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Implementing sustainable development Goals 1, 3.9, 7, and 13 through adoption of green concept in environmental management: Case of Nairobi, Kenya

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Abstract

The Sustainable Development Goals (SDGs) emerging from the Rio Earth Summit provided substantial synergy on environmental management. Kenya in her Vision 2030 agenda prioritized implementation of SDGs. This paper documents the evidence for the process of implementation of SDGs in Nairobi through adoption of green concept in environmental management. The emphasis is on the SDGs that are dependent on protected, conserved and preserved environment. Data was collected by surveying 92 households and five key informants (n=97) using semi-structured questionnaires, interviews and observations. The *non-parametric Data Envelopment Analysis (DEA)* was used to determine the degree of connectivity between the process of implementation of SDGs and adoption of the green concept in environmental management. The respondents' knowledge, attitudes and practice on implementation of SDGs through green concept in environmental management was significantly low. About sixty percent thought SDG 1 would be enhanced through attributes that protect the environment while attributed implementation of SDG 3.9 would be implemented through preserved environment. Again majority of them perceived SDG 7 would be implemented through use of clean energy devices. However, it's only the minority that thought SDG 13 would be implemented through conservation of the environment. Majority of respondents were of the views that increased awareness, improved institutional capacity, enhanced enforcement, and individual aptness would enhance implementation of the SDGs through adoption of green concept in environmental management.

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Introduction

The United Nations Assembly adopted Sustainable Development Goals (SDGs) for Sustainable Development (CGAP report, 2016). There are 17 goals within the SDGs framework (Fig. 1). The SDGs serve as milestones and benchmarks for achieving sustainable development with measurable targets and clear-cut timetables (UN report, 2000; CGAP, 2016). Amongst the issues addressed by implementation of SDGs are inequality, unsustainable consumption patterns, weak institutional capacity, and environmental degradation. Implementation of SDGs is also expected to halt human activities threatening the environment through increased biodiversity loss, water scarcity, pollution, and climate change (UNEP report, 2012). Environmental goods and services support economic and social development. Thus, the sustainability of the environment's viability in urban cities like Nairobi it is essential fully implement SDGs through protection, preservation and conservation of the environment (green concept) (Sternier, 2006).

Once the environmental resources and services are taken care of through adoption of the green concept, the resultant value would be a great impact on sustainable implementation of the related SDGs (Steiner, 2006). Thus, SDGs that include goal 1 (end poverty), which requires both the provision of basic income and social protection through wealth creation and distribution would be implemented (Mosse, 2010). In addition goal 3.9 (reducing deaths and illnesses from pollution) and goal 7 (ensure access to affordable, reliable, sustainable, and modern energy) will also be guaranteed through adoption of green concept in environmental management (Ren21 report, 2014; UN report, 2014). The main SDG (Goal 13: Take Urgent Action to Combat Climate Change and Its Impacts) that is the centre of global focus in economies, societies and environmental resource sustainability could benefit substantially through adoption of green concept in environmental management (Maslin, 2009; PMA report, 2015).

One approach muted for sustainable implementation SDGs through adoption of green concept is international participatory via collaborative involvement of public and private sectors, and civil societies (IPCC report, 2007; Bausch, 2011). However, the smooth implementation of SDGs in countries require constant monitoring through evidence gathering to inform policy for necessary shifts to be undertaken from time to time within the implantation time frame (Survey of Kenya report, 2003; Kabubo-Mariara, 2007; KFSSG report, 2008; USAID report, 2008). This so because a number of social and political factors continue to put pressure on natural resources and could easily compromise on the sustainable implementation of SDGs in countries like Kenya (UNDP report, 2005). This paper seeks to provide evidence on factors that affect implementation of SDGs in Nairobi through adoption of the green concept in order to inform policy for appropriate action plan for sustainability.

Materials and methods

The theoretical framework of the research (Fig. 2) was based on institutional and resource based view where coercive push and resource benefits for society are expected to influence adoption of green concept in environmental management (Florida and Davison, 2001). In brief the design the study that assumed that adopt the green concept in environmental management would enhance the implementation of SDGs that depend on environmental resources and services (SDGs 1, 3.9, 7, and 13). Data was collected from Nairobi. Surveys were conducted using semi-structured questionnaires and key informant interviews.

