

Assessment of Beach Hotels Adaptation Capacity to Climate Variability: The Case of Mombasa County, Kenya

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Abstract

Climate change has been a worrying issue all over the world. The variability in terms of intensity and frequency of rainfall, wind, and temperature has impacted various ecosystems and economic activities especially in developing countries. Low lying coastal regions are vulnerable to the rise of sea level and storms. This affects the tourism economy which is a primary economic activity among the beach hotels in Mombasa County. In order to sustain tourism economy, the beach hotels need to cope with prevailing climate variability. This study, therefore, assessed the capacity of beach hotels to cope with climate variability in Mombasa County, Kenya. Chi-square analysis showed no significant difference on on-shore vegetation cover, rainwater harnessing and establishment of seawall barriers ($P > 0.05$). Strategies established by the beach hotels in Mombasa County were not effective to cope with climate variability thus are unable to sustain tourism economy during climate variability era.

Key words: assessment, adaptation, capacity, climate variability, Mombasa County

1. Introduction

A stable climate system is essential for prosperity in various economic activities. Most of the economic activities in Africa such as agriculture, fishing, and tourism are dependent on stable climatic systems. However, climate change phenomena have threatened the future of these economic systems. Climate systems are no longer as they were before, their variability are likely to worsen in future if the present trend of greenhouse gas emissions continues (IPCC, 1996; IPCC, 2007). This will have significant impact on climate variability. For example, wind, rainfall, temperature among others will increase in variability in terms of frequency and intensity (Meel, et. al., 2007). There is need for public and private organizations to adapt to climate variability in Africa so as to sustain economic opportunities.

Adaptive capacity covers a wide scope stretching from institutions, asset base, knowledge, decision making to governance (Levine et. al., 2011). These are tools necessary to enable societies to intervene with the aim of reducing global warming and minimizing climate variability impacts. As such, adaptive capacity involves thinking and reacting positively to sustain economic activities against climate variability. Conservation of forests, for instance, is one of the adaptation strategies aimed at enhancing carbon sinks. Others include establishment of seawall barriers in coastal areas to control storms, and harnessing of rain waters to offset water deficit. It is important for various institutions and organizations to maintain their economic activities through embarking on positive strategies despite any challenge that prevails.

Mombasa County is rich on biological diversity with warm beaches (G.O.K, 2010). The presence of these resources and favorable climatic conditions made the county to be an important tourist destination region. Beach hotels are located along and adjacent to the Indian Ocean. Their strategic position is crucial in enjoying all the benefits of the beach environment. These include sea food, warm beaches, biological and cultural diversity, scenic environment and tourism. Tourism remains the main economic activity of the beach hotels. However, the county is vulnerable to climate variability thus threatening the future of tourism economic activity. According to Awuor et. al., (2008) 17% of the land area will be submerged with a rise of 0.03m of the sea level.

The study further noted that the county is already experiencing climate variability issues such as floods and droughts. With the increase in frequency and intensity of climate variability more negative impacts will be experienced.

Therefore, the beach hotels in the county could have developed, or they need to develop strategies to cope with climate variability so as to sustain tourism economy. As a result, this research paper examines the effectiveness of measures adopted to cope with climate variability. Measures under focus included establishment of on shore vegetation cover, seawall barriers and harnessing of rain waters.

2. Methodology

The research was conducted among beach hotel managers in Mombasa County located in the coast province of Kenya. All the beach hotels were located off Mombasa Island and along as well as adjacent to the Indian Ocean (Figure 2.1). Beach hotels were rated as 3 star hotels, 4 star hotels, and 5 star hotels based on their bed capacity and quality of service delivered. In total, the 3 star hotels were composed of 14 hotels, while the 4 star hotels were 9, and the 5 star hotels were 6 adding to a total number of 29 beach hotels. The sample population was selected using stratified random sampling procedure. A total sample size of 15 hotels was purposely selected from each category with an equal representation on the number of hotels. Therefore: 3 Star Hotels were represented by $(14/29)*15= 7.241$ approximately 7 hotels. 4 Star Hotel were represented by $(9/29)*15= 4.655$ approximately 5 hotels. 5 Star Hotel were represented by $(6/29)*15= 3.103$ approximately 3 hotels.

