

Chapter 2

Literature Review

Our primary goal in development must be to reduce the disparities across and within countries. The key development challenge of our time is the challenge of inclusion.

-- James D. Wolfensohn, President, World Bank.

2.1 Anatomy of the review of literature for the research

The literature review for this research will be divided into three parts: Theme/theory, place, and analytical method as refer to Figure 2.1. *Thematically and theoretically*, the research project centered on the key concepts of economic and social welfare, natural resources and environmental resources economics shown as a series of testable linkages in Figure 1.1 of the previous chapter. Sustainable development should proceed along such linkages or path-ways where development is harmonious with economic, social and environment²¹.

Unfortunately, however, the populations of the target systems ecosystems are facing what is known in game theory as a prisoner's dilemma between conservation and degradation because of the lack of market alternatives to subsistence economic activities.

Geographically, as noted in the preview chapter, the research was conducted in the zones of rural development projects in Myanmar, especially in environmentally

²¹ Lebel, L., Tri, N. H., Saengnoee, A., Pasong, S., & Thoa, U. B. a. L. K. (2002). *Industrial Transformation and Shrimp Aquaculture in Thailand and Vietnam: Pathways to ecological, social and economic sustainability?* Royal Swedish Academy of Sciences 2002 311
<http://www.ambio.kva.se>

degraded ecosystems. However, the challenges of sustainable development of forest ecosystems are shared by many of Myanmar's neighbours in South and Southeast Asia. This will potentially lend external validity to the findings of this thesis.

Methodologically, the socio-economic, socio-cultural, and environmental endowments in the local communities were studied through tests for significant differences of mean, correlation matrices and multiple regression econometrics to find out how they inter-link within the dynamic system of rural development processes. A full set of primary data was collected because existing environmental statistics were judged incomplete and inadequate for quantitative analysis. To our knowledge, this kind of study had never been done in Myanmar.

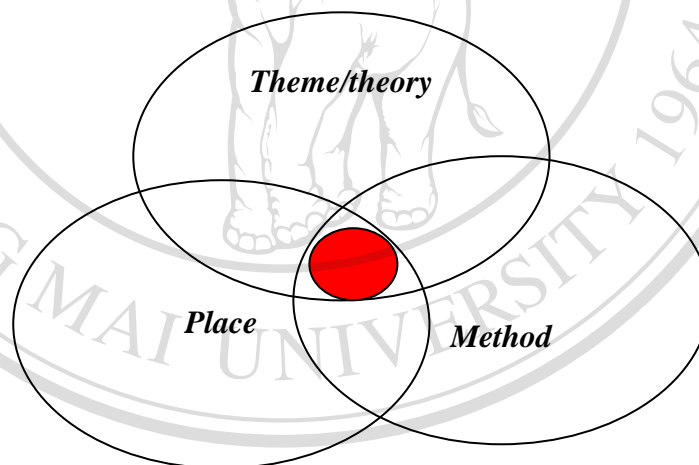


Figure 2.1 The grid of literature review

The remaining sections of this chapter will give in detail the thematic/theoretic, geographical, and methodological literature to which the current research aspires to make a contribution.

2.2 The theoretical and thematic literature

2.2.1 Complex systems in dynamic evolution

Perkins et al. (2006) explain that, if left unguided, the economic system consumes natural capital to generate current income without replenishing natural capital in a long-run. Indeed, the relationship between the economic system and its physical and biological environment is at the centre of interest in ecological economics, and in spite of significant progress made during the past decades, it still remains a largely unsolved mystery.²² Some authors²³ have gone so far as to claim that the fate of humankind will be determined by how sustainable ecosystems and the renewable resources in them are managed. Since growth of the economy depends on natural capital, it is important to better integrate the economic and ecology. But the exact nature of the socio-eco-environmental relationship for the sustainability varies from one specific community to the next because each ecosystem has distinct characteristics. The systems approach is used to study the linkages among society, the economy and the environment.

One application of the systems approach of potential interest for sustainability studies is the soft systems approach, whereby humans with a problem to solve are added to problems in the geosphere or atmosphere. A positive and frequently pragmatic study is then conducted of behavior, awareness of the environment, attitudes and economic infrastructural development. Case studies and

²² Buenstorf, G. 2000, Self-organization and sustainability: energetic of evolution and implications for ecological economics. *Ecological Economics*, 33, 15

²³ Zhao Sheng, Hong Huasheng, Zhang Luoping. (2008) Linking the concept of ecological footprint and valuation of ecosystem services: A case study of economic growth and natural carrying capacity, *The international Journal of Sustainable Development and World Ecology*,

CATWOE analysis²⁴ of the Canadian Oil Spill 1973 and intellectual development in Papua New Guinea demonstrate that a positive analysis may be done to study human systems and inquire into such intangible indicators as interactions of gender norms, social, institutional and natural systems.

Within such a systems framework, Tacconi and Bennett stress that economic viability depends on the natural resources endowment of the ecosystems. Environmental resources are absorbed directly into economic activities as raw materials for production or indirectly as asset for production. They also provide welfare for consumption for food, raw materials and providing ecological services. Protected areas (Pa's) constitute one way to redistribute or reallocate natural resources or welfare through land management Tacconi and Bennett, 1995. They have multiple purposes: conservation, maintenance of indigenous use and the provision of recreation and tourism services. In the real world, several PA's have adversely disturbed the local livelihood because of failing to consider local needs. The implementation and success of a PA is therefore largely dependent upon the participation of local people and the consideration of local needs in economic analysis. If implemented well PA's are one way to balance economic development and environmental sustainability, to sustainably maintain ecological services, and to conserve biodiversity.

