

The Development of a Provincial Green and Happy Society Index in Thailand: The Richer You Are, the Happier You Are

Sumalee Santipolvut¹

¹ Faculty of Economics, Department of Economics, Kasetsart University, Bangkok, Thailand

Correspondence: Sumalee Santipolvut, Faculty of Economics, Department of Economics, Kasetsart University 50 Ngamwongwan Rd., Lardyao, Chatuchak, Bangkok 10900, Thailand. Tel: 66-81-354-5060. E-mail: fecosus@ku.ac.th

Received: December 16, 2014 Accepted: March 9, 2015 Online Published: August 18, 2015

doi:10.5539/ass.v11n24p48

URL: <http://dx.doi.org/10.5539/ass.v11n24p48>

Abstract

This paper aims to develop the GHI at the provincial level, in order to reflect obvious levels of development under the eleventh National Economic and Social Development plan (2012–2016), which can be used to monitor, evaluate, and report the performance of a green and happy society. It will also encourage awareness and the formation of networks in the development of the GHI in each province. There are six dimensions of the GHI, the values and levels of which depend on data availability, benchmarking, and index classification. The panel data along with the random analysis implies that the provincial GHI calculation, using area approach benchmarking, is more accurate than the national calculation. In addition, this analysis also implies that wealthier people in the provincial areas are more likely to be happier than their poorer counterparts.

Keywords: Green and Happy Society Index, Provincial GHI, Thailand

1. Introduction

Since World War II, nations have equated economic growth with an increase in the production and consumption of goods and services, which are indicated by increasing Gross Domestic Product (GDP). Therefore, GDP has become the standard measure of economic progress, even though it was only intended to be a macroeconomic accounting tool. All nations generally applaud increases in GDP. However, the problem with GDP is that it does not separate costs from benefits, but rather, it simply adds them together under the generic heading of economic activity. Using GDP to gauge progress is indicative of an increase in well-being, but this is dependent on whether the social costs of such an increase outweigh the benefits. At the individual level, economic activity is required for well-being. However, this relationship becomes very weak after a low per capita GDP is achieved. Simon Kuznets, the Nobel laureate who developed the GDP measurement, warned the U.S. Congress in 1934 that, "the welfare of a nation can scarcely be inferred from a measurement of national income." Later on, different alternatives for measuring economic progress were introduced.

The United Nations Development Programme (2009) measures a nation's achievement in terms of three different aspects relating to human development: (i) a long and healthy life, as indicated by life expectancy at birth; (ii) knowledge, as indicated by literacy; and (iii) school enrollment rates, and a decent standard of living as indicated by GDP per capita. Although the first two components of HDI address specific societal goals, the GDP component is not an adequate proxy for well-being. Herman and John (1994) developed a genuine progress indicator (GPI), which was a refined version of the index of sustainable economic welfare. GPI begins with the same personal consumption data as GDP, but it can be adjusted so that it accounts for factors such as income distribution, and also adds factors such as the value of household and volunteer work, whilst subtracting factors such as the costs of crime and pollution.

The Global Footprint Network (2009) uses an ecological footprint to measure how much land and water area a human population requires to produce the resources that are consumed and to absorb its waste under the prevailing technology. The New Economics Foundation uses a Happy Planet Index (HPI), which measures the ecological efficiency through which human well-being is attained. It is calculated by multiplying the indices relating to life and life expectancy and dividing that product by the ecological footprint. Nations score well when they achieve high levels of satisfaction and health, while only lightly impacting environmental resources (Marks et al., 2006).

A survey of economic and ecological news from around the world illustrates that human economies have entered a phase of growth wherein costs are outpacing benefits. Evidence of these costs are demonstrated in terms of climate disruption, extinction of species, intense competition for natural resources, declining ecological services, widespread unemployment and poverty, and massive inequity in respect to the wealth distribution. The global economy and GDP of many nations has grown consistently for many years, but human well-being and ecological health have not kept pace with such growth. These scenarios are also prevalent in Thailand.

The developmental direction of Thailand has been geared towards well-being as laid out in the eighth and ninth National Economic and Social Development Plans, and towards the formation of a green and happy society as detailed in the tenth Plan. The National Economic and Development Board (NESDB), as the national central planning agency, developed the “Well-Being Index” during the Eighth Plan, along with the “Economic Strength Index” and “Sustainable Development Index” during the Ninth Plan. However, the NESDB was still unable to evaluate the impact of development towards a green and happy society, which was the primary focus of the Tenth Plan, influenced by the Sufficiency Economy Philosophy (SEP) of His Majesty King Bhumibol Adulyadej. In this regard, the country’s capital must be enhanced in order for people to live in peace within the existent human and natural resources. Through developing social capital, such as health, education, and culture, Thai people will enjoy a better quality of life and also attain integrity and knowledge capital. In addition, the economy will become efficient, stable, and equitable through economic enhancement. Biodiversity, natural resource bases, and environmental quality will also be attained as a result of the conservation of natural resources. Good governance at all levels must be exercised in the development process. In light of these developments, the office of NESDB developed the Green and Happiness Index (GHI), to monitor and evaluate the developmental impact of the tenth Plan’s on the well-being and happiness of Thai people and society as a whole at the national level.

During the eleventh Plan (2012–2016), the office of NESDB increases its efforts to lift GHI development at the provincial level, and targeted two main objectives: (i) to develop and test the validity of the constructed GHI at the provincial level, in order to reflect the obvious levels of development under the guidelines of the eleventh Plan. The development index will be used to assess socio-economic and environmental changes and also measure the developmental impact at the provincial level; and (ii) to encourage awareness and the formation of networks in the development of the GHI in each province. These networks are expected to contribute to the sharing of knowledge, understanding, and the acceptance of GHI as a tool for furthering common development in all the provinces. In light of the above objectives and developments, the author was assigned to conduct this development project.

