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ROLE OF INDIGENOUS KNOWLEDGE PRACTICES ON SUSTAINABLE ECOLOGICAL CONSERVATION IN COUNTY GOVERNMENTS IN KENYA: A CASE OF MACHAKOS COUNTY

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ABSTRACT

The general objective of the study was to establish the role of indigenous knowledge practices on sustainable ecological conservation in County Governments in Kenya: A case of Machakos County. The study employed descriptive research design. The target population was 860 members that included community elders, Government Representatives (chiefs and sub-chiefs), Church and Religious leaders and representatives from the civil society. The Slovenes formula was used to obtain a sample size of 273. The study made use of the questionnaire as the main data collection tool. Quantitative data was coded using Statistical Package for Social Science (SPSS) version 22. Inferential analysis was used in relation to correlation analysis and regression analysis to test the relationship between the four explanatory variables and the explained variable. The study established that indigenous culture, culture, technology and policy framework played a significant role on the sustainable ecological conservation in county governments in Kenya. The study recommended that there is need to enhance indigenous cultural beliefs which are constantly struggling to maintain their place in environmental conservation in a system dominated by scientific worldviews. The study recommended for improvement on the indigenous education through community dialogue, coaching and apprenticeship, word of mouth by custodians of traditional knowledge form part of training on agriculture and land use. The study recommended that there is need to enhance indigenous tools as part of a rich knowledge base used to ensure sustainable land use. The study recommended that there is need to improve indigenous values, beliefs and practices relating to land use and natural resource conservation lost due to lack of policies and legislation to ensure their protection. This can be carried out by both the National and County governments in assisting communities' to document, preserve and disseminate indigenous knowledge on environment conservation and land use.

Key Words: *Indigenous Culture, Education, Technology Policy Framework, Sustainable Conservation*

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INTRODUCTION

Indigenous knowledge (IK) is the local knowledge that is distinctive to a particular society and culture. IK is dissimilar with other global knowledge schemes and systems as created by institutions of higher learning, research organizations and private companies. It is the foundation for community decision making in farming, well-being, diet preparation, schooling, and a host of other undertakings in country side societies (Warren 2011). Indigenous Knowledge forms the data base upon which decisions and choices are made in rural communities. Indigenous data systems are alive, and constantly shaped by original internal community interactions and communication with exterior information systems (Flavier et al. 2015).

In Africa, interest has been drawn to issues of ecological concern ranging from clearing and removal of forest cover, obliteration of water sources, pollution and a host of other action that cause environmental degradation. (Boafo, 2013, and UNEP, 2011). Factors responsible for the accelerated environmental destruction include excess use of natural resources occasioned by population growth, destroying of traditional shared land application systems, laxity in observing sustainable environmental conservation and conflict of economic activities with ideals of sustainable environmental conservation as observed by the Republic of Kenya (2010), Nyaga (2009) and UNEP (2011). As a consequence, agricultural activities have continued to get depressed while environmental hazards such as floods, landslides, mudslides and droughts, among others, have become common thereby adversely affecting the livelihoods of those relying on the natural resources for survival.

In Kenya, despite environmental challenges being more severe in regions that experience arid and semi-arid conditions, medium and high potential agricultural areas such as Teso district are equally affected. In spite of environmental degradation having existed in Kenya since the pre-colonial and colonial times, its pace and rate seems to have been accelerated by the evolution of socio-economic activities such as commercialization of agriculture, industrialization and expansion of trade in natural resources products adopted by the post independent regime; that is to say 1963 to date. This is attributed to the post-colonial government being pre-occupied with how to achieve a steady increase in their Gross Domestic Products (GDPs) through maximum exploitation of available resource at the expense of environmental conservation (Orodho, 2010).

Currently the Kenyan rural areas appear to be facing several environmental challenges brought about by land-use practices that seem to disregard the need to conserve soil and renew its fertility. Likewise, high population growth, rising poverty levels and the desire to open up new land for agriculture appear to have led to the destruction of biodiversity and water catchment areas (Republic of Kenya 2010). Again, there appears to be evidence of pollution in major urban centres due to unplanned and indiscriminate dumping of garbage and sewage waste (Republic of Kenya 2010, NEMA,2013).To attain sustainability in environmental management and enhanced livelihoods, the agenda 21 of the UNCED conference emphasized on the need for governments to work towards incorporating indigenous environmental management knowledge systems into contemporary socio-economic development programmes (Burgess *et al.,* 2009, UNEP, 2011).

