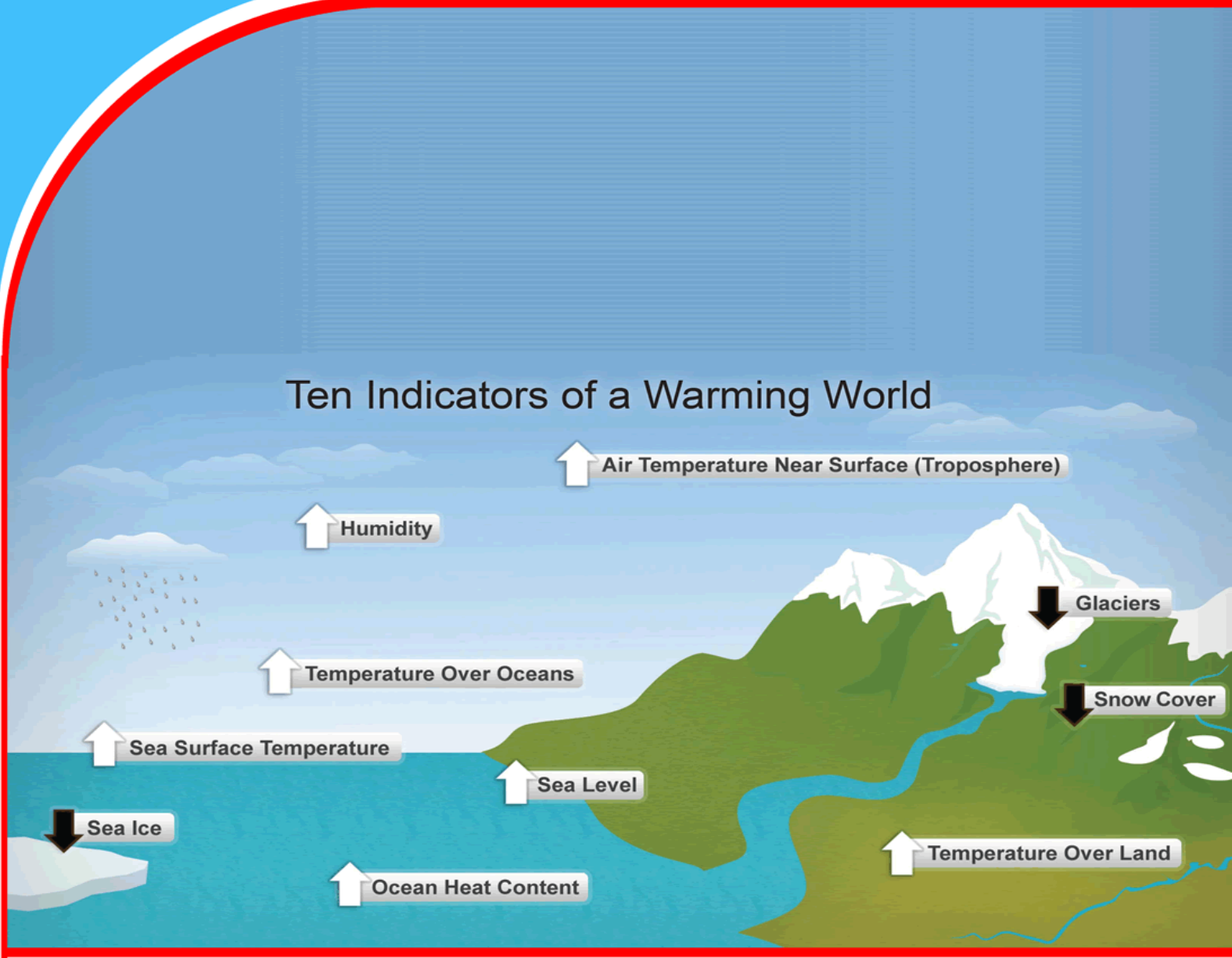
American Journal of
Climatic Studies
(AJCS)



EVALUATION OF THE IMPACT OF COUNTY CLIMATE CHANGE FUND ON COMMUNITY RESILIENCE TO CLIMATE CHANGE IN GARISSA COUNTY, KENYA

Abdiladif Ahmed Haret, Julius M. Huho, Ahmed M. Mohamed and Hussein Sheikh Adams Golicha

American Journal of Climatic Studies
ISSN 2520-0471 (Online)
Vol.2, Issue 1, pp 38-59, 2021
www.ajpojournals.org

EVALUATION OF THE IMPACT OF COUNTY CLIMATE CHANGE FUND ON COMMUNITY RESILIENCE TO CLIMATE CHANGE IN GARISSA COUNTY, KENYA

Abdiladif Ahmed Haret[1*], Julius M. Huho[2], Ahmed M. Mohamed[3] and Hussein Sheikh Adams Golicha[4]

[1,2,3,4]Department of Natural Ressources, Garissa University, Kenya

[*]Corresponding Author's Email: abdilatif846@gmail.com

ABSTRACT

Purpose: Climate change is a major threat to the livelihoods of communities in the Arid and Semi-Arid Lands (ASALs) in Kenya since they depend on climate related resources. To caution ASALs dwellers in some counties, County Climate Change Fund (CCCF) was introduced to build resilience against the shocks related to the vagaries of climate change, resources are allocated to build community resilience from the Government. This study therefore evaluated the impact of this fund on community resilience to climate change taking a case of Garissa County, Kenya.

Methodology: Qualitative and quantitative data was collected from the households, ward planning committee members, the village elders, county representatives of the funds and womankind in charge of the fund in a purposively sampled ward, Goreale Ward, in Garissa County. While the qualitative data was analyzed through thematic analysis, the quantitative data was analyzed through Spearman Rank-order correlations.

Findings: The findings indicated that the fund had ensured economic resilience, infrastructure resilience and natural resource management in the ward to a very low extent. Additionally, the relationship between participatory planning, social inclusion and accountability in CCCF and economic resilience was positive and significant but weak. Moreover, the relationship between participatory planning, social inclusion and accountability in CCCF and infrastructure resilience was positive and significant but weak. It was also established that the relationship between participatory planning, social inclusion and accountability in CCCF and natural resource management was positive and significant but weak.

Unique Contribution to theory, practice and Policy: Based on the findings it was established that there is a need to enhance participatory planning, social audit and accountability of CCCF in order to ensure efficiency in utilization of the fund which can result to stronger and higher impact on both economic as well as infrastructure resilience to climate change and also natural resource management.

Key Words: *Economic Resilience, Natural Resource Management, Infrastructural Resilience, Count Climate change Fund*

Introduction

The impacts of climate change are far biting because the livelihoods and economic activities of people rely on climate-sensitive natural resources (Nzau, 2013). Climate change impacts is a global problem (Watson *et al*. 2012). An Economic Commission for Latin America and the Caribbean (ECLAC) (2014) established that Latin America suffers costs in the tune of up to 1.5% to 5% of GDP per year. Asia and the Pacific, led by China, are the leading emitters of Green House Gas (GHG) (World Bank, 2014). Further argument by Shepherd *et al*. (2013) posit that Asians are among the world's most vulnerable to the effects of climate change. Paradoxically, even though Sub-Saharan Africa (SSA) is the least contributor to emissions of GHG, it is the most vulnerable to the impact of climate change (Brown & Bird, 2019). In addition, the Intergovernmental Panel on Climate Change (IPCC, 2016) demonstrated that SSA region which heavily relies on rain fed-agriculture experiences cases of acute droughts, hunger and food shortages (Heinrich Boll Foundation South Africa, 2019), prompting an urgent need for climate change finance.

