PERCEPTION ON BIOPHYSICAL COMPONENTS OF KIT-MIKAYI SITE FOR CULTURAL LANDSCAPE CONSERVATION

B. Okello[1], J. B. Mukundi[2], A. O. Watako[3] and A. A. Ochieng[4]
Department of Horticulture, JKUAT, Nairobi, Kenya
E-mail: adhiambo_benter@yahoo.com

Abstract
Customs and traditions of cultural landmarks which kept the landmarks' memory alive through time have been eroded by infiltration of western culture, modernism and population increase. Kit-Mikayi is a cultural landscape regarded as sacred by the local community and one of the major potential tourist attraction destinations in Nyanza Province, western part of Kenya. Despite the sites' unique geomorphology and appreciation of its other natural components, little objective information is available about the inherent landscape and associated cultural values. Besides, no study has been conducted on visual quality assessment to examine the inherent and associative values of Kit-Mikayi, for understanding landscape qualities for protection and sustainable conservation. The objective of this study was to investigate the major landmarks and environmental aesthetic value of Kit-Mikayi cultural site. The study involved identification of biophysical elements at the site and assessment of the community's perception and judgement. The study employed survey research design, questionnaires and observations through eight photographic records taken at sixty three (63) selected sites representing different features. The results show that biophysical components associated with the site were major landmarks. The respondents perceived the site for ecotourism with median of four for conservation. The findings shows that the highest median was three on naturalness, Kruskal Wallis test showed high significance difference (p<0.0001) amongst respondents perception who preferred the site to remain natural for diversification in utilization of the resources to avoid overdependence.

Key words: conservation, cultural landscape, ecotourism, geomorphological features, Kit-Mikayi.

1.0   Introduction

Communally protected areas have gradually deteriorated with time seriously endangering their existence and raising need for their conservation. In Kenya, well known cultural conservation areas can be found in the coastal areas of Mombasa, Kwale and Malindi. The Kaya forests, wildlife in the Masai Mara and scenery of Chyulu hills and Nkunga Island are good local examples of communally managed areas (Wagner *et al*. ,2008; Ombongi, 2009). On the other hand, the western Kenya region is endowed with a landscape characterized by unique and towering rock outcrops such as the Mud Sheds Rock in Kakamega and Luanda Magere Rock in Kisumu (NMK, 2009; Barner *et al.* ,2009), which lie along a geological fault consisting of big rocks that appear as huge columns piled together. The Kit-Mikayi site, also in this region is prominent not only due to the unique geological rock formations but also to the strong attachment between people's way of life and the natural land formations. As Carlson (2011) observes, stories and myths endow landscapes with meanings transcending the directly observable and create people's mental maps. In recent times the influence of introduced cultures and economic needs has gradually played down traditional values of communities and their attachment to their surroundings. In addition, increase in population has led to increased demand for more agricultural land and high rate of land use changes. Based on cultural considerations, three categories of landscape are recognized, man-made, organically evolved and associative cultural landscapes (UNESCO, 2002). The associative landscapes place value on landscape features related to indigenous people and to the importance of protecting biological diversity. Environmental aesthetics incorporates various kinds of empirical work concerning the human aesthetic experience of environments (Nasser, 1988; Carlson, 2011). The role of the environmental aesthetic is reflected by its meaning of feeling and by its opposite anaesthetic (Freeman *et al.,* 2001; Larry, 2002). In the National reserves, geological wonders and the forests of the world blooms are protected for their higher values for uses in education, enjoyment and relaxation (Chen *.et al.*, 2009). It is here that we learn about culture and natural history firsthand. Places that commemorate culture and natural legacy are sacred, where we listen to the land, the intangibles values of the heart soul and spirit takes precedence, we rise to a new level of understanding, responsible action and integrity (Stegnar *et al*., 1991; Larry, 2002). The objectives of this study were, to assess the residents' visual preference of different views within Kit Mikayi and to rate the residents preference based on quality aspects of environmental aesthetics.

2.0   Methodology

Description of the study area The study area was Kit Mikayi cultural site in Kisumu district which is historically inhabited by the Kakello clan of the Luo tribe in Western Kenya. The area lies along longitude 34° 32'27'' East and latitude 0° 7'03''

