

ENVIRONMENTAL PERFORMANCE AND HUMAN DEVELOPMENT OF SOUTH ASIAN NATIONS: A QUEST FOR SUSTAINABLE DEVELOPMENT

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Sustainable development comprises economic and social development of people focusing on the environment. The 2030 Agenda for Sustainable Development highlights critical links between development, the environment and human well-being. The complex relationships between environmental factors and human well being could be seen in a broader spatial, socio-economic and cultural context. South Asia is a key economic zone but environmental degradation is becoming so severe that it is undermining growth and human development of this region. South Asia had lowest Human Development Index (HDI) value of 0.558 in the world higher only than that of Sub-Saharan Africa in 2014. There are strong evidences that low human development in this region, i.e. high poverty, low per capita income and literacy rate, high densities of population, and unplanned use of technology cause environmental degradation here.

Now the question arises, is the environmental change has constrained the human well being in South Asia or the low human development causes environmental degradation? The research paper tries to explore the causal relation between human development and environmental performance, the two components of sustainable development in South Asia.. It is secondary data based study which has used the backcasted data of Environmental Performance Index (EPI) (2002-2012) and modified Human Development Index of the South Asian Nations to prepare the time-series data of both indices for the purpose of the comparison. The correlation coefficient, regression, cointegration and Granger causality test are used for the analysis.

Keywords: Environmental Health, Ecosystem Vitality, Granger Causality, Cointegration.

INTRODUCTION

Sustainable development is not only a mere concentration on environmental problems but comprehension of three different factors - social, economic and environmental. It depends on the ability to balance these three elements, so that not a single one is neglected. These elements of sustainable development are interlinked with each other. Economic and social development have positive and negative impacts on the environment and similarly the environmental change also has a strong impact on human development which comprises economic and social development. The goals of sustainable development cannot be achieved without healthy people and population health cannot be maintained without ecologically sustainable development. The 2030 Agenda for Sustainable Development highlights critical links between development, the environment and human well-being. The complex relationships between environmental factors and human well being should be seen in a broader spatial, socio-economic and cultural context.

Considering this the present study is focused on the sub-region of South Asia. In South Asia, environmental degradation is becoming so severe that it is undermining growth itself. The “South

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Asia Environment Outlook 2014” report presents concrete evidence that human well being in South Asia is at risk due to the environmental threats. Human development is also linked to the environmental priorities of the region. Despite being the high economic zone, South Asia had lowest Human Development Index (HDI) value of 0.558 in the world, higher only than that of Sub-Saharan Africa. The higher economic growth in the region caused emission of harmful gases at higher level which deteriorated environment. Along with this poverty, high densities of population, low per capita income and literacy rate and unplanned use of technology also cause environmental degradation here (Moyen Uddin and Wadud, 2014).

Now the question arises, is the environmental change has constrained the human well being in South Asia or the low human development causes environmental degradation? Which threatens the Sustainable development of South Asia more, the environmental change or low human development? Focusing these issues the present research study is designed.

OBJECTIVES

The objectives of the present research paper are :

1. To analyse the trend of human development and environmental performance in selected South Asian countries.
2. To explore the correlation between human development and environmental performance, the two components of sustainable development in South Asia.
3. To analyse the causal relationship between human development and environmental performance two components of sustainable development in the region.

