CHAPTER I

INTRODUCTION

1. 1 Background

Mankind is facing one of its greatest dilemmas since the start of the industrial revolution. We are in a time of unprecedented economic growth and development. International trade, cooperation, and infrastructure have brought prosperity to areas that had previously been stuck in poverty or backwardness, while the developed nations have been able to continuously push the boundaries of human achievement, developing fantastic technological, medical, and scientific innovations on a yearly basis. The growing links, either physical or electronic, between cities and countryside, neighboring states and regions, as well as between areas on opposite sides of the planet have largely been responsible for this revolution.

However, there has been another side to these achievements. Accompanying this unprecedented pace of economic growth and development has been an equally extraordinary wave of environmental degradation, directly caused by mankind's economic decisions. This environmental degradation, which includes such global issues as climate change, ozone depletion, mass deforestation, and bio-diversity loss, directly threatens our planets ability to sustain human activities. Thus, mankind has a reached a turning point in its history: Do we continue along the path of growth and development, increasing the income and livelihood for all those involved, despite the fact that such actions may prove to be environmentally unsustainable? Or do we change course, slow or halt growth and development and let the environment recover? Is there a middle ground, or is it too late?

The UK Government, in its environmental White Paper, emphasized the moral basis of environmental conservation, stating that "The ethical imperative of stewardship... must underlie all environmental policies... We have a moral duty to look after our planet and hand it on in

good order to future generations (HMG, 1990: 10)." Yet centuries of classical economic thought would also argue governments have just as great of a duty to promote the growth and economic well-being of their citizens. The concept of sustainable development, which evolved from early theoretical debates surrounding both the limits to, and the desirability of growth, seeks to achieve both of these objectives. However, it did not gain widespread appeal until the 1980s when the international community began to gain a growing awareness of the ecological impacts of development and began placing sustainability on the global agenda. Development agencies and NGO's, like the International Union for the Conservation of Nature's World Conservation Strategy, which first linked environmental conservation with development and coined the term 'sustainable development' in 1980, began to adopt tenets of sustainability to their operations; however despite the popularity of the term, real and quantifiable progress has been slow (IUCN, 1980: 1)

The problem with sustainable development rests in its application. The dialogue surrounding the concept has been vague and it has more frequently been adopted as a 'mantra' or set of guiding principles rather than as a usable action plan. In order for sustainable development to make a noticeable impact towards environmental conservation it needs to be adapted in a way which can be applied on a sector by sector or case by case basis. Additionally, an operational definition of the concept should be formed, which focuses on goals and standards which can be applied to specific development sectors.

One notable field where sustainable development has not been a significant mitigating factor on environmental degradation has been infrastructure development. Infrastructure is an extremely vital part of human development, as well as a pre-requisite to trade, capital accumulation and thus economic growth. As an indicator of its importance, infrastructure development has proceeded at a rapid pace throughout the developing world. Well planned and implemented infrastructure facilitates trade, supports industrial activities, increases incomes, and improves productivity. In fact it is easy to argue that countries which are endowed with high quality infrastructure are better positioned to be competitive in global markets than those with poor infrastructure. However, infrastructure as it is currently implemented suffers from the same unsustainability as the large global economy as a whole, contributing directly to a wide range of

harmful ecological issues such as deforestation, water depletion, species extinction, etc. The goal of sustainable infrastructure development should not be to, 'implement a project while cutting down as few trees as possible.' In fact that is already the mantra, no project begins with the intention of being environmentally unsustainable, but through a multiple of variables and failings it too infrequently is. Instead, there should be a clear operational framework through which these goals could be realistically achieved while hindering economic growth and development as little as possible.

