

Chapter 1

Introduction

1.1 Problem Statement

The early 21st century has been marked by natural disasters resulting from land slides, flooding, tsunamis, typhoons or hurricanes that kill tens and often hundreds of thousands of people. Much less is said of another, silent killer: natural degradation and misuse of resources, which intensify low food productivity in most part of the world. Myanmar is no exception.

As the second largest country in Southeast Asia, covering 677,000 square kilometers of land, Myanmar has historically been endowed with rich natural resources: arable land, forest products, minerals (including gas and oil), freshwater and marine resources. Yet today, environmental degradation is quite high, both because of the mining and extraction of forest products; and because other economic

pressures (unemployment, inflation, market failures, poor infrastructure) render more than 70 percent of the population directly dependent upon the environment for energy,

food and agriculture.¹ Myanmar's major challenge for bringing about sustainable socioeconomic development is the poverty in rural and remote areas, which both results from and further intensifies inequality and a vicious cycle of short circuits in

the forward (or industrial) and backward (or rural) sectors. Of a total population of

¹MFF Forum (Myanmar Fishery Federation's Economic Forum Dec 2008,). The Myanmar Fishery Federation is organized with the fish exporters, government and economic think tanks. MFF Forum discussed about the impacts of financial crisis on rural people, opportunities and strategies. MFF Forum (Myanmar Fishery Federation's Economic Forum Dec 2008,).

56.51 million, the poverty incidence in Myanmar is estimated to be 26.6 percent (20.7 percent for urban areas and 28.4 percent for rural areas.)²

Some observers may presume that environmental problems and poverty are endemic to developing countries. To be sure, poverty traps are widespread. In Myanmar, however, the trap is particularly well-set. Environmental degradation and inefficient resource allocation prevent people from climbing out of poverty. Inequality in capital allocation further strengthens the inequality in income distribution within the country.

Land use and economic planning in Myanmar³ bear the stamp of center-periphery theory because government development planning has emphasized central Myanmar since the 1960s. Indeed, institutional factors are the main constraint to integrating the environment into development. Separate Sectoral ministries and departments in government bodies are poorly coordinated and motivated to carry out current natural resource conservation projects. Road construction, industrialization and infrastructural development therefore cannot effectively channel workers from traditional agriculture into industrial jobs. Nor does raw material flow smoothly from the backward sector towards the industrial sector. This under-development trap means that the majority of the population of both backward and forward sectors must still specialize in traditional agriculture and directly depend upon environmental resources to a scale much greater than in most other developing economies. To make matters worse, each area and community bears distinct characteristics and must confront unique problems in the microeconomic decision making process.

² 2001 expenditure survey from a sample size of 30,000 households in 75 townships (ADB, 2007 fact sheet), online paper at http://www.adb.org/Documents/Fact_Sheets/MYA.pdf.

³ Please see figure (1.2), Land use and Economic planning of Myanmar.

These social and economic problems are head and tail of the same devalued currency of poverty. Poor living facilities and economic problems exert pressure upon natural resources, such that environmental degradation and forest depletion come back into the economy as a limitation to development. This conclusion -- that environmental problems in Myanmar arise from underdevelopment and poverty -- has been confirmed by the National Commission on Environmental Affairs (NCEA⁴). Deforestation, loss of biological resources, land degradation due to wind and water erosion, urbanisation and waste management all intensify negative pressure on the natural environment. According to data from United Nation Economic and Social Commission for Asia and the Pacific, ESCAP⁵ for the year 2000, the agricultural sector contributes 57.2 percent of Myanmar's GDP and provides employment for nearly 66 percent of the labour force. 15 percent of land is used for cultivation and 50 percent of the land area is covered by the forest. The 50 percent uncultivated land is made up of alluvial soil in the delta regions and river valleys, 30 percent black soil in the Central Dry Zone and 20 percent suffers from man-made aridity or semi-aridity due to deforestation, drought, misuse and mismanagement.

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⁴ NCEA, National Commission for Environmental Affairs is established in February 1990 under the Ministry of Foreign Affairs. In recent years, NCEA drafted the Myanmar Agenda 21 in collaboration with UNEP which promote activities and programs that promote environmental protection and environmentally sound and sustainable development. This Myanmar Agenda 21 promised social, economic, institutional and infrastructural strengthening as well as environmental protection i.e., integrating environmental considerations into economic policy making processes.

⁵ United Nation Economic and Social Commission for Asia and the Pacific (ESCAP) include the dry zone greening project as one of the good example in its virtual conference page, http://www.unescap.org/drrpad/vc/conference/ex_mm_124_iec.htm.

1.2 Significance of the Problem

In environmental economics, the environment is the very foundation of both social and economic welfare. A close relationship interlinks environmental degradation, natural resource depletion and the economic activity of people. The livelihood strategies of the local population depend upon two factors: market proximity and opportunities for trade, and the wealth of natural resources. With regard to the latter, forest conservation and protection of nature are considered to be “mere” luxury goods in most parts of the world; even though scarcity leads to alienation from nature and endangers local physical and cultural survival. Such scarcity is of two types: (1) nature is degraded to the point where it can no longer sustain continued resource extraction by the population and (2) the patterns and means of extraction involve inefficiency, misuse or poor allocation of those resources. The problem of Myanmar today is mostly the allocation problem.

