ENVIRONMENTAL PERFORMANCE INDEX (EPI): 2018

KAKAMEGA COUNTY

National Environment Management Authority, Kenya (NEMA)

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Our Environment, Our Life, Our Responsibility

Mazingira Yetu, Uhai Wetu, Wajibu Wetu

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PREFACE

National Environment Management Authority (NEMA), recently domesticated the Environment Performance Index (EPI), a global tool, which measures performance in our State of Environment (SOE) and is the first step towards preparing Environmental Action Plans (EAP). The EPI is now part of the Report that the Cabinet Secretary for Environment and Forestry is obliged under EMCA CAP 387 to present to the National Assembly each year, applicable to both national and county level. The EPI ranks and compares County by County performance for select indicators, clearly illustrating where additional support, resource allocation and investment is needed. Maintained by Yale and Columbia University for the past 20 years, the Global EPI has ranked Kenya a "poor performer", currently at 130 out of 180 nations. This County brief, therefore, calls upon high level, County policy-oriented readership to work toward improve their grass root situation.

The Green Economic Strategy and Implementation Plan (GESIP), launched by the Ministry of Environment and Forestry in 2016, established that 40% of GDP and 70-80% of livelihoods are dependent on our natural resource base. Nature therefore underpins the Constitutional rights of every Kenyan to a health environment, improved well-being, employment and sustainable development. We see daily, growing reports of illegal anthropogenic pressures, over-exploitation, unregulated pollution and degradation eroding the quality of life of Kenyans. The very people who are causing this damage are our customers, our clients, "our voters". They need results! The EPI is designed to help us shape policy, bringing a green growth focus to national and county programs and plans.

The Constitution, in Schedule 4, laid out a two-tier system of government, placed emphasis on Devolved Environmental Functions (DEF) whereby County Governments are now responsible to implement EMCA CAP 387. The expectation is that Counties will use SOER to mainstream Environmental Action Plans (EAP) into their County Integrated Development Plans (CIDP). County EPIs therefore inform County Governments in a simple, easy to read, illustrative format, as to the "state of affairs", helping them to drive prioritization in budgetary decision making, and guiding fund allocation by the Commission for Revenue Allocation (CRA).

This Index provides a rich source of data and information that can be used by different audiences, particularly high-level political decision makers, County Executives and their donors. In subsequent years, it's expected that the County Environment Committee (CEC) will maintain the EPI database for the County Executive Member for Environment to inform political debate and dialogue, guiding County environmental governance, planning and budgeting. The EPI summarizes key messages of the County SOER, based on the Drivers, Pressures, State, Impact and Response (DPSIR) approach, describes trends, ascribes reasons for decline and lists the impacts of the anthropogenic pressures, and accordingly, recommending mitigation actions to fund.

The EPI is also a monitoring and accountability tool that both identifies the strong and weak points of environmental performance across sectors, and by County. It notes issues that require corrective actions or interventions needed from policy makers. At the same time, it respects the Constitution Article 42, that civil society and the public can hold duty bearers to account, using the EPI as a tool for a grass-root lobby to address weak spots. It fosters transparency, highlighting where policies need to give greater attention. It is also an important tool to assess on a regular basis the performance of sectors and Counties and could be used as part of sector or County Performance Contract, informing whether there is progression or regression over time.

We are indebted to the Danish Government, DANIDA for supporting the preparation of this report, and appreciate the NEMA technical team and acknowledge the many stakeholders who contributed.

Prof. Geoffrey Wahungu
Director General
National Environment Management Authority

COUNTY ENVIRONMENTAL PERFORMANCE INDEX: 2018

1. EXECUTIVE SUMMARY

1.1. What Purpose an EPI?

The Environment Performance Index (EPI) measures progress towards achieving 100% of a Sustainable Development target, helping to guide County and Sector policy, planners and decision makers to identify Counties with under-performing environment and natural resource management (E&NRM) sectors that need support, both politically and financially, and becomes a powerful lobby tool to increase investment, as needed.

1.2. How Well is the County Performing Overall?

The national EPI is 55.6%. The Kakamega County EPI is 50.3%, suggesting a below average performance, and placing its ranking as 35th out of 47 counties. The County is therefore in the bottom 20%, in a category of "below average performing" counties, implying attention and investment is needed in the E&NRM budgets of the CIDP.

1.3. How Well is the County Doing by Sector?

Of the 27 indicators in the National EPI, the 13 containing County databases are attached and the assessment of the County performance suggests, it is doing well in the following sectors, notably:

a. Water Stress Index is at 100% implying high water endowed.
b. Literacy levels are at 91%, implying the community should be well educated in E&NRM.
c. Tree cover loss has been maintained at below 6%, giving a 94% tree cover retention vs 2000 baseline.
d. Access to safe water is at 62%, implying reasonable coverage
e. Climate change mainstreaming in CIDP is at 60%, implying some attention has been given to adaptation.

1.4. Where is the County in need of Support?

The attached 13 indicators, suggest, poor performing sectors in the County where attention is needed includes:

a. The health of 92% of households are exposed to poor indoor air quality pollution from paraffin lamps and 88% from cooking with fuelwood, needs urgent attention.
b. The capacity of environmental expertise is at 11% of requirement, suggesting more recruitment is needed.
c. Waste water treatment is at a low 19%, and needs attention
d. Expenditure on E&NRM in CIDP is a low 22%, and needs to proportionately match the 40% GDP worth.
e. Access to solid waste services is low 26%, implying poor waste management, and has room to improve.

1.5. Recommendations for Environmental Action Plan by the County Government

a. Given the high number of households that are dependent on paraffin and fuelwood for cooking and lighting, investment is needed to promote more carbon efficient cook stoves and improved indoor ventilation to avoid respiratory health risks to women and young children exposed to black carbon and particulate matter in the kitchen.
b. The County needs to invest in more environmental expertise and capacity building.
c. Waste water treatment plants require investment.
d. Access to solid waste services needs investment in CIDP to increase County capacity in collection and safe disposal to reduce environmental health hazards.
e. County need to increase CIDP expenditure in E&NRM to match the GDP worth.

2. COUNTY ENVIRONMENTAL PERFORMANCE INDEX (EPI): 2018.

2.1. How to Interpret EPI Scores

The Global Environmental Performance Index (EPI) has been domesticated by the National Environmental Management Authority (NEMA), and adapted to Kenyan conditions. The Kenyan Index reports national and county government performance in three areas: a) Environmental Health (ie air and water quality), b) Environmental Vitality (ie biodiversity and resource status) and c) Socio-economic Environment (ie. education and gender engagement). It is a State of the Environment (SOE) policy guide that looks at status of National and County service delivery and conditions that need additional support, resource allocation, investment and governance. It is a composite Index where the national EPI comprises 27 indicators of which 13 are County level indicators. The County number is lower because full data sets were not available.

The status of indicator is standardized across sectors, transformed for comparison to either % of population affected or % of land area involved (eg sanitation is measured as % of population, while forest cover is % of land area). Points are then allocated as per performance vs % towards a national target (100% being the ideal). A cumulative index of all sectors, add up on a weighted bias according to pre-determined judgement of the indicators relative importance and contribution to sustainable development, gives the national or County EPI.

2.2. How to Use the EPI to Inform Policy?

The EPI is a SOER, policy monitoring and accountability tool that both identifies strong and weak points of environmental performance across sectors as well as county by county. It notes issues that require corrective actions or interventions either by politicians, policy makers or planners. It also fosters transparency, highlighting where policies or budgets need to give greater attention to remedial solutions. It is designed as a compass, a pointer to draw high level attention to where additional political support, resource allocation, or donor investment is needed to improve livelihoods and human well-being. It does not attempt to explain the relationship and/or the impact of one variable on another, this would be the target of additional research.

2.3. Purpose of the County EPI Information Fact Sheet

The 13 County EPI Fact Sheets attached to this Report, are designed as a database to inform both national and county policy makers and planners, to help them at a glance to visualize the trends in E&NRM performance. It allows County Government to make comparison with their peers (ie County to County), and for sectors to assess in which County they are under-achieving. This information is for use by lobbyists to support their case either for policy change, or for justifying prioritization of investment needs during ADP budget debates.

2.4. Why a Kenyan EPI?

An EPI represents trends in the selected combination of a multiple of E&NRM sectors in the 3 policy categories. It allows a comparison between national and county performance towards achieving national goals (ie Vision 2030) and international standards (ie SDGs). The percentage measure of how close achievement is to target, is known as “proximity to target” (PTT) where 100% means “on target”.

For the last 20 years, Yale and Columbia Universities have published a bi-annual global EPI, comparing 180 countries. Currently, Kenya is ranked 130, implying it is in the 25% “low performing category”. In 2017, to re-address the situation, NEMA embarked on domesticating the tool to guide national and county planning, providing senior management with an insight into science based information for policy and decision making.

The EPI is part of the State of the Environment Report (SOER), presenting the national trend lines, with county by county performance comparison. The data is presented in a format whereby the connectivity between Drivers, Pressures, State and Impacts can easily be understood so as to illicit the right remedial Response (ie a process known as the “DPSIR approach” for SOER). The EPI is the first step in appraising the EAP performance whereby priority, appropriate mitigation actions can then be incorporated in National and County EAP, and mainstreamed into the County Integrated Development Plans (CIDP) and annual budgets.

2.5. How Policy Makers and Planners Can Use an EPI to Lobby for Resources?

An EPI is a tool whereby national and county policy makers and planners, their donors and NGOs can visualize performance trends and current status in any one of the selected priority E&NRM sector indicators. It helps the user to rapidly and visually assess County status vs national targets. County management can quickly pin-point in which sectors they are under-performing, and look at this as an opportunity to draw Ministry of Finance, the Commission for Revenue Allocation (CRA) or their donors attention to their situation.

The EPI helps make a strong case for where future investment is needed. The presentation as visual trends, info-graphics and GIS map can be easily interpreted by the National and County Assembly, and can be used by County Councilors to guide them in political decision making how best to serve their Constituencies.

The EPI, in accordance with EMCA CAP 387, 9(3) is presented alongside the Cabinet Secretary, Ministry of Environment and Forestry (MEF) **"Annual State of the Environment"** report to the National Assembly. This makes it a powerful tool for a budget lobby, and offers Counties the opportunity to input, to ensure the Medium Term Plan (MTP) is sensitive to County E&NRM concerns and supports under-performing Counties budget requests during appraisal of Annual Development Plans (ADP).

2.6. The Kenya EPI Framework Explained

The EPI framework as domesticated for Kenya and illustrated in the tables below includes:

a. A National EPI Framework made up of 3 policy segments and 27 issue based indicators.
b. The National EPI comparison is ranked as a total of 27 Sector Indicators, based on the SOER data.
c. The County EPI performance, presents a County by County comparison ranked as a total of 13 indicators.

2.7. The Kenya EPI Fact Sheets Explained

The attached 47 County EPI Fact Sheets, presents the SOER database, highlighting trends for the 13 County E&NRM indicators, based on:

a. SOER trends of the national performance by sector.
b. The County EPI by sector, of all 47 counties, graphically ranked from best to lowest performance.
c. GIS map of the County by performance level.
d. And the DPSIR of the individual County status.

Each Sector Fact Sheet graphic shows:

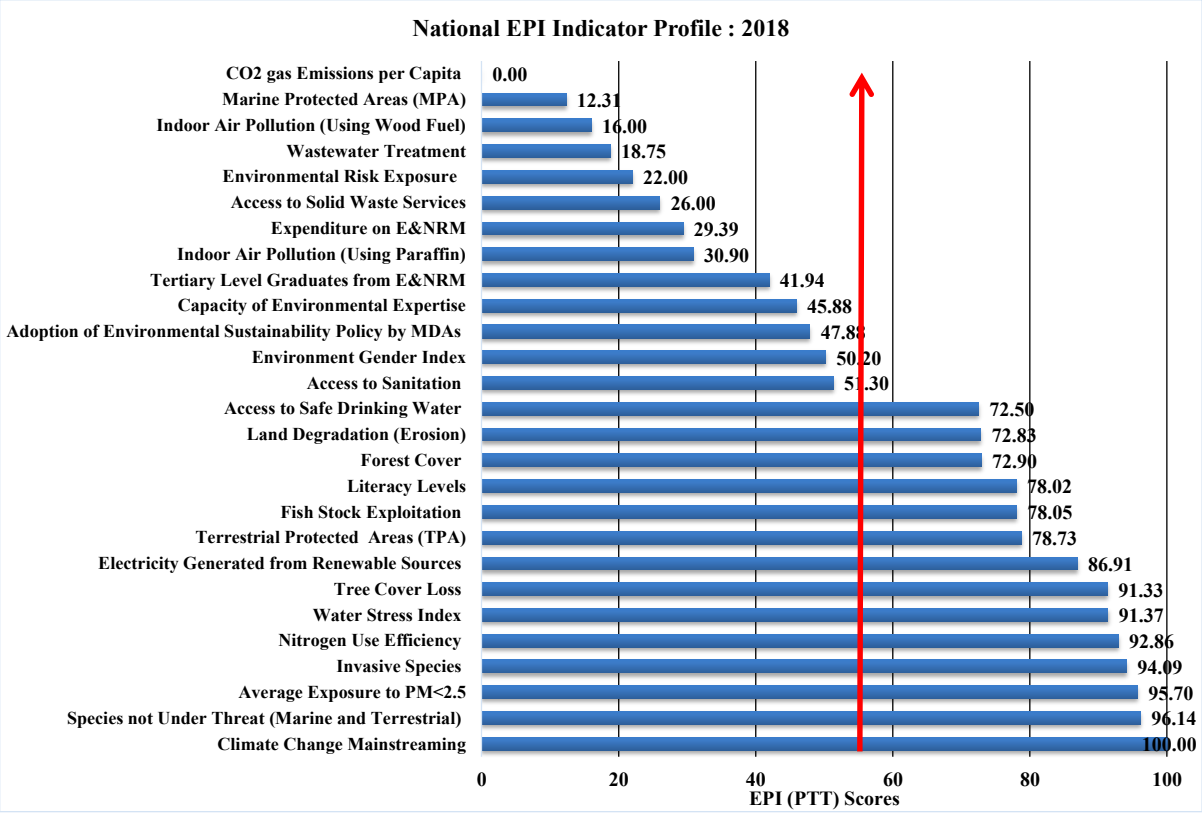
a. The County in question, encircled in red to highlight its performance status ranked by sector and
b. A red line which is the national average, and any County below this line, is effectively under-performing.

