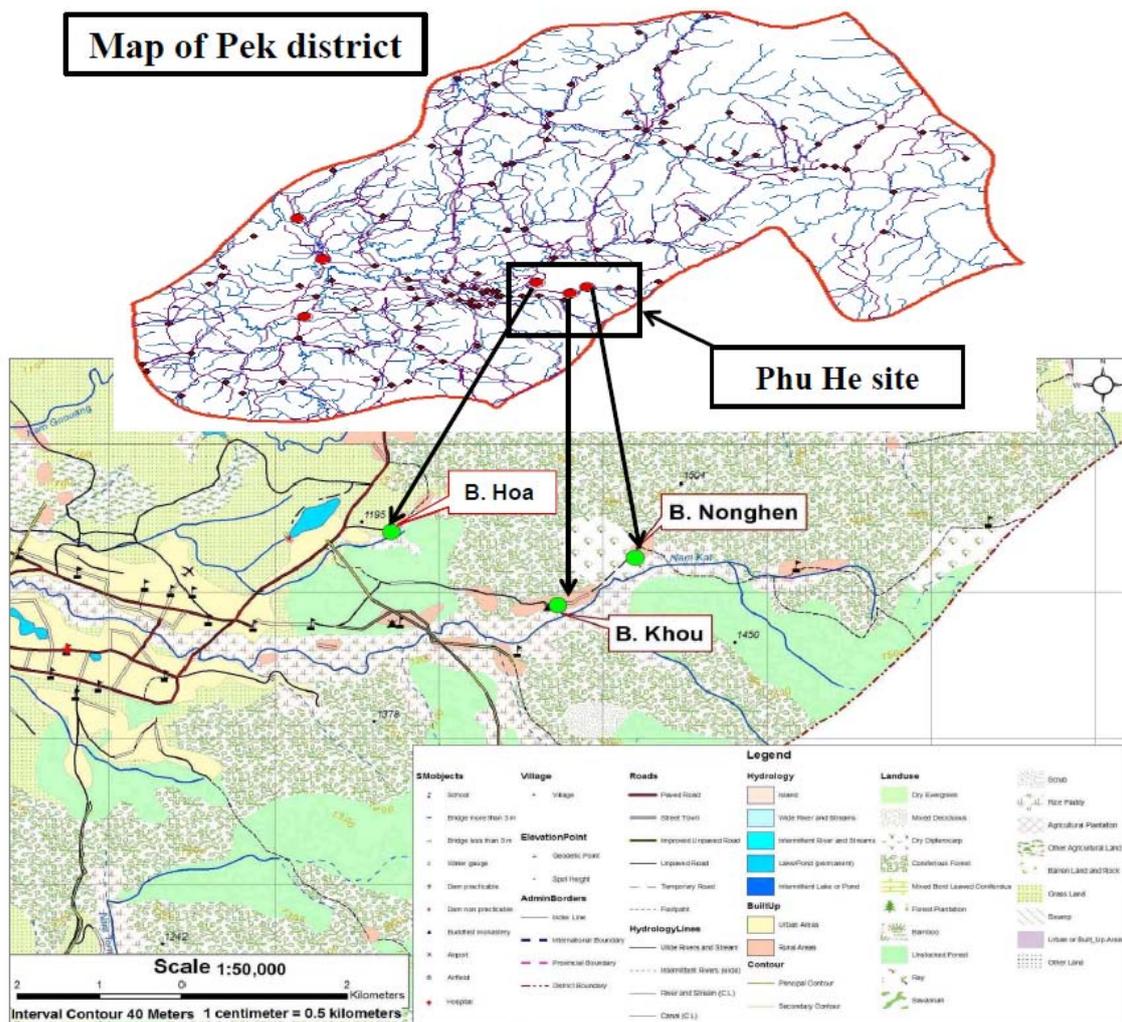


Figure 7. 2: Map of Phu He site, Pek district
Source: Lao National Geography Department, PMO, and Author

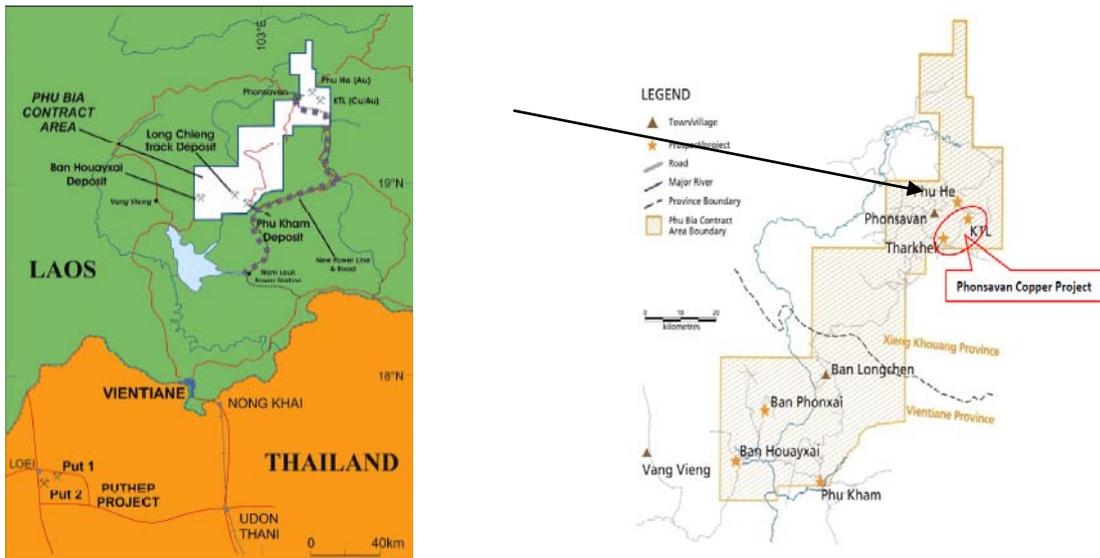


Figure 7. 3: Maps of Phu Bia exploration licence and Phonsavan copper project
 Source: Extracted from PanAust (2005, 2010)

Phu Bia Mining (PBM), a registered mining company in Laos jointly owned by Australian PanAust Resource Limited (90%) and the GoL (10%), has an exploration license over an area of 2,636 Km² in Vientiane and Xieng Khouang Provinces (see Figure 7.3). Its main activities are copper and gold prospecting and exploration. After implementing its copper and gold operation at Phu Kham, PBM expanded its investment to many sites, one of which is Phonsavan Copper-Gold Project in Xieng Khouang. Many sites have been included in the Phonsavan project; one of them, Phu He Gold Prospect, is located approximately 6 km from Phonsavan town (PanAust, 2010). Since early 2005, many holes have been drilled in Phu He ground to excavate gold ore samples. In December 2005, after drilling two holes, PanAust (2005) declared Phu He a potential resource of high-grade gold and silver.

Over the years, most of the villagers residing in the foothills went to the forests in Phu He in search of food and NTFPs, for example bamboo shoots, vegetables, wildlife, mushrooms and firewood; but, they were not aware of the gold deposits under Phu He ground. In early 2005, PBM started drilling Phu He ground for ore samples: the company hired some local villagers as labourers. Later, curious about the drilling activities, some villagers panned the soil near the drilling holes and found small pieces of gold, which they traded for money. Soon after, news vis-à-vis the finding of gold in Phu He spread from nearby villages to other villages, to other districts and to other provinces. As a result, many local people and people from elsewhere came to Phu He in search of gold, using simple and basic tools to dig holes without obtaining official permission and lacking proper techniques. Since mid 2008, because many holes were dug using incorrect techniques, the mountain slopes and some parts of Phu He

collapsed during digging, killing in excess of 20 people³³ in a series of accidents between 2008 and 2010. After these deaths, the Xieng Khouang provincial government banned the prospecting for gold at Phu He; as well, it assigned soldiers into many spots to prevent people from digging for gold.

Since 2005, due to PBM's survey activities and the many holes dug by people in Phu He, the local people have found their resources and livelihoods increasingly threatened, particularly by deforestation, water decline and pollution, and land degradation. They claimed that because big and small trees were cut down in large areas to open up the surface for PBM activities and gold panning/prospecting deforestation has occurred. In addition, the usage and disposal of toxic chemicals, for example, the cyanide and mercury that the villagers use to separate the gold from the stones and the hydraulic oil used by the PBM for drilling, have resulted in water pollution, and disease and death among livestock. In the wet season, the soil becomes eroded, and, the muddy water contaminated by toxic chemicals flows into the streams and rice fields. Consequently, the villagers have had to use unsafe water. Many of the farmers living in the foothills have lost their rice and other crops due to their fields being full of mud and dirty water. In the dry season, the mud in their fields becomes degraded causing water shortages. Since a large area of Phu He has been privatised to PBM, information about local livelihoods and resource usage appears somewhat controversial. These factors make Phu He an interesting case to investigate regarding the real impact of PBM.

7.3.2. Village profiles and poverty in Phu He

The term 'Ban' in Lao language means 'village'. As shown in Figure 7.2, Ban Khou, Ban Nonghen and Ban Hoa at the Phu He site were selected as case studies. This subsection provides the backgrounds of each village, based on interviews undertaken with their village development committee (VDC) member and an informal village survey undertaken by the researcher (RS). Then, it explores the poverty patterns of these villages, based upon the local knowledge of the village chief (VC) and selected households (HH) and the RS's personal observations (see Chapter 4).

Ban Khou profile and poverty

Ban Khou is located approximately 5 km from Phonsavan town. Based on the official poverty definition of poor households and poor villages stated in Chapter 3, Ban Khou, prior to 2010,

³³ The numbers of deaths reported by interviewees were inconsistent, from 8 to 28 people. There were no official records: "about 20 people died" was the number generally mentioned during the interviews.

was classified as a poor village. Most of its households were poor. After 2010, it became to some extent a non-poor village; the number of poor households decreased when villagers gained access to village roads, hospitals and schools, and had rice sufficiency for a whole year. In 2010, only 5 out of 78 households remained poor, experiencing rice shortages for 3–4 months per year. Among its total population of 464 with 243 females in 2010, there were 45 Lao Loum³⁴ and 33 Hmong households. While many Hmong households have lived there for some time, others have recently resettled for different reasons; for example, to avoid the fighting between the ethnic minorities and the Lao army in Xaisomboun district. Others have come from Huaphanh and other provinces in search of cultivatable land. In earlier times, lowland agriculture was the main farming activity in this village; some Hmong families still practice shifting cultivation, albeit in the territory of other villages. Before 2000, diarrhoea and malaria were major health problems attributable to lack of hygiene, clean drinking water and mosquito nets. Today, these health problems have been reduced because many villagers use clean water from wells and gravity fed-water systems. As well, most can access the hospital in Phonsavan town. Since 1999, Ban Khou has had one primary school (Grade 1 to 5) funded by PBM³⁵ (80%) and local villagers (20%). Since 2007, the village road has been improved. This has helped the villagers to access the main road, the hospital and markets in provincial towns as well as electricity. In earlier times, the village economy was mainly based upon local resources and agricultural products such as paddy rice, vegetables and livestock. Fisheries and NTFPs were subordinate. Nowadays, many households can afford to buy furniture, tools, rice mills, hand-tractors, televisions (TVs) with satellite disks, pick-up trucks and motorbikes. Ban Khou villagers support the notion that the increase in these assets indicates poverty reduction and livelihood improvement. However, despite these improvements, they claim their livelihoods and resources have been threatened since PBM started its activities. For this reason, many aspects of the local livelihoods and resources in Ban Khou need further examination.

As stated in Chapter 4, the poverty patterns of each village were informed by three observers: the VC, the HH and the RS. As the researcher, I followed the official definition of poor household and village. During my data collection in Ban Khou, the VC saw poverty in terms of income earning, arable land, agricultural products and family heritage/ownership, whereas

³⁴ Most of the Lao Loum people in Xieng Khuang province are said to associate with the Thai Phuan, who migrated to Laos from southern China in the 13th century.

³⁵ Ban Khou's Village Chief explained that the PBM team undertook an informal survey of Phu He site in early 1999, and contributed this primary school building to establish a good reputation.

most of the HH understood it as insecure jobs, low rice products and vulnerability to disease and natural disasters.

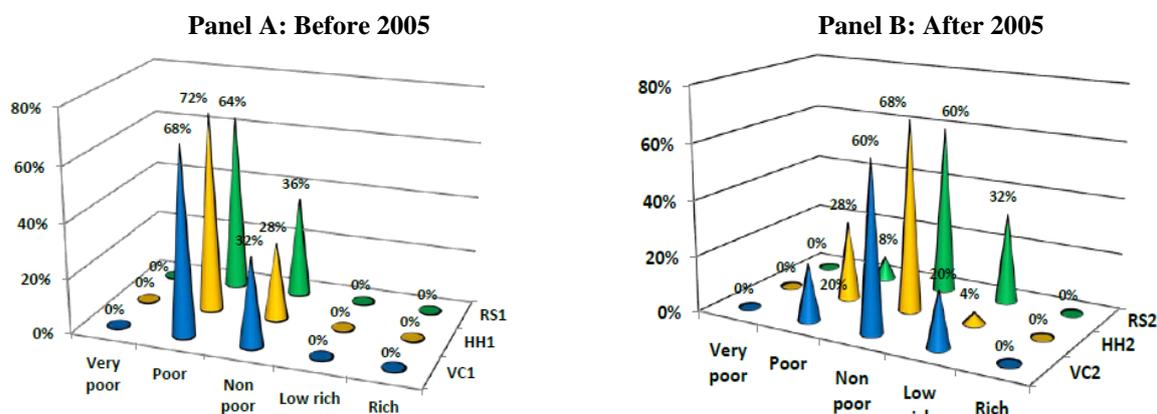


Figure 7. 4: Household poverty patterns before and after investment in Ban Khou

After data collection, two poverty patterns - before and after 2005 - of Ban Khou appear in Figure 7.4. In panel A of this Figure, at least 64% of households were identified as poor and approximately 30% as non poor. The very poor, low rich and rich groups were not identified by the three observers. The main reasons for their poverty before 2005 were insufficient water for agricultural cultivation, a decline in rice and vegetable yields, low prices and low demands for their agricultural products, difficulty accessing district services in town, and poor road conditions. During this time, the Ban Khou villagers were heavily reliant upon local resources for their survival and income earning, particularly on agricultural activities with unstable yields and insecure prices. Panel B of Figure 7.4 shows different patterns from those in Panel A, particularly low percentages of poor, high of non-poor, and the emergence of a low-rich group. After 2005, the ratio of the poor out of total households was estimated at approximately 20% by the VC, 28% by the HH and 8% by the RS, with above 60% of non poor households. Low rich households were estimated as follows: 20% by the VC, 4% by the HH and 32% by the RS. No rich group households were recognised. As mentioned above, the key factors leading to these interesting differences between the VC's, the HH's and the RS's estimations of the poverty status of households were the different understandings and perceptions based on local knowledge. In particular, the HH's percentages of poverty were often higher than those of the VC and the RS because the HH may expect to receive both internal and external assistance to improve their livelihoods.

When comparing these two periods, poverty in Ban Khou can be seen to have been reduced. This reduction may be attributable to many factors such as convenient access to markets and services in the town, increased demand for their agricultural products with reasonable prices,

and the availability of electricity. In addition, many households can now afford to buy modern tools and machinery, including hand tractors, rice mills, pick-up trucks and motorbikes, which save their time and labour on farming activities. Some can now spend more time on non-farming activities earning additional income, such as running small business in the town market, working as construction workers, and raising livestock and poultry. Some households mentioned positive contributions from PBM as part of their poverty reduction. However, many criticised the company's mining activities, seeing them as negatively impacting on their livelihoods and local resources, particularly on water, the forests, and land critical for their agriculture. These issues are explored in the following sections.

Ban Nonghen profile and poverty

Ban Nonghen, which is located approximately 7 km from Phosavan town, between Ban Khou and the Phu He foothills (see Figure 7.2), was established in 1978 separate from Ban Khou. In 2010, Ban Nonghen had only 48 Hmong households with 297 people and 138 females. According to official definition prior to 2010, the Pek district authorities classified this Hmong village as poor; but, subsequently many households met the non-poor criteria. Only 8 households in the village were considered poor. They faced rice shortages for approximately 4 months per year due to owning small pieces of agricultural land only and cultivating upland rice in other villages. The village economy was reliant on low land agriculture such as paddy rice, vegetables and raising cattle. The village development committee claimed that they rarely experienced major health problems since they all drank boiled water and used mosquito nets. Since 2005, they have accessed the hospital in the town and no mothers have died during childbirth. Ban Nonghen has a gravity-fed water system as its main water supply: its water source is located approximately 200 meters above the village on the slopes of Phu He, and supported by a German non-government organisation. But, water shortages occur for 3 months during the dry season. Most of the village children can attend primary school at Ban Khou. All of the households can access the main road, the hospital and market in the provincial town, bank credit and electricity, and most have TVs and motorbikes. Some even have trucks or vans. Rice, vegetables, maize, cassava and bananas constitute the main agricultural products sold for their incomes: cattle support their incomes and savings. Like Ban Khou, the villagers in Ban Nonghen have been largely dependent upon local natural resources and practiced agricultural activities for their livelihoods.

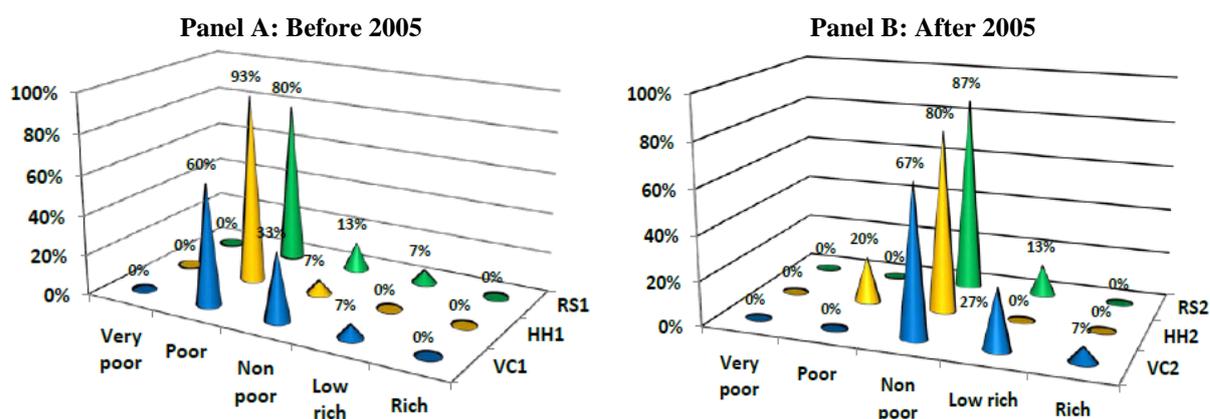


Figure 7. 5: Household poverty patterns before and after 2005 in Ban Nonghen

Poverty patterns before and after 2005 in Ban Nonghen, as observed by the VC and RS, were quite similar; but, they were different from those observed by the HH (see Figure 7.5). In Panel A of this Figure, many people in Ban Nonghen before 2005 were considered poor, an estimated 60% by the VC, 93% by the HH, and 80% by the RS. The main reasons for their poverty were lack of agricultural land and tools, technical skills, vehicles, and jobs. Some had to rent lands in other villages to cultivate their rice fields. During this period, the VC and RS saw 7% of households as the low-rich group, as elite households in the village. They owned large areas of rice fields, a number of cattle, visited the USA, and received remittances from overseas. There were no households in the rich group. These patterns tend to suggest uneven wealth distribution in Ban Nonghen prior to 2005.

Panel B of Figure 7.5 presents different observations by the three observers. Post 2005, according to the VC, 67% of households had fallen into the non poor group, 80% by the HH and 87% by the RS. Similar to above, the low-rich group was viewed 27% by the VC and 13% by the RS. In this Figure, only the VC regarded as 7% as rich, and only the HH considered 20% of the households as poor. When compared with the poverty patterns in Figure 7.5, poverty in Ban Nonghen appeared significantly reduced. Many factors were seen as having contributed to their poverty reduction. For example, some households raised cattle for income, some expanded their agricultural lands to increase their products, and some received remittances from abroad. Many referred to village infrastructure improvements, such as road, water and electricity. Many were changing their occupations from farming to business trading. When asked about gold prospecting in Phu He, many admitted that this was a major force vis-à-vis the improvement in their livelihoods. This issue will be revisited in the following section.

Ban Hoa profile and poverty

Ban Hoa, which is located near the Phu He foothills (opposite Ban Nonghen, see Figure 7.2) was officially established in 1996 after it split from Phonsavan town. According to the official definition of a poor village, Ban Hoa was considered poor before 2003 but as non-poor after 2005. In 2010, Ban Hoa had 63 households including 55 Lao Loum and 8 Hmong. Lowland agriculture was the main farming system of the village. Paddy rice, which relies on rain-fed water, was cultivated only once a year. After rice harvesting, vegetables were planted using water flowing from Phu He. Cattle were raised in these paddy fields. The villagers' agricultural products were sold at the market to earn cash income. Few major health problems were reported as most households boiled the water from their wells, used mosquito nets, and accessed the hospital in the town. No mothers or infants had died during childbirth in the past 4 years. However, the village often faces water shortages in April and May each year. Ban Hoa has no school; so, most of the children attend schools in Phonsavan town, which is located some 5–6 km from the village. Currently, all Ban Hoa villagers can access the main road, the market, credit, district services and electricity. Many possess TVs, motorbikes, pick-up trucks, rice mills and hand-tractors. Agricultural products and raising cattle constitute their main economic activities. Fisheries and collecting NTFPs were seen as alternatives to sustaining their livelihoods. This means that village livelihoods in Ban Hoa are dependent upon their local resources.

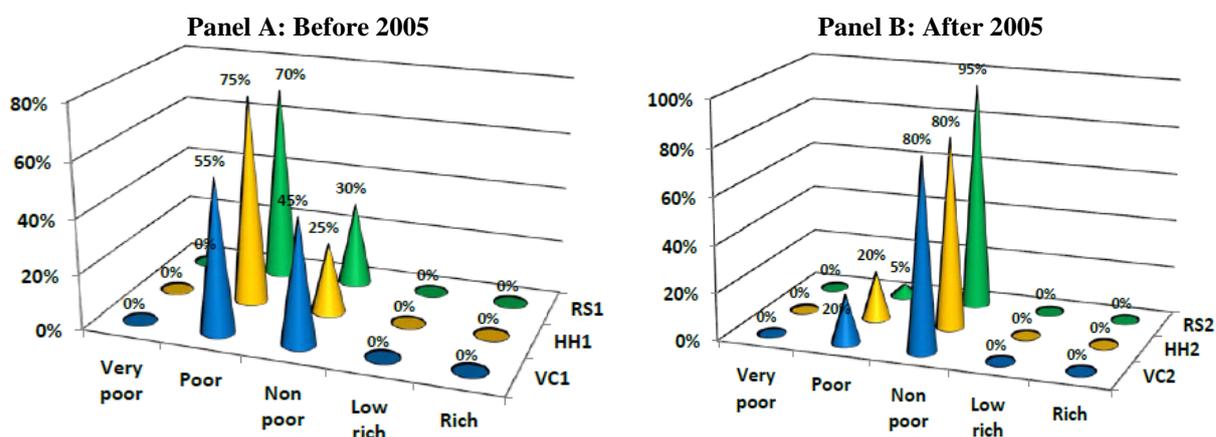


Figure 7.6: Household poverty patterns before and after 2005 in Ban Hoa

Based on the three observers, Figure 7.6 shows the different poverty patterns in before and after 2005 in Ban Hoa. As shown in Panel A of this Figure, more than half of the households before 2005 were viewed as poor. For example, 55% of the households were considered poor by the VC, 75% by the HH and 70% by the RS. The primary reasons underpinning their poverty prior to 2005 were lack of family labour, agricultural equipment and vehicles, and

lack of agricultural and technical skills, tools, and instruction and lessons on how to increase their production. Some relatively poor households explained the reasons for their poverty as lack of secure occupations, enough agricultural lands and other alternatives for income earning.

However, Panel B in Figure 7.6 presents poverty patterns opposite to those in Panel A, with a sharp fall in the poverty rate. After 2005, the VC and the HH estimated the poor in Ban Hoa at about 20%. The RS estimated 5%. The percentage of the non-poor group had significantly increased (80% by the VC and the HH, and 95% by the RS). Many factors were attributable to poverty reduction at this time. For example, some households had more labour as their children had grown up: many now owned agricultural tools and vehicles; some had either changed or added to their non-farming occupations, such as small trading and businesses or selling vegetables in the town. Improved roads and electricity supplies helped them to access the market and other district services. Learning from others, many households increased their agricultural production and raised more cattle to sell. In Ban Nonghen and Ban Khou, no households claimed any benefits from PBM activities until asked some specific questions.

Examination of the village poverty patterns observed by the VC, the HH and RS showed similar changes. The percentages of the poor were reduced and those of the non poor had increased. In addition, there were similarities in the ways in which they practiced sustaining their daily lives inasmuch as their local resources of food, income and wealth accumulation came mainly from agricultural activities. When comparing before and after 2005, the key factors vital to the reduction of their poverty were driven not only by traditional agricultural practices, but also by non-farming activities such as trading, family businesses, and adding or changing occupations for additional income. These factors were observable in the Phu He area; but, contribution by the Phu He mining activities appeared negligible. In fact, as mentioned above, while the Phu He mining activities appeared to change their livelihoods in many ways, the villagers preferred not to talk about them. This gave rise to interesting questions about the livelihoods and resources patterns at Phu He. These patterns will be revealed through the device of livelihood asset pentagons in order to better understand the impact of Phu He mining on the local livelihoods and resources usage. I address these questions in the following section.

7.3.3. *Livelihood assets in Phu He*

After comparing the above poverty patterns of two investment periods, poverty reduction and livelihood improvement at Phu He were seen to have been achieved. To understand this achievement, it is important to assess five capitals as the main elements of local livelihoods via asset pentagons, based on in-depth household interviews undertaken at Phu He. As suggested above, most questions in this interview were drawn from and related to access to the five capitals described in Chapter 4.

Human capital

Assessment of the five human resource indicators stated above revealed that access to human capital at Phu He had improved when compared with access availability before and after the investment period. The percentages of households' ability to support their children in primary schools and adults in vocational schools had increased in all villages. It may be argued that the percentage of vocational attendance can increase human capital; but, the small ratios of vocational school accessibility in Table 7.1 can generate uncertainty vis-à-vis human capital accumulation. In addition, Table 7.1 shows a high percentage of primary school attendance with low skills obtained. While recognising this fact, these two indicators were simply used to quantify the village's access to human capital. Next, the health indicator is not shown in the Table because all of the households had full access to the town hospital in both periods. And, while access to hospitals was not an issue, some households had to sell their cattle, rice, or borrow money from their relatives to pay for hospital expenditure. So, clearly they needed a regular income to cover their medicines and hospital service costs.

Table 7. 1: Percentages of households accessing sources of human capital in Phu He

Human resource indicators	Khou		Nonghen		Hoa	
	Before	After	Before	After	Before	After
Primary school	44%	52%	60%	73%	65%	75%
Vocational school	16%	36%	13%	27%	5%	45%
Training	56%	52%	53%	60%	20%	75%
Permanent jobs	24%	20%	13%	27%	30%	35%
Investment policies	20%	76%	7%	60%	25%	40%

The percentages of households that received training increased after the 2005 period, except in Ban Khou. The training they received was in the main facilitated by district officers and INGOs: the topics included cropping practices and animal husbandry. Many households were trained in bush and weed clearance (as casual workers) by PBM. This work involved survey trails, UXO clearance and safety issues, and working techniques. Some households found

these skills useful in their daily lives; in particular, they prevented injury from UXOs in the forests and in their rice fields. UXOs posed dangerous problems in Phu He, as Xieng Khuang was particularly heavily bombed during the “secret war” in Laos parallel to the conflict in neighbouring Vietnam.

The percentages of having at least one member gaining a permanent job beyond his/her own farming activities were low (less than 30%) before and after 2005. This implied limited skills as most of the villagers worked mainly on their farms. When asked about jobs provided by PBM, many households reported that jobs offered by PBM were temporary and offered low wages, approximately 35,000 kip/day (or USD 4) for an entire day’s work. Many had to rise before 5:00 a.m. to assemble at a village central point; then, a truck picked them up at 6:00 a.m. and dropped them off at the PBM office in Phosavan. After donning security suits, they were transported to the work site where they worked from 8:00 a.m. to 4:00 p.m.

The last human indicator is related to knowledge and understanding of current central government investment policies, particularly the granting of land concessions to foreign investors by each household. This was important to them in the sense that if they were cognisant of these policies, they had to prepare new or different livelihood strategies given that PBM controlled their local resources in Phu He. The survey found that the percentage of households who understood investment promotion policies was low before 2005 but high post 2005 in the three villages. Before 2005, many householders admitted to paying little attention to government policy because they trusted the latter and concentrated on improving their livelihoods. Post 2005, they realised that PBM mining activities were impacting on their agricultural land, water and forests. Thus, they paid more attention to government and investor policies relevant to them, for example compensation schemes, mitigation of local area impacts, and local livelihood improvement at investment sites.

Financial capital

The financial resource indicators shown in Table 7.2 suggest that most of the households in Phu He could access financial capital and that access significantly increased in both periods. On average, approximately 90% of households had a regular income during both periods: the percentages slightly declined in Ban Hoa but increased in Ban Khou and Ban Nonghen. The villagers’ income sources mainly derived from selling agricultural products such as rice, vegetables, cassava and maize, from off-farm activities including family trading businesses, the sale of NTFP collection, construction work and truck driving services, and from

remittances from overseas. In Phu He, agricultural products have been the main source of the households' regular incomes in the three villages and in both periods, while off-farm income activities were considered subordinate and undertaken only when the households had free time or urgently needed money.

Table 7. 2: Percentages of households accessing financial capital in Phu He

Financial resource indicators	Khou		Nonghen		Hoa	
	Before	After	Before	After	Before	After
Regular income	88%	92%	93%	100%	100%	95%
Agricultural sale	92%	84%	100%	100%	95%	95%
Off-farm income	64%	88%	47%	80%	60%	85%
Expenditure	52%	56%	73%	87%	75%	85%
Regular saving	88%	76%	53%	80%	80%	85%

Apropos of income, the households spent more on goods and services than on consumption and clothing, for example on education fees, entertainment equipment, agricultural tools, machines and vehicles. Table 7.2 shows that more than half of the households met these expenditures and that their percentages increased in all of the Phu He villages. For example, the percentages of expenditure increased in both periods from 52% to 56% in Ban Khou, from 73% to 87% in Ban Nonghen, and from 75% to 85% in Ban Hoa. The last indicator was the percentage of households that could regularly save income after meeting all expenditure. The figures showing the number of households practicing regular saving in Table 7.2 were different for the three villages; for example, they showed a decline from 88% to 76% in Ban Khou, an increase from 53% to 80% in Ban Nonghen, and from 80% to 85% in Ban Hoa in both periods. According to the interviews, the main reasons for their saving were to meet their household health issues, their children's educational costs, the building of new houses, and to buy agricultural tools, machines and vehicles. Overall, these high percentages indicated strong access to financial capital leading to livelihood improvement and wealth accumulation in Phu He.

