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Corruption levels of countries and progress on ensuring environmental sustainability

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Abstract

Purpose – The purpose of this paper is to explore the relationships of selected measures of environmental sustainability and the level of corruption within countries.

Design/methodology/approach – The design uses secondary data from Transparency International on perception of corruption within countries. The World Economic Forum's (WEF's) environmental sustainability assessment is one measure of environmental sustainability used in the study. World Bank data on CPIA Policies and institutes for environmental sustainability that foster and protect sustainable use of natural resources and manage pollution and its data on the Millennium Development Goal (MDG) target of the percent of population with access to improved drinking water were two specific measures used to indicate environmental sustainability. A series of statistical tests were used to examine the relationships among perceptions of corruption and a country's policies and reported improvements in environmental sustainability.

Findings – The findings are mixed; the level of corruption does not appear to always be negatively associated with environmental sustainability as was expected.

Research limitations/implications – The research is limited by the availability of data from reliable sources over a period of time. The corruption data, while the best available, are based on opinions and perceptions. Only selected aspects of a country's environmental sustainability were examined; these included the Environmental Sustainability Index, evaluations of selected countries; policies and institutions; and the improvement in the percent of the population with access to safe drinking water.

Social implications – In general, the less corruption, the better the record of environmental sustainability. However, corruption may not be a negative influence on specific selected aspects of environmental sustainability as would be anticipated.

Originality/value – This study examines selected aspects of the potential relationships between corruption and environmental sustainability measures. There is little, if any, research into this relationship.

Keywords Sustainability, Sustainable development, Sustainable environment, UN Millennium Development Goals

Paper type Research paper

Introduction and background

In 2000, under the sponsorship of the United Nations (UN), the leaders of many nations came together at the Millennium Summit and committed their nations to a new global partnership. The purpose of this partnership was to reduce extreme poverty in the world with time-bound quantified targets. The eight goals that were developed at this summit became known as the Millennium Development Goals (MDGs). Included among the goals was one goal specific to the environment, Goal No. 7 was ensuring environmental sustainability.

This environmental goal included four specific targets:

(1) integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources;

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(2) reduce biodiversity loss, achieving by 2010, a significant reduction in the rate of loss;

(3) halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation; and

(4) achieve by 2020, a significant improvement in the lives of at least 100 million slum dwellers (United Nations, 2006).

There has been progress in some identified areas, however, progress has not been made on all targets. The most significant improvement has been in the improvements in basic sanitation and drinking water. Estimates are that there was a 40 percent improvement in basic sanitation between 1990 and 2011, with another one billion people gaining improved access by 2015. The lives of many slum dwellers were improved and approximately 44 million former slum dwellers were no longer considered to be living in slums. However, in absolute numbers, over one million more individual are estimated to be living in slums today than in 2000 (United Nations, 2013). Despite forest laws and policies supporting sustainable forest management, forests are disappearing at a fast pace. Deforestation is a serious threat to sustainability. Due to overfishing, marine fish stocks globally are now not able to produce sustainable yields.

The WEF is also concerned with and measures environmental sustainability through its indicators for Sustainability Index. This organization sees increasing pressure on our natural resources and is concerned that we may be leading to a "less habiFigure world" (World Economic Forum, 2012, p. 49). In cooperation with Yale's Center for Environmental Law and Policy and Columbia University's Center for International Earth Science Information Network, the WEF developed its somewhat comprehensive Sustainability Index. This index is composed of assessments on three dimensions: environmental policies, use of renewable resources and degradation of the environment. The work of the WEF has found that some nations (48) have improved sustainability scores while others (29) have scores indicating a degradation in environmental sustainability.

With regard to the MDG Goal No. 7, according to the World Bank data, some countries have improved their performance on some of Goal No. 7's targets, while other countries have backslid. For example, Target No. 1, policies and institutions for environmental sustainability, was measured on a six-point scale with a 6 being the highest. In total, 16 countries received improved scores between 2010 and 2013. However, during the same time period, 11 countries saw their scores lowered. When reporting on Target No. 3, proportion of population with access to safe drinking water, many more countries improved than declined. These are two of the targets for which somewhat reliable data are available, so are two of the foci of environmental sustainability in this research.

