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## Searching for Correlation between Global Sustainability Policy Growth and Growth in Sustainability Accounting Research

Collins C Ngwakwe<sup>1</sup>

**Abstract:** This research examined whether accounting research responds to changing world policies toward sustainability ideology to remain relevant as a dynamic discipline. The paper became pertinent to highlight the extent to which accounting profession is imbued with the resilience to respond to sustainability through research. The paper applied a mixed method of review and quantitative empirical analysis. Sustainability-accounting research output data were collected from the Google Scholar. Sustainability policy initiatives were collected from the United Nations Framework Convention on Climate Change (UNFCCC) climate policy archive from 1989 - 2015. The co-integration and OLS regression statistics were applied to evaluate if the growth in sustainability accounting research correlates with the global growth in sustainability policy initiatives. The co-integration test showed a long-term correlation between the variables. Also, tested at an alpha of 0.05, results from the OLS regression analysis showed that an increase in sustainability and/or environmental accounting research has a significant correlation with the growing trend in global sustainability policy initiatives at a  $P=0.005$  which is less than 0.05. The paper concludes that accounting research is being resilient to growing sustainability policy initiatives. The paper recommends further research to examine the extent to which sustainability accounting research has influenced a pragmatic change in corporate sustainability behaviour.

**Keywords:** sustainability accounting; accounting research; sustainability policy; sustainable development

**JEL Classification:** M40; M41; M42; M48

### 1. Introduction

This paper examines the extent to which accounting research has become relevant toward a global quest for a sustainable world. Thus, the research evaluates how accounting research is evolving in response to the emergence of global sustainability ideology to remain relevant as a dynamic discipline. Accordingly, the paper became pertinent to highlight the extent to which accounting scholars are imbued with the resilience to respond to sustainability through its varied forms of academic and practical research output. This is evidenced within the nearly three decades of notable change in global sustainable development policy initiatives that commenced with the release of the notable World Commission on Environment and Development report in 1987 – Our Common Future (WCED, 1987). The paper seeks to reemphasise that accounting is a dynamic discipline, which is relevant in addressing not just the economic needs of the corporate, but also relevant in addressing the social and environmental desires of its community (Lodhia & Hess, 2014). The paper thus portrays accounting as a discipline with outstanding resilience to remain relevant in any metamorphic stage of the environment.

This unique characteristic of accounting highlights the need for accounting discipline to expand its academic offerings to prevent encroachments from other disciplines.

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Sustainability accounting research has much credit to the early writings of Gray in the 1990s, which points the impetus and vigorous momentum on sustainability accounting research, which grew significantly in line with the various World Summit on Sustainable Development under the auspices of the United Nations Framework Convention on Climate Change. (UNFCCC) (UNFCCC, 2014) These summits were in response to the growing global sustainability campaign that seeks to enunciate initiatives to foster sustainability in human activities to ensure a sustainable future for posterity and environment. Given the pertinent role of research in communicating sustainability ideology to a pragmatic end, (Sneddon et al, 2006) it becomes apposite to evaluate how accounting research has emerged to connect with global sustainability policy initiatives emergence.

## **2. Problem Statement**

Since the post Brundtland report on sustainable development (WCED, 1987), there appears to have been a quagmire that subsists amongst scholars regarding the integration of the concept of sustainable development to move disciplines of human endeavour forward. (Sneddon, Howarth & Norgaard, 2006) Researchers thus opine that the extent to which sustainability might instil into public, business, disciplinary and practical reality depends on the disposition and calibration of scholars' research that bolsters sustainability. (Sneddon et al, 2006) The United Nations Framework Convention on Climate Change (UNFCCC) avows that interdisciplinary research is a key to drive sustainability action through dissemination of sustainability knowledge. (UNFCCC, 2014) Accounting is one of the disciplines that should assume the sustainability research responsibility.

Accordingly this paper is problematized upon various early research literature that questioned the stature of accounting discipline in responding to emerging sustainability desires. (Gray, 1992; Gray, Walters, Bebbington & Thompson, 1995) Other researchers have also raised a doubt or critic on whether accounting discipline is still relevant and responsive enough to global environmental issues. (Adams & Larrinaga-González, 2007) In lieu of this seeming scepticism, this paper applied an empirical enquiry to search for possible correlation between accounting and sustainable development policy initiatives and thus provide a preliminary response about accounting research resiliency in the phase of emerging sustainable development initiatives.