The remainder of this paper will tackle the following topics. Section 2 will describe the concept relating to a Green and Happy Society, the correlation between income and happiness, and related methodologies. In Section 3, the results of the provincial GHI calculations will be presented. This section will also elaborate and discuss the validity of the developed the Green and Happy Society Index (GHI) and the implication of its relationship with provincial income and per capita gross provincial product. Finally, Section 4 will document the conclusions for each topic.

2. Concept and Methodology

2.1 The Concept of a Green and Happy Society

Using the application of His Majesty King Bhumibol Adulyadej’s SEP, the NESDB laid out the GHI at national level with the aim of balancing six domains in a holistic manner. Creating happiness is a process which stretches from micro to macro levels. Firstly, individuals should be happy because they are self-reliant, and this contentment should then be further developed to groups and networks. Subsequently, this will then influence outside communities, and reach higher levels of society. With respect to the individual level, the focus is placed on health and family, and in particular, the relationships among family members. Empowering members is the main concern at the community level, while at the national level, economic, social, natural resources, and the environment are the major issues, as well as good governance. Therefore, all the factors including health, family, community, economic, social, natural resources, the environment, and good governance are closely related, in order to create a sustainable and happy society. Living conditions and societal development are shared values, which place stress on the ethical mind. Happiness is experienced from that inner part of ourselves, which is concerned with freedom, having a peaceful mind, being a good person, and from the outer part that is related to relationships with other people, having a warm family, and security in life. GHI is reflective of the ends that are linked to the means of development. As aforementioned, the definitions and components of the index are set up to enable the calculation of GHI.

A Green and Happy Society means a state of well-being for Thai people, with a good quality of life, that is both

physically and mentally well balanced. The economic, social, and environmental aspects are integrated to form a peaceful and harmonious society.

In this respect, six fundamental dimensions are included: (i) health, (ii) a warm and loving family; (iii) community empowerment; (iv) economic strength and equity; (v) the surroundings and ecological systems; and (vi) democratic society with good governance.

Health is used in reference to the state of an individual who is healthy and enjoys longevity, and upholds morals, ethics, and conscience, and who is willing to learn, and has the capability to carry out “conceptual thinking and practical skills”, which are reasonable, and who is able to live peacefully in a society. In this respect, there are two sub-components: (1) physical and mental health, which includes physical health and proper behaviour, as well as the ability to control emotions and adjust to changes; and (2) intelligence, which includes the ability to learn, apply knowledge and skills, and uphold morals and ethics.

Warm and loving family refers to two persons who at least, have mutual affection and aim to live together peacefully, and have proper roles and maintain good relationships. In this respect, there are three sub-components: (1) the family role concerns appropriate family roles and responsibilities among family members and takes into account the love and care that is given, especially for children and older persons; (2) family ties concerns the strong relationships and support for others and takes into account their intentions to build families and problem-solve; and (3) self-dependence is inclusive of income, housing and adequate infrastructure and also takes into account income, and the existence of a permanent dwelling.

Community empowerment refers to a community that is peaceful and empowered. Members of a community are united and self-reliant. A community has learning processes, and maintains local traditions, culture, and wisdom. There are two sub-components: (1) self-reliance, which concerns unity, effective problem-solving, and having learning processes in place within the community, the upgrading of living standards, and the development of the local economy; (2) a supportive community, which concerns the existence of a loving, caring, and harmonious community, respectful minds by taking into consideration local welfare provisions and also caring and sharing.

Economic strength and equity refers to individual employment, adequate income, and job security and also considers whether the economy is sound and stable, provides fair incomes with adequate distribution and if it is able to reduce the income gap and poverty. The three sub-components are: (1) good work, which includes having a job, productivity, safety, sufficient income by means of considering employment, and work security; (2) economic strength is related to stable economic growth, self-reliance, productivity, and the ability to adjust to global changes by considering stability and sustainability; and (3) equity is related to poverty reduction, prosperity, and fair income distribution.

Surroundings and ecological systems refers to access to basic needs, enjoying safety in respect to life and property, a quality environment and well-balanced ecological systems, which support quality of life and sustainable society. There are three important sub-components, which are namely: (1) security in life and property in respect to the reduction of crime and drug problems, having effective laws and a sound judicial system by considering legal cases, especially those related to crime and drugs; (2) good environmental quality in respect to the control of pollution, which affects quality of life; (3) ecological systems in respect to the existence of measures to facilitate a balance between the preservation and utilisation of natural resources for maintaining the ecosystem.

A democratic society with good governance is a state in which an individual has rights, freedom, dignity, and relationships based on justice and equality, as well as participation in the national administration in order to create good governance with transparency, value for money, and equity, which will in turn lead to a harmonious and peaceful society. In this respect, there are three sub-components: (1) democratic awareness concerning the awareness of rights, responsibilities, freedoms, and having dignity, especially in regard to politics, as well as active participation in politics and public administration by considering the respective rules and regulations, protecting rights, and participating in development; (2) good governance and transparency in the public and private sectors, along with the participation of developmental partners, fair distribution, and decentralisation; and (3) a harmonious society is a society which lives together regardless of culture, race, ethnic group, or religion through consideration and acceptance of the differences in respect to race, religion, and culture.

For the provincial study, GHI development follows the above mentioned national defined level for the purpose of comparing GHI levels and changes across the country.

2.2 Correlation between Income and Happiness

Several academics have long investigated the correlation between income and happiness, using certain inter-changeable words for happiness, such as well-being, quality of life, and life satisfaction. The use of such words is likely to be dependent on the level of study; macro or aggregate and micro.

