



The Determinants of Sustainable Development in Laos

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Abstract

This study attempts to determine the importance of sustainable development and aims to propose some indicators and tools that would be used to facilitate a transition towards sustainability. It is assumed that sustainable development is a function of three factors, economic growth, social development and environmental conditions. The results are then combined with certain principles of sustainability, to develop a roadmap for sustainable development in Laos. Annual time series data is used for the period 1990-2010. In order to generate the most appropriate equation for analysis, relevant theoretical and studies are reviewed. This study proves that sustainable development is a fair combination of the three main factors of development, economic growth, social development, and environmental protection, under the condition that economic growth is distributed to all the population, through poverty reduction, minimizing inequality in society, and maintaining a good condition of the environment and natural resources. It is about achieving the economic growth needed to meet human needs, improve living standards, and provide the financial resources that make environmental protection possible.

Key Words

Sustainability, Economic Growth, Social Development and Environment Conditions.

I. INTRODUCTION

Sustainable development (SD) is development that "meets the needs of the present without compromising the ability of future generations to meet their own needs" [1]. The definition also includes two facets: First one is about the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and second one is the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.

Initially, SD was emphasized only the environmental issues; however, the reality of development, this concept should also encompass the social development perspectives and other key indicators such as natural, cultural and economic issues. At the 1992 'Rio Earth symposium' in Brazil, sustainable development issue was the main topic of discussion. Rio Earth Summit in Brazil was attended by 152 world leaders from around the world. The symposium's main focus was to highlight the importance of sustainability, included in agenda 21, a plan of action, and a recommendation that all countries should produce national sustainable development strategy.

In addition, SD is a politically and scientifically contested concept and it is needed to identify clearly about the major indicators influencing in the development purpose. This is partly due to its definition, which contains ambiguous, normative and subjective elements. In addition, sustainable development is a complex concept describing developments at different time-scales, geographical scales and across domains [2]. The sustainable development indicators are used to monitor and evaluate the development dimensions. These indicators are expected to supplement political decision-making, representing states and trends of development. However, employing indicators to assess the sustainability of some nations' strategies and policies has limitation as they only reflect the systematic interaction between them. The concept of sustainable development has become a global issue. Therefore, in order to achieve the goal we need the cooperation of relevant organization, particularly from government to frame the most appropriate strategy to achieve this development goal.

In Laos, although the country has performed persistent sustained economic growth since the introduction of open door policy in 1986, particularly after holding a full membership of ASEAN (The Association of South-East Asian Nations) in 1997, it is questionable whether economic growth is of benefit to the reduction of either poverty or social inequality, or whether the economic growth produces negative impacts on environmental conditions both environmental degradation and deforestation. The interaction of these determinants is proposed to be a primary concept of sustainable development, which remains a major challenge for current and future development of Laos.

The sustainability of development undertaking should almost by definition become the main criteria to achieve the national development goal. This study attempts to determine the importance of sustainable development, which aims to present some indicators and tools that would be used to facilitate a transition towards sustainability. It is assumed that sustainable development is a function of three factors, economic growth, social development and environmental conditions.

The expected outcomes of this study are to identify the key factors dominate in economic growth, based on the concept and theory of economic growth and its influence on social and environmental aspects. The employment of many relevant indicators in our analysis, it is expected to clarify a clear explanation, and also to identify a very good strategy contributing to a sustainable development of Laos. This paper consists of five sections, including the introduction. The next section reviews the theoretical issues. Section 3 specifies the methodology and provides the model specification, while the empirical result is detailed in Section 4. Finally, section 5

concludes the paper.

II. COUNTRY DEVELOPMENT PROFILE OF LAOS

A. Development Background

Laos, one of the world's few remaining communist states, is one of East Asia's poorest countries (<http://www.bbc.co.uk/news/world-asia-pacific-15351898>). This is a small landlocked country located in the centre of South-East Asia, which occupies an area of 236,800 square kilometres of the northwest portion of the Indochinese peninsula. Laos is surrounded by China, Vietnam, Cambodia, Thailand, and Burma. It is a mountainous country, especially in the north, where peaks rise above 2,800 meters and dense forests cover the northern and eastern areas. It is considered to be large country compared with number of the population (6.3 millions), the density is only 27 people per kilometer square (2010).

This country became independent in 1975, and the country follows the socialist system, where the government decides what to produce, how to produce it, and who receives the final product. In 1986, the new economic reform under the new economic mechanisms (NEMs) (Drastic changes from the socialist revolution to the market economy in Laos" <http://www.esri.go.jp/jp/archive/bun/bun137/bun137d.pdf#page=2>) and open door economic policies were introduced and implemented, aimed at transforming the nation from a closed and centrally planned economy to a market-oriented one. The two basic political goals including: 1) Open Market policy and 2) Introduction of Market economic principles. The introduction of NEMs leads to increase in the international cooperation and attractive foreign direct investment (FDI). Laos has successfully developed amicable relations with regional states, being a members of many international organization, particularly, the country joined the Association of Southeast Asian Nations (ASEAN) is necessary for Laos in respect of its economic progress both regional and global procedure [3].

It could be assumed that gaining full membership of ASEAN in 1997 was a significant occasion for Laos, which could promote this country to set up both economic and political cooperation amongst members rather than its previous socialist states. This is a good opportunity for Laos to access new markets with both regional and international cooperation. ASEAN does not only increase the cooperation and relation within member countries, but it also expands its cooperation with other regions in order to facilitate wider cooperation among different nations outside its regions; thereby, the ASEAN's committees were established in order to create dialogue with its partner countries to handle its external relations [4]. This organization derived three main objectives:

- 1) To act as a forum for the resolution of intra-regional differences;
- 2) To secure the political and economic constancy of the region and exert an influence on competition; and
- 3) To enhance the economic, social, and cultural expansion of the region through cooperative programs.

In order to obtain greater achievement from membership of ASEAN, it is necessary for the commitments of both trade liberalization and cooperation policies to involve education development, in particular emphasizing more development of human resources and building of capacity. The Government of Laos has itself attempted to accelerate the economic development in order to eradicate poverty and increase the living conditions of the population. Furthermore, the cooperation among ASEAN member countries is assumed to gain more positive advantages in terms of human resource development, economic growth, and trade cooperation. The national development goal of the Government is to emerge from the list of least developed countries (LDCs) by 2020.

Laos has emerged into international trade with very deprived social and economic growth conditions in 1986. Since then, Laos has pursued significant economic and institutional reforms aimed to improve the living condition of the population by consistently through the implementation of market-orientated economy and. In 1997, beyond ASEAN, Laos and member countries seem to be more rival in economic cooperation than balancing; while many member countries of ASEAN have more potential both human resource and know how technology. However, this is important for this country to access a good atmosphere to boost both regional and global affairs to warranty the economic progress of Laos.

In order to encourage and maintain high economic growth, several policies were adapted since beginning of year 2004 and in late of the same year, Laos aimed at Normal Trade Relations status with the US, allowing Laos-based producers to benefit from lower tariffs on exports. This means that Laos has a good opportunity to take the steps to join the World Trade Organization (WTO). This would assume that the introduction of trade policy reforms and joining ASEAN would improve the business environment in Laos.

