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CORRUPTION AND ENVIRONMENTAL SUSTAINABILITY

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ABSTRACT

Purpose: The Purpose of this paper is to explore the relationships of corruption and selected measures of the Millennium Development Goal (MDG) #7 of Ensuring Environmental Sustainability.

Design: The design uses secondary data from Transparency International on perception of corruption and the World Economic Forum's Executive Opinion Survey of selected aspects of corruption. 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 MDGs were used to measure environmental sustainability. A series of statistical models were developed to examine the relations among perceptions of corruption and a country's policies and reported improvements in Environmental Sustainability.

Research Limitations: 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 evaluation of selected countries' policies and institutions, the improvement in the percent of the population with access to clean water, renewable international freshwater resources and the percent of total surface area protected.

Findings: The findings are mixed, however, the level of corruption does not appear to be as negatively associated with environmental sustainability as was expected.

Originality: This Study builds on previous work by Anderson (2014a and b, 2012) that used Transparency International's Corruption Perception Index (CPI) as a global measure of corruption and The World Economic Forum's measures of corruption associated with economic development. This study, in contrast, examines the potential relationships between corruption and environmental sustainability measures.

Implications: Corruption may not be as negative influence on environmental sustainability as would be anticipated.

Keywords: environmental sustainability; Millennium Development Goal (MDG) #7; corruption.

INTRODUCTION AND BACKGROUND

In 2000, under the sponsorship of the United Nations, 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, #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.
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.
4. Achieve by 2020, a significant improvement in the lives of at least 100 million slum dwellers. (UN Millennium Project, 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% 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 (UN, 2013). Despite forest laws and policies supporting sustainable forest management, forests are disappearing at a fast past. Deforestation is a serious threat to sustainability. Due to overfishing, marine fish stocks globally are now not able to produce sustainable yields (UN, 2014).

According to the World Bank (2014) data, some countries have improved their performance on some of Goal 7's targets, while other countries have backslid. For example, Target #1, Policies and Institutions for Environmental Sustainability, was measured on a six point scale with a six being the highest. The 17 countries received improved scores between 2010 and 2013. However, during the same time period, 11 countries saw their scores lowered. When reporting on Target #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 the focus 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 served as the reason for this research. Previous research has 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 United Nations 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 Leff (1964) 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. Assiotis (2011) reports on research conducted by Assiotis and Sylwester that examined the impact of corruption in authoritarian versus 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 towards the negative impacts than the 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 emphasises the preservation of the environment necessary to support human life. However, the United Nations 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). Recognising 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, they develop a Perception Index that ranged from 0 (very corrupt) to 10 (very clean) (Transparency International, 2011) up until 2012. In 2013, the scale changed and now ranges from 0 (very corrupt) to 100 (very clean). When multiplying the 2010 ratings by 10, the numbers did not always seem reasonable. Therefore, it was concluded that this change in scale dimension make comparisons over time more questionable. No countries have ever received a perfect score and most score below 50. The most recent CPI includes 177 countries.

The operational definition of environmental sustainability was more of a challenge 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 UN’s MDG (#7) appeared to provide the most 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 the 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 (2014) 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

There was a total of 83 countries for which there was a 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 to 6, however, the highest rating given to any country on this measure was a four and the lowest rating given was a two. The reported scores were in 0.5 increments, which resulted in five possible classifications. Using the Kendall's Tau 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 1 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 rating 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.

Table 1 Environmental policies rating and corruption perception indices 2010 and 2013

Environmental Policies Rating*	CPI in 2010			CPI in 2013		
	Mean 2010 CPI**	N	SD	Mean 2013 CPI**	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

*Environmental Policies scaled 1–6 with a six being the highest.

**Prior to 2013 CPI was scaled 0–10, in 2013 scale was 0–100.

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. The 16 countries had improved ratings and the ratings of 11 countries were lower. Table 2 show the countries, their ratings for both 2010 and 2013 and the CPI for 2010.

Table 2 Progress and regress on environmental policies and programs and corruption perception indices in 2010

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
Guinea	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

There are several interesting aspects to note in this table. On average, both the raised 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 10 point 2010 CPI scale. Given the standard deviation for both, there is no 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. The 27 countries reported that 100% 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 3. The information in Table 3 illustrates the unexpected findings related to the *T*-Test results. Table 3 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 (Central Intelligence Agency, 2008).

Table 3 Increase in percent of population with access to safe water and CPI

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		

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. 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 (CIA 2009). Of this 13% 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 8120 sq. km. of water (~22% 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 organisations. 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% 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 (CIA 2009). Approximately 40% 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 positive relationship between clean (lack of corruption) governments and favourable Environmental Policies and Programs. In contrast the relationship between improved access to safe drinking water and levels of corruption is 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 citizen's access to safe water has not improved in the years studied. Water utilisation has been more directed towards 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 than actual hard data. Another limitation is that only two targets of the MDG's were considered in this research. There are many other measures of Environmental Sustainability and it is likely that these other measures may produce different results.

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BIOGRAPHICAL NOTE

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