1.2 Research Question

This study aims to contribute to the development of such a framework by examining infrastructure development in Lao PDR in the context of the Greater Mekong Sub-region (GMS) cooperation program, an economic union designed to stimulate regional trade and growth across borders, and identifying a set of principles which could guide infrastructural development in order to make it more sustainable environmentally. I will specifically examine the case of GMS sponsored highway construction in Lao PDR, a road that is being built to facilitate regional transport and commerce. This road, Highway 9 in Lao PDR, is part of the East-West Economic Corridor (EWEC), a key component of the GMS's economic corridor strategy which seeks to create "corridors" of concentrated development and investment across the Mekong region.

I have chosen to set my case study in Southeast Asia, and Lao PDR in particular, for several reasons. First, quite simply that's where they are building the infrastructure these days. The incredible investment and construction boom that has proceeded across Indochina over the past two decades allows for plenty of examples of both good and bad development. As far as quality goes its fairly average, the infrastructure is definitely not the best (see Europe or Singapore for that) and it's certainly not the worst (Bangladesh comes to mind), but there is definitely room for improvement. Furthermore, the nature of infrastructure development in the region, big bank funded and state-enterprise implemented is quite a familiar blueprint across the developing world.

The second question of course is why roads? The first reason is that Southeast Asia as a whole, has truly committed to transport infrastructure development, allocating huge sums over the past few decades towards the construction of roads, ports and other facilities, thus once again, providing a large array of examples for any intended research. However, the single biggest reason for choosing roads is the fact that in many ways they are generally representative of other types of infrastructure. Land transport facilities generally entail large investments to establish a network; private provision is not the most efficient form due to the externalities involved and economies of scale; and there is general agreement on its importance to economic development on the aggregate level. Furthermore, they seem to spawn a large amount of environmental externalities, many of which could be minimized without significant altering implementation practices, so seemingly road construction would be the sector most in need of renovation. Thus, despite my focus on road construction in Lao PDR, I would hope that many of my recommendations would also apply to infrastructure development in general, as well as other types of projects in more varied locations. Furthermore, a significant knowledge gap exists regarding the negative environmental impacts of road construction. Most studies regarding infrastructure and the environment focus on much more large-scale projects, notably dams. In fact, every new dam project seems to attract intense criticism despite the size of its ecological footprint Although these projects, due to their size, can have larger impacts on the environment, the cumulative effects of poor road construction can be just as severe, and frequently overlooked. Thus this study also serves to both promote awareness about roads while also filling an existing hole in the literature regarding infrastructural impacts on the environment.

Specifically, the main research question of this study is to discover what knowledge can we glean from past infrastructure development in the Greater Mekong Subregion and Lao PDR which would facilitate the creation of a more sustainable development model.

In answering this question, the study is aimed at identifying selected core principles of sustainable development to be applied to infrastructure in order to correct or mitigate many of its environmental effects while promoting infrastructure as a viable growth-centric development tool for the future. This tentative framework for sustainable infrastructure development, although containing general ideas and guidelines which can and should be adapted for different types of

infrastructure projects, is meant to be applied specifically to rural road construction in Southeast Asia.

The chosen research focus put limits to the scope of the study. Socio-environmental concerns not directly linked to road projects, like the disruption of freshwater fisheries, an issue frequently linked with dam construction e.g., will not be explicitly addressed. Furthermore, I have adapted a rather specific understanding of the concept of sustainability, one which gravitates towards and emphasizes the United Nations third mutually exclusive pillar of environmental preservation, a notion more akin to Sustainable Developments theoretical and institutional roots. Thus, socio-economic issues recurrently associated with infrastructure, like migration, resettlement, or even disease transmission all remain beyond the scope of this analysis.

1.3 Methodology

Considering the purpose of this study, i.e. creating an operational framework for sustainable infrastructure development extrapolating from a concrete case situation, the main methodological approach has consisted of an extensive literature research in conjunction with field observations.