3. KENYA NATIONAL ENVIRONMENTAL PERFORMANCE INDEX FRAMEWORK: 2018

Objective Category	Policy	Indicator	Indicator Description	Target	Reference
Environmental Health	Environmental Burden of Disease	Environmental Risk Exposure	% of a population exposed to environmental health risks (a composite of 4 factors of unsafe water, poor sanitation and poor air quality)	0%	WHO, Vision 2030
	Air Quality	Indoor Air Pollution (Using Wood Fuel)	% of total households using wood fuel as energy for cooking.	0%	Vision 2030, CoK
		Indoor Air Pollution (Using Paraffin)	% of total households using paraffin for indoor lighting.	0%	Vision 2030, CoK
		Average Exposure to PM<2.5	% population exposed to fine particulate matter of PM<2.5µg/m3.	0%	Vision 2030, CoK
	Water and Sanitation	Access to Safe Drinking Water	% of population having access to safe drinking water	80%	Vision 2030, MWI
		Access to Sanitation	% population that has access to improved sanitation	100%	MOH
	Environmental Nuisance	Access to Solid Waste Services	% of solid waste generated that is collected and disposed of in designated dumpsites	100%	Vision 2030, EMCA (2015)
Ecosystem Vitality	Sustainable Water Resources Management	Water Stress Index	% of water demand <40% of total available water resources	<40%	NWMP, 2030
		Wastewater Treatment	% of urban population covered by formal sewerage services	100.0%	Vision 2030
	Agriculture, Livestock and Fisheries	Nitrogen Use Efficiency	% N2 output vs N2 input to crops	>70%	SDG 2030
		Fish Stock Exploitation	% of inland and marine catch vs the peak capacity as the MSY.	<50%	FAO
	Forests and woodlands	Tree Cover Loss	% of tree cover vs area in 2000	0.0%	Vision 2030
		Forest Cover	% total land area covered in trees	10.0%	Vision 2030, CoK
	Biodiversity and Habitat	Species not Under Threat (Marine and Terrestrial)	% of all 5 taxa of national species that are not under threat	0.0%	Vision 2030, IUCN
		Terrestrial Protected Areas (TPA)	% of terrestrial protected area vs total terrestrial land area.	17.0%	CBD
		Marine Protected Areas (MPA)	% of total MPA vs total marine area	10.0%	CBD
		Invasive Species	% total land/water area not covered by 4 select indicator invasive plants/animals.	0.0%	Vision 2030
	Climate Change	Climate Change Mainstreaming	% degree of climate change mainstreaming in National and County budgeting processes	100.0%	NCCAP
		CO2 gas Emissions per Capita	% of CO2 emissions per capita in comparison to 30% reduction of 2015 emissions	<30%	UN, 2015
	Energy	Electricity Generated from Renewable Sources	% electricity generated from renewable sources	80.0%	Vision 2030
	Sustainable Land Resource Use	Land Degradation (Erosion)	% total land area that is not at very high risk from soil erosion	0.0%	SDG 2030
Socio Economic Sustainability	Environmental Education	Capacity of Environmental Expertise	% of licensed EIA experts proportionate to 10,000 population	0.0001%	Expert Opinion
		Literacy Levels	% population over the age of 15 who can both read and write	100.0%	Vision 2030
		Tertiary Level Graduates from E&NRM	% students graduated in E&NRM courses from tertiary institutions	10.0%	Expert Opinion
	Gender and Environment	Environment Gender Index	% of women involved in gender responsive environmental conservation	100.0%	Vision 2030
	Governance, Compliance and Enforcement	Expenditure on E&NRM	% of expenditure on E&NRM Vs total expenditure	34.0%	Expert Opinion
		Adoption of Environmental Sustainability Policy by MDAs	% degree of adoption of environmentally sustainable policies by MDAs	100.0%	EMCA

3.1. The National EPI Sector Profile: 2018

In domesticated the EPI to Kenyan conditions, the following performance trends by sector, emerge:



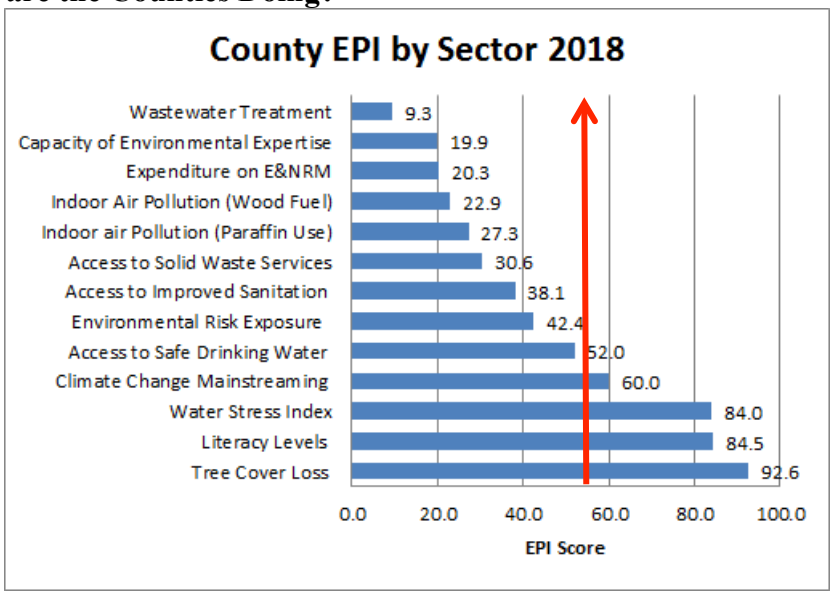
The top 5 Kenya national best performing E&NRM sectors are:

a. Climate change mainstreaming has achieved 100% inclusion in all CIDPs to date.
b. Species under threat are less than 5%, achieving 96% towards a zero threatened status.
c. Exposure to outdoor air quality of PM<2.5 is <5%, achieving 95% to zero risk to human health.
d. The spread of invasive species is just over 5% of area, achieving 94% toward zero coverage.
e. Nitrogen use efficiency in agriculture is at 93% attainment of an international target.

The bottom 5 national poor performing sectors where attention is needed:

a. Kenya has 0% achievement in its maintenance of CO_2 emissions at the agreed 2015 levels.
b. Only 1.2% of Marine Protected Areas (MPA) has been achieved towards a target of 10%.
c. >84% of households are exposed to harmful air pollution from indoor cooking fires and lighting.
d. >81% of towns do not have adequate waste water treatment plants.
e. >78% of population are exposed to environmental health risk from water and air pollution.
f. Less than 26% of population has access to solid waste disposal systems.

3.2. How well are the Counties Doing?



Consolidated County EPI Scores by Sector

(The red line represents the national average showing under-performing sector of Counties)

Overall, it would appear that the top 5 low performing sectors in Counties vs targets are:

a. Waste water treatment is at 9.3%
b. Environmental expertise is at 19.9%
c. Expenditure on E&NRM is at 20.3%
d. Households not exposed to indoor air pollution from fuelwood is 22.9% and paraffin 27.9%
e. Access to solid waste disposal is at 30.6 %

3.3. How Well is the County Performing: 2018?

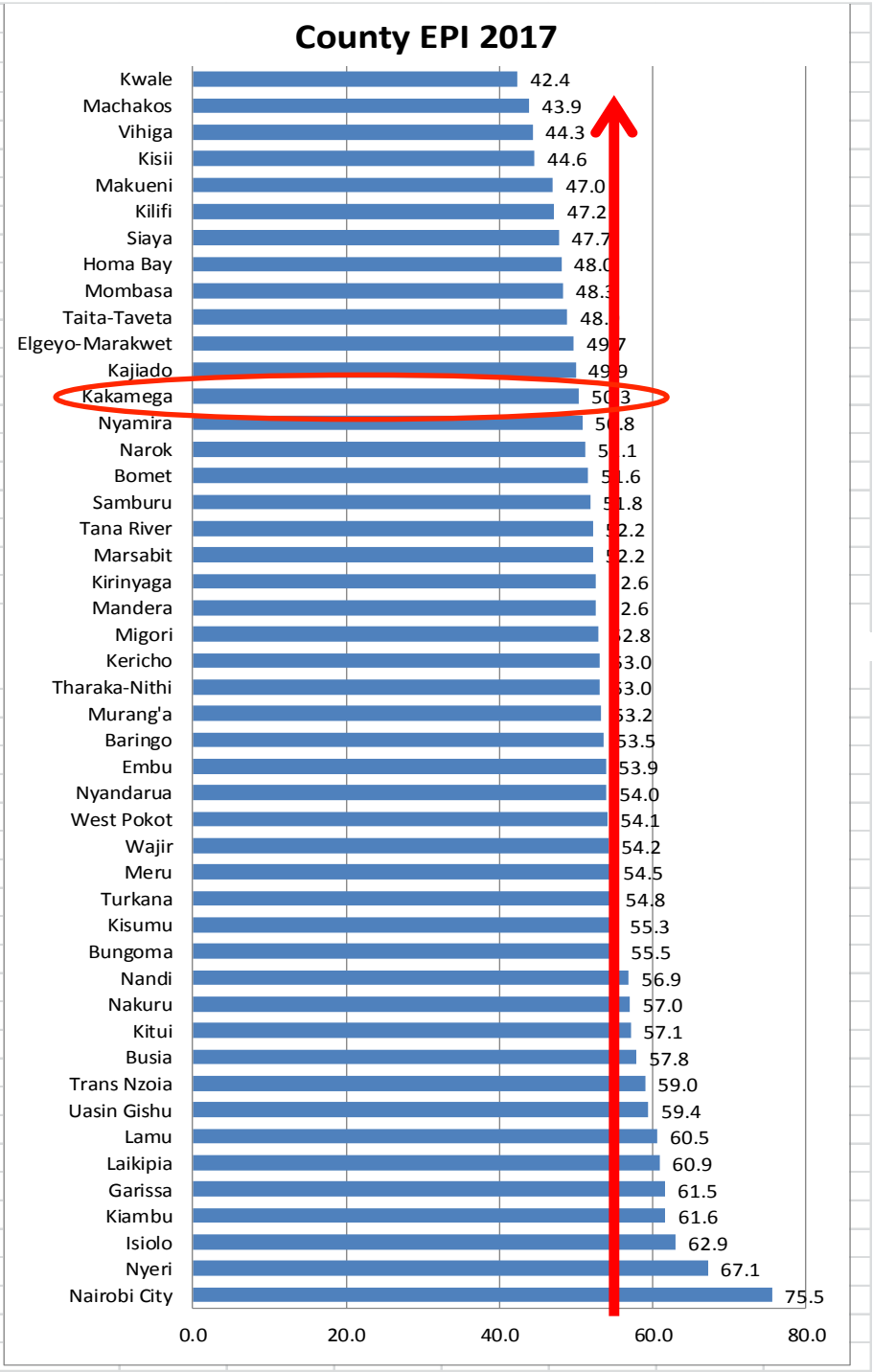
The combined EPI score of all sectors ranks the County performance and the following graph allows comparison between Counties showing best performing and those in need of support.

3.4. How Well is the County Performance vs The National EPI?

The national EPI is 56.4, and the County EPI is 50.3%, suggesting below average performance.

The County is ranked as 35th out of 47 counties, placing it in the bottom 25% of the poor performing Counties in Kenya, implying attention is needed to E&NRM in CIDP budgets and annual plans.

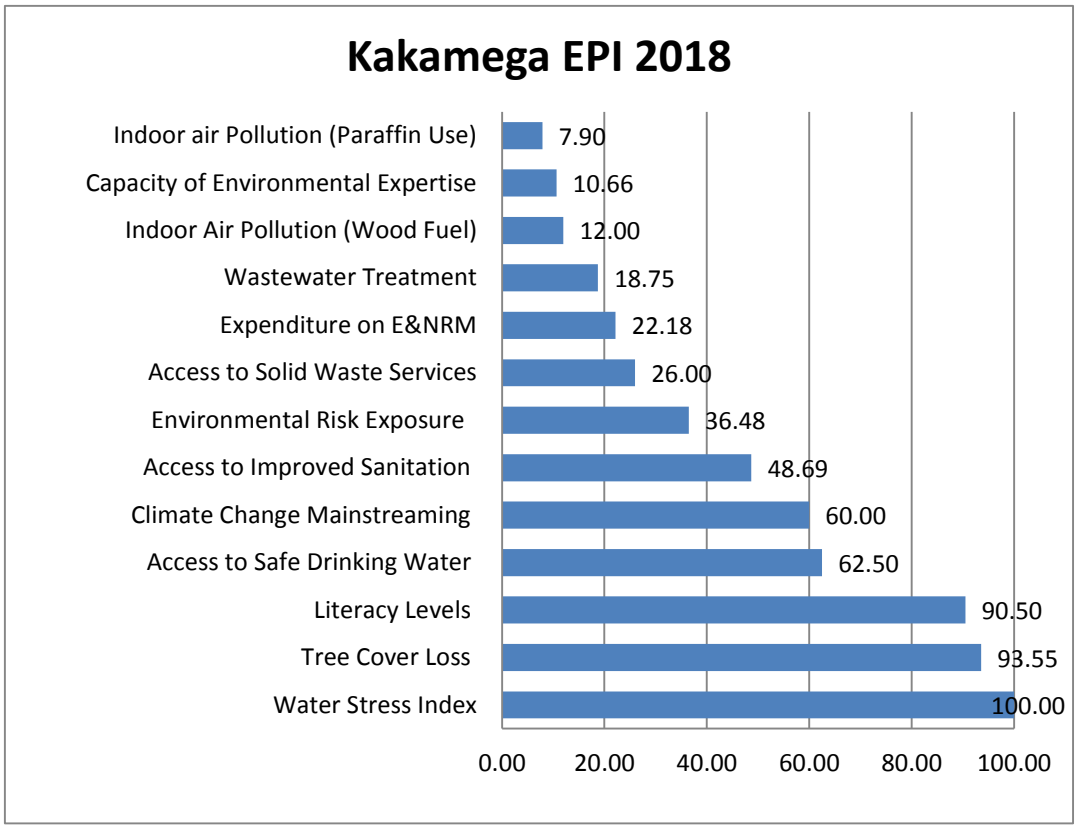
	County	EPI
1	Nairobi City	75.5
2	Nyeri	67.1
3	Isiolo	62.9
4	Kiambu	61.6
5	Garissa	61.5
6	Laikipia	60.9
7	Lamu	60.5
8	Uasin Gishu	59.4
9	Trans Nzoia	59.0
10	Busia	57.8
11	Kitui	57.1
12	Nakuru	57.0
13	Nandi	56.9
14	Bungoma	55.5
15	Kisumu	55.3
16	Turkana	54.8
17	Meru	54.5
18	Wajir	54.2
19	West Pokot	54.1
20	Nyandarua	54.0
21	Embu	53.9
22	Baringo	53.5
23	Murang'a	53.2
24	Tharaka-Nith	53.0
25	Kericho	53.0
26	Migori	52.8
27	Mandera	52.6
28	Kirinyaga	52.6
29	Marsabit	52.2
30	Tana River	52.2
31	Samburu	51.8
32	Bomet	51.6
33	Narok	51.1
34	Nyamira	50.8
35	Kakamega	50.3
36	Kajiado	49.9
37	Elgeyo-Mara	49.7
38	Taita-Taveta	48.9
39	Mombasa	48.3
40	Homa Bay	48.0
41	Siaya	47.7
42	Kilifi	47.2
43	Makueni	47.0
44	Kisii	44.6
45	Vihiga	44.3
46	Machakos	43.9
47	Kwale	42.4



3.5. County EPI Profile: 2018.

The EPI scores of individual E&NRM sectors performance towards a target, can be ranked for each County according to the available data. In this way the EPI allows County governance and management to make a peer comparison between Counties showing best performing by sector and those that are under-performing and in need of additional support.