The questionnaires and interviews focused on attributes on implementation of SDGs through adoption of green concept in environmental management (activities of conservation, preservation and protection of the environment). *Data Envelopment Analysis (DEA) method* was used to evaluate the determinants of implementation of SDGs as affected by respondents' perceptions, knowledge,

attitudes and practices in environmental management (Reinhard *et al.*, 2000; De Koeijer *et al.*, 2002; Sipiläinen *et al.*, 2008). Briefly, the DEA method compared various individual and institutional decisions for adoption of the green concept as they impacted on the implementation of SDGs, as also evaluated by others (Boussonfiane *et al.*, 1991; De Koeijer *et al.*, 2002).

The analysis aimed to determine how individual and institutional decisions on adaption of green concept affected implementation of SDGs 1, 3.9, 7 and 13 (Solovyeva *et al.*, 2011). The possible theories of statistical variety on each decision type of the randomly chosen respondents were applied in the analysis of the data (MacDonald *et al.*, 2000, Tasser and Tappeiner, 2002; Dullinger *et al.*, 2003, Fare and Grosskopf, 2004; Kuosmanen and Kortelainen, 2004 and 2005; Kuemmerle *et al.*, 2008).

Ninety two (92) household heads were surveyed and five (5) key informants interviewed. Open and closed

questions as well as qualitative and quantitative questions were used (Jahnke and Jahnke, 1982; Fare and Grosskopf, 2004). The indicators were weighed according to their importance in the implementation of the said SDGs through adoption of green concept in environmental management. Chi-square was used to test of significance ($P \leq 0.05$, $n=97$). Statistical (social desirability bias and leniency bias) was minimized by adapting previously described methods (Michelsen and de Boer, 2009).

Results

Knowledge, attitudes and practice on implementation of SDG 1, 3.9, 7, and 13 through adoption of green concept in environmental management

The respondents knowledge (33.0%), attitudes (30.4%) and practice (26.3%) on implementation of SDGs 1, 3.9, 7, and 13 through green concept in environmental management was significantly low (Table 1).

Table 1. Respondents knowledge, attitudes and practices on green concept and the Sustainable Development Goals (SDGs) Goal 1, 7, 13 that promote adoption of green concept in implementation (n=97).

Parameter	Yes (positive) (%)	No (negative) (%)
Understanding of green concept	33.0±2.11 ^a	67.0±2.17 ^b
Awareness of the existence of SDGs	30.4±1.56 ^a	69.6±1.14 ^b
Involved in implementation of SDGs	26.3±0.08 ^a	83.7±0.82 ^b

^{a, b} Different letters in the same row differ statistically by Chi-square, $P < 0.01$; Positive: respondent’s knowledge of the green concept, aware of existence of SDGs and their implementation through adoption of green concept in environmental management; Negative: respondents of the contrary views of the positive responses.

However, majority seemed to recognize how benefits of adopting the green attributes can enhance the implementation of the SDGs (Table 2).

About sixty (60.7%) thought SDG 1 would be enhanced through attributes that protect the environment while (52.5%) attributed implementation of SDG 3.9 to preserved environment. Again majority of them (57.6%) perceived SDG 7 would be implemented through use of clean energy devices.

However, it’s only the minority that thought SDG 13 would be implemented through conservation of the environment (24.1%).

Drivers that can be utilized to enhance implementation of SDGs through adoption of Green Concept in environmental management

Majority of respondents were of the views that increased awareness (78.2%), improved institutional capacity (58.7%), enhanced enforcement (83.2%), and individual aptness (61.7%) could enhance implementation of the SDGs through adoption of green concept in environmental management (Table 3).

Specifically in Fig. 3 the respondents indicated that the use of clean alternative energy options of solar, biogas, wind and geothermal wind power would enhance implementation of SDG 7 (n=97). Again the

majority of the respondents (Fig. 4-5) were willing to SDGs 1 and 13 for improved livelihood and mitigation of climate change, respectively.

Table 2. Respondents perceptions how benefits of adopting the green concept attribute enhanced the implementation of SDGs 1, 3,9, 7, and 13 (n=97).

Parameter	Agree (positive) (%)	Disagree (negative) (%)
SDG 1 through protection of the environment	60.7±1.24 ^a	36.3±1.04 ^b
SDG 3.9 through preservation of environment	52.5±1.59 ^a	44.5±1.36 ^b
SDG 7 through use of clean energy devices	57.6±1.36 ^a	39.4±1.48 ^b
SDG 13 through conservation of environment	24.1±1.89 ^a	72.9±2.54 ^b

^{a, b} Different letters in the same row differ statistically by Chi-square, P<0.01; Positive: respondents are aware the benefits of adopting green concept attribute enhanced the implementation of SDGs; Negative: respondents of the contrary views of the positive responses.