According to (KNBS, 2013) the County borders eight counties: Nairobi and Kiambu counties to the West; Embu to the North; Kitui to the East; Makueni to the South; Kajiado to the South West and Muranga and Kirinyaga to the North West and lies between latitudes 0º45´South and 1º31´South and longitudes 36º45´ East and 37º45´ East. It covers a total area of 6218.2 km². The Kenya Population and Housing Census (2010) indicated the total population of the County at 1,098,584 with male and female

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representation of 543,139 and 555,445 respectively. The age cohort 65-69 is 6,109 male and 8100 female.

Agriculture is the main economic activity in the County, which is largely semi-arid. Most of the crops grown include maize, beans, fruits, vegetables and drought-resistant crops such as sorghum and millet.

The County receives bimodal rainfall with short rains in October and December while the long rains from March to May. The rainfall range is between 500mm and 1250mm, which is unevenly distributed and unreliable. Temperatures vary between 18˚C and 29˚C throughout the year. The dry spells mainly occur from January to March and August to October.

Statement of the Problem

Despite the fact that the importance of Indigenous Knowledge systems has now been recognized by international organizations, such as the United Nations, its role in conservation has to date not received the much needed attention it deserves among communities in Kenya. This position is supported by (Nyaga, 2012) who contends that Indigenous Knowledge, as an instrument of development, has to date not received the much needed attention in developing countries, in general, and in Africa in particular. Although Indigenous Knowledge systems are important in sustainable environmental management and enhanced local livelihoods, these knowledge systems and technologies are being marginalized and even getting lost in communities in Kenya (Intitute of Culture and Ecology, 2014).

(Njiraini, 2012) Observes that despite the emphasized need to incorporate indigenous environmental knowledge systems and technologies in environmental conservation programmes in Kenya, several government development documents do not seem to capture local communities and their cultural norms, skills and technologies in environmental conservation.

Machakos County is a region that continues to experience frequent and persistent degradation of natural resources exemplified by increased incidences of soil erosion, siltation in rivers and dams, destruction of water catchment areas and wetlands (Institute of Culture and Ecology, 2014). While other factors may be playing a role, it is also possible that diminishing Indigenous Knowledge practices may be contributing to the overall environmental degradation. It was against this background that the study sought to determine the role of Indigenous Knowledge practices on sustainable ecological conservation in County Governments in Kenya: A Case of Machakos County.

Objectives of the Study

The general objective of the study was to determine the role of Indigenous Knowledge practices on sustainable ecological conservation in County Governments in Kenya: a Case of Machakos County. The specific objectives were;

- To determine the role of indigenous culture in sustainable ecological conservation in Machakos County
- To establish the role of indigenous education in sustainable ecological conservation in Machakos County
- To find out the role of Indigenous technology in sustainable ecological conservation in Machakos County
- To establish the role of policy framework in sustainable ecological conservation in Machakos County

LITERATURE REVIEW

Modernization Theory

Garnov (2004) observes that the major consequence of the European Colonialism was the progressive amalgamation of African economy into the global industrialist system in which Africa was seen primarily as a source of basic materials for western industrial production. According to Linden (2003),

modernization, for instance, meant that agricultural production was to be moved towards commercial production thereby leading to a sudden shift in the mode of production from traditional methods of producing food crops to cash crops. Besides, the process of modernization emphasized change in methods of production, creation, recreation and consumption patterns among the colonized communities. As a consequence, the above led to hunger and starvation in Africa.

Social Learning Theory

Psychologist Albert Bandura proposed the theory in 1977. It describes social behavior in relation to endless interaction of reasoning capacity, behavior and ecological determinants. Knowledge acquisition takes place as a consequence of replies based on experience, and explicitly observing the special effects on the communal and social mood of other public's conduct. In clarifying his theory of social learning, Bandura (1977) reflects four separate mechanisms or sub-procedures: consideration, holding, motor imitation, and motivational procedures. These procedures clarify the attainment and maintenance of observational learning. (Luthans and Davis 1980).