Kenya falls among the most vulnerable countries to climate change in the SSA region with current projections suggesting that its temperature will rise to 2.5ºC between 2000 and 2050 and rainfall is expected to reduce drastically thus posing a risk in food security (Bryan *et al*. 2013). Going by the IPCC's (2016) report, up to 85 per cent of the Kenyan landmass is inclined to climate change impacts. Further statistics from the GOK (2018) National Climate Change Action Plan add that the impacts of climate change are far worse as shown by an increase by 5.3 per cent in the number of cattle slaughtered to cushion farmers from drought in the year 2018, more than a half a Million Kenyans facing starvation as a result of the 2018 drought and the 2018 floods claiming more than 183 lives and displacing more than a quarter a Million Kenyans (GOK, 2018).

The cost of climate change is even an alarming fact given that up to 2.6% of the country's GDP is lost and the same is likely to increase given the argument that the country is driven by climate-sensitive sectors such as agriculture, tourism and energy (GOK, 2018). In the ASALSs of Kenya, for instance Garissa, Wajir, Turkana, Isiolo and River Tana, where livestock production, specifically, nomadic pastoralism, is the key source of income, the impact of climate change is severe causing high livestock mortality (GOK, 2018; Crick *et al* .2019). A UNICEF (2018) report indicated that due to the prolonged drought of the year 2018, up to 30 per cent of Children in Garissa and Wajir faced hunger resulting in acute malnutrition. On the other hand, up to 20 per cent of the people needed food aid (Climate and Development Knowledge Network, 2018).

Five counties in the ASALs have to date implemented the County Climate Change Fund; Makueni (2015), Wajir (2016) and Garissa, Isiolo and Kitui (2018) in the tune of not less than 1 percent of their budget to take care of climate change adaptation at the local level through community-led adaptation mechanisms with the support of SIDA and UK Aid. The CCCF mechanism enables the County governments to mobilize climate finance from diverse sources and utilize it to build the resilience of the community with the intention

of reducing the vulnerabilities of climate change impacts in a more coordinated way (Ada, 2019).

The CCCF fund is supposed to enable the counties to develop holistic approaches that guide climate change adaptation at the community level, identify priorities and finance investments that seek to reduce climate risks while achieving adaptation priorities (Ada, 2019), develop institutional structures that connect local communities to the fund through Ward-level planning committees charged with the responsibility of identifying adaptation needs (Apgar *et al*. 2017). In Garissa, the County Climate Change Fund Act was established and implemented in the year 2018 to enable the County set aside up to 2% of its annual development budget for climate change adaptation in the County at the grassroot level. The County climate funds amounted to approximately 60 Million for Garissa County (Apgar *et al*. 2018). Even though these budgets exist, the County is still prone to adverse effects of climate change, year in and year out, and yet, limited empirical surveys have been documented to interrogate the impact of the fund on community resilience, thus the motivation for this probe.

Statement of the Problem

The impacts of climate change are threatening the livelihoods of not just the Kenyan citizens, but the world at large. Kenya is one of the most vulnerable countries in SSA with IPCC's vulnerability assessment techniques indicating that more than 85% of Kenyan landmass is extremely susceptible to climate change impacts (Nzau, 2013; IPCC, 2013). To manage such impacts, the international community have set up climate finance and like other nations of the world, Kenya has set up CCCF with five ASAL counties having already established the Climate Change Fund Act to guide them on how to utilize the funds.

Even though such efforts are supposed to trigger an improvement that remains a mirage among the ASAL counties of concern whereby the impacts of climate change still bite these counties. For instance, Garissa County which allocate 2 per cent of its budget to CCCF annually, still face the wrath of climate change as evidenced by the 2018 drought which caused over 70% of livestock mortality in ASAL areas (GoK, 2018). The impact of the fund is thus a matter of concern which motivated this interrogation.

Objectives of the study

i. To determine the impact of CCCF on economic resilience to climate change in Goreale Ward of Garissa County, Kenya
ii. To establish the impact of CCCF on infrastructure resilience to climate change in Goreale Ward of Garissa County, Kenya
iii. To find out the impact of CCCF on natural resource management in Goreale Ward of Garissa County, Kenya

American Journal of Climatic Studies
ISSN 2520-0471 (Online)
Vol.2, Issue 1, pp 38-59, 2021
www.ajpojournals.org

Conceptual Framework

The study was based on UNDP and International Union for Conservation of Nature (IUCN) drylands resilience frameworks developed in the year 2016 to improve community climate change resilience for enhanced livelihoods and sustainable natural resources management. The UNDP model is based on actions from several fronts such as legislation, capacity strengthening, water management, gender equity, health and education (ADA, 2019). The model proposes three interlinking areas of focus that is: Mainstreaming drylands issues, climate change adaptation and mitigation into national policy planning and budgeting frameworks; improving governance and management of natural resources with emphasis on sustainable land and water management at the local level and enhancing livelihoods of drylands communities through capacity building, livelihood diversification, networking and value chain development. The model was adopted by organizations such as the Kenya Adaptation Consortium (ADA). The organization is demonstrating that local climate adaptation planning, supported by County government-managed devolved funds, informed by community priorities and enhanced by climate information services, renders significant benefits for people in poor and marginalized households in the most drought prone areas. Based on the theoretical argument, the following Conceptual framework was developed.