METHODOLOGY

The present research is a secondary data based study which has used the data of Human Development Index (HDI) and Environmental Performance Index (EPI) of the five South Asian Nations – Bangladesh, India, Nepal, Pakistan and Sri Lanka. These countries are selected among eight nations of the South Asia on the basis of the availability of the scores for both Indices for each country. The methodology, sources and weights assigned are changed time to time for calculating these indices, so year-wise comparison of their values is rather difficult. For this purpose the EPI index values are taken from the “EPI Indicators Score and Backcasted Data (2002-2012)” of Yale Centre for Environmental Law & Policy. This data series is constructed by the centre to provide a time series data to show what a country’s EPI score would have been in a prior year given the 2014 EPI’s method. Thus these scores make the EPI indices comparable for the countries during 2000 to 2012. Since the data are available in this series up to the year 2012 only so this constrained the study period to 2000 to 2012. For the purpose of the study, HDI indices are modified and converted by chain indices method to have a time series data for HDI and make them comparable. The source of HDI is Human Development Reports of United Nations Development Programme. The Composite Indices of HDI and EPI of these five South Asian Nations are computed by assigning weights with the help of Principal Component Analysis Technique. For missing values, linear interpolation method has been used. The techniques of Correlation, Panel Cointegration Test , Granger Causality test under Vector Error Correction Model (Amin, Ferdaus & Porna, 2012; Dantama & Inuwa, 2012) are applied on Panel Data of 65 observations with five cross- sections.

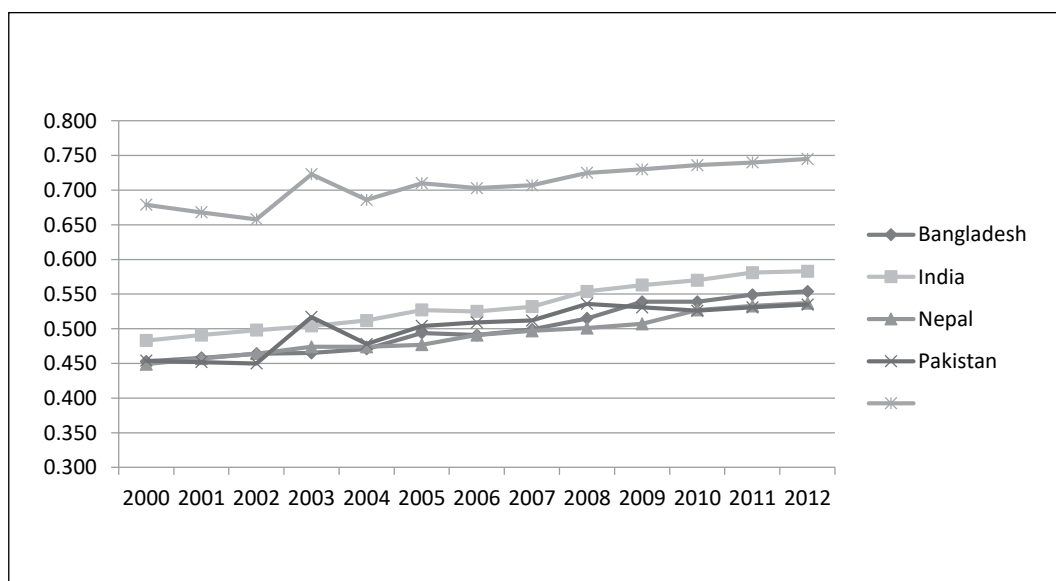
RESULTS AND DISCUSSIONS

Trends in Human Development in Selected South Asian Nations

Human development is about expanding the richness of human life, rather than simply the richness of the economy in which human beings live. The Human Development Index (HDI) is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living. The HDI is the geometric mean of normalized indices for each of the three dimensions. The HDI was created to emphasize that people and their capabilities should be the ultimate criteria for assessing the development of a country, not economic growth alone. The HDI can also be used to question national policy choices, asking how two countries with the same level of GNI per capita can end up with different human development outcomes.

Income growth is seen as a means to development, rather than an end in itself. The trends in human development in selected five South Asian nations are shown in Figure 1. Out of the five only two, Sri Lanka and India were countries with medium human development and other three were low human development countries. In 2012 Sri Lanka has been high human developed country, India and Bangladesh medium and Nepal and Pakistan has remained low human developed countries.

Figure 1: Trend in HDI of South Asian Nations



Source: Modified Scores of HDI collected from various Human Development Reports of United Nations Development Programme.