Such biodiversity is expressed as the prerequisite of economic adaptability and provides a diversity of options for economic development. The economic system intertwines with social and ecological systems, which are in turn composed of human capital and natural capital. The former is composed of the culture, skills, knowledge and the institutions, which regulates social and economic

²⁴ Calkins, Peter. 2007. **Supplemental course notes on Research Methodology for Economists.** Chiang Mai, Thailand: Faculty of Economics.

life of people living in that certain area. The latter may be subdivided into renewable natural capital (NRNC) and renewable natural capital (RNC) but only RNC is highlighted. This is because of the uncontrollable nature of NRNC by the local community. The present study is intended to recommend a policy implication for the rural economy for the sustainable practices.

According to Mehmet (1995), four critical dimensions interact within sustainable in planning the development of soft ecosystems: economic, human, environmental and technological improvement. An employment friendly sustainable development strategy is an asset for green development economy to be more sustainable. It should not ignore rural employment implication since it is a key to sustainable development.

Moser has identified the asset vulnerability framework of the urban poor. She included both tangible and intangible assets such as housing, labour, and human capital. Since 1990, the conceptual debate about differences in measuring poverty has grown but there remain two main branches or schools of thought, summarily termed the 'objective conventional' approach and the 'subjective participatory' approach. Objective conventional method takes income and consumption as the best proxy for poverty. In contrast, the subjective participatory approach uses multiple subjective indicators of poverty status that emerge out of the local norms and definitions of the poor collected through participatory techniques.

2.2.2 Welfare economics

This section will discuss the welfare problems connecting property rights for the access of the natural resources, the distribution of resources and income, trust in social institutions, and the spiritual ‘third’ pole in economic development theory.

We are told in the first chapter of economic courses that economics is the study of allocation of scarce resources to maximize the utility of households. Indeed, the word economics comes from the Ancient Greek word “οικονομια” (oikonomia). It is a combination of two words ‘oikos’ which means households or families in small letter and farms and business in a capital letter and ‘nomia’ is for management. The oldest recognized written book in economics is “Oeconomicus”²⁵, a book of farm and household management by the Greek philosopher Xenophon²⁶ in 430-354 BC.

“Property is that which is useful for supplying a livelihood, and useful things turned out to be all those things that one knows how to use. The word property means profitable whatever to its owner. Land is not wealth if it makes us starve instead of supporting us. If a man losses because of ignorant of farming, it will not be a wealth for him. Making a living appeared to be held in the highest estimation by our states because it seems to turn out the best citizens and most loyal to the community.”
In a way, good management and knowledge brings about welfare into the community.

²⁵ Xenophon, *Oeconomicus*, Perseus Digital Library Project, English Translation, Ed. Gregory R. Crane.

²⁶ Xenophon is a famous soldier, mercenary and a contemporary and admirer of Socrates. His work *Oeconomicus* is written in Socrates dialogue. The information was taken from the following links.
http://highered.mcgraw-hill.com/sites/0072875577/student_view0/chapter1/origin_of_the_idea.html,
<http://en.wikipedia.org/wiki/Xenophon> mentioned Xenophon lived (430-354 BC).

Here he emphasized about the art of management and knowledge as the key to get the welfare in productivity.

Knowledge of environment is constructed by the idea of conservation perceive by the villagers according to the information they could access. It is calculated by asking people how much they know and could accept about endangered species, extinct species and whether they should protect the endanger species or not for the prosperity of their community. Without this knowledge, awareness of benefit of reforestation and awareness of environmental degradation, the management for the well-being of environment would be in appropriate, which would in turn impact the livelihood of local people and out-put yield in agricultural from soil erosion, flooding and low fertility in forest products. Here property is also a condition to improve to become wealth since Xenophon defined prosperous property only as wealth. The definition of private property in 400 BC is very refined on knowledge and technology when we look back in 21st century, which is a knowledge age.

Otherwise, the common pool resources lead to “The Tragedy of Commons” Hardin (1968), one externality arising from mismanagement of resources from a non-cooperative game. Hardin mentioned about the common property resources and management. In his essay, ‘The Tragedy of Commons’ said that if people would have a chance to repeat the game several times, people would learn how to play that game and moral and ethic would be included in the game and it could manage towards the Pareto Optimum by the community itself. The people will find a way to escape from prisoner’s dilemma if they have social capital and trust in the community as mentioned by Dasgupta (2001). Where does these, ethic and morality comes from? This trust and social cooperation is mentioned as social capital.

Adam Smith (1976) mentioned about the moral meaning of utility. Smith mentioned that if a possession makes more burden than use, the utility is degraded. Someone who lives in the society care more about the self-judgment than his greed, the invisible hand. He will care about his image in the society. Part (IV), Chapter (II), humanity, justice, generosity and public spirit, are the qualities most useful to others. The propriety of generosity and public spirit is founded upon the same principle with that of justice. Generosity is different from Humanity. Those two qualities, which at first sight seem so nearly allied, do not always belong to the same person. Humanity is the virtue of a woman, generosity of a man. The spirit to sacrifice a utility make a person deserves more appreciation at the presence of spectator. It is the same case with the greater exertions of public spirit.

Adam Smith²⁷ played an important role in welfare theory for presenting the philosophy of the “invisible hand”, competition, self interest, which will drive an optimal allocation. The second reason why Adam Smith takes an important role is that, he attempts to explain the “Water and Diamond Paradox” where he came up with a distinct value theory of use value and exchange value. The value in exchange is not enough to measure welfare.