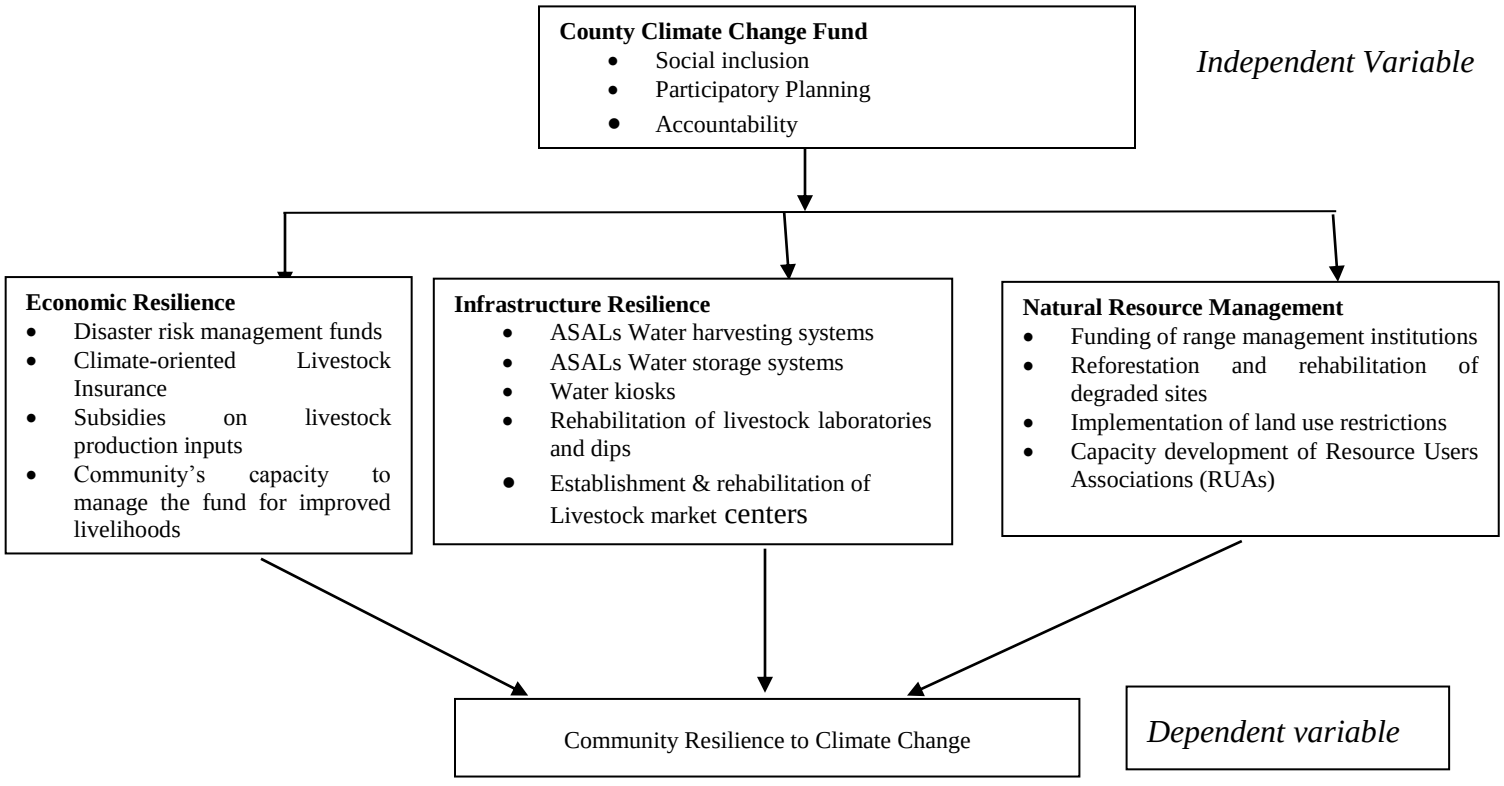


Figure 1 Conceptual Framework

American Journal of Climatic Studies
ISSN 2520-0471 (Online)
Vol.2, Issue 1, pp 38-59, 2021
www.ajpojournals.org

RESEARCH METHODOLOGY

The study focused on Goreale Ward in Lagdera Sub-County, Garissa County, Kenya. The Ward is principally a semi-arid area which receives an average rainfall of 275 mm per year. Goreale Ward is susceptible to famine, drought and floods hence a beneficiary of the CCCF fund.

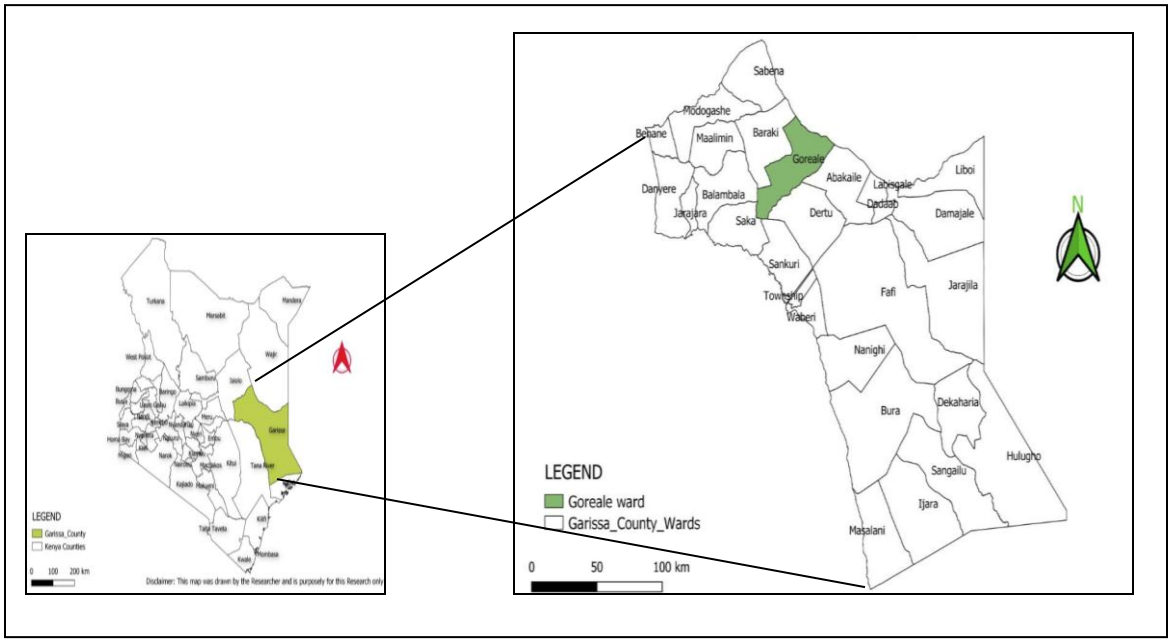


Figure 2 Study Area

The study targeted the beneficiaries of the fund, that is, households of Goreale Ward, Ward Planning Committee Members, village elders, civil organizations in the Ward, respective County governments' representatives in charge of the County Climate Change Fund the Ward as well as UK Aid representatives in charge of the County Climate Change Fund in the Ward. In total, the households of Goreale Ward who are also the expected beneficiaries were 1,571, the Ward planning committee members based on the County records of Garissa were 33. In addition, the village elders of the 4 villages making up Goreale Ward, that is 2 from each village were considered besides the 2 County representatives of the funds and 2 Womankind in charge of CCCF. To determine the sample size of the project beneficiaries to participate in the study, Yamane formula was adopted to sample 318 respondents. On the other hand, purposive sampling was adopted to select the remaining category of respondents.

To collect data, the study made use of semi-structured questionnaires, interview guide as well as Focused Group Discussion (FGDs) which aided collection of both quantitative and qualitative data from the households. Thematic analysis was used to analze the qualitative data while both descriptive and inferential statistics were used to analyze

quantitative data. Spearman rank-order correlation was adopted to establish the relationship between the study variables.

