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# Environmental management practices implemented by the hotel sector in Kenya

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**ABSTRACT**

Environmental management has become an important concept among the hotel sector globally following the negative impacts of its operations on the natural environment. In this regard, hotels have embarked on a course of implementing environmental management practices to mitigate their negative impacts on the environment. This study therefore was aimed at identifying environmental management practices that have been implemented by hotels in Kenya. Parameters of concern were on waste management, energy and water conservation practices. A cross-sectional census survey research design was used to gather data using structured questionnaire administered via email to managers from a total of 70 hotels classified as three-to-five-star properties in Kenya. 42 hotels responded to the questionnaire representing 60% response rate considered adequate for the study. Mean score ranking and percentages revealed that the highly implemented environmental management practices are; reviewing and monitoring of energy bills by 71.42% and ensuring taps are not opened unnecessarily by 85.70%. However, the least implemented were using renewable energy sources by 31.42% and composting organic and food waste by 36.18%. Based on the findings, hotels have majorly implemented more of those practices that either involves "low cost" or "no cost" of implementation and less of those practices that require high upfront cost. The study therefore recommended increased awareness among hotel operators and employees on the various environmental management practices which can be achieved through environmental training programs. Hotels should also be supported by government in subsidizing the cost of environmental management practices that require high installation fee.

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Energy; water; waste; environmental management; hotels; Kenya

## Introduction

Environmental management (EM) has become an important concept for tourism businesses globally, particularly in the hotel sector, which forms an important segment in the tourism industry. The hotel sector has traditionally been considered to have less negative impact on the environment compared to manufacturing industries (Siti-

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Nabiha et al., 2010). However, due to the luxurious nature of its functions, operating characteristics and services provided, hotels consume large amounts of non-durable products, water and energy, thereby generating much more negative environmental impacts than perceived (Erdogan & Baris, 2007).

Consequently, hotels have been urged by stakeholders, such as governments, customers, investors and government agencies, to implement measures that will enable them to preserve and conserve the natural environment. Following the growing concern on EM in the hotel sector, hotels have adopted various Environmental management practices (EMPs) to enable them to reduce the negative impacts of their operations. EMPs are the techniques, policies and procedures adopted by organizations specifically aimed at monitoring and controlling the negative impacts of their operations on the natural environment (Montabon & Narasimhan, 2007). EM in hotels is usually aimed at waste management, energy conservation, water conservation, improving indoor air quality and EM education. However, according to Mensah (2007) and Wisansing (2013), waste prevention and water and energy conservation practices are the most popular EMPs in the hotel sector, since these practices reduce cost of operation. Apart from reducing operational cost of the hotels, other potential benefits of EM are increased profitability, improved customer satisfaction, improved employee satisfaction, improved relationships with local communities, improved public relations and competitive advantage.

In Kenya, environmental sustainability in the tourism industry is vital in the achievement of sustainable development goals of the country. Tourism is the second largest contributor of gross domestic product (GDP) in Kenya and hence a key industry. It has seen steady growth over the years, which has resulted in an increased number of hotel facilities with varied environmental impacts. Therefore, it is imperative that hotel managers and operators seriously consider implementing measures that will enable them to mitigate their negative impacts on the environment. According to Masau and Prideaux (2003), half of the tourists, who visited Kenya, were of the view that Kenya's wild parks are managed on a sustainable basis, while two-thirds were of the opinion that hotels had some impacts on the environment.

Few studies in Kenya have been done to determine EMPs implemented by the hotel sector. A few exemptions include a study by Osiako and Kummitha (2020), which identified EMPs implemented among coastal beaches in Kenya. They established that energy and water conservation practices are implemented by the majority of hotel facilities in the coastal region. Kimeu (2015) investigated how waste management affected operational performance and examined waste management practices implemented by hotels in Mombasa County. He established a moderating effect of waste management on operational performance. Kariuki (2014), on the other hand, sought to investigate the relationship between green practices and operational performance of hotels in the coastal region of Kenya. He established a positive effect of green practices and operational performance. Although there have been attempts to determine EMPs adopted by hotels in Kenya, none, if any, have identified EMPs implemented by hotels in Kenya as a whole. The majority of the studies have focused on the coastal part of Kenya. This leaves a gap in the literature concerning EMPs implemented by hotels in Kenya. Therefore, the study aimed at filling this gap by identifying EMPs implemented by hotels in Kenya relating to energy conservation, water conservation and waste management practices.