The Diamond Paradox asserts that water has use value and diamond has exchange value. People in 18th century wanted diamond more even though diamond is useless. People tend to seek for security by keeping power to make transaction and exchange with the goods. This is the theory of 18th century where economic development was brought about by the capital investment and trade. Smith

²⁷ Aronsson, T., & Löfgren, K.-G. 2007, Welfare Theory: History and Modern Results, [Electronic Version], 66. Retrieved January 2009, from <http://www.econ.umu.se/ues/ues726.pdf>

tried to explain that value in use is more precious than an exchange value. Nowadays, people are seeking for environmental security because we now learnt that natural resources are the backbones of our living. Capital resources are inferior and without water we could not survive and if there is no clean water resources, we cannot exchange the clean water with a diamond. That the aspect of value is shifting into the nature again. The green gold exists in the forest that people are seeking for the environmental security to leave a prosperous investment to our new generations.

Smith (1790)²⁸ further listed mentioned humanity, justice, generosity, and public spirit, as the most useful qualities of a society. He mentioned that these qualities are for the agreement of our self esteem and personal preferences of a utility. It means every human beings have a will to be ethical and share with others if they have a surplus or want to follow the social norms and rules of the community. The attitude towards conservation and social-wellbeing depend on the moral of a community and reveal the welfare of people. The environmental behavior is accord with the situation of welfare in social and economical circumstances. The knowledge, education and information also play as a role in conserving a forest community since it relates to collective property and welfare that restrain with distribution and extraction that have to be balanced.

In Myanmar the aspects towards the natural environment is so much personified because of the influence of Hinduism. This high influence is even embedded in the Buddhism that we are practicing too. Buddha himself respected the other religion and prescribed in his texts for the monks not to cut the trees or make fire. The influence comes into our local customs in two ways as cultural and religion.

²⁸ The Theory of Moral Sentiment is used as a grid line for the welfare and utility of environment in the data collection. Its norms are highly preferred for the theoretical frameworks for this thesis.

Therefore, the local norms like not to cut down the whole trees or to leave a branch for the tree to survive evolved in the Myanmar context of sustaining the nature. There are much more rules in the community to share the resources. The social welfare, attitude towards community management is derived from the institutional strengths and adoption of these rules in real life. The attitude towards community management and attitude towards ecotourism is measured with the devotion of these local customs for sustainability. Measuring these three variables can show are these people in the two study zones attain the Buddhism way of living in middle path, where the community should live in balance with extraction and protection. Extremism is prevented in the context of Myanmar society in general.

The welfare optimization taxes under externalities are today called Pigouvian taxes. The driving force behind Pigou's contribution to welfare economics is his distinction between private and social cost. The most apparent view on poverty reduction neglects inequality.²⁹ The increase in inequality in developing countries is usually seen as the indicator of development. The most economists accept that the inequality will rise up to a certain point and will fall afterwards. Ravallion (2007) survey and find out that there is no correlation between inequality and economic growth. He extended that the measure of absolute poverty falls with economic growth but the same rate of growth can bring very different rates of poverty reduction. The poverty incidence is not responsive to economic growth in high initial inequality countries. With the same rate of economic growth in the countries with different Gini index and same poverty incidence, the country with a higher Gini index will take a longer time in poverty reduction to a certain point. There are good inequality and bad

²⁹ Economic Growth and Poverty Reduction, Ravallion, 2020 Focus Brief on the World's Poor and Hungry People, October 2007.

inequality. The good inequalities reflect and reinforce high market base incentives and attract innovation, entrepreneurship and growth while the bad inequality only generate higher poverty, discrimination, restrictions on migration, corruption and lack of access to finance and insurance. Ravallion mentioned the policies for poverty reduction reducing the bad inequalities to

- (1) Increase agricultural productivity
- (2) Address geographic poverty traps
- (3) Make markets and governments work better for the poor

Dasgupta presented an economic theory of CPRs indentifying the conditions of communitarian institutions can function well. The theory identifies the dark side of communitarian institutions as their limitation of giving permission to another group to exploit within a long-term relationship. He said the local commons are stand as common poll resources, CPRs and not open access. CPRs are the sources of natural capital and social institutions. CPRs are neither public nor private property, it is a communal property. The differentiation of global common from local common as geographical confinement yet access is open to all in local communal property.

Most of the village communitarian institutions build around CPRs.

Dasgupta estimated the proportion of income among poor families based directly on CPRs in the range of 15 to 25 percent and in Zimbabwe, it is up to 35 percent. The economic importance of CPRs ranges widely across ecological zones.

The rural families in Myanmar have to depend directly on the CPRs 100 percent for fuel. Most families have to depend on the forest for food and shelter. In the two study zones, economically more developed Bagan area has 9 percent and environmentally

richer Kyaintali area has 16 per cent with the total dependence on environment without a numeral income.

Dasgupta argues that increased uncertainty in property right lowers the private and collective profitability of cooperative behavior. Political instability is another kind of uncertainty since there is more chance the CPR could be taken away by force. When people have both uncertainties, they are reluctant to invest to protect and improve the CPR. Increase in economic insecurity is also deteriorating the trust to invest in CPR and the institutional participation falls because of the higher risk for investing in a common.

The tri-polar view of well-being in economics in psychology composed of material axis, political axis and spiritual axis. Calkins explains the avoidance of the corner solution or a suffering, composed of five voluntary sacrifice of well-being. He mentioned with five major poles of well-being for the sustainable development, social, political, economic, material and spiritual. Welfare in those areas is the premises of sustainable development. He mentioned institutional strength, sharing, knowledge and community participation facilitate social well-being, good governance and stability will enhance the long-term planning that the livelihood will be sustain, moderation in extraction which is balance in exploitation and conservation will enhance a long-term capacity of environmental capital, economic well-being should be maintain by efficiency in production and avoidance of risk, spiritual well-being should be brought about by the tolerance, knowledge, sharing and trust. This idea goes back at least as far as the Buddha (**Mangala Sutta**, Verse 9):

“Sharing with neighbors, friends and community is a good practice to follow the way leading to unlimited prosperity.”