RESULTS

Goreale Ward Community and the CCCF

The respondents were asked whether they were aware of CCCF and some of the projects conducted through the fund. All of them indicated that they were aware of the CCCF in the Ward. They indicated that the fund has helped in some projects such as capacity building of RUAs, installation of solar panels, water troughs and water storage facilities among others. In addition, the respondents were also asked to indicate whether there was participatory planning in management of CCCF, whether social audit of the fund was conducted and whether there was accountability in the management of the fund. The results to their responses were shown in Figure 3. It was established that majority of the respondents, 62 percent and 52 percent, disapproved of existence of participatory planning in the fund as well as social audit of the fund respectively. This implied that most of the decisions regarding the fund were made at the County level with low level of community's involvement.

In addition, 52 percent of the respondents from Goreale Ward indicated that they have not been involved in the social audit of the projects which have been implemented through the fund. They argued that the projects went ahead without their involvement in identification, monitoring and evaluation. Moreover, 44 percent of the respondents indicated lack of accountability in the CCCF. They stated that they had not received any financial reports, disclosures or plans on the CCCF. Neither were they involved in planning or accountability as far as the funds were concerned. On the contrary, the discussants in the FGD indicated that there was accountability in the management of the funds. They also argued that the process of initiating projects was conducted through community involvement at the Ward level as well as availing of financial information on projects.

As a result, the participants on the FGDs implied that there was accountability, social inclusion and participatory planning in the fund. The contradicting results are however not a surprise considering that not all the households are involved in planning but a few through committees. Therefore, it was understandable that some felt that the management of the funds was not accountable and participatory.

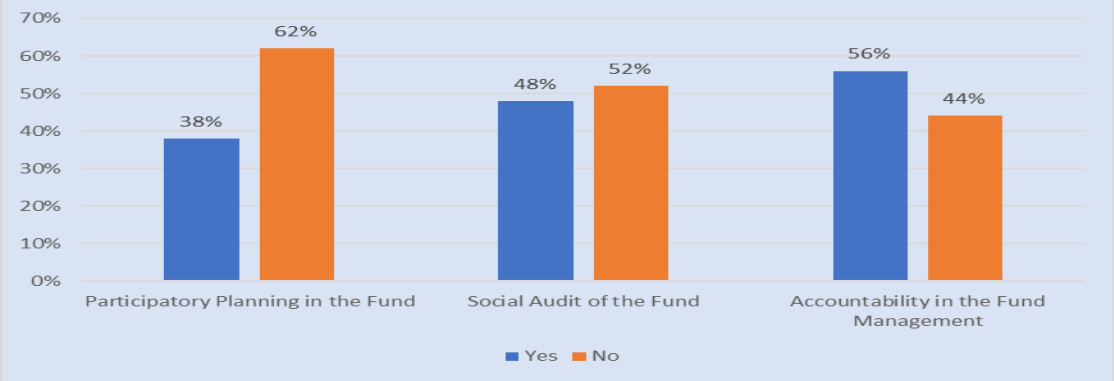


Figure 3 Management and Accountability in CCCF

CCCF and Economic Resilience to Climate Change

In investigating disaster risk management through the CCCF, respondents were asked whether they had ever experienced any economic losses due to adverse effects of climate change. All the respondents stated that they had experienced severe losses in assets and livestock during previous famines, droughts and floods. See plate 1. It is from such losses that the CCCF was introduced to caution households against the livelihood shocks while at the same time strengthening their economic resilience to climate change impacts.

Plate 1 Dead Livestock in Garissa County, Kenya (UNICEF, 2020)

Based on an adapted perception scale (1 = Very Low Extent; 2 = Low Extent; 3 = Moderate Extent; 4 = High Extent; 5 = Very High Extent), the respondents further indicated the extent to which various economic resilience initiatives have been implemented through CCCF drive in their locality (Table 1).

Table 1 Extent to which economic resilience initiatives have been implemented

Statement	Mean	Standard Deviation
There has been an allocation of some funds to groups to manage the risks of climate change	1.03	0.85
Climate oriented crop insurance has been initiated to the households engaged in crop farming to cushion against adverse climate change effects	1.02	0.81
Climate oriented livestock insurance has been initiated to the households engaged in livestock farming to cushion against adverse climate change effects	1.05	0.90
Subsidies on agricultural inputs have been provided to enhance agricultural production	1.85	0.67
The community members are trained to manage the funds allocated to them for improved livelihoods	4.13	1.06
Average	**1.82**	**0.86**

Results in Table 1 indicate that the extent of allocation of some funds to groups to manage the risks of climate change, the extent of implementation of climate-oriented and crop and livestock insurance to cushion against adverse climate change effects and the extent of provision of subsidies on agricultural inputs to enhance agricultural production were very low with means of 1.02 – 1.85. Respondents cited extensive use of the Fund only for capacity building and not for development initiatives. Other reasons as discussed in the FGD included low level of entrepreneurial skills whereby majority of the respondents indicated that they were not well conversant with alternative income generation activities, its management and operation. Additionally, low level of preparedness to face climate change impacts hindered improvement of economic resilience. This was majorly attributed to in-availability of funds as well as low access to climate change information.

Even though previous efforts to create climate change warning systems had been advanced before introduction of CCCF, it seems that they are still inadequate. Similarly, Sovacool, Linner and Klein (2017) established that in the Asia-pacific region, the households who received the CCCF to bolster their resilience experienced related challenges in its management which hindered its potential. On the other hand, the community members were highly trained (with mean of 4.13) to manage the funds allocated to them. Generally, economic resilience initiatives have been implemented to a very low extent (M = 1.82; SD = 0.86). These findings imply that as far as economic

resilience initiatives are concerned, the CCCF has mainly been used to train community members of Goreale Ward and not used for development. Some of the training they have obtained has ranged from mitigation strategies to climate change, natural resource management practices such as organic farming, entrepreneurial management skills and management of funds to be allocated for improved livelihoods.

Other initiatives such as allocation of funds to groups, crop and livestock insurance and subsidies on agricultural inputs had not adequately kicked off through the CCCF. The findings are consistent with that of a study by Odhiambo (2013) who established that through the ASAL policy, funds allocated for climate change helped the communities build their economic resilience through capacity building on diversification of income generating activities and sustainable production. Although CCCF was meant to support ASAL counties to improve their economic resilience through initiatives such as livestock disease control, agricultural insurance as well as capacity building (ADA Consortium, 2014), this has not been achieved in Garaole Ward.

The relationship between CCCF and economic resilience was established through Spearman rank order correlation and the results are presented in Table 2. The results indicated that CCCF had mildly improved the economic resilience of the households to climate change impacts. The relationship between participatory planning in CCCF and economic resilience of the households to climate change impacts was positive and significant ($r = 0.350$; R-square = 0.1225; P-value < 0.05). Results of Coefficient of Determination shows that participatory planning in CCCF accounted for up to 12.25 percent improvement in the economic resilience against climate change impacts in Goreale Ward. The weak correlation value was occasioned by the fact that by the time of the study, the initiatives implemented by the Fund had not realized much impact. At the time of the study, a big proportion of the fund had been directed to Wards capacity building. Other initiatives such as allocation of funds to groups, crop and livestock insurance and subsidies on agricultural inputs had not yet extensively kicked off.