The question of why some countries are making substantive progress on sustainable environmental targets, while other countries are falling behind and whether or not corruption is a salient factor are questions that prompted this research. Previous research studies have explored the relationships of economic development and corruption. However, there appears to be a dearth of research that examines the impact of corruption on policies or programs that improve or impede environmental sustainability.

Literature review

"Legally wrong, morally wrong and economically indecent," is how Ertimi and Saeh (2013) describe corruption. In 2003, the UN adopted a definition of corruption, which is

the one most commonly used among researchers and other writers, "The abuse of public office for private gain." This puts the emphasis on public officials rather than private individuals or businesses. While there may be corrupt individuals and corrupt businesses, these are not included in this definition.

Corruption has been around since the beginning of trade, but it was not until much later that it was "perceived as an economic problem" according to Volejníková (2009). That corruption adversely affects economic growth evolved as "status of received wisdom" according to Haggard and Tiede (2011). However, as early as 1964, Leff postulated that "contrary to popular opinion, bribing bureaucrats who are responsible for economic policies and regulations can benefit economic growth in underdeveloped countries." Later, Osterfeld (1992) said that corruption can lead to economic expansion in some cases. He made a distinction between actions that led to economic restrictions and those he believed to be expansionary in nature. Andreas Assiotis (2011) reports on research conducted by Assiotis and Sylwester that examined the impact of corruption in authoritarian vs democratic regimes. Based on a study of 119 countries between 1984 and 2007, they found that the negative effects of corruption are smaller in democracies than in authoritarian systems. Overall it appears that the literature on corruption weights more heavily toward negative impacts than positive, with a few studies finding some positive economic development benefits in less developed countries. Economic development, does not always equate with environmental sustainability. In fact, some believe the opposite, that economic development frequently has a negative impact on the environment.

There are various concepts and aspects associated with the word environment. Some see the environment as only the natural environment; others have a more expansive view that includes entire eco-systems, involving many interconnected parts. One definition is "the interactions between a community of living organisms in particular area and its nonliving environment" (Dictionary, 2015). Frequently, environmental sustainability emphasizes the preservation of the environment necessary to support human life. However, the UN Millennium Goals for environmental sustainability also include species diversity among its targets.

Generally, the focus of research on environmental sustainability has been to assess the impact of human activity on the environment. Most agree that the long-term implications of this issue are not fully understood and there is debate as to the degree to which human activity is responsible for degradation of the environment.

Methodology

The first step in this research was to determine operational definitions and measures of "corruption" and "environmental sustainability." The most widely used measure of corruption is Transparency International's Corruption Perception Index (CPI). Recognizing that corruption is "shadowy and secretive by nature," Transparency International surveys thousands of individuals regarding the perceived level of public sector corruption, worldwide. From the collected data, Transparency International developed a Perception Index that previously ranged from 0 (very corrupt) to 10 (very clean). In 2013, the scale was changed and now ranges from 1 (very corrupt) to 100 (very clean). When multiplying the 2010 index figures by ten, the numbers did not always seem reasonable. Therefore, it was concluded that this change in scale dimension made comparisons over time more questionable. No countries have ever received a perfect score on either the older or newer scales and most countries score below 50 on the newer scale. The most recent CPI includes scores for 177 countries.

The operational definition of environmental sustainability was more challenging because of the difficulty of finding valid and reliable measures for a substantial number of the 177 countries for which a CPI number was available. The WEF's Environmental Sustainability Index is one of the measures that was selected for this study. The index is based on a composite of nine variables as outlined in Table I. The data on these dimensions were collected from reliable and respected sources, which include, the WEF Executive Opinion Survey (2011-2012), Yale University and Columbia University, Environmental Performance Index (2012), The International Union for Conservation of Nature and The World Bank (2012) among others. The scale used was from 1 to 7, with a 7 being the highest or "best." No country received a score of 7; however, Finland received a score of 6.87, which was the highest among the 79 countries for which data were available.