2.2.3 Environmental Economics

Smith (1776) used the idea of the invisible hand to show that welfare distribution can be at least partially achieved through market forces. The adoption of the invisible hand idea without putting constraint on the environmental resources and market externalities have brought up a big capitalist economy and an uncontrollable market of natural resources. Extraction and exploitation of forest, renewable and non-renewable is driven on the profit for about two centuries. “The Wealth of Nations” discussed also about the water and diamond paradox. The use value and exchange value. The difference in perception on the environment of Smith’s time and nowadays is that the value is changed. Water was relatively abundant in Smith’s time is the scarce and become a hot topic in contemporary global problems.

The forest products and trees becomes more and more important because they possess both use value and exchange value. The forest and environmental resources can be seen as intergenerational savings and securities for the futures. Land, which included in the capital of production according to Smith, is also a basic and necessity for the community forestry. It also becomes a scarce resource in the age of booming population. The economic growth alienated the carrying capacity of environmental resources. For instance, the economic growth models did not internalized environmental degradation as part of depreciation of economic assets and golden rule steady state does not meant for carrying capacity of the nature. The savings is however, will not cover the depreciation if we externalized the environmental degradation in savings thus, growth that does not put constraint on will not be sustainable in the future. Zhao et al. (2008) addressed the carrying capacity of resources to integrate a steady-state economy. Human dependency on the

environment and nature's capital is considered to be balanced since the growth of economy is highly depending on carrying capacity of nature and ecological footprint. The authors narrowed down the gap between economy and ecology. The interdisciplinary study of economy and ecology helps us to understand how the natural endowments facilitate in economic development.

Concerning to the natural constraint, there are traditional cultures in Buddhism that balance the carrying capacity. It is *metta* and restriction to kill any animals. The sanctuary and sparing life of animals are embedded in the tradition and religion. Every year, there are festivals for freeing animals into the forest. This support sustainability and carrying capacity of the environment. Moreover, there is one more moral in Buddhism that prevents cutting trees is that the monks are prohibited from doing so. This is in the (Pthawisakana Sariya) Parseittiya Pali which is the volume two of practical rules for monks. For the human beings, it is prohibited to make the forest fire which kills animals and to go for hunting. In the survey, these are inquired whether these religious values are still in practice in the daily life or not.

In the philosophy of sufficiency economy, the middle path, which is the pivot of Buddhism is highly concerned as a way to sustainable development. The middle path which is avoiding the two extreme is the ultimate way of living in Buddhism. This is the first sermon of Buddha more than two thousand five hundred years ago. Balancing all the deeds, perceptions, thoughts, practices and activities to be away from two extremes, suffering and easy-going is the main idea. This idea is included in the philosophy of sufficiency economy. The balance life or middle way is taught by Buddha in his first sermon, "Dhammasakya Sutra". Moreover, Buddha

taught the way of going to the middle path in eight fold dimension where it can lead to the final ultimate goal is:

- (1) the right vision
- (2) the right thought
- (3) the right speech
- (4) the right action
- (5) right livelihood strategy
- (6) the right effort
- (7) the right mindfulness which means abstain from severity or laziness, and
- (8) Right concentration.

These ideas are used in creating or grouping the variables to analyze. The steps of logical frameworks in building hypotheses in the systemic equations comes from the ideas of these eight steps rising from the abstract to concrete in the flow of awareness, attitude, knowledge, behavior and environmental well-being, etc.

Mendelsohn (2003) described the efficient frontier for tropical deforestation to land conversion as measured by distance to nullify the transportation cost and taxes. This idea is used in calculating the attachment to land which also include the type of land ownership, which grant the stability and period of right for land use.

Darwin (1996) studied the correlation of forest depletion and numerous economic indicators in Southeast Asia. His study mentioned the services of ecosystem and the relationship between economic and environmental frameworks. This framework included trade and consumption since he mentioned a macro view and open economy. Our study is in a remote area and for the small scale economy and it is

a microeconomic study of relationship between economic and environment in a closed economy.

2.2.4 Natural Resources Economics

Natural resources and wildlife have certain intrinsic value above their relationship to economic activity and human welfare.³⁰ A country's environment including biodiversity, air, water, forest and natural surroundings are valuable natural resources that can be critical inputs to economic activity, job creation, and growth.

IMF staff country report (1999), mentioned Myanmar has a considerable economic potential because of its fresh natural resources and abundant of mineral resources and predicted that growth rate could be easily approach to double digit. It really approached to double digit in 2003 and 2004 accompanied with more and more severe Dutch Disease in the country. The problem is extraction of Natural Resources need plans for the future generation and need an optimal allocation. When the economy is in a booming stage with extraction of natural resources, rural development planning and asset transformation is necessary. The real challenge for these villages in the study is the linear programming of optimal allocation. The land, forest, water and ecosystem services have limitation but what we want is unlimited and there comes a crisis of scarcity. If we have knowledge of what we want and what is the constraint, scarcity will not be a problem.