A related study by United Nations Development Fund (UNDP) (2009) similarly indicated that the Least Developed Countries Fund (LDCF) has had positive impact on the economic resilience of those affected by climate change through enhancing technology transfer, energy, transport, industry, agriculture, forestry and waste management as well as economic diversification through climate change fund.

The study also established that the relationship between social inclusion and economic resilience was positive but weak ($r = 0.141$; R-square = 0.020; P-value < 0.05). Results of Coefficient of Determination shows that social inclusion accounted for up to 2 percent of the improvement in economic resilience to climate change impacts in Goreale Ward. Like under participatory planning in CCCF, the weak relationship was occasioned by low implementation of the CCCF initiatives at the time of the study. In comparison with the FGD results that there had been accountability in the management of the funds, it can be argued that the level was low.

The discussants in the FGD indicated that the process of initiating projects was conducted through community involvement at the Ward level which can be considered to be inadequate. The findings are consistent with that of Alliance (2019) who indicated that the Devolved Climate Finance (DCF) mechanism enabled residents of Senegal, Mali, Tanzania and Kenya prone to climate change impacts to recover economically through diversifying their income generating activities. The impact of accountability in management of CCCF was tested against economic resilience of the households to climate change impacts. Based on the results in Table 2, its impact was positive but very weak ($r = 0.114$; R-square = 0.013; P-value < 0.05). Results of Coefficient of Determination shows that accountability in management of CCCF explains up to 1.3 percent of improvement in economic resilience to climate change impacts in Goreale Ward. The reason for the weak relationship was not only due to low implementation of the CCCF initiatives but also because the CCCF Act was new as at the time of the study. Thus, accountability structures and framework not fully developed which explains the low extent of accountability which translates to its low impact.

Higher rate of accountability in management of CCCF would lead to a significant improvement in the economic resilience of the households to climate change impacts. Accountability ensures that embezzlement is minimized and the resources are efficiently utilized, which means that its utility is maximized to deliver its mandate. The findings are consistent with that of a study by Odhiambo (2013) who revealed that the ASAL policy of climate change fund well covers the ability of the households in the counties to build their economic resilience such as diversification of income generating activities, sustainable livestock production through subsidies on production inputs and livestock-oriented insurance.

Table 2 Relationship between CCCF and Economic Resilience to Climate Change

		Participatory Planning in CCCF	Social Inclusion	Accountability in CCCF Management	Economic Resilience
Participatory Planning in CCCF	Correlation Coefficient	1			
	N	245			
Social Audit of CCCF	Correlation Coefficient	.145*	1		
	Sig. (2-tailed)	0.023	.		
	N	245	245		
Accountability in CCCF Management	Correlation Coefficient	0.009	.304**	1	
	Sig. (2-tailed)	0.888	0	.	
	N	245	245	245	
Economic Resilience	Correlation Coefficient	.350**	.141*	0.114*	1
	Sig. (2-tailed)	0.000	0.028	0.044	
	N	245	245	245	245

*** Correlation is significant at the 0.05 level (2-tailed).**

**** Correlation is significant at the 0.01 level (2-tailed).**

American Journal of Climatic Studies
ISSN 2520-0471 (Online)
Vol.2, Issue 1, pp 38-59, 2021
www.ajpojournals.org

CCCF and Infrastructure Resilience to Climate Change

In investigating the adequacy of infrastructure in the Ward to spur resilience to climate change, the respondents were asked to indicate whether the previously developed infrastructure before introduction of CCCF was adequate. The results presented in Figure 4 indicated that majority of the respondents, 96 percent, argued that the previously developed infrastructure before introduction of CCCF was not adequate in the sense that they were few compared to the demand, some were old and not operational and others were incomplete. Specifically, the previously constructed water troughs, tanks and kiosks were aging as shown in plates 2.

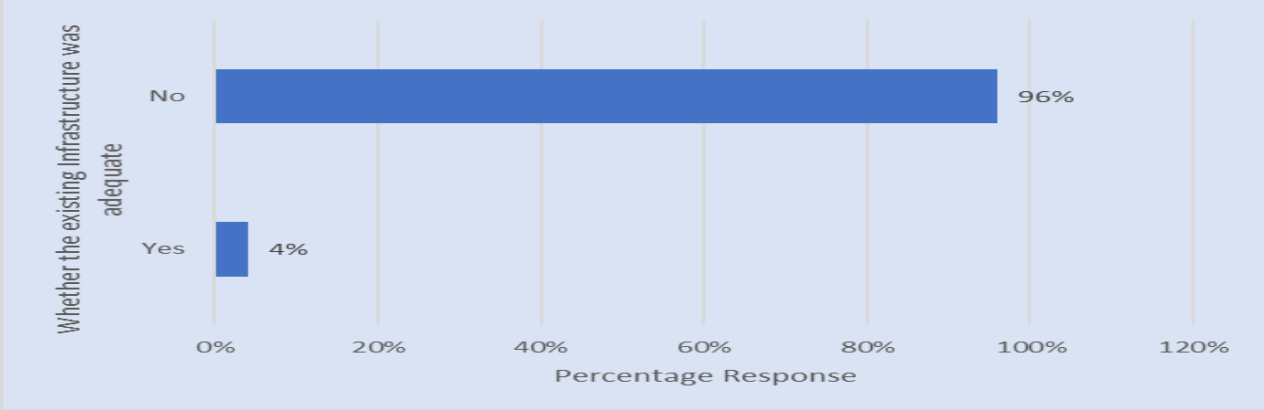


Figure 4 Adequacy of the Existing Infrastructure

These findings confirm one of the major reasons behind introduction of CCCF to develop infrastructure resilience because the previous infrastructure before this fund was not adequate. The respondents also indicated that some of the existing water kiosks, water troughs and water storage facilities (Tanks) in Goreale Ward were old and not operational (Plate 2).

Plate 2 An old Water Kiosk, Water Trough and Storage Facility in Goreale Ward (Field Work, 2020)

Based on an adapted perception scale (1 = Very Low Extent; 2 = Low Extent; 3 = Moderate Extent; 4 = High Extent; 5 = Very High Extent), the respondents further indicated the extent to which various infrastructures had been developed through the CCCF to enhance resilience to climate change (Table 3). It was established that CCCF have been used to develop water kiosks and water storage facilities in Goreale Ward to a high extent at M = 4.04 and 4.26 respectively. The extent to which the CCCF has helped build water harvesting facilities such as boreholes in the households and increased the acreage under irrigation in the households is very low at M = 1.35 and 1.36 respectively.