The UN's MDG (No. 7) also appeared to provide a promising approach. The four targets for this goal were somewhat specific and the World Bank publishes data that relate to some of the targets. When delving into the World Bank data, it became apparent that for several measures of targets, only limited data for a very limited number of countries were available. This led to the decision to limit these measures of sustainable environment to two:

(1) The assessment of a country's Environmental Programs and Policies (on a scale of 1-6). World Bank data were available for only a limited number of the countries for which CPI data were also available.

(2) The percent of the population with access to safe drinking water. The World Bank had these data from over 200 countries, however, not all matched with the countries for which CPI data were available.

Analysis and findings

The WEF's Environmental Sustainability Index data were compared to the CPI data for both 2010 and 2013. In both cases there was a statistically significant relationship. The Pearson correlation coefficient was 0.859, which is significant at the 0.01 level. Figure 1 shows the scatter plots of the data on environmental sustainability and the CPI. The direction of the relationship is evident in the scatter plots. The less the perceived corruption in a country, the higher the rating on the Environmental Sustainability Index.

The WEF also provides environmental score changes in five categories. The categories are improvement by 15-20 percent; improvement by 5-15 percent; figure with a change between −5 and +5 percent; lowered score by −5 to −15 percent;

Environmental policy	Environmental regulations (stringency and enforcement)
	Number of ratified international environmental treaties
	Terrestrial biome protection
Use of renewable resources	Agricultural water intensity
	Forest depletion
	Fish stocks' overexploitation
Degradation of the environment	Level of particulate matter concentration
	CO_2 intensity
	Quality of the natural environment

Note: Summary of indicators for environmental sustainability (figure 8)
Source: World Economic Forum (2012, p. 54)

Table I. Indicators for environmental sustainability index

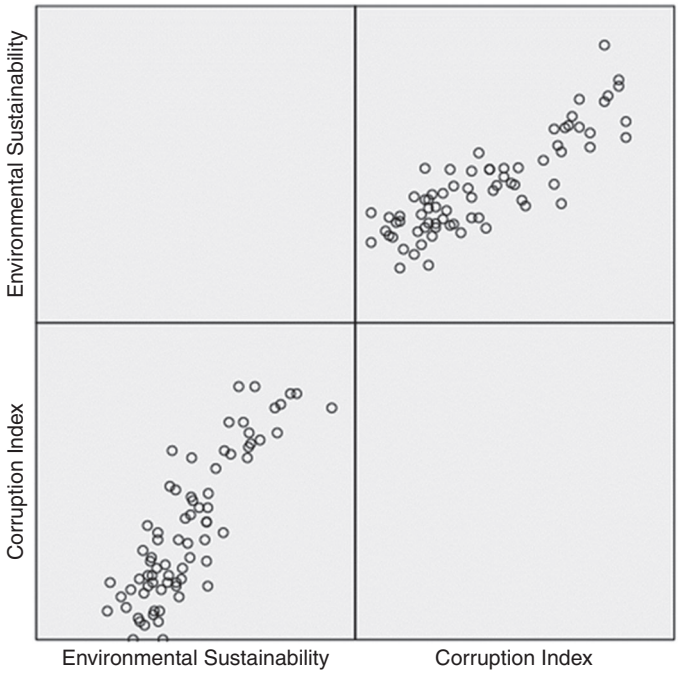

Figure 1.
Scatterplot of environmental sustainability and corruption index

and score lowed by −15 to −20 percent. For analytical purposes, the five categories were collapsed into two: countries that improved and countries that declined. The analyses produced consistent and significant results. The CPI mean score for the countries that improved was 56.75, while the mean score for countries that received lower scores was 40.17. Using a *t*-test, the difference between the two groups had a significance level of 0.000, showing that there is a strong relationship between the level of corruption in a country and its Environmental Sustainability Index as measured by the WEF.