David Pearce mentioned that optimal allocation land uses need to have concern of stakeholders since there is conflict in motives of the stakeholders of the

³⁰ Parkins H. D. et al. 2006 **Economics of Development**, New York & London, W. W. Norton and Company. It is in the entirely new introduction for the sixth edition that says about sustainable Development, chapter twenty. That chapter discussed about the open resources and commons, private property rights and common property rights.

forest. Forest-dwellers, famers, loggers and the local community always tend to have different understanding of land use and forest management. Optimal allocation should include the social justice for all those people. To conserve the natural environment for the sustainable development, what do we need more is plan the forest in a way here everyone will satisfy. How will we approach there is to ask the local communities about how do they view the forest, provider of services, food, shelter, and many ecosystem services. The local norms and use of forest and land should be studied.

The main challenge is how we reconcile the community of different motives in forest conservation peacefully. The land should be used for producing food, maintain the forest and use for shelter too. R. Darwin et al. (1999) mentioned that there are land, labor and capital as the supply of economic sectors. Land productivity in different sector of productions is derived from a Cobb-Douglas model and it restricts the mobility of land among sectors. However, land is a fixed asset that we have to trade-off for using the land from one purpose to another. Land is not substitutable with labour and capital. The land should be planned according to local norms and needs in these two ecosystem in our study. The problem is solved by trying to find out the way people are using the land and forest and inter-relation of their livelihood.

Thoms mentioned that forest conservation in Nepal has prevented the local poor to access the forest and has thereby excluded them from the development process. Livelihood potential of community forestry in rural development is failed and only the forest conservation is successful. He solved the problem of local norms and reliance on the forest by inquiring a household survey in forest user communities. The forest users are the stakeholders of the forest and should have empowered to have

equal distribution among households in the community forestry. The status of natural environment and extraction for necessary consumption should be balance avoiding destruction and conserving. That social harmony is at the Pareto Optimum where it is set by the local needs and social situation. The case of Pareto Optimum is abstract here because every different community has different level of need and endowments that estimation of optimal extraction differs from one community to another.

2.3 Literature on place: the challenges and successes of sustainable development in Myanmar and Southeast Asia

A major report³¹ published in 2004 expressed alarm about the heightened dependency of the Myanmar economy on both non-renewable and renewable environmental resources. It stated that such dependency on natural resources without implementable standards would make the economy decline rapidly in the future. The idea of economic incentives for conservation was added in that paper, but not from the microeconomic point of view. Nor were the forces and pressures of dependency stated. The current research will attempt to fill these gaps by exploring in detail at the micro-level the genesis of standards, as well as the entire socio-cultural system linking awareness, practice and knowledge that influence welfare, poverty and environmental degradation.

This is not to say that development projects have not been implemented. For example, the Government's Dry Zone Greening Department launched a "Greening

³¹ Krann, K. M., Kyi, K. M., & Findlay, R. 2000. *Economic development of Burma: a vision and a strategy* (Illustrated ed.). Singapore: NUS Press.

project for the Nine Critical Districts³², of Sagaing, Magway and Mandalay Divisions. This is one example of the good environmental practices applied through sustainable rural development projects in Myanmar. Although the ESCAP Virtual Conference Website reported no concrete evidence in statistics to prove the benefit from this greening mission, visual observation confirms the success of the project.

The NCEA³³ argued that to prevent environmental degradation, Myanmar needed to lift substantial numbers of households out of poverty in rural areas. Development would depend upon giving opportunities to the rural populace through the construction of social and physical infrastructures such as roads, health care services, education services, and marketing places. Studying parts of the dry zone greening project in the Bagan area will thus yield insights transferable to the Kyaintali area for its people-oriented development programs.

The Rakhine State is a virgin area in terms of development plans and economic research that it need a cross-sectional study comparing to a success story of another ecological project that bring poverty eradication along in its conservation process. Then weaknesses and strengths from Bagan can be lesson learn for planning the economic development and environmental conservation in Bagan. The previous studies in central Myanmar and Bagan areas are more related to tourism, history and forestry. The data collection is more on the facts that socio-economic surveys are missing in the previous research studies. There is a record for the success of water

³² Than Htoo, 2003, Mitigation for combating desertification in central Myanmar with the collaboration between Ministry of Forestry and agencies for UNCCD (United Nations Convention to Desertification). Than Htoo is an assistant director in National Commission for Environmental Affairs. His report for Dry Zone Greening Project, Myanmar representing Ministry of Forestry, Myanmar is expressed on ESCAP Virtual Conference webpage.

http://www.unescap.org/drrpad/vc/conference/ex_mm_14_gdz.htm

³³NCEA. 2001. Johannesburg Memorandum for Myanmar 2001, Ministry of Foreign Affairs, Yangon, Myanmar:

supply and sanitation project that was done under JICA³⁴. The clean water supply, which is the part of dry zone cleaning project, was successful and could improve the living status of the local villagers in ten townships in central Myanmar. The UNESCAP virtual conference expressed dry zone greening project³⁵ in Myanmar as one of the good examples but admitted that the data collection in the survey did not measure the success of this project yet.

In Myanmar, 44.6 percent of export is based on non-renewable resources and more than 70 percent of labor force is working in the primary sector.³⁶ There is an imbalance of resource transformation into assets. This is a major challenge that Myanmar's economy is highly depending on natural resources where there is less value added and job creation. Lack of macroeconomic policy and financial policy enhance unbalance growth in industrial sector and export market. According to Perkins *et al.* (2006), the development of a country and ecological sustainability are complementary to each other that Myanmar's development is surely away from the path of sustainable development. Moreover, rural job creation was found to be an asset for sustainable development in a case study of Indonesia, (Mehmet, O. 1995). It is also a challenge for the Myanmar's macroeconomic policy toward environmental sustainability and rural livelihood. In this study, job opportunity and variety for the rural households are included as an indicator of economic welfare.