Physical capital

The physical indicators in Table 7.3 suggest that the percentages of households gaining access to physical resources in Phu He increased during the two periods. The percentages of households having permanent houses³⁶ increased from 48% to 84% in Ban Khou, 27% to 93% in Ban Nonghen and 75% to 95% in Ban Hoa. The percentages of households owning at

³⁶ A 'permanent house' refers to either a wooden house with a zinc roof, or to a durable house built from bricks, concrete and tiles, and with a metal roof.

least one vehicle (other than a bicycle) also increased in all three villages. As more access to financial resources became available, some households bought modern agricultural tools to support their farming activities, for example hand tractors, rice mills and pick-up trucks. A comparison of percentages before and after 2005 showed that households owning at least one agricultural tool sharply increased from 10% to 72% in Ban Khou, from 7% to 60% in Ban Nonghen and 15% to 45% in Ban Hoa.

Table 7. 3: Percentages of households accessing physical capital in Phu He

Physical resource indicators	Khou		Nonghen		Hoa	
	Before	After	Before	After	Before	After
Permanent houses	48%	84%	27%	93%	75%	95%
Vehicles	28%	96%	27%	93%	25%	90%
Agricultural tools	10%	72%	7%	60%	15%	45%
Access to market	92%	100%	100%	100%	100%	100%
Agricultural land	92%	96%	60%	80%	85%	90%

In addition, most households were able to access the town market in the two periods, either by walking, riding or by owning or hiring vehicles. Many claimed that before 2005, they faced many difficulties accessing the market because they had to walk a long distance. The road conditions were generally very poor, for example too dusty in the dry season and extremely muddy and slippery in the wet reason. Nowadays, they have better access to the market and town because they have their own vehicles and the road conditions have improved. The last indicator in Table 7.3 shows that the number of households who have their tract of agricultural land (regardless of size) slightly increased in the three villages during the two periods. While agricultural land areas showed a small increase, many households can own the land due to increasing in access to financial capital. Agricultural land is important to villagers: it means that they can cultivate paddy rice and vegetable gardens on their own land.

Social capital

The social indicators in Table 7.4 show that the percentages of households accessing social resources had improved at Phu He when comparing the situation before and after 2005. This Table suggests that most of the households in the three villages frequently participated in village meetings (in excess of 95% both before and after 2005). While suggesting that the villagers had high access to social capital in terms of village meetings, some interviewees revealed that prior to 2005 they participated in meetings to avoid being fined for their absence rather than willingly participating in the meetings. Nowadays, they continue to participate in the meetings but pay more attention, especially to issues related to the impact of PBM

activities and government policies on their livelihoods. The next indicator suggests that when a member of a household becomes a member of either the village committee or of a district office, he/she tends to establish more connections and networks. Among the interviewees, approximately 45% used to be a member of a village committee or worked at a district office before 2005. After 2005, this figure rose to 60% in Ban Khou, 73% in Ban Nonghen, and remained the same (45%) in Ban Hoa. However, these households suggested that they rarely exercised these connections and networks as strategies to improve their livelihoods because they did not recognise the value of social capital.

Table 7. 4: Percentages of households accessing social capital in Phu He

Social resource indicators	Khou		Nonghen		Hoa	
	Before	After	Before	After	Before	After
Village meetings	100%	100%	100%	100%	100%	95%
Village members	44%	64%	47%	73%	45%	45%
Development opinions	60%	60%	60%	60%	50%	60%
Investment meetings	40%	84%	40%	73%	60%	80%
Investment participation	24%	40%	33%	47%	50%	60%

Approximately 60% of the households in the three villages claimed that they offered their opinions on village development plans during the meetings they attended in both periods. Moreover, regarding the meetings on PBM investment activities, 40% of the households in Ban Khou and Ban Nonghen and 60% in Ban Hoa participated in these meetings prior to 2005. This suggests that fewer than half of villagers were consulted regarding the mining investment activities. After 2005, the percentages of households attending the meetings addressing PBM investment increased in all three villages: 84% in Ban Khou, 73% in Ban Nonghen and 80% in Ban Hoa. However, the increase in the percentages of villagers attending investment meetings were of little help vis-à-vis negotiations and consultation regarding their local livelihoods and resources, given that notwithstanding, PBM activities started to impact on their villages. The last indicator in Table 7.4 shows a relatively small figure of local villagers' participation in PBM activities in both periods: the numbers only slightly increased. After PBM commenced operation in Phu He, the villagers participated in the company's activities in various ways, for example site surveys, bush and UXO land clearance, drilling, excavating, and working as technical and administrative staff during the two periods. However, those who participated as labourers claimed that their employment was casual and temporary and paid at a low wage rate. Overall, their access to social resources was high in Phu He in terms of figures; but, most of the households could not fully benefit from these resources. Low exercise of their social capital rendered these households not only

vulnerable, but also led them back to poverty, especially in circumstances of resource competition with PBM.

Natural capital

The overall results suggest that household access to natural capital in the three villages in Phu He decreased when compared over the two periods. Table 7.5 shows that the percentages of households able to maintain the productivity of their paddy lands increased slightly from 40% to 60% in Ban Nonghen, 80% to 90% in Ban Hoa, and remained at 96% in Ban Khou. These figures suggest that more agricultural land has become degraded. Ban Nonghen's figures were low due to the difficulties faced by the villagers when maintaining their paddy-fields located in the foothills of Phu He. In addition, because the PBM drilling programme impacted upon their fields, some households had to search for paddy land in other villages. After harvesting their paddy rice, three village households started planting vegetables, some in their paddy land, and some in shared or rented plots with others because they did not have their own land. After accessing a plot of land in which to plant their vegetables, most had to maintain the productivity in their plots. The percentages of households who could maintain their gardens appear in Table 7.5; above 90% in Ban Khou and Ban Hoa, while in Ban Nonghen the percentage increased from 73% to 93% during the two periods. The vegetable plantations were important indicators because they represented one of the villagers' main consumption and income sources.

Table 7. 5: Percentages of households accessing natural capital at Phu He

Natural capital indicators	Khou		Nonghen		Hoa	
	Before	After	Before	After	Before	After
Paddy land	96%	96%	40%	60%	80%	90%
Vegetable gardens	96%	92%	73%	93%	95%	90%
Water sufficiency	92%	28%	60%	47%	80%	20%
Firewood collection	96%	76%	100%	100%	100%	100%
NTFPs collection	70%	24%	60%	47%	50%	25%

In addition, three village households reported a decline in water sufficiency in Phu He. For example, the number of households with sufficient water for their agricultural and general usage dropped sharply from 92% to 28% in Ban Khou and from 80% to 20% in Ban Hoa. The main causes of the water shortages were tree felling by PBM and climate change.

Furthermore, while many households in Ban Nonghen and Ban Hoa were able to access the forests for their firewood during both periods, the percentage declined in Ban Khou due to less wood availability and the deforestation that occurred near their village. The last indicator

suggests that the percentages of households able to collect NTFPs were largely reduced in both periods, for example from 70% to 24% in Ban Khou, and from 50% to 25% in Ban Hoa. PBM survey activities and the illegal logging carried out by local people were considered the main reasons for the decline in the NTFPs and in the numbers of wildlife in their villages. Many households said that nowadays they have to walk longer distances to the forest if they want to collect NTFPs to maintain their livelihoods.

7.3.4. Phu He asset pentagons

Poverty status can be explained through livelihood asset pentagons; that is, the ways in which livelihoods can be improved when poverty is reduced. A pentagon can reveal this relationship; but, first, two steps need to be taken to delineate this relationship. First, as each asset pentagon can illustrate a shape of livelihood pattern, the three villages' asset pentagons will be created for the periods before and after 2005. Then, these pentagons will be combined for the aggregated Phu He pentagon. Second, the shape of each pentagon is explained descriptively to facilitate an understanding of the changes in the village livelihood patterns in the Phu He site.

Table 7. 6: Sample calculation of natural capital in Ban Hoa before 2005

	Indicators	Households accessing natural capital out of 20	Accessible proportion
1	PADY1	16	16/20=0.80
2	HGRD1	19	19/20=0.95
3	WATR1	16	16/20=0.80
4	WOOD1	20	20/20=1.00
5	NTFP1	10	10/20=0.50
Summation of accessible proportion =			4.05

Showing the first step in creating the pentagon, Table 7.6 provides a simple way of calculating the value of 4.05 on natural capital axis of Ban Hoa pentagon before 2005 in Figure 7.7, by taking the average number of households that can access natural capital out of 20 households. Following the same calculation, other axis values of the five capitals are calculated (before and after 2005) of the three villages and Phu He. Then, the resulting values are incorporated to create their asset pentagons. In order to go beyond the composite quantitative result, each pentagon is explained to reflect specific livelihood patterns (see below).

Figure 7.7 shows the different shapes of the three villages' asset pentagons before 2005. The left pentagon in this Figure indicates that the households in Ban Khou had high access to

natural capital, followed by financial and physical capitals, whereas access to social and human capitals was relatively small. Ban Khou's asset pentagon simply indicates that natural, financial and physical capitals played an important role in sustaining the household livelihoods in Ban Khou before 2005.

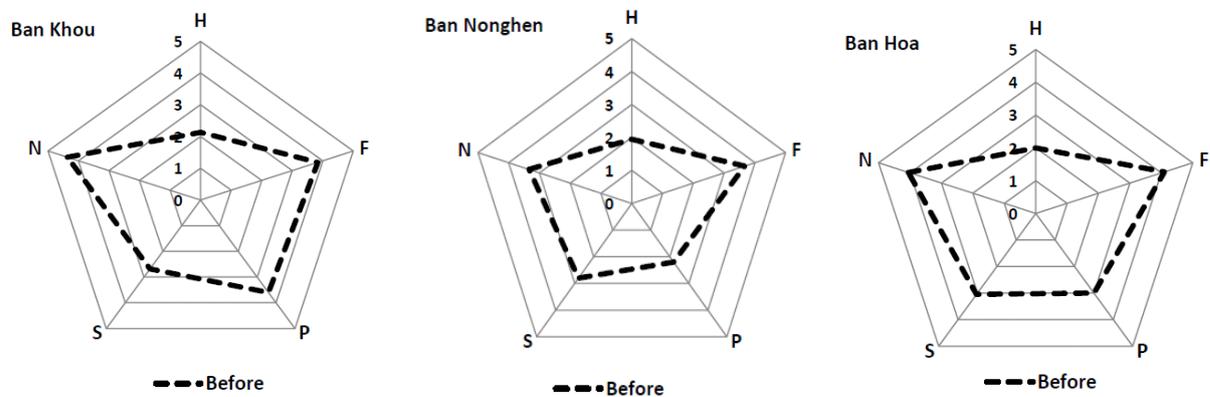


Figure 7. 7: Asset pentagons of three villages at the Phu He site before 2005

The middle pentagon shows that the households in Ban Nonghen had relatively lower access to five forms of capital than other villages. When comparing the five capitals, the financial and natural capital axes were higher than other capitals axes. These were the main resources required to maintain household livelihoods in Ban Nonghen. The right pentagon, which delineates households in Ban Hoa, suggests that access to natural and financial capitals was higher than to other capitals before 2005. Among the three pentagons in Figure 7.7, Ban Hoa's pentagon was more expanded than the other two pentagons. This means that Ban Hoa households were able to access more resources among the five capitals to sustain their livelihoods than were the other villagers. Overall, these asset pentagon shapes confirm that the three villages accessed all five capitals to maintain their livelihoods before 2005. While each axis capital of each pentagon has a different proportion, the natural and financial capitals were viewed as the most accessed to sustain local livelihoods. It was observed that in Phu He, natural capital was highly accessed to maintain the local livelihoods in Phu He before 2005.

Figure 7.8 shows both asset pentagons before and after 2005 of each Phu He village. When compared, the asset pentagons after 2005 shifted upward in the three villages, implying increased access to the five capitals and better livelihoods in Phu He. Among these villages, Ban Nonghen had the highest shift proportion, followed by Ban Hoa. Ban Khou showed the least. When comparing the two periods, access to four asset capitals showed significant increases in these villages. For example, physical capital in Ban Nonghen increased by 94%, human capital by 46%, social capital by 26%, and financial capital by 22%. In Ban Hoa,

human and physical capitals increased by 54% and 40%, respectively, and financial and social capitals by 10%. Ban Khou’s physical and human capitals increased by 25%, social capital by 8%, and financial capital by 3%. However, natural capital rose by only 4% in Ban Nonghen: it decreased in Ban Hoa by 20% and in Ban Khou by 30%. These results suggested that it is crucial to further investigate the sharp decline in access to natural capital in Phu He.

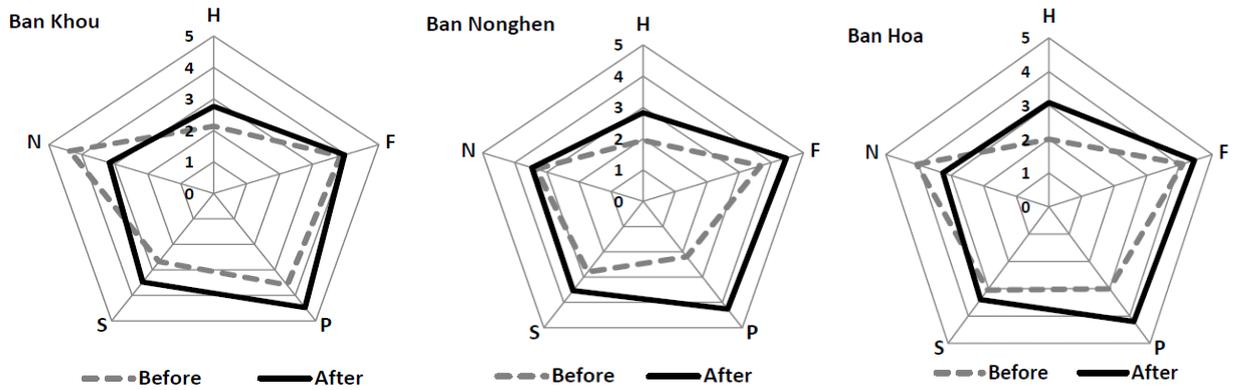


Figure 7. 8: Asset pentagons of three villages in Phu He before and after 2005

Combining the three villages’ pentagons, Figure 7.9 shows a shift upwards in the Phu He asset pentagon in the periods before and after 2005, signalling a positive change in livelihoods and better access to four capital assets. A comparison of the shapes of the two period pentagons in Figure 7.9 suggests that access to physical capital sharply increased by 67%, followed by human capital (41%), social capital (22%), and financial capital (9%). Access to natural capital dropped by 18%.

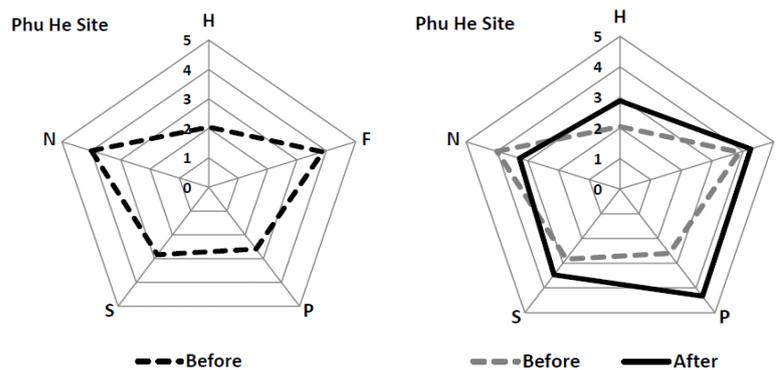


Figure 7. 9: Asset pentagons at Phu He before and after 2005

The increased access to physical capital can be explained by the fact that many households had high access to financial resources; thus, they could afford to purchase vehicles, hand tractors and other agricultural tools, and to build new houses. Some households explained that their incomes mainly came from their previous savings, and from the daily selling of agricultural products and cattle. Somewhat unexpectedly, some revealed that they earned most

of their income from searching for gold at Phu He. Their incomes were immediately used to buy physical needs assets, such as agricultural tools, hand tractors and vehicles. In contrast, reduced access to natural capital resulted in local resources degradation, declining land productivity, water decline and pollution and the deforestation of areas near their villages. Resource exploitation was thus attributable to PBM activities and the local people as well as legal and illegal logging by local authorities.

In short, post 2005, the local livelihoods in Phu He had improved more than ever before. The upward shifts of the asset pentagons indicate that four out of five capitals were increasingly accessible after 2005. Only access to natural capital dropped significantly after 2005. Clearly, there is a need to further investigate the process of resource exploitation. In the following subsection, I will explore the poverty implications of low access to natural capital at the Phu He site.

7.3.5. Natural resources usage in Phu He

Household interviews undertaken in Phu He revealed that the local households in the three villages used the natural resources available in Phu He to maintain their livelihoods in many ways. For example, the water that originated at the top of Phu He flowed down to the villages and was used for daily consumption, bathing, and watering their crops and vegetables. The arable land on the foothills was utilised for many agricultural activities, including paddy fields, maize, grass and vegetable cultivation. The forest was generally considered to be a warehouse from which they collected their daily foodstuff, NTFPs, firewood, and timber for building houses and fences. As well, it provided their income sources. Since PBM gained a concession to the Phu He area and the government has prevented the people from searching for gold in the area, the ways in which the local households utilise their local resources have changed as resources have become increasingly depleted and less available to them.

The local people and PBM continued to exploit Phu He's natural resources; but, the decline in local resource sufficiency, along with the constraints to accessing said resources, have proven problematic. As shown in Figure 7.10, the number of households who claimed availability of local resources as sufficient in Phu He declined from 57 of 60 households before 2005 to 45 post 2005. The householders observed that the reduction in resource sufficiency was caused by PBM activities. The company cut down large trees to facilitate survey tracks; in addition, many holes were drilled for purpose of acquiring soil samples on the Phu He slopes. These activities resulted in soil erosion and in muddy water flowing into their paddy fields in the

foothills during the wet season. Also, the water quality declined due to the felling of trees: it became polluted due to poor usage and disposal of the chemicals used in drilling. Only a few households accepted the responsibility for digging holes to search for gold: they reluctantly agreed that the practice caused a decline in resource sufficiency.

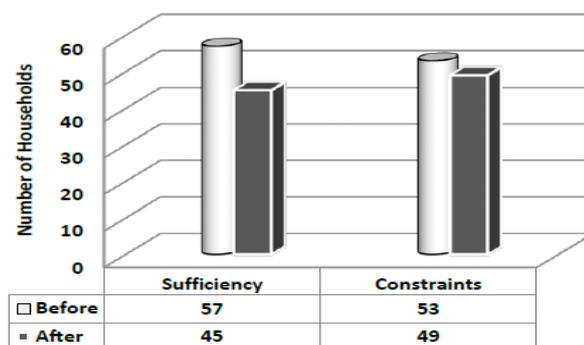


Figure 7. 10: Resource sufficiency and access constraints at Phu He

In addition to the reduction in resources sufficiency, the households suggested a number of constraints affecting their access to forest resources, ranging from self-difficulty to official warning notifications, travelling long distances to collect firewood and NTFPs, fewer resources available, the difficulties encountered when bringing them back home, local government restriction on zones, and problems associated with UXO areas. The number of households experiencing at least one difficulty or constraint when accessing these resources at Phu He was reduced from 53 to 49 out of 60 households across the two periods. While most householders detailed many constraints to accessing their resources; some pointed out that PBM's survey tracks helped particular local authorities, for example soldiers and local government staff, rather than local people, to access resources like timber and wood. Inevitably, these resources became less protected. Thus, from the Phu He householders' perspectives, PBM activities impacted on both their use of resources and livelihoods. In the next subsection, I will further analyse the impact of PBM activities on the Phu He site.

7.3.6. Impact of PBM activities on livelihoods and resources in Phu He

After PBM programs were implemented in 2005, many households in Phu He experienced both the positive and negative impacts of these activities on their livelihoods and resources usage. For example, employment, income generation, improvements to the village roads, the village office, the school and electricity were frequently mentioned as main positive contributions to the improvement of their livelihoods. In addition, there were opportunities to access other government services, UXO awareness and income compensation. In addition to these positives, one crucial fact was that the PBM survey taught them about gold in Phu He.

Many went to the top of Phu He to search for gold. Fifty-one out of 60 households admitted that at least one member of their households had left to search for gold. Furthermore, many revealed that the money accrued from searching for gold was a key factor in the change and improvement in their livelihoods.

Further to their views, it is important to explore the ways in which searching for gold has contributed to the improvement of the local livelihoods. According to the interviewees, the amount of money they earned was determined by luck and by the number of days they worked. The time varied from 2 days to 4 months and the total amount reported as earned varied from 300,000 to 150,000,000 Lao Kip or from US\$40 to US\$18,750 [the actual amount can be double or triple this amount according to informal personal conversations]. After selling the gold, the money was used for a variety of purposes, such as buying hand tractors for paddy cultivation, pick-up trucks and motorbikes for convenient travel and access to markets in the town, building new houses, buying furniture and entertainment facilities, such as a sofa, TVs with satellite dish, DVD players and stereos. In short, the local livelihoods improved from the simple process of gold prospecting. They took risks by digging holes for gold (exploiting natural capital), and by selling the gold for money (accumulating financial capital). The money was used first to buy things (physical capital) then to facilitate access to other capitals. Some of the money was set aside to meet their children’s education and health care (human capital).

Table 7. 7: Phu He households identifying impacts of PBM

	Livelihoods	Resources
Positive impacts	55	3
Negative impacts	58	10

In contrast, the households detailed many negative impacts of PBM activities on the village and on their livelihoods and resources. For example, deforestation, water pollution (toxic chemicals) and decline, soil erosion, land degradation and agricultural yield reductions were claimed as main negative impacts. There were followed by low wage rates, temporary employment and road destruction. The householders complained that after 2005, PBM continued to fell trees and to clear routes for their survey roads; they drilled many holes in the Phu He area, and their disposal of the toxic chemicals used in these activities fell short of the expected standard. In the wet season, soil erosion occurred in many of parts of Phu He. Muddy water containing sand and stones flowed into the villagers’ rice fields and into many other agricultural areas. In addition, the rain carried the toxic chemicals from the drilling sites into the streams, immediately polluting not only the streams, but also the village gravity-fed

waters, the rice fields and the fish ponds. As well, pollution caused decline in the rice yields. In the dry season, much of their agricultural land became degraded due to muddy water, landslides and water shortage.

Because PBM activities affected all of the households in Phu He in different ways, the households were requested to identify both the positive and negative impacts on their livelihoods and local resources usage. Fifty-five out of 60 households identified at least one positive contribution to their livelihoods and 3 households found positives vis-à-vis their resources (see Table 7.7). In the same Table, 58 out of 60 households identified at least one negative impact on their livelihoods, and 10 households on their local resources. During the interviews, many householders confused and mixed the impacts on their livelihoods with those on their resources, thus mixing the two categories. This confusion may suggest that the local livelihoods and resources have been seriously threatened. Thus, it was important to the village chiefs, in collaboration with the district authorities, to pay more attention to problems associated with PBM.

To date, problems arising from the negative impact of PBM have been partly resolved on a request basis. For example, the affected households sent their complaints to the PBM office. After investigation by PBM staff, a decision was taken to compensate these households. In this way, 20 households' claims of negative impacts on their local livelihoods and resources were resolved; but, many continue to remain unresolved. Most of the households, along with the village chief, raised their concerns about threats to their local natural resources. To better understand these threats, it is important to further examine the linkages between the impact of PBM and livelihood and resources usage at Phu He, linkages based on the concept of poverty-environment nexus (PEN).

7.3.7. Poverty-Environment Nexus (PEN) in Phu He

A starting point from which to examine issues related to PEN in Phu He is to look at the changes in the local environmental resources since 2005, based on each household's observations. Each interviewed household was requested to rank a five point scale on ten environmental indicators, based on their observations of the changes in these environmental indicators over the past five years. The results of the households' observations, which appear in Table 7.8, suggest that environmental resources in Phu He tend to be degraded. For example, 58% and 13% of the households observed a decrease and a large decrease in forest areas in Phu He, respectively: 72% commented on the increase in deforestation; 62% said that

firewood supplies were decreasing due to big trees being cut and logged, that encroachment was still practised, and that only small trees were left available. This suggested that forest resources were becoming increasingly threatened in Phu He. Responses regarding agricultural land were mixed: 20% of householders reported both decreased and increased, while 60% reported 'remained the same'. However, 72% agreed that their agricultural land was becoming increasingly degraded and hence less productive than before. Moreover, 53% of households claimed a decrease in the quantity of water supply from Phu He, with 23% saying largely decreased. As well as declining in quantity, 67% said the water was becoming increasingly polluted. Furthermore, 70% commented on the loss of wildlife due to the poor local environment; however, their observations regarding herbal trees and forest plants were mixed. The householders' observations of these environmental indicators suggested that Phu He's local resources were becoming seriously depleted, and that this depletion appears to be impacting not only on local livelihoods but also on natural resources as well.

Table 7. 8: Percentage of households in ranking environmental indicators in Phu He

Environment indicators	Largely decreased	Decreased	Average	Increased	Largely increased	No Idea
1. Forest areas	13%	58%	3%	25%	-	-
2. Deforestation	-	20%	8%	72%	-	-
3. Firewood	10%	52%	20%	18%	-	-
4. Tree cutting	2%	40%	13%	38%	3%	3%
5. Agriculture land area	-	20%	60%	20%	-	-
6. Land degradation	-	10%	18%	72%	-	-
7. Water quantity	23%	53%	18%	5%	-	-
8. Water pollution	-	17%	17%	55%	12%	-
9. Wildlife	45%	25%	7%	12%	2%	10%
10. Herbal tree/plants	2%	17%	20%	37%	12%	13%

The environmental indicators in Table 7.8 show high resource depletion in Phu He; thus, it is crucial to further investigate the circumstances relevant to this depletion. One way to do this was to ask each household to identify the first and second local actors guilty of degradation of deforestation, land degradation and water decline/pollution. Local actors included PBM as the investor, the local people, local governments (consisting of provincial, district and village authorities) and natural disasters triggered by nature that impacted on local resources. The first blame is viewed as a main root, with the second blame as supplementary information.

The responses garnered from the household interviews appear in Table 7.9. Somewhat surprisingly, 43% of the householders viewed the local people or themselves as guilty of deforestation. They admitted to exploiting the forest resources to sustain their livelihoods:

32% laid the primary blame on PBM activities for deforestation; and, 18% blamed the local government for permitting logging and for corruption. The similarity of the figures laying second blame on deforestation confirmed the findings of the ‘first blame’ actors. Apropos of land degradation, 45% of the respondents blamed PBM activities for causing landslides and toxic chemicals flowing into agricultural land: 28% laid first blame on the local people for cultivating the land for a long time and in the process impairing its productivity; and, 17% blamed natural disasters and global warming. As regards water decline and pollution, 60% attributed first blame to PBM activities for their cutting down of trees and using chemicals when drilling: 22% laid first blame on the local people, some of whom used cyanide and mercury when mining gold from stone and soil for washing it in the local water streams; and, 10% blamed the changes in nature. Thus, according to different household perspectives, PBM and the local people were seen as the main actors causing resource degradation in Phu He. Behind the scenes, the local government could be included as well, given that it was authorised to carry out certain duties, rights and roles of management, a fact of which the local people were generally unaware. This issue will be investigated in Chapter 8.

Table 7. 9: Percentage of households blaming local actors in Phu He

Local actors	Deforestation		Land degradation		Water decline/pollution	
	1 st blame	2 nd blame	1 st blame	2 nd blame	1 st blame	2 nd blame
PBM	32%	32%	45%	25%	60%	12%
Local government	18%	5%	7%	-	3%	5%
Local people	43%	25%	28%	8%	22%	22%
Natural disasters	-	-	17%	5%	10%	2%
No idea	7%	38%	3%	62%	5%	60%

While PBM and the local people were blamed as the first cause of resource depletion in Phu He, it seemed important to examine whether or to what extent the company’s activities contributed to problems of PEN in Phu He. For this purpose, each household was requested to answer two additional questions: (a) whether and to what extent PBM encouraged them to degrade environmental resources; and, (b) whether and to what extent the degradation of these resources has rendered them poorer since 2005.

Regarding the first question, 78% of respondents claimed that resource competition with PBM encouraged them to degrade the local resources. And, in answer to the second question, 97% believed that resource degradation at Phu He had made them poorer. These figures correspond to the above findings, that both PBM’s and the local people’s activities were the first causes of resources depletion. They also suggest that resource competition between the locals and PBM at this site strengthened the PEN at Phu He. But, while both PBM and the

local people created resource degradation, it was only the local livelihoods that suffered as a result. The increasing depletion of local resources, together with an inability to access resources, could potentially trajectory local livelihoods into a vicious circle of PEN in the near future. These findings tend to suggest a causal relationship between the impacts of PBM and the poverty-environment nexus (PEN) in Phu He. In other words, PBM has strengthened PEN at the Phu He site. Not only have its activities degraded the local resources, but environmental degradation will result in a level of poverty greater than in the past if local people depend only on local resources.

One may criticise these PEN-related findings given that they seem to contradict the Phu He asset pentagons in terms of livelihood improvement in Figure 7.9. In actual fact, the findings of the asset pentagons were based upon a comparison of two livelihood periods before and after 2005, while those pertinent to PEN were based upon household observations recorded between 2005 and 2010. The asset pentagons also indicate livelihood improvement when local people can increasingly access many types of capitals rather than national capital only. The immediate findings of these two resources of information were that competition for resources strengthened PEN, and that resource degradation posed a threat to local livelihoods in Phu He. At this point, I want to stress that policy makers should heed these issues: they must tackle these two problems at the same time. Timely local government intervention has weakened the PEN, resource competition reduced, and local livelihoods in Phu He improved through the introduction of non-farming activities. Not unsurprisingly, these real relationships may sound complex at the village level. For the purposes of clarification, in the next subsection I will explore the different impacts of resource degradation and the new livelihood opportunities generated by the investment through narrative analysis.