## Review of the literature

EM has become paramount for sustainable development of the hotel sector. The sector has been urged by their stakeholder to put in place measures to conserve the natural environment in which they operate. They have also realized that they can reduce their cost of operation by implementing EMPs, which can translate to increased profitability. Hotels, therefore, have adopted various EMPs ranging from energy conservation, water conservation, waste management, indoor air quality and education on EM. However, the current study focused on waste management practices, and energy and water conservation practices which is a vital aspect of EM among hotel operators.

The hotel sector is associated with excessive consumption of energy (Cheung & Fan, 2013; Chou, 2014), and therefore accounts for 21% of the total tourism sector's greenhouse gas (GHG) emissions (UNEP & UNWTO, 2012). According to Yang (2010), this figure is predicted to rise by 3.2% per year. Hotel Energy Solutions (2011) also estimates that a typical hotel releases between 160 and –200 kg of $CO_2$ per $m^2$ of the room floor area annually, depending on the type of fuel used to generate energy. Wilberg (2009) further claimed that CO2 emissions from the hotel sector are likely to increase by 170% by 2035. Reduction in energy consumption in hotels can, therefore, greatly reduce carbon emissions and reduce the negative effects of GHG emissions for the hotel sector (Tang et al., 2011).

Energy is an important resource for the operation of hotels, of which a large proportion is used for lighting, heating, air-conditioning and laundry facilities (Chan, 2008; Nikolaou et al., 2012; Shiming & Burnett, 2002; Teng et al., 2012). According to Chan and Wong (2006) and Mensah (2006), hotels operate on three types of energy: electricity, gas and diesel.

Electricity is considered to be the main form of energy used in hotels compared to gas, diesel and coal (Zografakis et al., 2011). For example, the total energy consumption of hotels in Hong Kong is dominated by electricity and accounts for 73% of energy use (Shiming & Burnett, 2002). Gossling (2002) shared similar findings, whereby 75% of energy use in New Zealand was in the form of electricity, coal (12%), petroleum fuel (3%), natural gas and wood (1%). Solar power is also increasingly being used and is considered a natural resource with economic and environmental benefits (Alexander, 2002). For example, Nikolaou et al. (2012) maintained that just over half the hotels in Corfu Island, Greece, are installed with water solar heaters.

Teng et al. (2012) maintained that hotels can reduce their energy consumption by 20–40% without affecting the functionality of the hotel. There are a number of measures aimed at reducing GHG emissions from energy usage in hotels. Several studies have examined how hotels have embraced energy reduction or renewable energy systems in their operations. Common energy conservation practices implemented by hotels include the use of energy-efficient lighting, installation of renewable energy systems, energy-saving power cards, the use of solar energy (Erdogan & Baris, 2007; Min, 2011; Nikolaou et al., 2012; Teng et al., 2012), the use of occupancy sensors to control lighting (Tarí et al., 2010), thermopane windows (Chung & Parker, 2010), good insulation (Alexander, 2002), key-card systems (Nikolaou et al., 2012), reviewing of utility bills (Kattara & Zeid, 2002), the use of energy-efficient appliances (Mensah, 2006), maximizing the use of natural light (Ali et al., 2008) and the installation of compact fluorescent light bulbs (Liu & Sanhaji, 2009).

### Water conservation practices

The hospitality industry, which is an important segment of tourism industry, is linked with high water consumption, especially by the hotel sector. This is attributed to factors, such as hotel size, standard and facilities. Kasim (2007) posited that in a standard hotel organization, a hotel room would require 396 gallons (1499 L) of water per day, which is enough to support 14 local people. This is because high standard hotels usually have facilities such as spas, golf courses and swimming pools, which require high water usage (Bohdanowicz, 2006).