In the attached 13 sector EPI Fact Sheet County Profiles and Database, the position of the County vs other Counties can be compared to emphasize where investment is needed.



The County's top performing sectors are:

a. Water Stress Index is at 100% implying high water endowed.
b. Literacy levels are at 91%, implying the community should be well educated in E&NRM.
c. Tree cover loss has been maintained at <6%, giving a 94% tree cover retention vs 2000 baseline.
d. Access to safe water is at 62%, implying reasonable coverage
e. Climate change mainstreamed in CIDP is at 60%, implying attention has been given to adaptation

Poor performing sectors in the County includes:

a. The health of 92% of households are exposed to poor indoor air quality pollution from paraffin lamps and 88% from cooking with fuelwood, needs urgent attention.
b. Capacity of environmental expertise is at 11% of requirement, suggesting recruitment is needed
c. Waste water treatment is at a low 19%, and needs attention
d. Expenditure on E&NRM in CIDP is low 22%, & needs to proportionately match the 40% GDP.
e. Access to solid waste service is low 26%, implying poor waste management and room to improve

3.6. Recommendations for Environmental Action Plan by the County Government

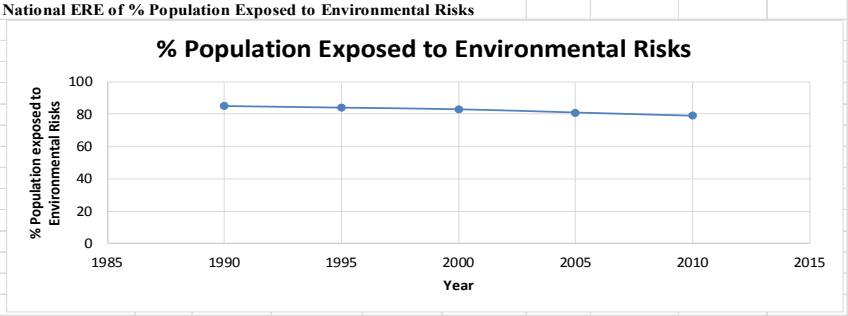
a. Given the high number of households that are dependent on paraffin and fuelwood for cooking and lighting, investment is needed to promote more carbon efficient cook stoves and improved indoor ventilation to avoid respiratory health risks to women and young children exposed to black carbon and particulate matter in the kitchen.
b. The County needs to invest in more environmental expertise and capacity building.
c. Waste water treatment plants require investment.
d. Access to solid waste services needs investment in CIDP to increase County capacity in collection and safe disposal to reduce environmental health hazards.
e. County need to increase CIDP expenditure in E&NRM to match the GDP worth.

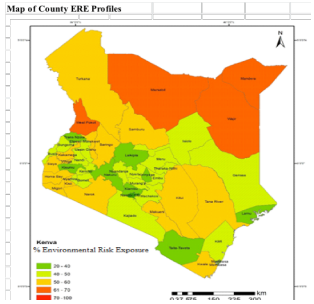
4. EPI FACT SHEETS DATABASE

County EPI Fact Sheet 1. Environmental Risk Exposure (ERE)

Measures % of a population exposed to environmental health risks from: unsafe water, poor sanitation and poor air quality generally due to indoor cooking fires and use of parrafin lamps and burners.

National ERE of % Population Exposed to Environmental Risks





(Reference: Yale Database; 2016)

Proportion of County Population Exposed to Environmental Health Risks

	County	Unsafe Water (N1)	Unsafe Sanitation (N2)	Indoor Air Pollution (wood fuel use) (N3)	Indoor Air Pollution (Paraffin use) (N4)	County Population at Risk Average %	County EPI Score (Y) %
1	Nairobi city	19.00	22.00	1.8	25.7	17.13	82.88
2	Kiambu	26.00	17.00	47.3	43.3	33.40	66.60
3	Mombasa	46.00	55.00	9.0	38.8	37.20	62.80
4	Laikipia	12.00	7.00	70.0	69.0	39.50	60.50
5	Garissa	38.00	19.00	79.0	50.0	46.50	53.50
6	Isiolo	42.00	24.00	70.0	50.4	46.60	53.40
7	Lamu	27.00	20.00	70.0	72.3	47.33	52.68
8	Nyeri	28.00	22.00	72.0	67.5	47.38	52.63
9	Nakuru	21.00	26.00	85.6	61.5	48.53	51.48
10	Kisumu	32.00	24.00	60.0	79.4	48.85	51.15
11	Taita-Taveta	24.00	23.00	75.0	80.7	50.68	49.33
12	Nyamira	63.00	16.00	50.0	80.5	52.38	47.63
13	Uasin Gishu	28.00	36.00	84.0	68.1	54.03	45.98
14	Tharaka-Nithi	24.00	27.00	90.0	79.6	55.15	44.85
15	Kajiado	65.00	35.00	67.2	54.6	55.45	44.55
16	Meru	38.00	23.00	86.0	77.2	56.05	43.95
17	Kirinyaga	66.00	12.00	68.5	78.3	56.19	43.81
18	Baringo	55.00	31.00	86.4	59.4	57.95	42.05
19	Kericho	42.00	26.00	80.0	86.2	58.55	41.45
20	Bomet	25.00	30.00	91.0	91.0	59.25	40.75
21	Nandi	49.00	9.00	88.0	91.3	59.33	40.68
22	Trans Nzoia	17.00	65.00	70.0	88.1	60.03	39.98
23	Murang'a	52.00	26.00	80.0	82.4	60.10	39.90
24	Busia	27.00	24.00	98.0	92.8	60.45	39.55
25	Samburu	75.00	67.00	70.0	30.0	60.50	39.50
26	Mandera	50.00	50.00	96.0	46.3	60.58	39.43
27	Nyandarua	57.00	25.00	79.0	81.6	60.65	39.35
28	West Pokot	80.00	24.00	90.0	48.8	60.70	39.30
29	Bungoma	18.00	40.00	93.0	93.3	61.08	38.93
30	Wajir	50.00	50.00	97.0	48.2	61.30	38.70
31	Machakos	45.00	40.00	82.0	78.5	61.38	38.63
32	Marsabit	78.00	40.00	93.0	35.8	61.70	38.30
33	Narok	67.00	20.00	83.0	83.0	63.25	36.75
34	Kakamega	50.00	24.00	88.0	92.1	63.53	36.48
35	Kisii	63.00	16.00	85.7	89.7	63.60	36.40
36	Kilifi	39.00	57.00	80.0	79.7	63.93	36.08
37	Makueni	69.00	15.00	85.0	88.0	64.25	35.75
38	Kwale	53.00	38.00	80.0	86.2	64.30	35.70
39	Elgeyo-Marakwet	79.00	14.00	91.0	75.3	64.83	35.18
40	Embu	32.00	75.00	80.0	79.6	66.65	33.35
41	Kitui	71.00	23.00	88.4	85.5	66.98	33.03
42	Tana River	50.00	50.00	88.0	86.7	68.68	31.33
43	Homa Bay	80.00	44.00	58.0	94.2	69.05	30.95
44	Turkana	51.00	64.00	95.0	70.0	70.00	30.00
45	Siaya	66.00	38.00	83.0	93.9	70.23	29.78
46	Migori	82.00	35.00	77.0	92.0	71.50	28.50
47	Vihiga	84.00	61.00	85.0	90.6	80.15	19.85

(Reference: KNBS Statistical Abstract 2016, SID, 2013 and County CIDPs)

SOER Drivers, Pressures, Status, Impact and Response (DPSIR)

Driver: Poverty and poor services exposes people to environmental health risks.

Pressures: Population growth and indiscriminant waste dumping contaminates air and water.

State: National ERE is 78% population at risk, & County at 63% is in top 12 under threat.

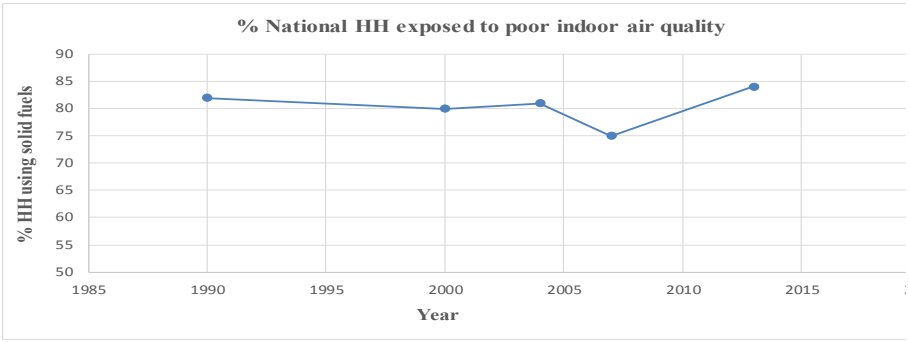
Impact: Impacts health, affects human well-being, leading to morbidity and mortality.

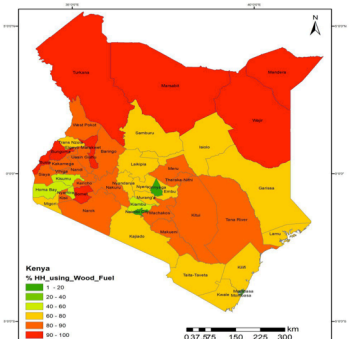
Response: Promotion of cleaner cooking and lighting technologies and increased investments in water supply, sanitation and sewerage treatment infrastructure.

County EPI Fact Sheet 2. Indoor Air Pollution from wood fuel use

Measures % of total households using wood fuel for indoor cooking versus a target of 0% so to reduce human health risk from exposure to poor air quality from black carbon and particulate matter (PM).

% National HH Exposed to Poor Indoor Air Quality



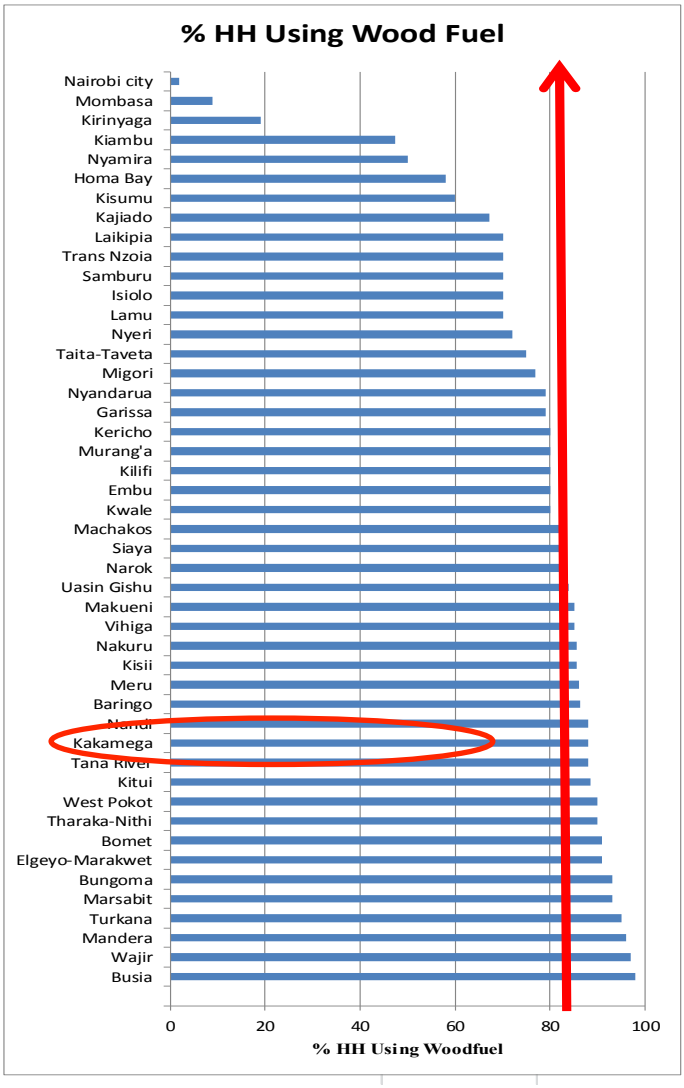


Reference: (Yale Database, 2016)

% HH at County Level Using Wood Fuel

	County	Total National No of HH	No of HH Using Wood Fuel	% HH Using Wood Fuel	EPI Score (PTT)
1	Busia	154,225	151,141	98.00	2.00
2	Wajir	88,574	85,917	97.00	3.00
3	Mandera	125,497	120,477	96.00	4.00
4	Turkana	123,191	117,031	95.00	5.00
5	Marsabit	56,941	52,955	93.00	7.00
6	Bungoma	270,824	251,866	93.00	7.00
7	Elgeyo-Marakwet	77,555	70,575	91.00	9.00
8	Bomet	142,361	129,549	91.00	9.00
9	Tharaka-Nithi	27,393	24,654	90.00	10.00
10	West Pokot	93,777	84,399	90.00	10.00
11	Kitui	205,491	181,654	88.40	11.60
12	Tana River	47,414	41,724	88.00	12.00
13	Kakamega	355,679	312,998	88.00	12.00
14	Nandi	154,073	135,584	88.00	12.00
15	Baringo	110,649	95,601	86.40	13.60
16	Meru	381,026	327,682	86.00	14.00
17	Kisii	269,683	231,118	85.70	14.30
18	Nakuru	409,836	350,820	85.60	14.40
19	Vihiga	123,347	104,845	85.00	15.00
20	Makueni	186,478	158,506	85.00	15.00
21	Uasin Gishu	202,291	169,924	84.00	16.00
22	Narok	169,220	140,453	83.00	17.00
23	Siaya	199,034	165,198	83.00	17.00
24	Machakos	264,500	216,890	82.00	18.00
25	Kwale	122,047	97,638	80.00	20.00
26	Embu	131,683	105,346	80.00	20.00
27	Kilifi	199,764	159,811	80.00	20.00
28	Murang'a	242,490	193,992	80.00	20.00
29	Kericho	160,134	128,107	80.00	20.00
30	Garissa	98,590	77,886	79.00	21.00
31	Nyandarua	143879	113664	79.00	21.00
32	Migori	180211	138762	77.00	23.00
33	Taita-Taveta	71090	53318	75.00	25.00
34	Nyeri	201703	145226	72.00	28.00
35	Lamu	22184	15529	70.00	30.00
36	Isiolo	31326	21928	70.00	30.00
37	Samburu	47354	33148	70.00	30.00
38	Trans Nzoia	170117	119082	70.00	30.00
39	Laikipia	103114	72180	70.00	30.00
40	Kirinyaga	154,220	105,576	68.46	31.54
41	Kajiado	173464	116568	67.20	32.80
42	Kisumu	226719	136031	60.00	40.00
43	Homa Bay	206255	119628	58.00	42.00
44	Nyamira	106385	53193	50.00	50.00
45	Kiambu	482450	228199	47.30	52.70
46	Mombasa	268,700	24,183	9.00	91.00
47	Nairobi city	985,016	17,730	1.80	98.20

(Reference KNBS, 2016, Statistical Abstracts 2016, CIDPs 2013-17)



SOER Drivers, Pressures, Status, Impact and Response (DPSIR)

Driver: Poverty drives a need for cheaper energy, such as fuel wood for cooking.