7.3.8. Narratives of household experiences in Phu He

Ban Khou was selected as a site for narrative interviews, the aim being to determine how different groups of households experienced the impacts of PBM mining activities and how these issues related to PEN at Phu He. Ten households were interviewed, corresponding to five groups: affected, poor, Hmong, PBM employee and wealthier households. Regarding the terminology used, 'affected' refers to any household seriously affected in terms of livelihoods and loss of natural assets due to PBM activities: 'wealthier' refers to villagers who occupied arable land, had cattle and valuable physical assets. These households were carefully selected following discussions between the village chief and the researcher. In the case of their narratives, I requested each household to relate their experiences of resource degradation and

of any changes to the new opportunities for their livelihoods resulting from the Phu He mining activities. Then, I selected one household narrative as representative of their group. The narratives were conducted in the Lao language and later translated into English for presentation as follows.

One of most affected households in Ban Khou said that:

Before PBM conceded Phu He, my family's livelihood was sufficient. Water was enough for agriculture, local resources were sufficient, and our cattle number expanded. After implementing their activities, these resources are degraded, particularly water. I saw the forest trees and NTFPs sharply decline because the PBM hired local people to cut forest and open the surface for their survey tracks and drilling holes. Consequently, my rice field are not cultivated because of mudslide and my cattle got diseases and died because of toxic chemicals. We have suffered a lot because of water shortage, low rice yields and low income. Like other households, we earned about 60-70 million kip per year from selling vegetables, cattle, NTFPs, but now less than 50 million from non-farming activities. I have to find additional jobs like truck driver, my wife run a small shop in the town market to maintain our livelihood. Since mud flowed into our rice fields, we cannot cultivate anything. After claiming from PBM, I was partially compensated by [small] money to take the mud out from my field, but my land would not be productive as before. We want the government and the PBM to closely analyse the impacts and take responsibility for our livelihoods and address issues on our local resources.

A member of a poor household in Ban Khou said that:

Our livelihood was reliant on raising [a few] cattle, planting paddy rice and vegetables in a small plot, and picking bamboo shoots, mushrooms and pine resin for our consumption and income. I think we are poor because of owning a small piece of land, but our daily life was fine. Since PBM has implemented activities, water for both drinking and agriculture became short. During raining, mud slid into our gravity-fed water source and damaged its head station and pipelines. The mud slid into my rice field as well and degraded its productivity. We could not cultivate any more. Moreover, the spreading of toxic chemicals in forest areas killed some wild animals or caused them disease and they moved away, and we dare not eat or collect these NTFPs anymore. Consequently, we had nothing to sell and our income decreased. We [being poor] have to work for the PBM as labour; but, the job given is casual with a low wage. To reduce my household suffering, I have additionally worked as a

construction worker and daily labourer in town. I don't know what to say about our future but I have worried about my children as they might be poorer than us. As the PBM damaged our local resources, water and forest areas, we hope the government would urgently help us, especially on water issues.

A Hmong household in Ban Khou related the following:

My family used to collect firewood and NTFPs for our consumption at Phu He forest area. As most of the arable lands belong to others, we have accessed only a small piece of land. Before, water was sufficiently available from Phu He, and we cultivated vegetables and paddy rice and raised cattle. Our life was relatively self-sufficient. After PBM investing, many holes were drilled in Phu He, and poor soil slid to rice fields and streams at the foothill of the mountain. In the raining reason, water was polluted with mud and toxic chemicals, while water became short in the dry season. We cannot raise cattle because of limited grass areas and toxic chemicals on the ground, and also cannot cultivate paddy rice because of mudslides. Our livelihood was less sufficient than before because our paddy land became degraded, water become shortage and polluted while forest resources [NTFPs] become few and few. To maintain our livelihood, we have to work harder than before. For example, we grow more vegetables and work as construction labourers in town. PBM gave us [money] compensation to buy rice but only for one year. Then, we do not know what to do in following years. We think we would become poorer in the near future because of losing land and water and lack of rice.

A household employed by PBM in Ban Khou said that:

Before PBM invested, our livelihood was stable and we mainly focused on farming activities such as growing paddy rice, vegetables and raising cattle. My wife also ran a small business in the market town. When PBM settled their office in Phonsavan, I was employed as a security guard at this office. I am quite pleased with this job because it is not as hard as working in my field, but my punctuality is important. At first, I thought this company would bring development to our village as I saw local people were hired to work for them, to clear bushes and trees for tracks and receive wages for their labour, and our village road has been improved. After drilling many holes in Phu He, the rain brought mud and poor soil into our rice fields and water source. I expected that too much deforestation, too many holes drilled in Phu He and too large areas destroyed on surface caused these problems. Like other households, some parts of my paddy land were filled up with sand, mud and [unproductive]

soil flowing from Phu He. Today, we still cultivated paddy rice and grew vegetables in only unaffected parts of the land. The PBM staff agreed to compensate the affected households but unclearly told the precise time and amount. We just kept waiting. My household was disturbed a little bit in the beginning, but slowly improved later on, due to many factors including our working hard and my salary from the PBM. For example, we used to save approximately 12 million kip per year, now we could save up to 15 million kip per year, and we plan to build our new house.

A member of one of wealthier households in Ban Khou said that:

Before we cultivated vegetables, paddy rice, raised cattle for consumption and income, and sometime also collected and sold NTFPs from Phu He. We were quite poor because of having small incomes from my salary and other sources, too many [four] children and too much expenditure on their education. After PBM investing, we could earn additional income from the PBM as being their labourers. We had more labour in my family because my children are grown up and finished their studies. However, the PBM activities damaged some parts of my rice fields and vegetable plots by filling up them with mud and sand. So our agricultural land has become small. We made claims to the community development unit of the PBM Company to follow up these impacts, but they have not practically responded yet. Nevertheless, we aim to produce more of our agricultural products in order to maintain our income and livelihood. When balancing the costs and benefits from the PBM, our household's livelihood seems to be almost the same or slightly improved because of having jobs and additional incomes.

Evaluation of household narratives and their experiences at Ban Khou

Various experiences of issues related to PEN and the impacts of PBM were expressed in the five different household narratives in Ban Khou. These experiences can be categorised into similarities and differences. Their similarity is shown in many ways. For example, in the past, these households relied upon Phu He's local resources to maintain their livelihoods. They often utilised these resources through their traditional agricultural practices, such as paddy rice, vegetables, animal husbandry and NTFPs collection. But, when these local resources became degraded, either by PBM or local people's activities or both, resource degradation immediately reduced their access to their agricultural practices and NTFPs, by extension destroying their food and income sources. Thus indubitably, degradation hurt their livelihoods. Furthermore, while PBM activities were blamed as the major cause of resource degradation, the locals' gold prospecting activities in Phu He were rarely mentioned. After

taking risks in gold prospecting, many households were able to accumulate wealth through increased access to financial and physical capitals. Finally, when local resources were degraded to a large extent, most of the villagers expected the government to help them to improve their livelihoods by restoring their local resources. It seemed not to occur to them to pursue their new livelihood opportunities by themselves. Their expectations derived from the fact that a) some households sent their complaints to the local government but nothing happened; and, b) some sent their complaints to PBM. While some who were mildly affected were compensated, many of the significantly affected were not. Some opined that the GoL needed to further negotiate with the PBM; that is, to deal with both social and environmental impacts on the local people. In effect, the locals expected the government to help them.

The experiences of these households were different and mixed in many ways. First, each household experienced different degrees of resource degradation, depending upon the ways in which they used the resources to sustain their livelihoods. For example, in terms of land and water degradation, those most impacted were the wealthier and elite households in the village, who owned large tracts of agricultural land and used considerable amounts of water for their agricultural activities. The poor and Hmong households were less vulnerable to impact vis-à-vis in these two degradation terms because they owned small tracts of agriculture land; but, they were the most impacted in terms of NTFPs and forest degradation as they relied heavily upon the available resources to maintain their livelihoods. Second, knowledge and social status tended to create unequal distribution of PBM job opportunities. Even though the poor and the Hmong were prioritised to work with PBM, their employment was considered temporary. As unskilled labourers, they were paid low wages. The long term jobs, including office, administrative and field site survey positions, were mostly occupied by members of the wealthier households, who had both the knowledge and capability to do the work, and perhaps the social capital, too. Finally, the locals' adaptation to resource degradation and the new opportunities accruing from investment could be viewed as different. The wealthier and elite households adapted quite well given that they could shift their access from natural capital to other capitals in order to maintain their livelihoods. Some started up non-farming activities, such as truck driving and services, small businesses in the market town, and working with various organisations. But, the poor and the Hmong continued to struggle. They seemed unable to access other capital resources as their socio-economic status and life skills were relatively low. Therefore, resource degradation at Phu He impacted severely on most of the

poor's livelihoods. The poor seemed to provide a more direct interpretation of the impact as a downward spiral rather than investment and its impact as a mixed experience.

7.3.9. Summary of Phu He site

At the Phu He site, local livelihoods and resources use changed before and after 2005. Many outcomes may be drawn from the assessment of PBM investment in Phu He. First, the local livelihoods have improved and poverty reduction has been achieved; but, at some cost to the local resources, when comparing local livelihoods and poverty patterns before and after 2005. Second, the local people have sought to utilise their local resources as before; but, their wants have not been fully satisfied because the availability and sufficiency of these local resources have become decreased and degraded due to the increasing influence of PBM activities and the misuse of the resources by the locals. Third, I found that PBM had largely changed the local livelihoods and resource usage. Before 2005, the local people were dependent upon local resources to maintain their livelihoods, implying the concept of PEN. After investment in 2005, PBM mining activities and gold prospecting by local people stimulated the strength of PEN in Phu He, at least for a while. When the local government intervened and prohibited all activities at Phu He, the strength of PEN became weakened. However, a consequence of PBM's mining activities was the destruction of livelihood patterns and the creation of uncertainty regarding the sustainability of local livelihoods in future.

Finally, the experiences of the different groups of householders suggested that they were affected in different ways by PBM. In terms of utilising local resources to maintain their livelihoods, the wealthier and elite households could efficiently shift from natural capital to other capitals; but, the poor could shift only inefficiently because they were too dependent on natural resources. Additionally, the wealthier and elite households could find new livelihood opportunities with either the PBM or non-farming activities. The poor could not access these opportunities because they lacked the necessary capability. For these reasons, the previous usage of resources in Phu He augurs unsustainable environment management in the immediate future. To this end, I consider it necessary to examine investment management by local authorities in relation to issues of PEN. This is the subject of the next chapter. First, however, I will turn to the second case study of domestic private investment in the resources sector.

7.4. Nam Kho sand mining site

7.4.1. Nam Kho site background and sand mining

In Pek district, sand, a necessary material for construction, can be mined from rivers, flat ground and mountain slopes. Sand mining has been recognised as a business; but, permission is granted only to local investors. During the 1990s, the sand mining started initially from rivers and in environmentally low-impact ways using boats and simple tools like shovels and hoes. Sand mining was mainly for household usage: some household labourers could earn an income from selling sand. Since early 2000, the demand for sand in Pek district has constantly increased due to a rapid boom in new buildings and road construction. Today, sand mining is seen as an important business. To meet this rapid development, the Xieng Khoung provincial authorities granted business licences to local people, who had both the capability and the financial capital to mine the sand.

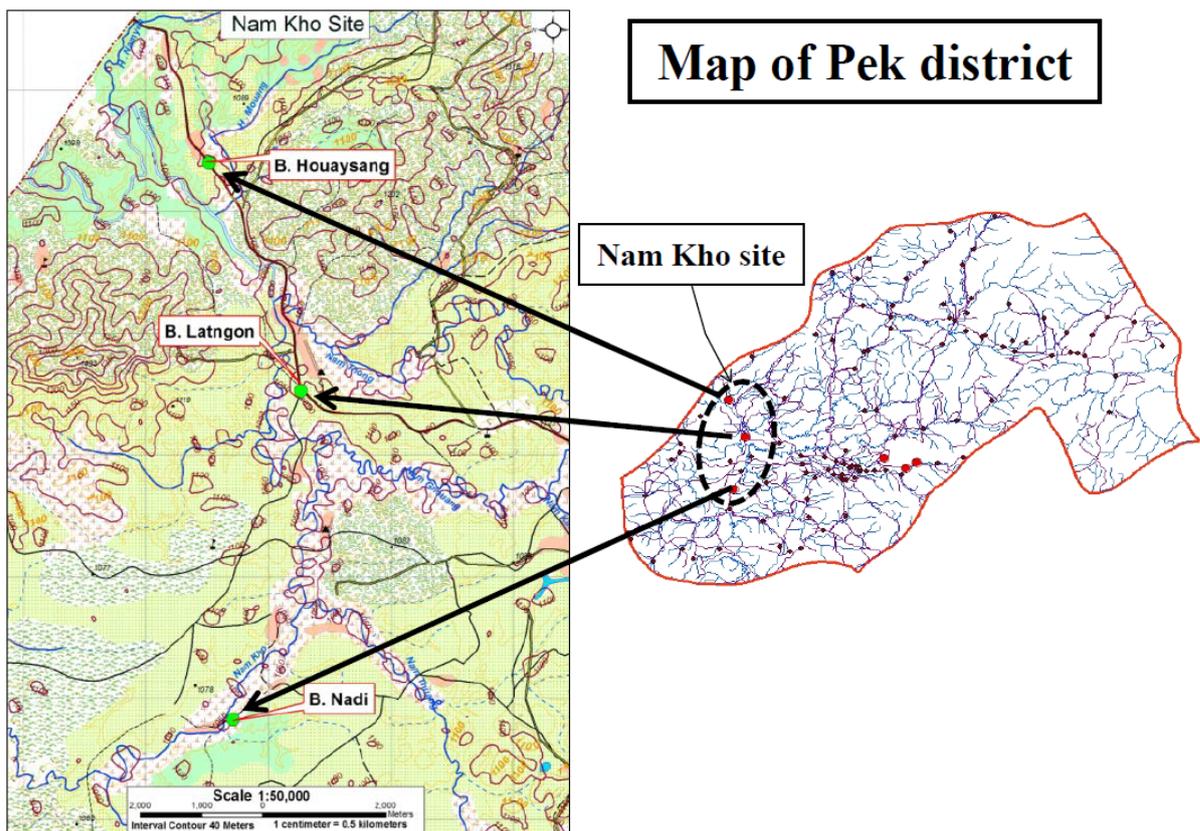


Figure 7. 11: Map of Nam Kho site, Pek district
Source: National Geography Department and Author

The ways of running this sand business have moved away from environmentally-friendly methods. In order to meet the high demand for sand and to make more profit, some local sand businessmen have used powerful pumps and other equipment to mine the sand near the rivers

and used water to remove the soil from the sand. An immediate consequence of these processes is that muddy water flows back into the river and pollutes the water. Due to such processes, sand mining businesses have inflicted many environmental impacts on local resources, especially on fish, water resources and local livelihoods along the river.

Nam Kho (Lao: Kho River) is one of the largest streams in Pek district, Xieng Khouang, that are being used and threatened by sand mining businesses. Nam Kho originates as a small stream in Phaxay district. It becomes a large stream in Pek district, where it flows into the Nam Ngum River. Sand mining businesses have been operated in some villages along the Nam Kho, and many environmental impacts from sanding mining on local resources at this site are highly significant. The people of these villages held several meetings regarding the sand mining operations. Most of the meeting topics were related to potential, issues and problems arising from sand mining and the ways to address such issues. The key participants in the meetings were the village chiefs and the villagers. The district authorities sometimes participated to address the surrounding sand mining and its impacts; but the provincial authority rarely participated unless requested by the village chiefs or the district authorities.

To examine the environmental impacts from sanding mining on local resources, three villages were selected for study based on their interesting sand mining features. The first was Ban Nadi, where the first sand mining in Nam Kho commenced. The second was Ban Latngon, which has the highest number of sand mining businesses. Finally, I selected Ban Houaysang, which is adjacent to Ban Latngon and is where the latest sand mining has been developed. In the following sections, I analyse the impact of sand mining on the locals' livelihoods and resources, similar to my outline of events at Phu He site.

7.4.2. Village profiles and poverty along the Nam Kho

Ban Nadi profile and poverty

Ban Nadi (Lao: a village with productive rice fields), which was established in 1960, is located approximately 12 km west of Phonsavan town. In 2003, the Pek district authority classified Ban Nadi as a non-poor village. By 2010, Ban Nadi had 68 households, and an all Lao Loum population of 384 with 205 females. Only four households among them were considered poor: these families experienced rice shortages for 3 months per year. Since 2000, Ban Nadi has claimed not to have any major health problems. Most of the villagers drink boiled water, access the hospital in the town, use mosquito nets and latrines. Gravity-fed water and wells are the main water sources in this village; but, water shortages occur two

months per year. The village has one primary school and one lower secondary school. Since 2005, the village road has been improved. Nowadays, all of the villagers can conveniently access the main road, the market, credit and other district services. As well, they have electricity. But, they have to confront water scarcity, animal diseases and influenza epidemics. The village economy is primarily based on agriculture products, mainly on paddy rice, crops and animal husbandry, with fisheries and NTFPs collection subsidiary. Most women engage in cotton and silk weaving in their free time, after the cultivating and harvesting seasons have finished. The sale of woven goods provides them with additional income.

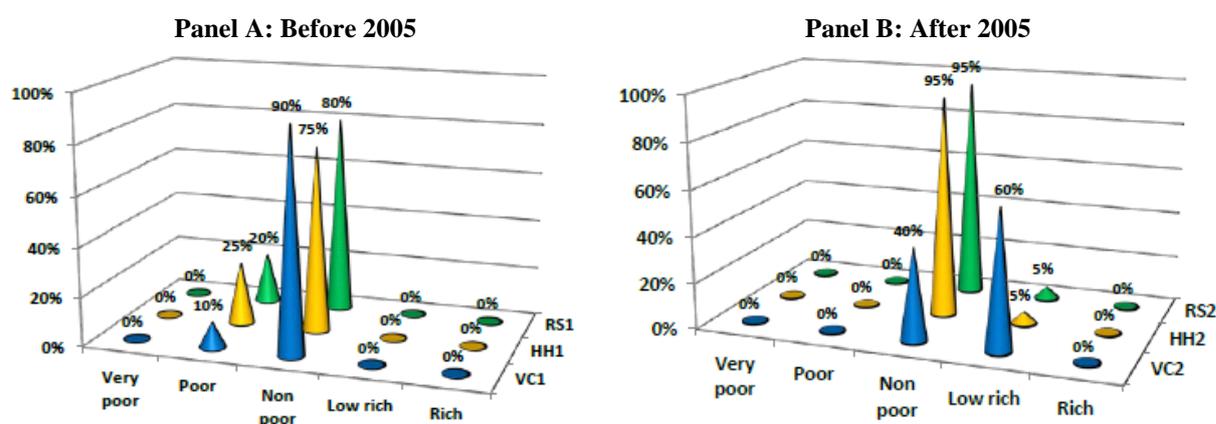


Figure 7. 12: Household poverty patterns before and after investment in Ban Nadi

As shown in Figure 7.12, a comparison of poverty patterns before and after 2005 revealed that poverty in Ban Nadi has significantly declined. In panel A of this Figure, on average, 20% of households were identified as poor by the RS, 25% by HH and 10% by VC. The remainder were viewed as non poor prior to 2005. Some households claimed that the main causes behind their poverty were lack of variety of rice seeds, agricultural tools and techniques, family labour and vehicles. Post 2005, the poverty pattern in Panel B of this Figure suggests increased progress in poverty reduction in Ban Nadi. During this period, the VC identified 40% of households as non-poor, and 60% as low rich. The observations of HH and RS were the same: they identified 95% of households as non-poor and 5% as low rich. Several factors were conducive to their poverty reduction. For example, access to electricity helped them to work in the evenings at home to earn additional income: their new agricultural tools increased their agriculture productivity; and, better road conditions and owning vehicles helped them to more easily access the market and other services in the town. Surprisingly, only a few households recognised some benefits of sand mining business as contributing to their poverty reduction.

Ban Latngon profile and poverty

Established in 1976, Ban Latngon is located approximately 10 km north of Phonsavan town on National Road 7. In 2010, this village recorded 158 Lao Loum and 21 Hmong households, and a total population of 1,031 people including 493 females. In 2003, the Pek district authorities classified this village as non-poor. In 2010, three households remained poor and 14 newly resettled households experienced rice shortages for three months of each year. Wells and boreholes were the main water sources in this village: 35 households faced water shortages in April and May each year. Since 2000, the village has not had any major health problems. The village has one primary and one secondary school. The village economy is reliant upon agricultural products, particularly on paddy rice, garlic, vegetables, cucumbers and cattle, with fisheries and NTFPs collections solely for household consumption. Since 2005, many households have engaged in non-farm activities to support their livelihoods; these include truck-driving services, small family businesses and sand mining businesses.

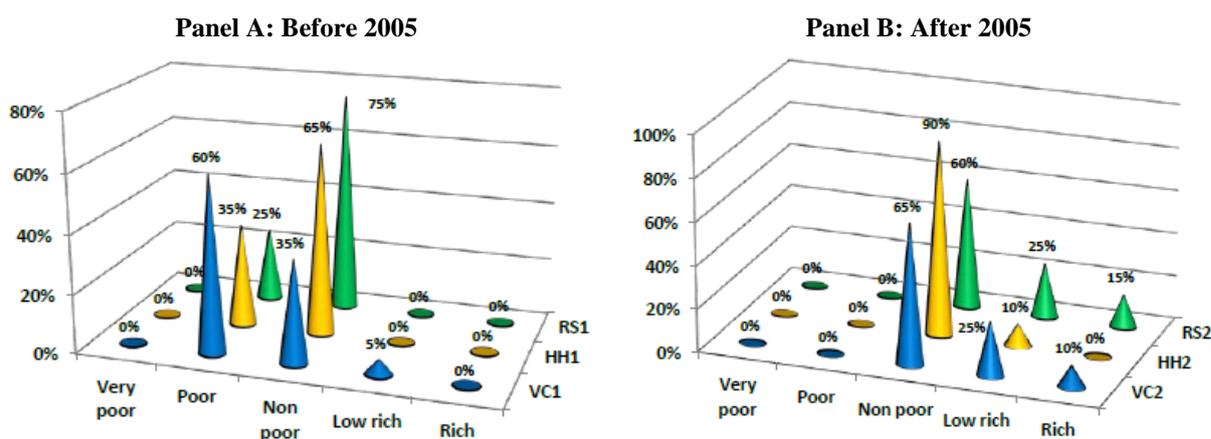


Figure 7. 13: Household poverty patterns before and after 2005 in Ban Latngon

According to the household survey, poverty patterns before and after 2005 in Ban Latngon were remarkably different (see Figure 7.13). Panel A of this Figure shows that 60% of the households were identified as poor by the VC, 35% by HH and 25% by the RS. The poor percentage registered by the VC was overstated vis-a-vis the non poor villagers; however, those of the HH and RS appeared realistic with an average of 20% poor prior to 2005. These poor households suggested that many factors contributed to their poverty, including lack of modern agricultural tools and financial capital, temporary and insecure jobs and incomes, and owning only small pieces of agricultural land.

Panel B of Figure 7.13 shows an improvement in the poverty patterns in Ban Latngon post 2005. In this Figure, none were recorded as poor in Ban Latngon. Both the VC and RS

identified similar patterns: 65% as non poor, 25% as low rich and 10% as rich; the households saw 90% as non poor and 10% as low rich. Like the case above, many factors had contributed to the eradication of poverty in Ban Latngon, including better road access, increased rice and crop yields, productive cattle, and extant opportunities in non-farm activities such as family businesses, truck – driving and the sand mining business. However, when each household in Ban Latngon was asked how they viewed their wealth accumulation as moving from poor to non poor, to low rich or to rich, some admitted that the sand mining business, and both legal and illegal logging and wood trading were their main driving forces. After making money from these activities, many of them reinvested in modern agricultural tools, such as hand tractors and rice-mills, which they used to increase their agricultural productivity. By doing so, their livelihoods kept improving. However, local resources such as forests, local biodiversity, water and forestry areas along the Nam Kho have become increasingly degraded.

Ban Houaysang profile and poverty

Ban Houaysang, which was established in 1979, is located approximately 10 km from Phonsavanh town. Its name came from a small stream flowing through the village. In early 2011, this village had 74 households including 57 Lao Loum and 17 old and new resettled Lao Theung, with a total population of 434. In 2003, the Pek district authorities classified the village as non poor. The VDC said that the village was free from any major health problems, and that the 15 new resettled Lao Theung households experienced rice shortages a few months each year. Wells and boreholes were the main water sources and supply was sufficient for the whole year. Paddy rice, vegetables and cattle, the main farming activities in the village, drove the village economy; but, water for agriculture was often inadequate during the dry season. Fisheries and NTFPs collection were less important because they were unable to support their villagers' livelihoods. Since 2005, roads and electricity have improved, and the villagers have access to bank credit and new non-farm activities, such as truck-driving and services. Some family businesses have emerged as additional jobs and income. However, many households claimed that they were reluctant to start businesses due to their lack of entrepreneurial knowledge and skills. There were only two sand mining operators in this village: one mine was operated by a village resident and another by a Phonsavan businessman.

Similarly to Ban Latngon, poverty in Ban Houaysang has been reduced. For a comparison of its pattern before and after 2005, see Figure 7.14. Panel A of this Figure shows that fewer than one third of households were classified as poor: for example, 10%, 25% and 15% by VC, HH

and RS, respectively. The remainder were categorised as non-poor by the three observers (prior to 2005). The poor households claimed that lack of agricultural tools, vehicles, investment capital and water deficiency were the main factors that contributed to their poverty.

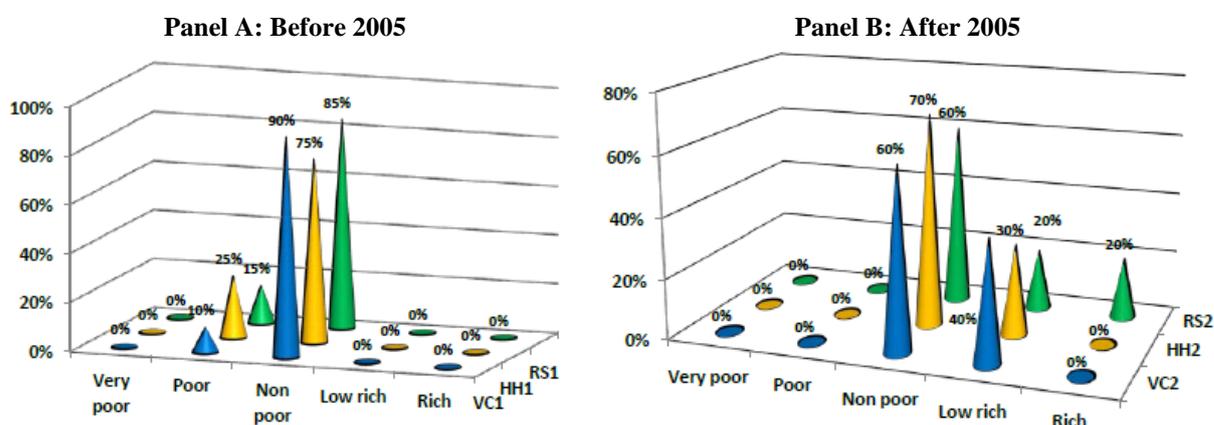


Figure 7. 14: Household poverty patterns before and after 2005 in Ban Houaysang

Panel B of Figure 7.14 shows dramatic poverty reduction in Ban Houaysang post 2005. By that time, no households were considered poor. The VC and HH declared an average of 65% as non poor and 35% as low rich: the RS identified 60% as non poor, 20% as low rich and another 20% as rich. Those interviewed claimed that this sharp reduction in poverty resulted from many factors including new opportunities for income activities and jobs, sand mining businesses, truck-driving services, family businesses and convenient access to credit and markets. While these activities may have helped to accumulate their economic wealth, I found it surprising that they achieved such a degree of development in such a short period of time. Thus, it is doubtful whether the households revealed everything that sharply reduced their poverty and enhanced their livelihoods. This rapid development can, however, be examined through their livelihood assets.

7.4.3. Livelihood assets of those living along the Nam Kho

Human capital

Access to human resources at the Nam Kho site showed slight improvement when percentages of household access to the five human resources in the three villages were compared before and after 2005 as shown in Table 7.10. The percentages of primary school attendance declined in Ban Nadi and Ban Latngon but remained the same in Ban Houaysang. The decline was said to be due to the reduction in the number of children rather than to their lack of capability to support their children. The percentages of vocational school attendance

increased in all three villages. Similar to the Phu He site, the percentage figure was relatively low. It may be argued that the high percentage for the primary schools as against the low percentages for the vocational schools was representative of the households' access to human capital.

Table 7. 10: Percentages of households accessing human capital in Nam Kho

Human resource indicators	Nadi		Latngon		Houaysang	
	Before	After	Before	After	Before	After
Primary school	80%	55%	80%	75%	70%	70%
Vocational school	20%	50%	30%	70%	20%	35%
Training	65%	55%	20%	20%	40%	10%
Permanent jobs	30%	45%	50%	50%	35%	40%
Investment policies	10%	15%	15%	15%	0%	0%

In addition, the percentages of householders training for professions declined in Ban Nadi and Houaysang but remained the same in Ban Latngon. The percentage of households with at least one member having a permanent job increased as villagers adapted to new activities and jobs (as mentioned above). The last indicator of investment policies showed the lowest figures as less than 16% in all three villages, both before and after 2005. Surprisingly, no one in Ban Houaysang had ever known of or heard about government policy on investment promotion. Thus, these low figures simply indicated that most households along the Nam Kho had little interest in, and understanding and knowledge of the national government policy for private investment promotion. Alternatively, the local authorities might not disseminate information.

Financial capital

Table 7. 11: Percentages of households accessing financial capital in Nam Kho

Financial resource indicators	Nadi		Latngon		Houaysang	
	Before	After	Before	After	Before	After
Regular income	100%	100%	100%	100%	95%	100%
Agricultural sale	85%	90%	90%	85%	70%	50%
Off-farm income	90%	90%	85%	95%	75%	90%
Expenditure	75%	95%	90%	100%	75%	95%
Regular saving	90%	100%	95%	95%	90%	100%

As shown in Table 7.11, the households' access to financial resources along the Nam Kho was strong both before and after 2005. Based on five financial resource indicators, most of the households in the three villages had regular incomes in both before and after 2005, regardless of the amount. While several ways of amassing financial capital were mentioned, most of the villagers claimed that their incomes mainly accrued from selling agricultural products and from off-farm activities.