South at an altitude of 2101 meters above sea level and about 30kms from Kisumu City, between the sub-locations of Kaila, Lower Kadongo and Koker Kajuju (Fig 1).
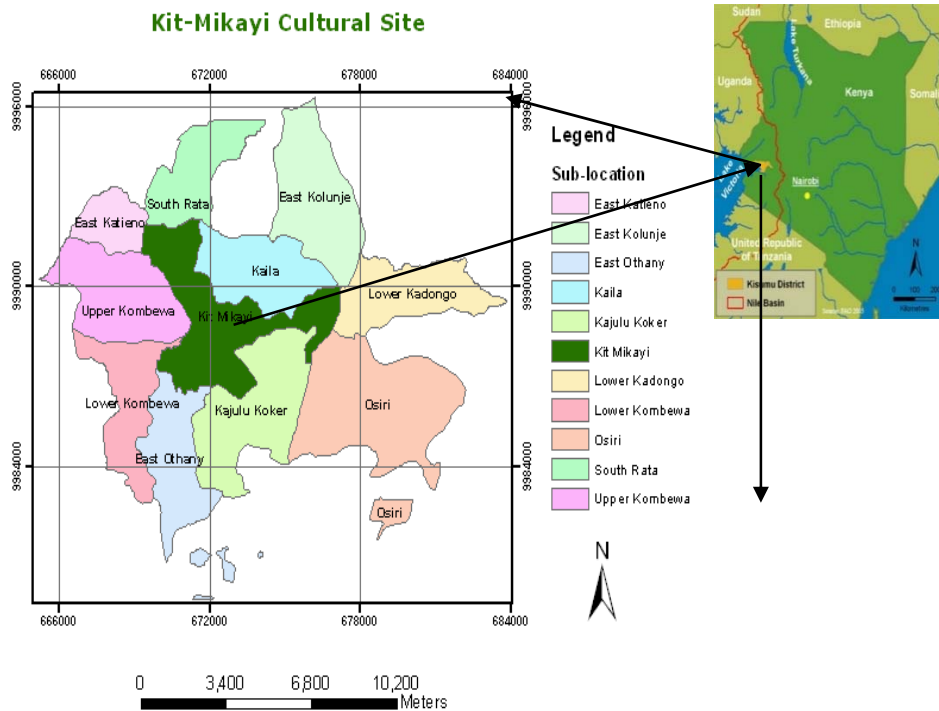

Figure 1: Map of Kenya showing location of study site of Kit-Mikayi developed from remote sensing

The landscape is characterised by big rocks which rise to a height of 70-80ft tall. The main cultural site is triangular and covers an area of 4.2 square kilometres.

2.1   Data collection
2.2   Target Population and Sampling

The target for the study were household heads residing within the study area, government representatives who included the chief, village elders and outside visitors. The total of households heads was 7000 (KNBS, 2009). The population of households was stratified into villages and sample size was calculated using the Cochran's formula (Formula 1) (Cochrans, 1977)

$$1 = {n0}/{1} + {n0}/{population}, 1 = {384}/{1} + {384}/{7000} = 364. \dots\dots\dots\dots\dots\dots\dots\dots 1$$

The villages sampled and the sample size determined for each household is shown in Table 1. A total of 364 households were surveyed. A systematic   sampling approach was employed in selecting households for the study. Each of the twenty four villages served as a stratum. The number of households in each stratum determined the sample size for that stratum. Within the strata, households were

selected in systematic manner by following the existing major routes starting at easily identifiable landmarks such as school, church, marketplace, bridge and the Kit -Mikayi rock.

Table 1: Population of households per village and the determined sample size in the study

s/no	Village name	Population of village households	Sample size of households	Households interviwed	Location name
1	Kadol	300	300/7000x364	16	East Seme
2	Bamgot	240	240/7000x364	12	East Seme
3	Kariaga	300	300/7000x364	16	East Seme
4	Kabando	200	200/7000x364	10	South Central Seme
5	Kachien'g	300	300/7000x364	16	South Central Seme
6	Kadela	300	300/7000x364	16	East Othany
7	Kagilo	350	350/7000x364	18	South East Seme
8	Kajagongo	200	200/7000x364	10	South Central Seme
9	Kakoth	350	350/7000x364	18	South Central Seme
10	Kalila	200	200/7000x364	10	South Central Seme
11	Kabundi	420	420/7000x364	22	East Othany
12	Kan'zienda	250	250/7000x364	13	East Othany
13	Kanyadon'g	240	240/7000x364	12	East Seme
14	Kanyangor	330	330/7000x364	17	Central Seme
15	Kanyapinde	390	390/7000x364	20	South East Seme
16	Karabuor	270	270/7000x364	14	South East Seme
17	Kasio	330	330/7000x364	17	East Othany
18	Kasuji	360	360/7000x364	19	East Seme
19	Katieno	300	300/7000x364	16	South East Seme
20	Kochiel	300	300/7000x364	16	West Kanyadwera
21	Kogelo	270	270/7000x364	14	West Kanyadwera
22	Kogwal	250	250/7000x364	13	East Seme
23	Kombam	250	250/7000x364	13	East Othany
24	Oluti	300	300/7000x364	16	East Othany