Pressure: Air pollutants of black carbon and particulate matter affect human respiratory health.

State: Ranked 12th highest County, 88% population exposed to health risk from indoor fires.

Impact: Health and reduced well-being, lead to morbidity and mortality, especially women.

Response: County to promoting cleaner technology for cooking, construction of well-ventilated kitchens and raise awareness on the implications of using wood fuel on human health.

County EPI Fact Sheet 3. Indoor Air Pollution using Paraffin as Fuel

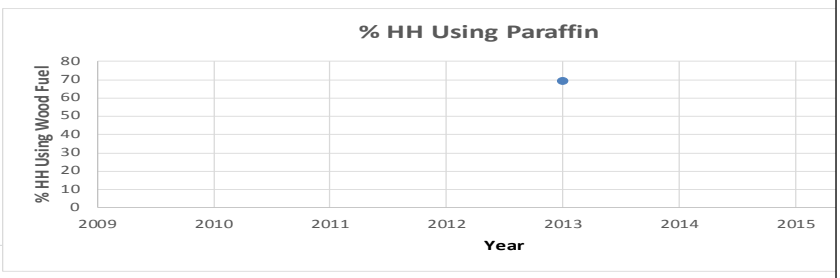
Measures % of total households using paraffin for indoor cooking and lighting, and exposed to respiratory health risks resulting from poor air quality due to black carbon and particulate matter.

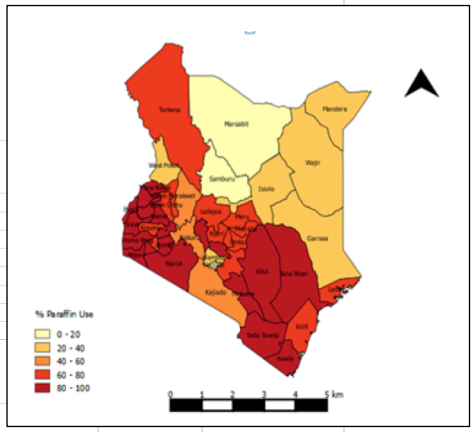
% National HH exposed to poor indoor air quality from Paraffin

Year	2010	2011	2012	2013	2014	2015
% HH Using Paraffin				69.1		
EPI Score (PTT)	100	100	100	30.9	100	100

(Reference KNBS and SID 2013, CIDPs 2013-17)

% National HH exposed to poor indoor air quality from Paraffin

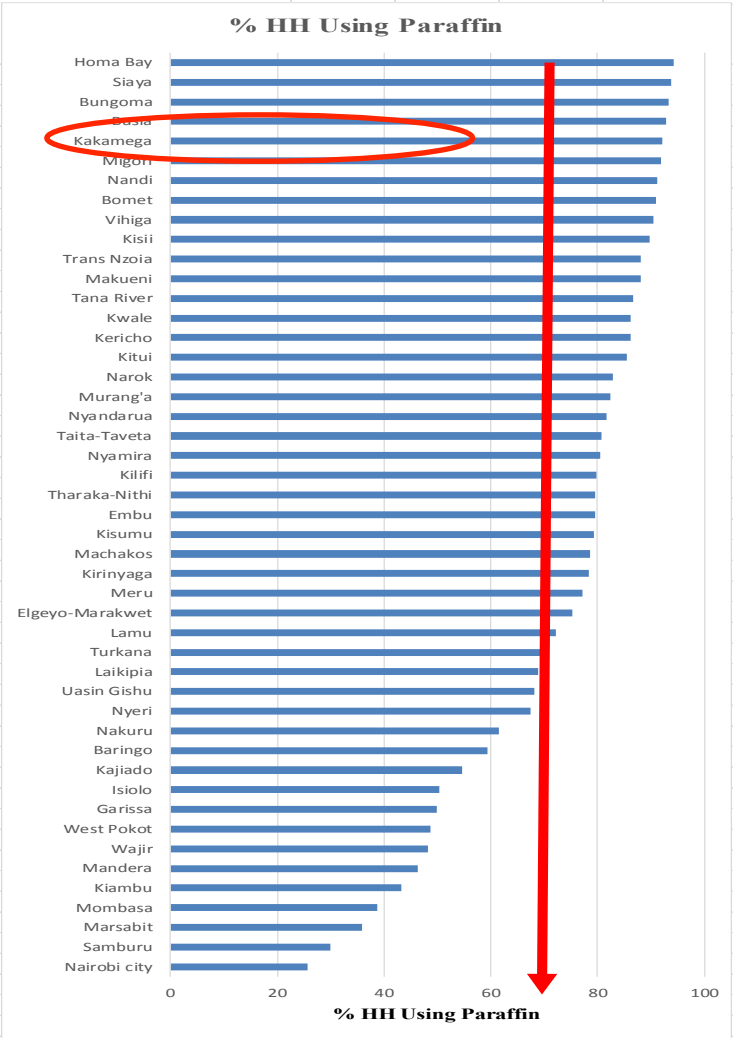




% HH using Paraffin by County

	County	% HH Using Paraffin	EPI Score (PTT)
1	Nairobi city	25.7	74.30
2	Samburu	30.0	70.00
3	Marsabit	35.8	64.20
4	Mombasa	38.8	61.20
5	Kiambu	43.3	56.70
6	Mandera	46.3	53.70
7	Wajir	48.2	51.80
8	West Pokot	48.8	51.20
9	Garissa	50.0	50.00
10	Isiolo	50.4	49.60
11	Kajiado	54.6	45.40
12	Baringo	59.4	40.60
13	Nakuru	61.5	38.50
14	Nyeri	67.5	32.50
15	Uasin Gishu	68.1	31.90
16	Laikipia	69.0	31.00
17	Turkana	70.0	30.00
18	Lamu	72.3	27.70
19	Elgeyo-Marakwet	75.3	24.70
20	Meru	77.2	22.80
21	Kirinyaga	78.3	21.70
22	Machakos	78.5	21.50
23	Kisumu	79.4	20.60
24	Embu	79.6	20.40
25	Tharaka-Nithi	79.6	20.40
26	Kilifi	79.7	20.30
27	Nyamira	80.5	19.50
28	Taita-Taveta	80.7	19.30
29	Nyandarua	81.6	18.40
30	Murang'a	82.4	17.60
31	Narok	83.0	17.00
32	Kitui	85.5	14.50
33	Kericho	86.2	13.80
34	Kwale	86.2	13.80
35	Tana River	86.7	13.30
36	Makueni	88.0	12.00
37	Trans Nzoia	88.1	11.90
38	Kisii	89.7	10.30
39	Vihiga	90.6	9.40
40	Bomet	91.0	9.00
41	Nandi	91.3	8.70
42	Migori	92.0	8.00
43	Kakamega	92.1	7.90
44	Busia	92.8	7.20
45	Bungoma	93.3	6.70
46	Siaya	93.9	6.10
47	Homa Bay	94.2	5.80

(Reference KNBS and SID 2013, CIDPs 2013-17)



SOER Drivers, Pressures, Status, Impact and Response (DPSIR)

Driver: Poverty drives HH to cheaper energy, such as paraffin for cooking and lighting

Pressure: Air pollutants affect human respiratory health from black carbon from paraffin

State Ranked 5th highest, 92% population are exposed to health risk from paraffin burning.

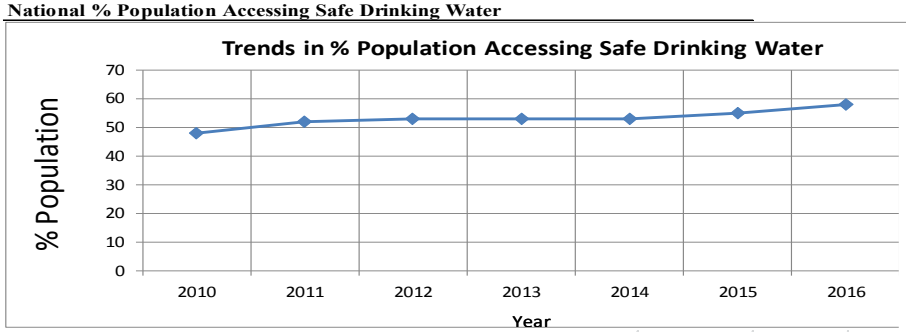
Impact: Affects respiratory health and well-being, leading to morbidity, and mortality.

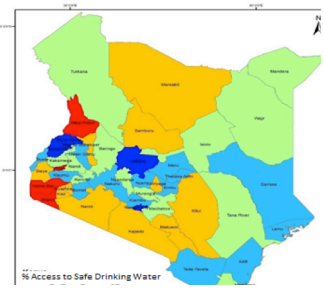
Response: Promote cleaner technology for paraffin use, construction of well-ventilated houses and raise awareness on the implications of using paraffin on health.

County EPI Fact Sheet 4. Access to Safe Drinking Water

Measures % of population having access to safe drinking water and therefore not at health risk from water borne diseases.

National % Population Accessing Safe Drinking Water

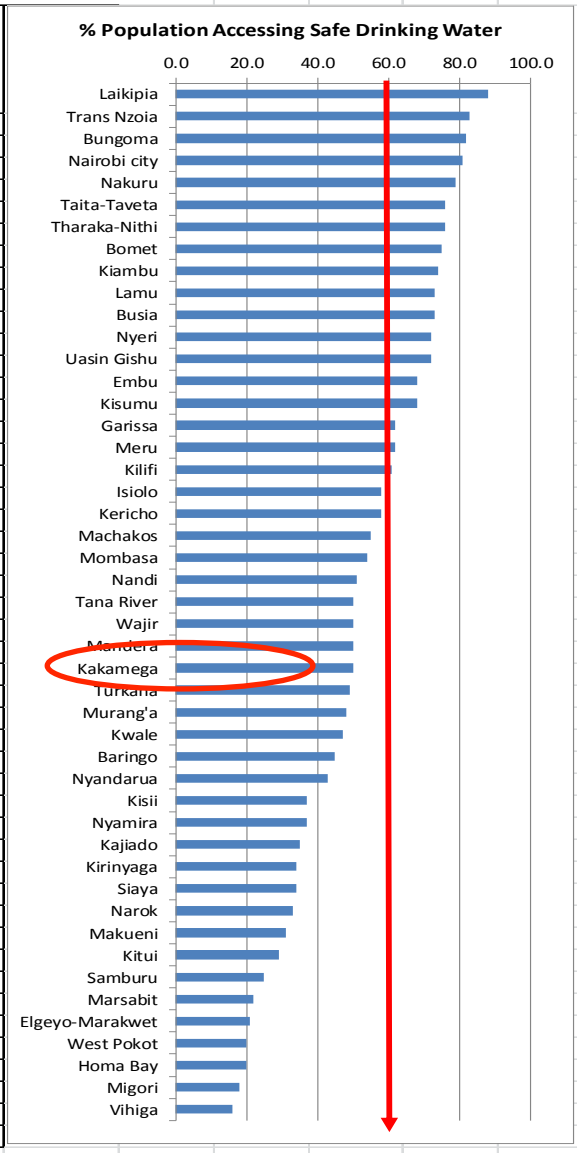




(Reference: Ministry of Water and Irrigation, 2016)

County % Population Accessing Safe Drinking Water

	County	% Population Accessing safe drinking water	EPI Score (T=100)	EPI Score (T=80)	EPI Score (T=80)
1	Laikipia	88.0	88.0	110.0	100.0
2	Trans Nzoia	83.0	83.0	103.8	100.0
3	Bungoma	82.0	82.0	102.5	100.0
4	Nairobi city	81.0	81.0	101.3	100.0
5	Nakuru	79.0	79.0	98.8	98.8
6	Taita-Taveta	76.0	76.0	95.0	95.0
7	Tharaka-Nithi	76.0	76.0	95.0	95.0
8	Bomet	75.0	75.0	93.8	93.8
9	Kiambu	74.0	74.0	92.5	92.5
10	Lamu	73.0	73.0	91.3	91.3
11	Busia	73.0	73.0	91.3	91.3
12	Nyeri	72.0	72.0	90.0	90.0
13	Uasin Gishu	72.0	72.0	90.0	90.0
14	Embu	68.0	68.0	85.0	85.0
15	Kisumu	68.0	68.0	85.0	85.0
16	Garissa	62.0	62.0	77.5	77.5
17	Meru	62.0	62.0	77.5	77.5
18	Kilifi	61.0	61.0	76.3	76.3
19	Isiolo	58.0	58.0	72.5	72.5
20	Kericho	58.0	58.0	72.5	72.5
21	Machakos	55.0	55.0	68.8	68.8
22	Mombasa	54.0	54.0	67.5	67.5
23	Nandi	51.0	51.0	63.8	63.8
24	Tana River	50.0	50.0	62.5	62.5
25	Wajir	50.0	50.0	62.5	62.5
26	Mandera	50.0	50.0	62.5	62.5
27	Kakamega	50.0	50.0	62.5	62.5
28	Turkana	49.0	49.0	61.3	61.3
29	Murang'a	48.0	48.0	60.0	60.0
30	Kwale	47.0	47.0	58.8	58.8
31	Baringo	45.0	45.0	56.3	56.3
32	Nyandarua	43.0	43.0	53.8	53.8
33	Kisii	37.0	37.0	46.3	46.3
34	Nyamira	37.0	37.0	46.3	46.3
35	Kajiado	35.0	35.0	43.8	43.8
36	Kirinyaga	34.0	34.0	42.5	42.5
37	Siaya	34.0	34.0	42.5	42.5
38	Narok	33.0	33.0	41.3	41.3
39	Makueni	31.0	31.0	38.8	38.8
40	Kitui	29.0	29.0	36.3	36.3
41	Samburu	25.0	25.0	31.3	31.3
42	Marsabit	22.0	22.0	27.5	27.5
43	Elgeyo-Marakwet	21.0	21.0	26.3	26.3
44	West Pokot	20.0	20.0	25.0	25.0
45	Homa Bay	20.0	20.0	25.0	25.0
46	Migori	18.0	18.0	22.5	22.5
47	Vihiga	16.0	16.0	20.0	20.0



(Reference: Ministry of Water and Irrigation, 2016)

SOER Drivers, Pressures, Status, Impact and Response (DPSIR)

Drivers: Population growth is exceeding the investment in safe water supply.