B. Opportunities and Challenges of Laos

In order to achieve a high rate of economic growth, there are several factors influenced, some of those factors may provide a good opportunity to support the economic growth, while the other factors would become a major challenge that the government has to find the most appropriate solution. The major opportunities and Challenges for future development of Laos can be briefly detailed below:

1. Opportunities of Laos

The sustainability of political and social stability since the introduction of economic reform, it shows that the positive side of the development production and industrial activities. The stable of political situation is recognized as a safe destination for domestic and international development as well as tourism promotion. Being full membership in regional and global political, economic and monetary organization contributes the dynamism of the economy and accelerates the development of Laos.

Particularly, becoming a membership of ASEAN in 1997 is a very good opportunity that Laos could benefit from the opening up of integration with the ASEAN market, and play an important role in international community.

Laos contains the abundant natural resources, such as forest and mineral resources, including many discovered and unexploited mineral resources endowments including the potential resource for hydropower construction. These things would be allocated in socio-economic development such as hydro-power, bio-energy production, forestry, organic agriculture, and mining. Moreover, this country is also rich of cultural heritage with a good maintaining the traditional custom and life style which would be a potential resource nominating in tourism business.

The advantageous geographical location, which is connecting the most dynamic South-east Asian markets with the huge Chinese market, even though Laos is a small land-locked, it is now becoming a land-linked country, known as land-bridge among GMS (Greater Mekong Sub-region Countries) countries. Laos has become an important trade link in Mekong region and South-East-Asia, Chinese and East Asia Economy. This country is finally obtaining the international attention that deserves, it is assumed as the "Jewel of the Mekong or the Battery of Asia".

Laos is able to continuously provide more opportunities for trade and investment. In particular, expansion of mineral and hydro-electricity investment and exports are highly possible. Other potentially areas for expansion of trade and investments are agro-business, tourism and other services industries. Overall, the number of investment will likely increase due to the attractive incentives packages provided by the new Law on Investment Promotion and the politic situation of the country.

Foreign agricultural investors are not only attracted by low land prices and rents, but also lower tariffs and duties on Lao exports under the principle of being membership of ASEAN, given the country's status as a least developed country. In recent years, with the Greater Mekong Sub-region programme boosting infrastructure development, in particular roads and railways, investors in Laos could also reap the benefits from better transport services, more integrated markets, and the free flow of goods and labour within the sub-region.

2. Key Challenges for Economic Development

A country with experienced transition, although succeeding in numerous aspects of socio-economic performance, would unavoidably still present challenges for future development perspective, including international cooperation and trade. Among the most-often cited constraints are skills shortage, inadequate and high-cost basic infrastructure services, low technology, and the absence of the sea ports due to being a land-locked country.

The main challenges for the government of Laos are how to sustain current growth in manufacturing and services sectors, especially to ensure that mining and hydropower development can be realized in a sustainable prospective for the future. Another challenge is

to ensure that the rules of laws and related trade and investment regulations are respected and implemented as envisioned.

One issue is about the development goal, which cannot be achieved or sustained when a high proportion of the population is affected by poor health and inadequate access to health care facilities, particularly in remote areas. Poverty eradication and inequality are other two challenges for current and future development of Laos. Although the country achieved high rate of economic growth last two decades, the poverty rate still extends in remote areas, and also the income inequality is also increased. The equitable growth is one concept to reach extreme development; in this case, the income growth should be distributed to the total population both in urban and rural areas, may be through community participation development method as author's suggestion.

A new challenge of economic development of Laos is involving in the ASEAN Economic Community (AEC), which is considered to be the goal of regional economic integration by 2015. AEC envisages the following key characteristics: (a) a single market and production base, (b) a highly competitive economic region, (c) a region of equitable economic development, and (d) a region fully integrated into the global economy. It is questionable about the impacts of AEC on the economy of Laos. Since this country is one of the poorest economic performances, small market in the large areas, and low human development resource (skills shortage) compared with other ASEAN nations.

The introduction of NEMs and the membership of ASEAN encouraged the economic activities and economic growth in Laos since the late 1990. However, to maintain a high rate of economic growth, a high level of investment and natural resource allocation is required. These activities lead to an increase in the level of environmental pressure, including deforestation and increasing the level of carbon dioxide emissions. These are also become the key challenges for current and future development of Laos.

Recently, the world leaders have been expressing their willingness to contribute to the issues of environment and climate change initiatives. To align with this issue, the government of Laos has highlighted its commitment to environmental issues as well as international participation in the fight against climate. This discussed issue is strong expressed for policy makers as to frame the most appropriate policies and documents, with a directive to achieve the equitable growth and sustainability [5].

III. THEORY REVIEW

A. The Relationship of Key Factors

1. The Relationship between Economic Growth and Social Development

The interaction between social development and economic growth is related to many factors of economic and social development; the main issues of Laos are related to the achievement of social equity, including poverty eradication, income distribution, gender promotion, ethnic minority, health, illiteracy, and intergenerational opportunity. This study highlights only the

interaction between economic growth and poverty reduction, as well as the impact of growth on income distribution.

Economic growth itself is dominated by several determinants, such as an open-door policy leading to an increase in the trade volume, receiving several kinds of support from other countries in terms of foreign aid and assistance, an increase in the number of foreign direct investments as well as domestic investments, while becoming a full member of ASEAN is important for Laos in respect of its economic progress in both regional and global procedures [6]. Furthermore, it confirms that economic growth benefits the poor, implying that a high rate of growth correlates with a high rate of poverty reduction; however, at the first stage, growth increases inequality and then it decreases when a certain average income is reached.

Poverty incidence and income distribution are representatives of sustainable social development. The final goal of national development is to succeed in poverty eradication and to minimize the level of income inequality. The positive impact of economic growth on social factors occurs only when the growth is distributed throughout the population, by minimizing the development gap between urban and rural areas and also between rich and poor. The interaction between economic growth and poverty is considered to be a positive correlation only when the growth can reduce poverty and reduce inequality among the population.

Sustainable social development through community participation relates with the right and voice of the population to speak and involve in socio-economic development in Laos. Particularly, for poverty reduction and rural development, the community participation has become an effective method for the economic development of Laos. Under the implementation of PRF (The Poverty Reduction Fund Project in Laos), sustainability development is related to the long-term effectiveness of sub-project operation. This largely depends on the capacity of the local community to be aware of the operation and the maintenance of rural infrastructures following the completion of PRF. The implementation assessment of PRF confirms that community participation is directly related to capacity building for local people as regards strengthening the skills, competencies, abilities of people, and gender equality in targeted areas so they can overcome the causes of their exclusion and suffering [7].

2. The Relationship between Economic Growth and Environmental Conditions

To encourage a high rate of economic growth in Laos, the Government has encouraged greater productivity and allocated a number of resources. The current economic development of Laos has caused a shift from an agricultural economy to an industrial and service economy, particularly since the year 2000; therefore, industrial extension is related to the increase in the proportion of air pollution, which is expected to become a serious issue for the living condition of the total population. To ensure the long-term development perspective, the interaction between growth and environment has to be categorized into its key components of development.

This relationship between economic growth and environmental quality, which resembles an inverted-U, has been found for many other environmental indices such as water quality and

waste disposal. In brief, the interaction between two of these factors is considered as a good situation only when economic growth produces less impact on environmental conditions, particularly, resources are used to both maximize their productive value and environmental protection

3. The Interaction between Social and Environmental Factors

The interaction between social and environmental factors has become an important issue for national and also global development, this factor concerns the safety and health of population, which is related with a good health of environment; therefore, it is necessary to develop clear environmental regulations, together with environmental justice, which are essential to prevent global climate change, as well as to maintain the access to potable water and long-term natural resources.