Accordingly, the question upon which this research inclines is whether there is a relationship between growing global sustainability policy initiatives and sustainability accounting research. Therefore, the objective of this research is to establish if there is a relationship between growing sustainability policy initiatives and emerging sustainability accounting research. Whilst a lot of research literature exists on sustainability accounting or disclosure, nonetheless researchers seem to have neglected to search for the linkage between growing global sustainability policy initiatives and growth in sustainability accounting research. This paper therefore contributes new knowledge to existing literature on sustainability accounting by adding this novel thought which is currently absent in sustainability accounting literature.

This paper proceeds as follows; after this introduction, section 3 presents a brief review of related literature. Next is the section 4, which presents the method, analysis and interpretation of findings. Lastly, section 5 presents the conclusion of the paper.

### 3. Review of Related Literature

Before delving into a discussion of some accounting research in response to sustainability, it is pertinent to highlight the ecological linkage with accounting, which makes it a worthwhile endeavour for accounting scholars and practitioners to engage in sustainability research and practice. Firstly, in this brief review, the paper presents a snapshot chronology of the emergence of global sustainability and/or environmental initiatives; it then proceeds to highlight the inextricable and intrinsic connection of accounting with ecology or environment.

#### 3.1. Chronological Emergence of Global Sustainability Policy Initiatives

Before searching into the accounting research response to sustainability, it is pertinent to present a brief highlight of the chronological emergence of global sustainability policy initiatives upon which this paper tries to establish an empirical link with the evolution of sustainability accounting research. Perhaps the lauded landmark trajectory of global sustainability policy initiatives can be rightly routed on the World Commission on Environment and Development (WCED) led by Dr Gro Harlem Brundtland in 1987. The summit climaxed in a popular sustainable development report and/or policy initiative – *Our Common Future*. (WCED, 1987) This policy initiative reminded the need for all human activities, including business operations, to be conducted sustainably to preserve the earth in a habitable condition for posterity. Table 1 presents a summary.

**Table 1. Brief Chronology of Sustainability/Environmental Policy Initiatives**

Years	Sustainability Policy Initiatives
1987	Release of world policy initiatives on environment and development
1988-1989	Inter-Governmental Panel on Climate Change (IPCC) was established
1990-1992	IPCC second world conference and the UN General Assembly Negotiations on Climate Change Framework
1992-1994	UNFCCC was opened for signing at the Rio Earth Summit.
1994-1995	The UNFCCC became binding
1996-1997	UNFCCC centred in Bonn Germany to oversee climate negotiations
1997-1999	Kyoto Protocol on climate change was adopted
2001-2002	Climate policy initiatives reinforced in Bonn and Marrakesh respectively
2005-2006	Kyoto Protocol became binding and the EU Emissions was launched
2006-2007	The Clean Development Mechanism came into existence
2007-2009	The joint Implementation Mechanism kicked off.
2009-2012	Various Climate policy meetings took place in Poznan, Copenhagen and Cancun.
2012-2013	Varrious Conference of Parties (COP 17) on climate action initiatives launched in Durban and Doha.
2013	COP 19 in Warsaw reached a climate accord for reducing forest degradation emissions. The IPCC released a 5 <sup>th</sup> report on climate change science
2014	The IPCC released the climate change adaption and vulnerability initiative The UNFCCC launched 20 <sup>th</sup> anniversary to accentuate its policy initiatives
2015	COP 21 climate initiatives meetings at Paris

Source: Author, with information from archives of the UNFCCC (2014)

Table 1 is only a brief highlight of the amplification of global sustainable development policy initiatives since the 1987 World Conference on Environment and Development. Detailed information on growing sustainability initiatives can be accessed from the United Nations Framework Convention

on Climate Change. (UNFCCC, 2014) Accordingly, a brief review of how accounting research is responding follows in subsequent sections beginning with environmental linkage with accounting.