2.3   Photo Recording

Strategic positions for photo recording were located along nature trails within the cultural site and paths mostly used by visitors to explore the Kit-Mikayi cultural site. The photo point locations were mapped by recording the GPS co-ordinates. Photographs were taken between 1200 hours and 1600 hours in the afternoon and on sunny days to maximise clear sky in the photo. Camera settings were constant and standard at 1.5m high and 50mm lens, (Hall *et al*., 2001). Two vantage points were first marked and used as a baseline (NARSC, 1989). A church near the cultural site gate with a large *Ficus cycamorus tree* at Ng'op Ngeso primary school, formed

the starting point. Camera positions were then taken at an interval of about 200 metres. Where the path was not straight, the next photo recording position was placed at a corner to capture both the previous and next view for continuity. Bias and professional incompetence were checked by always orienting the camera stand to the north and holding the vertical angle settings constant. A three hundred and sixty degree (360°) photo cover was applied always starting from the north bearing and taking shots at an angle of thirty degrees (30°) interval (Daniel *et al*., 1997). A total of sixty three photo points with twelve photos per point were recorded resulting to seven hundred and fifty six (756) photos. Out of the twelve photos per point eight were chosen by selecting the clearest photos and labelling them with numbers one to eight giving a total of five hundred and four (504) photos. These photos were utilized for environmental visual quality assessment.

2.4   Questionnaire Design and Visual Assessment
The survey was aimed at getting personal information of the respondent and for use in ranking the recorded photographs of the site. Questions for visual quality assessment of photos were based on five environmental aesthetic criteria namely; naturalness, variety, special effect, richness and accessibility (Schupbach, 2002). Description of this criteria and scoring for the test variables is shown in Table 2.

The final questionnaire was developed after several pilot tests to come up with the final structure. The final questionnaire accompanied the photos for ranking. Photos representing sixty three sites were presented to the respondents based on the sample size per village (Table 1). Questionnaire items were first presented then the photo panel followed, with each being presented at a time and the respondent given a free will of choice of where to start ranking. The respondents were requested to arrange the eight photos in each panel and rank them based on the environmental aesthetic criteria. Respondents were asked to choose the eight photos they preferred most and least at each scene. The most preferred was given a score of extremely good and least preferred was given a score of bad.

2.5   Data Analysis
From the questionnaire item, photos were assessed based on the environmental aesthetic criteria by quantifying the environmental aesthetic value of the site by scoring. The collected data was cleaned, coded and put in data sheet (Microsoft office excel 2007). Frequencies, means, mode and range were determined. ANOVA was conducted to establish significance of variable relationships. All data was analysed using SPSS 16.0 software.

Table 2: Description of the environmental aesthetic criteria applied to visually assess resident's perception of the Kit Mikayi cultural site

Interpretation		Variables on environmental aesthetic criteria			
	Naturalness	Variety	Special effect	Richness	Accessibility
	Expressed in % area of naturalness and semi natural patches in the cultivated (border, hedges and light patches). Percentage of land cover by vegetation and rocks	Expressed in number of crop farming, trees size of plots for crops	Expressed in % of impressive effect of the area or are characteristics of the area, rocks and fig tree	Macro biodiversity especially those concerning wild trees, birds, small animals like bats, frogs and monitor lizard	Expressed in % of paths narrow roads and panoramic view points bird watching area and narrations on the cultural existence
Scoring 0	0-20%= 0 (bad)	0=none	0=none	0=none	0=none
1	21-40%=1 (not good)	1= one element	1=precence of rocks	1=presence of vegetation	1=0-25% path, nature trail
2	41-60%=2(fair)	2=two elements	2=presence of rocks artifacts	2=presence of herbacious vegetation and shrubs	2=25-50% path, nature trail roads
3	61-81%=3 (very good)	3= three elements	3=presence of three impressive elements	3=all mixed vegetation and mammals	3=50-75% path, nature, roads, panoramic bird watching
4	81-100%=4 extremely good	4=four elements	4=presence of three elements and above	4=all mixed vegetation + mammals + amphibians	3=75-100% path, nature, roads, panoramic bird watching

3.0   Results

Majority of the respondents came from East Othany, East Seme and South Central Seme locations consisting 71% of the study area (Table 3). The age distribution of the respondents indicates that majority of the respondents were above 41 years old (91%) and married (80%). Male constituted 76% and females 24% of the respondents. Results also showed that 60% of the respondents had education below primary level.

Table 3. Respondents profile for the Kit Mikayi cultural population site survey

Personal information	Frequency(%)	Personal information	Frequency(%)
Location		**Marital status**	
Central Seme	1	Married	80
South East Othany	2	Single	16
West Kanyadwera	8	Widow	1
South Central Seme	21	Widower	3
East Othany	25	**Education level**	
East Seme	25	No formal education	16
Age of respondents		Primary education	44
<18	4	Secondary education	35
19-40	5	Tertiary education	5
41-70	57	**Gender**	
71 and above	34	Male	76
		Female	24