³⁴ JICA report 2006 done by the research team under Legend Forestry.

³⁵ It raises the awareness of people on the environment and bring about the economic development and living status to preserve the forest area in dry zone. UNEP virtual conference 2008.

³⁶ MFF Forum 2009 February, Yangon Myanmar, organized and published by Living Color Magazine. MFF, Myanmar Fishery Federation, is a government organized non-government organization.

Myanmar adopted the Rio Declaration and Agenda 21³⁷. Myanmar faces the challenges of environmental resource base economic and social development contrasting with sustainable development. Globalization, change of consumption pattern, rapid integration of market, mobility of capital and rapid increase in investment create the challenges and opportunity for pursuing the sustainable development. The global disparity is a huge risk for the environmental sustainability and climatic change. Globalization is a new dimension of challenge but the increasing infrastructure gap with the developed nations is also a major problem in achieving sustainable development.

In neighbouring India, Dasgupta conducted a case study of the management of local common systems in poor countries. His premise was that social capital is based on trust, communitarian institutions, mutual participation, cooperation and cultural sharing. The theories support that certain types of social capital suffer from negative productivity. He concluded that trust is a moral good which is not a public good or other economic commodities and will decay if we do not use or consume.

Agarwal, B. (2001), in discussing a South Asian conceptual framework, mentioned the exclusion and inconsideration for participation is a challenge for the natural resources management and sustainable development in Nepal and India. The study future analysed the participation and exclusion because of rules and norms in the society. The community rules and norms are different according to the context of each community even though the participation in the community forestry seems to be apparent in Myanmar and South Asian countries. The author so further analysed the

³⁷ The author refer the statement of the Role of Rio Declaration for Myanmar downloaded from UNESCAP website that is delivered by the NCEA, National Commission of Environmental Affair, Myanmar with the announcement number **A/CONF.199/L.6/Rev.2**.

local norms and participation in the community forestry in two different ecosystems. Agarwal, B blamed the lack of gender perspective for the participation of community forestry for adversely affecting the livelihood of more vulnerable groups. This is much more challenging in the places, where there is less social welfare because participation, trust and eagerness of the society is one of the key factors for the success of sustainable development projects.

Ravallion and Sen (1994) revealed the inequality neglected in targeting poverty reduction on land-based redistribution methods. The case study in Bangladesh proved that productivity falls with the amount of land ownership. In studying these two areas in two different ecosystems, assigning wealth might be also different and the income distribution alone cannot explain the welfare on livelihood since landless population have a larger income than farmers and have to use more proportion of their income for food and shelter because they are not supported by the ecosystem services. The data collection is made in three strata of wealth assignment according to the categorization of the village leaders by means of distribution for social welfare actions made by each family.

In Cambodia, Laos and Vietnam, there is a paradigm shift in community forestry. There is a case study in these three countries to find out the opportunity of community forestry to improve the livelihood of local population³⁸. The best core recommendations for the policy integration for sustainable development in these developing countries are:

³⁸ William D. Sunderlin 2006, Poverty alleviation through community forestry in Cambodia, Laos and Vietnam: An assessment of the potential, Forest Policy and Economics 8(2006), Forests and Livelihoods Program, Center for International Forestry Research (CIFOR), P.O. Box 6596 JKPWB, Jakarta 10065, Indonesia.

- (1) prevent illegal logging and forest sector corruption
- (2) locate community sites only in appropriate situations where there is opportunity for reforestation
- (3) raise forest income by improving access rights, tenure, and benefit sharing, and removal of anti-poor regulations.

The third recommendation is directly related to this study. It is more relevant to public sector policy that it will enhance welfare. The attachment to land is closely connected to the type of ownership that reflects the stability of access right and distance from house. This is one of the determining factors that whether a rational consumer of ecosystem services will conserve the environment or intensively utilize the resources.

The ninth national economic plan (2002-2006) is based on sufficiency economic philosophy bestowed by His Majesty, the King of Thailand. The emphasis of the ninth national plan is on the balanced development of human, social, economic and environmental resources. Thailand, is now integrating the tenth national economic planning since 2007 that will promote biodiversity and environmental resource enrichment and preservation. It is based on creative economy. NESDB report in 2008 September said that it is a big step towards sustainable development in the country that is based on knowledge economy. The main target in this plan is to create an economic miracle out of its rich biodiversity giving chance to local people to participate in the economy³⁹. It means that Thailand is going to achieve the sustainability and efficiency in economic development if the plans were successful.

³⁹ National Economic and Social Development Board, Thailand reported on its website in September 2008. <http://www.thailandoutlook.com/thailandoutlook1/government+policy/the+9th.htm>

Economic cointegration with relevance to the environmental preservation is now taking a greater role in economic planning in Southeast Asia region.

According to S. Puspanathan, Deputy Secretary-General of ASEAN for the ASEAN Economic Community. "*Proper forest management practices must be in place to ensure sustainable management of our forest and environment.*"⁴⁰ The agreement endorsed by ASEAN ministers of Forestry and Agriculture in 2008 also strengthened forest conservation in the region.