Apart from the size, facilities and standard of hotel facility, hotel guest contributes a lot when it comes to high water usage. Hotel guests tend to have a "pleasure approach" to shower or bath, using more water than they normally would at home (Eurostat, 2009). This is especially evident in the Mediterranean countries where 0.40 $m^3$ (400 L) of water are consumed by a tourist per day (Kasim, 2007). Water consumption at this rate will definitely cause a serious water shortage; therefore, there have been calls to reinforce practices geared at sustainable water management in the hotel sector.

Water conservation measures in hotels include reviewing and monitoring water bills (Sucheran, 2013); installation of efficient water fittings in guest rooms/areas such as low-flow shower heads, low-flow taps, tap aerators and electronic sensors (Alonso & Ogle, 2010; Graci & Dodds, 2008; Sucheran, 2013); customers and staff education on water usage (Sucheran, 2013); and linen and reuse programmes (Bohdanowicz, 2006; Erdogan & Tosun, 2009; Mensah, 2006; Min, 2011; Tang et al., 2011)

### Waste management practices

The generation of waste by hotels is one of the visible effects that a hotel has on the environment. There is a variety of waste produced by hotels; paper and food waste are the greatest amount of waste generated by the hotels. The food and beverage service area generate various solid and organic wastes such as packaging, food waste, aluminium cans, glass, bottles, corks and cooking oils. Kasim (2007) estimated that hotel waste consists of 46% of food waste, 25.3% of paper, 11.7% of cardboard, 6.7% of plastics, 5.6% of glass and 4.5% of metal waste. As again reported by Kasim (2007), hotel waste is on a much larger scale as compared to waste generated by households. Waste generated by hotels does not only increase their operational costs but also contribute to resource depletion (Kuuder et al., 2013).

Bohdanowicz (2006) indicated that the level of hotels' commitment to waste sorting and recycling varies depending on regulatory pressures and local government's support. For example, hotels actively implement waste sorting and recycling programmes in offices and kitchens but not in guest rooms, while Ghanaian hotels are less committed to recycling programmes with only 17% adopting recycling programmes in Accra (Mensah, 2006). Literature has indicated that the following waste management practices are commonly implemented by hotels: placing recycling bins in front and back of house areas, purchasing used or recycled content products, adopting a donation programme (leftover guest amenities, old furniture, appliance and food), composting organic kitchen waste, using refillable amenity providers, such as cloth, napkins, glass and

cups, purchasing food items and cleaning chemicals in bulk containers as well as recovering used cooking oil and food waste (Kasavana, 2008; Sherman, 2008)

## Methods

This study employed a cross-sectional census survey research design. It was carried out among three- to five-star hotels in Kenya. These hotel facilities are mainly found in the coastal region and Nairobi, the capital city. Few are found in the western region, rift valley and Mount Kenya region. Kenya lies in East Africa between 5°N and 5°S. It covers an area of 582,644 $km^2$ and has a population of over 47 million. There are 70 hotels classified as three to five stars in Kenya registered for 2015–2018 by Tourism Regulatory Authority (TRA). Of these targeted hotels, 42 responded to the questionnaire, representing a 60% response rate, which was considered adequate for the study. According to Mugenda (2005), a response rate of 50% and above can be considered sufficient for scientific studies.

### *Data collection methods and analysis*

Data were obtained through self-administered and structured questionnaires, which were administered via email to managers from all the 70 hotels classified as three to five stars in Kenya (census survey). The study targeted the general manager as the main respondent, however, where this was not possible, those working in the position of operations manager, housekeeping manager, maintenance manager or environmental manager completed the questionnaire after the consent from the general manager. These individuals were deemed knowledgeable on the EM issues of the hotel. The survey was carried out for three months, from October to December 2018. The first section of the questionnaire was about the general demographic characteristics of the hotels and the managers responding to the questionnaire. The second part was on EMPs that have been implemented by the hotels. The questionnaire sought to determine the extent to which hotels implement EMPs relating to energy conservation, water conservation and waste management using a 5-point Likert scale. The scale ranged from 1, representing "Not at all" to 5, representing "completely". A value of five was given more weight for this case. From the 70 hotels rated as three to five stars in Kenya, 42 hotels completely filled the questionnaire and submitted it back to the researcher. The data collected were screened before analysis. The analysis was done using SPSS version 24. Frequencies, percentages and mean score ranking with mean percentage were used to identify EMPs implemented by hotels in Kenya.

