



International Journal of Development and Sustainability

ISSN: 2186-8662 – www.isdsnet.com/ijds

Volume 7 Number 10 (2018): Pages 2445-2462

ISDS Article ID: IJDS18082901



Comparative analysis of sustainable development indicators in southeast Asian countries: Current status and policy implications

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Abstract

This article provides a comparative analysis of the sustainable development indicators among the Southeast Asian countries. A set of indicators are used to specify the level of sustainable development of the Southeast Asian countries based on the secondary data. A comparative analysis of the major indicators was carried out to determine the current status sustainable development among the countries. The study reveals that Singapore and Brunei have categorized very high human development country and Malaysia belongs to high human development country while Thailand, Cambodia, Indonesia, Laos, Philippines and Vietnam have included in the medium human development country and Myanmar has enlisted in the low human development country based on human development index (HDI). High level of poverty have found in Myanmar (32.7%), Philippines (25.2%) and Lao PDR (23.2%). Besides, majority of the countries public expenditure on education and health are found to low. Moreover, Brunei, Malaysia and Singapore are the major producer of Carbon dioxide emission per capita while Indonesia is the highest urban polluter among the ASEAN countries. Thus, most of the Southeast Asian countries are lagging behind from sustainable development where the critical issues such as poverty, income inequality, ecological footprint, urban pollution, inter-country environmental problems which need to be addressed properly for achieving sustainable development.

Keywords: Sustainable Development; Human Development; Sustainable Development Indicators; Southeast Asia; Policy Implication

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Cite this article as: Sadeka, S., Mohamad, M.S. and Sarkar, M.S.K. (2018), "Comparative analysis of sustainable development indicators in southeast Asian countries: Current status and policy implications", *International Journal of Development and Sustainability*, Vol. 7 No. 10, pp. 2445-2462.

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1. Introduction

The term “sustainable development” was first used by the World Commission on Environment and Development (WCSD) in 1987 which is popularly known as Brundtland Commission. The commission defines sustainable development as a pattern of resource use that aims to meet human needs while preserving the environment so that these needs could be met not only in the present, but also by future generations (UNWCED 1987). The 1992 Earth Summit held in Rio de Janeiro (Brazil) agreed to implement Agenda 21, which calls on countries to develop national-level sustainability indicators (Tsa, 2010). The World Summit on Sustainable Development (WSSD) in 2002 which was held in Johannesburg (South Africa) produced the Sustainable Development Action Plan which highlighted the implementation of Millennium Development goals. The United Nations Commission on Sustainable Development (CSD) was established by the UN General Assembly in December 1992 to ensure effective follow-up of United Nations Conference on Environment and Development (UNCED). Latest CSD indicators provide a set of indicator explicitly addresses their relation to Agenda 21 and the Johannesburg Plan of Implementation. It also offers guidance on applying and adapting the CSD indicators for the development of national indicator sets (United Nations, 2007). The newly revised CSD indicator contains a core set of 50 indicators under 14 themes (i.e. Poverty, Natural hazards, Economic development, Governance, Atmosphere, Global economic partnership, Health, Land, Consumption & production patterns, Education, Oceans & coasts, Demographics, Freshwater and Biodiversity). Therefore, sustainable development is considered as a complex phenomenon because of the wide range of indicators (Grzebyk and Stec, 2015). However, this study attempts to provide a comparative picture of the different major sustainable indicators in Southeast Asia.

Southeast Asia has included a number of countries in Asia which is considered as one of the fast growing regions in the world in terms of economic growth and population. This region is significantly important due to its geopolitical position particularly they are located at and around of South China Sea and Indian Ocean. More than 600 million people are living in this region. This region includes 11 countries and except East Timor all of the countries are members of the Association of Southeast Asian Nations (ASEAN) which is one of the leading regional organizations of the world. ASEAN was established on 8 August 1967 in Bangkok, Thailand by the signing of the ASEAN Declaration. During the establishment ASEAN had five founding members namely Indonesia, Malaysia, Philippines, Singapore and Thailand. The other countries such as Brunei, Cambodia, Laos, Myanmar and Vietnam join later in ASEAN. Presently ASEAN is working to enhance regional resilience by promoting greater political, security, economic and socio-cultural cooperation (ASEAN Secretariat, 2008a). It is also trying to promote sustainable development approaches so as to ensure the protection of the region’s environment, the sustainability of its natural resources, the preservation of its cultural heritage and the high quality of life of its peoples (ASEAN Secretariat, 2008a). The recent “Nay Pyi Taw Declaration” on the ASEAN Community’s Post-2015 Vision adopted at the 25th ASEAN Summit promotes inclusive, sustained and equitable economic growth, as well as sustainable development, consistent with the UN’s post-2015 development agenda (Nay Pyi Taw Declaration, 2014). Human resources development is another important agenda of ASEAN which could achieve through closer cooperation in education and life-long learning, and in science and technology, for the empowerment of the peoples of ASEAN and for the strengthening of the ASEAN

Community. The ASEAN Leaders has decided to establish ASEAN Economic Community (AEC) in the Kuala Lumpur Summit held in December 1997 for making ASEAN into a stable, prosperous, and highly competitive region with equitable economic development, and reduced poverty and socio-economic disparities (ASEAN Vision 2020). At the Bali Summit in October 2003, ASEAN Leaders declared regional economic integration (Bali Concord II) by 2020 as a goal of AEC (ASEAN Secretariat 2008b). Thus, ASEAN efforts are continuing to promote sustainable development, economy and community in this region.