Table 3. Respondents perceptions on factors affecting adoption of green concept in Sustainable Development Goals (SDGs); Goal 1, 7, 13 implementation (n=97).

Parameter	Agree (positive) (%)	Disagree (negative) (%)
Increased awareness	78.2±2.61 ^a	21.8±2.43 ^b
Improved institutional capacity	58.7±3.01 ^a	41.3±2.74 ^b
Enhanced enforcement	83.2±1.77 ^a	16.8±2.63 ^b
Individual aptness	61.7±3.04 ^a	38.3±2.59 ^b

^{a, b} Different letters in the same row differ statistically by Chi-square, P<0.01; Positive: respondents perceive the parameter could enhance implementation of SDGs through adoption of green concept in environmental management; Negative: respondents of the contrary views of the positive responses

Discussion

The respondents’ knowledge, attitudes and practices on implementation of SDGs 1, 3,9, 7, and 13 through green concept in environmental management was

significantly low as reported by others (Cooper *et al.*, 2002; Kuosmanen and Kortelainen, 2004; Kuosmanen and Kortelainen, 2005).



Fig. 1. The Sustainable Development Goals - Source: <https://sustainabledevelopment.un.org/sdgs>.

Different views also supported the fact that the data “spoke for itself” as also explained by Kuosmanen and Kortelainen, (2005).

The fact the majority seemed to recognize how benefits of adopting the green attributes can enhance the implementation of the SDGs supports theories

that concerted efforts are needed for implementation of SDGs by various stakeholders as previous noted (Hochstetler and Keck, 2007; Maathai, 2009). This would explain the finding that only minority thought that SDG 13 would be implement through conservation of the environment.

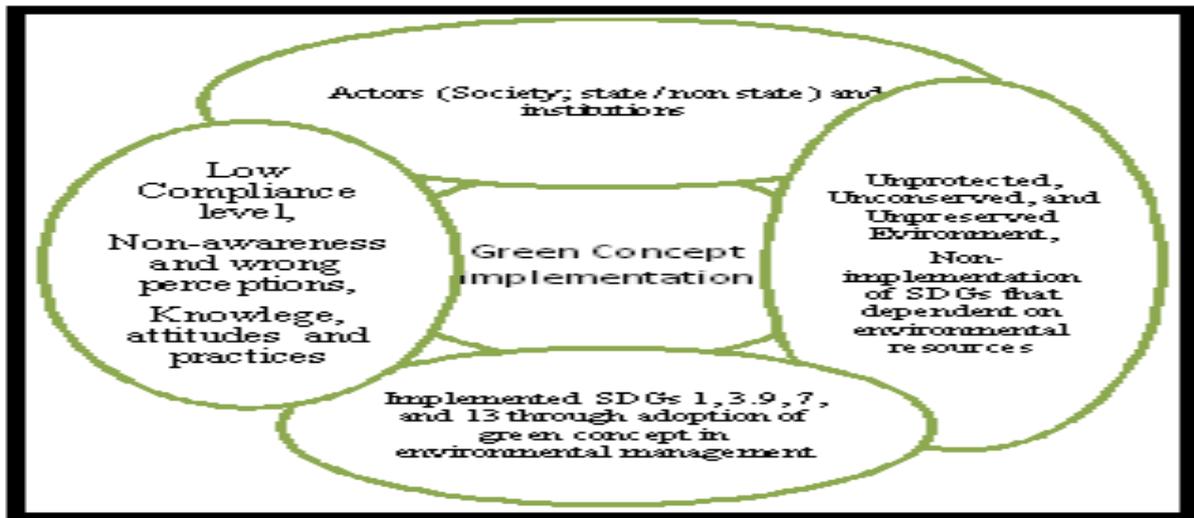


Fig. 2. The conceptual framework for implementation of SDGs 1, 7, 13.9 and 13 through adoption of green concept in environmental conservation.