## Results and discussion

Reviewing and monitoring energy bills was the most implemented energy conservation practice by 71.42% (Table 1) of the properties. A total of 40.4% of hotels indicated they implement this practice "to some extent," while 34.6% indicated "to a great extent." According to Kattara and Zeid (2002), reviewing utility bills and keeping a file of all utility charges is considered an important practice to monitor resource consumption. Lighting is the second largest energy consuming system in a hotel (Alexander, 2002), and therefore is a common area of energy-saving potentials. This study concluded that hotels use energy-efficient lighting systems, such as LED, CFL instead of traditional lighting systems by 62.38%.

**Table 1.** Descriptive statistics for energy conservation practices.

| | Likert scale | Frequency | Per cent of frequency | Mean | Per cent of mean |
|---|---|---|---|---|---|
| Reviewing and monitoring of energy bills | To some extent | 21 | 40.4 | 3.57 | 71.42 |
| | To a great extent | 18 | 34.6 | | |
| | completely | 3 | 5.8 | | |
| Use energy-efficient lighting systems | To a little extent | 14 | 26.9 | 3.12 | 62.38 |
| | To some extent | 13 | 25.0 | | |
| | To a great extent | 11 | 21.2 | | |
| | Completely | 4 | 7.7 | | |
| Install occupancy sensors | Not at all | 7 | 13.5 | 2.88 | 57.62 |
| | To a little extent | 10 | 19.2 | | |
| | To some extent | 11 | 21.2 | | |
| | To a great extent Completely | 9 | 17.3 | | |
| Install key-card activation systems | Not at all | 5 | 9.6 | 2.81 | 56.19 |
| | To a little extent | 12 | 23.1 | | |
| | To some extent | 11 | 21.2 | | |
| | To a great extent | 14 | 26.9 | | |
| Reduce the number of lifts operated | Not at all | 22 | 42.3 | 1.62 | 32.38 |
| | To a little extent | 14 | 26.9 | | |
| | To some extent | 6 | 11.5 | | |
| Use renewable energy sources | Not at all | 23 | 44.2 | 1.57 | 31.42 |
| | To a little extent | 14 | 26.9 | | |
| | To some extent | 5 | 9.6 | | |

Note: Likert scale used was 1–5, where 1 = to no extent at all; 2 = to a little extent; 3 = to some extent; 4 = to a great extent; 5 = completely; *N*=42.

21.2% of the hotels indicated they implement this practice "to a great extent" and 25% indicated "to some extent". This finding contrasts with Ali et al. (2008), who showed that only 8.5% of hotels in Jordan have installed energy-saving bulbs.

Hotels in Kenya (57.62%) installed occupancy sensors, timers and photo sensors to and installed key-card activation systems to 56.17% which is above the average. These figures are quite encouraging since installing occupancy sensors, timers and photo sensors, as well as installing key-card activation systems can be expensive to set up. Unlike the Kenyan hotels a large proportion of hotels in Turkey claimed that they did not have key-card control system in their hotels (Erdogan & Tosun, 2009). However, reduction of the number of lifts operated during off-peak hours was below average by 32.38% as only 11.5% implement this practice "to some extent". This finding may be possible because reducing the number of lifts operated may compromise guest comfort and luxury which hotels thrive to provide. Similarly, renewable energy sources, such as solar, wind and biomass, were used to 31.42%, of which only 9.6% implemented this practice "to some extent". This may be because renewable energy sources may be quite expensive to establish. Osiako and Kummitha (2020) also attested that environment-friendly energy sources are minimally used by hotels in the Kenya's coast. They found that only 25% had attempted to tap solar energy and the use was "to some extent" to hotels that harnessed it.