This literature research has encompassed all theoretical dimensions of sustainable infrastructure development and its links with economic growth and environmental degradation in order to form the conceptual basis for the proposed operational framework as well as documentation of infrastructural development in the region. Relying largely upon secondary and primary document analysis, I pull from a variety of sources, including: governmental and non-governmental reports, scholarly works regarding infrastructure and sustainable development, as well as classic pieces of economic literature. One limitation encountered during the literature analysis has been the relatively modest number of publications regarding sustainability. As of yet few major studies have been devoted to sustainable infrastructure development, thus I have had to pull heavily from the few that exist. Paul Ekins 2000 book, *Economic Growth and*

Environmental Sustainability, for example, has been a strong reference due to the lack of other seminal sources.

For the case study on highway construction in Lao PDR I apply a more varied methodology, pulling from secondary and primary sources, but also interviews and personal interviews and observations from time spent in Lao PDR. Among the primary sources that I rely upon the most is a series of monitoring reports conducted by IUCN: The World Conservation Union during the construction of Highway 9 as well as an interview with a member of the team who conducted the monitoring. A series of informal interviews and meetings conducted in Vientiane, Lao PDR in May of 2008, with members of the international development community there, including IUCN and World Bank employees, greatly enhanced my background knowledge of the East-West economic corridor projects, while setting the direction for the rest of my research. Furthermore, in June of 2008 I also conducted an informal interview with a member of the IUCN monitoring team, Ms. Shiranee Yasaratne, who was able to shed greater light on the challenges faced by the monitoring team, as well as on the environmental side-effects observed along Highway 9.

1.4 Structure

This thesis is structured in six chapters. In chapters two and three I present the theoretical discussion on sustainable development in relation to growth and infrastructure. The second chapter deals with the sustainability of development and its compatibility with economic growth. Major themes include the desirability of economic development, the creation of sustainable development as a concept and the operationalization of that concept for meaningful application in the real world.

The third chapter addresses the concept of infrastructure and its relationship with environmental sustainability. First I define infrastructure and discuss its strong relationship with economic growth and development. Once I have established an understanding of why infrastructure development is a desirable human action, I contrast with infrastructure's

destructive relationship with the environment, through the lens of sustainable development. I conclude my discussing the ways in which infrastructure, as it's currently constructed, is degrading the environment, and proving to be an ultimately unsustainable development tool.

The fourth chapter consists of my case study of highway construction in Lao PDR. I start by giving a basic introduction, including background information, on the ADB's East-West Economic Corridor and its Lao component, Highway 9. Following this background I discuss the environmental costs of the project, including deforestation and the erosion of water quality, while emphasis is placed on the cost and benefit ratios that are implicit in infrastructure development today. This contrast displayed in the example of Highway 9 shows that infrastructure as its currently implemented does not meet the standards of environmental sustainability outlined in chapter two and applied to infrastructure in chapter three. In the final section I introduce my framework for sustainable infrastructure development. This, like the case study, pulls from a variety of documentary sources, including the aforementioned monitoring reports, as well as my interviews. However, unlike previous chapters this section is largely focused on analysis and the presentation of my own views and recommendations.

In Chapter 5 I present the framework, centering on four key principles, or rather areas where modern infrastructure development must be strengthened or adapted in order to conform to the principles of sustainable development at as little cost as possible. These four areas, because they correspond with phases of project development, should be easily adapted, provided the donor organization(s) and project leaders are motivated towards change. The four phases cover the planning, implementation, and monitoring phases of a project and provide practical solutions, like economic valuation for cost/benefit ratios, improved environmental impact assessments, environmentally sound construction techniques, and reliable monitoring arrangements e.g. Furthermore a forth aspect encompasses accountability, a value seemingly lacking in many infrastructure development projects today. I propose methods through which contractors and development agencies can be more accountable for their projects both to local people who are affected by the project as well as the donor organization that funded it. Solutions include a more open and transparent contracting process that place more accountability on

quality and a more rigorous regulatory system which places both quality and environmental standards on the contractors and donors who finance projects.

I conclude in Chapter 6 by arguing that by applying this framework to future infrastructure projects we can make one of the largest factors of economic growth more sustainable, while setting an example for other sectors of the global economy.