For the study at aggregate level, Easterlin (2003); Frey and Stutzer (2002) found that increases in income have a mostly transitory effect on an individuals' reported satisfaction with life. However, large increases in income for a given country over time, are not associated with increases in average subjective well-being. Easterlin (1995) also found that the fivefold increase in real income in Japan between 1958 and 1987, did not coincide with an increase in the average self-reported happiness level. Although average life satisfaction in countries tends to rise with GDP per capita at low levels of income, there is little, or no further, increase in life satisfaction once GDP per capita exceeds \$10,000.

At the micro level, several scholars found there was a low correlation between life satisfaction and household income. The correlation between personal income and the average happiness rating was only 0.01, while family income was significantly positively correlated, with the following: (i) anger/hostility ($r = 0.14$); (ii) anxiety/tension ($r = 0.14$); and (iii) excitement ($r = 0.18$). Thus, higher income was associated with more intense negative experienced emotions and greater arousal, but it did not provide greater experienced happiness (P. Schnall, J. Schwartz, P. Landsbergis, K. Warren, & T. Pickering, 1998). There are several explanations as to why income has a weak effect on subjective well-being. Duesenberry, 1949; Easterlin, 2003; and Frank, 1999 argued that relative income, rather than the level of income, affects well-being i.e., earning more or less than others, has a greater influence than how much one earns. As society grows richer, the average rank does not change, and so the relative income hypothesis could explain the stability of average subjective well-being despite national income growth (Clark & Oswald; 1996; Ferrer-i-Carbonell, 2005; Luttmer, 2005). Additionally, Easterlin (1995; 2003) argued that individuals adapt to material goods, while Scitovsky (1976) also argued that material goods yield little joy for most individuals. Thus, increases in income, which are expected to raise well-being by raising consumption opportunities, may have little lasting effect, because the consumption of material goods has little effect on well-being above a certain level of consumption. Stutzer and Frey (2004) and Kahneman et al (2004) explained that many people seek high income, because they over predict the increase in happiness, due to the illusion that changes in relative income are associated with strong emotional responses. However, the long-term effects of these changes are relatively small, because attention eventually shifts to less novel aspects of daily life.

The relationship between well-being and income is still controversial. The Easterlin Paradox, a key concept in happiness economics discussed by Easterlin (1974) suggested that "high incomes do correlate with happiness, but long-term, increased income doesn't correlate with increased happiness". Contrarily, Hagerty and Veenhoven (2003) published an analysis based on various sources of data, and concluded that there is no paradox and populations were indeed happier with increased income. Diener & Seligman (2004) also found that even though GDP has tripled over the past 50 years in the United States, life satisfaction has remained unchanged. In contrast, rates of depression and anxiety have increased dramatically (Klerman et al., 1985; Robins et al., 1984; Twenge, 2000). The overabundance of available goods and services in developed nations does not therefore reflect the subjective well-being of the population. This situation has been described as the "progress paradox" (Easterbrook, 2003). In 2008, Stevenson and Wolfers published a paper in which they reassessed the Easterlin Paradox using new time-series data. As with Veenhoven et al., they concluded that, contrary to Easterlin's claim, the increases in absolute income are clearly linked to increased self-reported happiness, both for individuals and entire countries (Abdullah, 2012; Stevenson & Wolfers, 2008). Easterlin et al. (2010) published data reaffirming the paradox using a sample of 37 countries in a report prepared for the United Nations in 2012.

Regarding income, Layard, Clark and Senik (2012) suggested that happiness is not only affected at the absolute level. People compare their income to others, so relative income also has an impact. Higher levels of income inequality may therefore reduce happiness. They also pointed out that other variables covary with wealth, including social trust which may influence the drive towards the association of GDP per capita with well-being. Helliwell, Layard and Sachs (2015) concluded that among the more "external" factors, key determinants of happiness include: income, work, community and governance, together with values and religion. Among the more "personal" features, key determinants include: mental health, physical health, family experience, education, gender and age.

There are several determinants of well-being, both macro/micro and external/internal. At an early stage of study on provincial happiness, the author attempts to develop the GHI at provincial level and investigate the relationship between such index and per capita provincial product as a proxy of provincial income in Thailand.

2.3 Methodology

2.3.1 Selection of Indicators

Even though this study applies the GHI indicators based on a national approach, there may be some differences; particularly, those indicators which reflect the context of each area. Therefore, the indicators are divided into two types: generic indicators (G) at the national level which are appropriately applied for provincial level, while specific indicators (S) which are selected by the public and concerned authorities to reflect the well-being and happiness of people in provincial areas. In summary, a total of 44 indicators comprising 28 generic and 16 specific are included in the GHI (Table 1). In addition, benchmarking for some indicators is also applied for two cases at national and provincial level and these will be discussed later.

2.3.2 Construction of the Provincial GHI

Simple and composite methods are used to calculate equally-weighted GHI. The benchmarks for the calculation of each indicator may be divided as follows: 1) after the national GHI has been set, several methods will be used, such as planning, strategy and international benchmarks which are denoted as $\sum(G+S)_n$ and G_n ; 2) data available from the Tenth or Eleventh Plan, and from each province denoted as $\sum(G+S)_f$, G_f and S_f , as shown in Table 2.

2.3.3 Classification of the Provincial GHI Level

This study uses the coefficient of variation (CV) to classify the development level of the GHI for each province instead of the interval value, since the maximum value of the GHI is not captured at 100 resulting from the differential types and/or benchmarks of each indicator. The GHI is classified into five levels according to the CV: less than 100-CV for low level, more than 100-CV to 100-CV+I for moderately low level, more than 100-CV+I to 100-CV+2I for moderate level, more than 100-CV+2I to 100-CV+3I for moderately high level, and more than 100+CV for high level, where I is the interval value for the calculated GHI based on various types and benchmark indicators during the study period (2007–2012).