Out of three hundred and sixty four respondents, three hundred and forty nine (349) respondents managed to complete both the questionnaire and sixty nine (69) completed the photo ranking exercise. Major biophysical landscape features that were identified as most associating feature with the cultural site are shown in Figure 2. Majority of the respondents rated rock and trees (20%) and rock arrangement (17%) as the most striking identifying feature while the less frequently identifying landscape features were, rock house, plants and artifacts within the cultural site, which constitute traditional attires**.**
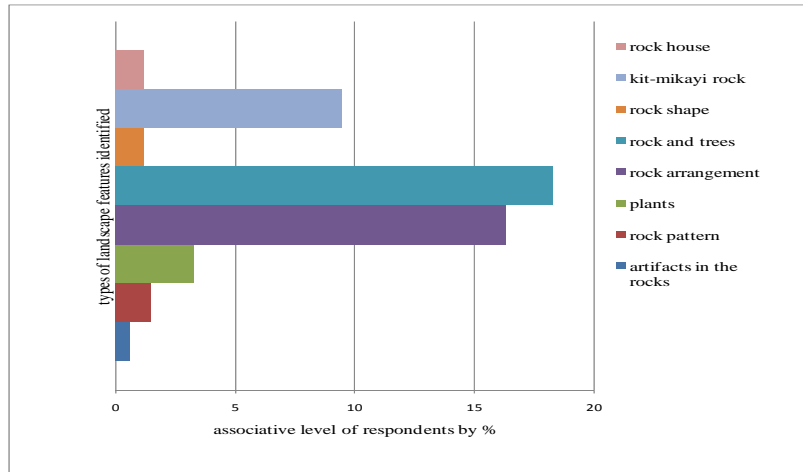
Figure 2. Major features identified and the associative level of each as ranked by respondents for Kit-Mikayi site
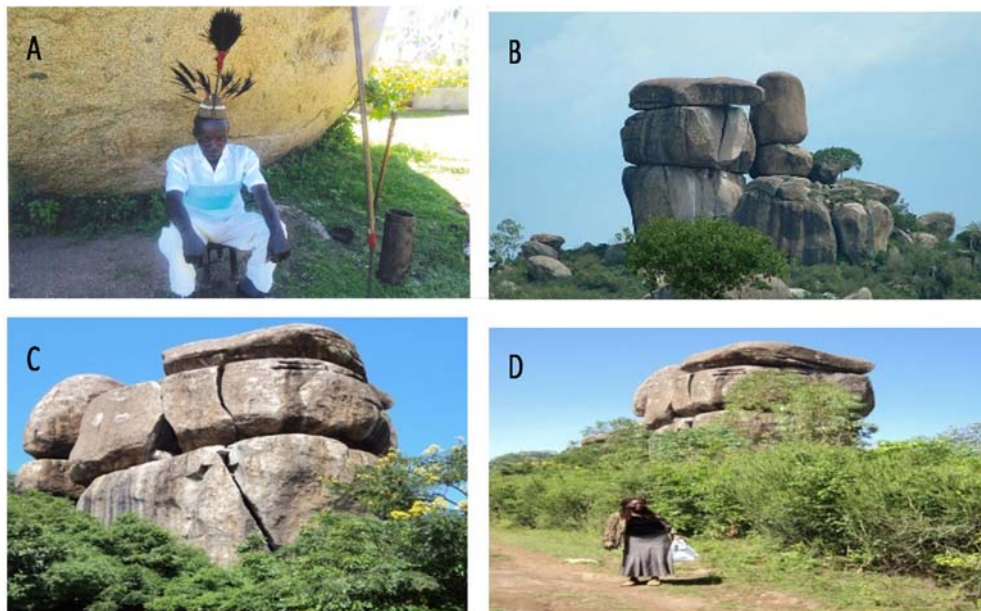

Figure 3. Major landscape markers at Kit-Mikayi area. (A) artifacts (B) Kit-Mikayi rock arrangement (C) Kit-Mikayi rock and (D) rock and tree

Visual Quality Assessment Personal Profile
Out of all respondents interviewed 25% scored very good on naturalness,fair on variety, fair on special effect ,not good on richness and fair on accessibility. Sixty nine respondents who were 50% scored very good on naturalness, fair on variety,fair on special effect,fair on richness and fair on accessibility. Majority of the respondents   scored 75% as extremely good on naturalness, very good on variety, very good on special effect, very good on richness and very good on accessibility