### **3.2. Environmental Linkage with Accounting**

Before the advent of environmentalism and its newest form sustainability, accounting was largely perceived as a discipline and/or discourse distantly alienated from ecology. (Mauders & Burritt, 1991) The custodians of the discipline (practitioners and scholars) may have seemingly painted this unnatural view given that accounting research before sustainability activism stood aloof to the yearnings of society for environmental and posterity protection but started tilting to ecocentrism with the emerging campaign for sustainability. (Nandan & Lodhia, 2004) With the passage of time and growth in sustainability crusading, the inalienable linkage between economics and ecology became manifest from sustainability crusaders. (Mauders & Burritt, 1991) Econcentrism is a terminology popularly applied in ecological philosophy, which refers to the act of placing nature as prime at the centre stage of every human decision or action. (Kortenkamp & Moore, 2001) This orientation is seen as humane even to non-humans, which is contrary to most popularly held but currently detested views and actions in contemporary society wherein human interest is often placed first before other creatures. Ecocentrism is founded on ontological and ethical values with both streams of values advocating for equality of values between humans and non-humans – currently referred to in ecological philosophy as biospherical egalitarianism. (Rowe, 1994)

Although accounting started as a commercial discipline with little or nothing to do with the natural environment; (Chatfield, 1974) however, since accounting serves as a tool for measurement and achievement of economic goals, (Barsky & Marchant, 2000) accounting thus has both implicit and explicit linkage with the environment. For instance, the outcry that a significant percentage of the world's population die from hunger and curable and/or preventable diseases (World Hunger, 2016) constitutes an ecological, economic and therefore accounting problem. Research shows that the world produces enough food to cater for everyone, but the problem is that a significant percentage of the world population has little or no income to purchase food; the poverty situation is worsened by lack of access to land to grow own food. (FAO, 2012; World Hunger, 2016) Therefore, poverty is seen as the chief cause of hunger, which breeds diseases, deformities and deaths. Prevalence of poverty is a direct result of lack of resources by poor people and very low-income earnings due to income inequality; (World Hunger, 2016) especially in developing countries. (Loayza & Rigolini, 2016) Prevalence of income inequality and the attendant poverty and social service deprivation has led to current research conclusion that Gross Domestic Product (GDP) may not serve as reliable measure of a nation's wealth given that the wealth and social wellness is often found in the hands of few wealthy individuals in the society. (Fleurbaey, 2009) Income inequality suggests embedded economic problem of entrenched unfair income distribution, which is also ecological when related to the ecologically unsustainable manner of production of goods and services by the corporate. (DeSimone & Popoff, 2000) The ecological ineptitude of some corporate catalyse in environmental and health issues such endangerment of workers, the business community and the deterioration or pollution of the environment such as land, air and water and/or exploitation of the natural assets. The health implication of pollution on humans have often being left unattended to by the corporate – leaving the human victims to either suffer perpetual damage to health or to shoulder the responsibility of the associated health costs and such costs have often not been accounted for within the corporate accounting system as these costs are externalized. (Kneese, 1971) However, internalising such

ecologically related costs into the corporate accounting reporting system has been part of the sustainability movement of which sustainability policies advocate. (Mathews, 2003)

This is the reason why the conventional accounting and economics measurement wherein the ecological capital was excluded from the resources used to achieve corporate objectives has, with the advent of sustainability movement, been denounced as flawed. (Mathews, 2003) This omission has seemingly resulted in the growing diminution of ecosystems that support human and non-human sustainable existence. (Zhou, Ou & Li, 2016) Therefore, by standing aloof or by getting involved in proper recognition and assignment of social and environmental costs and ensuring accountability in equitable distribution of wealth, accounting is intrinsically connected with the environment or ecology.

### **3.3. Accounting Research Evolving toward Sustainability**

Global environmental and sustainability advocacy gathered momentum even before the 1970s (Ostroff, 2011), it became evident that much desired social equality could be facilitated through improved human health which depends largely on improved environmental health. (Weisman, 2001) In fact Bramwell and Lane (1993) narrates that, although at a slight level, but environmentalism started gathering publications in the UK as far as 1953 to 1965 with an increased boost between 1965 and 1973. However, it was not until the late 1970s that the accounting discipline started writing and publishing research about sustainability. (Gray, 2008) An inference about the unsystematic development of the sustainability accounting research can be drawn from Gray (2008), in which he presented a scholarly and candid confirmation that sustainability accounting research began evolving outside of conventional research techniques. The early evolution of sustainability accounting research was characterised by historical experiences of researchers, political pronouncements, initiatives and/or attitudes of the corporate and the accounting profession. Furthermore, sustainability accounting research was also moulded by academic colloquiums and personal insights from where the sustainability accounting research writing could generally be said to have been planned and applied. (Gray, 2008)

