

# **SUSTAINABLE DEVELOPMENT INDICATORS OF SELECTED MUSLIM COUNTRIES**

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## **Abstract**

The aim of this paper is to analyze the impact of income level, population growth and industrial growth on sustainable development indicators of 39 Muslim countries of the world. For this purpose, a GMM (Generalized Method of Moments) method of estimation is used to observe the impact based on cross-sectional data. Data collected for the study covers the period of 1990 to 2005 and are sourced from the World Bank. The results indicate that the middle/higher income countries have less problem of air quality compared to low income countries which is at higher process of industrialization. This is consistent with hypothesized relationship of environmental Kuznet curve. It is also found that less population growth and low income countries contribute to better biodiversity or less percentage of country's territory in threatened eco-regions.

*Keywords: Sustainable development, Islamic countries, economic growth indicators*

## 1. Introduction

The concept of sustainable development was introduced in 1980 by the International Union for the Conservation of Nature and Natural Resources (IUCN). The World Conservation Strategy stated that “for development to be sustainable it must take account of social and ecological factors, as well as economic ones; of the living and non-living resource base; and of the long-term as well as the short-term advantages and disadvantages of alternative actions” (IUCN, 1980). This definition recognizes the interrelationship between social concerns, economic activity and the environment. However, the focus remains on environmental integrity.

However, in 1987 the Brundtland Commission in its report ‘Our Common Future’ defined the term sustainable development as “*a development that meets the needs of the present without compromising the ability of future generations to meet their own needs*” (WCED, 1987). To date, the Brundtland Commission definition is the most commonly used definition of sustainable development. Over the years, further improvements were made on the above definition, including that of the Islamic perspective.

The objective of this paper is to evaluate the environmental sustainability of 39 Muslim countries by looking at various growth indicators. Specifically, the paper examines the impact of economic growth, population growth and industrial growth on indicators of sustainable development of the countries under study.

The paper is organized as follows. Following this section, Section 2 discusses the concept of sustainable development from the conventional and Islamic perspectives. Section 3 looks at the research method followed by the discussion of findings in Section 4. Finally, Section 5 concludes the discussion.

## 2. The Concept of Sustainable Development

The literature discusses three main approaches to sustainable development. The first approach focuses on “*maintaining the rate of growth*” in the long-run in which development refers to the process of sustaining growth. This approach originates from classical economic theories, such as those of Malthus (1798), Ricardo (1817) and Mill (1857). Later, when the neoclassical and London schools adopt this approach, they relate the concept of sustainable growth to the use of natural resources. This, in turn, is related to the concept of weak and strong sustainability because the consumption of natural resources and the depletion that ensues would depend on what comprises these resources.

The second approach focuses on achieving “*intergenerational equity*”, that is, to ensure that the total welfare received by the present generation is non-declining over time and from one generation to another. This view is proposed by the United Nations in its World Commission on Environment and Development. This approach is generally accepted by many due to its inclusion of both the developed and developing economies.

The third approach relates to the idea of “*maintaining the present quality of human and environmental life*”. In other words, there should be a balanced between growth and environmental protection and conservation. Hassan (2003) suggests minimization of

pollution instead of elimination because “a minimal temporal increase in output is unavoidable in the face of population growth, poverty eradication programs and mitigation of regional prosperity imbalances.” Since the production of goods and services has some negative externalities such as pollution, eliminating the externalities altogether would be overwhelming.

On the other hand, the Islamic literature tends to discuss sustainable development in terms of the environmental aspect. Of late, there is an attempt to relate the concept of sustainable development to the economic aspect. For instance, Mannan (1989) put forth nine conditions of the development process in a modern Muslim society. Those conditions are:

- i. mass participation and sharing in economic activities through the establishment of Islamic social banking at grass-roots level.
- ii. using distributive consideration for determining production priorities
- iii. humanizing the lines of production
- iv. humanizing the lines of distribution and consumption
- v. institutionalizing the obligatory, Islamic tools of redistribution of income.
- vi. institutionalising the Islamic voluntary sector.
- vii. provisions for future generations
- viii. increasing the level of economic cooperation
- ix. increasing the levels of regional, economic and monetary integration.