Laos has obtained a high rate of economic growth, since the introduction of NEMs and becoming a member of ASEAN, including the benefits of trade openness, investment, foreign support, investment, etc. Those factors of economic activities are directly related to natural resources, particularly the hydropower generation potential that is considered to play a crucial role in the socio-economic development of the country. On the other hand, Laos is still considered to be one of the least developed countries and a remaining high level of poverty (<http://www.cia.gov/cia/publications/factbook/>). More than 70 per cent of the total population live in rural areas and rely on natural resources for their survival.

The construction of many hydropower systems would produce negative impacts that could be substantial, including displacement of people, flooding of natural habitats, damage to fisheries, changes in the quantity, quality, and timing of water flows, as well as changes in the quantity and quality of sediment transported by the river. The population who rely on natural resources would directly receive negative impacts on their living conditions [9]. As result, the poor may lose their chance to access those resources again and they would eventually become poorer, leading to increase the development gap between rich and poor. It is important to consider the most appropriate policy to distribute the growth that would benefit the entire population. The rural or urban development concept must be based on the characteristics of each region, and emphasize development through community participation and building capacity of local people.

3. The Interaction of Key Factors

It is important to integrate and reconcile the economic, social and environmental factors within a holistic and balanced sustainable development framework. The interaction of these factors implies the involvement of virtually all the traditional sectors of the economy and government activity. The sub-factors of the interaction include economic planning, economic growth, income distribution, poverty, trade, foreign direct investment, domestic investment, government expenditure, education, health, environment, natural resources, population, etc.

To ensure that these indicators have been developed and sustained consistently, the relevant institutions or organizations, particularly from government sectors, should take up the

mechanisms for national strategies to achieve sustainable development. The fundamental approach to sustainable development should be kept in mind in developing, examining, and using indicators. This thesis verifies that sustainable development is a combination of economic growth, social development, and environmental conditions, under the condition that economic growth is distributed to all the population, through poverty reduction, minimizing inequality in society, and maintaining a good condition of the environment and natural resources.

The analysis of sustainable development is important in innovative environmental theory, because it suggests how society itself should be organized, not simply how environmental protection should be adapted or how well it can be improved. The road map of sustainable development is proposed in Figure 1 and would be a very useful framework for the current and future development of Laos.

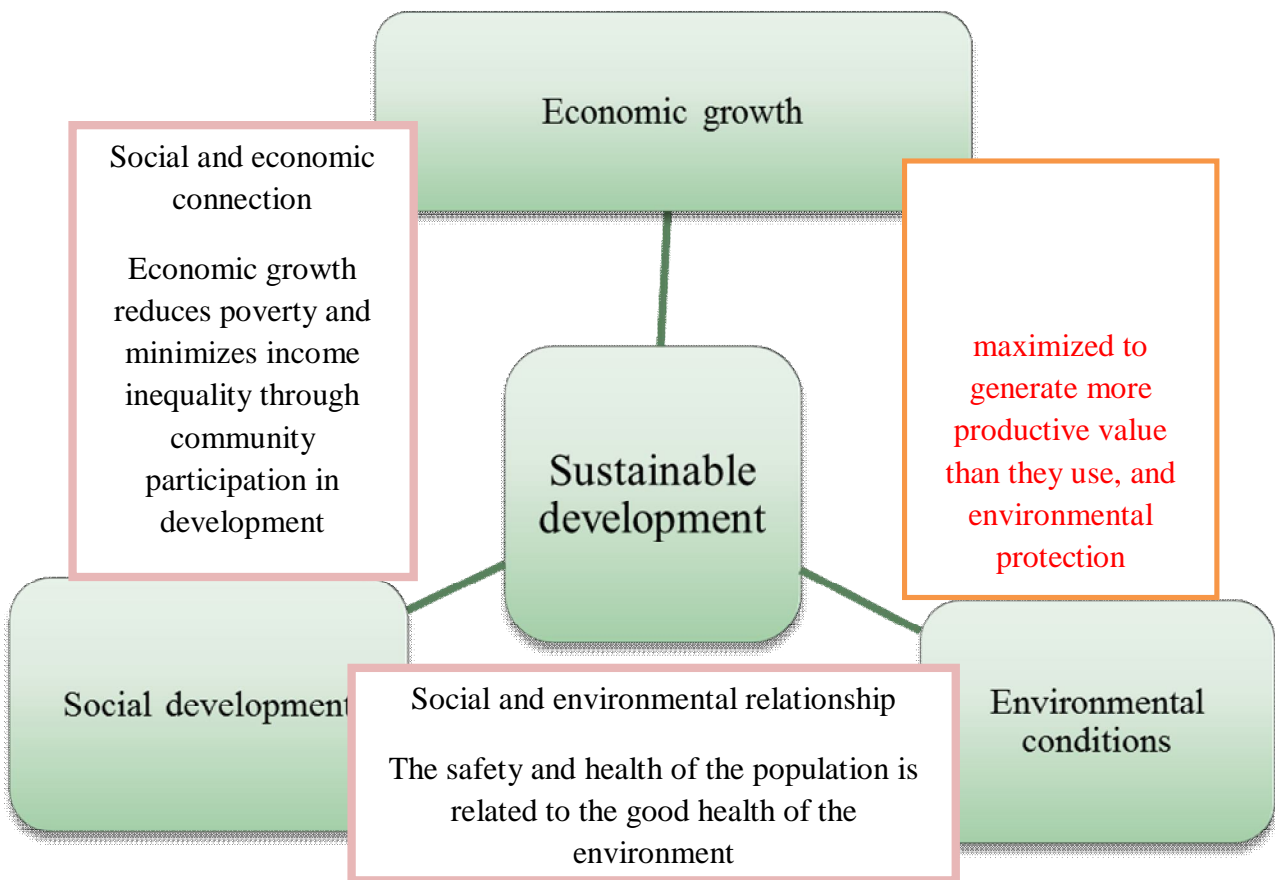


FIGURE 1: ROAD MAP FOR SUSTAINABLE DEVELOPMENT IN LAOS

Figure 1 specifies three key factors of sustainable development in Laos: economic, social, and environmental factors. The interaction among these three factors is identified as the key to reaching the sustainable development goal. The basic definition of these three factors can be explained below:

- The economic factor relates with two key elements including the capital efficiency and growth enhancement.
- Social development includes different dimensions, for example: human rights, community development, poverty, inequality, gender, ethnic minority, etc.
- Environmental factor relates to the environmental and natural resource protection such a clear air, clean water protection, reforestation and emissions abatement.

B. Sustainable Development Review

SD refers to a mode of human development whereby resources use aims to meet human needs while ensuring the sustainability of natural systems and the environment [10]. The concept of SD is related to different issues of socio-economic development, which aims to determine the needs for societies to be sustained. The concept of SD is largely; the Brundtland Commission introduced the idea that the next generation should have to access the same well-being opportunities as the current generation. In other words, sustainable development is described as “non-decline” in time of human welfare, which can be estimated, based on the type of analysis, through the level of human utility, earnings, and consumption [11]

In general, SD is about achieving and maintaining economic growth that relates to other factors of socio-economic development. It aims to meet the maximum expectation of human needs and improve the living conditions, in parallel with financial resources that make environmental conservation possible [12]. The vision of sustainable development encompasses a broad meaning and numerous assumptions in different countries. Economists, researchers, governments, and agencies (including the World Bank, the IMF, and the WTO) in these last decades characterized the strategy for sustainable development, taking into account living conditions of people and environmental aspects [13].