Much of the earlier research writings on sustainability accounting which constituted the maiden quick response to emerging global sustainability policies and/or initiatives can be attributed to the works of Gray (1992) as confirmed in (Lamberton, 2005; Spence, Husillos & Correa-Ruiz, 2010). As early as 1992, Gray (1992) classified diverse framework for understanding and researching sustainability accounting, which include input-output analytical framework for sustainability accounting, the natural capital sustainability accounting framework and the sustainable cost accounting framework. (Lamberton, 2005)

Research which has tried to connect accounting discipline with the emerging idea of sustainability surfaced in the mid 1990s. (Lamberton, 2005) Since then, accounting research has maintained a rising trajectory – addressing issues of sustainability from academic discourse to practitioner perspectives. for instance, (Lamberton, 2005) in his research, presented a historical brief on sustainability accounting research through to the arrival of the Sustainability Reporting Guidelines at the World Summit on Sustainable Development in August 2002 solidifying the different methodologies into a sustainability accounting reporting system. The outcome was a far-reaching reporting model that presents a vast and daunting challenge to businesses, requiring unexpected use of business assets to accomplish broad sustainability initiatives. Mathews (1997) initiated this inquiry very early in 1997 in which he surveyed 25 years of social and ecological accounting research trying to assess the position and ascertain whether accounting research has made an inroad into sustainability issues. He also aimed



in addition to proffer a structure or characterization, which other researchers might utilize in furthering the course of sustainability. In his research, Mathews also had a specific goal to structure his sustainability research survey through the utilization of three eras: 1971-1980; 1981-1990; and 1991-1995, and orders the writing into a few sub-groups including exact reviews, regularizing explanations, philosophical talk, non-accounting writing, showing projects and course books, administrative systems, and different surveys. Subsequently, he inferred that there is something to celebrate following 25 years of sustainability accounting. Furthermore, Ballou et al (2012) presented an empirical findings from their investigation of 178 business accountability managers. This research was embarked upon to find whether and how accounting officers can provide value and support for corporate sustainability programmes. Precisely Ballou et al (2012) analysed how three zones of accounting aptitude (risk management, financial reporting, and autonomous assurance reports) could add to the vital coordination of corporate sustainability activities. Their findings show that accounting experts are hardly committed to pragmatic corporate sustainability activities. Following these aforementioned leading research on sustainability related accounting, many more have blossomed in apparent response to global sustainability initiatives. A cursory flipping of Google Scholar pages would reveal increasing sustainability-accounting research publications expanding in numbers since the World Commission on Environment and Development Report in 1987 (WCED, 1987). The extent to which these growing sustainability account research correlates with emerging global sustainability initiatives is empirically examined in the following section.

#### 4. Method and Analysis

This paper is an attempt to analyse if there is a correlation between growth in global sustainability policy initiatives and growth in sustainability accounting research publications. Data on the number of sustainability policy initiatives per year was collected from the archives of the United Nations Framework Convention on Climate Change (UNFCCC, 2014) from 1989 to 2015. Data on the number of sustainability accounting research published per year was sourced from the Google scholar; the first five pages of each year were examined. The analysis began by examining if a long run correlation exists between growth in sustainability policies and growth in sustainability accounting research output by conducting a co-integration test which showed a long run correlation between the two variables. Following the correlation, a linear relationship was test between the two variable by using the Ordinary Least Square (OLS) regression model. The validity of the analysis was checked by conducting the normality test, the heteroskedasticity and autocorrelation tests.

*The OLS regression model:*  $\gamma = \beta_0 + \beta_1\chi_1 + \varepsilon$ . Where:  $\gamma$  = dependent variable (growth in sustainability accounting research);  $\beta_0$  = constant,  $\beta_1$ = regression coefficient;  $\chi_1$  = independent variable (sustainability policy initiatives);  $\varepsilon$ . = error.