A random selection of 7 hotels from 3 Star Hotels, 5 hotels from 4 Star Hotels, and 3 hotels from 5 Star Hotels category were selected by simple random sampling procedure. During the research process, one hotel was found to have two different identities, where the first identity was for the former management and the second for the new management. Consequently, the former identity of the hotel was not taken into account ending up with a total population of 28 beach hotels and a sample size of 14 beach hotels.

Data was collected through questionnaire administration to the beach hotel managers. The questionnaires collected data on rain water harnessing, seawall barriers and on shore vegetation cover. Secondary sources were also used to collect data for comparison purpose. The data was summarized into tables, graphs and percentages. Chi-square analysis was used to test the null hypothesis, that is, H_0 : Beach hotels do not have the institutional measures to cope with climate variability.

3.1 Results

There was no significant difference between the beach hotels and the adoption of on-shore vegetation measure, ($\chi^2 = 8.244$, $P > 0.05$), rainwater harvesting ($\chi^2 = 1.283$, $P > 0.05$), and seawall barriers ($\chi^2 = 7.467$, $P > 0.05$). However, the 3 star hotels, 4 star hotels, and 5 star hotels revealed 67%, 40% and 33% respectively on good establishment of on-shore vegetation cover (Table 3.1). Majority of the 5 star, 4 star and 3 star hotels depicted poor exploitation of rainwater measures by 67%, 60% and 67% correspondingly (Table 3.2.). On construction of seawall barriers, the 3 star hotels demonstrated 83%, 4 star hotels 60% and 5 star hotels 67% good achievement.

3.2 Discussion

On-shore vegetation

The on-shore vegetation strategies adopted by the beach hotels were inadequately to cope with climate variability. Even though the 3 star hotels showed the best achievement in embracing the onshore vegetation strategy, the measures adopted does not effectively protect the beach hotels against climate variability. Establishment of the onshore vegetation by the 3 star hotels is just part of the effort to attract market. Most of the onshore vegetation maintained in beach hotels is mainly for beautification purposes rather than buffer zones.

Maintained vegetation is open, less dense and dominated by coconut trees. It also lacks shrubs and herbs because of the need to maintain neat environment. Thus the vegetation established cannot be classified as buffer zones. Strong buffer zone of coastal areas is build by Casuarina plantations. Casuarina plantations survived a tsunami wave of 0.7 to 6.5m above the sea level hence protected the surrounding community (Mascarenhas and Jayakumar, 2007). The beach hotels environs in the county are therefore highly vulnerable to climate variability due to limited vegetation density as well as poor selection of vegetation species planted.

Contrary, the 5 star and the 4 star hotels lags behind in the enhancement of the onshore vegetation strategy despite holding high status rate in terms of financial capacity and quality of service output.

These hotels have already gained wide market, their services are known and their mechanisms are well established. Consequently, less effort was channeled to environmental protection and enhancement of climate variability coping strategies. This could be the main reason for failure in enforcing on shore vegetation adequately.

Harnessing of rain water

Irrespective of the status rating level, the beach hotels had not instituted appropriate measures to capture and store rainwater even with water shortage experiences in the city. As of 2006, Mombasa County experienced floods due to the high amount of rainfall. But with frequent droughts the city's catchment could not generate enough rain resulting to water shortages (Awuor *et. al.*, 2008).

Mombasa is the second largest city in Kenya. It is supplied with water from well fed rainfall regions thus the problem of water scarcity rarely occurs. This could be the main reason for failure of harnessing rainwater resources. The main source of water is from Mzima Springs located 300km away in Taita Taveta County. The origin of the springs is believed to be from Mount Kilimanjaro. Apart from the Mzima Springs, the city obtains water from Baricho, Tiwi and Marere (Musingi *et. al.*, 1999).

Rain water is considered to be of poor quality especially when it is collected from unsafe materials. Most of the beach hotels in Mombasa County are either thatched with "makuti" - palm leaves, or asbestos. Asbestos are cancerous while palm leaves decompose in rain waters. Consequently, the water that could be collected from rain waters is of poor quality. Since tourists are clients of high caliber, beach hotels works to maintain that caliber through provision of high quality services thus failed to harness rain water resources.

Seawall barriers

The beach hotels had not effectively instituted seawall barriers to cope with climate variability. In as much as the beach hotels claim to have enforced appropriate seawall barriers where the 3 star hotels lead by 83%, the structural appearance and function of the seawall barriers were more of territorial boundary demarcation rather than protection against climate variability. The aim of their constructions was to provide a magnificent landscape view. The seawall barrier established was supported by strong pillars which lift a platform that provides a landscape view on the ocean.