2.3.4 Validity of the Constructed Provincial GHI

Adopting the random effect method, panel data is used to analyse the relationship between income wealth, GPP per capita as a proxy, and the GHI. The results should reveal the cause and effect as well as reflecting the validity of the calculated GHI based on various types and benchmark indicators.

Table 1. Dimensions, components, and categories of selected indicators of GHI at the provincial level

Dimensions	Components	Indicators	Type of Indicator
Health	Physical and mental health	Illness rate per 1,000 population	Generic (G)
		The success rate of suicide per 100,000 population	Generic(G)
		Life expectancy at birth	Specific (S)
	Morality, intelligence and curiosity	Proportion of criminal cases per 1,000 population	Generic(G)
		Achievement in 4 core-subjects of pupils in primary and secondary school (average scores)	Generic(G)
		Population aged 15 years and older graduate secondary school	Specific(S)
Warm and loving family	Appropriate family roles	Rate of juvenile detention by the prosecution per 1,000 youths	Generic(G)
		Ratio of the elderly to labour	Specific(S)
	Family relationship and support	Number of incidents of family violence	Generic(G)
		Proportion of divorces per 1,000 population	Specific(S)
	Family self-reliance	Ratio of debt to household income	Generic(G)
		Percentage of households with stability in the housings and permanent dwellings	Generic(G)
Community empowerment	Community self-reliance	Percentage of households with adequate clean water consumption throughout the year	Generic(G)
		Financial stability and security of the community organizations	Generic(G)
		Proportion of community enterprises with good potential level of operating performance	Generic(G)

Dimensions	Components	Indicators	Type of Indicator	
	Supportive community	Proportion of villages with self-learning process	Generic(G)	
		Percentage of households with family members to be community organization's members that provide social welfare per 1,000 households	Generic(G)	
		Ratio of community organization's social welfare expenses to number of its members	Specific(S)	
Economic strength and equity	Employment and job security	Employment rate	Generic(G)	
		Ratio of workers who receive welfare to total labour forces	Generic(G)	
		Number of accidents, dangers, and occupational diseases per 1,000 workers	Generic(G)	
	Economic stability	Ratio of total demand to GPP	Generic(G)	
		Proportion of saving - investment gap in GDP	Generic(G)	
		Growth rate of GPP	Generic(G)	
		Inflation rate	Generic(G)	
	Economic equality	Gini coefficient (expenditure approach)	Poverty incidences (expenditure approach)	Generic(G)
			Growth rate of labour productivity	Specific(S)
			Growth rate of labour productivity	Specific(S)
Surroundings and ecological system	Safety in live and property	Number of cases concerning the safety in life and property per 1,000 population	Generic(G)	
		Rate of deaths from traffic accidents per 1,000 population	Generic(G)	
	Quality of environment	Proportion of management of solid waste under appropriate-principle	Amount of carbon dioxide emissions per capita (tons)	Generic(G)
			Proportion of water sources with low quality standards in the province	Generic(G)
			Proportion of date with particles not larger than 10 microns (PM10) under the benchmark	Generic(G)
			Proportion of solid waste that can be utilized by 3R principle	Specific(S)
			Proportion of conservation forest areas to the total province's areas	Generic(G)
	Balanced ecological system	Proportion of renewable energy uses per capita	Quantity of fresh water fishery from natural sources	Specific(S)
			Quantity of fresh water fishery from aquaculture	Specific(S)
			Ratio of safety agricultural areas under GAP standard to total agricultural areas	Specific(S)
Number of pesticide stores			Specific(S)	
Democratic society with good governance	Democratic awareness	Proportion of the voters	Specific(S)	
	Society with good governance	Number of complaints of anti-corruption (from the date of the NACC's resolution)	Specific(S)	
	Harmonious society	Number of complaints about human rights	Specific(S)	

3. Result and Discussion

3.1 The Constructed and Differentiation of the GHI in the Studied Provinces

The development of the GHI utilises secondary data in the tenth Plan (2007–2011) and in the first year of the eleventh Plan (2012). Information retrieved from related databases, discussions, and workshops involving concerned governments, and private and public representatives in Ratchaburi province, are the major sources used to acquire the appropriate indicators for GHI at the provincial level. In fact, eight targeted provinces are included in this GHI development project. Among those, Ratchaburi is used as the pilot province for organising discussions and workshops in conjunction with the government and private and public representatives concerned, in the search for appropriate provincial green and happiness indicators. The additional seven provinces are selected

as the representatives for four regions, which are Phra Nakhon Sri Ayutthaya in Central Thailand, Kamphaeng Phet and Tak in the North, Nakhon Phanom and Nong Bua Lamphu in the Northeast, and Phuket and Yala in the South. It should be noted that these eight provinces were purposely selected in accordance with their various individual contexts including socio-economic and environmental factors. Therefore, the findings in this study are not inferential as in some case studies.

During the study period from 2007–2012, Nakhon Phanom had the highest GHI at 109.15–156.53, a moderately high to high level. Meanwhile, Kamphaeng Phet had the lowest GHI, equal to 91.35–104.09, a moderately low to moderate level. Ratchaburi, Tak, Phuket, and Yala all had moderate to high levels of GHI. In Phra Nakhon Sri Ayutthaya, the GHI fluctuated from a low to high level. Nong Bua Lamphu had a moderately high to high GHI level, although this finding was based on incomplete data. It can be seen that the GHIs of the eight provinces vary greatly depending on three factors. Firstly, when including the components of the two categories of generic and specific indicators, either together or separately. Secondly, the calculation of the GHI based on benchmarking, following the national GHI and the data available from each province in the Tenth or Eleventh Plan. Finally, classification of the GHI when the CV is applied. For these calculations, the GHI is therefore denoted as $(G+S)_n$, $(G+S)_f$, G_n , G_f , and S_f , as shown in Table 2. The GHI varies both within and between each province. These results are inconclusive regarding the relationship tendency between happiness and provincial income. Therefore, further in-depth investigation is required through panel data analysis.