(Fig. 4). From the results naturalness had the highest median of 3 and mean of 3.16 and this concludes that the site is preferred by the respondents to remain natural. An environmental aesthetic visual assessment criterion quantifies the cultural site as a natural landmark (Table 4).
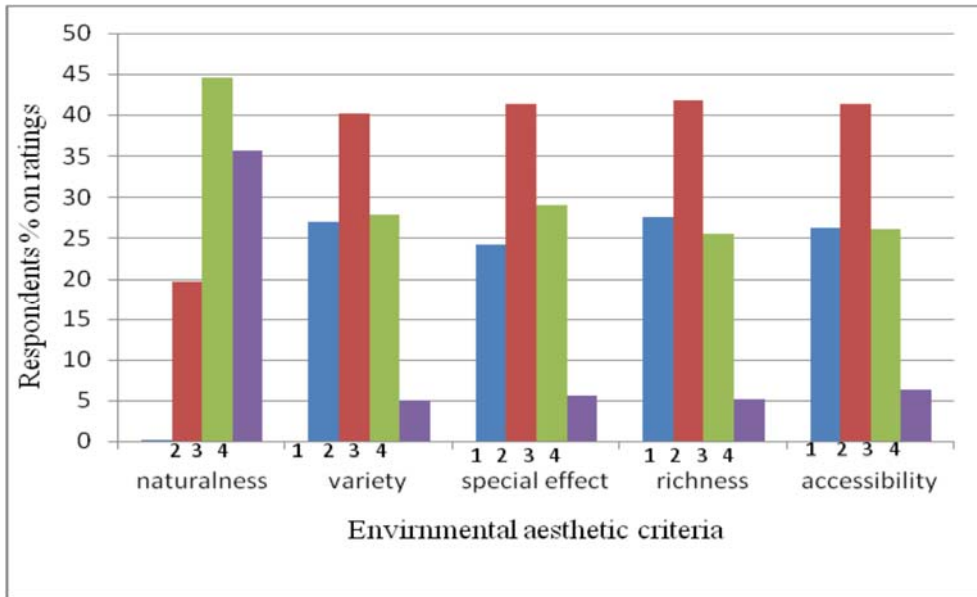

Figure 4. Overall score frequency by percentage for the five environmental aesthetic criteria rated by respondents' visual assessment of views from Kit Mikayi cultural site (n = 63)

Table 4. Mean, median and percentile of scores for the five environmental aesthetic variables based on respondents assessment of views from Kit Mikayi cultural site (n=63)

	Environmental aesthetic variables scores				
Scores	Nturalness	variety	special effect	Richness	ccesibility
Mean	3.16	2.11	2.16	2.09	1.12
Median	3	2	2	2	2
Range	2	3	3	3	3
Pecentiles					
25	3	1	2	1	1
50	3	2	2	2	2
75	4	3	3	3	3

The data was subjected to further analysis using the Kruskal-Wallis non-parametric ANOVA. Scores of different environmental aesthetic variables for the 63 photo points were the input data. Analysis of variance revealed significance difference of mean score at the confidence level $p < 0.001$ amongst the environmental aesthetic variables (Table 5). Cross tabulation was also done to identify which characteristics of the respondent most influenced the judgement of photos for the five criteria. The cross tabulation results revealed that education and gender influenced the respondent's judgement most.

Table 5: ANOVA test results for differences of overall mean scores allocated to the five environmental aesthetic variables based on Kruskal-Wallis non parametric test (n = 63)

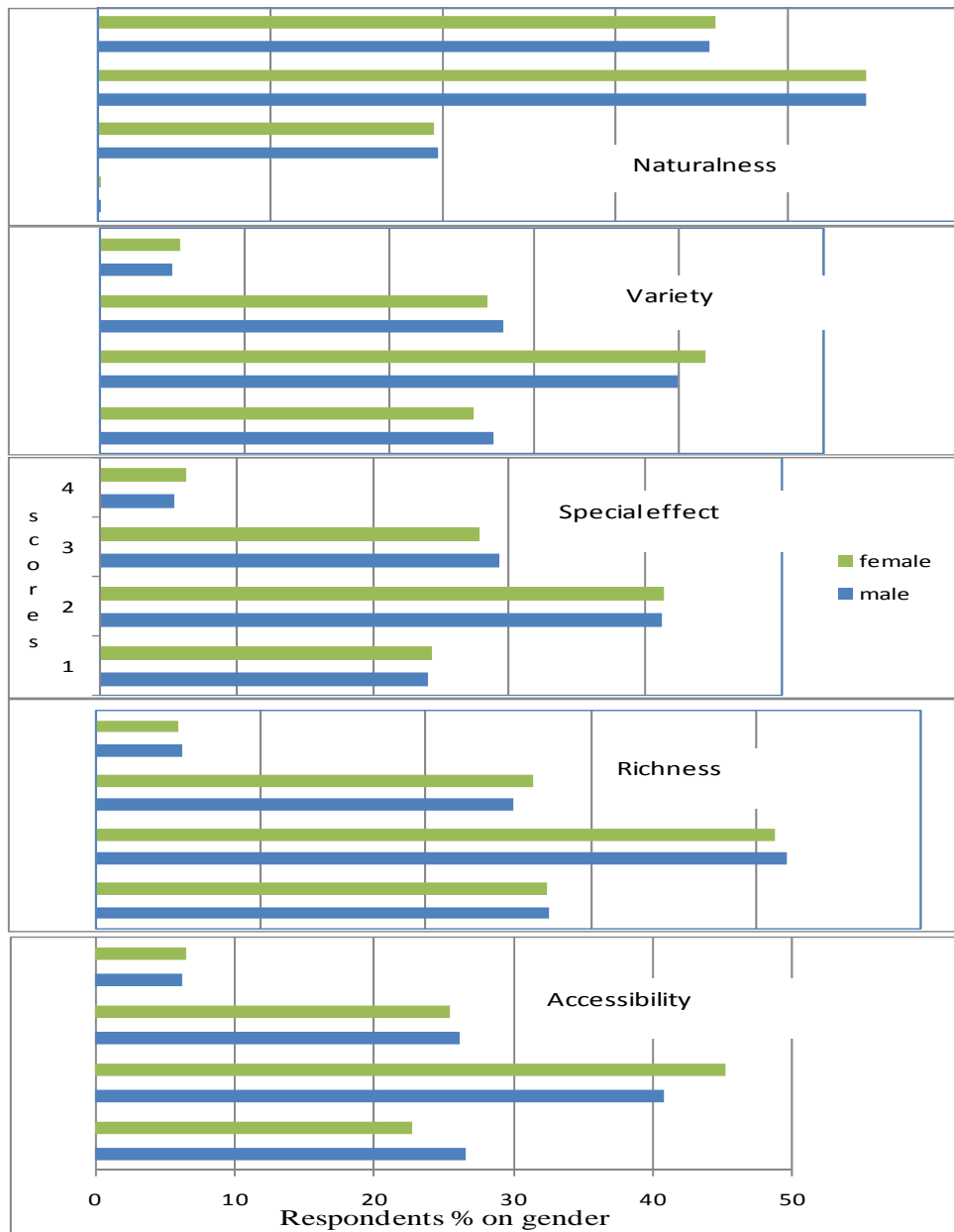| Chi-square	Degree of freedom	P	Aesthetic criteria
293.639	62	<0001	Naturalness
300.427	62	<0001	Variety
299.699	62	<0001	Special effect
468.199	62	<0001	Richness
378.354	62	<0001	Accessibility