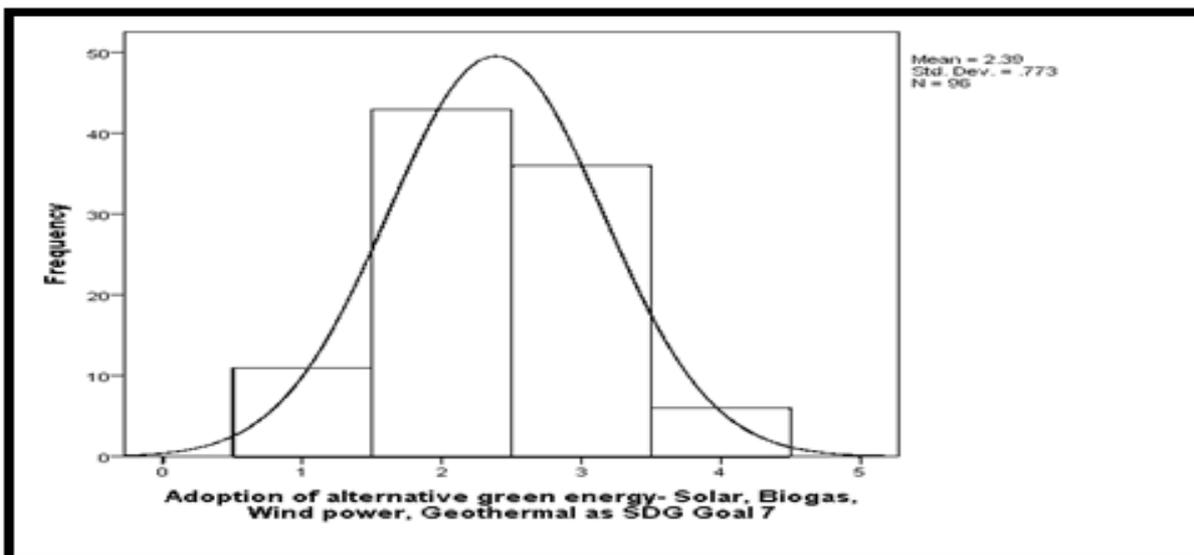


Fig. 3. Respondent’s willingness to implement SDGs as driven by adoption of use of clean energy.

This also agrees with others who suggested that in order to implement the Sustainable Development Goals successfully using green practices and activities, the approach for inclusivity, involvement and participation in management of the environment has

to be adopted (Swanson, 1995; Reinhard *et al.*, 2000; GOK report, 2007; Driessen *et al.*, 2012; Holley *et al.*, 2012; IPCC report, 2014; UN report, 2014; PMA report, 2015).

The fact that majority of respondents were of the views that increased awareness, improved institutional capacity, enhanced enforcement, and individual aptness could enhance implementation of the SDGs through adoption of green concept in environmental management explains a case that supports a dynamic approach in the implementation of SDGs based on peoples' views and practices as reported by Lesschen *et al.*, (2004).

And also the willingness by the respondents to implement the SDGs as driven by perceived accrued value suggested an avenue for exploitation of the utilitarian value strategy for implementation of SDGs through conservation of environment by taking into account the peoples' material well-being, besides the feelings and emotions that give them satisfaction in conservation.