Within the environment itself, Myanmar is also beset by interwoven imbalances. For example, soil erosion and natural degradation result in low yields, which in turn lead to dietary deficiencies. The severity and very definition of the problems differ one from each other in different places on earth. Each story may have similar or different answers; no one knows without closely studying the problems. Hence the present study of two distinct ecosystems in Myanmar.

1.3 Objectives of the study

The present contrastive study of two eco-marketing zones in Myanmar is designed to elucidate the reasons for success and failure in development planning according to local norms and endowments of human and natural resources. Knowing

the underlying causes and effects of welfare distributions will allow reforestation projects and other development efforts to be planned more effectively. It is hoped that the information that results from this study will be helpful in solving the pitfalls of development and poverty alleviation in two of the most distinctive environmentally fragile ecosystems of Myanmar.

Discovery of the underlying socio-cultural and economic factors that are putting pressure on the forest and land resources of Myanmar may also help governmental and non-government organization, NGO planners to create better policy to induce behavioral change in the local population, and thereby protect the forest and strengthen local community organisations. Communication and advocacy with local communities requires an intimate understanding to the local people and their livelihood systems. The present research relies upon a positive analysis of the environmental, physical, economic and social welfare dimensions of the livelihood systems, and of how they interact to affect the lives of rural people.

1.4 Scope of the study

The solution to the poverty-environment trap can lie either inside or outside of the socio-environmental-economic system, depending upon the basic structure of the community. The present study seeks *internal* solutions through a detailed analysis of the anatomy and inner workings of environmental degradation, economic well-being, and social welfare in two distinct eco-marketing subsystems of rural Myanmar. The first eco-marketing subsystem reflects the success story of the NCEA's five year

project⁶ to green the Dry Zone. This project included ensuring smooth transportation, sufficient water supply, promotion of education, enhancement of health care and reinforcement of economic development. In Myanmar's Dry Zone, all these initiatives have been carried out in collaboration with different Non-government organisations (NGOs), local Community-based organisations (CBOs) and such international organisations as the United Nations Development Program (UNDP) and the Japanese International Cooperation Agency (JICA)⁷. The present study selected for study two villages in the Bagan area of the Dry Zone to measure and monitor the diverse impacts of such initiatives and to identify the underlying causes of this success story. One village was chosen from the water supply project area and the other from the area of the reforestation project, which has phased out in 2007.

Meanwhile, the NCEA has denounced the assertion that environmental awareness is gradually rising throughout Myanmar. That is why this study has selected a second study site: Kyaintali, on the southern border of Rakhine State, where people depend totally upon the environment for food, income and shelter; the market is not developed; and there has been no governmental project for sustainable development to date. The present study seeks to identify and unravel the separate factors that could promote the integration of environmental conservation in five disparate villages in the Kyaintali eco-marketing zone.

The two study zones chosen lie in Central Myanmar (Bagan area; please see map picture 1.2) and southern Rakhine State (Kyaintali area). These two zones have

⁶ 2001-02 to 2005-06, initially drafted in 1994 with the collaboration between Ministry of Forestry Myanmar and National Commission for Environmental Affairs

⁷ Japan International Collaboration Agency that supports development projects and environmental conservation in developing countries. JICA supports environmental protection and economic development of the rural Myanmar especially in central dry zone and Irrawaddy delta.

different histories of conservation projects and have also used different approaches to sustainable development. The impacts of reforestation projects upon the livelihood of local people in these two areas also differ because of the distinct local culture and physical endowments of their environment. Moreover, government development planning has diverged one place to another. Central Burma is mentioned as the hub of transportation routes from all over the country in Myanmar, while Rakhine State has been regarded as a periphery between the sea and mountain ranges coming down from the Himalayas.

Study area 1 (Bagan in Central Myanmar, figure (1.3), is populated with textile, garment, food and other industries and has benefited from reforestation projects over the past thirty years (figure 1.2, map of Myanmar economic land use). Road construction and transportation connect Bagan with all parts of the country. Tourism is also the most developed in the country due to the lovely *wat*-studded Bagan plain, sometimes compared with Angkor Wat (Siem Reap) in Cambodia. At least theoretically, products from all over the country flow easily along these roads and transportation is developed. The two survey villages chosen have reforestation and agricultural extension projects from the Department of Agriculture and the Department of Irrigation. The study villages are chosen with respect to their distance from the main road (5 to 16 kilometers).

Study area 2 (Kyaintali in Rakhine State) is also a site for ecotourism (figure 1.4). The beautiful and famous beaches near Kyaintali include Ngapali, Ngwesagung, Chung Thar, Gwa (Kantharyar), and Maw Shwe Gyaing, the last less than 40 kilometers away. Lying as it does in the southern part of Rakhine State, Kyaintali is closer to mainland Myanmar compared to the other parts of Rakhine State, which are

remote from transportation and communication facilities. However, despite this locational advantage, Kyaintali receives no support from development agencies. Any UNDP, international NGOs or local NGO development projects are located in the north of Rakhine State; with none in the south such as Kyaintali, Gwa and Sandwe.⁸