Pressure: Increased microbial pathogens, leads to waterborne disease from contaminated water.

State: Ranks 27 with <65% of population having access to safe drinking water.

Impact: Increased cases of morbidity and mortality from waterborne diseases.

Response: County to increase resources to invest in improved water supply infrastructure.

County EPI Fact Sheet 5. Access to Improved Sanitation

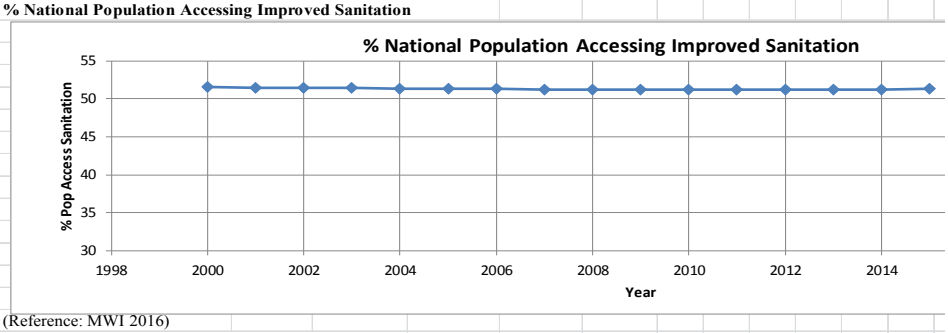
Measures % population with access to improved sanitation services for safe disposal of human waste.

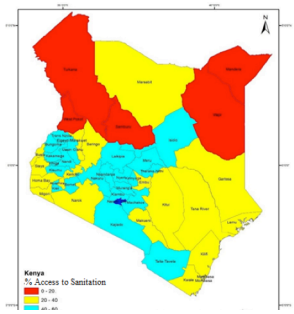
% National Population Accessing Improved Sanitation

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2018
% Pop w sanitation	51.5	51.4	51.4	51.4	51.3	51.3	51.3	51.2	51.2	51.2	51.2	51.2	51.2	51.2	51.2	51.3		

(Reference: JMP 2017)

% National Population Accessing Improved Sanitation



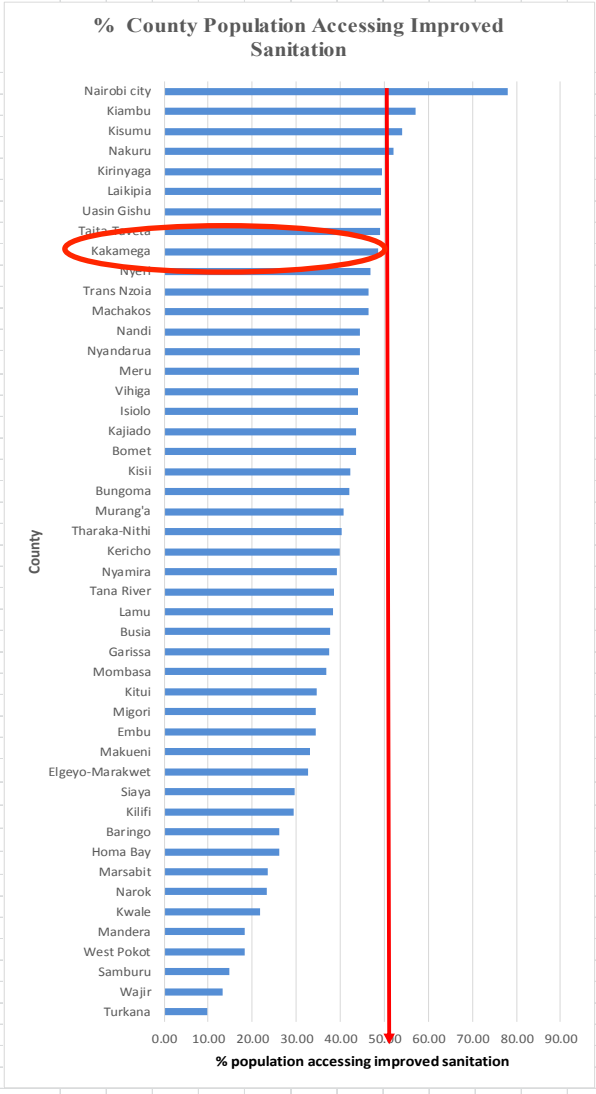


(Reference: MWI 2016)

% County Population Accessing Improved Sanitation

	County	% Urban Pop Accessing Sanitation	% Rural Pop Accessing Sanitation	Urban Pop	Rural Pop	% Pop Accessing Improved Sanitation
1	Turkana	36.0	7.0	102,886	942,693	9.85
2	Wajir	50.0	4.0	91,300	359,085	13.32
3	Samburu	33.0	12.0	36,353	237,451	14.79
4	West Pokot	76.0	15.0	34,046	592,786	18.31
5	Mandera	50.0	9.0	159,901	538,021	18.39
6	Kwale	62.0	15.0	112,908	679,790	21.69
7	Narok	80.0	20.0	57,114	982,723	23.30
8	Marsabit	60.0	14.0	64,249	248,449	23.45
9	Homa Bay	56.0	22.0	133,488	968,413	26.12
10	Baringo	69.0	22.0	60,995	618,261	26.22
11	Kilifi	43.0	26.0	275,162	1,077,880	29.46
12	Siaya	62.0	26.0	99,504	863,503	29.72
13	Elgeyo-Marakwet	86.0	26.0	49,972	402,388	32.63
14	Makueni	85.0	31.0	38,028	911,270	33.16
15	Embu	25.0	36.0	82,915	471,164	34.35
16	Migori	65.0	28.0	180,493	868,109	34.37
17	Kitui	77.0	29.0	125,538	961,061	34.55
18	Mombasa	45.0	0.0	938,131	207,128	36.86
19	Garissa	81.0	17.0	136,052	287,879	37.54
20	Busia	76.0	33.0	88,464	737,372	37.61
21	Lamu	80.0	31.0	18,382	105,460	38.27
22	Tana River	50.0	37.0	36,065	256,820	38.60
23	Nyamira	84.0	36.0	47,305	636,674	39.32
24	Kericho	74.0	36.0	92,095	800,334	39.92
25	Tharaka-Nithi	73.0	33.0	71,885	320,210	40.33
26	Murang'a	74.0	37.0	107,551	956,170	40.74
27	Bungoma	60.0	39.0	229,271	1,297,469	42.15
28	Kisii	84.0	35.0	195,644	1,121,763	42.28
29	Bomet	70.0	36.0	205,060	714,577	43.58
30	Kajiado	65.0	33.0	279,689	560,438	43.65
31	Isiolo	76.0	23.0	61,162	92,713	44.07
32	Vihiga	39.0	46.0	168,042	447,692	44.09
33	Meru	77.0	42.0	94,753	1,361,096	44.28
34	Nyandarua	75.0	40.0	83,948	589,052	44.37
35	Nandi	91.0	39.0	96,923	823,522	44.48
36	Machakos	60.0	34.0	562,425	616,790	46.40
37	Trans Nzoia	35.0	48.0	117,846	883,159	46.47
38	Nyeri	78.0	40.0	139,621	643,243	46.78
39	Kakamega	76.0	45.0	219,185	1,624,135	48.69
40	Taita-Taveta	77.0	37.0	104,994	242,201	49.10
41	Uasin Gishu	64.0	43.0	325,195	767,608	49.25
42	Laikipia	93.0	39.0	92,836	395,098	49.27
43	Kirinyaga	88.0	45.0	60,762	535,268	49.38
44	Nakuru	74.0	42.0	617,651	1,342,229	52.08
45	Kisumu	76.0	30.0	579,858	527,897	54.08
46	Kiambu	83.0	30.0	936,411	895,389	57.09
47	Nairobi city	78.0	0.0	4,232,087	-	78.00

(Reference: Annual Water Sector Review Report, 2016)



SOER Drivers, Pressures, Status, Impact and Response (DPSIR)

Drivers: Population growth exceeding investment in improved sanitation services.

Pressures: Increase in microbial pathogens and related diseases due to contaminated water.

State: County ranks bottom 10, only 48% of population have access to improved sanitation.

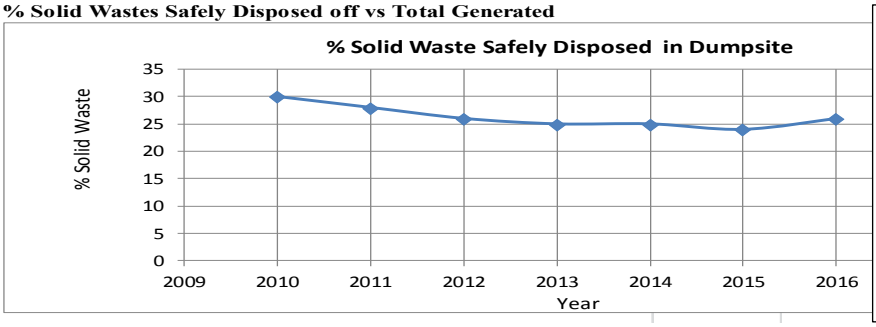
Impact: Increased cases of waterborne diseases, leads to morbidity and mortality.

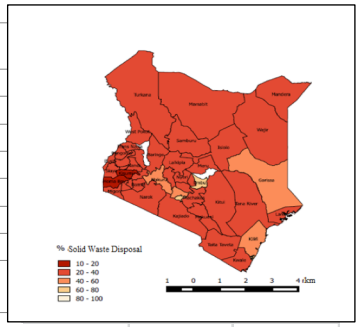
Response: County to increase resource allocation to expand improved sanitation infrastructure.

County EPI Fact Sheet 6. Access to Solid Waste Services

Measures % of total solid wastes generated that is collected and disposed of in designated dumpsites.

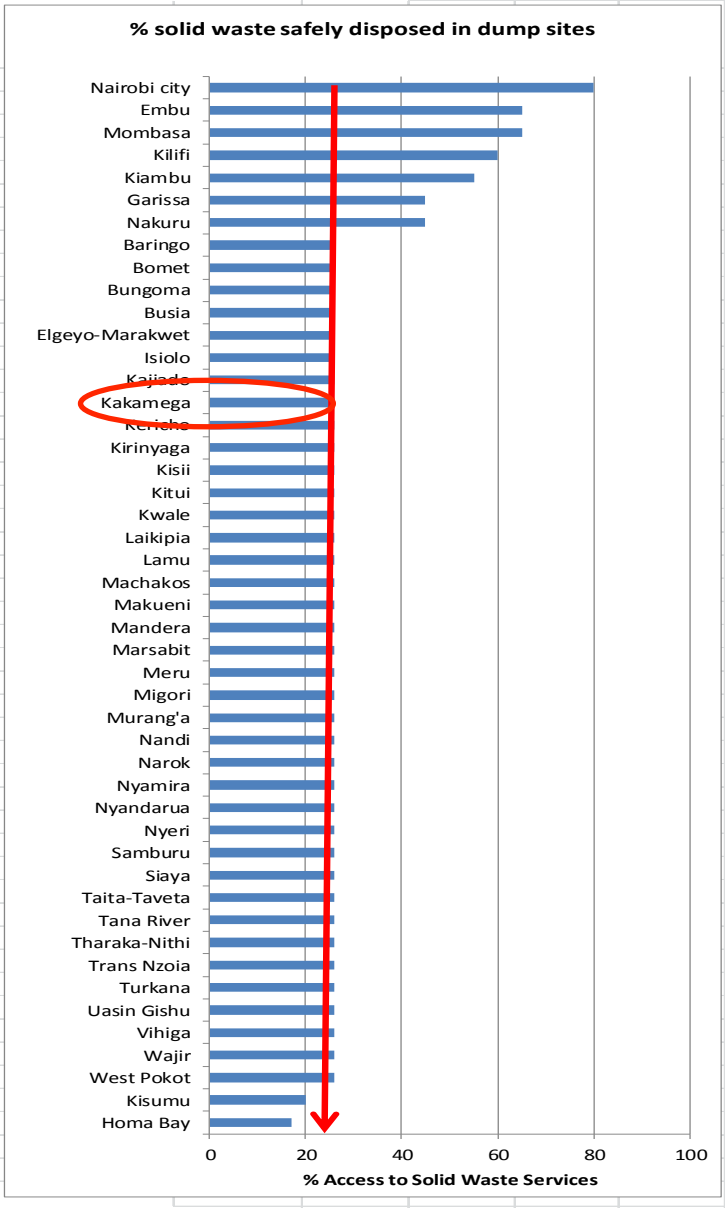
% Solid Wastes Safely Disposed off vs Total Generated





% County Solid Waste Disposed in Dumpsites

	County	% solid waste safely disposed in dumpsites.	EPI Score
1	Homa Bay	17.0	17.0
2	Kisumu	20.0	20.0
3	West Pokot	26.0	26.0
4	Wajir	26.0	26.0
5	Vihiga	26.0	26.0
6	Uasin Gishu	26.0	26.0
7	Turkana	26.0	26.0
8	Trans Nzoia	26.0	26.0
9	Tharaka-Nithi	26.0	26.0
10	Tana River	26.0	26.0
11	Taita-Taveta	26.0	26.0
12	Siaya	26.0	26.0
13	Samburu	26.0	26.0
14	Nyeri	26.0	26.0
15	Nyandarua	26.0	26.0
16	Nyamira	26.0	26.0
17	Narok	26.0	26.0
18	Nandi	26.0	26.0
19	Murang'a	26.0	26.0
20	Migori	26.0	26.0
21	Meru	26.0	26.0
22	Marsabit	26.0	26.0
23	Mandera	26.0	26.0
24	Makueni	26.0	26.0
25	Machakos	26.0	26.0
26	Lamu	26.0	26.0
27	Laikipia	26.0	26.0
28	Kwale	26.0	26.0
29	Kitui	26.0	26.0
30	Kisii	26.0	26.0
31	Kirinyaga	26.0	26.0
32	~~Kericho~~	26.0	26.0
33	Kakamega	26.0	26.0
34	~~Kajiado~~	26.0	26.0
35	Isiolo	26.0	26.0
36	Elgeyo-Marakwet	26.0	26.0
37	Busia	26.0	26.0
38	Bungoma	26.0	26.0
39	Bomet	26.0	26.0
40	Baringo	26.0	26.0
41	Nakuru	45.0	45.0
42	Garissa	45.0	45.0
43	Kiambu	55.0	55.0
44	Kilifi	60.0	60.0
45	Mombasa	65.0	65.0
46	Embu	65.0	65.0
47	Nairobi city	80.0	80.0
	NB: Missing data = National Average		26
	(Reference: NEMA (2015)		



SOER Drivers, Pressures, Status, Impact and Response (DPSIR)

Drivers: Urbanization & population growth exceed capacity in solid waste management.