Detailed descriptive findings (not presented in this paper), show that factors contributing to a green and happy society at the provincial level involve community empowerment, which reflect complementary and self-reliant social conditions. These involve partnerships with community organisations, strong development networks, generosity, unity, a harmonious peaceful existence, the upholding of traditional values, unique culture, and local wisdom. However, health is a debilitating factor. These results are consistent with Helliwell, Layard and Sachs (2015) who indicated several factors determining happiness.

3.2 Validity and Relationship of the Constructed Provincial GHI

This study employs 48 observations (8 provinces, 6 years) to analyse the relationship between calculated GHI and GPP per capita. The result in Table 3 shows that most F-statistics are statistically significant at the .01-1% level. This indicates that both fixed and random effect models are better than the pooled OLS model. Furthermore, the Hausman statistic is statistically significant at a level higher than chi-square, indicating that the random effect model is more suitable than that of the fixed effect. It is noted that the GHI, using a benchmark based on the data available from the Tenth or Eleventh Plan, namely, $(G+S)_f$, G_f , and S_f in equations (2), (4) and (5), has a positive relationship with GPP per capita. However, its coefficients are minimal at 0.0000146, 0.00000274, and 0.0001059, respectively. Only the specific index (S_f) has a significantly positive influential effect on GPP per capita. These results imply that the calculation of the provincial GHI, using a benchmark based on the area approach concept, is more accurate than those which follow the national GHI. In particular, the calculation of a specific index reflects the context of each province. These results also highlight the fact that wealthier people in the provincial areas are more likely to be happier; consistent with the Easterlin Paradox (1974), since a set of data for 6 years (2007–2012) is employed which should be considered as a short-term period correlation of income and happiness in the eight study provinces.

All the above results indicate that when the GHI is used for implementation, monitoring, evaluation, and network creation, the following factors should be taken into consideration:

- 1) The level of the GHI depends on several factors, such as data availability, benchmarking, and index classification. Therefore, various methods that reveal the relationship between the GHI and any hypothesised variable should be investigated for validity. This study uses panel data analysis, with a random effect model, to reveal the relationship between the calculated GHI and GPP per capita. The results imply that the calculation of the provincial GHI, with a benchmark based on the data available in each area, is more accurate than those calculations which follow the national GHI. In particular, the calculation of a specific index should truly reflect the context of each province. With regards to the development of the GHI, where the maximum value of any index is not captured at 100, a coefficient of variation should be used to classify the development level of a green and happy society for each area.

- 2) In addition, this study has the following suggested guidelines in respect to network creation for the development of the provincial GHI:

- 2.1) The central planning government agency which is responsible for green and happy society development, should support the GHI construction by providing a concrete conceptual framework, indicator compilation, and index calculation. The Provincial Office of Statistics, and/or the Provincial Office of Community Development,

should be assigned as the coordinators for all the concerned agencies to compile data and information for the construction of the provincial DHI, and for monitoring, and evaluations based on a well-developed GHI. These processes should consequently be submitted to the Office of the NESDB, which will serve as a guideline for the establishment of a new appropriate policy, and eventually achieving the objective of a green and happy Thai society at a higher level.

2.2) The selection of indicators for the GHI should take into account their status. Some environmental indicators do not indicate the difference between the quality of life and the happiness of the people in the whole country and in the individual provinces, i.e., indicators for public good or public bad should measure the overall level, rather than any specific area, and the relatively constant indicators from the BMN database should not be included. Measuring the total number should be replaced by proportion. In addition, indicators for children and the perceived health status should also be included.

2.3) The results of this study show that the application of national level indicators as a framework at the provincial level, may not be appropriate as a top-down guideline for such development. Therefore, the indicators should be developed from an area, or bottom-up, approach. Therefore, the office of the NESDB should support GHI development wherein the area approach is used to obtain indicators that truly reflect the geography, society, lifestyle, culture, economy, environment, and natural resources of each province. A standard questionnaire should be constructed and used as a tool for data collection, and it should be valid in terms of content and indexing accuracy, which are consistent with the contexts of the provincial areas. In addition, most prior-determined indicators are physical, despite the efforts taken to use physical indicators to reflect mentality. Additionally, mental indicators should also be included to indicate the real quality of the minds of the people.

2.4) A national database should be set up to report and collect data for suggestions regarding the timely and continuous development of the GHI at the provincial level. This study also concerns the development of a preliminary database which is not presented in this paper, but should be a basis for further development.

4. Conclusion

Since the Eighth Plan, Thailand has geared itself towards improving the well-being of its citizens in accordance with the guidance provided by the SEP under the direction of His Majesty King Bhumibol Adulyadej, and through which the NESDB has developed the GHI to measure the well-being and happiness of Thai people and society at a national level. GHI development has risen steadily at the provincial level culminating in the advent of the Eleventh Plan. This study develops the provincial GHI in accordance with the national approach, by using a total of 28 generic and 16 specific indicators to reflect the well-being and happiness of people in provincial areas. An equally-weighted GHI was calculated, based on the two benchmarks of national and area levels for the period from 2007–2012. This shows that GHI values levels in eight pilot provinces vary greatly from moderately low to high, depending on data availability, benchmarking, and index classification.

The results of the panel data analysis, using a random effect model, reveal that the specific index (S_f) is the only one which has a significantly positive influential effect on GPP per capita. This implies that the calculation of the provincial GHI, using a benchmark based on data that is available from the provincial areas, is more accurate than those which follow the national GHI. It should also be noted that these results show that the wealthier people in the provincial areas are more likely to be happier. However, this pilot project contains limit data, and thus, all the happiness of people in all the provinces in Thailand should be further investigated. In addition, when using the GHI, the following factors should also be considered, i.e., the indicators for public good or public bad, and the constant BMN indicators should not be included. The application of national level indicators as a framework for the provincial level, may not be appropriate as a top-down guideline for this development. In addition, there should be support for GHI development based on the area approach. In addition, the development process should focus mainly on improving physical and mental health, morality, and intelligence. Health status and mental indicators for children should be included in order to reflect the individual intellectual ability of the people. The determination of provincial happiness rather than income should be investigated at an aggregate and individual level, as well as in the short and long-term.