Knowledge Management Theory

This theory defines the nature of knowledge as either explicit or tacit. Explicit knowledge is that which is formalizable and objectifiable in a scientific sense and whose content is typically captured in physical media. Knowledge that is explicit is often seen as object chunks to be captured, stored, distributed, and retrieved. In this sense, managing explicit knowledge is not very different from managing data (Spender, 2000).

Institutional theory

Institutional theory studies the development by which arrangements comprising regulations, standards, and practices, develop into recognized and respected rules (Scott, 2004).Scott affirms that institutions are social entities that achieve resistance and flexibility as they are a collection of traditional reasoning, normative and regulative elements organized and with related activities and resources offerings teadiness and significance to communal life.

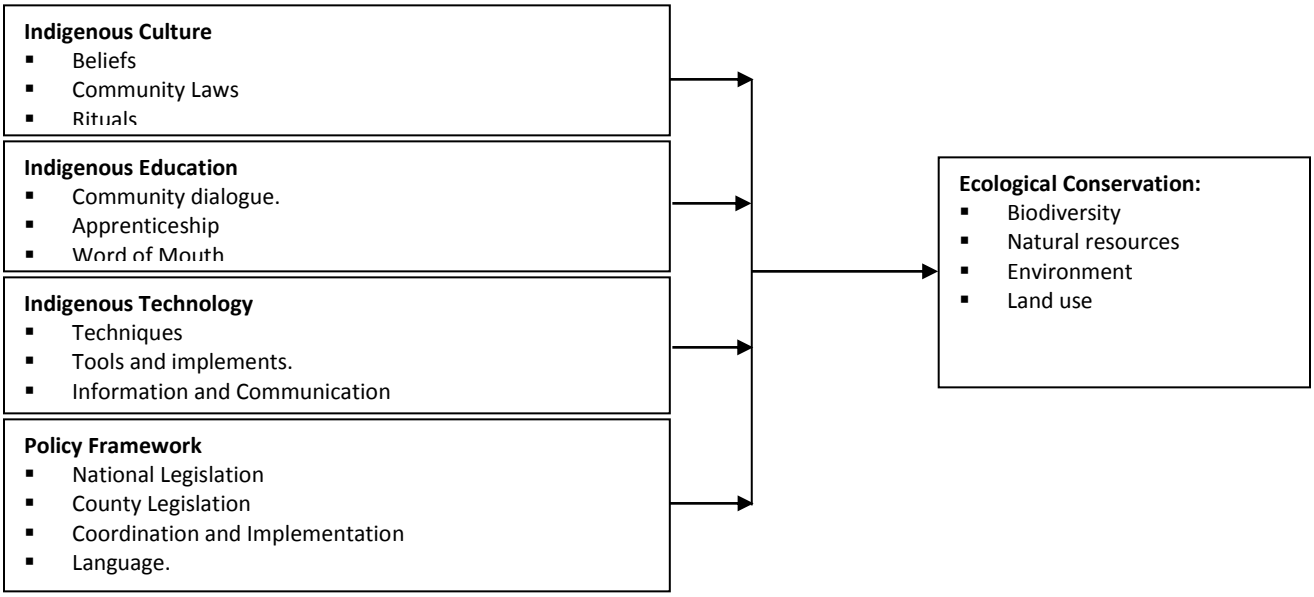

Figure 1: Conceptual frame work

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Empirical Review

Makhanu (2014), describes culture as a set of distinctive spiritual, material, intellectual and emotional features of society or a social group. It encompasses, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs. According to Richards (1985) IK is characterized by attributes of 'ecological particularism', generated in a local natural environment and under specific ecological relationships. Moreover, IK is a 'cultural heritage', being experienced, tested, and transformed by a given community over time (Brokenshaet al., 2010). It is utilized as an information base which facilitates communication and decision making in a particular society (Warren and Rajasekaran, 2011). The carriers of IK are indigenous people, who are unique to the given context (Warren et al., 2011). They share the common burden of having a historical continuity at a locality which became manipulated by dominant outsiders. They are excluded from access to production resources and important management strategies are destroyed (Cannon, 1995).