Though all the Southeast Asian countries share some common characteristics, they have differences in the themes of sustainable development. Most of the ASEAN countries populations are facing comparatively more or less similar problems in different degrees. However, the ASEAN countries have been registered growth rate about 5.5% from several years (OCED, 2013). Southeast Asia is one of the world fastest growing regions of in terms of GDP and tourist destination and population growth. But unfortunately one-third of its population has limited access to education, health and technology. Poverty is also acute in many Southeast Asian countries, i.e., Myanmar, Laos, Cambodia and Vietnam. Most of the Southeast Asian countries are experiencing of low level of GDP per capita (Table 1) where Brunei and Singapore are the high income countries. This region also have been facing a rising inequality, lack of good governance, as well as frequent disaster occurrences and which lead to a greater part of its population vulnerable. Table 1 shows that Southeast Asia is a moderate densely populated regions of the world where 628 million people live with an area of 4,493,944 Sq km. Singapore is one of the most densely populated country in Southeast Asia as well as in the world. According to GDP per capita (calculated at purchasing power parity, PPP), this region is scoring low level except Singapore, Brunei and Malaysia. This article determines the present status of the performance of sustainable development parameters as well as it attempts to provide a comparative feature among the Southeast Asian countries. Moreover, this article examines and compares the development indicators among the ASEAN countries and assesses their level of development as well as to identify the major gaps and challenges for achieving a good sustainable development status. Finally, this study provides suggestions and policy recommendations.

Table 1. South East Asian countries with major indicators

Country	Area (sq. km)	Population (million)	Density (persons/sq.km)	GDP per capita (Current US\$) at 2017
Brunei	5,765	0.43	77	28,290.6
Cambodia	181,035	16.24	90	1,384.4
East Timor	14,874	1.32	87	2,279.3
Indonesia	1,904,569	266.79	137	3,846.9
Laos	236,800	6.96	30	2,457.4
Malaysia	329,847	32.04	95	9,944.9
Myanmar	676,000	53.85	92	1,298.9
Philippines	300,000	106.51	348	2,989.0
Singapore	724	5.79	8,188	57,714.3
Thailand	513,120	69.18	133	6,593.8
Vietnam	331,210	96.49	290	2,343.1
Total	4,493,944	628	-	-

Source: CIA World Factbook, 2018 and World Bank, 2018a

2. Methods of the study

This article presents a comparative picture of the sustainable development indicators among the countries of Southeast Asia. It has also focused on the backwardness and forwardness of the Southeast Asian countries in terms of development indicators. All the member countries of ASEAN have been selected in this study to compare their current status of development as well as the gaps among them for achieving sustainable development outcome. Firstly, this study has outlined the countries level of development through the Human Development Index. Then, a sorted list of sustainable development indicators from the CSD Indicators of Sustainable Development based on economic, social, educational, environmental and others perspective has been selected for this study. The selected indicators of sustainable development are used to evaluate the ASEAN countries performance and gaps towards sustainable development. All the data used in this study have been collected from secondary sources and the majority of the data have been extracted from the Human Development Reports (HDR) 2011 and 2013 published by UNDP (United Nations Development Program). This study has explored the level of development of the ASEAN member countries through a number of indicators to specify the level of sustainable development and gaps among the countries which would be useful for policy making, developing strategies and actions for achieving sustainable development. The selected indicators of sustainable development for evaluating ASEAN countries performance are presented in Table 2.

Table 2. Selected sustainable development indicators for the ASEAN countries

Major indicators	Selected indicators for this study
Economic indicator	Gross National Income (GNI) per capita, GDP growth (%) and Income Gini Co-efficient, 2000-2011
Social indicators	Population vulnerable to poverty (%), Population below income poverty line (%) at PPP \$1.25 and National poverty line (%)
Education indicator	Adult literacy rate (% age 15 and older), Pupil teacher ratio in primary education (pupils per teacher), Population with at least secondary education (%) and Public expenditure on education (% of GDP)
Health indicator	Mortality rate at under five (per 1000 live births) and adult (per 1000 people), Life expectancy (Years) and Total expenditure on health (% of GDP)
Innovation and technology indicators	Electrification rate (% of population), Personal computers, Internet users (%), Fixed broadband internet subscriptions and Fixed and mobile telephone subscribers
Environmental indicator	Environmental Performance Index (0-100), Carbon dioxide emission (per capita tonnes), Greenhouse gas emission per capita (tonnes of carbon dioxide equivalent), Ecological footprint (ha/per capita), Urban pollution (micro grams per cubic meter) and Forest area (% of total land)
Other indicators	Population affected (Annual average per million people), Death due to water pollution (per million people), Death due to outdoor air pollution (per million people), Death due to Malaria (per million people), Death due to Dengue (per million people) and Population living on degraded land (%)