There was a total of 83 countries for which there was a World Bank 2013 measure of a country's Environmental Programs and Policies. Considering the assessment was reported for 2013, it was thought that perhaps the level of corruption perceived to exist in a country prior to 2013 should also be considered when looking for relationships to the programs and policies rating. This led to using both 2010 and 2013 CPI numbers in the analysis. However, the 2010 CPI figure was available for only 68 countries and the 2013 CPI figure was available for only 62 for which other data were available. Therefore, the analysis of countries' Environmental Policies and Programs consisted of only the countries for which both measures were available. The Environmental Policies and Programs measure was reported to be on a scale of 1-6, however, the highest rating given to any country on this measure was a 4 and the lowest rating given was a 2. The reported scores were in 0.5 increments, which resulted in five possible classifications. Using the Kendall's τ correlation for ordinal data, the significance level was 0.000, which indicates a relationships between a country's ratings on its Environmental Policies and Programs are related to the countries CPI.

Table II data show the average (mean) CPI score for the countries falling into each of the five Environmental Policies and Programs rating classifications. It appears that

regardless the scale used or the year (2010 or 2013), as the rating for environmental sustainability increases, the CPI figures increase. The data clearly show a trend that there is some type of interconnection between the level of corruption perceived to exist in a country and the country's policies and programs related to sustaining the environment.

The next step in the analysis was to look for any change in the Environmental Policies and Program ratings between the years 2010 and 2013. The ratings of 27 countries were reported to have changed during this three-year period. In total, 16 countries had improved ratings and the ratings of eleven countries were lower. Table III shows the countries, their ratings for both 2010 and 2013 and the CPI for 2010.

There are several interesting aspects to note in this figure. On average, both the improved and lowered ratings in Environmental Policies and Programs were approximately 0.6 on the scale. It is also interesting that on the 2010 CPI the average difference between countries that improved and those that regressed, was only 0.1 on the ten-point 2010 CPI scale. Given the standard deviation for both, there is no

	CPI in 2010			CPI in 2013		
Environmental policies rating[a]	Mean 2010 CPI[b]	*n*	SD	Mean 2013 CPI[b]	*n*	SD
2.0	2.18	5	0.39623	22.8	5	6.0585
2.5	2.2357	14	0.57860	24.0	13	7.68115
3.0	2.6421	19	0.78550	30.24	17	10.39549
3.5	2.8292	24	0.71535	34.19	22	9.84116
4.0	3.7333	6	1.18940	43.6	5	11.67476
Total	2.6868	68	0.83002	30.7742	62	10.82411

Notes: [a]Environmental policies scaled 1-6 with a 6 being the highest; [b]prior to 2013 CPI was scaled 0-10, in 2013 scale was 0-100

Table II. Environmental policies rating and Corruption Perception Indices 2010 and 2013

Countries that improved	2010 rating	2013 rating	2010 CPI	Countries that regressed	2010 rating	2013 rating	2010 CPI
Burkina Faso	3.5	4.0	1.8	Angola	3.0	2.5	1.9
Comoros	2.0	3.0	2.1	Central African Republic	3.0	2.0	2.1
Congo, Republic	2.5	3.0	2.0	Djibouti	3.5	2.5	3.2
Cote d'Ivoire	2.5	3.0	2.2	Guinea-Bissau	3.0	2.5	2.1
Ethiopia	3.0	3.5	2.7	Guyana	3.0	2.5	2.7
Ghana	3.5	4.0	4.1	Kyrgyz Republic	3.0	2.5	2.0
	2.5	3.0	2.0	Lao PDR	4.0	3.5	2.1
India	3.5	4.0	3.3	Madagascar	3.5	3.0	2.6
Lesotho	3.0	3.5	3.5	Sri Lanka	3.0	2.5	3.2
Mali	3.0	3.5	2.7	Timor-Leste	2.5	2.0	2.5
Mongolia	3.0	3.5	2.7	Uganda	4.0	3.5	2.5
Nigeria	3.0	3.5	2.4				
Sao Tome and Principe	3.0	3.5					
Sierra Leone	2.5	3.0	2.4				
Solomon Islands	2.0	2.5	2.8				
Zimbabwe	2.0	3.0	2.4				
Averages	2.78	3.34	2.54		3.23	2.64	2.45

Table III. Progress and regress on Environmental Policies and Programs and Corruption Perception Indices in 2010

statistical difference between the CPIs for countries that improved and countries that regressed. A *t*-test confirmed that there was not a statistical difference between the mean CPI figures and the improvement or regression in Policy and Program ratings.