Sifuna (1990) opined that informal or traditional methods of instruction involved productive and meaningful work, mostly learning by doing along with adults and the practical inculcation of skills through apprenticeship. The philosophical foundations that shaped indigenous education were universal to all ethnic groups and included philosophies of communalism, preparationism, functionalism, and holisticism. According to Sifuna (1990) communalism emphasized group cohesion, Preparationism prepared children to become useful members of the household, village, clan, and ethnic group. The preparation of young people was gender specific, where girls learned from women and boys from men. Functionalism is strictly utilitarian, used as an immediate induction into society and preparation for adulthood, a participatory process. Functionalism incorporates spiritual and moral living, economic communal participation, and job orientation and application. Lastly, holisticism involved learning without any specialization, in which aims, content, and methods are inextricably interwoven.

Foucault (1988) listed four types of technology which always function together but are not irreducible to one. These four types of technologies are technologies of production, technologies of sign systems, technologies of power and technologies of the self. According to Foucault, technologies of production allow us to produce, transform or manipulate things; technologies of sign systems permit us to use symbols, signs or meaning and technologies of power determine individual behaviour. Indigenous technology and knowledge are relevant to such sectors and strategies as agriculture, preventive medicine, community development and poverty alleviation. One key impediment to the development of technology in local people is the low patronage it has received from governments and citizens. According to Manabete (2014), African peoples seem to have a fondness for foreign technologies. However, because of the fact that such technologies were not designed peculiar to the African environment, they are often confronted with the problem of spare parts, knowledge of the design principles and maintenance and repairs. UNEP (2011) state that Indigenous knowledge is facing extinction, occasioned largely by the absence of strong mechanism for ensuring that such knowledge is passed on from generation to generation. World Bank (2010) argues that Innovators in Indigenous technologies lack effective mechanism for markets and for guaranteeing their protection and proposes that, in order to enhance indigenous technologies, governments can consider purchasing the indigenously developed products and promote them in such a way that they make in-roads into the global market.

Studies by Warren (1992) indicate that in most cases literature on indigenous knowledge systems tends to

focus on the poor communities in developing countries, the aborigine of Australia, the "Ameri Indians" of the United States of America and the Maasai of Kenya. This can particularly be seen in the light of how global organizations including the World Bank have continued to associate these knowledge systems with the poor. This can be exemplified, for instance, in the World Bank's website's statement: "Indigenous knowledge is also the communal capital of the poor, their main asset to invest in the battle for survival, to produce food, to provide shelter or to achieve control of their own lives". Agrawal (2004) notes that marginalization and the dying away of indigenous knowledge systems partly stems from its main characteristic of being tacit in nature. Accordingly, this character/property of indigenous knowledge makes it difficult to be codified, stored, shared or transferred. Consequently, this inadequacy of the indigenous knowledge systems has contributed to the current scenario whereby much of it is dying away with the beholders who in most cases are the elderly in different communities.

Formulation, coordination and implementation of policies are a responsibility assigned to governments and institutions of authority. In Kenya, the National and County governments have in the recent past formulated and enacted legislation to provide for the governance, protection and sustainability of IK as well as the rights of the marginalized communities. This is a critical element that advances the conservation of cultural and natural heritage which entail indigenous knowledge practices.

Ngara (2013) notes that indigenous knowledge is built by societies through generations, living in close contact with nature. This knowledge encompasses norms, a system of classification of natural resources, empirical observations about the local environment and a system of self-management that governs resource use. He further argues that traditional beliefs, cultural morals and practices are significant in the successful conservation of the natural environment. Culture has played a crucial role where environmental resources are under threat. Grenier (2008) adds that indigenous people with historical continuity of resource use practices often possess a broad knowledge base of the behavior of complex ecological systems in their abilities. According to Lssozi (2012), African communities have rich environmental cultures which can be understood by listening to their myths, taboos, stories, proverbs and beliefs and also by observing their symbols and rituals. For example, amongst some indigenous African communities, the association of some animals and plants with spirits has enabled environmental sustainability (Forde 2008).

METHODOLOGY

This study adopted a descriptive research design. According to Cooper and Schindler (2008), a descriptive study is one that is concerned with finding out the what, where and how of a phenomenon. The target population in this study was 860 of the five groups of people; 478 community elders where by two community elders were selected from each of the 239 sub locations within the County, 314 Government representatives (75 chiefs & 239 sub-chiefs), 29 Church and religious leaders and 39 civil society organizations representatives. The research employed the Slovin's formula to select a sample size of 273 respondents. The study used primary data that was collected through a semi-structured questionnaire to collect information for quantitative and qualitative analysis. In analyzing the qualitative data, the study used descriptive statistics using Statistical Package for Social Sciences V. 22.