Source: Modified from United Nations, 2007; Office for National Statistics, 2014

3. Results and discussion

3.1. Human development index (HDI)

Human Development Index (HDI) developed by UNDP is a powerful index which provides the current status of human development indicators and ranking among the countries. Three major indicators such as health, schooling and income have been used to measure HDI among the countries. UNDP also include other related development indicators to explain clearly about the level of human development. Therefore, UNDP has defined human development as the process of enlarging people's choice such as life expectancy, healthy life, access to education, access to resources, decent standard of living, political freedom, human rights and self respects (UNDP, 1997). Human development enables people to lead longer, healthier and fuller lives (UNDP, 1990; Anand and Sen, 2000; Ranis et al., 2000 and Ülengin et al., 2011). Human development is very close to development and sustainable development as they all includes most of the interrelated indicators. However, human development has treated as the first objective of international development policies where an increase in human well-being is necessary to provide a sustainable path (Costantini and Monni, 2008). Sustainable development represents a commitment to advancing human well-being and HDI has been used as an indicator of development where Moran et al. (2008) have argued that a HDI of no less than 0.8 represents a minimum requirement for sustainable development.

According to 2016 HDI, Southeast Asian countries possess in different level of human development. Table 3 shows that Singapore and Brunei has categorized very high human development by achieving 0.925 and 0.865 score of HDI respectively. Malaysia belongs to high human development country on which HDI score is 0.789 and it has occupied the 59th place out of 185 countries according to the ranking of the 2016 human development report (HDR, 2016). Besides this, Thailand, Cambodia, Indonesia, Laos, Philippines and Vietnam have included in the medium human development countries while Myanmar has fallen to the list of low human development country based on HDI. One of the important notes is that seven countries of ASEAN have been ranked out of top 100 countries. So there is a large gap between the nations while comparing the level of development according to the HDI.

Table 3. Status of human development index of Southeast Asia

Country	HDI value	Level of Human Development	Rank (out of 185 countries)
Singapore	0.925	Very high	5
Brunei	0.865	Very high	30
Malaysia	0.789	High	59
Thailand	0.740	Medium	87
Indonesia	0.689	Medium	113
Vietnam	0.683	Medium	115
Philippines	0.682	Medium	116
Lao PDR	0.543	Medium	138
Cambodia	0.563	Medium	143
Myanmar	0.556	Low	145

Source: Adapted from HDR, 2016

3.2. Performance of economic indicators

ASEAN is considered as one of the leading regional organization of the world but its majority members are facing lower GDP per capita. According to the PPP (purchasing power parity), the countries GDP per capita PPP is found to much higher compared to the GDP per capita. The highest GDP per capita basen on PPP is revealed in Singapore while the lowest is derived in Cambodia. However, it is remarkable that most of the countries are exercising higher level of GDP growth meaning that they are progressing faster. Some countries including Philippines, Vietnam, Lao PDR, Cambodia and Myanmar have gained 6% or more GDP growth in 2017 though their GDP per capita PPP are still below US\$10000 (Table 4).

Table 4 also shows that Income Gini Co-efficient among the ASEAN countries. The income Gini coefficient is a measure of the income inequality of a distribution having a range from 0–1, where 0 corresponds with perfect equality (where everyone has the same income) and 1 corresponds with perfect inequality (where one person has all the income and everyone else has zero income). All ASEAN countries face a greater level of income inequality where Singapore, Malaysia, Philippines and Cambodia's problem are acute. However, the highest and income Gini coefficient has been found in Singapore (0.52) while Thailand, Vietnam, Lao PDR and Cambodia has posses similar gini coefficient (0.38). Therefore, Singapore has faced a highest disparity between high income and low income people while Vietnam, Lao PDR and Cambodia with a low GNI per capita has lowest differences between the rich and poor people among the Southeast Asian countries. The Table 4 indicates the greater level of imbalance among the Southeast Asian nations.

Table 4. Gross National Income (GNI) per capita and income Gini coefficient among the ASEAN countries

Name on the countries	¹ GDP Per capita based on purchasing power parity (PPP) (Current US\$) at 2017	¹ GDP growth (%) at 2017	² Income Gini Co-efficient, 2010-2015
Singapore	93,905	3.6	0.52*
Brunei	78,836	1.3	-
Malaysia	29,431	5.9	0.46
Thailand	17,870	3.9	0.38
Philippines	8,343	6.7	0.43
Indonesia	12,284	5.1	0.40
Vietnam	6,776	6.8	0.38
Lao PDR	7,023	6.9	0.38
Cambodia	4,002	6.8	0.38
Myanmar	6,139	6.4	-