According to the work of Disano [8],), the underlying theme of SD is the integration of economic, social, and environmental issues in decision and policy making at all levels of development dimensions. This helps the understanding of the various dimensions of sustainable development and their complex interactions and the facilitation of policy decisions aimed at achieving sustainable development goals. The integration implies the involvement of virtually all traditional sectors of economic and government activity, such as economic planning, agriculture, health, energy, water, natural resources, industry, education, and the environment.

Several studies show that the wealthy benefit from growth are affected by the costs of resource depletion, social stress, environmental degradation, and other problems [14], [15], and [16].

Referring to the World Commission on Environment and Development (2011), sustainable development contains two key concepts: (1) the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and (2) the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet the present and future needs.

Sustainable development involves more than economic growth; it requires a change in the content of growth, to make it less material and energy-intensive and more equitable in its impact. These changes are required in all countries as part of a package of measures to maintain the stock of ecological capital, to improve the distribution of income, and to reduce the degree of vulnerability to economic crises [12].

David [13] states that SD is about achieving the economic growth needed to meet human needs, improve living standards, and provide the financial resources that make environmental protection possible. SD has two major aims: a sustainable economy that equitably meets human needs without extracting resource inputs or expelling waste in excess of the environment's renewing capacity and sustainable human institutions that assure both security and the opportunity for social interaction and spiritual life.

The most critical task facing humanity today is the creation of a shared vision of a sustainable and desirable society; one of the most important issues is to contribute permanent prosperity within the biophysical limitations of the world in a way that is fair and equitable to all of humanity, from this generation to future generations [17],[18]. Environmental sustainability is the maintenance of the factors and practices that contribute to the quality of the environment on a long-term basis. The measurement of this factor emphasizes the overall viability and health of living systems in their different and comprehensive dimensions [20].

IV. METHODOLOGY AND RESULTS

This section presents the source and key factors used for this study, including the methodology and basic model specification which are employed in this study.

A. Data Source and Description

The annual time-series data of Laos were collected, for the period 1990-2010. The data applied for this study are taken from different sources, both international and national. Mostly, the data are from the World Development Indicators, Penn World Table 07, IMF, Asian Development Bank, UNDP, Laos Economic and Consumption Survey (LECS), and relevant ministries in Laos. Additionally, data were collected from surveys and case studies carried out by local and international organizations including economic annual reports of Laos, economic monitoring reports by the World Bank, economic development strategy, etc.

1) GDP growth, trade openness, and foreign aid

Laos has achieved a good performance for its economic development and growth. It is assumed that the introduction of NEMs produced a significant increase in public and private investment,

which contributed to an average economic growth rate of over 5 per cent from 1990 to 1999, more than 6 per cent from 2000 to 2005, and more than 7 per cent from 2006 to 2011. Some factors are assumed to dominate the economic growth, such as the open-door policy and international cooperation, which is related to the degree of trade openness. An increase of one unit of this determinant is associated with an increase in the level of GDP.

It seems that international trade has contributed significantly to the economic growth of the country; an increase in trade is expected to increase the overall economic growth, thereby producing the resources required for environmental conservation because economic efficiency means better use of natural resources [13]. After the introduction of the NEMs in 1986 and joining ASEAN in 1997, the Government of Laos liberalized its trade in order to integrate into the regional and world economy.

To enhance trade liberalization and the integration of the country with the regional and global economy, and in the context of ASEAN and dialogue partners, together with the other ASEAN member countries, Laos is actively participating in free trade area (FTA) negotiations with China, the Republic of Korea, Japan, India, and the EU. It has also applied for WTO membership since 1998 as part of an economic strategy to increase export revenues and attract foreign investment.

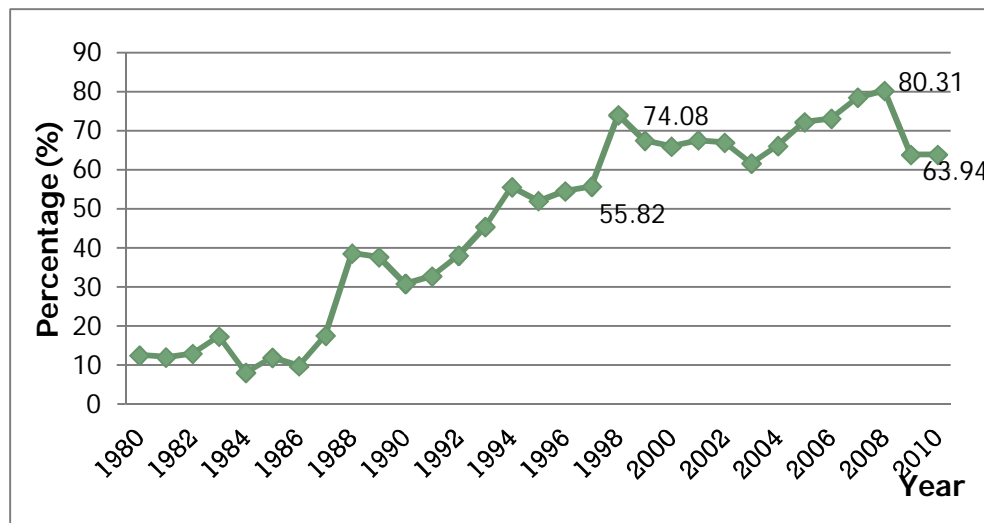


FIGURE 2: TRADE OPENNESS DEGREE (1980-2010)

Figure 2 shows that the degree of trade openness [$OPEN = (Import + Export)/GDP$] increased remarkably from 1986 to 2010 (Source: PENN World). For example, it rose from about 10 per cent in 1986 to over 50 per cent during 1997 and 2000; in particular, it reached 74.08 per cent in 1998, which was one year after becoming a member of ASEAN, and showed a minor decrease after the ASEAN financial crisis. After a certain period, the openness degree reached its peak point of 80.31 per cent in 2008, the preparation year for the first occasion of the SEA Game (The Southeast Asian Games also known as the SEA Games, is a biennial multi-sport event involving participants from the current 11 countries of Southeast Asia) organized in Laos in 2009, leading

to an increase in the cooperation and trade volume with other ASEAN countries as well as other regions.

Next we consider foreign aid, because the impacts of foreign aid on the economic growth process of developing countries have been a topic of intense debate. The impact of foreign aid on economic growth is supported by several studies [20-21]. However, there are two major contrasting views in this debate: one that argues that aid has a positive effect on economic growth, with an even greater impact in countries with sound economic and trade policies; and another that contends that foreign aid causes corruption, encourages rent-seeking behaviour, and erodes bureaucratic institutions [22-23].

In general, foreign aid is classified into two types such as grants aid and loan aid. Both grant and loan aid can be divided into two categories, including (1) Bilateral aid administered by agencies of each donor government, such the Newzealand Official Development Assistance (NZODA), and Swedish International Development Authority (SIDA); and (2) Multilateral aid funded by contributions from developed country governments and administered by international institution, for example: World Bank, ADB, UN, FAO, UNCTAD, etc. In addition, foreign aid plays a significant role in stimulating economic growth by transferring capital (money), ideas, and technology from donors to the recipient countries.