The Ministry of Forestry, together with the NCEA⁹, defined the mountainous ecosystems of Myanmar and the dry zone of central Myanmar as “fragile ecosystems” because of the threat of soil erosion and rapid loss of habitat and genetic diversity.¹⁰ Most mountain areas in Myanmar are experiencing environmental degradation, poverty, poor health and sanitation, and unemployment among the populace of mountain dwellers. Education, health care, energy, livelihood opportunities and proper management of mountain resources and socio-economic development constitute pressing needs for the local indigenous people. But neither Rakhine State nor Kyaintali is mentioned as a fragile ecosystem in any document, which is all the more surprising in that the biggest elephant sanctuary in Myanmar lies near Kyaintali and the forest is richly endowed with *dipterocarpus*, an endangered species of valuable hard wood with aromatic essential oils. Moreover, Kyaintali’s forest land serves as a water tributary for several streams that flows into the Bay of Bengal, where mangrove forest gardening at the mouth of the rivers is necessary for fish and aquatic species to flourish. But coastal area protection is poor, there was no governing body yet until 2002, and even that is managed under a limited government budget. The Kyaintali research area is therefore both fragile and forgotten.

⁸ Sandwe is well established with eco-tourism but Kyaintali and Gwa are not.

⁹ NCEA (National Commission of Environmental Affairs) is set up in 1997, participated in collaboration with UNEP to adopt Myanmar agenda 21 and is working with different environmental NGOs in Myanmar.

¹⁰ Johannesburg Summit 2002, Myanmar, Country Profile.

The map of UNDP Projects in Myanmar (Figure 1.1) helps to locate the two study areas. The Bagan area has development projects and accessibility to markets and the external economy, while Kyaintali has neither of those advantages. The government land use map for economic activity confirms that there is no economic integration in Kyaintali. In terms of the communications and infrastructure necessary for economic development, Kyaintali is still virgin territory compared to Bagan. The populations fortunate enough to be endowed with natural resources use them for survival without sustainable management; the resulting environmental degradation becomes a threat for the survival of local people. To explore possible avenues for success in poverty eradication in Kyaintali that might play upon the conservation of forest and natural resources, the present study analyzes the relative success of Bagan in terms of environmental scores, knowledge, participation and infrastructure development. The common factors and differences in the situation of the two regions will determine whether the same strategies and policies of development are universal for Myanmar, or must be distinct for each eco-marketing zone.