Source: *Shweta, 2012; ¹World Bank, 2018a; ²HDR, 2016

3.3. Social indicators

Social indicator has been explained by the rate of poverty of the countries in this study. Poverty is a major problem of many countries for achieving sustainable livelihood and development. The developing and least developed countries of the world are continuously fighting with poverty (Sarkar et al., 2013). According to the recent statistics, about 925 million people in the world (13.6% of the world population) is suffering with poverty who do not have enough food to lead a healthy active life (World Bank 2011). Most of the Southeast

Asian countries are facing high level of poverty. Table 5 shows that the national poverty line has found to be higher in case of Myanmar (32.7%), Philippines (25.2%) and Lao PDR (23.2%). It is also mentioned that about 10% of population are vulnerable in Thailand, Philippines, Indonesia and Vietnam while 14% in Laos and more than 20% in Cambodia. Singapore, Brunei and Malaysia have a good position among the ASEAN in terms of very lower rate of poverty. Vietnam progress of poverty reduction is remarkable in terms of poverty reduction where the country has reduced poverty from 26.8% in 2010 (HRD, 2013) to 13.5% in 2015 (HDR, 2016)

Table 5. Poverty situation among ASEAN countries

Name on the countries	¹ Population vulnerable to poverty (%)	² Population below income poverty line (%) at PPP \$1.25	³ National poverty line
Singapore	-	0.00	-
Brunei	-	0.00	-
Malaysia	-	0.00	1.70
Thailand	9.90	0.40	10.5
Philippines	9.10	18.4	25.2
Indonesia	12.2	18.1	11.3
Vietnam	7.90	40.1	13.5
Lao PDR	14.1	33.9	23.2
Cambodia	21.4	22.8	17.7
Myanmar	-	-	32.7

Source: ¹HDR, 2013; ²World Bank, 2018b; ³HDR, 2016

3.4. Education and health indicators

For getting skilled and active population, access to education and health are essential and these factors accelerate to the level of human development and sustainable development as well. The current status of different education related indicators are presented in Table 6. The adult literacy rate is found to higher almost all the ASEAN countries. However, pupil teacher ratio varies among the countries where Brunei and Malaysia have a considerably good pupil teacher ratio 10:1 and 14.6:1 respectively which seems to be better than Singapore (17.4:1) and Indonesia (17:1). The pupil teacher ratio is expected to be lower for better service and nursing the students but many countries exhibits higher pupil teacher ratio in this region. The best pupil teacher ratio is revealed in case of Brunei where one teacher is available only for 10 students. Cambodia's position in terms of pupil teacher ration is found as worst among the ASEAN countries where 1 teacher is available for 45 students. However, in the case of population with secondary school, most of the ASEAN countries performance is not satisfactory where Singapore maintains a highest (78.6%) and Cambodia is in the lowest position (19.6%). Another important indicator for achieving a good human capital is public expenditure on education. Vietnam (6.3%) as well as Myanmar (2%) and Cambodia (2%) jointly has occupied the highest position and lowest position respectively following the public expenditure on education.

Table 6. Education indicator performance among the ASEAN countries

Name on the countries	Adult literacy rate (% age 15 and older)	Pupil teacher ratio in primary education (pupils per teacher)	Population with at least secondary education (%)	Public expenditure on education (% of GDP)
	2005-2015	2010-2015	2010-2015	2010-2014
Singapore	96.8	17.4*	78.6	2.9
Brunei	96.4	10	68.6	3.8
Malaysia	94.6	11	77.1	6.1
Thailand	96.7	15.0	43.3	4.1
Philippines	96.3	31	71.6	3.4
Indonesia	93.9	17	47.3	3.3
Vietnam	94.5	19	71.7	6.3
Lao PDR	79.9	25	36.3	4.2
Cambodia	77.2	45	19.6	2.0
Myanmar	93.1	28	23.8	2.0*

Source: HDR, 2016 and *HDR, 2013

Health is crucial indicators in the aspects of development. Developing and the least developed countries are facing higher mortality rate due to lack of access to health services. Life expectancy at birth is another crucial factor of human development as the HDI is measured by the aggregates of country-level attainments in three dimensions: life expectancy at birth, education, and income per capita. Singapore has achieved the lowest mortality rate while highest mortality has found in the Myanmar in the Southeast Asian countries (Table 7). Life expectancy is highest in Singapore and lowest in Myanmar. It has found that Thailand employs 5.6% of its GDP for health sector which is highest in the ASEAN members while and it is lowest in case of Myanmar who spends only 1% of its GDP for health sector. Vietnam and Brunei's position is comparatively good in case of public expenditure for health which has found to 3.8% and 2.5% of their GDP respectively in 2014.