When separating their income sources before and after 2005, the percentages of householders who earned their incomes from selling agricultural products decreased slightly from 90% to 85% in Ban Latngon and from 70% to 50% in Ban Houaysang. Ban Nadi showed an increase from 85% to 90%. In addition, the percentages of households' earnings from off-farm activities increased from 85% to 95% in Ban Latngon and from 75% to 90% in Ban Houaysang. It remained the same at 90% in Ban Nadi. Therefore, it seemed highly likely that their ratios of spending on goods and services other than on consumption and clothing increased in the three villages in both periods. Moreover, the percentages of households who could save money also increased, showing an average of 95% both before and after 2005. While these financial indicators implied strong access to financial capital and secure incomes among most of the households along the Nam Kho, it was quite clear that agricultural products and off-farm activities were their main sources of income.

Physical capital

Table 7. 12: Percentages of households accessing physical capital in Nam Kho

Physical resource indicators	Nadi		Latngon		Houaysang	
	Before	After	Before	After	Before	After
Permanent houses	95%	100%	75%	100%	100%	100%
Vehicles owned	40%	100%	65%	100%	75%	100%
Agricultural tools	40%	100%	55%	90%	70%	95%
Access to market	100%	100%	95%	100%	95%	100%
Agricultural land	100%	100%	100%	95%	100%	100%

Access to physical capital in Nam Kho significantly increased both before and after 2005. Among the five physical resource indicators in Table 7.12, most households showed high access to permanent houses, markets and agricultural land (above 90% of households both before and after 2005). In addition, the percentages of the households that owned at least a vehicle other than a bicycle increased from 40% to 100% in Ban Nadi, 65% to 100% in Ban Latngon, and from 75% to 100% in Ban Houaysang during the two periods. These figures were similar to those of households owning agricultural tools both before and after 2005. Therefore, access to physical capital in Nam Kho was significantly high

Social capital

The five human resources in Table 7.13 suggest high access to social capital along the Nam Kho both before and after 2005. In excess of 90% of households in the three villages stated that they often participated in village meetings. More than half of these participants offered their opinions on village development during the meetings: this figure increased after 2005.

Among the respondents, 30% in Ban Nadi and Ban Latngon and 45% in Ban Houaysang said that at least one of their members joined the village committee before 2005. Interestingly, the proportions of households that participated in village meetings regarding sand mining activities increased from 15% to 85% in Ban Nadi and from 45% to 80% in Ban Houaysang. They stayed the same (85%) in Ban Latngong between the two periods. Likewise, the percentages of households that participated in sand mining, either as owners, middlemen or casual workers, increased from 10% to 65% in Ban Nadi and from 10% to 15% in Ban Houaysang. They decreased from 80% to 70% in Ban Latngon. However, these percentages seemed contra to the householders' low responses when they were asked about government policy on investment promotion.

Table 7. 13: Percentages of households accessing social capital in Nam Kho

Social resource indicators	Nadi		Latngon		Houaysang	
	Before	After	Before	After	Before	After
Village meetings	100%	100%	95%	90%	100%	100%
Village members	30%	55%	30%	35%	45%	40%
Development opinions	65%	70%	55%	55%	65%	75%
Investment meetings	15%	85%	85%	85%	45%	80%
Investment participation	10%	65%	80%	70%	10%	15%

Natural capital

Similar to the Phu He site, access to natural resources in the Nam Kho site showed considerable decrease when comparing their figures for before and after 2005. Regardless of land size, most of the households in Ban Nadi and Ban Houaysang were enabled through access to at least one piece of paddy land and vegetable gardens to maintain productivity before and after 2005; but, only 80% and 95% of households in Ban Latngon could maintain productivity of their vegetable gardens and paddy land after 2005.

Table 7. 14: Percentages of households accessing natural capital in Nam Kho

Natural capital indicators	Nadi		Latngon		Houaysang	
	Before	After	Before	After	Before	After
Paddy land	100%	100%	100%	95%	100%	100%
Vegetable gardens	100%	100%	100%	80%	100%	100%
Water sufficiency	30%	30%	35%	45%	75%	60%
Firewood collection	100%	100%	95%	90%	95%	85%
NTFPs collection	15%	0%	50%	30%	60%	45%

The percentages of households with water sufficiency for both consumption and agriculture in the two periods remained the same at 30% in Ban Nadi. There was a slight increase from 35% to 45% in Ban Latngon; but, a decrease from 75% to 60% in Ban Houaysang. All of the

households in Ban Nadi said that the supplies of firewood were sufficient; but, the percentages of households that collected firewood dropped slightly from 95% to 90% in Nam Latngon, and from 95% to 85% in Ban Houaysang during the two periods. Moreover, the percentages of households that collected NTFPs fell sharply from 15% to none in Ban Nadi, from 50% to 30% in Ban Latngon, and from 60% to 45% in Ban Houaysang during the two periods.

7.4.4. Nam Kho asset pentagon

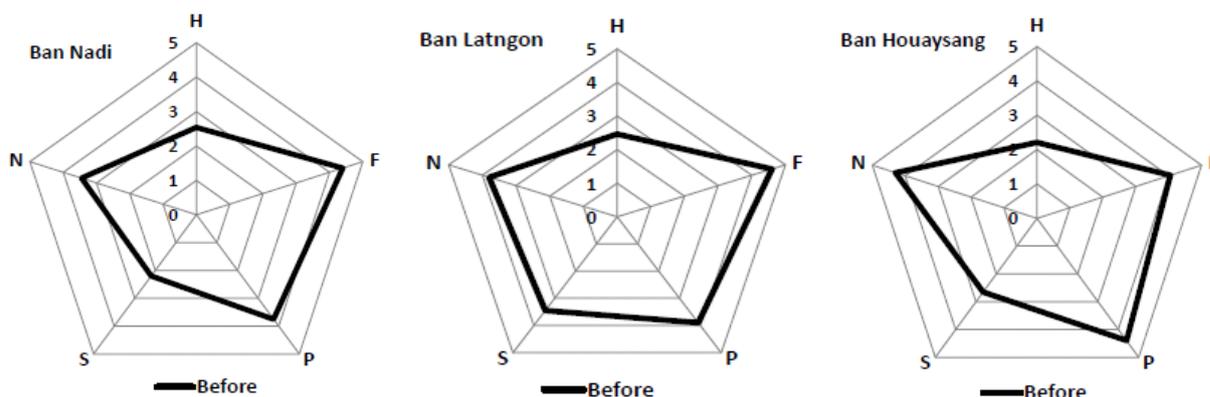


Figure 7. 15: Asset pentagons in three villages along Nam Kho before 2005

Following similar steps applied to Phu He site, asset pentagons for Nam Kho site were created by deriving all of the values in the five asset capitals as described above. These pentagons are illustrated both before and after 2005.

Figure 7.15 displays three different pentagon shapes representing three villages in the Nam Kho site before 2005. In the Ban Nadi pentagon, access to financial and physical capitals was stronger than for other capitals, followed by access to natural capital to sustain their livelihoods. Access to human and social capitals was relatively moderate in Ban Nadi before 2005. Similarly, in the Ban Latngon pentagon, access to financial capital was highest before 2005, followed by access to physical and natural capitals. Access to social capital was moderate and to human capital the least. Ban Houaysang's pentagon before 2005 shows that physical, natural and financial capitals were highly accessed by the households, while social and human capitals were moderately accessed. Among these three different pentagons, financial, physical and natural resources appear to have been the main capitals accessed to maintain local household livelihoods in the three villages before 2005, while access to social and human capitals was subsidiary.

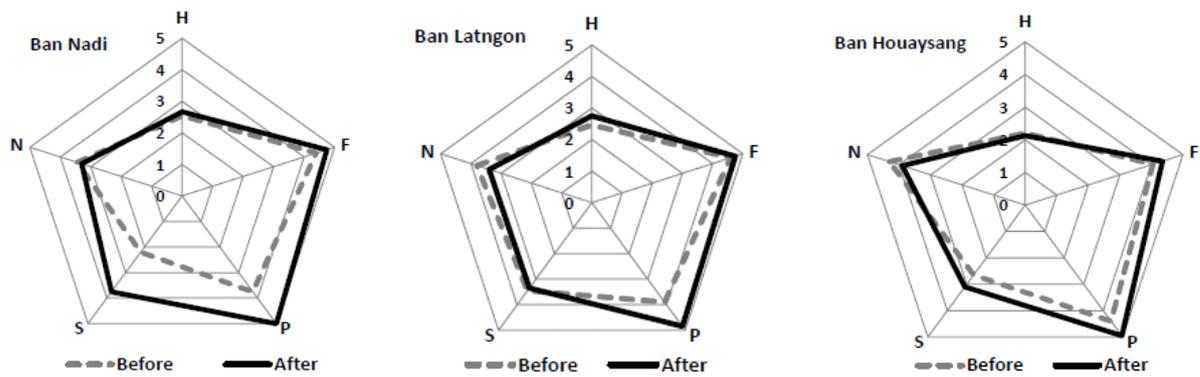


Figure 7.16: Asset pentagons in three villages along Nam Kho after 2005

Figure 7.16 shows three different shapes of village asset pentagons after 2005 along the Nam Kho. When compared to the before 2005 pentagons, the after 2005 pentagons have shifted upwards, suggesting livelihood improvements in the three villages. In Ban Nadi, social and physical capitals increased by 70% and 33%, respectively, while financial capital rose by only 8% and human capital by 5% after 2005. These figures suggest that physical and financial capitals were the most accessed in Ban Nadi. Access to natural capital was reduced by 4%. Similarly, in the Ban Latngon asset pentagon, physical and financial capitals were strongly accessed, showing an increase of 24% and 3%, respectively, after 2005, followed by human capital at 12%. However, access to natural and social capitals declined by approximately 11% and 3%, respectively. Thus, financial and physical were the capitals most accessed to sustain local livelihoods in Ban Latngong after 2005.

Ban Houaysang's asset pentagon after 2005 shifted upwards marginally. When comparing its pentagons for the two periods, access to social, physical, and financial capitals increased by 17%, 13% and 7%, respectively, while access to natural and human capitals decreased by 9% and 4%, respectively. Similar to the other two villages, financial and physical capitals were the main capitals accessed to maintain local livelihoods in Ban Houaysang after 2005. When comparing the before and after 2005 pentagons for the Nam Kho site, it may be said that the local livelihoods improved but at the expense of natural capital.

After aggregating the data of the five asset capitals from the three villages along the Nam Kho, two asset pentagons were created for the Nam Kho site (see Figure 7.17). This Figure shows that before 2005, the households had strong access to financial, physical and natural capitals and moderate access to the human and social capitals essential to supporting their livelihoods. After 2005, the asset pentagon shifted upwards, which could suggest livelihood improvement along the Nam Kho.

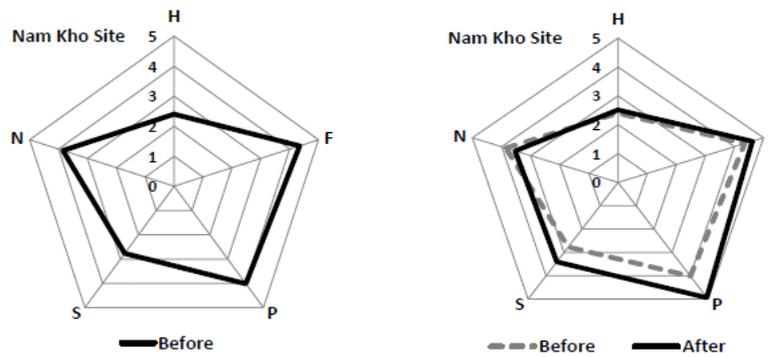


Figure 7. 17: Asset pentagons in Nam Kho before and after 2005

While achieving this improvement, there were significant changes in access to each capital after 2005. For example, the upward shift was attributed to the 23% increase in access to physical and social capitals, and from a 4% and 6% increase in access to human and social capitals, respectively. However, only access to natural capital declined by 8% during the two periods. Drawing from the pentagon after 2005, access to financial, physical and natural capitals still remained the main path to sustaining the local livelihoods along the Nam Kho site. Here, I deem it important to further examine the reasons for the decrease in access to natural capital.

7.4.5. Natural resource usage along the Nam Kho

The survey indicated that households along the Nam Kho used various local resources to support their livelihoods both before and after 2005. These resources can be grouped into three main resources: land, forests and water. Surrounded by an open grassland landscape, land along the Nam Kho has been mainly used for paddy rice, vegetable gardens and animal husbandry. The households also used forest resources such as collecting firewood, timber for house building and sale, and NTFPs collection to supplement their food and incomes. Since the early 2000s, according to the national government policy on forest conservation and the land and forest allocation program, villagers have had less access to the forest resources critical to maintaining their livelihoods. Water supplies for their agricultural activities have relied on rain-fed catchments and on some small streams. However, in Nam Kho, water is rarely used for agriculture purposes at this site because the level of the Nam Kho is lower than that of the paddy fields. So, it is quite difficult and costly to pump water from the Nam Kho for irrigation purposes. Unlike at the Phu He site, the villagers have used Nam Kho water but not as a key resource for their livelihoods. Before 2000, Nam Kho water was used for daily consumption and for catching fish. But post 2000, the river water has become dirty and

contaminated and the fish numbers in the river have started to decline due to the sand mining activities. Since 2005, Nam Kho water has been used mainly for the sand mining business. Household interviews suggest that land, water and the forest resources along the Nam Kho have undergone rapid change since 2005. Paddy land and vegetable plots have become increasingly degraded due a long-term water shortage. In the past, these lands were highly productive: animal husbandry helped to fertilise the lands in natural ways. Since the early 2000s, in a bid to increase their rice yields, many households have sold their cattle, bought hand tractors, and used chemical fertilisers in their paddy fields. In addition, in recent years, many paddy fields have dried out during periods of drought; thus, the rice yields have been reduced each year. Since 2005, the water has been polluted and suffered decline, particularly Nam Kho water. In earlier times, the villagers consumed and used the water from the Nam Kho; but, after 2000, their river became contaminated due to sand mining. While water from wells, boreholes and other streams has been substituted, the quantity of water yielded from these sources is reduced every year due to environmental change and a reduction in the nearby forest areas. In actual fact, the forest areas along the Nam Kho, as well as in Xieng Khouang, were replete with pine trees (*Pinus kesiya*, known locally as “Pek”, after which the District is named). Wood from the Pek tree can be easily converted into commercial timber for construction. Since 2000, the demand for Pek trees has sharply increased due to the rapid pace of construction in many urban areas of Xieng Khouang, Vientiane Capital and other provinces. The forest areas along the Nam Kho have been largely reduced, by both legal and illegal logging. As a result, the land, water and forest resources along the Nam Kho have been degraded and this degradation has negatively impacted on both the local livelihoods and local resources.

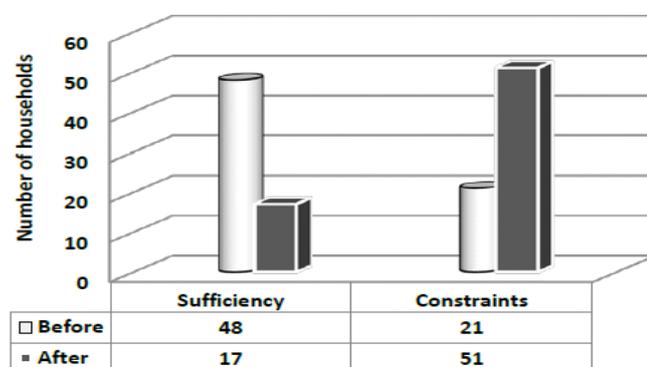


Figure 7. 18: Resource sufficiency and access constraints in Nam Kho

As shown in Figure 7.18, the households suggested a declining trend in resource sufficiency but an increasing trend in constraints to accessing local resources along the Nam Kho. Out of

60 households, the number of households claiming that these resources were sufficient to access decreased from 48 before 2005 to 17 after 2005. This decline, as suggested above, was due to overexploitation and degradation of the local resources. Moreover, many households observed that constraints to accessing their local resources had increased. For example, the number of households out of 60 facing at least one constraint increased from 21 before 2005 to 51 post 2005. The households highlighted the various constraints to accessing these resources such as lack of vehicles, tools and capital, and a decrease in both the quantity and quality of resources. In addition, they saw most constraints as deriving from the complexities of national government policies, processes and regulations pertaining to local natural resources.

7.4.6. Impacts of sand mining on livelihoods and resources along the Nam Kho

While the local livelihoods have relied on agriculture, Nam Kho water is no longer used for agricultural activities due to its low level. In the past, Nam Kho water was used for daily consumption such as drinking, bathing, for fishing and for other income sources using non-machine tools such as sand mining, activities that were not viewed locally as environmentally destructive. Since early 2000, however, the rapid pace of construction in nearby urban areas, as well as of individual house building in many suburban areas, has increased the demand for sand. Sand mining using simple tools was viewed as insufficient to meet the high demand. To meet the demand, local businessmen used machines such as powerful pumps, big pipes and steel filters rather than simple tools to increase their productivity. As a consequence, the heightened use of these machines impacted negatively on Nam Kho water, resulting in water pollution and decline, fish reduction, river bank erosion, and damage to both the local environment and to people living along the river. Thus, the impacts of sand mining along the Nam Kho need to be investigated.

Table 7. 15: Nam Kho households experiencing impacts of sand mining

	Livelihoods	Resources
Positive impacts	59	2
Negative impacts	56	29

Table 7.15 shows the number of households who experienced at least one positive and one negative impact from sand mining on their local livelihoods and resource use along the Nam Kho. While both local livelihoods and resources have been impacted in various ways, somewhat interestingly, the households reported only the impact on their livelihoods, not on

their resources. Their perceptions can be explored differently according to their environmental, economic and social views.

First, many households did not differentiate between the impacts on their livelihoods and those on the environment. In fact, environmental impacts, which were seen separately from their livelihoods, were relatively new issues to them; and, at the same time, many seemed to have little knowledge of environmental impacts. Thus, most of them often responded in similar ways. For example, sand mining caused water contamination and a reduction of the Nam Kho; then, the river bank became eroded, sand mining reduced the fish quantities, destroyed the aquatic habitats, and, by extension, hurt their livelihoods. Quite often many among them linked both the negative and positive impacts on their livelihoods with resources from the sand mining.

Second, many households seemed to consider sand mining in terms of economic aspects, rating positives higher than negatives. For example, sand mining created jobs and incomes for many low income households and tax revenues for the local government. The locals conveniently used the sand for buildings their new houses and for construction work in their villages, seeing it as being available, near to them and low in cost. However, in an economic sense, some claimed that the employment and incomes created were temporary, and based on seasonality. And, when the demand for sand declined in the rainy season, the village development committee did not receive any tax revenue.

Finally, the households mentioned both positives and negatives in terms of the social impacts of sand mining. For example, sand mining provided them with material to build their houses; as well, it supported their villages and improved infrastructures, such as temples, roads and schools, all of which benefited the villagers. Most importantly, the income they earned from the mining business paid for their food consumption and clothing, home furniture, agricultural tools and vehicles. They saved some of this income for their children's education and health care. Conversely, some among them realised the socially negative impacts. For example, water pollution from the sand mining caused health problems for people living downstream; and, the haul trucks destroyed their village unpaved roads and created excessive dust. Furthermore, sand mining created conflict among some villagers or siblings vis-à-vis landownership; that is, where the sand sources were deposited. Some realised that areas of their paddy fields on the river bank had been lost due to river bank erosion, a further result of sand mining. As these negative impacts severely threatened the local livelihoods and resource

usage, the villagers requested that these negative impacts along the Nam Kho should be addressed urgently.

In reality, some local governments and households have attempted to address the negative impacts of sand mining. For example, the village and district authorities placed signs and allocated particular locations to mining. They often monitored the mining sites, fined operators who damaged the land resources of others and forced businessmen to repair the roads that had deteriorated due to their business activities. In addition, some sand businesses had their licences terminated: they were only permitted to mine the sand in their own lands to avoid conflict with others. However, many households still kept blaming the local government for granting permission to the sand operators, claiming that the ways in which they addressed these negative impacts were not successful in reality.

7.4.7. Poverty-Environment Nexus (PEN) along the Nam Kho

Like the Phu He site, and based upon household observations over the last five years vis-à-vis the Nam Kho, ten environmental indicators were used to examine the impacts of sand mining on issues related to PEN. As shown in Table 7.16, the household survey suggests that environmental resources had become depleted and that this depletion appeared to have increased along the Nam Kho. More than 63% of households claimed a significant decrease in forest areas in the vicinity, while 72% confirmed an increase in deforestation.

Table 7. 16: Percentages of households ranking environmental indicators in Nam Kho

Environment Indicators	Largely decreased	Decreased	Average	Increased	Largely increased	No Idea
1. Forest areas	2%	63%	10%	25%	-	-
2. Deforestation	-	22%	5%	72%	2%	-
3. Firewood	-	72%	13%	15%	-	-
4. Tree felling	5%	90%	2%	3%	-	-
5. Agriculture land area	-	-	67%	33%	-	-
6. Land degradation	-	3%	7%	90%	-	-
7. Water quantity	-	78%	12%	10%	-	-
8. Water pollutions	-	15%	17%	68%	-	-
9. Wildlife	67%	10%	2%	12%	-	10%
10. Herbal tree/plants	7%	35%	25%	10%	-	23%

Furthermore, 72% observed that their firewood supplies were diminishing: 90% found a fall in tree felling; no trees had been available for felling since 2005. While 33% found that agricultural land had moderately increased, at the same time 90% said that agricultural land was becoming increasingly degraded. Seventy-eight percent reported a decline in water

quantity and 68% stated that the water was becoming increasingly polluted. A large decline in wildlife, herbal trees and plants in the forest areas was observed by 77% and 42%, respectively. In short, the percentages in Table 7.16 indicate that the environmental resources along the Nam Kho were degraded.

Table 7. 17: Percentages of blame on local actors in Nam Kho

Local actors	Deforestation		Land degradation		Water decline/pollution	
	1 st blame	2 nd blame	1 st blame	2 nd blame	1 st blame	2 nd blame
Sand Mining	2%	-	43%	13%	47%	18%
Local government	7%	22%	2%	8%	3%	2%
Local people	77%	8%	45%	35%	35%	38%
Natural disasters	3%	5%	5%	3%	10%	2%
No idea	12%	65%	5%	40%	5%	40%

In order to ascertain the main causes of these degradations, like at the Phu He site, each household was additionally requested to identify the first and second local actors to be blamed for deforestation, land degradation and water decline/pollution; the first blame was considered the main cause and the second just supplementary information. Table 7.17 show the percentages of households' opinions on local actors to be blamed for resource depletion along the Nam Kho. Seventy-seven percent of households considered the local people the first to be blamed for deforestation; actually, many of them realised that they had cut tree illegally to supplement their incomes. Regarding land degradation, 45% first blamed the local people, while 43% blamed the sand mining businessmen. Finally, 47% first blamed the sand mining operators for the water decline and pollution along the Nam Kho; 35% blamed the local people.

While the asset pentagons suggested livelihood improvement and poverty reduction in the Nam Kho site, Table 7.16 shows that local resources, including forests, agricultural land and water have been dramatically degraded. This degradation resulted mainly from the usage of modern machinery to mine the sand and from the activities of the local people. From the household perspectives, the local people should shoulder part of the blame for resource degradation, with the sand mining operators as the major cause. These findings revealed a causal relationship between poverty and environment inasmuch as the local resources were utilised to reduce their village's poverty. To better understand the impacts of sand mining in relation to PEN, each household was requested to answer two questions: whether and to what extent the sand mining business encouraged them to degrade their environmental resources, and whether and to what extent the degradation of these resources has rendered them poorer.

Drawing from the survey, the households claimed that the revenues that accrued from selling sand increased the wealth of the people who mined the sand initially. While most of the households who owned sand sources started independently running or joined the sand mining business/es on their own lands, and sand mining definitely increased their wealth, it destroyed their land, water and the river bank along the Nam Kho. After depleting their sand sources, the sand mining business, and local people without sand sources, kept increasing their wealth through illegal “Pine or Pek” tree logging. As a result, local resources along the Nam Kho became increasingly depleted. Accordingly, 95% of householders agreed that the local people and the sand mining business caused environmental degradation. After degrading their resources, 97% stated that resource degradation would eventually make them poorer. Therefore, the sand mining business is associated with issues related to PEN inasmuch as it has degraded the local resources and strengthened the strength of PEN along the Nam Kho. However, each household may have had similar or different experiences of these relationships. In the next subsection, I describe these household experiences through narrative reports.

7.4.8. Narratives of household experiences in Nam Kho

Similar to the method applied in Phu He, ten households in Ban Nadi were selected to conduct narrative interviews that aimed to determine how different groups of households have experienced the impacts of sand mining businesses and local resources degradation in relation to PEN. These households were selected by the village chief; then, they were classified into five groups, namely poor, affected, women, sand business, and wealthier. Each household was requested to relate “what experiences” they had of resource degradation and any changes in their livelihoods or new opportunities resulting from the sand mining activities. Then, I selected one household narrative as representative of their group. The narratives were related in the Lao language and I translated them into English as follows:

One of the poor householders in Ban Nadi said that:

Before starting sand mining in our village, my poor family worked hard to maintain our livelihood by relying on local resources and traditional practices, such as cultivating paddy rice and vegetables, raising cattle and fish, collecting pine resin and weaving. After operating sand mining, our livelihood still remained the same. But, we additionally became casual labourers to shovel the sand into the trucks and earned a little money. Shovelling the sand was hard but we had to do it for additional income to improve our livelihood. I think because

of working hard, my health became weak and I often got sick. Since many locations on Nam Kho were used for sand mining, local nature was destroyed, such as river bank erosion, dirty water, and declines in fish and paddy land areas. We used Nam Kho water but now not anymore. In my opinion, while hurting a lot of local resources, the sand mining businesses did not help us much to improve our livelihoods. Thus, our livelihoods remained [poor] the same. We hope for the [all] government to address our poverty issues by providing jobs with better working conditions while also covering health issues.

One of the affected and involved households in Ban Nadi related the following:

Before, my family was poor because we did not have any jobs to earn additional income. Like other households, we mainly cultivated paddy rice and vegetables, raised cattle and caught fish to sustain our livelihoods. I tried many ways to improve our livelihoods. Until 1998, I joined with other households to mine sand in village common land and shared profits with them. While I saw that some sand mining caused soil erosion on my land on river bank, no one took responsibility. In 2005, I decided to start my own business to mine sand in my affected own land. After doing this business, my income was increased and my family's livelihood became better. I could afford to buy a truck for my business and provided sand service. I did consider about problems of bank erosion but I caused it in my own land. Local biodiversity and downstream impacts were not [my] serious issues because many people in our and downstream villages have done the same things. I think as long as [I did] not conflict with others, it would be fine to run this business. When I use up my sand source, I would stop this business, start a new business but still provide a truck service. This can be a proper way to maintain my household's livelihood.

One of the female householders in Ban Nadi said that:

In the past, my household's livelihood was just self-sufficient. While my husband earned salary and I ran a small grocery shop and weaving at home, paddy rice and cattle were our main source of subsistence livelihood. After sand mining was booming, we did it for a while but stopped it due to lack of labour. I saw that sand mining provided jobs and income to many women but on a temporary basis. The work was quite heavy to them, but some women had to bear it because they wanted to earn for their family and cover their expenditures. At the same time, these sand operators also gave some taxes to the village chief to maintain village roads and building temple and some other development activities. After allowing sand mining, my household's livelihood was improved for some reasons. For example, village economy was

improved as many [women] villagers had higher income and I could sell more goods in my shop: we also were able to produce and sell our rice yields and cattle each year. Sometimes, we did some sand mining, but it was not a key factor to sustain my family's livelihood. I saw some villagers lose their land for sand mining, conflicting with their neighbours, destroying the river bank and becoming unhealthy. Some people mined the sand in reservation areas and immediately destroyed the local environment, forest and water sources. For these reasons, the local authorities needed to clarify the mining locations and fine or seriously punish those who violated the rules and laws.

One of the sand business operating householders in Ban Nadi said that:

In the past, my family received income from selling sawn wood, cattle and NTFPs, and our livelihood was just stable and reliant on paddy rice and vegetable cultivation. Starting in 1990, one construction company looked for the sand in our village to build 'the Khangkhai Vocational School'. As the sand was already piled up near Nam Kho, we just shovelled it up into their trucks and received money. After that, I and other villagers started mining the sand from Nam Kho by using boats and simple tools like shovels and hoes. Since 2000, as the demand of sand was high, we used a pump and pipelines to mine the sand near Nam Kho but in my own land. After mining sand, we had better income and livelihood than before. We could afford to buy motorbikes, hand tractors and other equipment. We also paid tax to the district government and village development committee. Currently, we realise that while I lost my land, the local ecosystem in Nam Kho was changed, such as more water polluted, water degraded and fish declined, and the tax is too high to pay. When the sand sources in my land finish, I will stop sand mining business, and I am not sure what to do. I may return to cattle raising, paddy rice cultivation and non-farm jobs like truck-driving and construction workers.

One of the wealthier householders in Ban Nadi said that:

Before, my family were poor and relied mainly on paddy rice cultivation and raised cattle as our income sources. I did not see any opportunities to expand my livelihood. After starting the sand mining business, I could earn additional income and afford to buy my vehicles, truck, hand tractor and rice mill for agricultural activities. I also provided jobs to other villagers by hiring them to shovel the sand into my truck. If anyone requested, I also provided a truck driving service. However, we still considered paddy rice cultivation and raising cattle as our main occupation. Now, my family's livelihood is better than before. For example, we used buffalo to plough and harrow our rice fields but now [we use] the hand tractor. After a few

years of operating sand mining, I saw the bank was eroded in my own land, not interrupting anyone else. Other households, who did not own sand sources, kept accumulating their wealth by illegally cutting the trees and this caused deforestation in our village. In the future, I think this sand mining business should be continued but stopped if their locations are improper. I will stop it too, when I run out of my sand source and turn to provide truck services, paddy rice cultivation and raising cattle.

Evaluation of household narratives of their experiences at Ban Nadi

There can be several ways to evaluate the different experiences of the above householders in Ban Nadi. Following the same method applied at Phu He, their experiences are grouped into different and similar themes.