Table 1 give the details of growth of HDI in selected Asian Nations. Though HDI of Sri Lanka has remained highest during the study period but the growth rate of HDI of Sri lanka (0.9 per cent) is lowest in the same period among all South Asian Nations. Whereas it is highest for Bangladesh (1.8 per cent) and other nations have approximately same growth in HDI, slightly smaller than Bangladesh. It shows the decreasing gap of human development among South Asian Nations.

Table 1: Results of Regression Analysis (Growth Equations) of HDI (2000-2012)

Country	B-Coefficient	t-value	F-value	R ²
Bangladesh	.018*	17.994* (.000)	323.767* (.000)	.967
India	.016*	27.502* (.000)	756.358* (.000)	.986
Nepal	.015*	24.090* (.000)	580.331* (.000)	.981
Pakistan	.015*	6.003* (.000)	36.035* (.000)	.766
Sri Lanka	.009*	5.991* (.000)	35.894* (.000)	.765

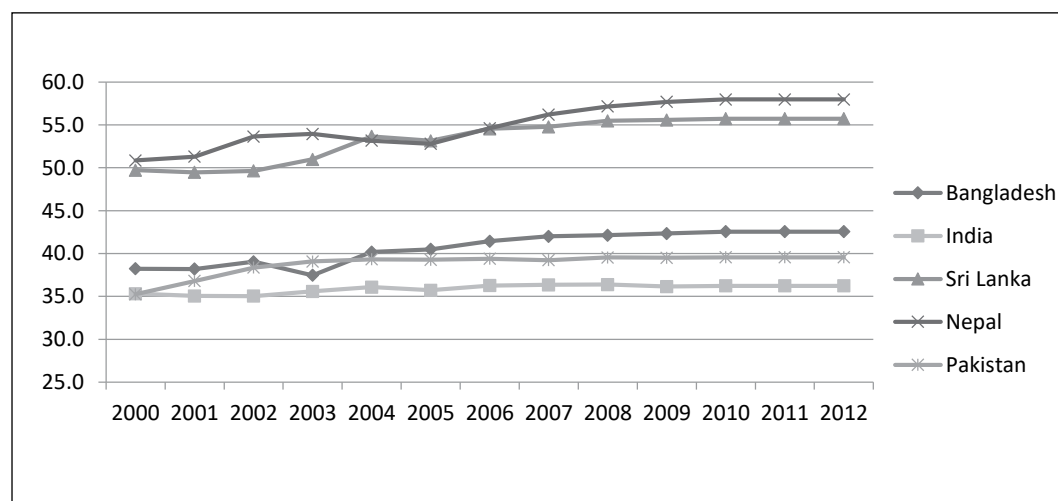
Source: Computed

Note: ¹figures in the parentheses show the p-value

*Value is Significant at 5 percent level of significance

Trends in Environmental Performance in Selected South Asian Nations:

The Environmental Performance Index (EPI) ranks how well countries perform on high-priority environmental issues in two broad policy areas, Environmental Health and Ecosystem Vitality. Within these two policy objectives the EPI scores country performance in nine issue areas comprised of 20 indicators. Environmental Health measures the protection of human health from environmental harm. Ecosystem Vitality measures ecosystem protection and resource management.

Figure 2: Trends in EPI of South Asian Nations

Source: EPI Scores are collected from “Historical Values of EPI, 2012” and “EPI, 2012” data sources of Yale Center for Environmental Law & Policy

Figure 2 shows the trend in environmental performance of selected South Asian Nations through EPI values. Value of EPI for all the nations is below 60 during 2000-12 but Nepal and Sri Lanka are performing far better than other nations. The values of EPI for these countries during the study period remained highest and so as growth rate (1.2 per cent for both nations). India is the lowest performing country according to EPI and its growth is also slowest during the period with the rate 0.3 per cent (table 2).