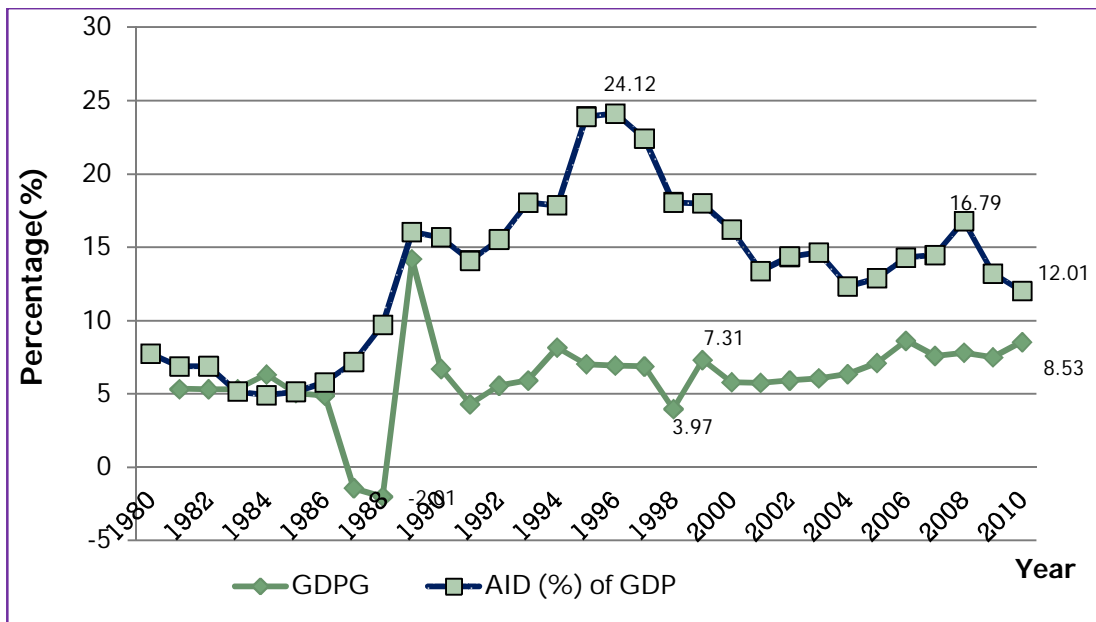


FIGURE 3: GDP GROWTH AND FOREIGN AID PER GDP IN PERCENTAGE (1980-2010)

The adoption of new market oriented economic policies was the turning point of the donor policies towards Laos in the late 1980s. In addition, in order to achieve the economic development goal by 2020, the Government of Laos sought more international assistance from many countries and organizations. Figure 3 shows that Laos received a great deal of support from international organizations and agencies in terms of foreign aid. In 1986, it amounted to only 5.57 per cent of the GDP, while in 1989, 1997, and 2010 the figures were 16.08 per cent, 22.41 per cent, and 12.01

per cent of the total GDP, respectively. It amounted to 15 per cent of the GDP, on average, between 1997 and 2010. During the 1990s, the remaining sectors are considered as having received aid for promoting economic growth, directly targeting the poor, and the social safety net of 74.12 per cent, 15.68 per cent, and 10.20 per cent (National Human Development Report Lao), respectively.

Foreign aid constitutes the major part of Laos's public investment programme (PIP), through which the Government plans and invests capital investment. It allocates about 60-80 per cent to the PIP and it mainly distributes it to finance public capital outlays, such as infrastructure construction, including roads, bridges, irrigation, electricity networks, and other factors related to education and health care improvement. In addition, many aid agencies have engaged in humanitarian, social, and environmental aspects, such as food security, poverty eradication, and natural resource protection.

The annual average of Laos's economic growth was about 6 per cent from 1980 to 2010, with a minimum of -2.01 per cent in 1988 and a maximum of 14.19 per cent in 1989. The negative growth in the drought years of 1987 and 1988, it was the period that the Laos economy experienced recessions which exports of hydroelectricity were substantially lowered (<http://countrystudies.us/laos/76.htm>), and also so the border-war between Laos and Thailand (1987-1988). It notices that the virtual end of the command economy fueled the 1989 industrial boom after the first investment law was issued and dominated in a high rate of growth in following years. Principal activities in the industrial sector include manufacturing, construction, mining, processing agricultural and forestry goods, and producing hydroelectricity.

The decrease of economic growth of Laos in 1998, it was because of the impact of the Asian financial crisis in 1997, and then Laos achieved high rate of growth again in 1999, which was the first year in which international tourism and the first world heritage city (Luanphrabang; http://www.azuretours.com/laos_luangphrabang.htm) in Laos were announced. Following years, Laos could maintain high rate of economic growth over 5 per cent, particularly, during 2005-2010, Laos sustained a high rate of economic growth of 7-8 per cent (<http://www.theglobaleconomy.com/Laos/indicator-NY.GDP.MKTP.KD.ZG/>). This high rate of economic growth is because of the economic policy improvement and international cooperation with ASEAN and other regions; for example, Laos gained normal trade relations status with the US in 2004 and was admitted to the WTO in 2012. In addition, the Government simplified investment procedures and expanded bank credits for farmers and small entrepreneurs, which encouraged the economic growth prospects of Laos.

2) *Poverty Incidence in Laos*

By basic definition, poverty is described as a lack of essential human needs, such as food, clothing, and shelter needed for proper living. The basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education, and information. Based on these components, when people are unable to get sufficient food to eat, unable to go to school or any access to health care, then those people can be considered to be in poverty, regardless of their income.

Poverty has frequently been discussed in terms of income and the poverty line, measured by the percentage of the population living below PPP (PPP stands for purchasing power parity) US\$1.25 per day and multidimensional deprivation in Laos. In Laos, poverty is defined as the lack of basic requirements for daily livelihood, such as the lack of food (less than 2,100 kilocalories per person per day), clothing, and permanent shelter, the inability to afford necessary medical treatment, the inability to afford one's own education and the education of other members of the family, and the lack of easy access to primary education. To deal with this situation, the Government of Laos has issued different strategies and methods for poverty eradication as well as rural development.

Based on the Laos economic profile report 2013 (http://www.indexmundi.com/laos/economy_profile.html), the economic growth of Laos exceeded 7 per cent per year during 2008-2012. Despite this high economic growth rate, this country remains a country with an underdeveloped infrastructure, particularly in rural areas. There is a basic, but improving, road system, and limited external and internal landline telecommunications. In addition, Laos's economy still continues to rely on subsistence agriculture, and is dominated by rice cultivation in lowland areas, which accounted for about 30 per cent of the GDP and 75 per cent of the total employment in 2010.

The high rate of economic growth was officially considered to minimize the poverty rate from 45 per cent in 1992 to 26 per cent in 2010; therefore, it is necessary to find a reasonable answer to whether/how economic growth can reduce poverty. However, this is not an absolute response without considering the change in income distribution [24]. The remaining 26 per cent of the poverty rate (2010) is considered to be a key challenge for the national development of Laos, because the poverty proportion remains widespread in remote areas, where people rely on natural resources for their survival. It is suggested that the Government considers the most appropriate policy to minimize the development gap between urban and rural areas, as well as a good strategy for poverty reduction.