Pressures: Increase in pathogen and toxin related diseases due to contaminated air and water.

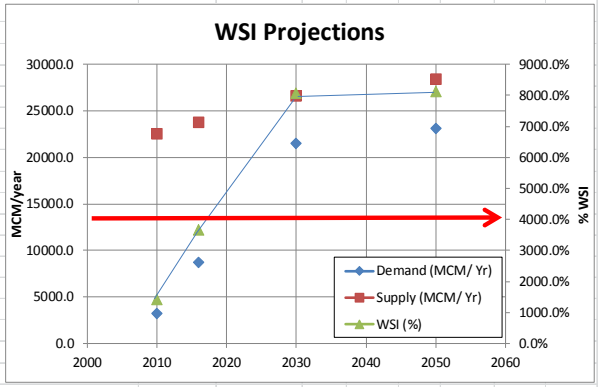
State: County follows national trend, <26% collected, shows a gradual decline.

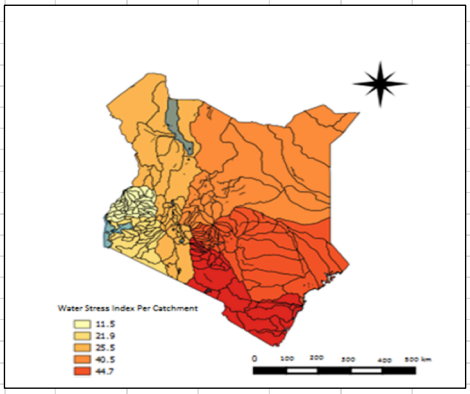
Impact: Proliferation of disease and water degradation from leachates and GHG emissions.

Response: Increase resource allocation, expand improved waste management infrastructure.

County EPI Fact Sheet 7. Water Stress Index

Measures % water demand which is <40% of total available water resources in County catchment.



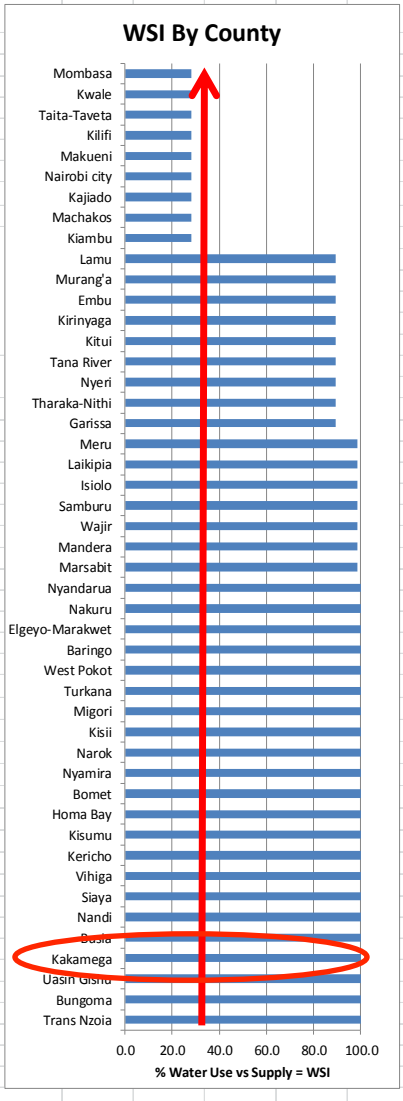


Source(NWMP 2030)

WSI by Catchment Broken down by County

Catchment	Area (km^2)	Counties	Water Demand (MCM/yr)			Available Water Resources (MCM/yr)			WSI	EPI Score	PTT >40
			2010	2030	2016	2010	2030	2016			
Lake Victoria North Catchment Area(LVNCA)	18,374	Trans Nzoia	228	1337	561	4742	5077	4843	11.58%	345.46	100.00
		Bungoma								345.46	100.00
		Uasin Gishu								345.46	100.00
		Kakamega								345.46	100.00
		Busia								345.46	100.00
		Nandi								345.46	100.00
		Siaya								345.46	100.00
		Vihiga								345.46	100.00
Lake Victoria South Catchment Area (LVSCA)	31,734	Kericho	385	2953	1155	4976	5937	5264	21.95%	182.25	100.00
		Kisumu								182.25	100.00
		Homa Bay								182.25	100.00
		Bomet								182.25	100.00
		Nyamira								182.25	100.00
		Narok								182.25	100.00
		Kisii								182.25	100.00
		Migori								182.25	100.00
Rift Valley Catchment Area (RVCA)	130,452	Turkana	357	1494	698	2559	3147	2735	25.52%	156.73	100.00
		West Pokot								156.73	100.00
		Baringo								156.73	100.00
		Elgeyo-Mara								156.73	100.00
		Nakuru								156.73	100.00
		Nyandarua								156.73	100.00
Ewaso Ng'iro North Catchment Area (ENNCA)	210,226	Marsabit	212	2857	1006	2251	3011	2479	40.56%	98.62	98.62
		Mandera								98.62	98.62
		Wajir								98.62	98.62
		Samburu								98.62	98.62
		Isiolo								98.62	98.62
		Laikipia								98.62	98.62
		Meru								98.62	98.62
Tana Catchment Area (TCA)	126,026	Garissa	891	8241	3096	6533	7828	6922	44.73%	89.43	89.43
		Tharaka-Nith								89.43	89.43
		Nyeri								89.43	89.43
		Tana River								89.43	89.43
		Kitui								89.43	89.43
		Kirinyaga								89.43	89.43
		Embu								89.43	89.43
		Murang'a								89.43	89.43
		Lamu								89.43	89.43
Athi Catchment Area (ACA)	58,639	Kiambu	1,145	4586	2177	1503	1634	1542	141.17%	28.33	28.33
		Machakos								28.33	28.33
		Kajiado								28.33	28.33
		Nairobi city								28.33	28.33
		Makueni								28.33	28.33
		Kilifi								28.33	28.33
		Taita-Taveta								28.33	28.33
		Kwale								28.33	28.33
		Mombasa								28.33	28.33
Total	**575,451**	**National**	**3218**	**21468**	**8693**	**22564**	**26634**	**23785**	**36.55**		

Source (NWMP 2030)



SOER Drivers, Pressures, Status, Impact and Response (DPSIR)

Drivers: High population growth demands water for domestic, industrial and agricultural use.

Pressures: Water scarcity implies vulnerability that water demand may exceed ability to renewal.

State: Water supply exceeds demand by >100%, County is in top 5% without water stress.

Impact: Adequate levels of available water for human, agriculture, livestock and wildlife use.

Response: Investment needed in integrated water management and water storage infrastructure.

County EPI Fact Sheet 8. Wastewater treatment

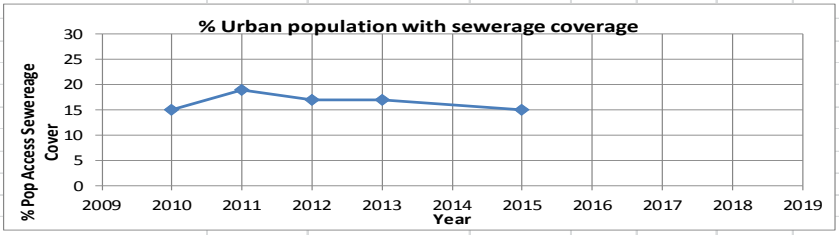
Measures % urban population accessing formal sewerage and waste water treatment systems/plants.

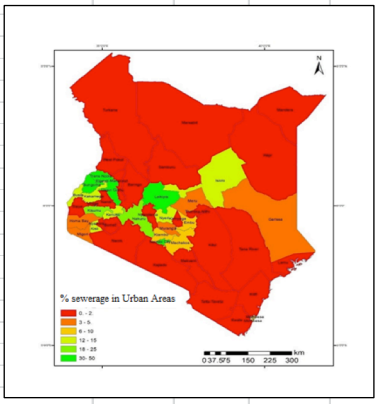
National Trend in Waste Water Treatment: 2010-2015

Year	2010	2011	2012	2013	2015	2017	2018
% Population Serviced	15	19	17	17	15		
EPI Score	18.8	23.8	21.3	21.3	18.8		

(Reference: WASREB 2016)

Trendline in % Population Accessing Sewerage Coverage

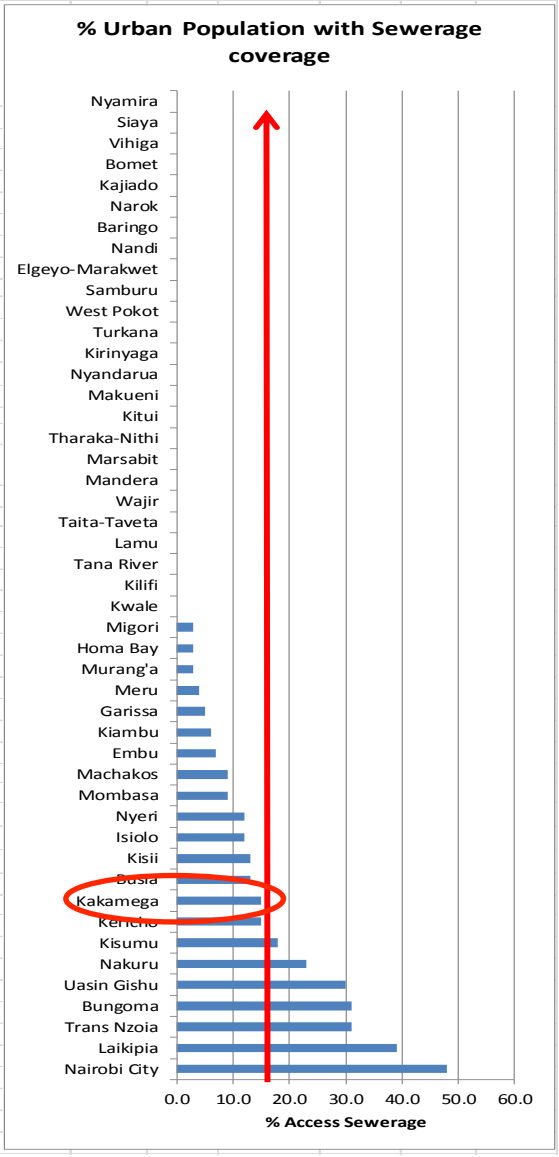




Source: (WASREB Impact Report 9)

% Urban Population with Sewerage Coverage in Counties

County	% Urban Population with Sewerage coverage	Names of towns with sewerage services	No. of towns with sewer services	EPI Score vs 80%
Nairobi City	48.0	Nairobi city	1	60.0
Laikipia	39.0	Nyahururu	2	48.8
Trans Nzoia	31.0	Kitale	1	38.8
Bungoma	31.0	Bungoma town	1	38.8
Uasin Gishu	30.0	Eldoret	1	37.5
Nakuru	23.0	Nakuru Naivasha	2	28.8
Kisumu	18.0	Kisumu town	1	22.5
Kericho	15.0	Kericho town	1	18.8
Kakamega	15.0	Kakamega Mumias	2	18.8
Busia	13.0	Busia town	1	16.3
Kisii	13.0	Kisii town	1	16.3
Isiolo	12.0	Isiolo town	1	15.0
Nyeri	12.0	Nyeri Mathira	2	15.0
Mombasa	9.0	Mombasa city	1	11.3
Machakos	9.0	Machakos,	2	11.3
Embu	7.0	Embu town	1	8.8
Kiambu	6.0	Kiambu town, Thika, Limuru,	3	7.5
Garissa	5.0	Garissa town	1	6.3
Meru	4.0	Meru town	1	5.0
Murang'a	3.0	Murang'a town	1	3.8
Homa Bay	3.0	Homa Bay town	1	3.8
Migori	3.0	Migori town	0	3.8
Kwale	0.0	none	0	0.0
Kilifi	0.0	none	0	0.0
Tana River	0.0	none	0	0.0
Lamu	0.0	none	0	0.0
Taita-Taveta	0.0	none	0	0.0
Wajir	0.0	none	0	0.0
Mandera	0.0	none	0	0.0
Marsabit	0.0	none	0	0.0
Tharaka-Nithi	0.0	none	0	0.0
Kitui	0.0	none	0	0.0
Makueni	0.0	none	0	0.0
Nyandarua	0.0	none	0	0.0
Kirinyaga	0.0	none	0	0.0
Turkana	0.0	none	0	0.0
West Pokot	0.0	none	0	0.0
Samburu	0.0	none	0	0.0
Elgeyo-Marakwet	0.0	none	0	0.0
Nandi	0.0	none	0	0.0
Baringo	0.0	none	0	0.0
Narok	0.0	none	0	0.0
Kajiado	0.0	none	0	0.0
Bomet	0.0	none	0	0.0
Vihiga	0.0	none	0	0.0
Siaya	0.0	none	0	0.0
Nyamira	0.0	none	0	0.0



Source: WASREB Impact Report 9 (2015)

SOER Drivers, Pressures, Status, Impact and Response (DPSIR)

Drivers: High population growth exceeds County capacity & investment in sewerage services.

Pressures: Unregulated sewage and waste water disposal contaminates waterways a disease risk.

State: County is in top 15% with sewage plants treating <19% of wastewater.

Impact: Raw sewerage & effluents contaminate water ways, increasing water borne diseases.

Response: County to allocate more resources for infrastructure for wastewater treatment system.