Data on the percent of the population with access to improved drinking water in 2011 and 2012 were available for 160 countries. In all, 27 countries reported that 100 percent of their population had access to safe drinking water in both 2011 and 2012. When looking at the countries that reported a change in the percentage, five countries reported a decrease in the percent of population who had access to safe drinking water. The remaining 79 countries reported an improvement in the percent of the population who had access to improved drinking water. For the purpose of this research, the decision was made to look at the level of corruption (CPI) in 2010 for countries that showed an improvement in the percent of population accessing safe water. The assumption being that the government (and its level of corruption) that existed in 2010 would be responsible for instituting ways to improve access to water.

The range in percentage change in access to safe water was from a negative of −2.9 (Lesotho) to a positive of +4.90 (Guinea-Bissau). The mode was an improvement of 0.10, which was the improvement percentage in 13 countries. The first statistical test that was run was a *t*-test to see if the mean CPI for the countries where the percentage improved was statistically significant from the countries that did not show improvement. The *t*-test results were significant at the 0.000 level but not in the direction expected.

The next step involved collapsing the water improvement numbers into five categories. The categories are shown in Table IV. The information in Table IV illustrates the unexpected findings related to the *t*-test results. Table IV shows the improvement in access to clean water and the corresponding CPIs. The numbers show that the greater improvements in the percentage of the population with access to clean water in the years between 2011 and 2012, the lower the countries CPI. This is the opposite of what was expected. Trying to understand the underlying reasons for this surprising finding led to a decision to examine more closely the two countries at the extremes: Guinea-Bissau was the country with the largest increase in the percent of the population with access to clean drinking water, while Lesotho was the country that had the largest decline in the percent of the population with access to clean water. The CPI for Lesotho, however, was higher than the CPI for Guinea-Bissau. Both countries are in Africa and are of a similar size, geographically. The population of Lesotho (~2 million) is slightly larger than that of Guinea-Bissau (~1.7 million), but both are relatively small.

Guinea-Bissau

The country was reported to have the largest increase in percentage of the population with access to improved drinking water, in contrast it is also a country that was reported to regress (from 3 to 2.5) in its Environmental Policies and Programs.

Table IV. Increase in percent of population with access to safe water and Corruption Perception Index

Water improvement percentages	Number of countries	Average 2010 CPI	CPI SD
0.1-0.49	22	3.82	1.55
0.5-0.99	27	2.82	0.984
1.0-1.5	14	3.06	1.05
1.6-2.0	6	2.65	0.701
2.1-4.9	4	1.93	0.350
Total	73		

This country rated a 2.1 on the 2010 CPI and was rated 163 out of 175 countries in 2013 with a CPI of 19. In other words, Guinea-Bissau would be considered one of the more corrupt countries in the world; however, it was reported to have the best record for improving access to safe drinking water for its population.

Guinea-Bissau is a coastal country on the west coast of Africa. Fresh water withdrawal is reported to be approximately 0.18 cu km/yr in 2000 (Central Intelligence Agency, 2008). Of this 13 percent was reported to be for domestic use. It is reported to have approximately 31 cu km of renewable water resources, even though the country includes 8,120 sq km of water (~22 percent of its geographical area).