Figure 5: The respondent's gender in relation to the aesthetic environmental criteria
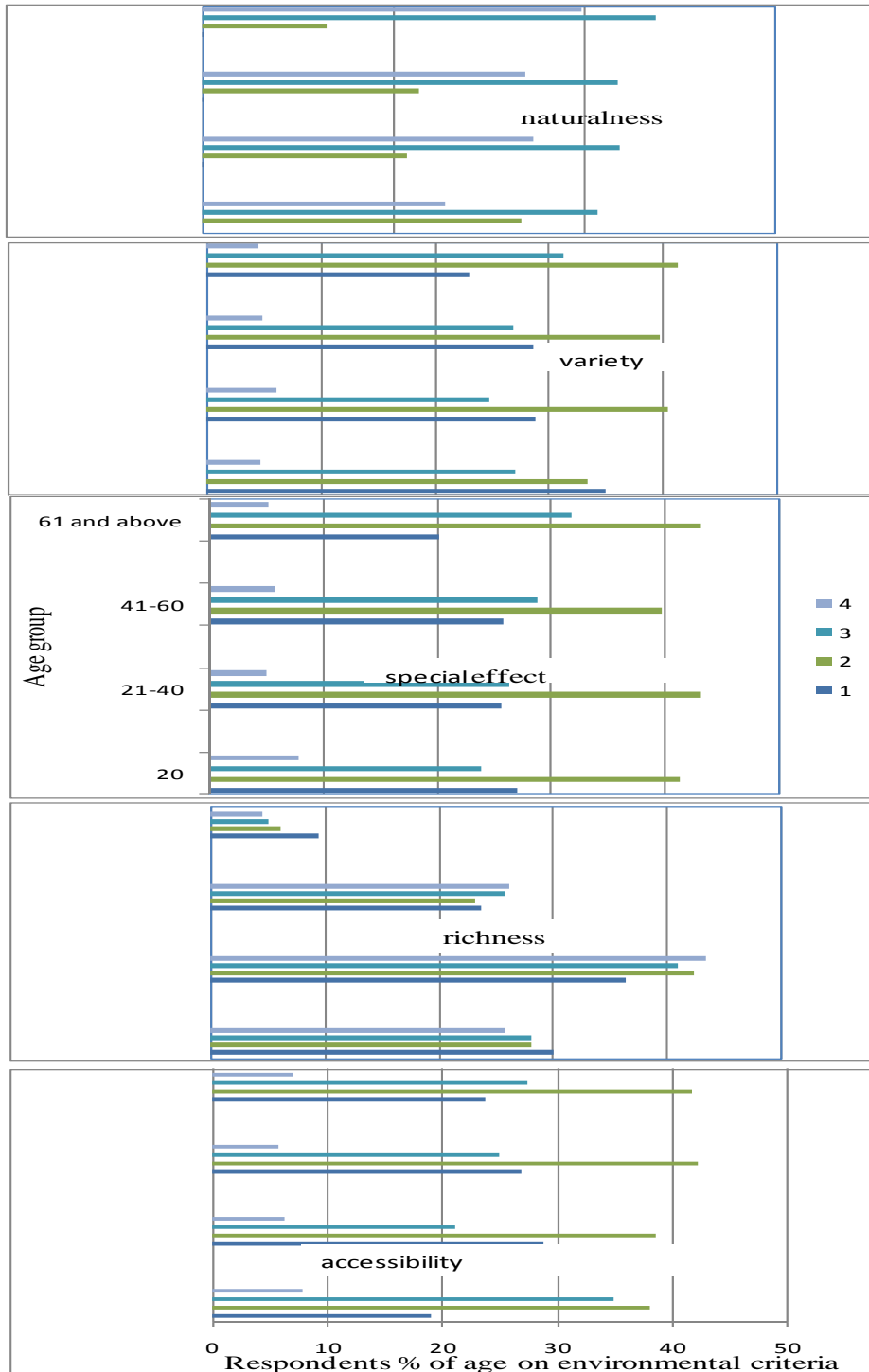
Figure 6: The respondents' age in relation to the aesthetic environmental criteria