According to the author, the identified nine conditions would provide the blueprint for the establishment of the *ummah* economic order. Development in Islam is centered on the development of the human person to fulfill the two functions of the human person; as the servant of God (*Abdullah*) and as his vicegerent on Earth (*Khalifah*). The development goals of Islam are well anchored in the concepts of *falah* and the extended horizon of the present world and the hereafter. This is to be achieved through the balanced satisfaction of both the material and spiritual needs of all human beings (Hamid, 2006). Imam Al-Ghazali noted that well-being comprises the continual enrichment of man's faith (*Deen*), self (*Nafs*), intellect (*Aql*), posterity (*Nasl*), and wealth (*Mal*).

Meanwhile, Ikram Azam (2002) points out three areas for sustainable human development namely: (1) choice to live a long and healthy life; (2) choice to be educated; and a decent standard of living and; (3) choice to have resources needed for a decent standard of living. These measurements are quite similar to the Human Development Index (HDI) developed by the United Nation and was first introduced in 1990. The HDI is a summary measure of human development. It measures the average achievements in a country in three basic dimensions of human development: a long and healthy life, knowledge and a decent standard of living. The basic objective of development is to create an enabling environment for people to enjoy long and healthy lives. Hamid (2006) suggests setting up a specific “Islamic Development Index” that is in harmony with the HDI.

The goal of sustainable development is to achieve an equitable distribution of economic well-being that can be shared among present and future generations. This implies the utilization of renewable resources in ways which do not diminish their usefulness for the future and the depletion of non-renewable resources at a rate slow enough to ensure the high probability of a systematic transition to renewable sources. Thus, policies that support population growth which is unsuitable with economic conditions and consumerist

living should be rejected. If one looks at one of 8<sup>th</sup> the Millennium Development Goals (MDG), Goal 7 refers to “Ensure environmental sustainability” and list the following targets:

- Target 9: Integrate the principles of sustainable development into country policies and program and reverse the loss of environmental resources.
- Target 10: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.
- Target 11: Have achieved, by 2020, a significant improvement in the lives of at least 100 million slum dwellers.

In short, regardless of whether one take the conventional or Islamic approach in discussing sustainable development, the end results is the same. While the Brundtland definition stresses the humanitarian face of development, Islam propagates the values of moderation as an economic behavior pattern to draw the line between human needs and wants. Therefore, the contribution of this paper is to evaluate the performance of the selected Muslim countries in terms of their environmental sustainability based on the inverted U-shaped Kuznet curve hypothesis.

### **3. Research Method**

In this section, an empirical investigation is performed to observe the environmental sustainability of selected Muslim countries as a result of their development, in particular when the development involves changes in income level, industrial growth and population growth. The results of the impact of countries' development on sustainability of environment of these countries are expected to assist policymakers to outline and implement the best policies for their sustainable development through the identification of factors which lead to problem of sustainable environment among Muslim nations. A limitation of this study is that the model developed for the investigation will specify only on 'environmental sustainability' which is known as one part of sustainability of development. This is due to limited availability of data. The study will leave more exploration to be done on 'socio-cultural' and 'economic' aspects in the future as suggested in the previous section on Islamic perspectives of sustainable development.

The study evaluates the impact of economic growth, population growth and industrial growth on the environmental sustainability of 39 Muslim countries (based on data availability). The cross-sectional data collected cover the period of 1990 to 2005. All data of income level, industrial growth and population growth are obtained from the World Bank.

The study employs GMM (Generalised Method of Moments) methods of estimation in a multiple regression model. This model is dynamic (as compared to the OLS model) in the sense that the set of explanatory variables includes some explanatory variables that are potentially jointly endogenous (in the sense of being correlated with the error term). Thus, the GMM method of estimation is used to capture this endogeneity problem.