2.4 Literature on method: how to measure and explain well-being, poverty and systemic linkages.

2.4.1. Measuring poverty

The Gini coefficient is a measure of inequality where we should take a note before the development projects. We can choose the target groups of where the line sagged the most because the intensity of the sagging of the line is the most suffering and unequal population. Gini coefficient is calculated for nutritional status, land property and exchange value of income left after deducting the nutritional expenses. According to Ravallion 2007 the measure of absolute poverty tends to fall with growth and the same rate of growth brings different rates of poverty reduction because of the different rates of initial inequalities. That Gini coefficient, a measure of inequality in absolute income becomes important to this study. High initial inequality

⁴⁰ ASEAN Secretariat - World Bank Staff Seminar on Forest Law Enforcement and Governance (FLEG) at the ASEAN Secretariat in Jakarta on 2 June 2009. Dr. S. Puspanathan recognized the need of immediate actions and plans within a specific timeline to promote forest law enforcement and governance in the region, both in ASEAN Economic Community and ASEAN Socio-Economic Community.

usually needs high growth rate. The Lorentz curves and Gini-coefficients can compare the two regions in terms of equality on nutritional, income and land distribution.

The measure of Gini coefficient is not enough to show about the dimension of poverty in these two societies. Even though the inequality is kept constant, the head count index of poverty can be reduced by economic growth.⁴¹ The elasticity of poverty is low with high inequality. Calkins P. 2008 head count index, poverty gap and intensity of poverty can give more information to implement a strategy for poverty reduction. The gap of poverty can tell clearly how much effort we should make to take the target out of poverty and it is weighted by head count index. World Bank 1990 proposed to use poverty line as 1 US \$ per day to standardize with the developing countries.

2.4.2. Measuring environmental impacts

Arcury & Chirstianson examined environmental characteristic differences between rural and urban residents. The environmental characteristic is not significantly different by individual's environmental world view, concern, knowledge and actions but the differences were found by education and income Arcury, T. A., & Chirstianson, E. H. (1993). Population equity is suggested for the solution in that paper. In the situation of Myanmar, the environmental information, knowledge and customs varied from place to place because of uneven distribution and poor transportation. Local custom is also different from place to place therefore studying environmental characteristic in the different ecosystems influenced by the

⁴¹ Ravallion, M. 2006. Evaluating Anti-Poverty Programs [Electronic Version]. *Handbook of Development Economics*, 4, from http://works.bepress.com/cgi/viewcontent.cgi?article=1003&context=martin_ravallion

information, communication, distribution of equity and income will give us an insight which characteristic should be taken into another area. The intensity of success in self-help reforestation and reforestation projects will not be the same. The supporting policies from government will also differ by the equality, information and flow of information, which is transportation and communication.

Environmental awareness depends upon ethnicity, income, education and other socioeconomic factors⁴². Then the survey results on education, physical environment, source of food and water, awareness of pollution, knowledge of environmental agencies and behaviours that may affect the physical environment is compared in to demographic, socioeconomic and environmental quality indicators.

2.4.3 Testing systems linkages

The importance of inter-relation among, environmental degradation, awareness, socioeconomic and demographic variables are study here for learning the system to detect the source of the problem. Hai, L. T., Hai, P. H., Dung, T. A., & Hens, L. (2008) tested the correlation of knowledge, attitude and practice (KAP) in the sustainable development concepts affecting the health and environmental issues.

Their cross-sectional survey was done in Quang Tri province, Vietnam. The data is collected as a random sampling method gathering on basis of socio-demographic variables. One coastal zone, one central region and one mountain area was selected for the purpose of study. A cross-sectional survey with random sampling was used to study about the health care and environmental knowledge, information and

⁴². Preston, B. L., Warren, R. C., & Stewart, P. 2000, Factors Affecting Environmental Awareness Among Head Start Families in Mississippi. *American Journal of Preventive Medicine*, 19(3), 6.

comprehension of sustainable indicators and willingness to participate in the environmental and health care program. Pearson's chi-square test and logistic regression is used. The paper portray SD is in the core of KAP.

The study of awareness, knowledge and attitude should be extended into behavioural change, economic situation such as employment situation too. Mehmet (1995) found that sustainable development should be employment friendly. The case study in Indonesia resulted that rural employment creation is an important role in green development. The dry zone greening project in Myanmar focuses on transportation, awareness building, water supply, rural infrastructural reconstruction and raising economic status. The employment is not considered in the scope of environmental conservation. Ozey pointed out in the case study of Indonesia that rural employment is important to attain the sustainable and green development. The example of China's "Spark Program" for rural job creation is also discussed in that paper. Then how is the role of rural job creation in Myanmar.

2.4.4. Explaining ecological behaviour

Jacob et al (2008) tested the relation among ecologically sustainable behavior, subjective well-being and mindfulness meditation with the use of multiple regression equations. The study approached with the questionnaire survey that has both quantitative and qualitative data. Welfare is measured in ordinal data from the range of one to ten. The scales of the variables are logically summated and used the subsequent scale construction procedure was used in the study. The author mentioned that non-materialistic approach to life has a potential to weaken material

accumulation, presumed enemy of sustainability, without disturbing the personal well-being.

This piece of literature gave a strong initiation that enhanced eagerness to test a series of hypotheses that concern not only with economic well-being but also with social, environmental and physical well-being that directly concern with the qualitative factors in life that need a logical summation of subsequent scale construction. The qualitative variables such as knowledge, awareness and attachment to land etc., are the variables that need to include local norms, logical sequestration and index summation.

The Rakhine State is a virgin area in terms of development plans and economic research that it need a cross-sectional study comparing to a success story of another ecological project that bring poverty eradication along in its conservation process. Then weaknesses and strengths from Bagan can be lesson learn for planning the economic development and environmental conservation in Bagan. The previous studies in central Myanmar and Bagan areas are more related to tourism, history and forestry. The data collection is more on the facts that socio-economic surveys are missing in the previous research studies. There is a record for the success of water supply and sanitation project that was done under JICA⁴³. The clean water supply, which is the part of dry zone cleaning project, was successful and could improve the living status of the local villagers in ten townships in central Myanmar. The UNESCAP virtual conference expressed dry zone greening project⁴⁴ in Myanmar as

⁴³ JICA report 2006 done by the research team with Legend Forestry, a local CBO in Bagan.