Table 7. Health indicator performance among the ASEAN countries

Name on the countries	Mortality		^b Life expectancy (Years)	^a Total expenditure on health (% of GDP)
	^a Child under five (per 1000 live births)	^b Adult (per 1000 people)		
	2015	^b 2013	^b 2013	2014
Singapore	2.7	59.0	81.1	2.1
Brunei	10.2	93.5	78	2.5
Malaysia	7	135	74.2	2.3
Thailand	12.3	204.5	74.1	5.6
Philippines	28	185	68.7	1.6
Indonesia	27.2	188.5	69.4	1.1
Vietnam	21.7	140	75.2	3.8
Lao PDR	66.7	270	67.5	0.9
Cambodia	28.7	270	63.1	1.3
Myanmar	50	231.5	65.2	1.0

Source: ^aHDR, 2016 and ^bHDR, 2013

3.5. Innovation and technology indicators

These indicators play a key role in the development as well as these make livelihood comfortable and easy. Electricity is considered as the power of development. ASEAN countries have a very good coverage of electricity except Cambodia and Myanmar. Majority of the population of these two countries are deprived from electricity (Table 8). Few people of all ASEAN countries Except Singapore have personal computers. It is unrealistic without internet to communicate with different parts of the world. Most of the people of Singapore, Brunei and Malaysia uses internet but still the coverage of broadband internet is less in all the Southeast Asian countries. It is revealed that ASEAN countries have over 100% mobile phone subscription except Lao PDR and Myanmar.

Table 8. Innovation and technology indicators among ASEAN countries

Name on the countries	¹ Electrification Rate (% of population)	¹ Personal computer (% of population)	² Internet users (% of population)	¹ Fixed broadband Internet subscriptions	² Mobile phone subscriptions (per 100 people)
Singapore	100.0	74.3	82.1	24.9	146.1
Brunei	99.7	9.1	71.2	5.4	108.1
Malaysia	99.4	22.7	71.1	7.3	143.9
Thailand	99.3	6.6	39.3	4.6	125.8
Philippines	89.7	7.2	40.7	1.8	118.1
Indonesia	64.5	2.0	22.0	0.8	132.3
Vietnam	97.6	9.7	52.7	4.1	130.6
Lao PDR	55.0	1.7	18.2	0.2	53.1
Cambodia	24.0	0.4	19.0	0.3	133.0
Myanmar	13.0	1.0	21.8	0.0	76.6

Source: ¹HDR, 2013; ²HDR, 2016;

3.6. Environmental sustainability indicators

Environmental sustainability is one of the key drivers of ensuring sustainable development and livelihood. Many countries have higher per capita income, higher economic growth but they are lagging behind about environmental sustainability without which sustainable development is impossible (Sarkar et al., 2013). The Table 9 shows the performance of environmental sustainability Indicators among the countries highlighting Malaysian position. According to the Environmental Performance Index (EPI), Singapore has achieved highest score (69.6) and where Cambodia has got lowest score (41.7) while Malaysia has achieved a score of 65 out of 100 among the ASEAN countries. Emissions per capita are much greater in very high HDI countries than in low, medium and high HDI countries combined. This is because of more energy-intensive activities like driving cars, cooling and heating homes and businesses, consuming processed and packaged food by the high HDI countries. The average person in a very high HDI country accounts for more than four times the carbon dioxide emissions and about twice the methane and nitrous oxide emissions of a person in a low, medium or high HDI country and about 30 times the carbon dioxide emissions of a person in a low HDI country (HDR, 2011). Brunei (18.9) is producing highest Carbon dioxide emission followed by Singapore (9.4) and Malaysia (8.0) among the ASEAN countries.

Table 9. Environmental Sustainability Indicators among the southeast Asian countries

Countries	¹ Environmental Performance Index (0-100)	² Carbon dioxide emission (per capita tonnes)	¹ Ecological footprint (ha/per capita)	¹ Urban pollution (micro- grams per cubic meter)	² Forest area (% of total land)
Singapore	69.6	9.4	5.3	31	23.1
Brunei	60.8	18.9	-	51	72.1
Malaysia	65.0	8.0	4.9	20	67.6
Thailand	62.2	4.5	2.4	55	32.1
Philippines	65.7	1.0	1.3	19	27.0
Indonesia	44.6	1.9	1.2	72	50.2
Vietnam	59.0	1.7	1.4	53	47.6
Lao PDR	59.6	0.3	1.3	39	81.3
Cambodia	41.7	0.4	1.0	41	53.6
Myanmar	51.3	0.2	1.8	46	44.5

Source: HDR, 2013 and ^bHDR, 2016

Ecological Footprint is another indicator of sustainable development which is a measure of the amount of bioproductive land and sea required to support a person's lifestyle. It includes the land needed to grow their food, dispose of their waste and absorb their carbon emissions (Calcott and Bull, 2007). UNDP shows that most of the developed countries and middle income countries have exceeded the global average biocapacity and it has found that their biologically productive area per person is 1.8 global hectares (gha) (HDR, 2013). The estimated footprint (ha/per capita) for Singapore, Malaysia and Thailand has found to 5.3, 4.9 and 2.4 respectively in 2013. However, urban population is the major contributor to the high level ecological footprint (Savage 2006). Urban pollution is comparatively less in Philippines and Malaysia but it is acute in case of Indonesia among the ASEAN countries. In case of forest cover, almost all the ASEAN members have fulfilled the minimum requirement of forest (25% of total land area) except Singapore (23.1%). Another important indicator of environmental sustainability is natural resources depletion where Malaysia's position (7.9 % of its GNI) is worst among the ASEAN countries (HDR, 2011). Thus evidence shows that though Malaysia has initiated some good policies (as for example, National Green Technology Policy 2009) but it is still far away for achieving better environmental sustainability indicators. Thus, there is a gap between good policy and implication in Malaysia and other countries as well.