RESULTS

Indigenous Culture

The study sought to assess the role of indigenous culture on sustainable ecological conservation in county governments in Kenya. This section presented findings to statements posed in this regard with responses given on a five-point Likert scale (where 1 =

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Strongly disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5= Strongly Agree). Table 1 presented the findings. The scores of 'strongly disagree' and 'disagree' were taken to represent a statement not agreed upon, equivalent to mean score of 0 to 2.5. The score of 'Neutral' were taken to represent a statement equivalent to a mean score of 2.6 to 3.4. The score of 'agree' and 'strongly agree' were taken to represent a statement highly agreed upon equivalent to a mean score of 3.5 to 5.0.

A majority of respondents were found to agree with the statement posed in regard to the effects of indigenous culture and sustainable ecological conservation in the county government of Machakos, Kenya. The study established that indigenous cultural beliefs are constantly struggling to maintain their place in environmental conservation in a system dominated by scientific worldviews (Mean=4.324, Std= 1.657). The community laws and customs ensure communities take care of natural resources including Land use and are formed out of the need for the community to survive (Mean= 4.568; Std= 1.876). The indigenous rituals among the gender divide ensure generations do not loose important knowledge on environmental conservation. (Mean= 3.908; Std= 1.875). The indigenous cultural practices such as Song, folklore, Symbols, and Artifacts have a special role in protecting the environment (Mean= 3.897; Std= 1.765). The overall mean was 3.879. The study results implied that respondents agreed that indigenous culture did affect sustainable ecological .conservation in the county government of Machakos.

Table 1: Indigenous Culture and Sustainable Ecological Conservation

Indigenous Culture	Mean	Std. Dev
Indigenous cultural beliefs are constantly struggling to maintain their place in environmental conservation in a system dominated by scientific worldviews.	4.324	1.657
Community laws and Customs ensure communities take care of natural resources including Land use and are formed out of the need for the community to survive.	4.568	1.876
Indigenous Rituals among the gender divide ensure generations do not loose important knowledge on environmental conservation.	3.908	1.875
Indigenous cultural practices such as Song, folklore, Symbols, and Artifacts have a special role in protecting the environment	3.897	1.765
Composite Mean	**3.879**	

Indigenous Education

The study sought to assess the role of indigenous education on sustainable ecological conservation in county governments in Kenya. This section presented findings to statements posed in this regard with responses given on a five-point Likert scale (where 1 = Strongly disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5= Strongly Agree). Table 2 presented the findings. The scores of 'strongly disagree' and 'disagree' were taken to represent a statement not agreed upon, equivalent to mean score of 0 to 2.5. The score of 'Neutral' were taken to represent a statement equivalent to a mean score of 2.6 to 3.4. The score of 'agree' and 'strongly agree' were taken to represent a statement highly agreed upon equivalent to a mean score of 3.5 to 5.0.

A majority of respondents were found to agree with the statement posed and established that community dialogue forums are important events at which Indigenous knowledge practices on sustainable conservation of the ecology are learned. (Mean=3.245, Std= 1.876). Coaching and apprenticeship were strong methods of acquiring skills on sustainable land use (Mean= 3.765; Std= 1.235). Word of mouth by custodians of traditional knowledge form part of training on agriculture and land use. This has suffered invasion and oftentimes eclipsed by western knowledge imparted through

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western institutions. (Mean= 3.456; Std= 1.754). The modern education system does not support indigenous forms and methods of knowledge acquisition (Mean= 4.321; Std= 1.432). The overall mean was 3.456. The study results imply that respondents agreed that indigenous education did affect sustainable ecological .conservation in the county government of Machakos.