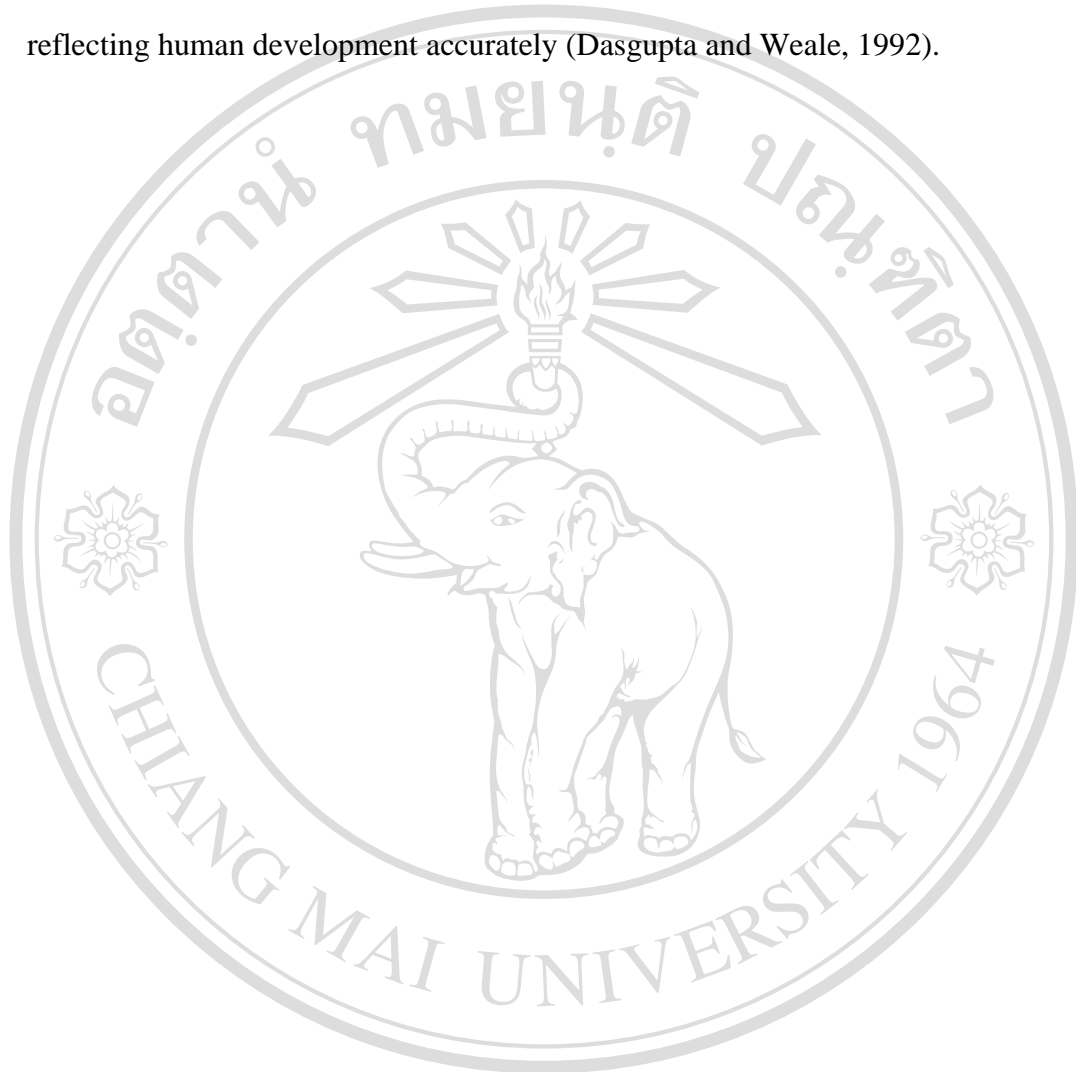
⁴⁴ It raises the awareness of people on the environment and bring about the economic development and living status to preserve the forest area in dry zone. UNEP virtual conference 2008.

one of the good examples but admitted that the data collection in the survey did not measure the success of this project yet.

According to Nourry (2008), the objective of measuring ecological footprint is to translate all the ecological impacts of human activities into the area required to produce the resources consumed and to produce assimilate the wastes generated under the predominant management and production practices in any given year. The French Dashboard on sustainable development is a non-monetary measure composed of non-aggregated indicators. In 1995, the Commission on Sustainable Development defined a list of 134 indicators divided into four groups (economic, social, environmental and institutional). In this paper, eight measures of sustainability or development for France chosen are genuine savings, ecological footprint, Indicator of Sustainable Economic Welfare, Genuine Progress Indicator, Sustainable Human Development Indicator and French Dashboard on Sustainable Development. This gives an insight of measuring environmental footprint, welfare measures and awareness, knowledge and attitude of local communities.

Nourry extended the overestimation of environmental degradation and monetization of environmental resources by externalizing land and water pollution because of lack of statistical data. In HDI, economic and social variables are included but environmental indicators are missing that it is insufficient to interpret HDI as a sustainable development indicator. The French Dashboard calculations in his report avoided monetization and valuation bringing the nature of invaluable ecological services in the economy.

The validity of the HDI as an indicator of human development and well-being is still criticized. Critics are related either to the idea that the HDI is not reflecting human development accurately (Dasgupta and Weale, 1992).



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