County EPI Fact Sheet 9. Tree Cover Loss

Measures % total cumulative tree loss from a baseline to present vs target to retain year 2000 % cover.

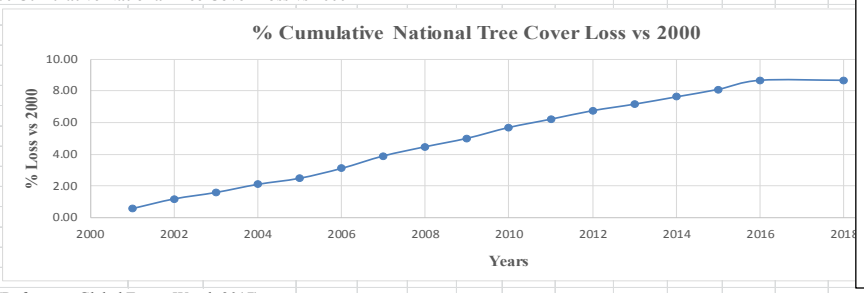
100.0 % tree cover vs 2000 (Reference: SDG 2030)

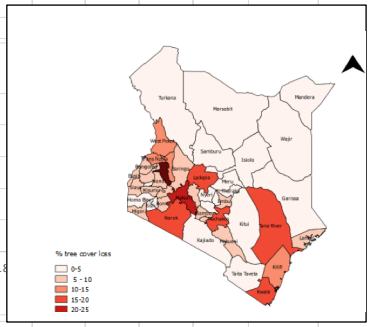
Cumulative % National Tree Cover Loss vs 2000

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2018
Annual Loss (ha)		19,027	20,288	13,553	16,988	12,745	20,656	26,103	19,224	17,696	22,693	17,300	17,899	13,564	15,357	15,616	19,048	
Cumulative (ha)		19,027	39,315	52,868	69,856	82,601	103,258	129,361	148,585	166,281	188,974	206,274	224,173	237,737	253,094	268,709	287,757	287,757
% Loss Vs 2000	3,319,481	0.57	1.18	1.59	2.10	2.49	3.11	3.90	4.48	5.01	5.69	6.21	6.75	7.16	7.62	8.09	8.67	8.67

(Reference: Global Forest Watch 2017)

% Cumulative National Tree Cover Loss vs 2000

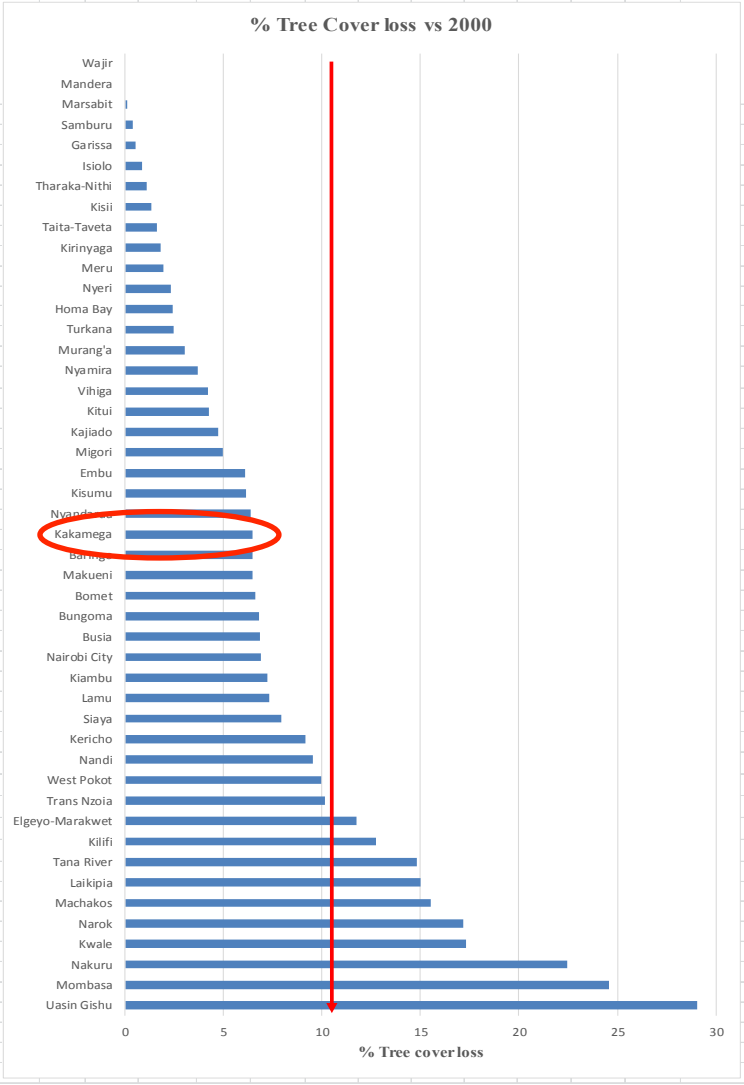




(Reference: Global Forest Watch 2017)

County by County % Tree Cover Loss Vs 2000-2016

	County	Tree Cover (ha) (2000)	Cumulative Tree Cover Loss (ha) (2000-2016)	% Tree Cover loss vs 2000	EPI Score (%)
1	Uasin Gishu	35967	10454.0	29.1	70.9
2	Mombasa	3811	937.0	24.6	75.4
3	Nakuru	123401	27719.0	22.5	77.5
4	Kwale	88915	15406.0	17.3	82.7
5	Narok	334631	57526.0	17.2	82.8
6	Machakos	7795	1211.0	15.5	84.5
7	Laikipia	46229	6928.0	15.0	85.0
8	Tana River	60105	8893.0	14.8	85.2
9	Kilifi	160174	20381.0	12.7	87.3
10	Elgeyo-Marakwet	107099	12583.0	11.7	88.3
11	Trans Nzoia	51439	5227.0	10.2	89.8
12	West Pokot	100198	9997.0	10.0	90.0
13	Nandi	110192	10514.0	9.5	90.5
14	Kericho	141228	12942.0	9.2	90.8
15	Siaya	35124	2789.0	7.9	92.1
16	Lamu	244951	17879.0	7.3	92.7
17	Kiambu	67619	4900.0	7.2	92.8
18	Nairobi City	5242	361.0	6.9	93.1
19	Busia	22038	1508.0	6.8	93.2
20	Bungoma	71112	4832.0	6.8	93.2
21	Bomet	120634	7968.0	6.6	93.4
22	Makueni	29164	1886.0	6.5	93.5
23	Baringo	113989	7358.0	6.5	93.5
24	Kakamega	35908	2315.0	6.4	93.6
25	Nyandarua	86039	5474.0	6.4	93.6
26	Kisumu	26031	1593.0	6.1	93.9
27	Embu	33625	2051.0	6.1	93.9
28	Migori	14725	730.0	5.0	95.0
29	Kajiado	19468	917.0	4.7	95.3
30	Kitui	32855	1393.0	4.2	95.8
31	Vihiga	12042	504.0	4.2	95.8
32	Nyamira	45412	1667.0	3.7	96.3
33	Murang'a	83218	2531.0	3.0	97.0
34	Turkana	6308	156.0	2.5	97.5
35	Homa Bay	50462	1220.0	2.4	97.6
36	Nyeri	172307	3962.0	2.3	97.7
37	Meru	120912	2356.0	1.9	98.1
38	Kirinyaga	43860	784.0	1.8	98.2
39	Taita-Taveta	28346	458.0	1.6	98.4
40	Kisii	48734	652.0	1.3	98.7
41	Tharaka-Nithi	46119	500.0	1.1	98.9
42	Isiolo	117	1.0	0.9	99.1
43	Garissa	239156	1228.0	0.5	99.5
44	Samburu	84134	341.0	0.4	99.6
45	Marsabit	8614	10.0	0.1	99.9
46	Mandera	0	0.0	0.0	100.0
47	Wajir	32	0.0	0.0	100.0
	(Reference: Global Forest Watch 2017)				



SOER Drivers, Pressures, Status, Impact and Response (DPSIR)

Drivers: Population growth and poverty increases demand for economic fuelwood and land.

Pressures: Deforestation due to agriculture expansion, illegal logging, charcoal burning, etc.

State: National 8% tree cover lost vs 2000, County is <6% loss, ranks 24.

Impact: Degradation of forest eco-services such as fuelwood, wildlife, water towers, etc.

Response: Investment in land and forest management, tree planting & enforcement of laws.

County EPI Fact Sheet 10. Climate Change Mainstreaming

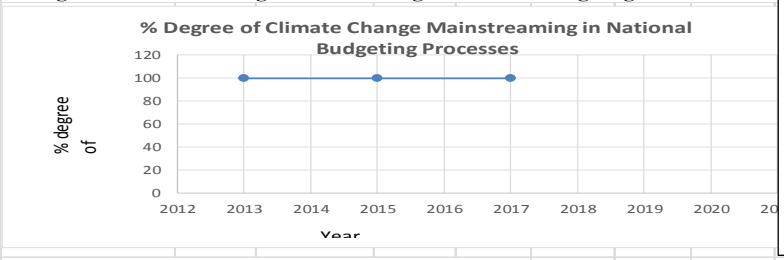
Measures % degree of climate change mainstreamed in National and County budgeting process.

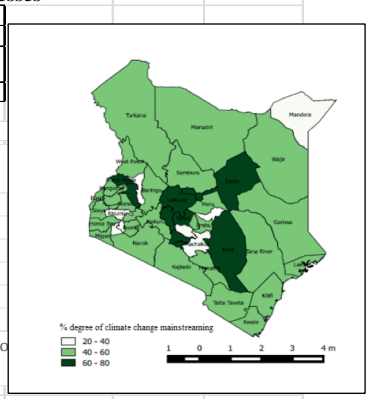
% National degree of Climate Change Mainstreaming in National Budgeting Processes

Year	2013	2015	2017	2018	2020
Rank	5	5	5		
% Climate Change Mainstreaming in National budgeting processes	100	100	100		
EPI Score	100	100	100		

(Reference: National Climate Change Action Plan (2013 – 2017))

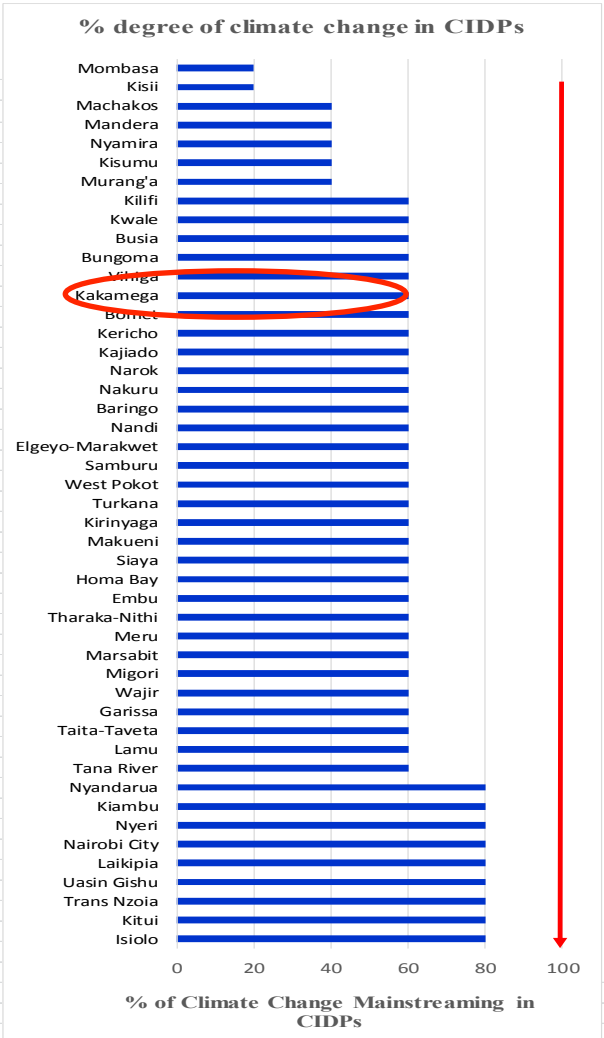
% Degree of Climate Change Mainstreaming in National Budgeting Processes





% Degree of Climate Change Mainstreaming in CIDPs

County	Rank	% degree of climate change in CIDPs	EPI Score
Isiolo	4	80	80
Kitui	4	80	80
Trans Nzoia	4	80	80
Uasin Gishu	4	80	80
Laikipia	4	80	80
Nairobi City	4	80	80
Nyeri	4	80	80
Kiambu	4	80	80
Nyandarua	4	80	80
Tana River	3	60	60
Lamu	3	60	60
Taita-Taveta	3	60	60
Garissa	3	60	60
Wajir	3	60	60
Migori	3	60	60
Marsabit	3	60	60
Meru	3	60	60
Tharaka-Nithi	3	60	60
Embu	3	60	60
Homa Bay	3	60	60
Siaya	3	60	60
Makueni	3	60	60
Kirinyaga	3	60	60
Turkana	3	60	60
West Pokot	3	60	60
Samburu	3	60	60
Elgeyo-Marakwet	3	60	60
Nandi	3	60	60
Baringo	3	60	60
Nakuru	3	60	60
Narok	3	60	60
Kajiado	3	60	60
Kericho	3	60	60
Bomet	3	60	60
Kakamega	3	60	60
Vihiga	3	60	60
Bungoma	3	60	60
Busia	3	60	60
Kwale	3	60	60
Kilifi	3	60	60
Murang'a	2	40	40
Kisumu	2	40	40
Nyamira	2	40	40
Mandera	2	40	40
Machakos	2	40	40
Kisii	1	20	20
Mombasa	1	20	20



Criteria scale:(0 = 0%, 1=1-20%, 2=21-40%, 3=41-60%, 4=61-80%, 5=81-100%)

(Reference: Ministry of Environment and Forestry, 2017)

SOER Drivers, Pressures, Status, Impact and Response (DPSIR)

Drivers: Anthropogenic increase in greenhouse gas (GHG) emissions is altering climate.

Pressure: Climate change adversely affecting weather patterns, changing water cycle patterns.

State: National mainstreaming of climate change is 100%, but County budget is a low 60%.

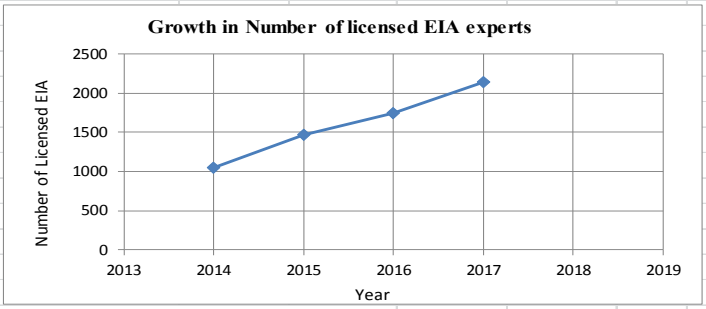
Impact: Changing weather patterns, droughts, floods and lake level, affect power generation.