In conclusion, these results, proposed approach, and analytical tools provide a good basis for researchers, developers, practitioners, and local people in deciding how best to improve the GHI development at provincial level. These practical guidelines, however, should further prove useful for concerned networks in all areas.

Table 2. Provincial levels of green and happiness society as classified by the coefficient of variation adjusted GHI index

Province	GHI based on benchmarking	Periods											Ranges of GHI index					Average GHI	GHI Level	
		2007	2008	2009	2010	2011	2012	CV	Interval	low	Moderately low	Moderate	Moderately high	High	CV					
		Less than 100-CV		More than 100-CV		More than 100-CV		More than 100-CV		More than 100-CV		More than 100-CV		More than 100+						
Ratchaburi	(G+S)n	81.62	92.52	124.57	119.01	144.72	117.00	20.12	13.41	79.88	79.88	93.29	93.29	106.71	106.71	120.12	120.12	113.21	Moderately high	
	(G+S)f	100.00	109.12	134.10	124.73	156.21	112.87	16.50	11.00	83.50	83.50	94.50	94.50	105.50	105.50	116.50	116.50	112.83	High	
	Gn	63.42	59.28	105.98	86.36	96.93	131.43	29.96	19.97	70.04	70.04	90.01	90.01	109.99	109.99	129.96	129.96	90.57	Moderate	
	Gf	100.00	102.52	133.99	115.95	134.98	127.49	12.97	8.65	87.03	87.03	95.68	95.68	104.32	104.32	112.97	112.97	119.16	High	
	Sf	100.00	140.52	153.03	168.64	215.78	95.72	30.87	20.58	69.13	69.13	89.71	89.71	110.29	110.29	130.87	130.87	145.61	High	
	GPP per capita (1,000 Baht)	126.09	135.28	144.03	160.32	165.00	162.39													
	Phra Nakhon Si Ayutthaya	(G+S)n	94.28	85.71	96.19	89.94	111.14	136.85	18.55	12.36	81.45	81.45	93.82	93.82	106.18	106.18	118.55	118.55	102.35	Moderate
		(G+S)f	100.00	100.97	104.22	106.57	123.26	137.84	13.52	9.02	86.48	86.48	95.49	95.49	104.51	104.51	113.52	113.52	112.14	High
		Gn	99.79	72.82	79.97	88.27	86.60	84.23	10.56	7.04	89.44	89.44	96.48	96.48	103.52	103.52	110.56	110.56	85.28	Low
		Gf	100.00	97.65	93.66	115.18	109.43	101.99	7.71	5.14	92.29	92.29	97.43	97.43	102.57	102.57	107.71	107.71	102.99	Moderately high
Sf		100.00	123.49	133.32	106.86	180.79	265.37	41.27	27.51	58.73	58.73	86.24	86.24	113.76	113.76	141.27	141.27	151.64	High	
GPP per capita (1,000 Baht)		336.64	429.44	373.86	422.98	364.75	377.24													

Table 2 (Continued)

Province	GHI based on benchmarking	Periods											Ranges of GHI index					Average GHI Level		
		2007	2008	2009	2010	2011	2012	CV	Interval	low	Moderately low	Moderate	Moderately high	High						
		Less than 100-CV	More than 100-CV	+1	+1	+21	+21	+31	CV											
Kamphaeng																				
Phet	(G+S)n	87.88	77.80	88.33	115.61	123.04	105.58	17.83	11.89	82.17	82.17	94.06	94.06	105.94	105.94	117.83	117.83	98.71	Moderate	
	(G+S)F	100.00	90.35	93.37	107.75	103.31	102.54	6.56	4.37	93.44	93.44	97.81	97.81	102.19	102.19	106.56	106.56	98.55	Moderate	
	Gn	81.25	68.87	85.54	123.80	113.18	75.44	24.10	16.07	75.90	75.90	91.97	91.97	108.03	108.03	124.10	124.10	91.35	Moderately low	
	Gf	100.00	92.82	94.96	134.05	105.38	97.31	14.71	9.81	85.29	85.29	95.10	95.10	104.90	104.90	114.71	114.71	104.09	Moderate	
	Sf	100.00	98.78	94.52	98.94	105.24	115.98	7.39	4.93	92.61	92.61	97.54	97.54	102.46	102.46	107.39	107.39	102.24	Moderate	
	GPP per capita(1,000 Baht)	89.15	96.50	90.30	96.90	114.90	140.22													
	Tak	(G+S)n	96.32	108.72	109.11	143.77	110.64	133.85	15.28	10.19	84.72	84.72	94.91	94.91	105.09	105.09	115.28	115.28	117.07	High
		(G+S)F	100.00	109.30	110.21	114.26	106.92	136.43	11.05	7.37	88.95	88.95	96.32	96.32	103.68	103.68	111.05	111.05	112.85	High
		Gn	79.22	81.35	95.93	127.64	92.57	96.66	18.18	12.12	81.82	81.82	93.94	93.94	106.06	106.06	118.18	118.18	95.56	Moderate
		Gf	100.00	104.94	107.69	103.32	98.70	115.80	5.89	3.93	94.11	94.11	98.04	98.04	101.96	101.96	105.89	105.89	105.08	Moderately high
Sf		100.00	110.26	122.29	134.12	123.44	141.98	12.54	8.36	87.46	87.46	95.82	95.82	104.18	104.18	112.54	112.54	112.02	High	
GPP per capita(1,000 Baht)		56.42	56.81	58.71	67.60	69.91	73.43													