Table 2: Indigenous Education and Sustainable Ecological Conservation

Indigenous Education	Mean	Std. Dev
Community dialogue forums are important events at which Indigenous knowledge practices on sustainable conservation of the ecology are learned.	3.245	1.876
Coaching and Apprenticeship are strong methods of acquiring skills on sustainable land use	3.765	1.235
Word of mouth by custodians of traditional knowledge form part of training on Agriculture and Land use. This has suffered invasion and oftentimes eclipsed by western knowledge imparted through western institutions.	3.456	1.754
The modern education system does not support indigenous forms and methods of knowledge acquisition.	4.321	1.432
Composite Mean	**3.456**	

Indigenous Technology

The study sought to assess the role of indigenous technology on sustainable ecological conservation in county governments in Kenya. This section presented findings to statements posed in this regard with responses given on a five-point Likert scale (where 1 = Strongly disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5= Strongly Agree). Table 3 presented the findings. The scores of 'strongly disagree' and 'disagree' were taken to represent a statement not agreed upon, equivalent to mean score of 0 to 2.5. The score of 'Neutral' were taken to represent a statement equivalent to a mean score of 2.6 to 3.4. The score of 'agree' and 'strongly agree' were taken to represent a statement highly agreed upon equivalent to a mean score of 3.5 to 5.0.

A majority of respondents were found to agree with the statement posed and established that indigenous tools and implements were part of a rich knowledge base used to ensure sustainable land use; on the contrary, western tools and equipment had introduced techniques that lead to fast degradation of farming land. (Mean=3.574, Std= 1.765). Indigenous technologies included information systems that ensured natural events and phenomena awareness. These helped the community to predict natural disaster occurrences (Mean= 3.821; Std= 1.876). Indigenous technologies developed Agricultural appliances and traditions that aided in sustainable land use and limited natural resources destruction (Mean= 4.230; Std= 1.754). Lack of techniques to document Indigenous technology inventions has led to their eclipse by western and emerging technologies that have led to environmental degradation (Mean= 4.372; Std= 1.436). The overall mean was 3.987. The study results implied that respondents agreed that indigenous technology did affect sustainable ecological .conservation in the county government of Machakos.

Table 3: Indigenous Technology and Sustainable Ecological Conservation

Indigenous Technology	Mean	Std. Dev
Indigenous Tools and implements are part of a rich knowledge base used to ensure sustainable land use; on the contrary, western tools and equipment have introduced techniques that lead to fast degradation of farming land.	3.573	1.765
Indigenous technologies included information systems that ensured natural events and phenomena awareness. These helped the community to predict natural disaster	3.821	1.823

occurrences.		
Indigenous technologies developed Agricultural appliances and traditions that aided in sustainable land use and limited natural resources destruction.	4.230	1.876
Lack of techniques to document Indigenous technology inventions has led to their eclipse by western and emerging technologies that have led to environmental degradation.	4.372	1.436
Composite Mean	**3.987**	

Policy Framework

The study sought to assess the role of policy framework on sustainable framework on ecological conservation in county governments in Kenya. This section presented findings to statements posed in this regard with responses given on a five-point Likert scale (where 1 = Strongly disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5= Strongly Agree). Table 4 presented the findings. The scores of 'strongly disagree' and 'disagree' were taken to represent a statement not agreed upon, equivalent to mean score of 0 to 2.5. The score of 'Neutral' were taken to represent a statement equivalent to a mean score of 2.6 to 3.4. The score of 'agree' and 'strongly agree' were taken to represent a statement highly agreed upon equivalent to a mean score of 3.5 to 5.0.

A majority of respondents were found to agree with the statement posed and established that indigenous values, beliefs and practices relating to land use and natural resource conservation had been lost due to lack of policies and legislation to ensure their protection (Mean=3.821, Std= 1.234). There had been inadequate support by both the National and County governments in assisting communities' to document, preserve and disseminate indigenous knowledge on environment conservation and land use (Mean= 3.543; Std= 1.009). Indigenous technologies developed agricultural appliances and traditions that aided in sustainable land use and limited natural resources destruction (Mean= 4.009; Std= 1.231). Very few or none of the community elders and custodians of indigenous knowledge are aware of the existing policies and legislation on indigenous knowledge (Mean= 3.678; Std= 1.245). The overall mean was 3.876. The study results implied that respondents agreed that policy framework did affect sustainable ecological conservation in the county government of Machakos.