The dependent variable of the regression equation is a proxy of environment sustainability, namely, the Environment Sustainability Index (ESI), air quality, land, biodiversity and water quality. Meanwhile, the independent variables are proxies of

economic development, such as income level, population growth and industrial growth. The ESI is the index used for environmental sustainability which centers on the state of environmental systems, both natural and managed. It also measures stresses on those systems, including resource depletion and pollution rates, measures impacts and responses and human vulnerability to environmental change and it tracks a society's capacity to cope with environmental stresses and each country's contribution to global stewardship (ESI Report, 2005). In specific, four indicators of 'environmental systems' which used to construct the ESI are also used in this study to reflect the more likely that the country to be environmentally sustainable to the extent its vital environmental systems are maintained at healthy levels and to the extent to which levels are improving rather than deteriorating. Those indicators are air quality, AIR (base on variables of urban population weighted NO<sub>2</sub> concentration, urban population weighted SO<sub>2</sub> concentration, urban population weighted TSP concentration and indoor air pollution from solid fuel use), biodiversity, BIO (base on variables such as percentage of country's territory in threatened ecoregions, national biodiversity index and others), land, LAND (base on variables such as percentage of total land area, including inland waters, having very low anthropogenic impact and percentage of total land area, including inland waters, having very high anthropogenic impact) and water quality, WQLTY (base on variables such as dissolved oxygen concentration, electrical conductivity and others).

The following regression equation is used in this study to examine the impact of economic development on the environment sustainability:

$$ES_i = \beta_0 + \beta_1 DUMMY_i + \beta_2 IGROWTH_i + \beta_3 POPGROWTH_i + u_i \dots\dots(1)$$

where ES is Environment Sustainability Indicators (namely, either ESI, AIR, LAND, BIO or WQLTY), IGROWTH is industrial growth, POPGROWTH is population growth and DUMMY is a proxy of income level (1=high/middle income countries, 0=otherwise).

The ES is based on the index revealed on 2005 for each country, published by Yale University as a joint project with few other organisations. As for the industrial growth, the average annual growth of industrial output between 1990 and 2003 is used. Average annual population growth rate between 1990 and 2003 is used as a measure of population growth. Category of income group for each country is obtained from the World Bank list of economies, April 2006.

#### 4. Findings

Table 1 shows the results obtained from the regression using the GMM method. Using overall index of environmental sustainability, ESI (regression 1), all independent variables are not significantly contribute to the change in ESI of the countries. However, when the indicator of environment sustainability is specified on air quality (AIR) ie. in regression 2, the dummy variable which represents the income level is significant at 5 per cent level with positive sign. This indicates that the middle/higher income countries have less problem of air quality compared to low income countries. The result is somehow consistent with hypothesized relationship of environmental Kuznets curve which found by some previous studies such as Grossman and Krueger's(1991), Shafik and Bandyopadhyay's (1992), Selden and Song (1994) and others.

**Table 1: Empirical Results**

Equation Variable	Dependent Variable:				
	(1) ESI	(2) AIR	(3) LAND	(4) BIO	(5) WQLTY
<i>constant</i>	40.57*** (8.01)	-0.17 (-0.46)	0.57 (1.29)	0.72** (2.71)	-0.06 (-0.19)
<i>Population growth (PG)</i>	1.49 (0.83)	-0.05 (-0.44)	-0.21 (-1.23)	-0.18 (-1.86*)	-0.05 (-0.49)
<i>Industrial growth (IG)</i>	0.09 (0.40)	-0.05** (-2.65)	0.03 (1.41)	0.02 (1.67)	0.02* (1.75)
<i>Dummy</i>	2.75 (0.78)	0.95** (2.60)	-0.14 (-0.40)	-0.73*** (-3.58)	-0.38 (-1.13)
<i>Included observations</i>	39	39	39	39	39
<i>S.E of regression</i>	6.418	0.544	0.704	0.402	0.575
<i>J-statistic</i>	0.302	0.114	0.371	0.162	0.279
<i>Diagnostic test:</i>					
<i>JBnormal</i>	0.273	19.609***	0.076	8.183**	3.941
<i>Ljung-Box Q-stat.:</i>					
<i>Lag=1</i>	0.019	0.555	0.289	0.429	0.024
<i>Lag=2</i>	0.502	1.862	1.847	0.789	0.387
<i>Lag=3</i>	3.368	2.242	3.657	1.726	0.856
<i>Instrumental list</i>	C, IG, WQLTY, AIR, LAND, BIO	C, IG, PG,WQLTY, LAND, ESI, BIO	C, IG,PG, WQLTY, AIR, ESI, BIO	C, PG, IG, WQLTY, AIR, LAND, ESI	C, PG, IG, BIO, AIR, LAND, ESI

Notes: 1. t-statistic in parentheses

2. *JBnormal* is the Jarque-Bera Statistic of Normality Test*Ljung-Box Q-statistics at lag k* is a test statistic for the null hypothesis that there is no autocorrelation up to order k.