Their different experiences can be grouped into three categories. First, differences in sand source ownership created distinctions in wealth accumulation among the households. This meant that households who owned large sand sources along the Nam Kho experienced more opportunities to establish a sand mining business. According to their narratives, regarding the accumulation of their wealth, the sand mining businessmen had more opportunities to access water and sand sources and convert these natural capitals into financial capital. Consequently, their access to financial capital allowed these businessmen to further access other asset capitals. On the other hand, households that did not own sand sources experienced difficulty or fewer opportunities to establish their sand mining businesses. Some of them opted to accumulate their wealth by exploiting other resources, such as illegal logging and non-farming activities, even mining sand in prohibited areas. Second, sand mining imposed different impacts on households. It damaged Nam Kho resources in many ways, including bank erosion, water pollution and fish decline. The wealthier and business households may have been less impacted because they depended less upon the above resources. Again, even if they had been impacted, the revenues from sand mining could off-set their losses. The poor water-user households appeared to be the most impacted because they generally relied upon the Nam Kho for their livelihoods or owned agricultural lands along river. Among the most impacted households were those who owned land along the Nam Kho but did not run sand mining businesses. Finally, current perceptions among households of sand mining differed. Some business and wealthier households considered sand mining a good opportunity to improve local livelihoods, not only for themselves in terms of converting their own land resources into financial capital, but also for the poor households and women in terms of job creation. However, many of the poor and the women saw the sand mining business as offering

them poor conditions, hard work, temporary jobs and low wages. They had to participate as casual workers because they had no other alternatives to earn more income.

Their narratives also suggested that these households have had similar experiences in many ways. First, most of them agreed that the sand mining business was the main cause of the degradation of their local village resources. They claimed that this business not only directly caused bank erosion, water pollution and a decrease in fish numbers, but also affected most of the poor and households that relied on Nam Kho resources for their livelihoods. The sand mining business indirectly contributed to forest destruction. Some villagers, who lacked sand sources, started mining the sand in forest conservation areas while others illegally felled trees to boost their incomes. Second, most households participated in the sand mining business. The poor and the women mostly participated as casual workers, shovelling the sand into the trucks. The wealthier households may have been impacted but as resource owners, investors in and managers of sand mining. Most of them had similar future expectations of the sand mining business. They viewed sand mining as temporary, short-term as it was built upon limited sand sources. When these sources were exhausted, the businesses would cease and the locals would revert to their traditional agricultural practices, such as paddy rice cultivation and animal husbandry to sustain their future livelihoods. However, the current resources depletion may obstruct their future agriculture practices. For this reason, many of them expect the local government to intervene and address their local resources degradation.

7.4.9. Summary of the Nam Kho site

Apropos of local investment in sand mining along the Nam Kho, the main findings are quite similar to those of Phu He. Note that the sand mining businessmen were local people, who exploited their own resources along the Nam Kho. Several points can be drawn from the Nam Kho site as well. First, comparing the patterns before and after 2005, poverty sharply declined; the local livelihoods significantly improved, and this was mainly achieved through both farm and non-farm activities. At the same time, the local resources were increasingly degraded, particularly the waterways and the forests; in effect, the sand mining business imposed a cost on the local resources. Second, the local sand mining business was a key factor underpinning local livelihood changes given that it stimulated resource competition among the households to accumulate more wealth. The households who owned sand sources started sand mining businesses by exploiting their own land; but, the problem was that these businesses were located along the Nam Kho. Thus, they destroyed the local resources and the

way to use these resources. In particular, mining caused water pollution, fish decline and bank erosion, and impacted on downstream households.

Third, the sand mining businesses strengthened the strength of the PEN by encouraging resource competition among the households to increase their wealth. The sand mining activities caused resource degradation in Nam Kho; for example, some households illegally logged timber for their incomes, thus causing deforestation. These activities increasingly hurt the poor and other households who relied on these resources to maintain their livelihoods. This strength of PEN at the Nam Kho site will continue unless the local government intervenes or the sand sources are finally depleted. The experiences of the different groups of households suggested several impacts on them. For example, those most impacted were households who were non-sand mining businessmen, who owned land along the Nam Kho, and the poor who rely on the Nam Kho and forest resources for their livelihoods. For these reasons, the current use of water resources may lead to unsustainable environment management in the Nam Kho site, both in the present and in the near future.

7.5. Summary of Chapter 7

This chapter has explored the real impacts of private investment on the resources sector at the village and household levels at two investment sites: Phu He gold mining and Nam Kho sand mining. Sixty sample households in three villages of each site were randomly selected for in-depth interviews regarding their local livelihoods and resource usage. A household questionnaire was developed using the asset pentagons device under the Sustainable Livelihood Framework. Upon completion, the results were compared and descriptively analysed into two periods: before and after 2005. While this household questionnaire represents findings at the site and village levels, 10 targeted households were additionally selected to further examine their experiences of investment-related resource degradation and new livelihood opportunities. The information that appears is based upon their narratives.

Drawing from the two sites, there are certain important points that require highlighting. Poverty has been significantly reduced and local livelihoods improved at the two sites through increased access to the four asset capitals. The upward shifts in their asset pentagons confirm these findings. Local resources usage has changed; in addition, access to natural capital in the two sites declined after 2005. In reality, before 2005, the local people exploited their local resources to maintain their livelihoods. But, after 2005, both the local people and the investors exploited the resources. At the Phu He site, the main threat to land, water and forest resources

stemmed from these two parties. At the Nam Kho site, it was mainly the land, fish, water and forests that were under threat.

The PEN was strengthened at the two sites due to resource competition, degradation and wealth accumulation resulting from investment. While the PEN at the Phu He site weakened following the local government intervention, at the Nam Kho site it will continue unless there is official government intervention or the sand sources become depleted. Clearly, government intervention can reduce the problems created by private investment. Different experiences of the households at the two sites showed that most of them were victims of private investment in the resource sectors. The poor are still the people most affected by and vulnerable to this kind of investment. While one can list many key factors relevant to the poor, such as low socio-economic status in the villages, a weak capacity to cope with problems and lack of opportunities to access the five asset capitals, one fundamental fact is that they have long lived with natural resources for subsistence.

In conclusion, the findings that appear in this Chapter clearly suggest that private investment in the resource sector has changed local livelihoods and resources usage in several different ways based on the types of investment and the resources used. In reality, it seems feasible to suggest that private investment will reduce poverty by eliminating or at least reducing local people's dependence on natural resources and exposing them to the advantages of new opportunities. While a shift of this nature could lead to a 'virtuous circle', investment also has the potential to reduce people's access to natural resource, lead to further exploitation in a 'vicious circle' given that both eventualities can happen at the same time. The two case studies have proved that without local government intervention, private investment will stimulate the PEN. This means that the government has a role to intervene, whether to strengthen or weaken the PEN. The next chapter (Chapter 8) will investigate the management of private investment by provincial and district authorities according to the rights and duties assigned to them by the investment promotion law.

Chapter 8: Private investment management

8.1 Introduction to Chapter 8

The GoL has taken advantage of the country's rich natural resources by promoting private investment in the resources sector. It viewed this promotion as a strategy to achieve economic growth and poverty reduction. As stated in Chapter 3, the GoL (2004c, p. 11) described this strategy as the "Thammasat Way of Development", which meant that it was prepared to manage this growth in tandem with the balance of social-cultural development and conservation of natural resources. In this way, the GoL's investment management could be viewed as well-intentioned. As well, it indicated an awareness of the need to confront the many challenges of the investment impacts and issues related to the vicious circle of the poverty-environment nexus (PEN) for long-term sustainability in Laos.

However, this research suggests evidence of problematic investment management. For example, as suggested in Chapter 5, despite the massive increase in private investment, most of the investment was concentrated in the resource sectors that competed with the rural poor for their daily livelihoods and intensified issues associated with PEN in many districts in Laos. In addition, in Chapter 7, the real impact of private investment on the resources sector at the village and household levels appeared ambiguous given that while some of the locals had improved their livelihoods, the local resources had increasingly become degraded. Thus, the majority of the poor remained vulnerable at the investment sites. For this reason, I deem it is crucial to assess the local government capacity (provincial and district level) to manage the investment impact on development based on their experience in determining how PEN is understood and dealt with in a hybrid system based on a socialist market economy. What is at stake here is the fact that private capital is encouraged and regulated within a nominally socialist system in which the public interest is supposed to be protected by state regulation.

In line with the above challenges, investment management is seen as a crucial issue in Laos according to three perspectives; first, the UNDP and UNEP (2011, p. 1) have claimed that FDI can have several positives; but, its improper management can also create natural resource degradation, depletion or loss of access by local communities. Thus, the host government needs to enforce laws to monitor FDI outcomes. Second, the GoL experiences many

constraints to managing private investment in Laos. For example, Vongsay³⁷ (2010) alludes to many limitations to managing the rapid expansion of private investment in Laos, one among them being lack of an effective regulatory framework and monitoring, and the enforcement of environmental and social safeguards against unwarranted impacts. Finally, one of the findings in Chapter 6 highlighted the fact that in some circumstances, local governments can exercise their rights and duties to mitigate the negative impacts of investment. For example, the PEN at Phu He was strengthened due to the PBM and local activities; but, it was weakened after the local government intervened. Conversely, the PEN at Nam Kho appears to be unmitigated as local government did slightly intervene.

The objective of this chapter is to examine the ways in which private investment is managed locally by provincial and district authorities in relation to issues of PEN. In particular, it seeks to examine the experiences of the above authorities' daily investment management in the context of PEN that can be related to several themes, as stated in Chapter 4. Accordingly, this chapter is divided into five sections. In the next section, I will review the research method as introduced in Chapter 4. I will detail the selection of provinces and districts and their relevant offices reflecting the case studies' criteria, the semi-structured interviews undertaken for data collection, and my analysis of the case study. In section 8.3, I describe the investment background of each administration for the case study. Section 8.4 examines the seven themes derived from the results of the semi-structured interviews; apropos of each theme, the key findings are focused on investment management in the case studies. Section 8.5 will summarise the three case studies and draw appropriate conclusions.

8.2 Reviewing the research method

According to the criteria provided in Chapter 4.6 , three administrative districts, along with their provinces, were selected as case studies, namely Pek District and Xieng Khuang Province: Houayxay district and Bokeo province; and, Bachiang district and Champasack province. These district and provincial administrative authorities are located in the map below (Figure 8.1).

These administrative governments were selected because the districts received a relatively high amount of investment in their resource sectors, and the local resources in these districts were used to promote private investment. In addition, they were categorised in the prioritised

³⁷The National Project Manager of Poverty-Environment Initiative (PEI) and the Deputy Director General, Investment Promotion Department, Ministry of Planning and Investment.

investment promotion zoning, and their poverty assessments in 2003 were ranked differently by the officials. The features of these districts are listed in Table 8.1.

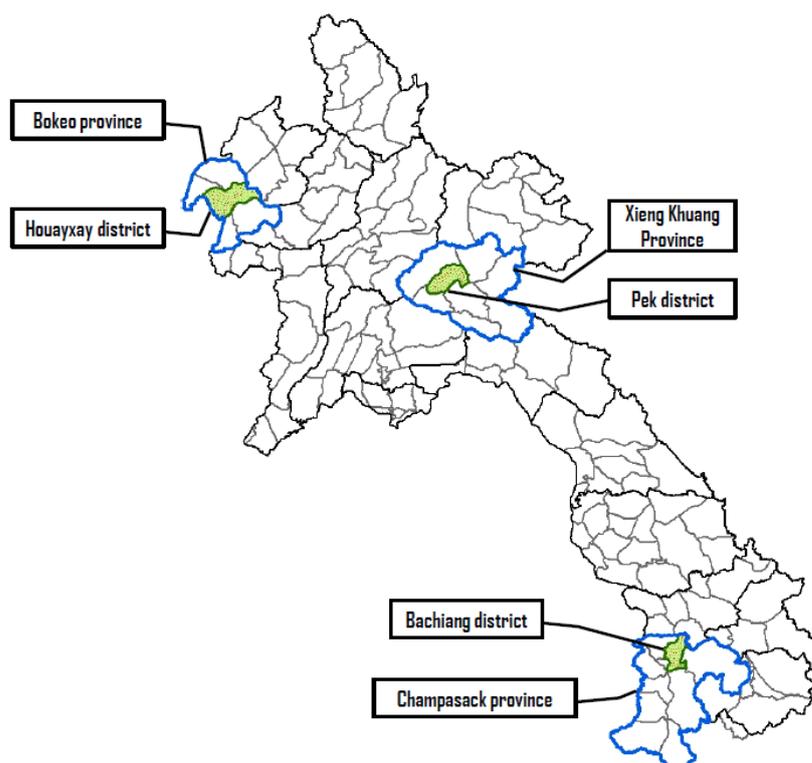


Figure 8. 1: Map of three districts and provinces
Source: Created by author

Table 8. 1: Characteristics of the three selected administrations

Districts	Province	District poverty classification	District zoning promotion	District investment ³⁸
Pek	Xiengkhuang	Poor	Zone 1	29
Houayxay	Bokeo	Non poor	Zone 2	26
Banchiang	Champasack	Poorest	Zone 1	22

After selecting three districts along with their provinces for case studies, fieldwork and data collection were conducted from early June 2010 to the end of July 2010. During this fieldwork, semi-structured interviews were conducted among nine selected offices in each district and province that were expected to relate to the investment management tasks. The nine offices of each administration included 1) the Governor's Office (GO); 2) Planning and Investment Office (PIO); 3) Agriculture and Forestry Office (AFO); 4) Industry and Commerce Office (ICO); 5) Mining and Energy Office (MEO); 6) Tourism Authorities Office

³⁸ See the definition and calculation of district investment in Chapter 5.

(TAO); 7) Land Management Authority (LMA); 8) Labour and Social Welfare Office (LSW); and, 9) Lao Women's Union (LWU).

The semi-structured interviews aimed to elicit participants' experiences in investment management in terms of their awareness of and solutions to issues of PEN in their local areas. To this end, the content of the interviews was intended to set some particular themes, partially extracted from the "rights and duties" of investment management at each government level as stated in the investment laws (see Government of Laos, 2004a, 2004b; 2009). As the law assigned different rights and duties among three main bodies (see subsection 3.5.1, Chapter 3), it is important to examine the ways that the local authorities had exercised the rights and duties in relation to their experiences on investment backgrounds, the process of investment approval and decision-making, the consequences of the positive and negative impacts of investments, their collaboration with other agencies, and their own perceptions vis-à-vis the relationships between private investment and issues of PEN in their local development. Each official was contacted in advance via an official letter: the interviews were conducted in their respective offices.

Data collection during the interviews was carried out (a) by writing down key notes; (b) by audio recording with the permission of the interviewees; and, (c) by taking photos as primary evidence of access to the real investment impacts on local resources and local livelihoods. After completing the interviews, a text analysis approach was employed to examine and interpret the informants' responses. Data collected from the fieldwork were summarised as follows. The interview information was analysed into key information; then, the audio recordings from the interviews were transcribed and combined with the notes taken. Following this, the thematic analysis method was applied to evaluate the information provided. This technique was helpful in identifying the information of each theme raised according to the interview content. It can also detect the common actions and attitudes of the local authorities as they pertain to their daily investment management. In the next section, I provide a short background and evaluate the interview results for each investment site.

8.3 Investment background of provinces and districts

Drawing from the interviews, this section provides the general investment background from each provincial and district administrative level including private investment overview, promotion policy, resources used for investment, and formal and informal investment. Note that while discussing the investment background in their local areas, some authorities

mentioned their weakness and the staff and budget limitations of their offices to carry out their investment management tasks, information that seemed irrelevant to this section. Some of their responses in this section may appear again in the next section, due to the fact that these authorities tended to give similar answers during the interviews, particularly regarding their perceived weakness and human and budget limitations.

8.3.1 Private investment in Xieng Khuang Province and Pek district

Xieng Khuang (or XKH) provincial authorities revealed that both foreign and domestic private investment have increased since early 2000, offering various reasons for the increase. While foreign investment involved only a small number of projects, their financial capital investment was large. Domestic investment, however, was small. The provincial authorities claimed that their investment management and decision-making followed the rights and duties as laid down in the investment laws. For example, as the local CPMI, they approved only small investment projects, acted as inspectors, monitored the investment projects, and reported to the central CPMI. Mining and large investments were approved by the central CPMI. In addition, the authorities detected a number of small informal investments that were not registered with the governments. Some of these informal investments were those of retired staff and local wealthy villagers, who owned large tracts of land and invested in agricultural and forestry activities for their own profit. Some of the informal investments were mostly approved by the local governments as a way of assisting these local households to increase their wealth and reduce their poverty.

According to Xieng Khuang's 5 year socio-economic development plan (2011-2015),³⁹ private investment between 2006 and 2010 increased dramatically with a total of 85 investment projects and capitals registered at 678.11 billion kip, sixteen times their planning target for 2005. Among them, 56 domestic investments worth 250.55 billion kip and 18 foreign investments worth 174.4 billion kip were approved by the local authorities. Another 11 investment projects worth 253.15 billion kip were approved by the Central CPMI. Clearly, the number of domestic investments was higher than that of foreign investments. Among the domestic, there was 35.7% investment in the service sector, 28.5% in agriculture, 25% in light industry and 10.7% in others. Among the foreigners, 31% invested in agriculture, 31% in trading and light industries, 27.6% in mining and 10% in the service sector.

³⁹This report is available in the Lao language.

In terms of land concession, 50% was allocated to mining and land excavation projects, 30% to agriculture and wood processing, and 8% to livestock raising. In the agriculture sector, most of the investment focused on vegetables, tea, grass, tobacco and cassava plantations, following the 2+3 method.⁴⁰ These investments were mostly located in Pek district, rather than in other poorer districts, where better infrastructure and arable land were available. Most of the companies (from Australia, China and Vietnam) were interested in large scale mining surveys and exploration, such as iron, gold, zinc, copper, coal and lead. The domestic companies only invested in small-scale mining like sand mining and stone extraction and services. In the tourism sector, natural historical and cultural tourism were promoted for private investment in the interests of conserving the local environment and reducing poverty. Hydropower received less investment due to geographical difficulties: only small dams and power grid extension projects were proposed.

Despite the increased investment, some provincial authorities remained uncertain regarding private investment, claiming that most were likely to be short-term and on a trial basis. For example, if they were making a loss, the investors would immediately withdraw and invest elsewhere. In addition, after approval, some investments with large land concessions either did not activate their investment activities or only activated a small section of the activities. Moreover, some of the large companies approved by the central CPMI seemed unwilling to cooperate with the local authorities. For example, they hired local labourers without informing the local authorities; then, when problems occurred among the local labourers, the local authorities could not help them because the labourers were not registered, having been hired on a casual basis. Poor cooperation from the investors was claimed to create difficulties for the officials. The latter found it difficult to collect data on real implementation activities, and on the real wages and welfare provided by the companies. While there was little doubt that investment would benefit the local households through employment and income generation, the authorities remained silent regarding internal conflict between the benefitting and affected groups, and local resources depletion. When asked about such impacts, some provincial authorities admitted to ambiguous results from investment based on their personal experience.

Similar to provincial authorities, most of the Pek district authorities claimed a stable increase in private investment in their district after 2000, particularly in foreign investment, small and

⁴⁰ The 2+3 method refers to agricultural investment where local villagers contribute land and labour; companies provide seeds, technical input and marketing for products.

medium enterprises (SMEs), and small surveys projects approved by the local CPMI. These investments mainly focused on agriculture for export (such as corn, peanuts, cassava, animal and cattle raising and farming), industrial tree plantations (wood processing, sawmills and factories), mining (sand mining and stone extraction) and the service sector (hotels, guesthouses, resorts, golf courses and trekking). Most of the district authorities oversaw the investment management tasks implemented at the provincial level. In other words, the provincial authorities guided them in ways to manage investment in Pek district. Following provincial guidelines, their duties were mainly to conduct baseline surveys, monitor investment activities, and report investment progress and obstacles to the provincial authorities.

But, the Pek district authorities had mixed perceptions of investment management tasks in their district. Some were optimistic about the current system of investment management that followed the provincial guidelines rather than their own. They maintained that the investment management tasks were both new to and difficult for them; as well, they had limited human resources (staff), equipment and budgets to handle these difficult tasks. On the other hand, other district authorities considered the current management system impractical and insufficient, claiming that the system allowed them only limited information and lacked investment data to share with them. As they did not receive full investment information, and were not involved in the decision-making process, this deficiency caused some difficulties for their administrative work and an inability to assist the provincial authorities to manage the investments. In addition, while they realised some benefit from the investments for the local livelihoods in terms of income generation, employment opportunities, and women's empowerment, many of them admitted that local livelihoods at the investment sites had almost remained the same. They considered investment as providing temporary employment with low wages. The majority agreed that most of the investors were on trial periods: they sought only to make profit rather than taking risks in their district. Most of the district authorities admitted that they needed to improve their knowledge and skills in terms of investment management in order to better perform their tasks.

8.3.2 Private investment in Bokeo Province and Houayxay district

The Bokeo provincial authorities explained that prior to the year 2000, private investment in their province started from small individual merchants and informal traders and was later transferred to collectives, cooperative enterprises and individual companies. After 2000, both foreign and domestic investment gradually increased in Bokeo due to its convenient location,

its sharing of borders with Thailand and Myanmar, its linking roads and natural resource potential. Consequently, the demand for land for investment sharply increased, particularly for rubber plantations and mining. Houayxay, the district capital, received most of the investments compared to other districts. Some among the Bokeo authorities insisted that they had a proper system in place to manage private investment in their province. For example, all agricultural investors had to cooperate with the local villagers and follow the 2+3 method to avoid the land concession approach. While most of the investments were formally approved either by the central or local CPMI, they admitted that a few informal investments had been made in their province and operated as individual industrial tree plantations on their 1–2 ha of land. Apart from the resource sector, Bokeo experienced large investment in the non-resource sectors, such as casino and tourism constructions, paper, bio-fertiliser, a hand-bag factory, a motorbike factory, matches and some food products factories.

By contrast, some of these authorities criticised the current investment management in the following ways: first, management was not fully decentralised and participatory; and, vis-à-vis the concerned officials, some were not informed or involved in the investment decision-making process. Second, after investment approval, many private companies cooperated less with the relevant provincial departments regarding the implementation of their investment activities. For example, like Xieng Khuang, the provincial Labour and Social Welfare authority has a minor role in investment management: it could not manage the labour demands and market as the companies directly hired local labour. Third, as the increase in investment resulted from local resources and investment incentives, the authorities raised concerns regarding future investment impacts when said resources and incentives were eliminated. Finally, while the increase in investment led to an increase in their tasks of monitoring and reporting, they freely admitted the difficulties they faced when attempting to effectively manage investments due to their low capacity, limited skills and limited human resources.

The provincial authorities recognised that most of the investors were interested in the resources sector. For example, many investors were said to focus on the agriculture sector, such as maize, peanuts, beans, sesame farming and rubber plantations; and, all of them were required to follow the 2+3 model. Most of their products were exported to Thailand. But, electricity distribution was improved and extended by the government as was the

development agency budget through Electricite du Laos (EdL).⁴¹ Only three dams (40MW, 70MW and 5MW) in Houayxay were privatised. Both domestic and foreign companies were interested in the mining sector, for example in iron, gold, salt, sapphire surveys and exploration. Similar to Xieng Khuang, private investment in the tourism sector increased including hotels, guesthouses, and resorts. A survey was undertaken of 85 integrated-tourism sites. Their histories, nature and culture were surveyed and promoted for private investment. The provincial authorities expected these tourism activities to be pro-poor and to enhance the local livelihoods. They also expected that some local villagers would be able to turn their land into capital and to start their businesses. Indeed, many of these villagers found that such investment boosted their wealth and improved their livelihoods.

Similar to the comments of the Bokeo authorities, the Houayxay district authorities noted an increase in investment in their districts, mainly from China. Most authorities claimed that their access to details of the investments was limited; but, they were available at the provincial level because most of these investments were managed by the provincial authorities. Many of the district authorities realised that their duties in terms of investment management were mainly to support the provincial and other district offices' daily tasks, to survey new investment sites, to license local small businesses, to correspond to the change in price and quotas, and to facilitate local import-export goods. In other words, they acted as assistants to the provincial authorities. While many investments were registered, some informal or unregistered small investments existed in their district in many forms, such as brokers or middlemen, local household businesses, and some profit-related activities for retirement staff on their own lands. The last mentioned operated on a seasonal and short term basis. The Houayxay authorities claimed that they encouraged informal businesses to register and to avoid being illegal.

The Houayxay district authorities found that the investors were interested in all of the resource sectors; but, they encouraged them to engage with the agricultural sector, to produce products for export, create employment, and generate income for the local villagers. Most of the companies in the agricultural sector were interested in crops and vegetables, maize, peanuts, organic plantations and products for export as well as raising animals. In addition, investment in the wood sector focused on rubber plantations and followed the 2+3 method. Investment in the NTFPs was small: trade was carried out along the borders. Mining

⁴¹ Electricite du Laos (EDL), the state corporation of Laos, owns and operates the country's electricity generation, electricity transmission and electricity distribution assets.

investment was controlled at the provincial level, as suggested above. In addition to the resource sector, some private companies invested in non-resource sectors, such as hotels and guesthouses, factories, match factories, bio-fertiliser, weaving, and bag and wallet factories.

The district authorities raised several concerns over the current investment management. First, data appertaining to investment and land concessions were not fully shared among them. Some of the district offices faced difficulties performing the tasks assigned to them. Second, most of the investors communicated only with the district offices that were relevant directly to their investment activities. They appeared to ignore other district offices, thus creating weak communication with them in terms of monitoring and reporting to the provincial authorities. Third, some of the investment companies appeared lax following the investment laws, especially laws related to land. Many laws on investment promotion were announced; but, they were not fully enforced. The investors tended to violate these laws; for example, some of them provided lower compensation to the affected households than stated by the law, or did not report their production and business activities to the local authorities. Finally, they found that most of the investments in the resource sectors increasingly used modern machines, facilities and tools rather than local labour; for example, in some cases, tractors rather than local labourers were used to clear bushes and plant seedlings. By doing so, use of these machines contributed to local people losing their jobs and to local resources becoming increasingly degraded in their district.

8.3.3 Private investment in Champasack Province and Banchiang District

Champasack provincial authorities revealed that private investment in their province increased dramatically between 2003 and 2008. The factors driving this increase were attributed to provincial resources, low labour costs, road connections, peaceful and secure locations and active government service, openness of government policy, incentive investment promotions and adaptable investment laws and regulations. Most of the investments were sourced from Vietnam, China and Thailand. In 2009, investment decreased slightly due to the global financial crisis and to the shortage of land for investors; but, the authorities claimed that the financial inflows from approved investments continued to rise. Some among the Champasack authorities claimed the existence of informal investment in the forms of unregistered small household businesses. But, these businesses were not eligible for any special incentives.

The provincial authorities maintained that since 2000, most of the available land had been allocated to private investment, in particular rubber plantations, coffee farming and mining surveys. In the agriculture sector, companies invested in coffee, organic vegetables, cassava, sugar cane, and rice for export. In the wood industry, rubber plantations sharply increased both financial investment and land demand from both Vietnamese and Thai investors. In the mining sector, 40 projects were proposed and some were under survey. Some of the provincial authorities considered mining investment important to support national revenues and local incomes. The hydropower sector received 19 projects with 12 small ongoing projects and 7 under a Memorandum of Understanding (MoU), all of which streamed from Japan, South Korea, Malaysia, France and Thailand. The tourism sector aimed to promote natural and cultural tourism activities; but, most of the investment went into hotels and small tourism activities rather than into developing and maintaining these attractions. In the main, the authorities insisted that investment in Champasack was promoted along with the government promoting investment list.

Most of the Champasack authorities recognised both the benefits and concerns surrounding private investment in the resource sectors. For example, they appreciated the fact that a number of the local people engaged in investment activities, and that their livelihoods had improved as a result. In the past, unemployment rates were high. Many local women and others stayed at home and could not earn any income. Recently, many of them had benefited from investment in terms of getting jobs and incomes to support their families. Conversely, the authorities expressed their concern over the increase in large scale investments that could reduce the forest areas upon which the locals relied for their daily livelihoods. So, the authorities attempted to reduce the supply of land to investors. At the same time, they also prevented the investors from encroaching on the local villagers' land. In addition, they criticised some investors who employed the locals only in the initial stages of their investment, with employment gradually diminishing later on. Lastly, they claimed that many of the local poor, who had lost their lands to investors, seemed vulnerable to poverty because their access to natural resources was reduced and they had limited alternative income sources to sustain their livelihoods.

The Bachiang district authorities suggested that the increase in private investment in their district was mainly driven by the local people, domestic investment and by interest expressed by Vietnamese and Thai investors. Most invested in activities related to trading and factories; for example, in the wood industries (including rubber plantation and saw-mill factories), and

in the agricultural sectors (including cashew nut, cassavas, sweet corns, maize farming and raising animals for export). In addition, investment in the non-resource sectors, such as shoe and food factories, also attracted attention. As regards their daily tasks, the Bachiang district authorities claimed that they approved only small scale local investment and offered few investment incentives. Large scale investment was granted and managed by the provincial authorities. With reference to their investment management tasks, the Bachiang authorities admitted that they acted as assistants, particularly for data collection, monitoring and reporting to the provincial authorities. Some of them faced many difficulties in monitoring a large investment because they were rarely involved in the decision-making process, did not have full investment information, and lacked the necessary capacity to perform the tasks.

The Bachiang authorities observed some positive and negative effects from the investments on the local livelihoods. For example, most of the local villagers were farmers and earned small income (data not given). After 2005, many of them became labourers, working for investors and earning approximately 20,000 to 25,000 kip per day. Before this, many of the women had worked hard on their farms to support their families; but, now they had jobs and were learning skills; so, most of the women could earn at least some income to support their families. From this perspective, the livelihoods of many households were viewed as improving. However, since investment has grown in their district, some of the Bachiang authorities recognised the local pressures on land allocations. Some of them claimed that land management was weak due to the demands of the investors. In some cases, the locals were willing to sell their land to investors because they wanted the extra money. They also recognised the increase in the number of social problems, such as conflict over land ownership among siblings and between neighbours. In other cases, some local people sold their lands to investors, fearful of being cheated by others. To date, the district authorities have collaborated with the provincial authorities to resolve these issues; but, many remained unresolved.

8.4 Investment management explored through semi-structured interviews

As stated in Chapter 3, the investment promotion laws have assigned rights and duties to the authorities to manage investment. I define the term ‘management’ as processes and techniques used by the relevant authorities according to their assigned rights and duties to handle investment in their local areas. In other words, the authorities are supposed to carry out their rights and duties as outlined in the laws. On the other hand, as mentioned in Chapter 1 and suggested above, the GoL tends to pursue socialist ideology under the leadership of the LPRP,

which implies that real power in decision-making is laid upon the senior members of the LPRP, ranking from the Central to Local levels. Additionally, under this ideology, any task and position assigned to the government staff is often assessed on the grounds of their being members of the LPRP rather than on knowledge and capacity related to the tasks. In this context, it is important to understand the political issues regarding the political culture, structure of political power and political corruption in the Lao government context in detail, issues that have been widely studied and debated, for example, by Stuart-Fox (2005; 2006), Bourdet (2000, 2002) and St John (2006). Thus, it may be questionable as to whether these rights and duties are practised sufficiently, and to what extent the local authorities have the capability to successfully manage private investors, particularly in the context of PEN. To this end, each authority was interviewed on seven themes related to the provincial and district rights and duties as stated in the investment laws. Their responses are summarised in the following subsections.