3.7. Human development effect of environmental threats

Every year many people of different countries are affected due to environmental hazards. Highest and lowest annual average of affected population has found China and Norway respectively (HDR, 2011) in the world where Thailand and Malaysia took the highest and lowest position in case of affected population due to hazards in ASEAN countries. Water pollution is another environmental threat which is influencing human development negatively and it has found severe in Cambodia where highest death due to water pollution (826 per million people) has occurred among the Southeast Asian countries. Most of the developed and developing countries are facing outdoor air pollution and surprisingly highest death due to outdoor air pollution (per million people) has found in Singapore while Lao PDR has no death for this in 2004. Indonesai, Lao PDR and Myanmar is still fighting with acute Malaria problem and all the Southeast Asian countries are facing dengue problem in a

limited extent in spite of great advancement of medical treatment. It has found that only 31% of Cambodia's population has access to improved sanitation while Indonesia, Lao PDR, Philippines, Vietnam and Myanmar have 54%, 63%, 74%, 76% and 76% respectively (UNICEF and WHO, 2012). So a significant portion of people of these countries are still using poor sanitation which is one of the major cause of spreading dengue. Cambodia's problem in case of population living on risk zones like degraded land (%) is surprising because of its 39.3 percent population lives on degraded land (Table 10). Malaysia's position in all the case has found good except death due to dengue on a small scale.

Table 10. Human development effect of environmental threats

Countries	Population affected (Annual average per million people)	Death due to water pollution (per million people)	Death due to outdoor air pollution (per million people)	*Death due to Malaria (per million people)	Death due to Dengue (per million people)	Population living on degraded land (%)
Singapore	-	-	264	-	5	-
Malaysia	1573	35	23	0.0	4.0	1.0
Thailand	58220	121	61	1.0	1.0	17
Philippines	48370	182	54	0.1	5	2.2
Indonesia	1364	141	144	9.8	5	3.1
Vietnam	19794	72	81	0.2	1	8.0
Lao PDR	15096	406	0	9.5	1	4.1
Cambodia	34829	826	23	3.7	1	39.3
Myanmar	6551	432	96	11.3	3	19.2

Source: HDR, 2011; *HDR, 2016

3.8. Gaps and policy implications

It is evident that most of the Southeast Asian countries are facing several problems towards achieving sustainable development and livelihood. All the ASEAN countries have taken medium term plan for accelerating their development. Towards sustainable environment, Malaysian government has launched the "National Green technology Policy" in 2009. The main aim of this policy is to provide a conducive environment for green technology development which will enhance the quality of life (National Green technology Policy, 2009). The country has also prepared 10th Malaysia Plan (2011-2015) in 2010 highlighting one of the key strategic thrusts such as creating an environment that enhance quality of life (EPU, 2010). For another instance, Government of Vietnam has established the Socio-Economic Development Plan (SEDP) 2011-15 and Socio-Economic Development Strategy (SEDS) 2011-20, towards making Viet Nam as a modern, industrialised country by 2020 (SEDS, 2011). Table 11 summarizes the ASEAN countries development plan with their visions. Therefore, it is said that Southeast Asian countries have undertaken some policy initiatives for their development paradigm shift. However, countries are still far reaching for sustainable development. It has found that there is a gap between the plan and current status of development due to problem specific plan and strategies. Thus, specific policy intervention could be potential towards development that can transfer considerable impacts at societal level (Lay, J. 2012). Another important gap is the problem of implementation of plan so that country's plan can bring positive outcome. Motivation for promoting 'integrated people-

oriented programmes and effective efforts by the development agencies and organization towards achieving integrated and sustainable development in practice (Shaw, 2002).

Table 11. Medium-term development plans in Southeast Asian countries

Countries	Periods	Theme/vision
Singapore	2010-20	Highly skilled people, innovative economy, distinctive global city
Brunei Darussalam	2012-17	Knowledge and innovation to enhance productivity and economic growth
Malaysia	2011-15	Charting development towards a high-income nation
Thailand	2012-16	A happy society with equity, fairness and resilience under the philosophy of a Sufficiency Economy
Philippines	2011-16	Pursuit of inclusive growth
Indonesia	2010-14	Realisation of an Indonesia that is prosperous, democratic and just
Vietnam	2011-20	A modern, industrialised country by 2020
Lao PDR	2011-15	Socio-economic development, industrialisation and modernisation towards the year 2020
Cambodia	2009-13	Growth, employment, equity and efficiency
Myanmar	2012-15	Development of industry, balanced development, improvements in education, health and living standards and improved statistical capacities