Effective seawall barriers are heavily built with strong concrete, blocks and gabions. The structures are designed slightly at a high elevation along the shoreline in appropriate shape to deflect sea wave's energy (Linham and Nicholls, 2010). Seawalls barriers are important in controlling erosion and floods. There is need for beach hotels in Mombasa County to invest in seawall barriers. This is due to the threat of submergence on some parts of the county especially along the shoreline.

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Table 3.1: Cross Tabulation between Beach Hotels and Onshore Vegetation

Hotel Category	Vegetation			
		Poor	Average	Good
3 star	Frequency	2	0	4
		33%	0%	67%
4 star	Frequency	2	1	2
		40%	20%	40%
5 star	Frequency	0	2	1
		0%	67%	33%

Table 3.2: Cross Tabulation between Beach Hotels and Rainwater Harvesting

Hotels Category	Rain water harvesting		
		Poor	Average
3 star	Frequency	4	2
		67%	33%
4 star	Frequency	3	2
		60%	40.0%
5 star	Frequency	2	1
		67%	33%

Table 4.4: Cross Tabulation between beach hotels and seawall barriers

Hotel Category	Seawall barriers			
		Poor	Average	Good
3 star	Frequency	1	0	5
		17%	0%	83%
4 star	Frequency	1	1	3
		20%	20%	60%
5 star	Frequency	1	0	2
		33%	0%	67%

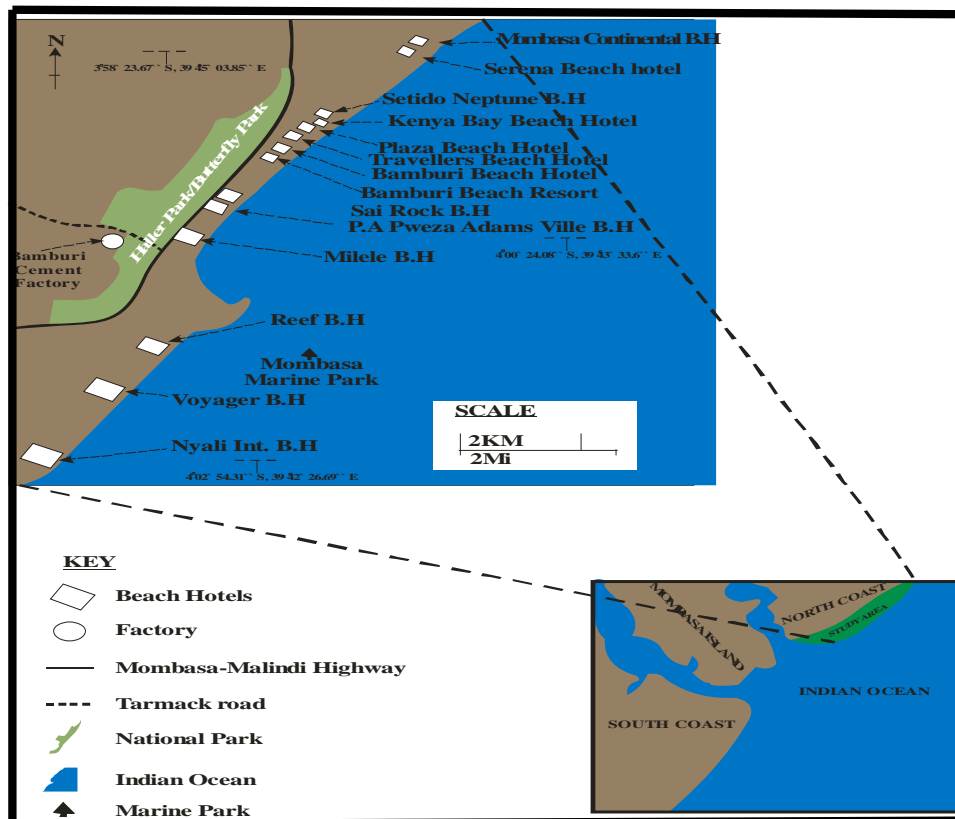


Figure 2.1: Location of the sampled beach hotels (Adopted from Google on 26/11/2012)