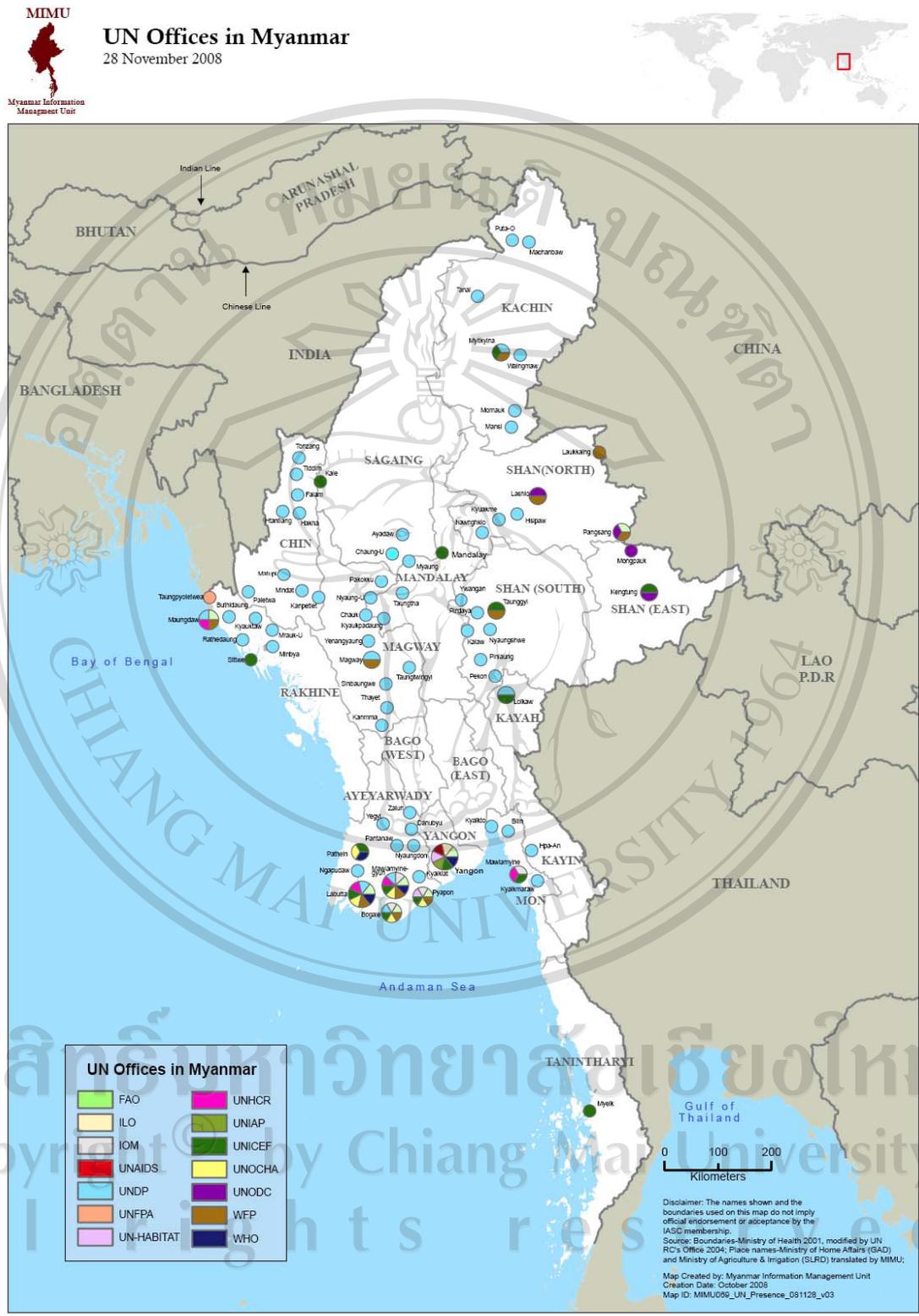


Figure 1.1 Location of UNDP projects in Myanmar.

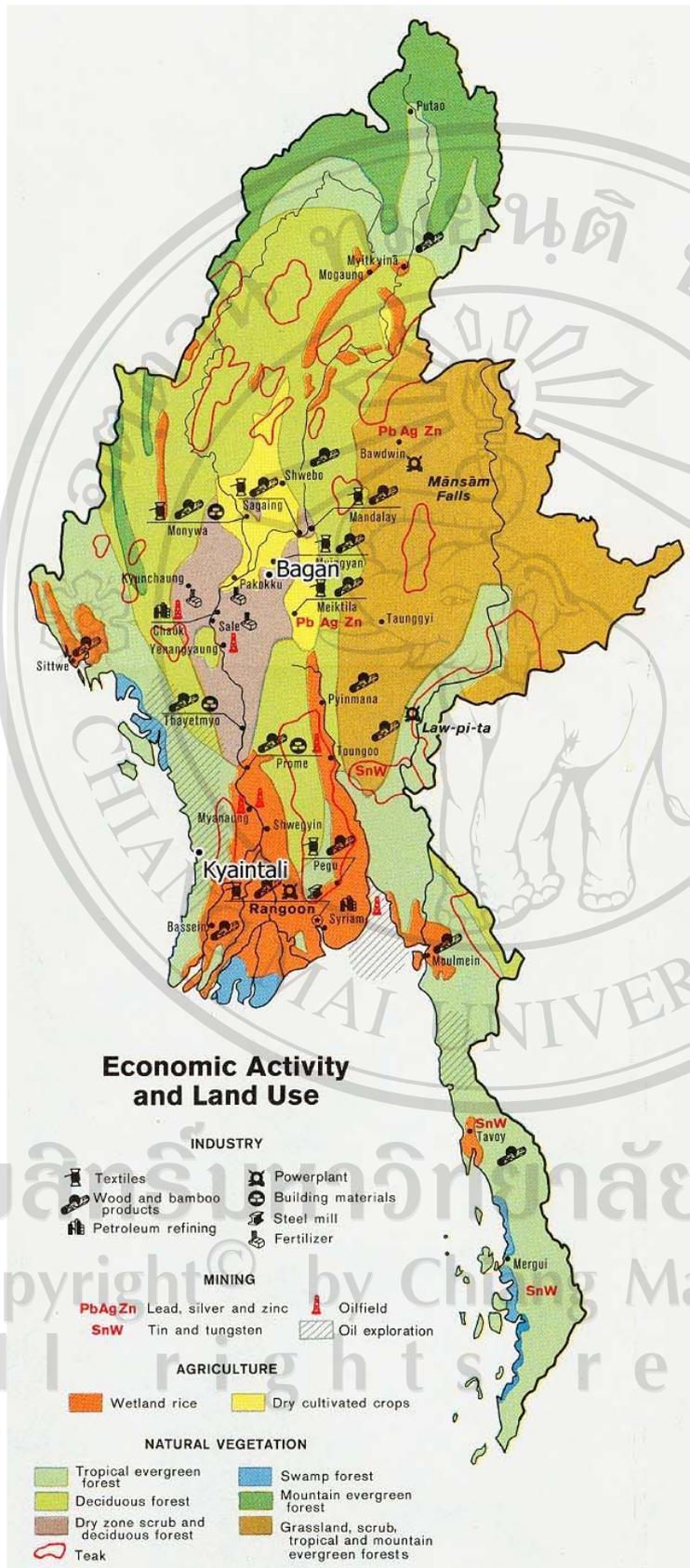
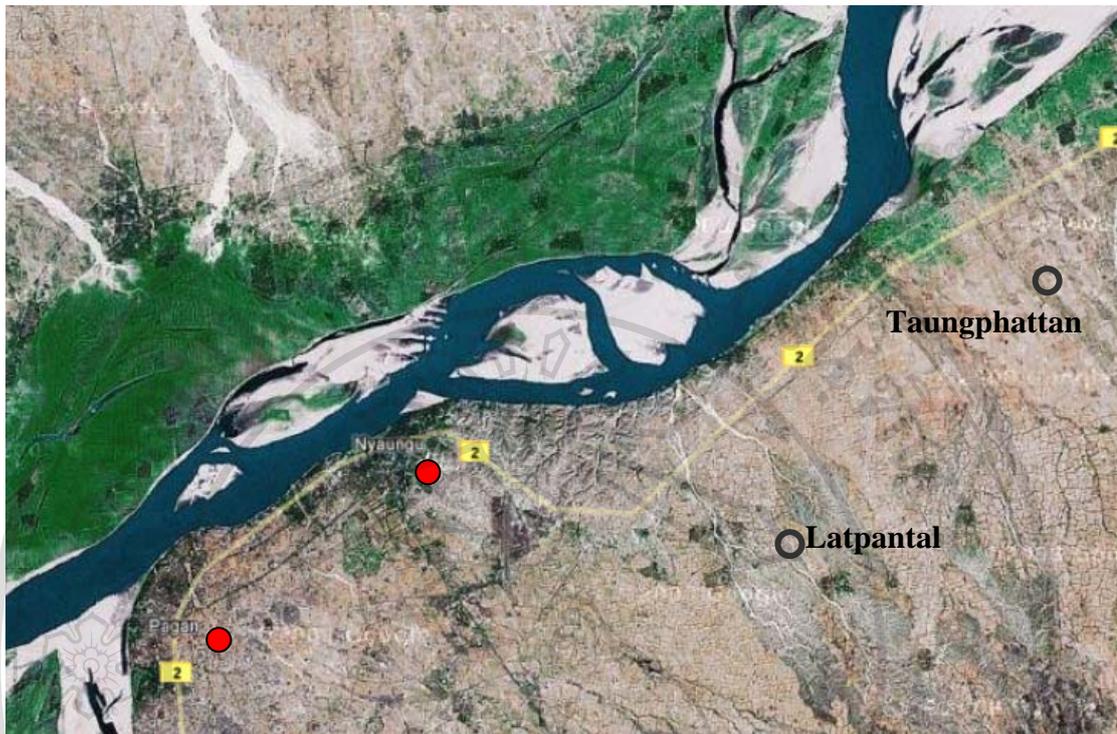