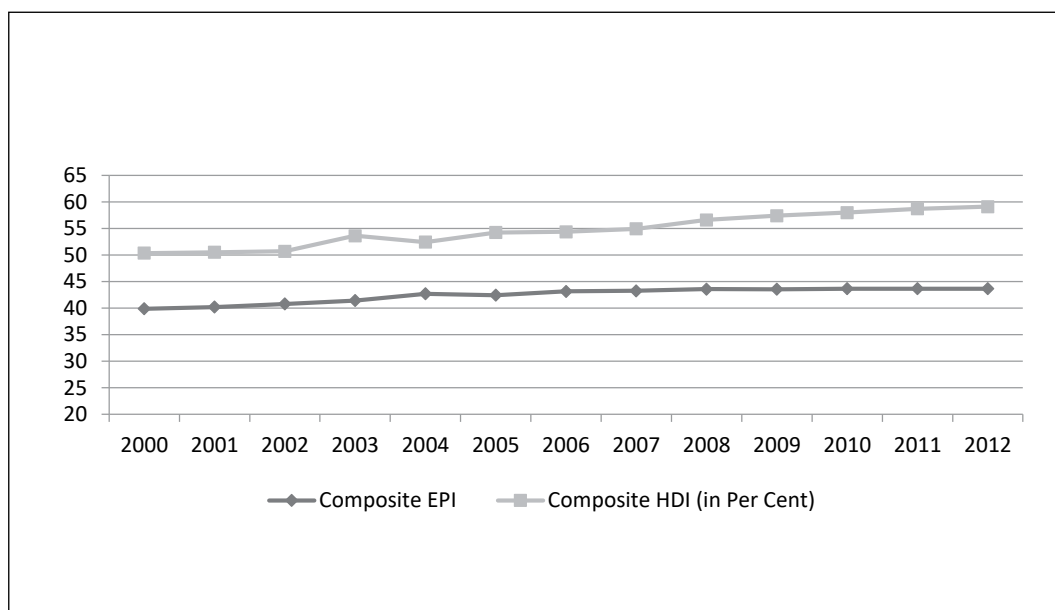
Table 2: Results of Regression Analysis (Growth Equations) of EPI (2000-2012)

Country	B-Coefficient	t-value	F-value	R ²
Bangladesh	.011*	7.674* (.000)	58.885* (.000)	.843
India	.003*	4.852* (.001)	23.541* (.001)	.682
Nepal	.012*	9.864* (.000)	97.289* (.000)	.898
Pakistan	.007*	3.707* (.000)	13.744* (.000)	.555
Sri Lanka	.012*	8.246* (.000)	67.997* (.000)	.861

Source: Computed

Note: ¹figures in the parentheses show the p-value

*Value is Significant at 5 percent level of significance

Figure 3: Trends in Composite EPI and HDI

Source: Computed on the basis of data source of figure 1 and figure 2.

Trends in Composite EPI and HDI of Selected South Asian Nations:

The figure 3 shows the trends in Composite EPI and HDI of selected South Asian Nations. It is apparent that selected five South Asian Nations are not performing well on both the fronts, i.e. human development and environmental performance and even worse on the latter one since the growth rate of composite EPI (0.8 per cent) is less than the growth rate of HDI (1.4 per cent) so the gap between two indices is increasing (Table 3).

Table 3: Results of Regression Analysis (Growth Equations) of Composite EPI and Composite HDI (2000-2012)

Variable	B- Coefficient	t-value	F-value	R ²
Composite HDI	.014*	17.048* (.000)	290.642* (.000)	.964
Composite EPI	.008*	7.728* (.000)	59.725* (.000)	.830

Source: Computed

Note: ¹figures in the parentheses show the p-value

*Value is Significant at 5 percent level of significance

Relation Between Human Development and Environmental Performance in South Asia

To find out the relation between human development and environmental performance Karl-Pearsons' correlation coefficient is calculated for HDI and EPI country-wise and results are shown in table 4. It shows high level of significant positive correlation between the indices in all South Asian Nations.