Table 4: Policy Framework and Sustainable Ecological Conservation

Policy Framework	Mean	Std. Dev
Indigenous values, beliefs and practices relating to land use and natural resource conservation have been lost due to lack of policies and legislation to ensure their protection.	3.573	1.765
There has been inadequate support by both the National and County governments in assisting communities' to document, preserve and disseminate indigenous knowledge on environment conservation and land use.	3.821	1.823
Poor coordination and implementation of existing policies and legislation on the protection of Indigenous knowledge has contributed to the attrition of IK beholders who in most cases are the elderly in the community.	4.230	1.876
Very few or none of the community elders and custodians of indigenous knowledge are aware of the existing policies and legislation on indigenous knowledge.	4.372	1.436
Composite Mean	**3.876**	

Sustainable Ecological Conservation

The study sought to assess sustainable ecological conservation in Machakos county government, Kenya. This section presented findings to statements posed in this regard with responses given on a five-point Likert scale (where 1 = Strongly disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5= Strongly Agree). Table 5 presented the findings. The scores of 'strongly disagree' and 'disagree' were taken to represent a statement not agreed upon, equivalent to mean score of 0 to 2.5. The score of 'Neutral' were taken to represent a statement equivalent to a mean score of 2.6 to 3.4. The score of 'agree' and 'strongly agree' were taken to represent a statement highly agreed upon equivalent to a mean score of 3.5 to 5.0.

A majority of respondents were found to agree with the statement posed and established that Indigenous cultural beliefs, community laws, rituals and cultural practices such as songs, and folklore played a vital role in ensuring sustainable ecological conservation in Kenya (Mean=3.745, Std= 1.241). Indigenous education methods including community dialogue, apprenticeship, community elder's word of mouth and indigenous innovations were central to sustainable ecological conservation in Kenya (Mean= 3.876; Std= 1.237). Support to Indigenous technologies used to develop tools and implements and the dissemination of indigenous information played a key role in ensuring national and county governments realize sustainable ecological conservation in Kenya. (Mean= 4.321; Std= 1.327). National and County governments support in the coordination and implementation of policies and legislation on indigenous knowledge is fundamental in ensuring sustainable ecological conservation in Kenya (Mean= 4.376; Std= 1.432). The overall mean was 3.325. The study results implied that respondents agreed that policy framework did affect sustainable ecological conservation in the county government of Machakos.

Table 5: Sustainable Ecological Conservation

Statements	Mean	Std. Dev
Indigenous cultural beliefs, community laws, rituals and cultural practices such as songs, and folklore play a vital role in ensuring sustainable ecological conservation in Kenya.	3.573	1.765
Indigenous education methods including community dialogue, apprenticeship, community elder's word of mouth and indigenous innovations are central to sustainable ecological conservation in Kenya.	3.821	1.823
Support to Indigenous technologies used to develop tools and implements and the dissemination of indigenous information play a key role in ensuring national and county governments realize sustainable ecological conservation in Kenya.	4.230	1.876
National and County governments support in the coordination and implementation of policies and legislation on indigenous knowledge is fundamental in ensuring sustainable ecological conservation in Kenya	4.372	1.436
Composite Mean	**3.876**	

Inferential Statistics

The correlation coefficient was 0.825. This indicated a very strong postive relationship between the independent variable and depedent variable. The data showed that the high R square was 0.680. It showed that the independent variables in the study were able to explain 68.00% variation in the organizational effectiveness while the remaining 32.00% is explained by the variables or other factors which the study recommended for further study. This implied the set of independent variables are very significant and they therefore need to be considered in any effort to enhance suatainable cological conservation in county government of Machakos.

Table 6: Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.825	.680	.653	.761

ANOVA Results

From the ANOVA statics in Table 7, the study established the regression model had a p-value of 0.000<0.05 which was an indication that the data was ideal for making a conclusion on the population parameters as the value of significance. The calculated value was greater than the critical value (110.067 > 1.987) an indication that indigenous knowledge practices (culture, education, technology and policy framework) affected sustainable ecological conservation in county governments in Kenya.

Table 7: ANOVA

Model	Sum of Squares	d.f	Mean Square	F	Sig.
Regression	39.398	4	9.840	110.067	.000
Residual	18.483	207	.089		
Total	57.881	211			

NB: F-critical Value = 1.987;

Regression Coefficients

The general form of the equation was to predict sustainable ecological conservation in county governments in Kenya from indigenous culture, education, technology and policy framework is: ($\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon}$) becomes: $Y= 7.890+ 0.876X_1+ 0.832X_2+ 0.768X_3 + 0.654X_4$.