3) Income Distribution

Income equity is one of the principal values underlying sustainable development, with people and their quality of life being recognized as a central issue. By basic definition, equity involves the degree of fairness and inclusiveness with which resources are distributed, opportunities afforded, and decisions made. Income distribution is the only one key factor to prove that economic growth is good for economic development and how it is distributed to the entire population.

In economic terms, the income distribution describes how a country's total income is distributed amongst its population. In order to assess the level of income inequality of a country, the Gini coefficient is widely used by several organizations, such as the United Nations (UN) and the US Central Intelligence Agency (CIA). These organizations have measured and used this index to clarify the degree of inequality in the distribution of family income in a country.

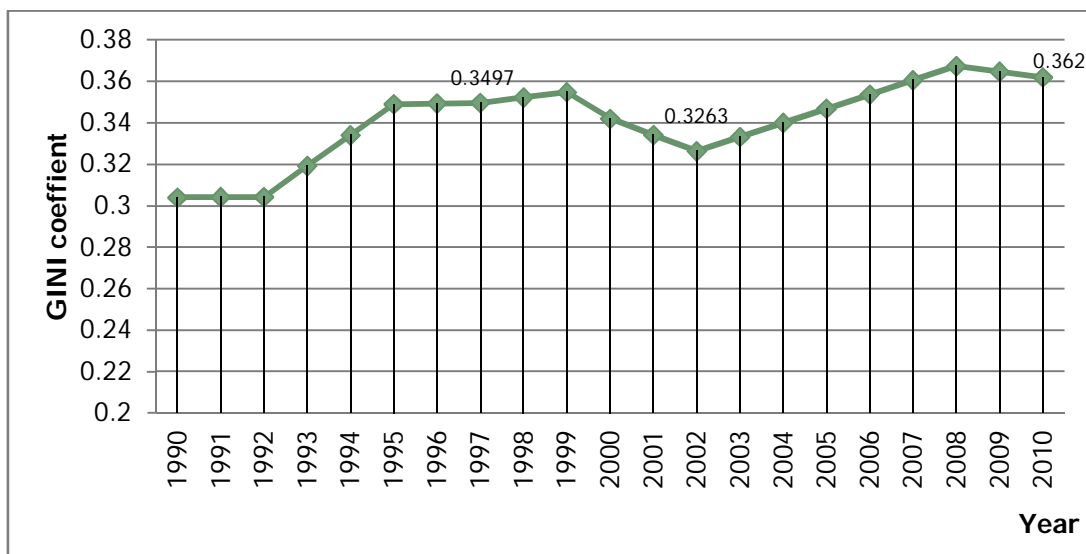


FIGURE 4: THE GINI COEFFICIENT IN LAOS (1990-2010)

Figure 4 shows that the average value of the Gini coefficient remains high at 33.8 per cent, on average, between 1990 and 2010. The changes in the Gini coefficient might be influenced by the change in government policy in each period. It is noticeable that this index increased from 30.40 per cent in 1990 to 35.4 per cent in 1999; in parallel with the high rate of growth during this period, the inequality value also increased, especially, the introduction of international tourism year in Laos in 1999, the rich people benefited more than the poor.

During 2001-2003, the Gini coefficient decreased, as during the period that the introduction rural development project through community driven development (CDD) which encourage the community (villagers, women and ethnic minority) involvement in development process. However, it increased again from 2004 when the Government took another step in amending the FDI promotion law, The Gini coefficient remained high value during 2008 and 2010, which was 36.73 per cent and 36.20 per cent, respectively.

The high value of the Gini coefficient implies that the high rate of growth caused the high level of inequality in the early stage of development dimensions, and caused the development gap in society, such as the development gap between rich and poor, urban and rural areas, gender and ethnic minority issues, the lack of opportunity for most of the population to participate in the development process, and decision making. It is important for policy makers to develop the most appropriate policy to guarantee sustainable development as well as to reduce the development gap in society in Laos.

4) Environmental Conditions in Laos

Managing natural resources is essential, especially if the government of Laos wants to maintain high rate of economic growth in long term. The increase in economic activities is related to the allocation of natural resource of the country, which assumes to increase the environmental degradation. In this case, the environmental management and natural resource protection have

become an important issue to reach the development perspective by 2020.

Laos is highly dependent on natural resources for socio-economic development and growth; approximately 70 per cent of the total population lives in rural areas and relies totally on natural resources for daily consumption, such as food, firewood and charcoal, traditional medical usages, and family income, for example, people's access to forests to find non-timber products to sell in local markets. Almost 60% of FDI is related to the country's environmental and natural resources.

Given the limited diversification of the Lao economy, natural resource especially forest, being a critical element of the ecosystem, remaining an important source of living condition of population. Currently, Laos suffers several numbers of environmental problems, the key issue of which are related to deforestation. To obtain high rate of economic growth, it is necessary to extend commercial exploitation of the forests, plans, for additional hydro-electric facilities, foreign demand for wild animals, and non-wood forest products for food and traditional medicines, and growing population put pressure on the forests.

The high rate of deforestation not only destroyed at least 150,000 to 160,000 hectares of valuable forest annually in the 1980s, but this also caused erosion, which leads to the siltation of reservoirs, navigation channels and irrigation systems downstream and reduce groundwater level. Moreover, the widespread soil erosion, leading to the decrease of agricultural productivity and having a harmful effect on Laos' wildlife habitat. The deforestation issue, since the forest coverage of Laos has declined substantially from 47 percent of the total land area in 1992 to 41.5 percent in 2002 and less than 40 percent in 2010, the main cause of destruction being slash and burn, illegal logging, and over-cutting of trees (According to the data of Minister of Agriculture and Forestry in Laos). Therefore, this issue is becoming a current as well as future serious matter of economic development.

Even though the environmental issue of Laos is only a minor contributor to climate change at global and regional levels, the change in environment may have a significant impact on the long-term development of the country and region. The major cause of greenhouse gas emissions of Laos were mainly related to widespread consumption of fuel wood and slash-and-burn farming. Therefore, the conservation and sustainable management of agricultural biodiversity would play an important role in adapting to the climate change scenarios and their impact on the living condition of Lao people should be taken into consideration.

The introduction of NEMs and the membership of ASEAN encouraged the economic activities and economic growth in Laos. However, to maintain a high rate of economic growth, a high level of investment and natural resource allocation is required. These activities lead to an increase in the level of environmental pressure, including deforestation and carbon dioxide emissions. By definition, carbon dioxide emissions are those stemming from the burning of fossil fuels and the manufacture of cement. They include carbon dioxide emissions produced during the consumption of solid, liquid, and gas fuels and gas flaring.