Sources: Adapted from OCED, 2013

This study has explored the country specific problems and performance of development indicators. Most of the countries are facing different problems which is differ from one another such as poverty, low GNI per capita, higher emission, urban pollution and so on which makes them backward from the sustainable development. There are also some gaps among the needs and policies. Therefore, all the ASEAN countries need to respond regarding the particular challenges and gaps for achieving the sustainable development. As for example, Brunei has a very high per capita GNI but it has also a very high GHG emission which hampers the country's environmental sustainability. Thailand could promote a better holistic disaster management policy and improve its education system and quality for achieving sustainable development. It is very crucial for Myanmar, Cambodia, Laos to reduce the level of poverty and they need to ensure income generating activities, government support services for the poor people through the inclusive growth. Science and technological innovation can play crucial role for poverty reduction and science for development policy could be integral part of sustainable progress of development (Zuccala and van Eck, 2011). Some countries are frequently affected by disaster and there is mutual benefit between disaster risk reduction and sustainable development if they are correctly addressed, one can help another (Manyena, 2012). As a leading regional organization, ASEAN can play vital role for the regional development through the mutual cooperation and collaboration as well as equitable project management among the countries. Table 12 provides the country specific challenges and needed responses for attaining sustainable development at national level.

Table 12. Challenges and responses for the ASEAN countries towards sustainable development

Country	Challenges	Response
Brunei	<ul style="list-style-type: none"> • Human capital development • Environmental sustainability 	<ul style="list-style-type: none"> • Increase public expenditure on education and health and improve tertiary education • Promotion of using low carbon technology (LCT)
Indonesia	<ul style="list-style-type: none"> • Education • Disaster management • Urban pollution 	<ul style="list-style-type: none"> • Widen access to education, in particular for low-income households • Strengthen disaster management & protection measures • Transport sector reform & use of LCT
Malaysia	<ul style="list-style-type: none"> • Education • Income inequality • GHG emission 	<ul style="list-style-type: none"> • Improve the quality of education • Increase social transfer to the low income people • Energy policy and more use of renewable energy
Philippines	<ul style="list-style-type: none"> • Poverty reduction • Disaster risk reduction • Education and health 	<ul style="list-style-type: none"> • Create income earning opportunities for sustainable poverty reduction • Build holistic disaster risk reduction and management capacities to reduce vulnerability to natural hazards • Upgrade education system and health care service
Singapore	<ul style="list-style-type: none"> • Income inequality • Forestry expansion • GHG emission 	<ul style="list-style-type: none"> • Increase the facilities of the low income people • Promotion of green growth strategy by implementing the Singapore Green Plan • Increase taxes on private transport
Thailand	<ul style="list-style-type: none"> • Education • Urban pollution • Disaster risk reduction 	<ul style="list-style-type: none"> • Upgrade human capital by improving the national curriculum and teaching • Promotion of using low carbon technology • Build holistic disaster risk reduction and management capacities to reduce vulnerability to natural hazards
Cambodia	<ul style="list-style-type: none"> • Poverty reduction • Agriculture development • Electrification 	<ul style="list-style-type: none"> • Create income earning opportunities for sustainable poverty reduction • Improve productivity of agriculture modernisation • Generate more electricity by increasing investment
Lao PDR	<ul style="list-style-type: none"> • Poverty • Natural resource management • Infrastructure 	<ul style="list-style-type: none"> • Reduce poverty through inclusive growth • Improve national resource management, in particular mining, to ensure environmental sustainability • Promote transport infrastructure and rural development
Myanmar	<ul style="list-style-type: none"> • Poverty reduction • Human resource development • Electrification 	<ul style="list-style-type: none"> • Create a business-enabling environment • Upgrade education and health through better service • Generate more electricity by increasing the public expenditure
Viet Nam	<ul style="list-style-type: none"> • Human capital development • Disaster risk management 	<ul style="list-style-type: none"> • Increase access to education • Increase access to credit and financial service • Improved disaster risk reduction through better preparedness and quick responses

Source: Modified from OCED, 2013

Some critical aspects of sustainability need to be addressed for a real sustainable development in the Southeast Asia. The study has found that Singapore has achieved a very high sustainable development rank among Southeast Asian countries, because the environmental sustainability indicators applied for considered only 'the appearance' that is the result of a process. The proponent of the indicators has never considered the process by which the environmental performance has been generated. For instance, Singapore has achieved highest sustainable development rank in ASEAN Countries, at the same time, Singapore also leaves very high

ecological footprint in neighboring countries like Malaysia, Indonesia and other countries. Malaysia supplies raw water to Singapore, Indonesia supplies raw building materials such as sand and soil to Singapore. Singaporean enjoys development, but Indonesian suffers environmental degradation. Ecological footprint indicator must be given high weightage among the other environmental indicator. If the process of environment and ecology is considered, Lao PDR and Cambodia would be more sustainable than Singapore where former countries have categorized low ecological footprint, low GHG emission and high environmental resources and later country has exercised high ecological footprint, high GHG emission and almost no environmental resources.