Table 3 Extent to which Infrastructure Resilience Initiatives have been developed

Statement	Mean	Standard Deviation
There has been improvement of water kiosks through CCCF	4.04	1.00
The fund has helped build water harvesting facilities such as boreholes in the households	1.35	0.59
The fund has helped build water storage facilities such as tanks in the households	4.26	0.77
The fund has helped increase the acreage under irrigation in the households	1.36	0.70
Through CCCF, livestock laboratories and dips have been improved	3.34	0.78
Through CCCF, households have been installed solar panels	4.36	0.74
Average	**3.11**	**0.76**

Basically, only 4 water troughs and 3 water kiosks and tanks had been developed in the Ward through CCCF each to serve 30,000 people including those from the neighboring Wards as well as 2,000 cattle, 10,000 goats and 25,000 camel (ADA, 2020). In the long run, this would strain the infrastructures leading to faster rate of depreciation. This was majorly contributed by allocation of the funds for capacity building purposes and not development of infrastructures in the first phase. In addition, other reasons for the low adoption as presented in the FGD discussions were community politics, poor local leadership, lack of sufficient funds and low level of technical knowhow. In regard to community politics, the discussants in the FGD indicated that some clans in the area felt more entitled to control the infrastructures than others. As a result, long debates were held on the suitable locations of the infrastructures which delayed the development of the infrastructures. Concerning leadership, the discussants in the FGD argued that disagreements arose between the local councilor, Ward administrator and local

administration on where to locate and implement the infrastructures which are commonly used, that is water troughs and tanks. Before arriving at a compromise decision on which neutral grounds are suitable, long and overwhelming discussions were held.

Lack of technical knowhow to manage the developed infrastructure as well as the sustainability plan was also discussed in the FGD as a contributing factor. Therefore, to counter this problem, the management of the water troughs, kiosks and tanks was spearhead by well-trained Water User's Associations. The members of the associations were trained on effective water management and sustainability practices to ensure that there was efficiency in utilization. In addition, they were required to charge a small fee on the usage to ensure sustainability, maintenance and repair of the infrastructures. Similarly, Sovacool, Linner and Klein (2017) established that in the Asia-pacific region, the households who received the CCF to bolster their resilience experienced related challenges in its management. Before the introduction of the fund, most of the water kiosks, storage facilities (tanks) and troughs were old. Community members had a lot of livestock but due to limited resources like troughs they spent a whole night queuing for water. In most cases, they were forced to cross over to neighboring Wards in search of water. However, this posed a danger since they met hostile communities which led to water conflicts. The CCCF helped in developing four water troughs (Plate 3).

Plate 3 Newly constructed Water Troughs, Storage Facility and Solar Panel in Goreale Ward through CCCF (Field Work, 2020)

The water kiosks were placed under the management of a well-trained Water User's Association on water sustainability mechanisms. In Goreale Ward, one WRUA was created and that is Goreale Ward Planning Committee which comprises of members across the 4 villages in the Ward. The results further indicated that that through the fund, livestock dips have been improved to a moderate extent (M = 3.34) and through CCCF, households have been installed solar panels to a high extent (M = 4.36; SD = 0.74). Generally, it was indicated that the fund has helped to improve infrastructure resilience of the households to a moderate extent (M = 2.62).

These findings imply that the CCCF has majorly been used to improve and develop water kiosks, tanks and troughs. Other infrastructures such as increasing acreage under irrigation, improving dips and laboratories have not been improved to a great extent through the fund. The results are also consistent with that of Tenzing, Andrei, Gaspar-

Martins and Jallow (2016) who indicated that the households from the least developed countries facing climate change impacts can make good use of the CCF to develop their infrastructure resilience through establishing water management systems and early warning systems. The relationship between CCCF and infrastructure resilience was established using Spearman rank-order correlation and the results presented in Table 4.

Table 4 Relationship between CCCF and Infrastructure Resilience to Climate Change

		Participatory Planning in CCCF	Social Audit of CCCF	Accountability in CCCF Management	Infrastructure Resilience
Participatory Planning in CCCF	Correlation Coefficient	1			
	N	245			
Social Audit of CCCF	Correlation Coefficient	.145*	1		
	Sig. (2-tailed)	0.023	.		
	N	245	245		
Accountability in CCCF Management	Correlation Coefficient	0.009	.304**	1	
	Sig. (2-tailed)	0.888	0	.	
	N	245	245	245	
Infrastructure Resilience	Correlation Coefficient	.486**	0.249**	0.123*	1
	Sig. (2-tailed)	0.000	0.009	0.041	.
	N	245	245	245	245

*** Correlation is significant at the 0.05 level (2-tailed).**

**** Correlation is significant at the 0.01 level (2-tailed).**

The relationship between participatory planning in CCCF and infrastructure resilience of the households to climate change impacts was positive and significant but weak (r = 0.486; R-Square = 0.236; P-value < 0.05). Results of Coefficient of Determination shows that participatory planning in CCCF explains up to 23.6 percent of the improvement of infrastructure resilience among the households of Goreale Ward. In comparison with the FGD, the discussants in the FGDs indicated that the process of initiating projects was conducted through community involvement at the Ward level. This may imply less representativeness given that not many households have a chance to be part of the ward committees. The discussants also indicated that participatory planning ensures that the household's priority in infrastructure to be developed is given a first priority. As a result, the fund would end up developing only the infrastructures deemed relevant and needy by the households to support their livelihood. For instance, since most of the households in Goreale Ward have a lot of livestock with few resources like troughs, they needed more troughs, tanks and water kiosks in order to save on the time they look for water, the distance covered and the death of livestock and human lives as a result of the longer distances and water conflicts. In doing so, their livelihood which majorly depends on

livestock, is improved. In agreement, the study by UNDP (2016) indicated that through the Climate Change Trust Fund, the households and beneficiaries in Bangladesh were able to develop infrastructure resilience by building flood- and cyclone-resilient housing, installation of Nano-grids to increase electrification on chars, delivery of rainwater harvesting systems for drinking water and irrigation, construction of cluster housing that can serve as emergency shelters and repairing of damaged embankments that protect against flooding.

It was also indicated that the relationship between social inclusion and infrastructure resilience of the households to climate change impacts was positive and significant but weak ($r = 0.249$; R-square = 0.062; P-value < 0.05). Results of Coefficient of Determination shows that social inclusion explains up to 6.2 percent of the variation in development of infrastructure resilience among the households of Goreale Ward. This further implies that higher rate of social inclusion would lead to a significant improvement in the infrastructure resilience of the households to climate change impacts. The value is however weak to imply that as at the time of the study, social inclusion didn't have much impact on infrastructure resilience. This is because only a few infrastructures (water kiosks, solar panels, water troughs, tanks) had been built in Goreale Ward. In addition, the mechanisms for social inclusion were not well developed since the CCCF Act had just come into effect and the programme was in phase one. The findings are also consistent with that of a study by Tenzing, Andrei, Gaspar-Martins and Jallow (2016) who indicated that the households from the least developed countries facing climate change impacts can make good use of the CCF to develop their infrastructure resilience through establishing water management systems and early warning systems.

Additionally, the relationship between accountability in management of CCCF and infrastructure resilience of the households to climate change impacts was positive and significant but weak ($r = 0.123$; R-Square = 0.02; P-value < 0.05). Results of Coefficient of Determination shows accountability explains up to 2 percent of the variation in development of infrastructure resilience among the households of Goreale Ward. This further implies that higher rate of accountability would lead to a significant improvement in the infrastructure resilience of the households to climate change impacts. The value is however weak to imply that as at the time of the study, accountability was low in as far as infrastructure development was concerned. Given that only a few initiatives had been developed, the extent of accountability was low to mount a meaningful impact. However, it can be argued that if future projects enhance accountability, there would be a significant improvement in the infrastructure resilience of the households to climate change impacts. Consistently, Djohy (2019) indicated that the Decentralized Climate Funds in Mali has enabled the local communities to initiate strong infrastructural capability regarding management and dissemination of climate change information, tools for uptake of weather forecasting services and infrastructures to improve production. In Kenya, Murphy and Orindi (2017) also demonstrated that the County Climate Change Funds have had a positive impact on infrastructural resilience so far by enabling development of early warning systems as well as water harvesting and storage systems such as boreholes.