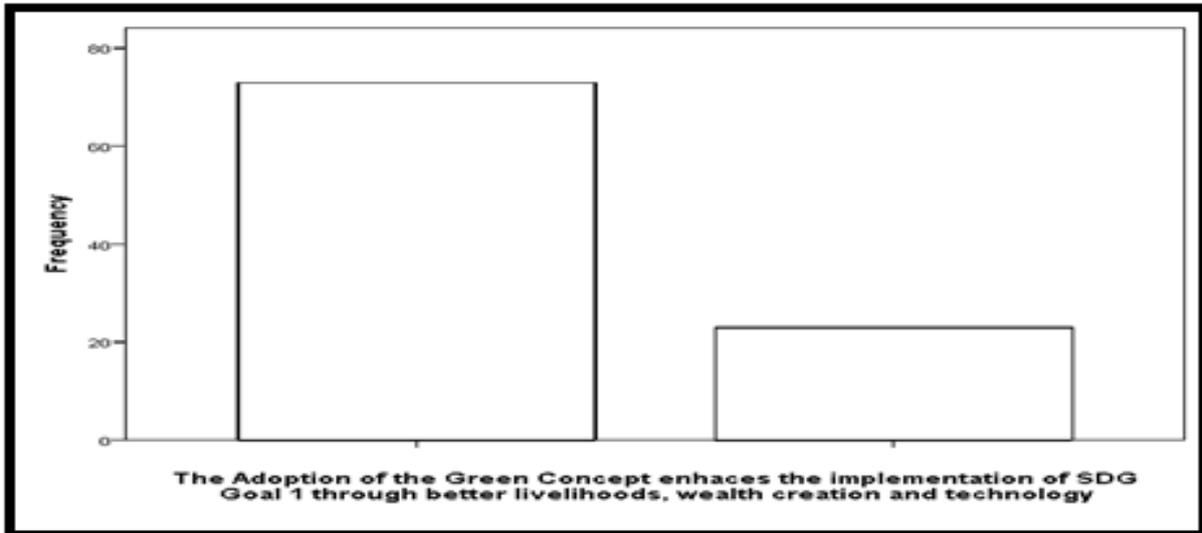


Fig. 4. Respondent's willingness to implement SDGs as driven by the need to adoption green concept for better livelihoods and wealth creation.

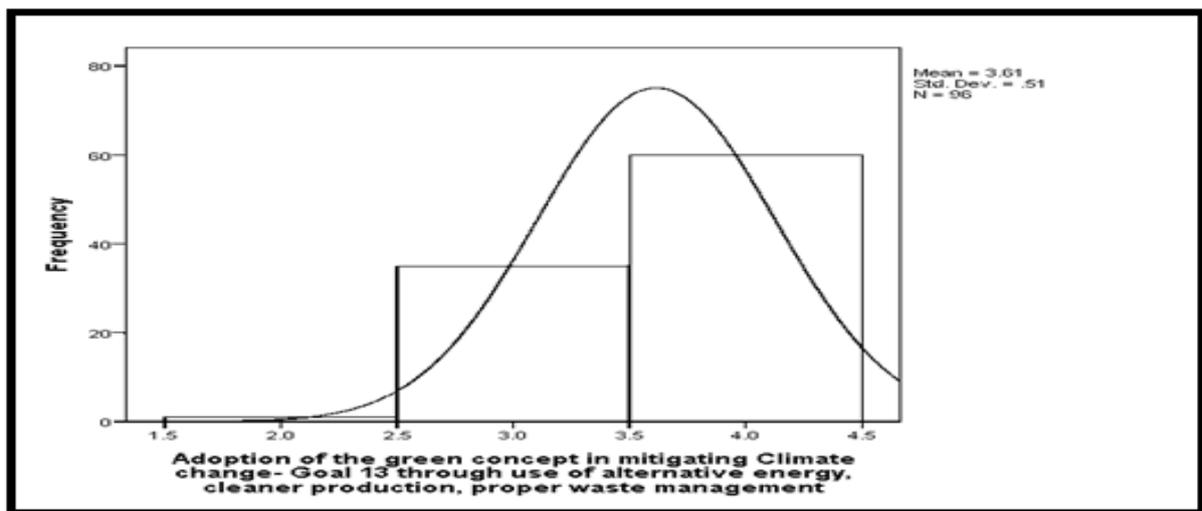


Fig. 5. Respondent's willingness to implement SDGs as driven by adoption of the need to protect the environment to militate against undesirable climate change.

This has been explained previously (Swanson, 1995; Steiner, 2006; UNEP Report, 2016).

Thus, good environmental management through adoption of green concept in countries like Kenya could enhance implementation of SDGs dependent on

well managed environment as influenced by the willingness and/or the unwillingness of the people to comply with instruments that govern protection, conservation and preservation of the environment.

This approach is supported by the reported data and also agrees with previous authors (Van Huelbroeck and Whitby, 1999; Kleijn *et al.*, 2009; Schader, 2009; Solovyeva *et al.*, 2011).

This suggest that for sustainability, a solution to implement such SDGs lies on the ability to embrace environmental governance that promote gains perceived by the society in relation to the adoption of the green concept; residents will see this as avenue for wealth creation and economic empowerment (Ji and Plainiotis, 2006; Schader, 2009; Solovyeva *et al.*, 2011; Driessen *et al.*, 2012; Holley *et al.*, 2012; UNEP Report, 2016).

Conclusion

The results support the peoples' willingness to implement SDGs through adoption of green concept in environmental management whenever supported through increased awareness creation and perceived benefits from such activities. This can inform policy for enhanced implementation of SDGs through adoption of green concept in environmental management.

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