### *Water conservation practices*

Water is one of the most important natural resource for the hotel sector to manage sustainably, simple practice aimed at reducing water use such as ensuring that taps are

closed when not in usage was highly implemented by hotels in Kenya to 85.70% (Table 2). 42.30% of hotels indicated they implement this practice "to some extent" and 30.8% indicated "to a great extent". Determining monthly water consumption and cost was implemented to 62.38%. Whereby, 34.60% indicated they implement "to some extent" and 25% indicated "to a great extent". According to (Sucheran, 2013) reviewing and monitoring water bills is often a first step towards managing water consumption, water bills give the necessary information and provide useful insights into how much water is consumed and cost.

Training staff on water usage was implemented to 58.08% of the properties. This approach of water management is knowledge intensive, as it requires hotel management to "teach" and influence stakeholders to support the hotels' goal of minimizing water consumption (Kasim & Okumus, 2014). Only 25% of the hotels installed low-flow taps and showerhead "to some extent," and 19.20% "to a great extent". Conversely, Alonso and Ogle (2010) concluded that 63% of hotels and lodges use low-flow shower heads and 40% use low-flow taps. In terms of installing grey water collection, treatment and distribution systems, hotels in Kenya implemented to 42.38%. Whereas, 38.50% of the hotels implemented "to a little extent", and only 23.10% "to some extent". This finding may be attributed to the fact that hoteliers will need additional financial resources to implement these practices. Sucheran (2018) highlighted high costs and lack of resources as a barrier to implementing EM in hotels. Towel reuse programme was the least implemented water conservation practice with 38.08% of the properties stating they engaged. In contrast to Kenya's hotels, a towel and linen reuse programme is a well-established activity in most European countries (Bohdanowicz, 2006; Erdogan & Tosun, 2009). Similarly, the majority of hotels in Ghana (Mensah, 2006), China (Min, 2011) and Taiwan (Tang et al., 2011) have also linen and towel reuse programmes in place.

**Table 2.** Descriptive statistics for water conservation practices.

| | Likert scale | Frequency | Per cent of frequency | Mean | Per cent of mean |
|---|---|---|---|---|---|
| Ensure taps are not opened unnecessarily | To some extent | 4 | 7.7 | 4.29 | 85.70 |
| | To a great extent | 22 | 42.3 | | |
| | completely | 16 | 30.8 | | |
| Determine monthly water consumption and cost | To a little extent | 10 | 19.2 | 3.12 | 62.38 |
| | To some extent | 18 | 34.6 | | |
| | To a great extent | 13 | 25.0 | | |
| | Completely | 1 | 1.9 | | |
| Train staff to reduce on water usage | To a little extent | 11 | 21.2 | 2.90 | 58.08 |
| | To some extent | 24 | 46.2 | | |
| | To a great extent | 7 | 13.5 | | |
| Install low-flow taps and shower heads | Not at all | 7 | 13.5 | 2.69 | 53.80 |
| | To a little extent | 11 | 21.2 | | |
| | To some extent | 13 | 25.0 | | |
| | To a great extent | 10 | 19.2 | | |
| | Completely | 1 | 1.9 | | |
| Install grey water collection, treatment and distribution | Not at all | 9 | 17.3 | 2.12 | 42.38 |
| | To a little extent | 20 | 38.5 | | |
| | To some extent | 12 | 23.1 | | |
| | To a great extent | 1 | 1.9 | | |
| Implement towel reuse programme | Not at all | 11 | 21.2 | 1.90 | 38.08 |
| | To a little extent | 24 | 46.2 | | |
| | To some extent | 11 | 13.5 | | |

Note: Likert scale used was 1–5, where 1 = to no extent at all; 2 = to a little extent; 3 = to some extent; 4 = to a great extent; 5 = completely.

### *Waste management practices*

Installing containers specific to waste type was highly considered by hotels to 66.18%, whereas 46.2% of the hotels implemented "to some extent". Waste separation was, however, considered the least applied practice in the Red sea hotels (Kattara & Zeid, 2002). Reduction of packing by purchasing in bulk was implemented to 63.80% (Table 3) as 32.70% of the hotels indicated "to some extent" while 23.10% "to a great extent". In Ghana, 60% of hotels purchased in bulk to reduce packaging (Mensah, 2006). According to Radwan et al. (2012), waste management should start at the point of purchasing and green purchasing reduces waste at the source.