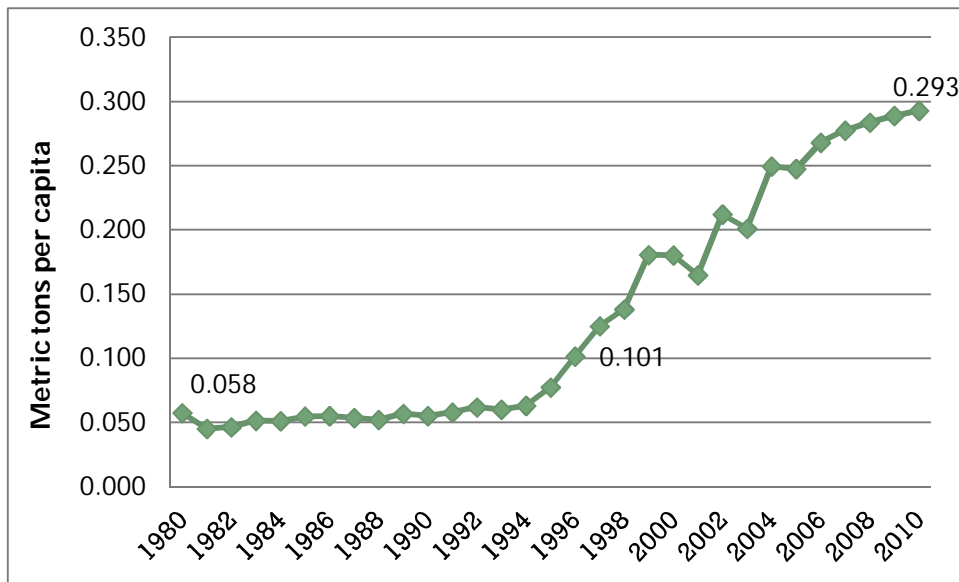


FIGURE 5: CARBON DIOXIDE EMISSIONS IN METRIC TONS PER CAPITA (1980-2010)

Figure 5 indicates the movement of carbon dioxide emissions per capita, which increased considerably from 1980 to 2010; the average during that period was 0.1327 metric tons per capita, with a minimum of 0.0456 metric tons in 1981 and a maximum of 0.2963 metric tons in 2010. The increase in carbon dioxide emissions per capita was very high between 1997 and 2010, after participating in ASEAN, from 0.1251 to 0.2929 metric tons per capita, respectively. The increase in carbon dioxide emissions per capita was mainly due to the continued high economic growth rate, with the related increase in fossil fuel consumption (coal, petroleum, and natural gas), the obvious deforestation and destruction of rainforests, the increase in the amount of building construction and expansion of infrastructure, the increase in the number of electricity establishments, and the rapid increase in the number of vehicles.

It is questionable whether the Government of Laos will reach its development goal by 2020, in order to emerge from the list of LCDs, how much the environmental conditions will be destroyed, and what the best strategies are to deal with this constraint. In order to maintain the condition of natural resources, which is part of sustainable development, the Government has developed a wide array of legislation, regulations, and action plans for environmental conservation and protection, including other factors such as health. The forestry law was amended in 2007 to strengthen the sustainable management of forests, and the wildlife law was also enacted to contribute a stronger legal framework for biodiversity conservation because this issue is directly linked to sustainable development.

B. Model Specifications

The combination of these three factors is important because all the activities aim at obtaining a balance between the economic, the social, and the environmental dimensions of the economic growth process. Based on the theoretical description of each factor, we highlight their

advantages and drawbacks, underlining the fact that no indicator is perfect and no one can give a comprehensive view of sustainable development; therefore, the analysis of various indicators is necessary to evaluate sustainable development with accuracy [25].

$$\text{SD} = \text{ECD} + \text{SOD} + \text{END} \quad (1)$$

where: SD denotes sustainable development; ECD denotes economic dimension; SOD denotes social dimension; and END denotes environmental dimension.

- ECD relates with the measurement of economic sustainability, which occurs if the economic system can maintain stability and support the economic activities and needs of current and future generations in addition to withstanding the pressures and shocks emanating from other determinants.
- SOD relates with the measurement of social sustainability, which is concerned with maintaining social and human relationships in the face of external pressures.
- END relates with the measurement of environmental sustainability, which is concerned with maintaining an ecological system that can support feasible communities.

The above discussion is based on the work of Clarke et al.[26], who state that sustainability is dependent on a healthy and functioning socio-economic environmental (SEE) system, which can be damaged by economic growth, through resource degradation, over-harvesting, and pollution. They conclude that the increase in environmental costs (The environmental costs caused by economic growth including noise pollution, water pollution, the depletion of non-renewable resources, and deforestation) of economic growth pursuing extreme high growth objectives, without consideration of the environment, threatens sustainability. With some modifications, the sustainable development equation of Laos can be proposed as below:

$$\text{SD} = f [\text{GDP} - (\text{SO cost} + \text{ENV cost})] \quad (2)$$

where SD denotes the sustainable development concept
 GDP presents the total gross domestic product
 SO cost presents the social development cost
 ENV cost presents the environmental cost

Within this analysis, SD is the adjustments of economic growth explained by the altering of the social development and environmental costs for poverty reduction (POVc), income inequality (Ic), air pollution (EDc) and deforestation (DEFs). The calculation of the sustainable development adjustment can be conducted as below.

$$\text{SD} = f [\text{GDP} - (\text{POVc} + \text{Ic} + \text{EDc} + \text{DEFs})] \quad (3)$$

POVc is based on the adjustment between poverty change in each year and GDP, it relates the

cost that would invest for poverty reduction activities; income inequality (I_c) is based on the coefficient value of Gini and GDP, it relates to the equivalent welfare level based on an equality distribution income; environmental degradation occurs due to the emission of pollutants into the atmosphere, ED_c is based on the cost of CO₂ emissions per capita and GDP, it relates the cost that would invest for environmental maintenance; and

Deforestation is caused by the increasing of economic activities that put pressure on the land requirement for factories, housing, farming, and logging for economic purposes, leading to a decline in the proportion of forest coverage. DEF_c is based on the cost of the adjustment between forest rents and GDP, it relates to the cost to invest for reforestation.

C. Results and Discussions

Sustainable development is a growth model that helps to ensure social equity and economic progress while protecting natural resources and ecosystems. In brief, it draws together with the capacity carrying of natural systems with the social challenges faced by humanity. To simplify this explanation, we generate a simple function of sustainable development based on equation 3 and estimated the movement of sustainable development in Laos.

Regarding social improvement, based on the poverty alleviation progress and income distribution, these determinants are used as a proxy for social improvement. The final aim of poverty reduction is to eradicate the proportion of the population living under the poverty line ($POV \leq 0$), together with minimizing the degree of income inequality in society or Gini coefficient ($GINI \leq 0$). In brief, a higher level of poverty and inequality is considered to have a negative impact on sustainable development, which relates to the national expenditure known as social cost to eradicate or decrease those matters.

The environmental aspect is considered both the air pollution and the natural condition (deforestation), to demonstrate that growth is worthy of sustainable development only when it produces fewer impacts on air pollution and natural resources. Meanwhile, the economic development of Laos is highly dependent on natural resources both economic growth and social development. It is questionable how those natural resources can be sustained for the next generation. Environmental degradation is explained by the increase in the proportion of air pollution, based on carbon dioxide emissions (CO₂) as well as deforestation. This is related to the national expenditure known as the environmental cost to resolve these problems, which has a negative impact on sustainable development.