Guinea-Bissau is a Republic and has lacked political stability for many years. No president has served a full five-year term. In 2009, President Vieira was assassinated. President Rachide Sambu-balde Malam Bacai Sanhá, who was elected after Vieira, died in office in 2012. In April 2012, there was a military coup and the interim president was arrested. The current president is José Mário Vaz. With all the turnover and coups, it is not surprising that Environmental Policies and Programs took a back seat to other concerns. The current level of corruption is likely related to the political in-fighting and, in part, related to the high level of drug trafficking in the country. Guinea-Bissau is reported to serve as a transshipment point for drugs originating in South America for distribution in European countries (Guinea-Bissau, 2015).

Through the years, Guinea-Bissau has received aid and help from western countries, the World Bank and several charitable organizations. In 2009, Tearfund and Wellfound joined with the Evangelical Church of Guinea-Bissau to bring sanitation facilities and wells with hand pumps to villages near the capital (Wellfound, 2015). In addition, the World Bank with millions in non-bank resources has embarked upon the Emergency Electricity and Water Rehabilitation Project (EEWRP), which is designed, in part, to bring water to the residents of the capital city, Bissau (World Bank Projects, 2015).

Lesotho is on the other end of the scale, having reported a percentage decrease of 2.9 percent in the percent of the population with access to clean drinking water. This country was evaluated as having improved its Environmental Program and Policies between 2010 and 2013 from 3 to 3.5. The country had a CPI of 3.5 in 2010, but had greatly improved on the 2013 CPI to a rating of 49 on the 100-point scale, putting it about the mid-point of all countries.

Lesotho is a landlocked African country, surrounded by South Africa. The country is reported to have water as one of its natural resources. Fresh water withdrawal is reported to be approximately 28 cu m/yr in 2000 (Central Intelligence Agency, 2008). Approximately 40 percent of which is reported to be for domestic use. The country is reported to have only about 5.2 cu km of renewable water resources. The country has a multi-billion-dollar Lesotho Highlands Water Project (LHWP). The project is designed to transfer water from Lesotho's Orange River to South Africa's large industrial and agricultural sectors needing fresh water. The country depends on its water resources to create revenue for the country. The country is planning another project (Metolong Dam Project), which will make water more accessible to the local population, however, this project is not expected to be completed before 2020. In the meantime, the country has an abundance of water, but lacks knowledge and technology to create access for much of its population.

The country has a parliamentary constitutional monarchy government. However, there have been several coups and sporadic rioting over the years. Nine opposition parties hold all 40 of the proportional seats. The Lesotho Congress for Democracy (LCD) holds 79 of the 80 constituency-based seats. In the summer of 2014 there was an

attempted military coup, which forced the Prime Minister to briefly flee to South Africa. The country is a member of the Southern African Customs Union (SACU). It has also received economic aid from several western countries (Lesotho, 2015).

Conclusions and limitations

The results of this study are mixed. There appears to be a negative relationship between the WEF's Environmental Sustainability Index and the level of corruption in a country. Clean (lack of corruption) governments are also found to be positively related to the institution of favorable Environmental Policies and Programs. However, the relationship between improvements in Environmental Policies and Programs was not clear. It appears that the level of corruption is not significantly different for countries that improved and countries that did not. The relationship between improved access to safe drinking water and levels of corruption is also not so clear. The results suggest that more corrupt governments are associated with improvements in access to safe water. In attempting to understand the reasons for these findings, two countries were examined in more detail. One country, Lesotho, has an abundance of water, but its citizens' access to safe water has not improved in the years studied. Water utilization has been more directed toward creating revenue through exports than for providing citizens with access. There is a project underway to provide better access, but this will not be completed before 2020.

On the other hand, Guinea-Bissau, has limited fresh water resources available, but has substantially improved the percent of its population that have access to safe water. In part, this has been aided by the intervention of outside entities (charities, World Bank and others) to work with the government to improve access to water.

There are, of course, limitations to this study, one of which is the reliability and validity of the data. While the data sources chosen are judged to be the best available, the figures reported are more judgments that actual hard data. Another limitation is that only two targets of the MDG's were considered in this research along with the WEF's Environmental Sustainability Index. There are many other measures of environmental sustainability and it is likely that these other measures may produce different results.

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