Figure 1.2 Map of Myanmar Economical Land use plan.



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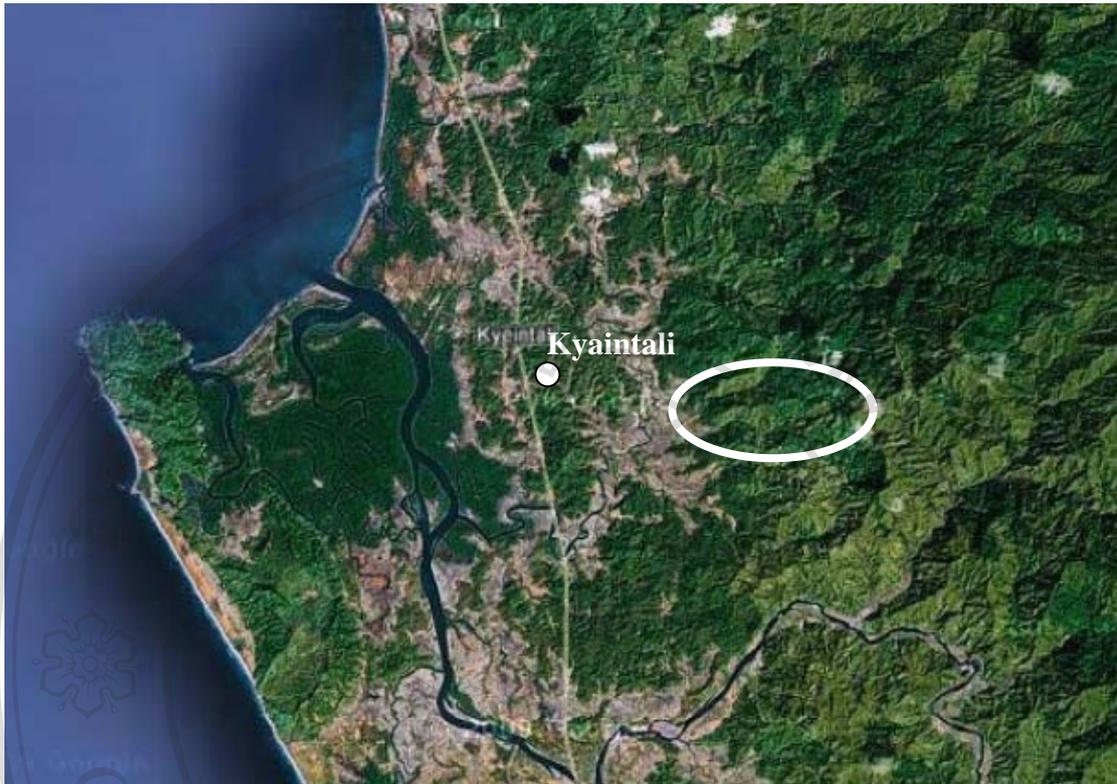
- Bagan
- Nyaung Oo
- Road
- Estimated position of studied villages

Figure 1.3 Estimate position of two sample villages in Bagan¹¹

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¹¹ Satellite Image of Bagan-Nyaung Oo area provided by Google at following link

http://www.nationsonline.org/oneworld/map/google_map_myanmar.htm



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- Gwa- Sandwe Road
- Kyaintali
- Estimate range of the location of study sites

Figure 1.4 Map of Kyaintali showing the location of villages in the data collection.¹²

1.5 Concept of Hypotheses Testing

This study traces the sources of social well-being in each of the two study areas down to their community norm roots. Social well-being is determined by the attitude of people in the community, the level of environmental awareness and

¹²The satellite view over Kyaintali provided by Google at the following link

http://www.nationsonline.org/oneworld/map/google_map_myanmar.htm

environmental knowledge. These in turn are posited to determine a behavioral change to conserve the forest cover, soil fertility and financial viability of the households within an economic situation influenced by complex social factors.