8.4.1. Involvement in approval and decision-making

This subsection elaborates on the ways in which the authorities are involved in investment approval and decision-making in the initial stage of investment and the granting of investment. After completion of the interviews, the authorities' responses were transcribed and listed in Table 8.2, illustrating the frequencies and methods involved in the approval or decision-making processes relevant to the investment. The columns in this Table indicate two levels: Pek, Houayxay and Bachiang at the district level, and Xieng Khuang, Bokeo and Champasack at the provincial level. The rows represent the acronyms of the nine offices.

The responses from the authorities of the three districts in Table 8.2 suggested that their involvement in approval and decision-making related to resources investment was relatively low. Most of the Pek district authorities stated that they rarely participated in formal investment approval and decision-making. Some did so only in the initial stages of surveying or informal meetings after approval. Some offices, such as the AFO and LMA, were assigned the task of monitoring the investment activities in relation to their technical responsibility. Then, they reported to the provincial authorities. Similarly, some among the Houayxay district authorities claimed that they had never participated in approval and decision-making: others said that they were engaged in management tasks as surveys conductors and monitors. Most of the Bachiang district authorities said that they performed tasks similar to those of the two district authorities. As evident in Table 8.2, some of the district authorities played a more direct and relevant role in the investment tasks. The GNO, PIO and AFO were more involved

in data surveys, monitoring and informal meetings; thus, their involvement in investment management may be considered as more significant.

According to Table 8.2, the provincial authorities were significantly involved in the approval and decision-making processes; but, not all were involved. In Xieng Khuang, for example, except for the MEO and LWU, most of the authorities participated in investment approval to some degree. Similar to the Pek authorities, they described their involvement in terms of surveys, approval meetings, monitoring and reporting. In addition, the degree of involvement of the most of Bokeo and Champasack provincial authorities matched that of the Xieng Khuang authorities. The PIO and AFO authorities in Bokeo and Champasack appeared to have more engagement than those in Xieng Khuang because the number of investments in Bokeo and Champasack was higher than in Xieng Khuang, especially in the agricultural and forestry sectors. Furthermore, Table 8.2 suggests that some of the provincial authorities, including the PIO, AFO and LMA, played direct roles in private investment, whereas the LSW and LWU were only indirectly involved. In short, because only some of the district authorities participated in investment decision-making and approval, their participation in management may be viewed as marginal. The provincial authorities appeared more involved, but only those offices directly concerned with private investment. Clearly, many of these authorities had limited involvement in investment approval and decision-making, limitations that constrained any effort to manage investment in their local areas competently.

8.4.2. Problems and conflict in investment management

The interviews in this subsection are intended to identify any problems or obstacles that the authorities faced or prevented them from effectively managing investments. Many of the authorities responded either to ‘problems’ or ‘conflict’ or ‘both’, outcomes they recognised as resulting from investment. Thus, many of their responses appear in Table 8.3. This Table shows the three districts and three provincial levels in the columns, and the six different actors facing or creating problems and obstacles in the rows. Note that the key message in this Table is located in the responses of the local and central government officials.

Pek and Houayxay identified the individual households’ problems in the course of their investment management as related to health, land entitlement and low incentives. Xieng Khuang and Bokeo claimed that the problems related to individual households included informal contracts, cultural impacts, individuals’ greediness and law violations. At the household level, both levels of authority revealed problems appertaining to land boundaries

and entitlements, insecure compensation, and temporary and unequal employment. In addition, low skills and education, high expectations, unequal opportunities, social problems, market inaccessibility, powerlessness when negotiating with investors, and conflict over land at the village level added to the difficulties experienced by the authorities. Furthermore, the investors created their own set of management problems such as unfair negotiations, breaking promises, poor disposal of chemical and toxic pesticides, low investment commitment, temporary employment, law violations, low pro-poor investment, limited collaboration with the local authorities, land conflict and invasion, unused land concessions and massive exploitation of the forest areas.

More importantly, many of the district authorities recognised a range of problems peculiar to themselves that prevented them from effectively managing investments. They acknowledged the different perceptions and partial collaboration among themselves along with insufficient information as major inhibitors of their investment management. In particular, they admitted to their weak management, which, they claimed, was due to lack of necessary knowledge and skills to analyse and prevent investment impacts. In addition, the district authorities considered some of the central government's policies regarding investment promotion as both unrealistic and impractical in their local areas.

Similar to the district level, many of the provincial authorities claimed their low capacity, partial collaboration, and insufficient access to data and information as major causes of their weak management. In addition, they maintained that lack of technical staff, inadequate budgets and weak law enforcement hindered their efforts to control and monitor the investment impacts. Most of the provincial authorities saw some articles of the investment policies as unrealistic and complex, especially those related to land allocation and concessions, and, some articles of the laws passed to manage the investment were weakly enforced. In addition to misunderstanding by the provincial and district authorities, the laws were not fully understood by some among the central authorities. For example, Dr. Phouangparisak,⁴² the Deputy Minister of Agriculture and Forestry, stated that: "The Ministry has laid down rules and measures about agricultural land management in Laos under the law, but they [rules and measures] are not yet clear" (Vientiane Times, 2013, 24 January). For these reasons, the district and provincial authorities insisted that many factors (constraints)

⁴² Dr. Phouangparisak Pravongviengkham, in the *Vientiane Times*, 24 January 2013, on the occasion of the release of a national report on land concession and leases.

surrounding the rules and measures needed to be improved (removed) in order for the authorities to effectively manage investments.

8.4.3. Positive contributions assessed by investment authorities

This section aims to determine the positive contributions that flow from private investment as assessed by the local authorities in the course of their investment management. For this purpose, each authority was requested to express the positives according to their perceptions. Their key responses appear in Table 8.4. In this Table, the authorities' positive contributions were divided into five beneficiaries in the rows and two authority levels in the columns.

Among the district authorities, only some among the Pek authorities claimed positives from investment in local resources in their district in terms of forest conservation and reduction in shifting cultivation. In addition, the authorities of three districts noted many positive contributions from investment to local villages including a significant increase in employment, family businesses and incomes, school enrolments, technical knowledge, the availability of various products, improvement in local infrastructures, market accessibility and village development funds. Moreover, these factors helped to enhance not only local livelihoods, but also development in the three districts. For example, the authorities considered that investment helped to expand the local market and economy, increased their tax revenues, and provided the local authorities with new technical knowledge. These positives financially contributed to rural development, poverty reduction, and infrastructure improvement, all of which improved local livelihoods and facilitated social problem mitigation in their districts. It is worth noting that the district authorities did not mention any positives at the provincial and national levels as this went beyond their knowledge.

Similarly, Table 8.4 shows that the authorities in the three provinces acknowledged several positives from investment. Xieng Khuang and Bokeo authorities saw forest conservation and reforestation as positives from tree plantation investment in their local resources. Like the district authorities, many of the provincial authorities recognised several benefits from investment that improved local livelihoods, especially increases in female employment and family incomes and improved education enrolment. Many of them believed that these factors helped them to reduce rural poverty and to enhance the development of many villages and districts in their provinces. More importantly, the provincial authorities identified many positives from investment at the provincial level. For example, they stated that the tax revenues accruing from investment boosted the development budgets that they used for

poverty reduction, infrastructure improvement, for building their capacity and technical knowledge, and implementing their provincial development plans. Note that only the Chamapasack authorities observed that private investment contributed positively towards achieving the national development plan.

8.4.4. Negative impacts assessed by investment authorities

As opposed to the previous section, in this section I seek to examine the negative impacts of private investment as assessed by the local authorities in the course of their investment management. Each authority was requested to outline the negative impacts. Their key assessments appear in Table 8.5 in which the negative impacts are divided into five affected groups in the rows and two authority levels in the columns.

At the district level, the authorities of three districts detected several negatives. They claimed that investment had impacted on local resources, local villages and the districts' development. They further claimed that investment had degraded the local resources in many ways, causing deforestation, mudslides, infertile soil, soil erosion, NTFPs and biodiversity destruction, water decline and pollution, and wildlife decline. The above authorities realised that resource degradation was hurting many local villagers' livelihoods, in particular reduction of their arable land, livestock and rice fields, which have traditionally been important sources of food and incomes. In addition to taking away these resources, the authorities acknowledged that investment not only negatively impacted on local livelihoods, but investors broke their promises to help the people in areas such as health problems, alleviating labour exploitation through low wages and temporary employment, social problems, gender issues, and unequal benefits distribution. Moreover, interestingly, negative impacts at the district levels varied between the three districts. Some among the Pek authorities claimed that they could not properly control the influx of backpackers and foreign workers due to weak cooperation from the investors. The Houayxay and Bachieng authorities expressed their concerns regarding (a) the use of toxic chemicals and pesticides associated with mining and plantation investment; and (b) insufficient foods, seeing these factors as local resource degradation in their districts. Note that the district authorities did not allude to any negative impact on the provincial and national levels.

The negative impact assessed by the authorities of the three provinces was similar to that of the district authorities in that it appertained to local resources and local livelihoods at the district level. For example, the key negative impacts from investment in local resources,

similar to those of the districts, were mainly related to deforestation, land degradation and water pollution. In line with the district authorities, the provincial authorities emphasised the negative impact of investment on local livelihoods in terms of land invasion and conflict, increased local resources competition, insecure compensation, and household income instability. However, the provincial authorities' negative impacts differed from those at the district level. For example, the Xieng Khuang authorities said that some of the investments created land conflicts; investors avoided paying their taxes and delayed their investment activities, especially regarding land concessions. In Bokeo and Champasack, the authorities included uncontrollable foreign labour, human trafficking and social problems among the negative impacts of the investment at the district level. Note that the provincial authorities did not mention any negative impacts at the provincial and national levels.

8.4.5. Main lines of coordination related to investment management

The local authorities claimed to follow vertical and horizontal cooperation lines when implementing their administrative activities. Vertical or top-down cooperation flows from the central to the local governments, while the horizontal lines involve either the ministries at the central level, the departments at the provincial level, or offices at district level. To avoid problems of cooperation and management, these two lines are not supposed to cross each other.

With full awareness of these cooperation lines, in this subsection, I examine the main affiliating cooperation that the district and provincial authorities exercise regarding investment management. I also aim to explore the strength of their affiliations in the context of investment management. Affiliating cooperation, which directly helps the district and provincial authorities to manage investments, may be ranked from the central government to the chiefs of villages or from multilateral donors to small individual non-government organisations. The strength of the affiliation can be classified into three categories: high, moderate and low. The responses from the district and provincial authorities vis-à-vis their main affiliating cooperation are shown in Table 8.6.

The overall results in Table 8.6 suggest that the district and provincial authorities strictly followed the vertical and horizontal cooperation lines when selecting their affiliations in terms of investment management. At the district level, most of the district authorities suggested moderate cooperation with their provincial departments and district line offices. They also claimed to coordinate provincial authorities and villagers when addressing issues surrounding

the investment sites. But, the strength of their cooperation appeared to be mixed; most suggested high and moderate with most offices, but low with LSW and LWU. In addition, some districts offices, such as TAO and ICO in Pek, PIO and LMA in Houayxay, and AFO and LWU in Bachiang worked with development agencies and NGOs to avoid conflict of development interests. Only LMA in Houayxay and Bachiang claimed to contact directly with the central government, due to controversy over land issues in these two districts. But, this was quite an exceptional case.

Similar to cooperation at the district level, at the provincial level, most of the authorities in the three provinces coordinated several Ministries at the central level, most of the provincial departments and many districts line offices regarding investment management. The strength of their cooperation was generally considered to be moderate. In addition, with the exception of the Bokeo authorities, some of the provincial authorities stated that when collaborating with the relevant district authorities, they had approached the village levels to address the local peoples' issues at the investment sites. This was the case with the AFO, ICO, MEO and LMA in Xieng Khuang, and the MEO and LMA in Champasack. Moreover, some of the provincial authorities were increasingly working with particular development agencies and NGOs in a bid to promote private investment in their provinces, and to build capacity and technical knowledge so that their staff could handle investment impacts such as Environmental Impact Assessments (EIA) and Social Impact Assessments (SIA), and learn computer skills. Similar to the districts, some of provincial authorities, including LSW and LWU, claimed to have low cooperation with many offices because their technical responsibilities were viewed as less relevant to investment management.

At the central level, weak management and lack of coordination among the government agencies needs to be revised as well. For example, Dr Phouangparisak (Vientiane Times, 2013, 24 January) suggested that: "Changes are needed to address poor management and lack of coordination between the relevant sectors, in particular [in] the Ministries of Planning and Investment and Natural Resource and Environment".

8.4.6. Solutions to negative outcomes and problems

This subsection focuses on solutions that authorities can adopt to address the negative impacts of- and problems that are caused by- investment. Prior to conducting the interviews, my attention was focused mainly on practical solutions; but, during the interviews, the authorities not only stated their key practised solutions, but also proposed additional solutions that were

not as yet practised. Accordingly, both key practiced and proposed solutions were extracted after interviewing: they appear in Table 8.7. The columns in this Table are divided into district and provincial authorities; each column consists of five actors, namely investors, local people, and district, provincial, and national authorities. Each actor alluded to both practiced and proposed key solutions.

The district authorities suggested that the investors should increase the locals' employment opportunities and wage rates, provide them with secure compensation, and reforest and reinvest in the local resources. Additionally, the investors were requested: (a) to share more of their investment information in Pek district; (b) to stop using chemicals in Houayxay district; and, (c) to reduce land demand in Bachiang district. At the same time, the Pek district authorities conceded that the local people needed to improve their productivity and skills, become more aware of gender and social issues (related to prostitutes, human trafficking and women's empowerment) in Houayxay, and to conserve more of their forest areas and NTFPs in Bachiang. In addition, the district authorities needed to improve their own performance in three areas: first, they needed to expand their cooperation to include other relevant government agencies, especially during CPPI consultations and the sharing of investment data; second, they needed to build up their own skills including investment negotiation and selection, environmental management and monitoring systems; and third, they needed to enforce and disseminate the investment laws, particularly in relation to land allocation and fees, and impose fines to reduce or eliminate the use of toxic chemicals. Furthermore, the Houayxay and Pek authorities observed that the provincial authorities should decentralise or share the investment responsibilities with them. On this topic, there was no comment from the Bachiang authorities. The Pek authorities emphasised improvement on the part of the provincial authorities vis-à-vis CIPM consultations and cooperation, concrete investment information and multiple-scale analysis, and especially environmental management. Note that the district authorities did not comment on the national authorities.

The provincial authorities proposed several solutions to investment management. Apart from stating that some of the investors needed to activate their investment activities, transfer skills and knowledge, and increase the local wage rates, they insisted that compensation to the affected households should be secure. In addition, the local people should be invited to participate in the investment activities, by extension improving their skills and productivity, empowering women, and preserving the local cultures. Some of the authorities in the Xieng Khuang and Bokeo provinces said that their district authorities needed to become more

involved in CPMI consultation and in strengthening their own capacity, especially knowledge of toxic side-effects, environmental management, and investment impact analysis. As well, they should improve their management of investment registration, land allocation and law enforcement. At the same time, the provincial authorities also suggested that they needed to improve their investment management skills, particularly concerning CPMI consultation, concrete information, monitoring systems, multiple-scale analysis, law enforcement and dissemination. As well, they needed to increase their decentralising responsibilities, especially in the areas of investment selection and technical cooperation with their government line agencies. Finally, some of the Xieng Khuang authorities stressed that the investment policies of the national authorities needed to be more realistic regarding their local circumstances. There was no comment from Bokeo or Champasack.

8.4.7. Recognising issues related to PIPEN and investment management

As stated in Chapter 3, the GoL established the poverty-environment initiative (PEI) program (see PEI, 2010, n.d.) to provide the right understanding and knowledge of these issues to their government staff with the expectation that poverty reduction activities would not cause environmental degradation, and that both issues could be addressed at the same time in the same areas. In recognising attention, the study assumed that the local governments' understanding of PEN issues in Laos may be extremely low; and, that of PIPEN might be extremely rare.

Accordingly, this subsection seeks to determine whether the local authorities can recognise issues of PEN in relation to their investment management, especially investment contributing to poverty reduction and environmental management. It also investigates whether they can identify any relationships between private investment and issues related to PEN in their local areas. With this in mind, each authority was asked to describe issues related to poverty and environmental resources in their local areas as a result of resource utilisation by the local people and investment; also, whether their utilisation caused resource degradation and resource degradation, in turn, hurt their local people. Their opinions were sought according to experiences related to their management rights and duties. Their main responses appear in Table 8.8. Similar to the previous Table, the district and provincial authorities are shown in the columns, and the three issues and the PIPEN observations are shown in the rows.

At the district level, the authorities in the three districts recognised many issues that could be attributed to investment in their local areas. For example, many of the local people were

unskilled labourers. Jobs offered by the investment companies were temporary, the volume of arable land and forest resources was diminishing, compensation was insecure, and land conflict among households and invasion by investors frequently occurred. The district authorities claimed that environmental degradation and changes in the ecosystems in their districts resulted from deforestation, land degradation and water pollution. But, the main factors underlying the degradation were quite different; for example, poor disposal of toxic chemicals, resource exploitation in Pek and Houayxay, and mono-cropping in Bachiang. Thus, while they ceded that resource exploitation by the locals and investors caused resource degradation, they remained quite uncertain as to whether degradation would hurt local livelihoods. The Pek and Houayxay authorities noted a weak relationship between the impacts of private investment and issues related to PEN in their districts. Some of the Bachiang authorities were not sure, and some viewed the relationship as weak. Furthermore, regarding issues pertaining to their duties and right to manage investment, the district authorities blamed their work system, too many investments to manage, weak exercise of investment rules and laws, violations of laws and regulations, weak cooperation among the local authorities, and lack of a proper monitoring system.

At the provincial level, the authorities of the three provinces suggested that the key issues underpinning poverty resulted from investment: land conflict, allocation and invasion, insecure compensation, reduction in agricultural land, local unskilled labour exploitation, low wage and temporary jobs, high living costs and unequal benefits for the local people. Similar to the district authorities, the provincial authorities detected issues of environmental degradation including deforestation, land degradation, and water decline and pollution in their provinces. While the provincial authorities acknowledge that both the locals and investors utilised the local resources, they had mixed opinions regarding the relationship between private investment and issues related to PEN in their provinces. In their responses, they were not sure who degraded resources and to what degree. While resource degradation would hurt the local livelihoods, the locals often searched for alternatives for their survival. Also, they were not sure if the current investments in fact benefitted the local people in the long run, and if the investment policies genuinely served the interests of their provinces. Therefore, some said there was a weak relationship while others were not sure.

Moreover, the provincial authorities criticised a number of issues related to their own investment management. First, their technical staff had low capacity to carry out investment management, especially evident in weak monitoring, poor environmental impact assessment,

and weak cost-benefit analyses. Second, their weak investment management was due to the fact that the enforcement of investment rules and laws by the concerned authorities was low; thus, some of the investors sought to violate the investment rules and laws. Many investments became ineffective in their provinces; many investors, who were little better than profit seekers, avoided paying their taxes. Finally, the provincial authorities claimed that there were too many investments to manage while they had limited staff and budgets to execute tasks effectively.

8.5 Summary of Chapter 8

This chapter has examined private investment management based on the experiences of the provincial and district authorities and their observations of the relationship between private investment and issues related to PEN in the local areas. The three districts of Pek, Houayxay and Banchiang, and their respective provinces of Xieng Khuang, Borkeo and Champasack, were selected for data collection through semi-structured interviews with nine relevant officers at each administrative area.

The interview results suggested a rapid increase in private investment in the resource sectors in these districts and provinces, due mainly to the investment promotion policies and the rich resources in the local areas. In the course of investment management, most of the local authorities could recognise both the positive and negative impacts of investment on local resources and livelihoods, facing many challenges, difficulties and limitations were among the problems shared among themselves and their office staff.

Many of them claimed that they were rarely involved in approval and decision-making pertinent to investment. While performing important tasks such as monitoring investment activities and compiling progress reports, they had to work on limited information. Most of them found many of the problems and conflicts in investment management resulted from several factors; for example, some local individuals were too greedy, many of the locals were unskilled and misled regarding investment, most of the investors committed too much to profit rather than local development, many of the local governments lacked the necessary skills and capability to manage the investments, and some parts of the investment policy were too complex and unrealistic for them to understand.

Low cooperation among themselves impeded their addressing of investment issues and their ability to effectively manage investments. The authorities usually followed the proposed vertical and horizontal cooperation lines in their tasks, but found many inefficiencies. Most of

the interviewees admitted their low capacity to effectively manage investment. In the short run, now would seem the proper time to improve their cooperation lines and build up their capacity to acquire better management skills for better investment management. In the long run, both their capacity building and work systems need to be improved at the same time since a major part of their poor management is attributable to the latter.

Many of the local authorities understood the key issues related to poverty, environmental degradation and investment management in their local areas. However, many of these issues remain unresolved because of their weak capability to handle investment and because too many investments were beyond their management capacity. In addition, those who observed the relationship between private investment and issues of PEN claimed that the strength of relationships was low. Some were not sure about these relationships. The findings of this chapter could suggest that the impact of private investment, issues of PEN and their linkages are new lessons for them. Therefore, it is important that the local authorities learn more about these issues because they represent key problems in their investment management duties. Finally, this chapter contributes to a broader understanding of the link between weak governmentality and the poverty-environment nexus, and how political power plays a role in whether to break down or maintain said link.

Table 8. 2: Involvement in approval and decision-making

<i>Offices</i>	District Level			Provincial Level		
	Pek	Houayxay	Bachiang	Xieng Khuang	Bokeo	Champasack
<i>GNO</i>	Rarely. Informal meetings	Usually. Meetings, monitoring	n/a	Sometimes. Surveys, approval and reports	n/a	n/a
<i>PIO</i>	Rarely. Surveys, meetings.	Rarely. Surveys, monitoring	Sometimes. Surveys, reports	Usually. Surveys, approval, meetings, monitoring and reports	Always. Surveys, approval, planning, monitoring, reporting, meetings and approval	Always. Surveys, approval, planning, monitoring, reports, meetings, decision-making
<i>AFO</i>	Rarely. Surveys, monitoring.	Never. Surveys, monitoring.	Never. Surveys, monitoring.	Usually. Surveys and monitoring	Frequently. Surveys, approval, monitoring	Frequently. Surveys, approval, planning, monitoring, reports, meetings, decision-making
<i>ICO</i>	Seldom. Surveys.	Rarely. Monitoring.	n/a	Sometimes. Surveys, approval, and reports	Usually. Approval, monitoring	Usually. Approval, monitoring
<i>MEO</i>	n/a	n/a	n/a	Never. Surveys, monitoring, and reports	Frequently. Surveys, monitoring	Frequently. Surveys, monitoring.
<i>TAO</i>	Rarely. Meetings.	n/a	n/a	Seldom. Surveys.	Sometime. Surveys, approval, reports	n/a
<i>LMA</i>	Rarely. Surveys, monitoring	Seldom. Monitoring.	Never. Surveys, monitoring.	Frequently. Surveys, monitoring, and reports	Frequently. Surveys, approval, monitoring	Frequently. Surveys, monitoring
<i>LSW</i>	Never	Never. Monitoring.	Never. Informal meetings	Rarely. Informal meetings.	Rarely. Informal meetings.	Seldom. Monitoring.
<i>LWU</i>	Rarely. Informal meetings.	Never. Informal meetings	Rarely. Informal meetings.	Never. Informal meetings	Never. Informal meetings.	Sometime. Informal meetings.

n/a – not available, offices not established or not mentioned during the interviews

Table 8. 3: Recognition of main problems or conflict in investment management

Level	District offices			Provincial offices		
	Pek	Houayxay	Bachiang	Xieng Khuang	Bokeo	Champasack
Individual	Health issues.	Health issues. Land entitlement. Low incentives.	n/a	Informal contracts. Cultural impacts. Risk taking.	Informal contracts. Local greediness. Law violations.	n/a
Household	Land boundaries. Land entitlement.	Insecure compensation. Temporary employment.	False data. Land entitlement.	Temporary employment. Land entitlements.	Ethnic language. Insecure compensations. Unequal benefits.	Low skills.
Village	High expectations. Low education. Low skills.	Informal contracts. Land boundaries. Low education. Low skills. Market inaccessibility. Unequal opportunities.	Low skills. Low education. Social problems.	Livelihood changes. Market inaccessibility. Temporary employment.	Land conflicts. Low education. Low wages. Powerless negotiations.	Illegal trading. Land entitlement. Low education. Win-Lose situations.
Investor	Biased negotiations. Chemical usage. Dishonest investors. Low commitment. Temporary employment. Toxic pesticides.	Chemical usage. Informal contracts. Labour exploitation. Land concessions. Land invasions. Law violations. Partial collaborations. Toxic pesticides.	Chemical usage. Illegal workers. Land invasions. Low wages. Short-term benefits. Temporary employment. Law violations.	Breaking promises. Chemical usage. Land concessions. Land conflicts. Land invasions. Partial collaborations. Temporary employment. Toxics pesticides.	Dishonest investors. Ineffective investments. Law violation. Low pro-poor investment. Partial collaborations. Unused land concessions.	Ineffective investments. Investment withdrawals. Land concessions. Land invasions. Temporary employment. Exploiting forest areas.
Local government	High expectations. Insufficient information. Partial collaborations. Unpredictable impacts. Weak management.	Careless inspections. Insufficient information. Uncontrolled prices. Weak analysis. Weak management. Incomplete data.	Different perceptions. Partial collaborations.	Lack of staff. Land entitlement. Low capacity. Overlapping concessions. Partial collaborations. Uncontrolled prices.	Illegal workers. Low budget allocation. Low capacity. Partial collaborations. Unpredictable impacts. Weak management.	Careless inspections. Incomplete data. Overlapping concessions. Partial collaborations. Uncontrolled prices. Unused land concessions. UXO in investment areas. Weak law enforcement. Weak management.
Central government	Unrealistic policies.	Gaps in investment laws	n/a	Unrealistic policies Weak law enforcement.	Complex policies.	Gaps in laws. Too many investments.

n/a - not mentioned during the interviews.

Table 8. 4: Positive contributions observed by investment authorities

Beneficiaries	District authorities			Provincial authorities		
	Pek	Houayxay	Bachiang	Xieng Khuang	Bokeo	Champasack
Local resources	Forest conservation. Shifting cultivation reduction.	n/a	n/a	Forests conservation.	Reforestation.	n/a
Local livelihoods	Businesswomen. Employment expansion. Family businesses. Family incomes. Local infrastructures. School enrolments. Technical knowledge. Various products. Women's employment.	Employment expansion. Family incomes. Gender awareness. Family businesses. Local infrastructures. Market accessibility. New alternatives. Various products. Village accessibility.	Electricity available. Family income. Gender awareness. Livelihood improvement. Local infrastructures. Technical knowledge.	Electricity available. Family incomes. Female employment. Local employment. Local infrastructures. Poverty reduction. Technical knowledge. Various products.	Family incomes. Gender awareness. Household businesses. Local infrastructures. Social problem mitigations. Technical knowledge. Village accessibility. Village funds.	Benefits sharing. Education enrolments. Family incomes. Household businesses. Household furniture. Local employment. Local infrastructures. Technical knowledge. Women's employment.
District	Market expansion. Rural development. Social problem mitigations. Tax revenues. Urban development.	Better livelihoods. Local economy. Poverty reduction. Rural developments. Tax revenues. Transportation improvement.	Better livelihoods. Capacity building. Employment expansion. Family incomes. Financial support. Tax revenues. Technical knowledge.	New building factories. Technical knowledge.	Employment expansion. Local economy. Local infrastructures. Policy orientations. Resource management. Rural development. Technical knowledge. Various products.	n/a
Provincial	n/a	n/a	n/a	Development funds. Employment expansion. Infrastructure improvements. Markets for exporting. Money flows. Tax revenues. Technical knowledge.	Development funds. Development plans. Employment expansion. Low shifting cultivation. Tax revenues. Technical knowledge.	Capacity building. Development plans. Human development. Illegal migration reduction. Poverty reduction. Tax revenues. Trading expansion. Various products.
National	n/a	n/a	n/a	n/a	n/a	Development plan

n/a - not available or not mentioned during the interviews

Table 8. 5: Negative impacts observed by investment authorities

Impacted	District authorities			Provincial authorities		
	Pek	Houayxay	Bachiang	Xieng Khuang	Bokeo	Champasack
Local resources	Bad smell. Deforestation. Dusty wind. Infertile soil. NTFPs reduction. Poisoning of NTFPs. Soil erosion. Toxic chemicals. Water decline. Water pollution. Weather change.	Biodiversity destruction. Climate change. Deforestation. Drought. Floods. Infertile soil. Slash and burn for plantation. Soil erosion. Water decline. Wildlife decline.	Deforestation. Infertile soil. Mud slides. NTFPs reduction. Water decline. Water pollution. Wildlife decline.	Bad smell. Fish decrease. River bank erosion. Water decline. Water pollution.	Deforestation. Dust. Floods. Noise and dust. Sound. Water pollution.	Chemical usage. Climate change. Deforestation. Losing heritage. Monocropping effects. Mud slides. NTFPs reduction. Protected areas invasion. Soil erosion. Water pollution.
Local villages	Arable land reduction. Breaking promises. Livestock deaths. Rice fields reduction. Roads destruction.	Gender issues. Health problems. Labour exploitation. Rice fields reduction. Social problems. Temporary employment. Unequal benefits.	Elderly unemployment. Exploited local labour. Long distance to forests. Low wages. More expenditure. Rice field reduction. Temporary employment.	Land invasions. Losing land.	Benefitting conflict. Breaking promises. Cultural pressures. Debt increases. Food shortages. Income instability. Land conflicts. Land invasions. Low local ownership. Low productivity. Low wages.	Arable land reduction. Exploited labourers. Income instability. Increasing competition. Insecure compensation. Land invasions. Low wages.
District	Uncontrollable backpackers. Unmanageable foreign workers.	Chemical fertilizers.	Chemical usages. Elderly unemployment. Insufficient food. Pesticide usages.	Land conflicts. Tax avoidance. Unused land concession.	More foreign labourers. Human trafficking. Social problems. Tax avoidance.	Social problems.
Provincial	n/a	n/a	n/a	n/a	n/a	n/a
National	n/a	n/a	n/a	n/a	n/a	n/a

n/a – not available or not mentioned during the interviews

Table 8. 6: Main affiliating organisations with investment management authorities

Offices	District level			Provincial level		
	Pek	Houayxay	Bachiang	Xieng Khuang	Bokeo	Champasack
GNO	P, D, V. Moderate.	P, D. Moderate.	n/a	C, P, D. Moderate	n/a	n/a
PIO	P, D. High.	P, D, DA, NGOs. Low.	P, D. Low.	C, P, D. Moderate	C, P, NGOs, DA. Moderate.	C, P, D. Moderate.
AFO	P, D. Low.	P, D, V. Moderate.	P, D, NGOs. Moderate.	C, P, D, V. Moderate	P, D, DA, NGOs. Moderate.	C, P, D, DA, NGOs. Low.
ICO	P, D, V, DA. Moderate.	C, P, D. Low.	n/a	C, P, D, V. Moderate	C, P, D, NGOs. Low.	C, P, D. Low.
MEO	n/a	n/a	n/a	C, P, D, V. Moderate	C, P. Moderate.	C, P, D, V. Moderate.
TAO	P, D, DA, NGOs. Low.	n/a	n/a	P, DA, NGOs. Moderate	C, P, D, DA. Moderate.	n/a
LMA	C, P, D. Moderate.	C, P, D, DA. Low.	P, D. Moderate.	P, D, V. Moderate	P, D. Moderate.	P, D, V, DA. Low.
LSW	P, D, V. Low.	P, D. Low.	P, D. Moderate.	C, P, D. Low	P, D. Moderate.	P, D, DA. Low.
LWU	P, D, V. Low.	P, D, V. Low.	P, D, DA, NGOs. Moderate.	P, D. Low	C, P, D, NGOs, DA. Low.	P, D. Moderate.