**Table 2. Regression Analysis**

Model 1. OLS, using observations 1989-2015 (T = 27)

Dependent variable: SusAccRes

Null Hypothesis: No relationship exists between growth in global sustainability policy initiatives and growth in sustainability accounting research

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	18.2825	1.36942	13.3505	<0.00001	***
ICP_Evo	2.35194	0.767306	3.0652	0.00516	***

Mean dependent var	21.59259	S.D. dependent var	5.032657
Sum squared resid	478.6390	S.E. of regression	4.375564
R-squared	0.273158	Adjusted R-squared	0.244084
F(1, 25)	9.395368	P-value(F)	0.005160
Log-likelihood	-77.12532	Akaike criterion	158.2506
Schwarz criterion	160.8423	Hannan-Quinn	159.0213
rho	0.716244	Durbin-Watson	0.416572

**Table 3. Validity Tests**

White's test for heteroskedasticity - Null hypothesis: heteroskedasticity not present Test statistic: LM = 1.66252 with p-value = P(Chi-square(2) > 1.66252) = 0.4355	Test for normality of residual - Null hypothesis: error is normally distributed Test statistic: Chi-square(2) = 1.92538 with p-value = 0.381863
Test for autocorrelation Null hypothesis: there is autocorrelation Test statistic: LMF = 26.464074, with p-value = P(F(1,24) > 26.4641) = 0.0008	

Tested at an alpha ( $\alpha$ ) of 0.05, the regression result in Table 2 show a  $P$  value of 0.005 which means that  $P$  is less than the alpha or  $P < 0.05$ . The null hypothesis is therefore rejected in favour of alternative hypothesis. This means that within the years of study 1989 – 2015, a relationship exists between emergence of global sustainability policy initiatives and growth in sustainability accounting research. Validity tests in Table 3 confirm that regression result is valid on the following account from Table 3: Since  $P > 0.05$ , the null hypothesis is therefore accepted, which shows there is no heteroskedasticity. Given that  $P > 0.05$ , the null hypothesis is therefore accepted, which shows that the error is normally distributed. Also since  $P < 0.05$ , the null hypothesis is rejected, which shows that there is no autocorrelation. From the foregoing analysis, it is therefore evident that the data contains no heteroskedasticity and that the error term is normally distributed. Given these validity results, the regression result can be regarded as valid and appropriate. (Temiz & Gökmen, 2014; Schwert, 2015)



## 5. Conclusion

Whilst many research exists on sustainability accounting, this paper contributes by adopting a slightly different approach and examined the relationship between global sustainability policy initiatives and accounting research development. The literature overview highlights a plethora of burgeoning global sustainable development policy initiatives. Similarly, the literatures indicate that accounting research on sustainability has equally been burgeoning in response to emergence of sustainable development policy initiatives. Accounting profession through its accountability role and financial guardianship of every institution including business and public institutions can recalibrate sustainability action through research on sustainability. This is so important now that experts lament that the goal of sustainable development as envisioned and enshrined in the World Commission on Environment and Development (WCED) Brundtland Report – Our Common Future (WCED, 1987) is drifting away as social and economic inequity is still rife especially in developing countries. (Sneddon et al, 2006) The paper recommends further research on the need for further sustainability accounting research to probe the extent to which sustainability accounting research has actually influenced policy changes both in the corporate and public policy arena to catalyse change towards sustainability behaviour.

## 6. References

- Adams, C.A. & Larrinaga-González, C. (2007). Engaging with organisations in pursuit of improved sustainability accounting and performance. *Accounting, Auditing & Accountability Journal*, 20(3), pp. 333-355.
- Ballou, B.; Casey, R.J.; Grenier, J.H. & Heitger, D.L. (2012). Exploring the strategic integration of sustainability initiatives: Opportunities for accounting research. *Accounting Horizons*, 26(2), pp. 265-288.
- Barsky, N.P. & Marchant, G. (2000). The most valuable resource-measuring and managing intellectual capital. *Strategic Finance*, 81(8), p. 58.
- Bebbington, J. & Gray, R. (2001). An account of sustainability: failure, success and a reconceptualization. *Critical perspectives on accounting*, 12(5), pp. 557-587.
- Bramwell, B. & Lane, B. (1993). Sustainable tourism: An evolving global approach. *Journal of Sustainable Tourism*, 1(1), pp. 1-5.
- Chatfield, M. (1974). *A History of Accounting Thought*. Dryden Press, Oak Brook, pp. 6-14.
- DeSimone, L.D. & Popoff, F. (2000). *Eco-efficiency: the business link to sustainable development*. MIT press, Massachusetts.
- Fleurbaey, M. (2009). Beyond GDP: The quest for a measure of social welfare. *Journal of Economic literature*, 47(4), pp. 1029-1075.
- FAO: Food and Agriculture Organization. 2012. FAO Statistical Yearbook 2012 <http://www.fao.org/docrep/015/i2490e/i2490e03a.pdf>.
- Gray, R. (1992). Accounting and environmentalism: an exploration of the challenge of gently accounting for accountability, transparency and sustainability. *Accounting, Organizations and Society*, 17(5), pp. 399-425.
- Gray, R. (2008). Social and Environmental Accounting and Reporting: From Ridicule to Revolution? From Hope to Hubris?- A Personal Review of the Field. *Issues in Social and Environmental Accounting*, 2(1), pp. 3-18.
- Gray, R.; Walters, D.; Bebbington, J. & Thompson, I. (1995). The greening of enterprise: an exploration of the (non) role of environmental accounting and environmental accountants in organizational change. *Critical perspectives on accounting*, 6(3), pp. 211-239.
- Kneese, A.V. (1971). Environmental pollution: Economics and policy. *The American Economic Review*, 61(2), pp. 153-166.