Environmental services are mostly free of charge, since nature is generally a common pool resource. The more those resources are held in common, the sooner degradation will occur. Although individual villagers may wish to protect the environment, they also have to extract and use the part of the resources for the economic activities necessary to survival. The poor must depend disproportionately more upon nature for income and food, while the rich destroy the environment disproportionately more through their consumption patterns.

This thesis will inquire into the roles of culture, awareness and knowledge in the improvement of income and conservation projects in poor communities in Myanmar. A middle path for using the environment and natural resources is posited, as well as the idea that sustainable development is an answer for those people who depend upon natural resources yet have not improved their income as those resources rapidly decline. The Buddhist concept of the 'middle path' is embedded in Myanmar culture. In addition to the universal norms of community harmony, group responsibility, and respect for nature and each other, communities in Myanmar are expected to, and do, appeal to a strongly integrated set of values inherent in Theravada Buddhist philosophy.¹³

The research project was based upon a cross-sectional survey of the two differently fragile eco-marketing systems. Both Bagan and Kyaintali are fundamentally agrarian economies but with different levels of infrastructure

¹³ The full force and scope this theory will be presented as part of the conceptual framework of the study (Chapter 2).

development. The analysis of the status of each economy can thus pinpoint the role of infrastructural improvements in the economic development of Myanmar. These road, transportation and communication factors will be highly emphasized in this thesis because the awareness building, conservation, and poverty eradication projects in the Dry Zone by the DZGD¹⁴ highly emphasized rural transportation as an asset for sustainable development which is not accessible in Rakhine State. This study tested whether these factors are limitations for the welfare and sustainable development of Kyaintali since Kyaintali is very poor in infrastructure.

Although poverty in Myanmar is ubiquitous, its story is different in different classes of people, different places, ethnicity and ecosystem. The two study zones were therefore also selected to investigate inequality and degradation and to answer a series of fundamental questions that lie at the heart of effective policies for environmental, economic and institutional sustainability. For example,

- *what makes people degrade their own environment even though they know that they are depending on it?*
- *What are the driving forces of over-extraction of natural resources?*
- *Do economic fundamentals and structures make people lighten their behavioral foot print?*
- *If people had more income and education, would they acquire more environmental knowledge to protect the ecosystem and sustain their long term income?*

¹⁴ Dry Zone Greening Department is under Department of Forestry Myanmar. It is a special branch collaborating with NCEA, UNEP and other INGOs and NGOs for the reforestation of semi-desert area in Myanmar.

- *Why do people not take advantage of the infrastructural assets to participate in the market? Do they not want to improve their income and raise their living status?*
- *Is it possible that people simply lack the technical knowledge to conserve natural resources ?*
- *If assets like roads, forest cover, and the sea provide employment and welfare for local people, why is their use neglected in national and local income accounts. What policies could lead to more explicit natural resource accounting and correction?*

Such pressing questions lead to a series of nine hypotheses that will be tested as a system in the two different study zones. The concepts used to construct the system of hypotheses are shown in Figure 1.1. This figure itself was built up through the processes of induction, deduction and retrodution¹⁵ during the successive phases of the research process. The underlying concepts of this figure are taken from the idea of ecological economics, sustainable development, welfare theory, Buddhist philosophy of mutualism in living, and unified economic theories.¹⁶ How these concepts fit with this study will be explained in detail in the next chapter. The framework of the soft system of human-nature interactions with economic well-being, efficiency and infrastructure will also be laid out.

¹⁵ The results from the regression analysis to test the hypotheses in their original form often lead to the discovery of significant new forces in eco-marketing systems that were unseen in the stage of hypotheses formulation. This process is called retrodution, as distinct from induction or deduction. The sum of these new insights will be shown graphically in the revised conceptual framework in Chapter (6).

¹⁶ Calkins, Peter 2008, tri polar view of balanced economy, Microeconomic Issues and Policy Models, Econ 860.