Table 4: Correlation between EPI and HDI of South Asian Nations

Nation	Correlation Coefficient	P-Value
Bangladesh	.934*	0.000
India	.781*	0.002
Nepal	.946*	0.000
Pakistan	.785*	0.001
Sri Lanka	.821*	0.001

Source: Computed

Note: ¹figures in the parentheses show the p-value

*Value is Significant at 5 percent level of significance

Table 5 shows the correlation coefficient of Composite EPI and Composite HDI which is computed with the panel data of five South Asian Nations. The coefficient also shows the high level of significant positive correlation.

Table 5: Correlation Coefficients between Composite EPI and Composite HDI

	EPI	HDI
EPI	1.000000	0.935698*
	-----	(0.0000)
HDI	0.935698*	1.000000
	(0.0000)	-----

Source: Computed

Note: ¹figures in the parentheses show the p-value

*Value is Significant at 5 percent level of significance

To analyse the long run relationship between EPI and HDI, the Panel Cointegration Test is applied assuming that both the series are integrated of the same order. The results of the Pedroni Residual Cointegration Test are given in table 6.

Table 6: Result of Pedroni Residual Cointegration Test

Pedroni Residual Cointegration Test : Included observations: 65, Cross-sections included: 5, Null Hypothesis: No cointegration, Trend assumption: No deterministic trend, Automatic lag length selection based on SIC with a max lag of 2					
Alternative Hypothesis: Common AR coeffs. (within-dimension)					
				Weighted	
		<u>Statistic</u>	<u>Prob.</u>	<u>Statistic</u>	<u>Prob.</u>
Panel v-Statistic		4.170871	0.0000	4.170871	0.0000
Panel rho-Statistic		-3.444319	0.0003	-3.444319	0.0003
Panel PP-Statistic		-4.576950	0.0000	-4.576950	0.0000
Panel ADF-Statistic		-0.364825	0.3576	-0.364825	0.3576
Alternative Hypothesis: Individual AR coeffs. (between-dimension)					
		<u>Statistic</u>	<u>Prob.</u>		
Group rho-Statistic		-2.081445	0.0187		
Group PP-Statistic		-4.607352	0.0000		
Group ADF-Statistic		0.392657	0.6527		

Source: Computed

The p-values of eight out of the eleven criteria are less than 0.05 so null hypothesis can be rejected and it can be concluded that EPI and HDI are cointegrated means there is long run relationship between them. Since series are cointegrated the Granger Causality Test under Vector Error Correction Model (VECM) is applied. The results are given in table 7.

Table 7: Results of VEC Granger Causality Tests of EPI and HDI

VEC Granger Causality/ Block Exogeneity Wald Tests			
Included observations: 50			
Dependent variable: D(EPI)			
Excluded	Chi-sq	df	Prob.
D(HDI)	76.92533	2	0.0000
All	76.92533	2	0.0000
Dependent variable: D(HDI)			
Excluded	Chi-sq	df	Prob.
D(EPI)	8.121176	2	0.0172
All	8.121176	2	0.0172

Source: Computed

The table 7 shows that for both null hypotheses- ‘EPI does not Granger Cause HDI’ and ‘HDI does not Granger Cause EPI’ p-values are less than 0.05 so they got rejected and it is proved that EPI and HDI cause each other.

CONCLUSION

On the basis of the above analysis it can be concluded that South Asia is not performing well for the human development and its environmental performance is even worse than human development. So to achieve the goal of sustainable development environmental development is more threatening component in the region. It is also explored that environmental performance and human development have high significant positive correlation so if environmental performance declines or increase at very slower pace, it will also have the negative impact on human development and its growth in the region. Since the causality test proves the two way causality between both the variables so the situation becomes more severe when low human development force the environment performance to be remained at lower level and a vicious circle is formed which constrained the sustainable development of the South Asia. For the sustainable development of the region human development and environmental performance both need to be improved, may be simultaneously or one by one.

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