Moreover, Indonesia forest fire sometimes covers whole Singapore and parts of Malaysia that creates environmental degradation in these countries. The illegal burning of forests and agricultural land across Indonesia has encased much of Southeast Asia especially Singapore, Malaysia in an acrid haze, leading to one of the most severe regional shutdowns in 2015 (Holmes, 2015; Clifford, 2015). Due to the worst situation of Indonesia forest fire, Singapore shut down schools and suspended outdoor activities after the city-state's Pollution Standards Index readings peaked to 341 on 17 September 2015 as any reading above 300 is considered hazardous to public health. It was the highest level of air pollution seen in Singapore at 2015 (Poon, 2015). Indonesia still has not ratified the ASEAN trans-boundary haze treaty; thus, there is need of regional effort, consensus, and cooperation with neighbors as Indonesia has been unable to control the repeated fire outbreaks. This situation calls for an effective regional policy initiatives to address the environmental sustainability of the region.

4. Conclusion and Recommendation

Sustainable development is one of the core policy concern for the every countries which can be achieved through the better performance of multiple indicators. As a growing region in terms fo economic and population dimension, ASEAN could play a cruicl role for the countries sustainable development. Evidence shows that the Southeast Asian countries have found a greater level of imbalance based on the recent performance of different development indicators. The study has evaluated the ASEAN countries through a set of indicators of to specify the level of sustainable development where Singapore and Brunei has only categorized in the very high human development country by achieving 0.925 and 0.865 score of HDI respectively. Malaysia belongs to high human development country while Thailand, Cambodia, Indonesia, Laos, Philippines and Vietnam have included in the medium human development country and Myanmar has gone to the list of low human development country in terms of HDI score. However, Singapore, Brunei and Malaysia's position is quite well in case of ASEAN countries in term of GNI per capita, education and health indicators, social indicators as well as environmental performance index. But, it is alarming that all ASEAN countries face a greater level of income inequality where Thailand, Malaysia, Philippines and Cambodia's problem are acute. In case of social indicator, high level of poverty have found in Myanmar, Lao PDR and Philippines. Education especially the rate of literacy has been found high in all the ASEAN countries but the rate of population enrolled in secondary school are not in the satisfactory level. ASEAN countries have a very good coverage of electricity

except Cambodia and Myanmar where majority of the population of these two countries are deprived from electricity.

According to the Environmental Performance Index (EPI), Singapore has achieved highest score (69.6) whereas Cambodia has scored lowest (41.7) among the ASEAN countries. Despite achieving many sustainability indicators in a good position by Malaysia there are some other indicators which are in a bad position such as GHG emission, ecological footprint and so forth. Therefore, it is important for Malaysia to concentrate on this where they have a very good literacy rate, people are enlightened and governance are good while comparing to other ASEAN countries. In the case of Malaysia, a good and firm political will is important to achieve a very good sustainable development status. On the other hand, highest urban pollution has been estimated in case of Indonesia among the ASEAN countries. It revealed that, since many parameters of development are still to be achieved at considerable level where most of the Southeast Asian countries are lagging behind, therefore, it is important to identify those and need to apply proper policy and systematic process in order to achieving various perspectives of sustainable development and regional development.

Considering all the indicators among the ASEAN countries as for example land area, natural resources, land adjacent to oceans and sea and human capital, ASEAN may lead for the achievement of good sustainable development position. Moreover, ASEAN community as a whole have a great potential to be a showcase for whole world in order to approach a regional commitment and strategy for achieving very good and robust sustainable development score or position. Except Singapore, Brunei and Malaysia, rest of the countries are facing several problems such as low per capita income, poverty, low literacy rate and health performance and so on. As many parameters of development are still lagging behind in the most of the Southeast Asian countries, so there is need a break through towards achieving sustainable development. ASEAN needs to gear up the performance of human development indicators for achieving a very good sustainable development stage. There is also need of further research regarding the development indicators, because ASEAN is currently lacking of research based update information on these issues. The following paras are describing some of the major recommendations for Southeast Asian countries in order to achieving a good and robust sustainable development position.

As most of the Southeast Asian countries are facing lower per capita income as well as a significant portion of the people are characterized as poor so there is immense need of economic stimulus package for increasing earnings of the low income people. Developing human capital is crucial for all nations. So there is a great demand to increase the share of public expenditure on education and health for accelerating quality human capital which would promote the implication of policy as well.

Most of the ASEAN countries are disaster prone, particularly Vietnam, Philippines, Indonesia, Thailand, and Myanmar. Disaster increases vulnerabilities and risk through many dimensions. Therefore, it is essential to develop sustainable strategy for disaster risk reduction and adaptation. There need to conduct further research by country regarding the gaps and challenges which hampers to achieve sustainable development. Some countries can take lessons from other countries which are well ahead about their achievement of development parameters.

Finally environmental sustainability need to ensured through multiple measures and actions. There are several initiatives such as use of energy efficient technologies, pollution control, promotion of renewable energy, control of resource deflection etc. which could be implemented through useful policy initiatives, sustainable planning and good legislation. Finally, ASEAN could take initiative to formulate a regional policy regarding the environmental sustainability of the region.

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