Acronyms: C-ministries at central level, P-provincial departments, D-district offices, V-village chiefs, DA-development agencies of any bilateral and multilateral donors, and NGOs- non government organisations' development activities.

n/a – not available, offices not established or not mentioned during the interviews.

Table 8. 7: Key solutions to negative impacts and investment associated problems

District authorities			Provincial authorities		
Pek	Houayxay	Bachiang	Xieng Khuang	Bokeo	Champasack
<p><u>Investors</u> Increased employment. Reforestation. Secure compensation. Sharing information.</p> <p><u>Local people</u> Improving products. Raising skills.</p> <p><u>District authorities</u> Capacity building. Government cooperation. Investment selection. Investor negotiations. Law dissemination. Monitoring systems. Toxic side-effects.</p> <p><u>Provincial authorities</u> CIPM consultation. Concrete information. Decentralising responsibilities. Environmental management. Government cooperation. Multiple-scale analysis.</p> <p><u>National authorities</u> (Non)</p>	<p><u>Investors</u> Increased employment. Reforestation. Secure compensation. Stopping chemical usage.</p> <p><u>Local people</u> Gender awareness. Social awareness.</p> <p><u>District authorities</u> Capacity building CPMI consultation. Data information. Government cooperation. Investment negotiations. Law enforcement. Multiple-scale analysis. Toxic side-effects. Trading associations.</p> <p><u>Provincial authorities</u> Decentralising responsibilities.</p> <p><u>National authorities</u> (non)</p>	<p><u>Investors</u> Increasing wages. Reforestation. Returning land. Secure compensation.</p> <p><u>Local people</u> Forest conservation. NTFPs conservation.</p> <p><u>District authorities</u> CPMI consultation. Environmental management. Investor negotiations. Land reallocation. Law enforcement. Local employment. Monitoring systems. NTFPs markets. Toxic side-effects.</p> <p><u>Provincial authorities</u> (non)</p> <p><u>National authorities</u> (non)</p>	<p><u>Investors</u> Activated investments. Local employment. Secure compensation. Transferring skills.</p> <p><u>Local people</u> Culture preservation. Forest conservation. Investment participation</p> <p><u>District authorities</u> CPMI consultation. Environmental management. Investment potential. Investment registration. Toxic side-effects.</p> <p><u>Provincial authorities</u> Capacity building. CPMI consultation. Concrete information Environmental management. Increasing wages. Law dissemination. Law enforcement. Local price adjustments. Monitoring systems. Multiple-scale analyses. Tax extension. Village negotiations.</p> <p><u>National authorities</u> Making realistic policies.</p>	<p><u>Investors</u> Activated investment. Impact of migrations. Local products. Secure compensation.</p> <p><u>Local people</u> Improving products. Raising skills. Women’s empowerment.</p> <p><u>District authorities</u> Capacity building. CPMI consultation. Investment potential. Land allocation. Law enforcement. Local employment. Toxic side-effects.</p> <p><u>Provincial authorities</u> Capacity building. CIPM consultation. Concrete information Decentralising responsibilities. Government cooperation. Investment facilitations. Monitoring system. Investment selection. Law disseminations. Multiple-scale analyses</p> <p><u>National authorities</u> (non)</p>	<p><u>Investors</u> Activated investments. Increasing wages. Local participation. Reforestation. Secure compensation. Transferring skills.</p> <p><u>Local people</u> Culture preservation. Improving products. Investment group. Women’s empowerment</p> <p><u>District authorities</u> (non)</p> <p><u>Provincial authorities</u> CPMI consultation. Concrete information Environmental management. Investment selection. Land reallocation. Law enforcement. Monitoring systems. Multiple-scale analysis.</p> <p><u>National authorities</u> (non)</p>

Table 8. 8: Understanding key issues of PIPEN and additional comments

Issues	District authorities			Provincial authorities		
	Pek	Houayxay	Bachiang	Xieng Khuang	Bokeo	Champasack
Poverty	Conflict over land. Forest dependence. Law violation. Reduced agricultural land. Unequal benefits. Unimproved livelihoods. Unrecognised government warnings. Unskilled labour.	Foreign workers. Insecure compensation. Limited products. Reduced arable land. Small markets. Temporary jobs.	Exploiting labourers. Foreign workers. Gender issues. Land invasion. Reduced arable land. Temporary jobs. Unskilled labour.	Conflict over land. High living costs. Insecure compensation. Investment in non-poor activities. Low wages. Temporary jobs. Unskilled labour. Weak labour management.	Conflict over land. Exploiting labourers. Insecure compensation. Land invasion. Low wages. Unequal benefits. Unregistered labourers. Unskilled labour.	Cultural impacts. Insecure compensation. Land invasion. Reduced agricultural land. Unskilled labour.
Degradation	Deforestation. Resources exploitation. Serious environmental impacts. Toxic chemicals.	Change in ecosystem. Deforestation. Land degradation. Resources exploitation. Toxic chemicals. Water pollution.	Mono-cropping impacts. Resources exploitation.	Contaminated water. Deforestation. Insufficient water. Toxic chemicals.	Resources exploitation. Deforestation Land degradation.	Ground disruption. Deforestation. Land degradation.
PIPEN	Low	Low	Not sure/Low	Not sure/Low	Not sure/Low	Not sure/Low
Investment management	Awkward investment cooperation. Ineffective investments. Limited information. Too many investments. Weak cooperation among authorities. Weak monitoring.	Unused lands. Weak cooperation among authorities. Weak investment management. Weak investment rules and laws	Law and regulation violations. Too many investments. Use modern tools. Weak cooperation among authorities. Weak investment management. Weak investment rules and laws.	Conflicts among investors. Ineffective investments. Low EIA assessment. Low pro-poor investment. Low staff capacity. Profit seekers. Tax avoidance. Unrealistic policies. Weak investment rules and laws.	Ineffective investments. Investment in non-poor districts. Law and regulation violations. Less pro-poor investment. Low staff capacity Too many investments. Weak investment management. Weak investment rules and laws.	Ineffective investments. Low staff capacity Poor cost-benefit analysis. Profit seekers. Too many investments. Unproductive investments Weak investment management. Weak investment rules and laws Weak monitoring.

Chapter 9: Conclusion

9.1 Review of research problems and methods

This thesis set out to investigate the real impact of private investment on the resources sector, on poverty reduction and environmental sustainability in Laos, with particular focus upon private investment (PI) and issues related to the poverty-environment nexus (PEN) or PIPEN. Its overall objective is to determine whether, to what extent and in what circumstances intervention by private investment in Laos' resources sector is fulfilling its promise to achieve sustainable development.

Laos has faced many issues along its development trajectory including widespread poverty, increasing resources degradation and uncertain investment impacts. The GoL has sought to alleviate several problems, including lack of human and financial capital, low technology, high budget deficits, official corruption, lack of investment capital and natural disasters, in its endeavour to remove the country from the list of the world's least-developed countries by 2020. In reality, the true causes of poverty are various and associated with several externalities uncontrollable by the poor themselves, such as government strategies, development policies, difficult geographical locations and market access limitations.

Laos has extensive forests and biodiversity areas, water sources, minerals and fertile soil, resources that are crucial to the earning of foreign exchange, and to providing incomes, subsistence benefits and food security for the rural poor, all of which contribute to poverty reduction. Environmental degradation, such as soil erosion, loss of forest land and biodiversity, and water decline and pollution has been detected. However, the real causes of degradation are multiplex and stem from different factors including overexploitation of resources by the government for national revenues and by the poor in search of food and cash for their livelihoods and survival. According to a series of studies undertaken by the World Bank (see Dasgupta et al., 2005; Dasgupta et al., 2003; Sophathilath, 2006; 2006b), resource exploitation in Laos is linked to the concept of PEN. Thus, urgent formulation of sound policies is needed to address these PEN-related issues.

In the interests of its 2020 goal, the GoL has promoted private investment, which has increased and focused mainly upon the resource sectors in which most of the poor in Laos pursue their daily livelihoods. Such investment tends to deplete the natural resources and impact upon the rural poor in terms of taking their forests and other resources away, in the

process expanding the issues related to PEN, particularly in the rural areas. In other words, private investment and the use of natural resources to support the rural poor's livelihoods increasingly compete for the same resources. While these problems need to be urgently investigated, addressed and provided with effective solutions, the interaction between private investment and issues of PEN has to date not yet been fully explored, neither in Laos nor elsewhere. By drawing from these development issues in Laos, this research aimed to address three research questions. Its research methodology was designed by combining these questions with a multi-scale research methodology based on multiple sources of data and methods for data collection, presentation and analysis. Based on this design, four research areas and their methods were identified.

The first was to create investment patterns and maps by collecting secondary data appertaining to private investment in several resource sectors from seven ministerial departments to create the investment map and to overlay this map onto poverty and environment maps. A simple Chi-square test was applied to examine their statistic-dependent relationships. This method responds to the first half of the first question regarding patterns of private investment in the resources sector (see Chapter 5)

The second method, which focused on statistical models and variables for spatial regression analysis, employed data from the district level and OLS and GWR analytical techniques. This method sought to answer the second half of the first question. In other words, it attempted to reveal the extent of private investment patterns related to issues of PEN by proving their spatial relationships in the generalised PIPEN model (see Chapter 6).

The third method used to assess investment impact at the local level utilised the livelihood asset pentagon, thus responding to the second research question. Information relevant to the two investment sites was collected along with that pertaining to 6 villages and 120 households selected for case studies through village surveys and household interviews. Descriptive analysis was applied to determine the investment impacts. Additionally, to understand the ways in which investment has changed local livelihoods and resources at the household level, and how local people have experienced such change, ten households in one village from each site were selected for in-depth interviews, which were interpreted through narrative analysis (see Chapter 7).

The last method, which aimed to assess private investment management, was based upon semi-structured interviews and thematic analysis involving 54 official authorities from three

districts and their respective provinces. This method replied to the third research question regarding the assessment of investment management by the provincial and district authorities in relation to the investment impacts and the issues related to PEN in their local areas.

9.2 Summary of the main findings

Official data on FDI (see IPD, 2010) indicated a rapid increase in private investment in the resources sector, especially in the wood industry, agro-forest and mining sectors with small investment capital. Investments in the hydro-energy sector while small in number were large in financial investment capital. Most of the investments were driven from China, Vietnam, Thailand, and domestic investors. The overlaying of maps in pairs and simple correlation analysis of investment, poverty, deforestation and promotion zoning maps found that most of these investments tended to be located in non-poor districts and in low development prioritised districts, suggesting poorly-managed and ineffective attempts to implement investment promotion policy for poverty reduction. In addition, spatial regression analysis using GWR techniques suggested that investment was found to spatially associate with both expansion and reduction in poverty and deforestation rates. After taking investment into account, both virtuous and vicious circles of PEN were predicted in many different districts, depending upon local conditions. As GWR suggested spatial relationships rather than causality, the investigation moved from district to village and household analysis.

Results from the local livelihood asset pentagon suggested that while investment could certainly contribute to poverty reduction and livelihood improvement in the short term, it could not do so in the long term because both the local people and the investors exploited the local resources. As a result of excessive exploitation, access to natural capital in the two sites was reduced. In addition, the different experiences of the households at the two investment sites showed that most of them were victims of investment. In particular, the poor and the poorest remained the most disaffected groups, vulnerable to impact due to their low socio-economic status, weak capacity, lack of real opportunities to access many asset capitals, and heavy dependence upon local resources for subsistence. Furthermore, another of the investment impacts was that the PEN was strengthened at the two sites due to resource competition, resource degradation and wealth accumulation at village and household levels. But, the PEN could be weakened if and when local governments officially intervened; otherwise, it will continue. Investment management by the local authorities is, I suggest, one of the important issues to examine in this thesis.

The semi-structured interviews revealed that the local authorities recognised both the positive and negative impacts of investment on their local resources and livelihoods. But, they confronted many challenges, difficulties and limitations in their course of investment management, for example, some local individuals' greed, unskilled local people, misleading information regarding investment, profit maximisation by the investors, low skills and lack of management capability among the local authorities, complex and unrealistic investment policies (considering the local circumstances), and limited investment information on task performance of local authorities. In addition, the vertical and horizontal cooperation lines that criss-cross the local authorities created low efficiency when addressing investment issues and delivering effective investment management. While understanding several of the key issues related to poverty, environmental degradation and investment management, the authorities could not solve many of these issues because of the number of investments and the officials' low management capability. Furthermore, only some among them could observe the relationship between investment impacts and the complex issues of PEN because the latter were new to them. For these reasons, the management system, local capabilities and decentralised policies need further improvement.

9.3 Contributions and implications of the findings

The findings of this thesis have implications in four main areas: theoretical, methodological, policy and practical.

9.3.1 Theoretical contributions

This research has employed four main concepts: poverty, environment, poverty-environment nexus (PEN) and private investment. The various perspectives related to these concepts have been discussed both in general and appertaining to Laos (see Chapters 2 and 3). While the possible existence of PEN in Laos is claimed in many studies (see Dasgupta et al., 2005; Dasgupta et al., 2003; IUCN & NERI, 2011a, 2011b; PEI, 2010, n.d.; Sophathilath, 2006; World Bank, 2006b), the authors have considered only factors related to poverty and environment issues. This thesis contributes to these theoretical concepts by building a better understanding of PEN and of the interaction between private investment and PEN in the Lao development context. In doing so, this research has examined the patterns of PEN at the district level, taking into account investment impact.

The findings of this thesis confirm the possible existence of both virtuous and vicious circles of PEN in many districts in Laos, albeit they appear to vary from one part of the country to

another depending on local conditions including the number of investments and rates of poverty and deforestation. Deforestation was predicted to both increase and decrease the poverty rates in many districts and also to have significant effect in others. This was also the case with poverty. In addition, the strength and weakness of PEN are associated with not only among the local poor (poverty) and resource degradation (environment), but also the types of investment and degree of interventions by local governments. The investment coefficient in the PIPEN model predicted investment to both reduce and increase the rates of poverty and deforestation. Where both rates were reduced (increased), the link of PEN was weakened (strengthened). For example, in the two investment sites, the link of PEN at Phu He was strengthened due to competition for resources between the local people and the mining company, but weakened after the lawful intervention of the local authorities. Unlike the Nam Kho site, the PEN was strengthened because of insignificant intervention by the authorities. In short, in addition to factors related to poverty and environment, it is important to consider several local conditions and actors when examining issues related to PEN.

One of the most significant findings resulting from the adoption of a multi-scale research approach is that PEN represents not only the linkages of two factors, but of many. This research shows that private investment is but one factor associated with PEN. In particular, investment management issues related to Lao political power and structure have influenced the degree of association between private investment and PEN. Therefore, conceptually, it is important to understand PEN's interrelations with multiple factors rather than with the poverty and environmental factors only.

9.3.2 Methodological contributions

Building on the theories mentioned above, I employed a hybrid research methodology in the form of a multi-scale research approach (see Chapter 4) as a mechanism to generate various results in this thesis. I combined my three research questions with a meso-level approach (see Messerli & Heinemann, 2007) and quantified them using a mix of both quantitative and qualitative methods.

Among the difficulties associated with this methodology is the fact that it requires collection of data from different levels and sources and different groups, is time consuming vis-à-vis both quantitative and qualitative qualification, and tests the patience of the researcher. However, this methodology has provided fruitful research results. One of its special features is that it has equipped me to understand the impact of private investment and issues of PEN at

different scales through a combination of geo-statistical analysis, detailed community-level investigation, and district and province authority interviews about the management of private investment, with reference to poverty and environmental considerations. I consider this methodology an appropriate tool for further research work.

9.3.3 Policy implications

The findings from this thesis contribute to several policy implications that are important and should be taken into consideration. First, the Lao government's investment promotion policy (see Government of Laos, 1994b, 2004a, 2004b, 2005; 2009), which resulted in a rapid increase in private investment in the resource sectors, may be viewed as delivering economic growth due to a rapid increase in investment and financial capital. However, it seems uncertain whether this policy can strategically serve poverty reduction and sound environmental management. This uncertainty is engendered by the fact that most of the investment has focused mainly on the resources sector and resulted in both increase and decrease in rates of poverty and environmental degradation (see Chapter 6). Therefore, it is important to revise the current investment policy designed to achieve economic growth, taking into consideration the balance of social-cultural development and conservation of natural resources. Second, when doing so, it is important to consider issues related to PEN and the ways in which investment can diminish this nexus into policy formulation. As suggested in the findings, investment can generate both virtuous and vicious circles of PEN; thus, it is crucial that the investment policy makers address issues related to PEN and investment impact at the same time.

Third, the investment incentives and promotion zoning of pro-poor objectives appear, to say the very least, unattractive. While many of the investors received benefits from the investment incentives, many did not sincerely orient their investments towards pro-poor activities or locate them in poor district zoning. Most have opted to invest in high profit activities with high resource utilisation and in locations where access was convenient. Thus, it is important to consider refining the investment incentives and promotion zoning to meet the government's objectives. Finally, the decentralised policy, especially as it pertains to investment management, must be more realistically and practically varied at the local level to match the capacity of the local authorities. While several shortcomings were attributed to weak investment management, the local authorities claimed that the main factors related to their low capacity, to lack of information, and to decisions made by a central and uncooperative working system. Thus, these factors need to be explored; at the same time, many policies

related to investment need to be further reformed in order to reach their effective investment management.

9.3.4 Practical implications

The findings of this thesis suggest that the rapid increase in investment and issues related to PEN have imposed many difficulties along Laos' development trajectory. On the one hand, the rapid expansion of investment has not only maximised economic returns to the investor and government, but also has offered positive economic and social outcomes to the local people at the investment sites. In this way, many of the local people achieved better livelihoods in terms of being able to access public services, hospitals, markets, education and job opportunities, alternative income sources, and new skills and knowledge. On the other hand, the rapid expansion of investment has created several problems, in particular, resource degradation and weak investment management at the sites. For example, this research shows (see Chapter 7) that investment has contributed to deforestation, land degradation and water pollution, and a decline in the two investment sites. In addition, the investment has not only created resource degradation, but also has hit the local poor hard, who rely for their livelihoods upon these resources. Thus, it is essential that the GoL formulates standard criteria for selecting appropriate investments, undertakes more sophisticated assessment, and employs monitoring tools to assess and minimise the negative impacts of investment.

In addition, the assignment of rights and duties to the local government in the areas of investment law, for example the management of investment, needs to be adjusted. In some cases, the local authorities were capable of addressing investment issues; but, in many cases, their investment management appeared less than effective due to their low capacity in investment management, too many investments beyond their knowledge and low cooperation in their working system (see Chapter 8). Perhaps one could suggest that they build up their capacity to achieve better management skills; but, this suggestion could prove effective only in the short-term and ineffective in the long-term, because a main part of the local authorities' inefficient management is rooted in their working system. This means that both their capacity building and working system need to be improved simultaneously. In effect, it is essential to improve their working cooperation lines for better investment management.

Additionally, more realistic and practical decentralised policy is needed to promote private investment for economic growth and poverty reduction, especially to manage growth in balance with socio-cultural development and the conservation of natural resources. More

importantly, as many development policies have been decentralised, the local authorities should learn about and understand the various investment policies and tools. They should be able to apply the appropriate policies to their local conditions in order to effectively manage private investors and avoid issues related to PEN.

9.4 Considerations arising from the research

This thesis has investigated the real impacts of private investment in the resources sector on poverty reduction and environmental sustainability in Laos, with particular focus upon the interaction of private investment (PI) and issues related to poverty-environment nexus (PEN). By exploring poverty, environment degradation, PEN and private investment concepts, and employing multi-scale research approaches, the objectives of this thesis have been adequately met. The analytical approaches adopted have revealed several key findings regarding the research questions that have responded to realistic development issues in Laos, particularly issues related to investment and PEN, as suggested above. While these main findings may be further explained in many ways regarding private investment in the resources sector and issues of poverty-environment nexus in Laos, it would be useful to briefly discuss them with reference to the four main sets of considerations.

First, private investors still seek to exploit the natural resources and local people in Laos in the interests of maximising their own profits. In this regard, while some investors can provide significant economic benefit at both the national and local levels, many seem not sincerely interested in contributing to development in Laos, especially regarding the environmental and social components. While this thesis's findings are well related to many studies that question the role of private investment in development (see Biersteker, 1992; Hope, 1996; Klein et al., 2001; Lang & Shoemaker, 2006; Parker & Kirkpatrick, 2005; Porter, 1971; Schulpen & Gibbon, 2002; Van de Walle, 1989), it is important to further investigate any additional impacts of private investment on both the resource and non-resource sectors.

Second, the rural people in Laos continue to utilise their local resources to maintain their livelihoods. The case studies suggest increasing competition for resources between the locals and the investors at the investment sites in Laos. As investment takes away their resources, most of the locals are affected, especially the poor due to their limited access to other types of capital that could off-set their access to natural capital. This finding has similarly been suggested in many studies (for example, Angelsen, 1997; Angelsen & Vainio, 1995; Cavendish, 2000; Duraiappah, 1998; Killeen & Khan, 2001; Mabogunje, 2002; Nadkarni,

2000; Reed, 2002; Sophathilath, 2006; World Bank, 2006b). Thus, it is critical to look for appropriate ways to benefit the affected peoples. The provision of secure compensation and the expansion of alternative income sources would benefit them greatly.

Third, investment policies have resulted in many questionable issues vis-à-vis the country's development, especially the utilisation of national resources for economic growth and poverty reduction through private investment promotion. While the government's approach is clearly important, many fundamental questions remain unanswered, particularly regarding the practicality of governmental policies being re-directed from the central to the local level, the enforcement of investment rules and laws to balance economic growth with socio-cultural development, and the mechanisms required for natural resource conservation. These questions have been raised in earlier studies as well as by some development institution in Laos (for example, ADB, 2000; Bourdet, 2000, 2002; Gunawardana & Sisombat, 2008; Rigg, 2006; Schoenweger & Üllenberg, 2009; Shaw et al., 2007; St John, 2006; Stuart-Fox, 2006).

Finally, the local authorities should be charged with keeping environmental sustainability; but, they should also bear in mind the importance of facilitating profit maximisation for the investors. In dealing with these two controversial tasks, they must confront not only the limitations of both human and financial capital in their offices, but also their own low capacity and the weak cooperation that persists among them. Many questions could still be raised; for example, whether it is the right time for them to handle such complicated tasks with the limited resources available to them. This finding demonstrates the importance of enhancing the government capacity and working system in Laos in general as mentioned in many studies (see ADB, 2001; ADB & World Bank, 2007; Bourdet, 2000; Chamberlain, 2007; Dwyer, 2007; IUCN & NERI, 2011a, 2011b; Lestrelin, 2010; Ministry of Planning and Investment, 2010; PEI, 2010; Rigg, 2005; Schoenweger & Üllenberg, 2009; Stuart-Fox, 2006; UNDP, 2007; Vongsay, 2010; World Bank, 2010; World Food Program, 2004).

9.5 Research limitations

This thesis has revealed several empirical findings based on its analytical research methods; but, the assembling of data, the thesis findings, and aspects experienced by the researcher in turn faced various limitations.

The data sets relevant to each of my analyses are not fully complete. For example, large investment data approved by the Prime Minister or the National Assembly were excluded due to specific difficulties alluded to Chapter 4. At the same time, almost half of the secondary

data regarding private investment approvals within the ministries were reported to be lost, especially the values of financial investments, and capital investment and investment locations, all of which were very important to this thesis. The loss of these data was due to using a simple data recording system which provided little information; and, formats differed among ministerial departments. Had these data been accounted for, the relationship identified would have been even stronger. In addition, my data collection from two investment sites may be considered limited because I selected only 60 sample households from three villages in each site. One could claim that this sample size is not representative of the majority of the total populations in each site. Moreover, my household questionnaire, which was designed to measure the local livelihoods, strictly followed the concept of livelihood asset pentagons under a sustainable livelihood approach; and, while this concept is considered simple, it has some critical concerns in practice. Ashley and Carney (1999, pp. 19-20) claim that this approach is limited in the policy arena; for example, livelihood analysis for a nation is impractical: it is difficult to unpack and understand its structures and processes. Brocklesby and Fisher (2003, p. 187) argue that this approach “provided a more rounded picture of the complexities of living and surviving in poor communities than understandings based on measures of income, consumption and employment”. Furthermore, the information from household interviews and narratives relied on self-reporting data, which could be seen as biased due to being based on selective memory and the personal experiences of the household members. Finally, much of the information gleaned from the interviews on investment management was too broad and mixed because the local authorities had low skills and little experience of investment management. And, some among them were unwilling to share information.

Thus, the findings of my thesis unarguably reflect some limitations. First, the findings regarding the coefficient map in the PIPEN indicate the correlations or relationships between the two variables in the model. In other words, it shows how two variables were associated, not their causal relationships. Thus, it would be wrong to draw causal conclusions from the correlation findings. Second, to ascertain the causal relationships between the variables, this thesis conducted a random selection of local participants at the two investment sites. The findings from this randomised section could suggest the causal relationships between the variables; but, causal relationships were valid only to the two investment sites selected. It would be wrong to claim this causal relationship vis-à-vis other investment sites. Finally, many findings regarding the household studies and narratives suggest the experiences and

behaviour of particular households. They may not reflect the views and experiences of the majority of households at the site. Thus, it would be wrong to simply imply that other households would have had the same experiences.

As the researcher, I was personally confronted with many shortcomings and limitations. First, my access to the necessary data during the course of my data collection was limited in various ways. For example, when attempting to obtain an official letter from the Ministry of Education, some of the ministerial departments were unwilling to share the requested data; again, a few of the provincial and district authorities refused my request to interview them. Some of the interviewing authorities provided false information, and some of the selected villagers were unwilling to agree to interviews and to provide me with true information. As well, I faced time constraints during my fieldwork/data collection. I have to admit that several of the more important factors either causing or affecting poverty, environmental degradation and private investment have been omitted from this thesis; for example, internal issues related to population growth, immigration, and pressures of high living costs due to the high rate of economic growth in Laos as well as to the recent external influence of Thai, Chinese and Vietnamese projects such as high speed trains, hydropower, and special economic zoning promotions. This omission resulted from the fact that I had both limited knowledge of- and limited time to explore all the relevant issues.

9.6 Recommendations for future research

Based on the main findings and the above research limitations, I advocate continued investigation of the impact of private investment and issues related to PEN in Laos and elsewhere. Many recommendations for future research extend from this current thesis.

Any future research should continue to collect and refine private investment data from various ministerial departments, as well as from the Provincial Planning and Investment Offices throughout Laos. A complete set of data would provide an interesting overview of patterns of investment in Laos, which could prove very useful to many development decision-makers, government organisations, development agencies and investors. Future scholars may opt to incorporate more variables into the PIPEN model. For example, if data is available and accessible, land degradation, water decline and pollution are also crucial indicators of environmental degradation; and, indicators of income equality, poverty density or vulnerability may be useful for analysing the poverty level. While these variables are related to PEN (see Duraiappah, 1996; Duraiappah, 1998; Jehan & Umana, 2003; Mabogunje, 2002;

Nunan et al., 2002; Reardon & Vosti, 1995), the values of financial investment and capital investment are very important indicators for predicting their spatial relationships. These predictions should be continued.

Because this thesis conducted case studies of two investment sites related to mining investment activities only in Pek district, Xieng Khuang, it could prove highly rewarding if future research explored many case studies in various resource sectors in different districts and provinces, and showing the precise locations of investment activity on their maps. Their results could be compared to those of this thesis. In this way, different perspectives of private investment and changes in local livelihoods and resources may be observed and could prove useful to policy makers.

In order to gain a better understanding of local livelihoods and resources, the household sample size number for in-depth interviews should be increased in the future research; and, the questions in the questionnaire should either follow or adopt other concepts related to livelihoods and resources rather than to asset pentagons. Finally and importantly, during my research, I did not interview any ministerial department directors, government staff at the central level, and/or INGOs or bilateral and multilateral development agencies in Laos, despite the fact that these actors play a key role in private sector development in Laos. Any future research is strongly recommended to incorporate these actors into their analyses because they play significant roles in private sector development in Laos, and understand the impacts of private investment and issues related to PEN in the context of Laos.

9.7 Thesis conclusion

I conclude my thesis making two important points: (1) I found that private investment in the resources sector has strong links to issues of PEN in Laos. Because investors have exploited the resources, the latter have become depleted and degraded, by extension affecting the local environment and the people at the investment sites. This is why these three issues have become integrated; (2) despite these negative impacts, private investment remains important to development in Laos because it has the potential to reduce poverty as well as to create economic growth. Given that uncertainty surrounds environmental and social impacts, the government needs to formulate realistic and practical rules and laws to mitigate said impacts; for example, revenues from investment must be reinvested in managing the resources exploited, in order to maintain environmental sustainability. In addition, local capacity and understanding of investment management and its impacts need to be regularly enhanced. In

this way, partnership between public regulatory authorities and private investors is crucial to driving sustainable development in Laos.