- Kortenkamp, K.V. & Moore, C.F. (2001). Ecocentrism and anthropocentrism: Moral reasoning about ecological commons dilemmas. *Journal of Environmental Psychology*, 21(3), pp. 261-272.
- Lamberton, G. (2005). Sustainability accounting—a brief history and conceptual framework. *Accounting Forum*, vol. 29, No. 1, pp. 7-26.
- Loayza, N. & Rigolini, J. (2016). The Local Impact of Mining on Poverty and Inequality: Evidence from the Commodity Boom in Peru. *World Development*, 84, pp. 219-234.
- Lodhia, S. & Hess, N. (2014). Sustainability accounting and reporting in the mining industry: current literature and directions for future research. *Journal of Cleaner Production*, 84, pp. 43-50.
- Mathews, M. (2003). Revisiting externalities and exploring the environmental account as a basis for internalising external costs. *Accounting, Accountability & Performance*, 9(1), p. 35.
- Mathews, M.R. (1997). Twenty-five years of social and environmental accounting research: is there a silver jubilee to celebrate?. *Accounting, Auditing & Accountability Journal*, 10(4), pp. 481-531.
- Maunder, K.T. & Burritt, R.L. (1991). Accounting and ecological crisis. *Accounting, Auditing & Accountability Journal*, 4(3), <http://dx.doi.org/10.1108/09513579110003277>.
- Nandan, R.K. & Lodhia, S.K. (2004). Current environmental accounting problematic: a shift from anthropocentrism to ecocentrism. *Accountancy Business and the Public Interest*, 3, pp.1-31.
- Ostroff, E. (2011). Universal design: an evolving paradigm. *Universal design handbook*. 2nd ed. McGraw-Hill, New York.
- Rowe, Stan J. (1994). Ecocentrism: the Chord that Harmonizes Humans and Earth. *The Trumpeter*, 11(2), pp. 106-107.
- Schwert, G.W. (2015). *Heteroskedasticity Advanced managerial data analysis*. Available at: [http://schwert.ssb.rochester.edu/a425/a425\\_het.pdf](http://schwert.ssb.rochester.edu/a425/a425_het.pdf).
- Sneddon, C.; Howarth, R.B. & Norgaard, R.B. (2006). Sustainable development in a post-Brundtland world. *Ecological economics*, 57(2), pp. 253-268.
- Spence, C.; Husillos, J. & Correa-Ruiz, C. (2010). Cargo cult science and the death of politics: A critical review of social and environmental accounting research. *Critical Perspectives on Accounting*, 21, pp. 76-89.
- Temiz, D. & Gökmen, A. (2014). FDI inflow as an international business operation by MNCs and economic growth: An empirical study on Turkey. *International Business Review*, 23(1), pp. 145-154.
- UNFCCC (United Nations Framework Convention on Climate Change) (2014). Time Line. Available at: <http://unfccc.int/timeline/>.
- WCED (World Commission on Environment and Development) (1987). *Our Common Future*. Oxford: Oxford University Press,
- Weisman, L. (2001). Creating the Universally Designed City. In *Universal Design Handbook*, 1st Ed.. Preiser, W and Ostroff, E. (eds.). New York: McGraw-Hill.
- World Hunger (2016). *2016 world hunger and poverty facts*, available at: <http://www.worldhunger.org/2015-world-hunger-and-poverty-facts-and-statistics/>.
- Zhou, Z.; Ou, J. & Li, S. (2016). Ecological Accounting: A Research Review and Conceptual Framework. *Journal of Environmental Protection*, 7(05), pp. 643 – 655.