CCCF and Natural Resource Management

In investigating the state of natural resources, the respondents were asked to indicate whether there were cases of destroyed natural resources as a result of climate change impacts in Goreale Ward. All the respondents stated that due to adverse effects of climate change, they had faced losses in natural resources characterized by reduced wildlife, gully erosion, deforestation and loss (reduced) natural pastures and grazing land (Plates 4).

Plate 4 Gully erosion as well as Vast and Bare Land with reduced pasture in Goreale (Field Work, 2020)

The existence of negative impact of climate change on the natural resources imply the need for CCCF in enhancing natural resource management. Given the presence of the negative impacts of climate change, the discussants in the FGD indicated that the community members had put in place some measures to mitigate it. Some of the strategies put in place by the households of Goreale Ward to minimize the climate change impacts on natural resources were planting of trees, seeking alternative sources of livelihood such as mixed farming in order to minimize the strain on the environment, formation of community-based resource users' associations to manage common community resources as well as agro forestry. The water resource user's associations for instance, ensure there is sustainable grazing on common lands and control the access to the land. Based on an adapted perception scale (1 = Very Low Extent; 2 = Low Extent; 3 = Moderate Extent; 4 = High Extent; 5 = Very High Extent), the respondents further indicated the extent to which various natural resource management practices had been implemented through the CCCF to enhance resilience to climate change (Table 5).

Table 5 Extent to which Natural Resources Management Practices have been implemented

Statement	Mean	Standard Deviation
Range management institutions in the locality have been funded to manage climate change through the fund	1.24	0.77
The fund has supported reforestation activities in the locality	1.23	0.84
The fund has supported activities to adopt mixed farming	1.36	0.76
Agroforestry at farm level has been initiated among the households through the fund	1.24	0.81
Community based resource users' associations have been funded to conduct natural resource management activities in the community	4.31	0.77
Average	**1.88**	**0.79**

The respondents indicated that the fund had supported reforestation activities in the locality and agroforestry at farm level to a very low extent as shown by Mean of 1.23 and 1.24 respectively. One of the reasons for this low extent was expensive use of the fund for capacity building of community members and RUAs on effective resource management practices. In addition, the discussants in the FGD indicated that lack of sufficient funds, low level of technical knowhow and poor attitudes towards adoption of diversified means of livelihoods also posed as challenges. At the first phase of the programme, capacity building and trainings had mainly been initiated through the fund. Other large-scale activities had not been implemented due to insufficient funds. In addition, due to high illiteracy level, most of the households stated that they didn't have much knowledge on the best natural resource management practices. Given that the area is largely dry, some of the households indicated that they had poor attitudes towards adopting irrigated farming as a supplement and diversification to their source of income. Most of them believed that livestock rearing was the main activity suitable in that area. Similarly, Sovacool, Linner and Klein (2017) established that in the Asia-pacific region, the households who received the CCF to bolster their resilience experienced related challenges in its management.

Additionally, it was established that the community-based resource users' associations have been funded to conduct natural resource management activities in the community to a high extent as shown by a Mean of 4.31. Through the fund, members of the resource user's associations have been trained on sustainable farming activities as well as to ensure sustainable grazing on common lands and control the access to the lands. The findings are consistent with that of Djohy (2019) who argued that through the Decentralized Climate Funds, households in Senegal started practicing agropastoral practices, reforestation activities, rangelands management and building the capacity of the locals for development of Resource Users Associations. The relationship between CCCF and Natural Resource Management was also established using Spearman rank-order correlation and the results presented in Table 6.

The relationship between Participatory Planning in CCCF and natural resources management by the households was positive and significant (r = 0.333; R-Square = 0.11; P-value < 0.05). Results of Coefficient of Determination shows that participatory planning explains up to 11 percent of the variation in natural resource management in Goreale Ward. The discussants in the FGD supported the importance of participatory planning by arguing that enhancing participatory planning in CCCF would lead to an improvement in natural resources management by the households. The findings are consistent with that of Huq, Bruns, Ribbe and Huq (2017) who indicated that natural resource management initiatives involving women had been initiated in the country, rehabilitation of lands and introduction of environmentally friendly farming activities in the country were all made possible with the fund.

It was also indicated that the relationship between social inclusion of CCCF and natural resources management by the households was positive and significant (r = 0.125; R-Square = 0.02; P-value < 0.05). Results of Coefficient of Determination shows that social inclusion explains up to 2 percent of the variation in natural resource management in Goreale Ward. The relationship is weak given the challenges faced in implementation of the natural resource management initiatives through the fund. It was established through the FGD that lack of sufficient funds, low level of technical knowhow and poor attitudes hindered full realization of the natural resource management practices. The findings also agree with Djohy (2019) who established that through the Decentralized Climate Funds, households in Senegal started practicing agropastoral practices, reforestation activities, rangelands management and building the capacity of the locals for development of Resource Users Associations.

The results also showed that the relationship between accountability in management of CCCF and natural resources management by the households was positive and significant (r = 0.109; R-square = 0.01; P-value < 0.05). Results of Coefficient of Determination showed that accountability explains up to 1 percent of the variation in natural resource management in Goreale Ward. The findings are also consistent with that of Sharma, Orindi, Hesse, Pattison and Anderson (2014) who indicated that the CCF has enabled an improvement in natural resource management by supporting and facilitating agro-forestry, soil restoration and unconventional water management. Similarly, Awuor (2009) indicated that through community-based approaches, the communities in ASALs were forming resource utilization associations with the aid of climate change funds which makes it possible to manage operational costs.

Table 6 Relationship between CCCF and Infrastructure Resilience to Climate Change

		Participatory Planning in CCCF	Social Audit of CCCF	Accountability in CCCF Management	Natural Resource Management
Participatory Planning in CCCF	Correlation Coefficient	1			
	Sig. (2-tailed)	.			
	N	245			
Social Audit of CCCF	Correlation Coefficient	.145*	1		
	Sig. (2-tailed)	0.023	.		
	N	245	245		
Accountability in CCCF Management	Correlation Coefficient	0.009	.304**	1	
	Sig. (2-tailed)	0.888	0	.	
	N	245	245	245	
Natural Resource Management	Correlation Coefficient	.333**	0.125**	0.109**	1
	Sig. (2-tailed)	0.000	0.004	0.006	
	N	245	245	245	245

*** Correlation is significant at the 0.05 level (2-tailed).**

**** Correlation is significant at the 0.01 level (2-tailed).**

CONCLUSION

The study concluded that the initiatives implemented through CCCF have realized economic resilience, infrastructure resilience and natural resource management to a low extent in Goreale Ward of Garissa County, Kenya. Specifically, some initiatives to build economic resilience such as providing subsidies on agricultural inputs to enhance agricultural production, crop and livestock-oriented insurance cover had been implemented to a very low extent. This is because of limited funds availability, low level of entrepreneurial skills and insecurity issues. However, training community members as a way of building their economic resilience had been conducted to a very high extent.