Finally, the summary of the findings in this conclusion does not call for either reduce or the cessation of private investment in the resources sector. Rather, it suggests making future investment part of a virtuous circle by greatly strengthening the regulation and monitoring of such investment in a way that draws upon a more nuanced understanding of the links between a decline in natural capital and poverty.

Bibliography

- Adaman, F. & Özkaynak, B. (2002). The economics-environment relationship: Neoclassical, institutional, and Marxist approaches. *Studies in Political Economy*, 69(Autumn), 109-135.
- ADB. (2000). *Environments in transition: Cambodia, Lao PDR, Thailand, and Viet Nam*. Manila: Asian Development Bank.
- ADB. (2001). *Participatory poverty assessment: Lao PDR*. Vientiane: Asian Development Bank & State Planning Committee.
- ADB. (2011). *Lao PDR: Private sector and small and medium-sized enterprises development program cluster (Subprograms I and II)*. Manila: ADB.
- ADB & World Bank. (2007). *Lao PDR Private sector and investment climate assessment : Reducing investment climate constraints to higher growth*. Manila: A Joint Document of the Asian Development Bank and the World Bank.
- Andersson, M., Engvall, A. & Kokko, A. (2006). *Determinants of poverty in Lao PDR*. Stockholm School of Asian Studies Working Paper 223. Stockholm School of Economics.
- Angelsen, A. (1997). The poverty-environment thesis: Was Brundtland wrong? *Forum for Development Studies*, 1, 135-154.
- Angelsen, A. & Vainio, M. (1995). Summary and conclusions: Lessons learned. In A. Angelsen & M. Vainio (Eds.), *Poverty and the environment* (pp. 173-180). Bergen: Comparative Research Programme on Poverty (CROP).
- Anselin, L. (1992). Spatial data analysis with GIS: An introduction to application in the social sciences *Technical Report 92-10*. Santa Barbara: National Center for Geographic Information and Analysis, University of California.
- Ashley, C. & Carney, D. (1999). *Sustainable livelihoods: Lessons from early experience*. London: Department For International Development (DFID).
- Auty, R. M. (1993). *Sustaining development in mineral economies : the resource curse thesis*. London: Routledge.
- Barney, K. (2009). Laos and the making of a 'relational' resource frontier. *Geographical Journal*, 175(2), 146-159.
- Barrow, C. J. (2006). *Environmental management for sustainable development* (2 ed.). New York, NY: Routledge.
- Bartelmus, P. (1986). *Environment and development*. Boston: Allen & Unwin.
- Bergstrom, J. C. (1990). Concepts and measures of the economic value of environmental quality: A review. *Journal of Environmental Management*, 31(3), 215-228.
- Bhatta, G. R. (2006). Poverty-environment nexus: Mainstreaming environment into the national poverty reduction strategy paper. *Journal of the Environment*, 10(11), 63-76.
- Bhattacharya, H. & Innes, R. (2006). *Is there a nexus between poverty and environment in rural India?* Paper presented at the American Agricultural Economics Association Annual Meeting, July 23-26, Long Beach, California.
- Biersteker, T. J. (1992). The logic and unfulfilled promise of privatization in developing countries. In L. Putterman & D. Rueschemeyer (Eds.), *State and market in development : synergy or rivalry?* (pp. 195-219). Boulder: Lynne Rienner.
- Bonaglia, F. & Fukasaku, K. (2007). Private sector development in poor countries: Seeking better policy recipes? *OECD Development Centre Policy Insights*, No. 48.
- Boserup, E. (1965). *The conditions of agricultural growth: The economics of agrarian change under population pressure*. London: George Allen and Unwin.
- Bourdet, Y. (2000). *The economics of transition in Laos : From socialism to ASEAN integration* Cheltenham: Edward Elgar.

- Bourdet, Y. (2002). Laos in 2001: Political introversion and economic respite. *Asian Survey*, 42(1), 107-114.
- Boycko, M., Shleifer, A. & Vishny, R. W. (1996). A theory of privatisation. *Economic Journal*, 106(435), 309-319.
- Braun, V. & Clarke, V. (2006). Using thematic analysis in Psychology. *Qualitative research in psychology*, 3(2), 77-101.
- Brocklesby, M. A. & Fisher, E. (2003). Community development in sustainable livelihoods approaches—An introduction. *Community Development Journal*, 38(3), 185-198.
- Brundtland, G. H. (1987). *Our common future: the world commission on environment and development*. Oxford: Oxford University Press.
- Carney, D. (1998). *Sustainable rural livelihoods: What contribution can we make?* London: UK Department for International Development (DFID).
- Cavendish, W. (2000). Empirical regularities in the poverty-environment relationship of rural households: Evidence from Zimbabwe. *World Development*, 28(11), 1979-2003.
- Chamberlain, J. R. (2007). *Participatory poverty assessment II: Lao People's Democratic Republic*. Vientiane: National Statistics Center and Asian Development Bank.
- Chambers, R. & Conway, G. (1992) Sustainable rural livelihoods: Practical concepts for the 21st century. *IDS Discussion Paper 296*. Brighton: Institution of Development Studies (IDS).
- Charlton, M. & Fotheringham, A. S. (2009a). Geographically Weighted Regression: A tutorial on using GWR in ArcGIS 9.3. Maynooth: National Centre for Geocomputation, National University of Ireland.
- Charlton, M. & Fotheringham, A. S. (2009b). *Geographically weighted regression: White paper*. Maynooth: National Centre for Geocomputation, National University of Ireland.
- Chen, S. & Ravallion, M. (2008). *The developing world is poorer than we thought, but no less successful in the fight against poverty*. Washington DC: World Bank, Development Research Group.
- Chowdhury, M. E. & Ahmed, S. U. (2008). *Poverty-environment nexus: An investigation of linkage and policy implications*. Dhaka, Bangladesh: Centre for Policy Dialogue, UNDP.
- Cocklin, C. (1988). Environmental values, conflicts and issues in evaluation. *The Environmentalist*, 8(2), 93-104.
- Dasgupta, S., Deichmann, U., Meisner, C. & Wheeler, D. (2005). Where is the poverty-environment nexus? Evidence from Cambodia, Lao PDR, and Vietnam. *World Development*, 33(4), 617-638.
- Dasgupta, S., Deichmann, U., Meisner, C. M. & Wheeler, D. (2003). *The Poverty / environment nexus in Cambodia and Lao People's Democratic Republic*. Washington D.C: World Bank.
- Davis, G. A. (1995). Learning to love the Dutch disease: Evidence from the mineral economies. *World Development*, 23(10), 1765-1779.
- de Groot, R. S. (1987). Environmental functions as a unifying concept for ecology and economics. *The Environmentalist*, 7(2), 105-109.
- Deacon, R. T. & Mueller, B. (2004). Political economy and natural resource use. *Working Paper 01-04*. Santa Barbara: Department of Economics, University of California.
- Development Assistance Committee. (1995). *Private sector development: A guide to donor support*. Paris Organisation for Economic Co-operation and Development (OECD).
- DFID. (1999a). *Sustainable livelihoods guidance sheet number 1: Introduction*. London: Department for International Development.

- DFID. (1999b). *Sustainable livelihoods guidance sheet number 2: Framework*. London: Department for International Development.
- DFID, EC, UNDP & World Bank. (2002). *Linking poverty reduction and environmental management—policy challenges and opportunities*. Washington D.C: World Bank.
- Duraiappah, A. (1996) Poverty and environmental degradation: A literature review and analysis. *CREED Working Paper Series No 8*. Amsterdam: Institute for Environmental Studies.
- Duraiappah, A. K. (1998). Poverty and environmental degradation: A review and analysis of the nexus. *World Development*, 26(12), 2169-2179.
- Dwyer, M. (2007). *Turning land into capital: A review of recent research on land concession for investment in Lao PDR*. Vientiane: iNGO Working Group on Land Issues.
- Emerton, L. (2005). Making the economic links between biodiversity and poverty reduction: The case of Lao PDR. Colombo: IUCN, The World Conservation Union and Ecosystems and Livelihoods Group.
- Epprecht, M., Minot, N., Dewina, R., Messerli, P. & Heinemann, A. (2008). *The geography of poverty and inequality in the Lao PDR*: Swiss National Center of Competence in Research (NCCR) North-South, University of Bern, and International Food Policy Research Institute (IFPRI), Bern: Geographica Bernensia.
- Fabricius, C. (2004). The fundamental of community-based natural resource management. In E. K. Christo Fabricius, Hector Magome, Stephen Turner (Ed.), *Rights, resources and rural development: Community-based natural resource management in Southern Africa*. Sterling, Va.: Earthscan.
- Farrier, D., Lyster, R. & Pearson, L. (1999). *The environmental law handbook: Planning and land use in New South Wales* (3rd ed.): Sydney: Redfern Legal Centre Publishing.
- Fisher, R. & Hirsch, P. (2008). Poverty and agrarian-forest interactions in Thailand. *Geographical Research*, 46(1), 74-84.
- Fotheringham, A. S., Brunson, C. & Charlton, M. (2002). *Geographically weighted regression: the analysis of spatially varying relationships*. Chichester: John Wiley.
- Fotheringham, A. S. & Rogerson, P. A. (Eds.). (2009). *Introduction*. Los Angeles: SAGE.
- Fujita, Y. & Phanvilay, K. (2008). Land and forest allocation in Lao People's Democratic Republic: Comparison of case studies from community-based natural resource management research. *Society and Natural Resources*, 21(2), 120-133.
- Giri, C. P., Pradhan, D., Ofren, R. S. & Kratzschmar, E. (1998). *Land use/land cover change in Southeast Asia*. Bangkok: UNEP Environment Assessment Programme for Asia and the Pacific.
- Government of Laos. (1994a). *Law on Business*. Vientiane: National Assembly.
- Government of Laos. (1994b). *Law on the promotion and management of foreign investment in Lao PDR*. Vientiane: National Assembly.
- Government of Laos. (1999). *Law on environmental protection*. Vientiane: National Assembly.
- Government of Laos. (2004a). *Law on the promotion of domestic investment*. Vientiane: National Assembly.
- Government of Laos. (2004b). *Law on the promotion of foreign investment*. Vientiane: National Assembly.
- Government of Laos. (2004c). National growth and poverty eradication strategy (NGPES). Vientiane: Ministry of Planning and Investment.
- Government of Laos. (2005). Decree 301/PM on implementation of foreign investment promotion law. Vientiane: Prime Minister's Office.
- Government of Laos. (2006). *National socio-economic development plan 2006-2010*. Vientiane: Ministry of Planning and Investment.

- Government of Laos. (2009). *Law on investment promotion*. Vientiane: National Assembly.
- Government of Laos. (2011). *The seventh five-year national socio-economic development plan*. Vientiane: Ministry of Planning and Investment.
- Gray, M. (2012). *Nam Theun 2 multipurpose development project: Overview and update (July 2012)*. Vientiane: The World Bank Office in Laos.
- Grima, A. P. L., Horton, S. & Kant, S. (2003). Introduction: Natural capital, poverty and development. *Environment, Development and Sustainability*, 5(3), 297-314.
- Gunawardana, P. J. & Sisombat, S. (2008). An overview of foreign investment laws and regulations of Lao PDR. *International Journal of Business and Management*, 3(5), 31-43.
- Hagenaars, A. & De Vos, K. (1988). The definition and measurement of poverty. *Journal of Human Resources*, 23(2), 211-221.
- Haglund, D. (2011). *Blessing or curse? The rise of mineral dependence among low-and middle income countries*. Oxford: Oxford Policy Management.
- Haining, R. (2003). *Spatial data analysis : theory and practice*. New York: Cambridge University Press.
- Hirsch, P. (2000). Underlying causes of deforestation in the Mekong region: Australian Mekong Resource Centre, University of Sydney.
- Hirsch, P. & Warren, C. (1998). *The politics of environment in Southeast Asia: Resources and resistance*. London: Routledge.
- Holland, T. & McNally. (2009). Mapping potential for REDD in Lao PDR: Forest cover, forest cover change, and forest carbon density. Hanoi, Vietnam: SNV (Netherlands Development Organisation).
- Hope, K. R. (1996). *Development in the Third World : From policy failure to policy reform*. Armonk, N.Y: M.E. Sharpe.
- Hopkins, P. (2007). Positionalities and knowledge: negotiating ethics in practice. *ACME: An International E-journal for Critical Geographies* 6(3), 386-394.
- Huetting, R., Reijnders, L., De Boer, B., Lambooy, J. & Jansen, H. (1998). The concept of environmental function and its valuation. *Ecological Economics*, 25(1), 31-36.
- IPD. (2008). *Investment guide book for Lao PDR*. Vientiane: Investment Promotion Department (IPD), Ministry of Planning and Investment.
- IPD. (2010) Laos: Land of ample opportunities and success. *Vol. 1. Newsletter*. Vientiane: Investment Promotion Department (IPD), Ministry of Planning and Investment.
- IUCN & NERI. (2011a). *Report on Economic, Social and Environmental Costs and Benefits of Investments in Saravan Province*. Vientiane: Poverty-Environment Initiative of Lao PDR.
- IUCN & NERI. (2011b). *Report on Economic, Social and Environmental Costs and Benefits of Investments in Savannakhet Province*. Vientiane: Poverty-Environment Initiative of Lao PDR.
- Jehan, S. & Umana, A. (2003). The environment-poverty nexus. *Development Policy Journal*, 3, 53-70.
- Jha, R. & Murthy, K. V. B. (2006). *Environmental sustainability : A consumption approach*. New York: Routledge.
- Jones, S. & Carswell, G. (2004). Introduction. In S. Jones & G. Carswell (Eds.), *The Earthscan reader in environment, development and rural livelihoods*. London Earthscan.
- Kakwani, N. & Silber, J. (2008). Introduction. In N. Kakwani & J. Silber (Eds.), *Many dimensions of poverty* (pp. xiv-xxii): Palgrave Macmillan.

- Kakwani, N., Sisouphanhthong, B., Souksavath, P. & Dark, B. (2001). *Poverty in Lao PDR*. Paper presented at the Asia and Pacific Forum on Poverty: Reforming policies and institutions for poverty reduction, Manila.
- Kates, R. W. & Haarmann, V. (1992). Where the poor live: Are the assumptions correct? *Environment*, 34(4), 4-28.
- Khan, H., Inamullah, E. & Shams, K. (2009). Population, environment and poverty in Pakistan: Linkages and empirical evidence. *Environment, Development and Sustainability*, 11(2), 375-392.
- Killeen, D. & Khan, S. R. (2001). Poverty and environment *Opinion: World Summit on Sustainable Development*. London: International Institute for Environment and Development (IIED).
- Klein, M. U., Aaron, C. & Hadjimichael, B. (2001). *Foreign direct investment and poverty reduction*. Washington, DC: World Bank.
- Kolstad, C. D. & Krautkraemer, J. A. (1993). Natural resource use and the environment. In A. V. Kneese & J. L. Sweeney (Eds.), *Handbook of natural resource and energy economics* (Vol. 3, pp. 1219-1265). Amsterdam: Elsevier Science.
- Krantz, L. (2001). The sustainable livelihood approach to poverty reduction: An Introduction. Stockholm: Swedish International Development Cooperation Agency (SIDA).
- Kyophilavong, P. & Toyada, T. (2008, 20-21 November). *Foreign capital inflows in the natural resources sector: Impacts on the Lao economy*. Paper presented at the The Future of Economic Integration in Asia, Imperial Queen's Park Hotel, Bangkok.
- Lall, S. (1974). Less-developed countries and private foreign direct investment: A review article. *World Development*, 2(4-5), 43-48.
- Lang, C. & Shoemaker, B. (2006). Creating poverty in Laos: The Asian Development Bank and industrial tree plantations. *World Rainforest Movement*.
- Lawrence, S. (2008). Case study four: Nam Theun 2 Hydropower project. In S. Lawrence (Ed.), *Power Surge: the Impacts of Rapid Dam Development in Laos* (pp. 41-46). Berkeley: International Rivers.
- Lee, D. R. & Neves, B. (2009). Rural poverty and natural resources: Improving access and sustainable management *Background Paper for IFAD 2009 Rural Poverty Report*. Rome: IFAD.
- Lestrelin, G. (2010). Land degradation in the Lao PDR: Discourses and policy. *Land Use Policy*, 27(2), 424-439.
- Lufumpa, C. L. (2005). The Poverty–Environment Nexus in Africa. *African Development Review*, 17(3), 366-381.
- Mabogunje, A. L. (2002). Poverty and environmental degradation: Challenges within the global economy. *Environment: Science and Policy for Sustainable Development*, 44(1), 8-19.
- Mehrotra, S. & Delamonica, E. (2005). The private sector and privatization in social services. *Global Social Policy*, 5(2), 141-174.
- Messerli, P. & Heinimann, A. (2007). *Development intervention disparities and the Poverty–Environment Nexus in the Lower Mekong Basin: Understanding environmental services in a Meso-Scale perspective*. Paper presented at the Sustainable Sloping Lands and Watershed Management Conference, Luang Prabang, Lao PDR.
- Messerli, P., Heinimann, A. & Epprecht, M. (2009). Finding homogeneity in heterogeneity—A new approach to quantifying landscape mosaics developed for the Lao PDR. *Human Ecology*, 37(3), 291-304.
- Messerli, P., Heinimann, A., Epprecht, M., Phonesaly, S., Thiraka, C. & Minot, N. (2008). *Socio-economic atlas of the Lao PDR – An analysis based on the 2005 population and*

- housing census*: Swiss National Center of Competence in Research (NCR) North-South, University of Bern, Bern and Vientiane: Geographica Bernensia.
- Millennium Ecosystem Assessment. (2005). *Ecosystems and human well-being: Synthesis*. Washington, DC.: Island Press.
- Ministry of Planning and Investment. (2010). *Poverty in Lao PDR 2008*. Vientiane: Department of Statistics.
- Morris, J., Hicks, E., Ingles, A. & Ketphanh, S. (2004). *Linking poverty reduction with forest conservation: Case studies from Lao PDR* IUCN, Bangkok, Thailand.
- Morris, J. & Ketphanh, S. (2002). *Bitter bamboo and sweet living: Impacts of NTFP conservation activities on poverty alleviation and sustainable livelihoods - A case study for Lao PDR*. Vientiane: IUCN.
- Nadkarni, M. V. (2000). Poverty, environment, development: A many-patterned nexus. *Economic and Political Weekly*, 1184-1190.
- Nadkarni, M. V. (2001). Poverty, environment and development in India. In A. Hayes & M. V. Nadkarni (Eds.), *Poverty, environment and development: Studies of four countries in the Asia Pacific region* (pp. 25-89). Bangkok: UNESCO Principal Regional Office for Asia and the Pacific.
- NAFRI, NAFES & NUOL. (2005). *Improving livelihoods in the uplands of the Lao PDR- Volume 1: Initiatives and approaches*. Vientiane: National Agriculture and Forestry Research Institute (NAFRI) and National University of Laos (NUOL).
- Narayan, D., Patel, R., Schafft, K., Rademacher, A. & Koch-Schulte, S. (2000). *Voices of the poor: Can anyone hear us?* New York: World Bank.
- Nishimura, Y. (2001). Economic policy for transition to market economy *Economic and Social Research Institute*: Cabinet Office, Government of Japan
- Nunan, F., Grant, U., Bahiigwa, G., Muramira, T., Bajracharya, P., Pritchard, D. & Vargas, M. J. (2002) Poverty and the environment: Measuring the links. *A Study of Poverty-Environment Indicators with Case Studies from Nepal, Nicaragua and Uganda*: Environment Policy Department, DFID.
- OECD. (2005). *Investment for development: 2005 annual report - investment policy co-operation with non-OECD economies*: OECD Publishing.
- Opschoor, J. B. (2007). Environment and poverty: Perspectives, propositions, policies. The Hague: Institute of Social Studies.
- PanAust. (2005). Gold-silver intercepts support the resource potential of the Phu He Prospect in Laos. *ASX Announcement on 6 December 2005* Retrieved 1 May 2011, from <http://www.infomine.com/index/pr/PA322352.PDF>
- PanAust. (2010). High-grade gold discovery at Tharkhek in Laos. *ASX Announcement on 6 June 2010* Retrieved 1 May, 2011, from http://www.panaust.com.au/sites/default/files/asx/Tharkhek_Gold_Discovery.pdf
- Park, H. (2011). Man-made disaster: A Cross-national Analysis. *International Business Review*, 20(3), 466-476.
- Parker, D. & Kirkpatrick, C. (2005). Privatisation in developing countries: A review of the evidence and the policy lessons. *Journal of Development Studies*, 41(4), 513-541.
- Peasgood, A. & Goodwin, M. (2007). *Introducing environment*. Oxford Oxford University Press.
- PEI. (2010). *Issues Brief 02/2010: Poverty-Environment Indicators for monitoring and evaluating sustainable growth goals*. Vientiane: Poverty-Environment Initiative (PEI) Lao PDR.
- PEI. (n.d.). The PEI Country fact sheet on Lao PDR. *Poverty-Environment Initiatives (PEI) Lao PDR* Retrieved 5 September 2012, from

http://www.unpei.org/index.php?option=com_content&view=article&id=124&Itemid=174

- Peluso, N. L. (1993). Coercing conservation: The politics of state resource control. *Global Environmental Change*, 3, 199-218.
- Pinstrup-Andersen, P. & Pandya-Lorch, R. (1995). Poverty, food security, and the environment 2020. *Brief No. 29*. Washington, D.C: International Food Policy Research Institute (IFPRI).
- Porter, R. S. (1971). Private investment in developing countries. *Long Range Planning*, 4(1), 58-62.
- Rahman, A. (2004). Environment-Poverty Nexus: A global overview: United Nations Department of Economic and Social Affairs.
- Ravallion, M. (1996). Issues in measuring and modelling poverty. *Economic Journal*, 106(438), 1328-1343.
- Reardon, T. & Vosti, S. A. (1995). Links between rural poverty and the environment in developing countries: Asset categories and investment poverty. *World Development*, 23(9), 1495-1506.
- Reed, D. (2002). Poverty and the environment: Can sustainable development survive globalization? *Natural Resources Forum*, 26, 176-184.
- Reser, J. P. & Bentrupperbäumer, J. M. (2005). What and where are environmental values? Assessing the impacts of current diversity of use of 'environmental' and 'World Heritage' values. *Journal of Environmental Psychology*, 25(2), 125-146.
- Ribot, J. C. & Peluso, N. L. (2003). A theory of access. *Rural Sociology*, 68(2), 153-181.
- Riessman, C. K. (2008). *Narrative methods for the human sciences*. Los Angeles: Sage.
- Rigg, J. (2005). *Living with transition in Laos: Market integration in Southeast Asia*. London: Routledge.
- Rigg, J. (2006). Forests, marketization, livelihoods and the poor in the Lao PDR. *Land Degradation & Development*, 17(2), 123-133.
- Rutherford, J., Lazarus, K. & Kelley, S. (2008). *Rethinking investments in natural resources: China's emerging role in the Mekong Region*. Phnom Penh: Heinrich Böll Stiftung Cambodia.
- Sachs, I. (1971). Approaches to a political economy of environment. *Social Science Information*, 10(5), 41-53.
- Sachs, J. D. & Warner, A. M. (1995). *Natural resource abundance and economic growth*. Cambridge, MA: National Bureau of Economic Research.
- Scherr, S. J. (2000). A downward spiral? Research evidence on the relationship between poverty and natural resource degradation. *Food Policy*, 25(4), 479-498.
- Schoenweger, O. & Üllenberg, A. (2009). *Foreign direct investment (FDI) in land in the Lao PDR*. Eschborn: Work of Division 45 - Agriculture, fisheries and food, GTZ
- Schulpen, L. & Gibbon, P. (2002). Private sector development: Policies, practices and problems. *World Development*, 30(1), 1-15.
- Scoones, I. (1998). *Sustainable rural livelihoods: A framework for analysis*. Brighton: Institute of Development Studies
- Scoones, I. (2009). Livelihoods perspectives and rural development. *Journal of Peasant Studies*, 36(1), 171-196.
- Sen, A. (1981). *Poverty and famines: An essay on entitlement and deprivation*. London: Clarendon Press Oxford.
- Sen, A. (1999). *Development as freedom*. London: Oxford University Press.
- Shaw, S., Cosbey, A., Baumuller, H., Callander, T. & Sylavong, L. (2007). Rapid trade and environment assessment (RTEA): National report for Lao PDR. . Manitoba: International Institute for Sustainable Development (IISD).

- Signasith, C. (1997). Lao-style new economic mechanism. In M. Than & J. L. H. Tan (Eds.), *Laos' dilemmas and options : The challenge of economic transition in the 1990s* (pp. 23-47). Singapore: Institute of Southeast Asian Studies.
- Smith, C. P. (2000). Content analysis and narrative analysis. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology*. New York: Cambridge University Press.
- Solesbury, W. (2003) Sustainable livelihoods: A case study of the evolution of DFID policy. *Working Paper 217*. London: Overseas Development Institute (ODI).
- Sophathilath, P. (2006). *Lao PDR Poverty-Environment Nexus case study: Non timber forest product (NTFP)*. Prepared for poverty and environmental nexus study II, The Pen Project Group, EASEN/DECRG/EASPR, WORLD BANK: NAFRI.
- St John, R. B. (2006). The political economy of Laos: Poor state or poor policy? *Asian Affairs*, 37(2), 175-191.
- Starr, P. (1988). The meaning of privatization. *Yale Law & Policy Review*, 6(1), 6-41.
- Stern, D. I., Common, M. S. & Barbier, E. B. (1996). Economic growth and environmental degradation: The environmental Kuznets curve and sustainable development. *World Development*, 24(7), 1151-1160.
- Stuart-Fox, M. (2005). Politics and Reform in the Lao People's Democratic Republic *Working Paper No.126*: The Asia Research Centre, Murdoch University.
- Stuart-Fox, M. (2006). The political culture of corruption in the Lao PDR. *Asian Studies Review*, 30(1), 59-75.
- Swinton, S. M. & Quiroz, R. (2003). Is poverty to blame for soil, pasture and forest degradation in Peru's Altiplano? *World Development*, 31(11), 1903-1919.
- Tellegen, E. & Wolsink, M. (1998). *Society and its environment : An introduction*: Gordon and Breach Science.
- The Economist. (2008, 26 January). Environment and development: How green is their growth. *The Economist*, 386.
- Tobler, W. (1970). A computer movie simulating urban growth in the Detroit region. *Economic Geography*, 46, 234-240.
- UN Millennium Project. (2005). *Investing in development: A practical plan to achieve the Millennium Development Goals*. London: Earthscan.
- UNDP. (2000). *Overcoming human poverty: Poverty report 2000*. New York: United Nations Development Programme (UNDP).
- UNDP. (2007). *Assessment of development results Lao PDR: Evaluation of UNDP contribution*. New York: United Nations Development Programme, Evaluation Office.
- UNDP & UNEP. (2011). *Managing private investment in natural resources: A primer for pro-poor growth and environmental sustainability*. Nairobi: UNDP-UNEP Poverty-Environment Initiative.
- UNEP. (2010). *Environmental scarcity and conflict - Guidance note for practitioners*. New York: UN Interagency Framework Team for Preventive Action.
- UNEP/EAP-AP. (2002). *State of the environment report 2001: Lao People's Democratic Republic*. Bangkok: UNEP Regional Resource Centre for Asia and the Pacific (RRC.AP).
- UNESCAP. (2003). *Economic and social survey of Asia and the Pacific 2003*. New York: United Nations.
- UNESCAP. (2005). *Policies and good practices in investment promotion and facilitation in least developed countries: Bhutan, Lao People's Democratic Republic and Timor-Leste*. Bangkok: United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP).

- US Department of State. (2011). 2011 Investment climate statement - Laos Retrieved 29 August, 2011, from <http://www.state.gov/e/eeb/rls/othr/ics/2011/157307.htm>
- Van de Walle, N. (1989). Privatization in developing countries: A review of the issues. *World Development*, 17(5), 601-615.
- Vedeld, P., Angelsen, A., Bojö, J., Sjaastad, E. & Berg, G. K. (2007). Forest environmental incomes and the rural poor. *Forest Policy and Economics*, 9(7), 869-879.
- Vientiane Times. (2013, 24 January). Better management of agricultural land needed, *Vientiane Times*.
- Vizard, P. (2006). *Poverty and human rights: Sen's' capability perspective explored*. Oxford: Oxford University Press.
- Vizard, P., Fukuda-Parr, S. & Elson, D. (2011). Introduction: The capability approach and human rights. *Journal of Human Development and Capabilities*, 12(1), 1-22.
- Vongsay, M. (2010). Managing private investments for sustainable development in Lao PDR. Vientiane: Investment Promotion Department, Ministry of Planning and Investment.
- World Bank. (2002). *Private sector development strategy-directions for the World Bank group*. Washington D.C: World Bank.
- World Bank. (2004). *Lao PDR economic monitor (November 2004)*. Vientiane: The World Bank Office.
- World Bank. (2006a). *Lao PDR environment monitor 2005*. Washington, D.C: World Bank, November.
- World Bank. (2006b). *Poverty environment nexus: Sustainable approaches to poverty reduction in Cambodia, Lao PDR and Vietnam*. Washington, D.C: World Bank.
- World Bank. (2007). *Lao PDR economic monitor (November 2007)*. Vientiane: The World Bank Office.
- World Bank. (2008). *Lao PDR economic monitor (November 2008)*. Vientiane: The World Bank Office.
- World Bank. (2009). *Lao PDR economic monitor end-year update*. Vientiane: The World Bank Office.
- World Bank. (2010). *Lao PDR development report 2010 : Natural resource management for sustainable development-hydropower and mining*. Washington, D.C: World Bank.
- World Bank. (2011). *Lao PDR economic monitor (May 2011)*. Vientiane: The World Bank Office.
- World Food Program. (2004). *Lao PDR-Analysis of vulnerability to food insecurity: Vulnerability Analysis & Mapping (VAM) Unit*, World Food Program.
- Xaovanna, V. (1999). *Introduction on poverty measurement in Lao PDR*: State Planning Committee, National Statistical Centre.
- Young, G. L. (1986). Environment: term and concept in the social sciences. *Social Science Information*, 25(1), 83-124.
- Young, M. D. (1992). *Sustainable investment and resource use: Equity, environmental integrity and economic efficiency*. Park Ridge, N.J: Parthenon.