3. \*\*\* significant at 1% level

\*\* significant at 5% level

\* significant at 10% level.

The curve basically views relationship between various indicators of environmental degradation and income per capita. In the early stages of economic growth degradation and pollution increase, but beyond some level of income per capita (which will vary for different indicators) the trend reverses, so that at high-income levels economic growth leads to environmental improvement. This implies that the environmental impact indicator is an inverted U-shaped function of income per capita. We assume that a similar phenomenon is applicable to any group of countries including the selected Muslim countries under study. The result is further strengthened by negative and significant of 'industrial growth' variable in the same regression. The negative coefficient of this industrial growth variable in the regression simply means that high industrial growth contributes to degradation of air quality in the sample countries. Undoubtedly, low income countries are having high industrial growth, in which industrial sector is well known as the sector which could promise high speed of growth for the economic growth. The process of industrialization in most of these countries has put the environment at a high cost as the main aim is solely for economic growth of the countries. To achieve the

targeted income level, the awareness of the importance of sustainability of environment rises as it is key element for the country to sustain in the long-run.

In regression 4, when biodiversity (BIO) is used as the indicator of environment sustainability, the sign of dummy and population growth variables are negative and significant. The results imply that less population growth and low income countries are normally contribute to better biodiversity or less percentage of country's territory in threatened ecoregions. Obviously, countries with less population and less developed are expected to have part of the country's territory untouched by rapid development that harmed the ecoregion or the environment. In regard to regression 5, industrial growth seems to contribute positively to the quality of water (WQLTY) when it is used as an indicator of environmental sustainability. It is expected that the process of industrialization in the sample countries is contributing to the improvement of irrigation system and the quality of water flowing in all regions of the countries. This could not be possible without the process of industrialization which basically depending on this main utility.

The overall empirical results are quite good. *J-statistic* is used to test the validity of overidentifying restrictions when the regression have more instruments than parameters to estimate. In this example, we have six or seven instruments to estimate four parameters and so there are two or three overidentifying restrictions. The null hypothesis of the test is that the overidentifying restrictions are satisfied and from table 1, all 5 regressions the J-statistics accept the null hypotheses that the overidentifying restrictions are satisfied. Jarque-Bera statistic (*JB normal*), on the other hand, is normality test for the residuals. The results found that most equations have no problem of normality distribution in residuals. Most importantly, the *Ljung-Box Q-statistics* for all regressions show that all regressions has no problem of autocorrelations in residuals up to order 3 (lag 3).

Thus, these empirical results of selected Muslim countries indicate that the issue of environmental sustainability should be one of the main agendas of Muslim countries development especially for those low income or underdeveloped countries as the process of industrialization and high population rate might contributes to degradation of environment in term of air quality and biodiversity. However, a balance between economic growth and sustainable environment is only expected to be accomplished once a certain level of economic growth has been achieved, as hypothesized by the Kuznet curve. But, if the Muslim world adheres to the *habluminallah*, *habluminanaas* and *hablumminal-alam* principles, it is still possible to achieve a moderate rate of economic growth while sustaining the environment, even at a low stage of development or low income level. This is in line with the *ummatan wasatan* or moderation values imbued in Islamic teachings.

## 5. Conclusion

The paper examines the sustainable development concept in terms of sustainable environment sustainability by looking at 39 Muslim countries over the period of 2003-2005. Using environment sustainability and its components as indicators of sustainable development, the study found that environmental degradation, in particular poor air quality, among selected Muslim countries basically suffered by low income countries

which at higher rate of industrialization process. However, those countries which already attained a status of middle/high income level countries are more likely to concern more on improving their air quality. Nevertheless, it is also found that high population growth in these countries contributes to poor biodiversity or high percentage of harmed eco-region. Thus, the process of industrialization and growing population rate in these countries should be aligned with proper policies with regard to environmental issues in order to ensure the sustainability of development of the countries involved. In addition, preserving the environment and achieving economic growth for the *ummah* is key strategies for development and social change.

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