Respondents aged between 21 to 40 ranked score 3 (24.68%), 61 and above (24.28%),41 to 60 (24.08%) while under 20 ranked 22.97% (fig6).
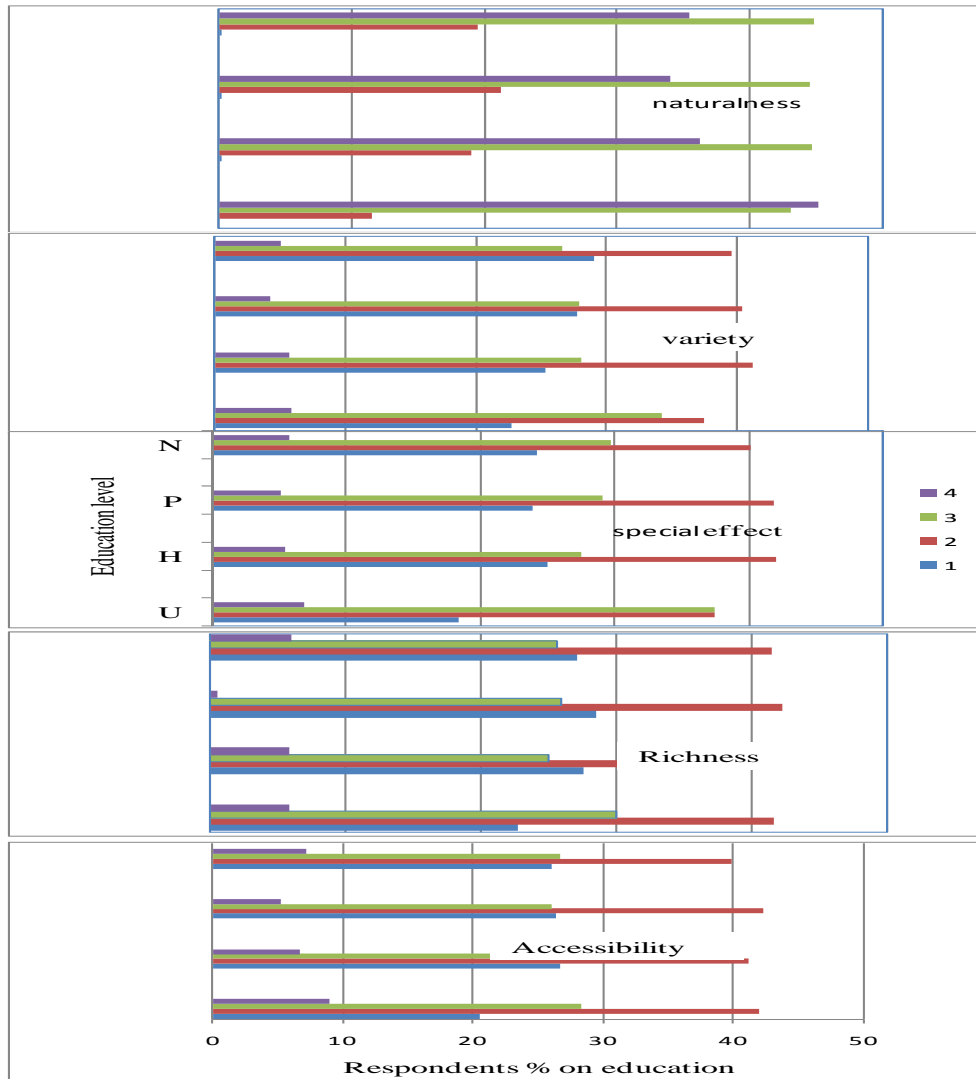

Figure 7 Respondents education with environmental aesthetics variables N-None, P-Primary,H-Highschool, Undergraduate and P-Post graduate

The respondents with undergraduate level of education ranked score 3, 54.1% followed by high school level of education (53.98%). Those who did not go to school at all scored 53.96%. However those who had primary level of education ranked 53.94%.The level of education influenced the way the respondents scored the photos based on environmental aesthetic criteria naturalness.