Table 2 (Continued)

Province	GH I based on benchmarking	Ranges of GH I index													Average GH I	GH I Level					
		Periods											CV	Interval			low	Moderately low	Moderate	Moderately high	High
		2007	2008	2009	2010	2011	2012	low	low	low	low	low									
Nakhon Phanom	(G+S)n	131.54	110.25	131.15	145.33	186.76	234.14	29.24	19.49	70.76	70.76	90.25	90.25	109.75	109.75	129.24	129.24	156.63	High		
	(G+S)f	100.00	104.60	97.30	118.47	117.96	116.59	8.83	5.89	91.17	91.17	97.06	97.06	102.94	102.94	108.83	108.83	109.15	High		
	Gn	137.93	73.63	138.07	102.60	173.89	247.54	41.59	27.73	58.41	58.41	86.14	86.14	113.86	113.86	141.59	141.59	145.61	High		
	Gf	100.00	100.76	108.35	96.91	119.19	120.18	9.41	6.27	90.59	90.59	96.86	96.86	103.14	103.14	109.41	109.41	107.57	Moderately high		
	Sf	100.00	99.85	94.49	129.85	132.74	134.03	16.35	10.90	83.65	83.65	94.55	94.55	105.45	105.45	116.35	116.35	115.16	Moderately high		
	GPP per capita(1,000 Bath)	32.45	36.60	43.67	48.80	51.78	62.76														
	Nong Bua	(G+S)n	83.77	98.66	564.46	568.56	424.50	557.65	60.68	40.45	39.32	39.32	79.77	79.77	120.23	120.23	160.68	160.68	382.93	High	
		(G+S)f	100.00	99.48	106.61	110.08	107.87	174.33	24.66	16.44	75.34	75.34	91.78	91.78	108.22	108.22	124.66	124.66	116.4	Moderately high	
		Gn	61.95	48.07	871.62	613.66	455.22	610.85	74.25	49.50	25.75	25.75	75.25	75.25	124.75	124.75	174.25	174.25	443.56	High	
		Gf	100.00	100.39	110.84	102.84	108.27	185.22	28.20	18.80	71.80	71.80	90.60	90.60	109.40	109.40	128.20	128.20	117.93	High	
Sf		100.00	96.87	97.09	114.80	126.84	149.83	18.46	12.31	81.54	81.54	93.85	93.85	106.15	106.15	118.46	118.46	114.24	Moderately high		
GPP per capita(1,000 Bath)		28.88	28.38	31.53	35.87	38.56	41.47														

Table 2 (Continued)

Province	GHF based on benchmarking	Periods													Ranges of GHI index					Average GHI	GHI Level
		2007	2008	2009	2010	2011	2012	CV	Interval	low		Moderately low		Moderate		Moderately high		High			
		Less than 100-CV	More than 100-CV	More than 100-CV	More than 100-CV	More than 100-CV	More than 100-CV	More than 100-CV	More than 100-CV	More than 100-CV	More than 100-CV	More than 100-CV	More than 100-CV	More than 100-CV	More than 100-CV	More than 100-CV	More than 100-CV	More than 100-CV			
Phuket	(G+S)n	105.45	162.77	69.63	115.61	82.81	98.15	30.61	20.41	69.39	69.39	89.80	89.80	110.20	110.20	130.61	130.61	105.74	Moderate		
	(G+S)r	100.00	95.65	109.05	109.42	126.62	159.78	20.22	13.48	79.78	79.78	93.26	93.26	106.74	106.74	120.22	120.22	116.75	High		
	Gn	132.05	253.91	47.75	120.21	65.12	48.14	70.82	47.21	29.18	29.18	76.39	76.39	123.61	123.61	170.82	170.82	111.20	Moderate		
	Gf	100.00	102.37	113.88	115.37	130.86	160.28	18.60	12.40	81.40	81.40	93.80	93.80	106.20	106.20	118.60	118.60	120.46	High		
	Sf	100.00	91.39	93.29	86.90	107.12	126.00	14.13	9.42	85.87	85.87	95.29	95.29	104.71	104.71	114.13	114.13	100.78	Moderate		
	GPP per capita(1,000 Baht)	201.95	201.49	174.76	185.68	201.10	224.38														
Yala	(G+S)n	89.45	83.79	138.78	75.83	129.52	119.78	24.90	16.60	75.10	75.10	91.70	91.70	108.30	108.30	124.90	124.90	106.19	Moderate		
	(G+S)r	100.00	101.69	115.73	120.76	138.01	137.88	14.02	9.35	85.98	85.98	95.33	95.33	104.67	104.67	114.02	114.02	119.01	High		
	Gn	84.46	61.10	142.45	79.22	137.24	133.93	33.31	22.21	66.69	66.69	88.90	88.90	111.10	111.10	133.31	133.31	106.4	Moderate		
	Gf	100.00	97.11	109.16	138.76	161.27	183.55	27.01	18.01	72.99	72.99	91.00	91.00	109.00	109.00	127.01	127.01	131.64	High		
	Sf	100.00	99.87	109.04	98.65	119.04	114.61	8.12	5.41	91.88	91.88	97.29	97.29	102.71	102.71	108.12	108.12	106.87	Moderately high		
	GPP per capita(1,000 Baht)	86.79	89.25	83.41	118.12	134.25	112.21														

Table 3. The relationships between generic and specific indices for GHI and GPP per capita