On transformation of old bed sheets into laundry bags and rags, hotels implemented to 59.52%, while 46.20% implemented "to some extent", and 17.30% "to a great extent". Hotels also encourage paperless transaction by 59.04% as 53.80% of the facilities implement "to some extent" and 11.50% "to great extent". This practice is one of the simplest yet inexpensive ways of managing waste. Hotels donated leftover guest amenities to 50% which is recommendable. Kuuder et al. (2013) highlighted donation programmes as the least popular waste management practice in Tamale metropolis, Ghana. Composting organic waste was the least implemented waste management practice by hotels in Kenya by 36.18%. This finding is consistent with Kuuder et al. (2013), who also highlighted composting of waste as the least implemented waste management practice by hotels in Ghana. They found that only 3% of the hotels compost waste. According to Radwan et al. (2012), hotels often consider composting to be costly, or they may lack the technology to perform such operations.

**Table 3.** Descriptive statistics for waste management practices.

| | Likert scale | Frequency | Per cent of frequency | Mean | Per cent of mean |
|---|---|---|---|---|---|
| Install containers specific to waste type | To a little extent | 11 | 21.2 | 3.30 | 66.18 |
| | To some extent | 24 | 46.2 | | |
| | To a great extent | 7 | 13.5 | | |
| Reduce Packaging by purchasing in bulk | To a little extent | 10 | 19.2 | 3.19 | 63.80 |
| | To some extent | 17 | 32.7 | | |
| | To a great extent | 12 | 23.1 | | |
| | Completely | 3 | 5.8 | | |
| Transform old bed sheets to laundry bags and rags | Not at all | 1 | 1.9 | 2.98 | 59.52 |
| | To a little extent | 8 | 15.4 | | |
| | To some extent | 24 | 46.2 | | |
| | To a great extent | 9 | 17.3 | | |
| Encourage paperless transaction whenever possible | To a little extent | 8 | 15.4 | 2.95 | 59.04 |
| | To some extent | 28 | 53.8 | | |
| | To a great extent | 6 | 11.5 | | |
| Donate leftover guest amenities | Not at all | 11 | 21.2 | 2.50 | 50.00 |
| | To a little extent | 21 | 40.4 | | |
| | To some extent | 6 | 11.5 | | |
| | To a great extent | 3 | 5.8 | | |
| Compost organic and food waste | Not at all | 19 | 36.5 | 1.81 | 36.18 |
| | To a little extent | 12 | 23.1 | | |
| | To some extent | 11 | 21.2 | | |

Note. Likert scale used was 1–5, where 1 = to no extent at all; 2 = to a little extent; 3 = to some extent; 4 = to a great extent; 5 = completely.

## Conclusion and recommendation

The study sought to identify EMPs implemented by hotels in Kenya. The major parameters of concern related to energy conservation, water conservation and waste management. On energy conservation, reviewing and monitoring of energy bills and use of energy-efficient lighting system was highly implemented, while reduction on the number of lifts operated as well as using renewable energy sources was implemented to a low level. Water conservation practice that was considered more popular was ensuring taps are not opened unnecessarily, while towel reuse programme was the least popular. In terms of waste management, waste sorting by waste type was implemented to a large extent by the hotels, while composting organic and food waste was implemented to a low extent. From the findings, hotels have majorly implemented more of those practices that involve "low cost" or "no cost". Examples include reviewing and monitoring of energy bills, ensuring taps are not unnecessarily and conducting waste sorting. However, EMP that is considered expensive to implement such as using renewable energy source and composting organic and food waste was implemented to a low extent. Furthermore, practices that may interfere with the luxury and comfort that most hotels seek to provide to guests such as towel reuse programme and reducing the number of lifts operated was implemented the least. The study, therefore, recommends that stakeholders, such as governments, to support hotels by subsidizing the cost of acquiring some of EMPs. Hotel guests should also offer support by willing to pay a premium price for environment-friendly products and services. Hotel practitioners also have a role to play by sensitizing hotel guests and offering more education and training programmes to their employees as this will create more awareness on EM-related issues.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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