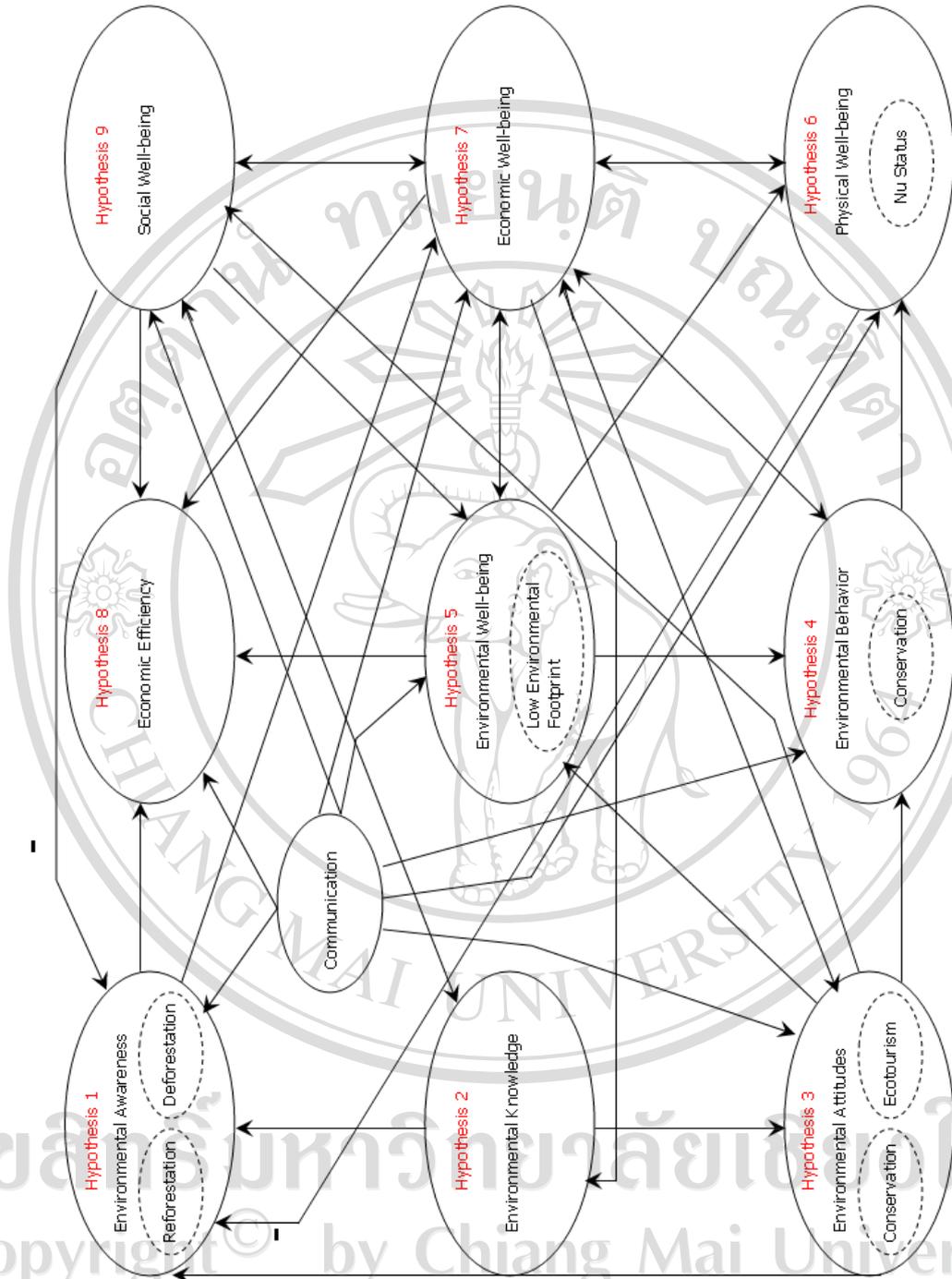


Figure 1.5 Theoretical Framework of Hypotheses.

Hypotheses (1) *Environmental awareness* is a ‘positive function’ of (i.e., it is increased by) environmental knowledge, environmental attitudes, attachment to the land, lack of social well-being, low physical well-being, and other socio-economic determinants.

Awareness is the conceptual start-point of a behavioral change process in the Awareness-knowledge-participation (AKP) method. Awareness of the environment is alternatively measured in the study by two composite scores calculated from simple Likert scales: a) average awareness of the benefits of reforestation and b) average awareness of environmental degradation. Clearly, since low levels of awareness of environmental conservation and participation will constitute major threats to development projects, we should inquire as to what factors may enhance such awareness. We hypothesize that those who lack food, employment, and tenure security will be pressured to acquire the most awareness of the natural environment. Physical well-being, as measured by nutrition, is the most immediate measure of the livelihood of people who are directly depending on the environment for food products and income. Attitudes, knowledge and social participation also enhance the awareness since these constitute the internal feedbacks of external validity and internal validity in the developmental system (Figure 1).

Land use is symbol of social and economic status in rural Myanmar. Ecological economics is also concerned about land use since land is the most fundamental ecological asset for production. The type of land ownership has a great influence on the length of time people are willing to invest in its maintenance, as well as their emotional attachment to land. Since the valuation of land is important to crop production, we calculated attachment to land as a composite score of type of land

ownership (inherited, purchased, rent and self-cleared which is shifting cultivation), distance to farm and amount of land possess.¹⁷ Distance to land is included here since the value of land declines with distance and commuting time. Land quality is expected to be a prominent factor since it is also a status symbol in the villages.¹⁸ Moreover, small scale farmers could be more productive than the large landlords if they possess more fertile land. In the real world, welfare redistribution based on land-based targets has not proved itself to be a good method. The land-quality difference would play some role in productivity that would enhance income and welfare.

Hypotheses (2) *Environmental knowledge* is significantly determined by social well-being, financial viability, high attachment to the land, low employment status, and economic fundamentals.

Knowledge comes into the system after people are aware of certain issues. Lessons are learnt and adopted into a practice. Thomas and Howard argue that there are no significant differences in environmental knowledge by any other socioeconomic determinants than income and education.¹⁹ It is obvious that people who are mostly struggling for the subsistence are unable to pursue knowledge or lack time to consider any social or environmental issue other than survival. Social well-being is included here to inquire whether the trust in community, sympathy and empathy would extend into the building of knowledge.