The estimated movement between GDP and SD in Laos is detailed in Figure 5, in which the calculation is based on equation 3, where SD is the adjustments of economic growth explained by the altering of the social development and environmental costs for poverty reduction (POV_c), income inequality (I_c), air pollution (ED_c) and deforestation (DEF_c)

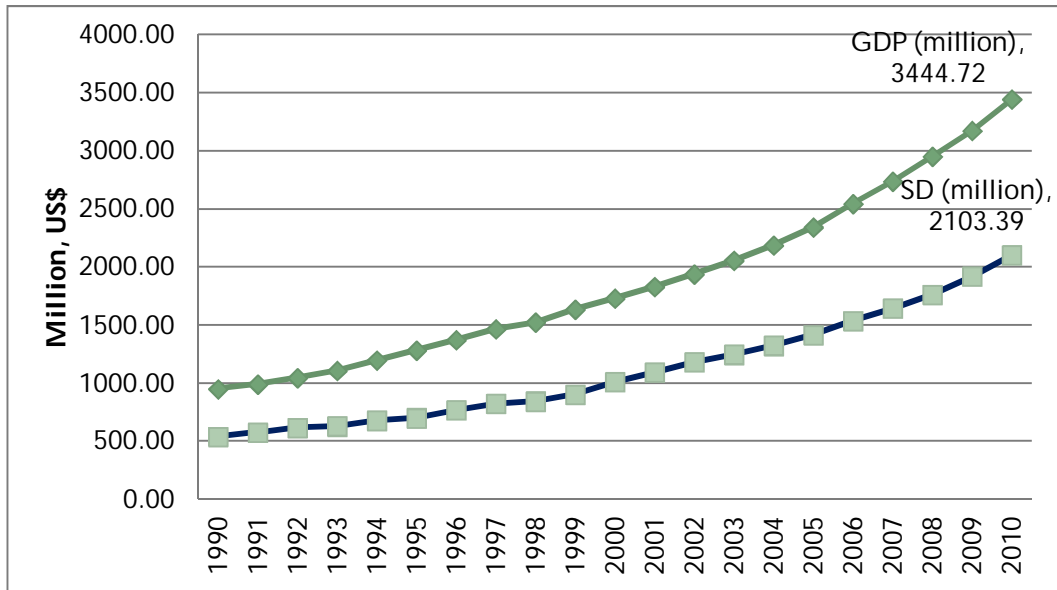


FIGURE 6: THE MOVEMENT OF GDP AND SD (MILLION US\$)

Figure 6 indicates the movement of economic growth based on the GDP and the adjustment of socio-economic and environmental factors, used as a proxy for sustainable development or SD. It is noticeable that Laos maintained a high rate of economic growth from early 1990, particularly after gaining full membership of ASEAN in 1997. By opening the country to the ASEAN market together with improving international cooperation, Laos retained the accelerated growth until 2010 and also in the following years.

However, a high rate of economic growth alone is not an absolute answer for SD; the impacts of economic growth and who are the final beneficiaries are questionable. The adjustment between GDP and its social and natural costs is explained by using the SD line; at the early stage, it indicates that SD moved straight ahead with the level of GDP; however, during 2008-2010, while this country continued to achieve a high rate of economic growth, the SD degree remained low. The distance between the GDP line and the SD line indicates the costs created by growth; a greater distance means an increase in the environmental damage as well as social inequality or poverty. To minimize the distance between these two factors, the final aim is only to eradicate poverty (≤ 0), minimize social inequality (≤ 0), and produce a lower impact on the environmental conditions.

The sustainable development degree (SDD) in Laos is measured by the proportion between SD and GDP ($SDD = SD/GDP$), which is only 0.5847 of the annual average from 1990-2010 (out of 1.00), which is considered as a low degree; instead, this degree should be closed to 1.00, which is the perfect degree of sustainable development, by minimizing the social and natural costs as the impacts of economic growth, such as poverty eradication, inequality minimization, a good environmental condition and natural resource protection. The accurate interaction between economic growth and social development, or economic growth and environmental damage, is subject to controversy. The increase or decrease of SDD depends on the economic policies or

development strategies of the Government in each period of development.

This study supports the agreement that high growth does threaten the level of sustainability concerning both social and environmental factors. Succeeding in achieving future economic growth and maintaining the health of the sustainable condition would not occur unless there are specific and deliberate policy interventions in all areas of economic development policies, environmental policies, macroeconomic policies, sectoral policies, legislative policies, trade policies, and international policies [27].

V. CONCLUSIONS AND IMPLICATIONS

This present presents the perspective of sustainable development based on three factors of development and sustainability of Laos. Each factor highlighted its advantages and drawbacks, underlining the fact that no indicator is absolutely perfect and no one can give a comprehensive view of sustainable development. Therefore, the study of a single factor is insufficient for sustainable development, for example focusing only on the analysis of sustained growth without considering the sustainability of the society and environment. Even though this study proved that many key variables influence sustained economic growth, it is important to identify the impacts of growth on other factors of development, such as social development, which is related to poverty reduction and income distribution, as well as the impacts of growth on the environmental condition, because the increase in the level of production in order to enlarge growth is related to increasing natural resource allocation and pollution exploration, which are assumed to produce negative impacts on current and long-term development. In brief, the analysis of various factors and sub-factors is necessary to evaluate sustainable development with accuracy.

In brief, this study concludes that sustainable development is a combination of economic growth, social development, and environmental protection, under the condition that economic growth is distributed to all the population, through poverty reduction, minimizing inequality in society, and maintaining a good condition of the environment and natural resources. It concerns the involvement of virtually all traditional sectors, including economic planning, education and health improvement, sanitation system extension, poverty reduction strategies, social equality promotion (including gender and ethnic minority), and the environmental and natural resource protection. The underlying detail of sustainable development is only the interaction of these factors in decision and policy making at all levels.

Based on the country's geography and those potential natural resources, sustainable tourism is one option that could play an important role in sustainable development. This tourism concept attempts to produce as low an impact on the environment and local culture as possible, while assisting in creating job opportunities for current and future local people. The final aim of sustainable tourism is to ensure that development carries a positive experience for local people (villagers or communities), tourism companies, and tourists themselves. This would benefit not only local people or companies, but also the entire population by increasing the national income.

An additional suggestion for rural development and poverty alleviation strategies is to

promote community participation in the development process through preparation and implementation. The final aim of community participation is to provide equality opportunities among the population (gender and ethnic minorities) to share their ideas and needs in social development, leading to increased capacity and awareness of local people that can be utilized for the future development of their communities.

Regarding the suggestion for natural resource protection, which is a main resource for the current economic development of Laos, it is necessary to have a good policy for natural and environmental protection. Large projects for hydropower construction and mineral projects should have acceptable environmental impact studies from environmental specialists to confirm that those projects will benefit the entire population and produce few impacts on the environmental and natural conditions in both current and long terms expectation.

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All of us face challenges and events in our lives which leave painful memories but which also can have a positive effect upon our development. Hatthachan Phimphanthavong is originally from the poor family in the south of Laos, he was born in 1979 at the family with ten children. He got a bachelor degree in economics and a bachelor of arts (majoring in letter) at National University of Laos in 2002 and 2003. He took the first MA in marketing at NOSPA, the Lao-French Cooperation project in Laos (2005). He took the second MA in economics at IUJ in Japan (2009). He had employed as deputy head of monitoring and evaluation unit, and evaluation specialist (July 2005-April 2007 and July 2009-August 2010) for a World Bank project (PRF) in Laos. He had a PhD in Local Development and Global Dynamics at the Graduate School of Social Science, University of Trento (2013). His work experience and interested occupation are concerned economic development, local development, rural development, poverty reduction, community participation, sustainable development, gender and ethnic minority promotion, monitoring and evaluation. Most publication journals are concerned economic development and sustainability.