From the study findings on the regression equation established, taking all factors into account (independent variables) constant at zero sustainable ecological conservation in county governments in Kenya was 7.890. The data findings analyzed also showed that taking all other independent variables at zero, a unit change in indigenous culture would lead to a 0.876 change in sustainable ecological conservation in county governments in Kenya. Based at 5% level of significance, indigenous culture had a t-value (6.123>1.96) with a .002 level of significance.

Further, a unit change in indigenous education would lead to a 0.832 change in sustainable ecological conservation in county governments in Kenya. Based at 5% level of significance, indigenous education had a t-value (4.449> 1.96) with a .005 level of significance. Additionally, a unit change in indigenous technology would lead to 0.768 change in sustainable ecological conservation in county governments in Kenya. Based at 5% level of significance, indigenous technology had a t-value (3.879>1.96) with a .007 level of significance. A unit change in policy framework would lead to 0.654 changes in sustainable ecological conservation in county governments in Kenya. Policy framework had a t-value (3.014>1.96) with a .013 level of significance.

Table 8: Coefficient Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	**B**		
(Constant)	7.890	2.952		2.673	.000
X_1_IndigenousCulture	.876	.143	.522	6.123	.002

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X_2_ Indigenous Education	.832	.187	.458	4.449	.005
X_3_ Indigenous Technology	.768	.198	.388	3.879	.007
X_4_Policy framework	.654	.217	.376	3.014	.013

CONCLUSION

The study concluded that indigenous culture did affect sustainable ecological conservation in the county government of Kenya. The regression coefficients of the study showed that indigenous culture had a significant role on sustainable ecological conservation in the county government of Kenya. This implieed that change in the levels indigenous culture would affect sustainable ecological .conservation in the county government of Kenya.

In addition, the study concluded that indigenous education did affect sustainable ecological conservation in the county government of Kenya. The regression coefficients of the study showed that indigenous culture had a significant role on sustainable ecological .conservation in the county government of Kenya. This implied that change in the levels indigenous education would affect sustainable ecological conservation in the county government of Kenya.

Further, the study concluded that indigenous technology did affect sustainable ecological conservation in the county government of Kenya. The regression coefficients of the study show that indigenous technology had a significant role on sustainable ecological conservation in the county government of Kenya. This implied that change in the levels indigenous technology would affect sustainable ecological conservation in the county government of Kenya.

Finally, the study concluded that policy framework did affect sustainable ecological conservation in the county government of Kenya. The regression coefficients of the study showed that framework had a significant role on sustainable ecological .conservation in the county government of Kenya. This implied that change in the levels policy framework would affect sustainable ecological .conservation in the county government of Kenya

RECOMMENDATIONS

The study recommended that there is need to enhance indigenous cultural beliefs which constantly struggling to maintain their place in environmental conservation in a system dominated by scientific worldviews. The community laws and customs should ensure communities take care of natural resources including Land use and are formed out of the need for the community to survive.

The study recommended for improvement on the indigenous education through community dialogue, coaching and apprenticeship, word of mouth by custodians of traditional knowledge form part of training on agriculture and land use. This would improve the invasion and oftentimes eclipsed by western knowledge imparted through western institutions.

The study recommended that there is need to enhance indigenous tools as part of a rich knowledge base used to ensure sustainable land use. The indigenous technologies such as information systems can ensure natural events and phenomena awareness. This would lead to improved sustainable ecological conservation in the county government of Kenya.

The study recommended that there is need to improve indigenous values, beliefs and practices relating to land use and natural resource conservation lost due to lack of policies and legislation to ensure their protection. This can be carried out by both the National and County governments in assisting communities' to document,

preserve and disseminate indigenous knowledge on environment conservation and land use.

Recommendation for Further Research

This study was a millstone for future research in this area particularly in Kenya. The findings emphasize role of indigenous knowledge practices on sustainable ecological conservation in county governments of Kenya. There is need to establish how the same factors can affect sustainable ecological conservation in county governments of Kenya so that the results can be generalized. The present research took a heavily quantitative approach with a little qualitative aspect to confirm some results. Future research could take a more qualitative approach so that knowledge in this area is enhanced by comparing results from a purely qualitative study with the findings of this study. Despite the few limitations of this study, the findings would address the frequent failures in sustainable ecological conservation in county governments of Kenya and spur development. The study would be an important reference for future research on indigenous knowledge practices and sustainable ecological conservation in county governments of Kenya.

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