Independent variable	(1) (G+S)n	(2) (G+S)f	(3) Gn	(4) Gf	(5) Sf
GPP per capita	-0.000211 (-0.73)	0.0000146 (0.56)	-0.000318 (-0.86)	0.00000274 (0.07)	0.0001059* (1.94)
Constant term	176.5304*** (3.17)	111.6050*** (24.65)	189.2353*** (2.91)	113.2416*** (17.36)	105.4898*** (11.13)
No. of observation	48	48	48	48	48
Adjust R-squared	0.0976	0.0062	0.0836	0.0011	0.1118
F-test	F(7,39)=6.36***	F(7,39)=1.84*	F(7,39)=4.87***	F(7,39)=2.71*	F(7,39)=1.71
Hausman test	Chi2(1)=1.75	Chi2(1)=5.57**	Chi2(1)=0.97	Chi2(1)=7.82***	Chi2(1)=0.58

Notes: 1. t-statistics in parentheses

2. * sig. at 5%, ** sig. at 1%, and *** sig. at 0.1%, respectively

Acknowledgements

This research was funded by the office of NESDB as part of the provincial green and happy society index development project, 2014. The author would like to thank all participants for their time and provided information, and all those who facilitated the research. This paper states the author's personal views, and does not necessarily reflect the office of NESDB.

References

- Clark, A., & Oswald, A. (1996). Satisfaction and comparison income. *Journal of Public Economics*, 61(359).
- Diener, E., & Seligman, M. (2004). Beyond money: Toward an economy of well-being. *Psychological Science in the Public Interest*, 5, 1-31. <http://dx.doi.org/10.1111/j.0963-7214.2004.00501001.x>
- Duesenberry, J. (1949). *Income, Saving, and the Theory of Consumer Behavior*. Cambridge MA: Harvard University Press.
- Easterbrook, G. (2003). *The progress paradox: How life gets better while people feel worse*. New York: Random House.
- Easterlin, R. (1974). Does Economic Growth Improve the Human Lot? Some Empirical Evidence. In P. A. David, & M. W. Reder (Eds.), *Nations and Households in Economic Growth: Essays in Honor of Moses Abramovitz*. New York: Academic Press, Inc.
- Easterlin, R. (1995). Will raising the income of all increase the happiness of all? *Journal of Economic Behavior and Organization*, 27, 35.
- Easterlin, R. (2003). *Building a better theory of well-being*. Discussion Paper No. 742, IZA, Bonn, Germany.
- Easterlin, R. A., McVey, L. A., Switek, M., Sawangfa, O., & Zweig, J. S. (2010). The happiness-income paradox revisited. *Proceedings of the National Academy of Sciences*, 107, 52.
- Ferrer, A. (2005). Income and well-being: an empirical analysis of the comparison income effect. *Journal of Public Economics*, 89, 997.
- Frank, R. (1999). *Luxury fever*. Princeton University Press, Princeton, NJ.
- Frey, B., & Stutzer, A. (2002). *Happiness and economics: How the economy and institutions affect well-being*. Princeton University Press, Princeton, NJ.
- Global Footprint Network. (2009). *Data and Results Website*. Retrieved from <http://www.footprintnetwork.org>
- Hagerty, M. R., & Veenhoven, R. (2003). Wealth and Happiness Revisited – Growing National Income Does Go with Greater Happiness. *Social Indicators Research*, 64, 1-27.
- Helliwell, J., Layard, R., & Sachs, J. (2015). *World Happiness Report*. Retrieved from <http://www.earth.columbia.edu/sitefiles/file/Sachs%20Writing/2012/World%20Happiness%20Report.pdf>
- Herman, E. D., & John, B. C. (1994). *For the Common Good*. Beacon Press, Boston, Massachusetts.

- Kahneman, D. et al. (2004). Toward National Well-Being Accounts. *The American Economic Review*, 94(2).
- Klerman, G., Lavori, P., Rice, J., Reich, T., Endicott, J., & Hirschfeld, R. M. A. (1985). Birth cohorts trends in rates of major depressive disorder among relatives of patients with affective disorder. *Archives of General Psychiatry*, 42, 689-693.
- Layard, R., Clark, A., & Senik, C. (2012). The Causes of Happiness and Misery. In J. Helliwell, R. Layard, & J. Sachs (Eds.), *World Happiness Report*. Earth Institute, Columbia University.
- Luttmer, E. (2005). Neighbors as Negatives: Relative Earnings and Well-Being. *The Quarterly Journal of Economics*, 120, 963.
- Marks, N. et al. (2006). *The Happy Planet Index*. New Economics Foundation.
- Nasser, A. (2012). Can Money Buy Happiness? A Macroeconomic Perspective on Easterlin Paradox. *THURJ*, 40, 9.
- National Economic and Social Development Board. *The Eleventh National and Social Development Plan (2012–2016)*. Retrieved from http://www.nesdb.go.th/Portals/0/news/plan/p11/Plan11_eng.pdf
- Robins, L., Helzer, J., Weissman, M., Orvaschel, H., Gruenberg, E., & Regier, D. A. (1984). Lifetime prevalence of specific psychiatric disorders in three sites. *Archives of General Psychiatry*, 41, 949-958.
- Schnall, P. et al. (1998). A longitudinal study of job strain and ambulatory blood pressure: Results from a three-year follow-up. *Psychosomatic Medicine*, 60, 697.
- Scitovsky, T. (1976). *The joyless economy*. Oxford: Oxford University Press.
- Stevenson, B., & Wolfers, J. (2008). Economic Growth and Subjective Well-Being: Reassessing the Easterlin Paradox. *Brookings Papers on Economic Activity*, Spring, 1-87.
- Twenge, J. (2000). The age of anxiety? The birth cohort change in anxiety and neuroticism, 1952-1993. *Journal of Personality and Social Psychology*, 79, 1007-1021. <http://dx.doi.org/10.1037/0022-3514.79.6.1007>
- United Nations Development Programme. (2009). *Statistics Website*. Retrieved from <http://hdr.undp.org/en/statistics/>

Copyright

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/3.0/>).