3.2   Photo Sites

Based on the respondent's judgment and preference, photo 51(A) was the most preferred based on naturalness as an environmental aesthetic criterion with 73.9% of respondents allocating a score of 4 while photo 22 ranked least with 43.5% of respondents allocating a score of 1 (Table 6, Fig 8). On the other hand, photo 22 (E) was most preferred based on variety while photo 45 was ranked worst with high percentage of respondents allocating a score of 1. Photo site 1(B) was ranked most preferred based on special effect while 5 was the least. Photo site 9(I) was ranked best based on richness and 3 best on accessibility. However photo 22 and 32 were ranked worst based on richness and accessibility respectively (Table 6).

Table 6: The best ranked and worst ranked photos based on the respondent's environmental criteria scores

Environmental sco variables	Percentage scores of 4 by respondents	Best ranked photo site	Percentage score of 1 by respondents	Worst ranked photo sites
Naturalness	73.91	51	43.47	22
Variety	40.57	22	49 27	45
Special effect	60.86	1	42.02	5
Richness	37.68	9	59.42	22
Accessibility	60.86	3	53.62	32

Some of the assessed photos in the exercise are illustrated below in (Fig.8) based on respondents perception and understanding in relation to the utilization of the cultural site

Figure 8 A and B best photos in naturalness and special effect while C and D are the worst photo sites on naturalness and special effect respectively. E and F best photos for variety and accessibility while G and H are worst photo sites for variety and accessibility. Finally, photos I best for richness while photo J is worst for richness

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Table 7 The most striking feature associated with Kit-Mikayi cultural site

Aesthetic criteria	Best photosites	Main striking sites associated with the photo
Naturalness	51	Kit-Mikayi rock and trees
Variety	22	Arable farming and trees
Special effect	1	Kit-Mikayi rock and Ficus sycamores tree a grave yard of Mzee Ngeso
Richness	9	Trees
Aceesibility	3	Precence of path and road

4.0   Discussion

We have assessed the Kit-Mikayi cultural landscapes based on environmental aesthetic criteria. New and unknown things have always attracted our curiosity and the respondents listed rock and trees, rock arrangement and Kit-Mikayi rock as the key features and identifying characteristic, while the less frequently noted identifying landscape features were rock house and rock shape. This shows that the local community interact with site in various ways. Our results agree with observations that quantitative model based on biophysical landscape characteristics account for the largest measure of perceived aesthetic quality within a given ecological context (Stamps,1999; Buhyuoff et al.,1982 and Silvernnoinen, 2001). The rock geomorphology is unique in a way that it gives the area a landmark. The most visually striking features were ranked higher as the best photo sites on naturalness (51) than the less easily visible features such as rock house which requires more deeper exploration of the site.

The overall results show that the respondents identified natural features as the major landmarks in the cultural site showing preference for the site to remain natural. This observation is complemented by Carlson (2008), that knowledge provided by natural science is central to appreciation of natural environment. Kit-Mikayi cultural landscape has outstanding scenic qualities, deriving from interaction between the works of nature and humanity such as rock, trees and traditional beliefs. The geological formations and the cultural relationships provide intangible functions such as cultural value, spiritual enrichment and environmental aesthetic as shown from the listed major landmarks. Similar studies have shown that aesthetic services is based on appreciation of natural scenery (Groot et al., 2010) or

configuration of open space in agricultural or forested areas (Chan et al.,2011). With the growing interest for such sites especially in the field of tourism, other tangible landscape functions like transport, production, information on genetic pool and hospitality are becoming prominent. For research and scientific purpose aesthetic quality has most often been assessed by perceptual surveys where quantitative measures of aesthetic quality are derived for targeted landscapes by averaging choices, ratings across observers within statistically coherent groups. This agrees with how we derived the five environmental aesthetic criteria to measure the quality of the cultural site (Daniel, 2001). This study has revealed the richness of aesthetic perception on a cultural landscape exposing the intangible value it holds for the community and other users. Real nature starts to be unknown to us, as in the case of a child not knowing what a chicken is, or a cow, or a sheep. It is the right moment to re-address the enjoyment of nature at Kit-Mikayi cultural landscapes for ecotourism purposes and for better livelihood of the community and the world at large.

5.0　　　Conclusion

Naturalness as a visual element scored the highest for the different five environmental aesthetic criteria. Education level influenced most the way in which the respondents evaluated the photos, the highest percentage had undergraduate level of education while the least had primary level of education. The level of understanding and experience with the site vicinity influenced the photo ranking exercise. Photo site 51 was the most natural site which need to be conserved and site 22 the worst photo site need to be improved.

The existence of unspoiled intact nature is an opportunity that should be given high priority for conservation. This is more critical in a geomorphologicaly unique area like Kit-Mikayi which has been inhabited and utilized by man over the years creating a traditional cultural landscape. Interested groups such as cultural landscape experts, heritage conservation experts, can work towards this aim with key stakeholders like the National Environmental Management Authority, local residents and researchers. The information can enrich the decision making process in evaluation of sites that need to be considered as cultural heritage for sustainable utilization and conservation by the local communities.

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