Additionally, some initiatives to enhance infrastructure resilience of the households such as building of water harvesting and storage facilities, increasing the acreage under irrigation in the households and improvement of livestock laboratories and animal dips had been implemented to a low extent. Only installation of solar panels and improvement of water kiosks has been widely achieved. The poor implementation was attributed to community politics, poor local leadership, lack of sufficient funds and low level of

technical knowhow. Furthermore, some of the efforts to implement natural resources management initiatives had experienced low success rate. Such as supporting reforestation activities in the locality, adoption of mixed farming and Agroforestry at farm level. However, training of community-based resource users' associations to conduct natural resource management activities in the community had been done to a high extent. The low rate of adoption was attributed to lack of sufficient funds as well as low level of technical knowhow.

The study further concluded that was the planning in CCCF to be participatory, it would lead to a significant improvement in the economic and infrastructure resilience of the households to climate change impacts as well as natural resource management in Garissa County. Similarly, was there social audit in CCCF, it would lead to a significant improvement in the economic and infrastructure resilience of the households to climate change impacts as well as natural resource management in Garissa County. Additionally, the study concluded that enhancing accountability structures in management of CCCF would lead to a significant improvement in the economic and infrastructure resilience of the households to climate change impacts as well as natural resource management in Garissa County.

RECOMMENDATIONS

The study recommends a need for the County government of Garissa to increase the CCCF allocation. This is because, in as much as an expensive share had been allocated to capacity building, the remaining proportion was still inadequate to implement the other initiatives aimed at improving resilience and natural resource management. In addition, even though a lot was proportioned for capacity building, there is a need to allocate more towards the same given that more training and awareness creation is needed. There is a need to allocate funds more to other initiatives aiming to build resilience as well as natural resource management. This is because an expensive share of the CCCF has been directed to capacity building, which has affected the allocations to other critical initiatives. This can be done by prioritizing areas of importance and allocating funds accordingly.

More trainings are required to build the capacity of the households of Goreale in entrepreneurship, agro forestry, strategies for mitigation of climate change impacts and the importance of natural resource management. These trainings can be conducted at the village level through the RUAs, CBOs and local administrations so as to reach more people on the ground. There is a need to ensure inclusivity and public participation when coming up with projects through the fund as well as identifying sites for setting up projects through CCCF. This will help reduce leadership and community conflicts between the clans, local administration and the local politicians regarding the suitable projects to be implemented and the suitable site for projects implementation

Based on the findings that enhancing participatory planning in CCCF would lead to a significant improvement in the economic, infrastructure and natural resource management resilience of the households to climate change impacts, the study

recommends the county government to improve the legal framework of the fund in order to create flexible channels for stakeholder involvement from the grassroots. Stakeholder involvement in planning can also be improved through availability of information, facilitation to meetings and creation of awareness. Currently, the community is being represented by members in ward planning committees which may not be satisfactory. The study also recommends an improvement in social audit of the fund by availing crucial accounting information to the stakeholders on time, allowing Public-Private Partnerships arrangements in projects implementation, community engagement and setting up local overseeing committees. This is because higher rate of social audit of CCCF would lead to a significant improvement in the economic and infrastructure resilience of the households to climate change impacts as well as natural resource management in Garissa County.

REFERENCES

ADA Consortium. (2014). Strengthening adaptation and resilience to climate change in Kenya plus (StARCK+)

Apgar, M., Kniveton, D., Naess, L., Orindi, V., Abuya, N., (2017). Improving the Impact of Climate Information Services in Kenya's Arid and Semi-Arid Lands.IDS Policy Briefing Paper 145

Awuor, C. (2009). Increasing drought in arid and semi-arid Kenya. In J. Ensor & R. Berger (Eds.), Understanding climate change adaptation: Lessons from community-based approaches (pp. 101–114). Rugby: Practical Action Publishing

Bryan, E., Ringler, C., Okoba, B., Roncoli, C., Silvestri, S., & Herrero, M. (2013). Adapting agriculture to climate change in Kenya: Household strategies and determinants. *Journal of environmental management*, *114*, 26-35.

Djohy, G. (2019). Social inclusion in the Decentralized Climate Funds process in Mali and Senegal.

ECLAC (2014). The Economics of Climate Change in Latin America and the Caribbean. Paradoxes and Challenges. Overview for 2014

Government of Kenya (2018). National Climate Change Action Plan 2018-2022. Nairobi, Kenya: Government of Kenya

Huq, N., Bruns , A., Ribbe, L., & Huq, S. (2017). Mainstreaming Ecosystem Services Based Climate Change Adaptation (EbA) in Bangladesh: Status, Challenges and Opportunities. *Sustainability* (9):926. doi:10.3390/su9060926

IPCC, 2016: Climate Change 2016: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Change.https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_all_final.pdf

Murphy, D. & Orindi, V. (2017) Kenya's County Climate Change Funds. NAP Global Network sNAPshot country brief 2B

Nzau, M. (2013). Mainstreaming climate change resilience into development planning in Kenya. *International Institute for Environment and Development (IIED). Country report. IIED, London.*

Odhiambo, M. (2013). Releasing our full potential: The ASAL policy, its promise and challenges (A briefing note for members of county assemblies, community representatives, leaders, CSO and ASAL stakeholders)

Sharma, V., Orindi, V., Hesse, C., Pattison, J., & Anderson, S. (2014). Supporting local climate adaptation planning and implementation through local governance and decentralized finance provision. *Development in Practice*, *24*(4), 579-590.

Shepherd, A., Mitchell, T., Lewis, K., Lenhardt, A., Jones, L., Scott, L. & Caravani, A. (2013). The geography of poverty, disasters and climate extremes in 2030. London: Overseas Development Institute

Sovacool, B.K., Linnér, B., Klein, R.J.T. (2017). Climate change adaptation and the Least Developed Countries Fund (LDCF): *Qualitative insights from policy implementation in the Asia-Pacific Climatic Change*, (2017). 140:209-226.

Tenzing, J., Andrei, S., Gaspar-Martins,G. & Jallow, P.B. (2016). Climate finance for the Least Developed Countries: A future for the LDCF? Available at http://pubs.iied.org/G04040/ (as accessed on 13 January 2018).

UNDP (2016). Kenya Climate Public Expenditure and Budget Review. UNDP. Available online at https://www.undp.org/content/dam/kenya/docs/energy_and_environment/2016%20CPEBR%20Report.pdf

Watson, C., Nakhooda, S., & Caravani, A. (2012). The practical challenges of monitoring climate finance: insights from Climate Funds Update.

World Bank (2014) World Bank Open Data portal: data.worldbank.org