Financial viability is a concern for the improvement in income, whether the yield or return is stable or not, whether the need of capital is seasonal or permanent,

¹⁷ Mendelsohn, Robert, Yale School of Forestry and Environmental Studies, New Haven, CT 06511, USA, made a frontier analysis of deforestation in Amazon internalizing property right and distance of land from the port to agricultural land.

¹⁸ Policy Research Working Paper 1270, World Bank, How Land-Based Targeting Affects Rural Poverty, Ravallion, Martin & Sen, Binayak, 1994.

¹⁹ Thomas A. and Eric Howard. Rural-Urban differences in Environmental Knowledge and Actions, 1993.

and the opportunity to improve net income. Otherwise, the household will be left behind in the community, since unimproved income means the household vulnerable to the current high inflation in Myanmar. In reality, households which cannot gain financial viability might not achieve an equal chance for participation in the social or development projects; or have the capacity to pursue the knowledge and information necessary to raise awareness for participation and social commitment.

This research views the type of employment as an indicator of the opportunity to take part in the market economy. It is assumed that off-farm employment would reduce the pressure on the extraction and dependency on nature directly.²⁰ Rural employment creation is an emerging key issue in sustainable development for improving the living standards of the small-scale farmers. For example, in 1986, China initiated the 'Spark Program' to create 100 million new environmentally friendly rural jobs to enhance rural development.

Hypotheses (3) *Environmental attitudes* depend positively on environmental knowledge, attachment to the land, economic well-being, communication, and environmental awareness.

The attitude comes from awareness and knowledge that people may have the intention to protect the forest and land resources after facing scarcity and degradation.

Alternatively, the good intention towards the ecosystem could derive from the local culture and traditional norms. Knowledge transfers from the outside world could also play an important role in taking lessons from others cases for the prevention of the degradation of the immediate environment. The search for alternative methods of

²⁰ Ecological Economics, 15 (1995) 11-19, Commentary, Employment Creation and Green Development Strategy, Ozay Mehmet.

livelihood and income also depends upon the local people's openness to the outside world, knowledge and experiences.

Hypotheses (4) *Average environmental behavior* is a positive function of environmental attitudes, social well-being, attachment to the land, environmental foot-print, average financial viability, communication, and other economic fundamentals.

This study posits that people will leave less environmental impact if they have more awareness, social wellbeing, a lighter environmental foot-print, better financial viability, and enjoy better economic fundamentals. This is the expected outcome of a community forestry project. The people in Central Myanmar are assumed to have better environmental behaviours than people in Rakhine State, where information, communication and implementation of projects are difficult. Environmental behavior is formed as a composite variable. That is, actual participation in conservation projects and performing agro-forestry are posited to be great contributors to the success of rural development and conservation since participation is always considered *sine qua non* for the success of a project.

Hypotheses (5) *Environmental well-being* is a positive function of financial viability, average attitude towards conservation, attachment to the land, social well-being and communication.

To test this hypothesis, environmental well-being is measured as the negative of the environmental foot-print; which may be improved by increasing financial viability, social wellbeing and average attitude towards conservation. Hypotheses (4) and (5) are very close to each other; while hypothesis (4) is seen from human action, hypothesis (5) tests the impact of those actions on the environment. The behavioral

footprint is concerned with the dependency, extraction, means of extraction and sustainability of the forest resources in the study zones.

Hypotheses (6) *Physical well-being* (nutritional status) is a function of economic well-being, communication and environmental well-being.

This study measures physical wellbeing in terms of nutritional status of local people, which is a proxy variable for the nutritional productivity of the environment. This physical productivity of the forest and land, which provide the sustainability of livelihood of people, is partly determined by the attitude of people towards the environment, attachment to land, the behavior of people that farm the environment, and the financial viability of the villager themselves.

Hypotheses (7) *Economic well-being* is a positive function of attachment to land, social well-being, environmental awareness, environmental behavior, attachment to the land, a low behavioral footprint, communication, and other economic fundamentals.

Here economic well-being is analysed as a function of environmental attitudes which determine crop yield; environmental well-being, which determines the productivity of land and forests; the environmental footprint, which weighs the pressure of environmental degradation; and other economic fundamentals such as location, road and transportation, information accessibility and education of household head.

Hypotheses (8), *Economic efficiency* is a positive function of environmental awareness, communication and environmental behavior; and a negative function of the sense of attachment to the land.

Economic efficiency is measured as the ratio of crop yield in money terms to the variety of crops grow in the year 2007. This ratio may be viewed as a benefit-cost ratio of specialisation of crop varieties. Economic efficiency will improve if there is good attitude toward the environment, more sustainable practices, better environmental well-being, good economic fundamentals and other socio-demographic variables are also improved.

Hypotheses (9) *Social well-being* is a positive function of environmental attitudes, environmental knowledge, and economic well-being.

1.6 Structure of the remainder of the thesis

After this introductory chapter, Chapter 2 will present the conceptual and theoretical structure of the thesis as well as the review of the relevant literature. Chapter 3 will then detail the methods of data collection and analysis, while Chapter 4 will present the descriptive statistics on the current state of welfare in the two study locations. Chapter 5 will present and discuss the conclusions from the hypothesis testing. Finally, chapter 6 will present a summary of the study, the main conclusions, and recommendations for sustainable polices in both study areas.