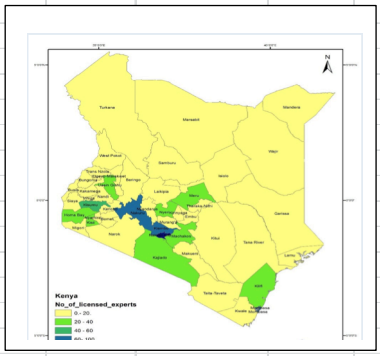
Response: Allocate more resources for climate change resilience, mitigation and adaptation, ie renewable energy, climate smart agriculture, rehabilitate forests, water storage, etc.

County EPI Fact Sheet 11. Capacity of Environmental Expertise

Measures % licensed EIA experts proportionate to 1:10,000 population as an ideal ratio for E&NRM.

Growth in National EIA Experts Licenced from 2004-18



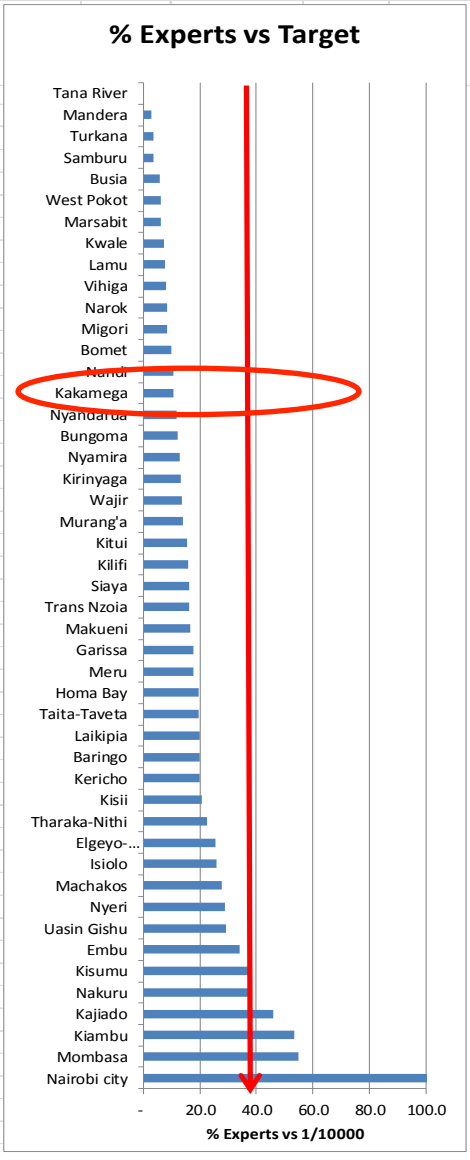


(Reference: NEMA, 2018, KNBS (2014-2017)

% of Licensed EIA Experts in County per 10,000 population 2016

	County	No. of Licensed EIA experts (2016)	Population (2016)	% Licensed EIA Experts/ 10,000 Pop	Target Number of Licensed EIA Experts	EPI Score
1	Nairobi city	960	4,463,149	215.1	446	100.0
2	Mombasa	65	1,184,988	54.9	118	54.9
3	Kiambu	100	1,868,208	53.5	187	53.5
4	Kajiado	40	870,721	45.9	87	45.9
5	Nakuru	77	2,031,247	37.9	203	37.9
6	Kisumu	42	1,132,264	37.1	113	37.1
7	Embu	19	559,766	33.9	56	33.9
8	Uasin Gishu	33	1,132,603	29.1	113	29.1
9	Nyeri	23	798,428	28.8	80	28.8
10	Machakos	33	1,191,325	27.7	119	27.7
11	Isiolo	4	155,465	25.7	16	25.7
12	Elgeyo-Marakwet	12	468,835	25.6	47	25.6
13	Tharaka-Nithi	9	396,115	22.7	40	22.7
14	Kisii	28	1,346,547	20.8	135	20.8
15	Kericho	19	944,576	20.1	94	20.1
16	Baringo	14	703,697	19.9	70	19.9
17	Laikipia	10	505,712	19.8	51	19.8
18	Taita-Taveta	7	358,173	19.5	36	19.5
19	Homa Bay	22	1,126,270	19.5	113	19.5
20	Meru	26	1,470,801	17.7	147	17.7
21	Garissa	11	623,060	17.7	62	17.7
22	Makueni	16	959,022	16.7	96	16.7
23	Trans Nzoia	17	1,037,455	16.4	104	16.4
24	Siaya	16	984,251	16.3	98	16.3
25	Kilifi	22	1,399,975	15.7	140	15.7
26	Kitui	17	1,097,687	15.5	110	15.5
27	Murang'a	15	1,084,871	13.8	108	13.8
28	Wajir	9	661,941	13.6	66	13.6
29	Kirinyaga	8	607,881	13.2	61	13.2
30	Nyamira	9	699,113	12.9	70	12.9
31	Bungoma	19	1,553,434	12.2	155	12.2
32	Nyandarua	8	686,379	11.7	69	11.7
33	Kakamega	20	1,875,531	10.7	188	10.7
34	Nandi	10	953,978	10.5	95	10.5
35	Bomet	9	916,175	9.8	92	9.8
36	Migori	9	1,071,803	8.4	107	8.4
37	Narok	9	1,077,719	8.4	108	8.4
38	Vihiga	5	626,707	8.0	63	8.0
39	Lamu	1	128,144	7.8	13	7.8
40	Kwale	6	820,199	7.3	82	7.3
41	Marsabit	2	315,936	6.3	32	6.3
42	West Pokot	4	649,418	6.2	65	6.2
43	Busia	5	840,251	6.0	84	6.0
44	Samburu	1	283,780	3.5	28	3.5
45	Turkana	3	855,399	3.5	86	3.5
46	Mandera	3	1,025,756	2.9	103	2.9
47	Tana River	0	303,077	0	30	0.0
	Total	**1,797**	**45,847,832**	**39.2**	**4585**	**39.2**

(Reference: NEMA, database 2018)



SOER Drivers, Pressures, Status, Impact and Response (DPSIR)

Drivers: Population and economic growth, place greater demand on limited expertise capacity.

Pressure: Limited skilled experts means improper EIA, low capacity for audits & enforcement.

State: County is ranked top 20, with a low of 11% of the E&NRM expertise required.

Impact: Inadequate E&NRM compliance, insufficient promotion of green & blue technology.

Response: County to invest more in capacity building and hiring of environmental experts.

County EPI Fact Sheet 12. Literacy Levels

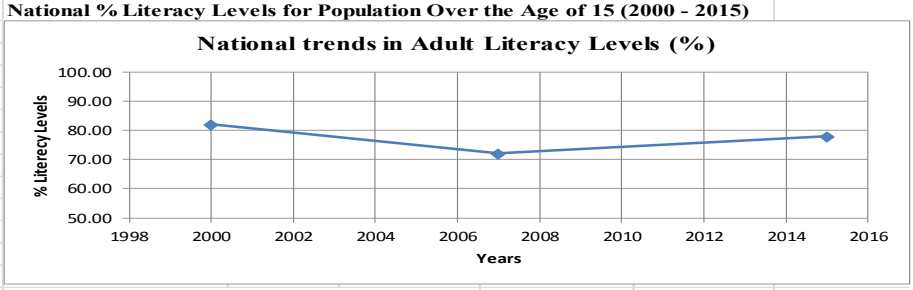
Measures % of population >15 who can both read and write, thereby understand their E&NRM role.

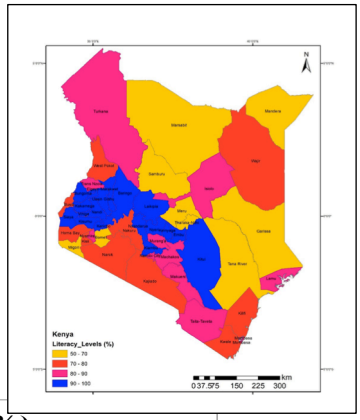
National % Literacy Levels for Population Over the Age of 15 (2000 - 2015)

Year	2000	2007	2015	2016	2018
Literacy levels (%)	82.23	72.16	78.02		

(Reference: World Data Atlas, Knoema, 2016)

National % Literacy Levels for Population Over the Age of 15 (2000 - 2015)

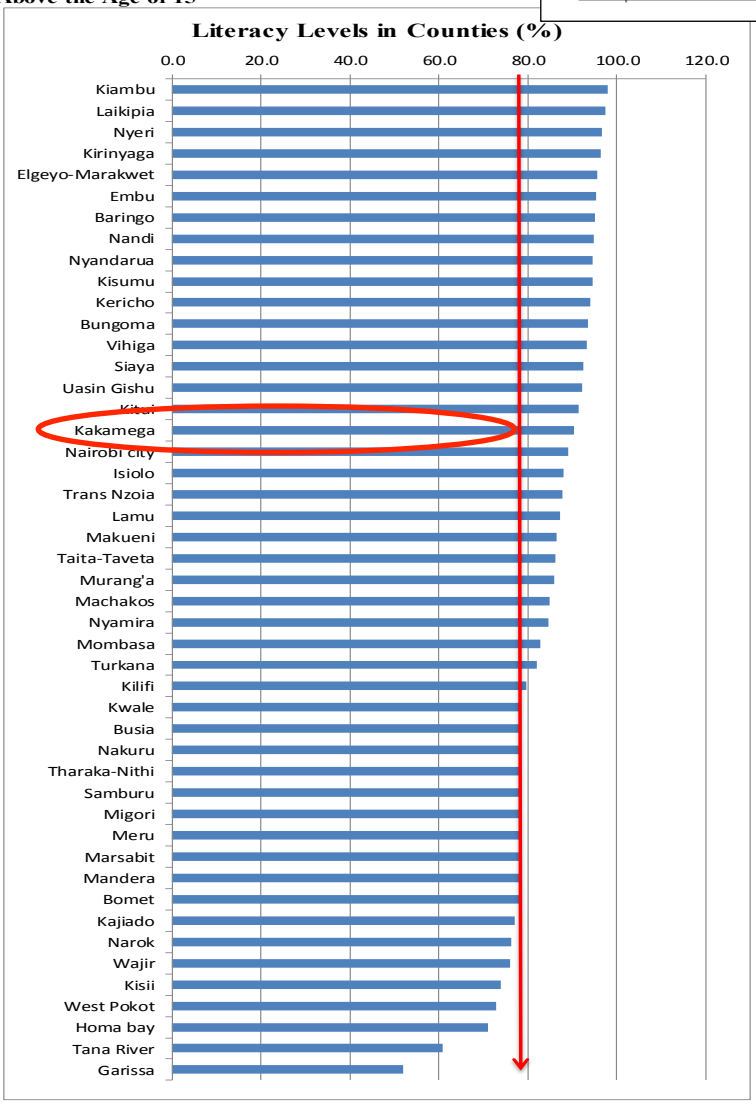




(Reference: World Data Atlas, Knoema, 2016)

County Literacy Levels for Population Above the Age of 15

	County	Literacy Levels (%)
1	Kiambu	98.00
2	Laikipia	97.40
3	Nyeri	96.60
4	Kirinyaga	96.30
5	Elgeyo-Marakwet	95.60
6	Embu	95.50
7	Baringo	95.10
8	Nandi	94.90
9	Nyandarua	94.60
10	Kisumu	94.50
11	Kericho	94.10
12	Bungoma	93.60
13	Vihiga	93.20
14	Siaya	92.50
15	Uasin Gishu	92.30
16	Kitui	91.50
17	Kakamega	90.50
18	Nairobi city	89.00
19	Isiolo	88.00
20	Trans Nzoia	87.70
21	Lamu	87.30
22	Makueni	86.60
23	Taita-Taveta	86.10
24	Murang'a	86.00
25	Machakos	85.00
26	Nyamira	84.60
27	Mombasa	82.70
28	Turkana	82.00
29	Kilifi	79.60
30	Kwale	78.20
31	Busia	78.20
32	Nakuru	78.00
33	Tharaka-Nithi	78.00
34	Samburu	78.00
35	Migori	78.00
36	Meru	78.00
37	Marsabit	78.00
38	Mandera	78.00
39	Bomet	78.00
40	Kajiado	77.10
41	Narok	76.40
42	Wajir	76.00
43	Kisii	74.00
44	West Pokot	73.00
45	Homa bay	71.00
46	Tana River	60.90
47	Garissa	52.10



(Reference: Knoema, 2016)

SOER Drivers, Pressures, Status, Impact and Response (DPSIR)

Drivers: Population growth exceeds education system capacity to teach literacy and E&NRM.

Pressure: Poor literacy is correlated with poor understanding of E&NRM & sustainable use.

State: County at 91% adult literacy is in top 20, above the national average of 78%.

Impact: Poor E&NRM awareness, increases incidences of bad environment related behaviour.

Response: Continued County investment in literacy and E&NRM education in the curriculum.

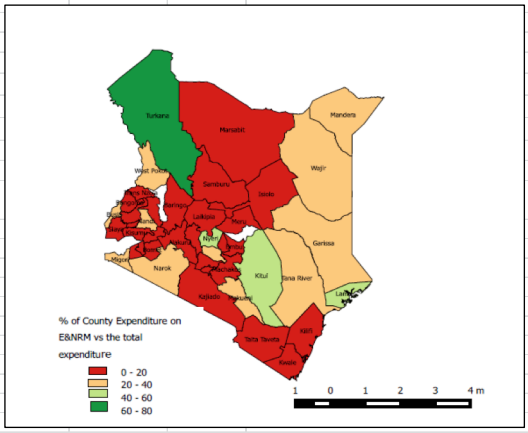
County EPI Fact Sheet 13. Expenditure on E&NRM

Measures % of E&NRM expenditure vs County total as % of E&NR worth vs GDP baseline of 35%.

% Contribution of E&NRM Sectors to GDP as National Target:

Sector	2013	2014	2015	2016	2017
Agriculture, Forestry & Fishing	26.4	27.5	30.2	32.1	31.5
Mining and Quarrying	0.9	0.8	0.9	0.8	0.8
Electricity Supply (renewable)	1.1	1	1.4	1.8	1.8
Water supply; Sewerage, Waste	0.9	0.8	0.7	0.7	0.7
Total Contribution	**29.3**	**30.1**	**33.2**	**35.4**	**34.8**

(Reference: Economic Survey Report, 2018)



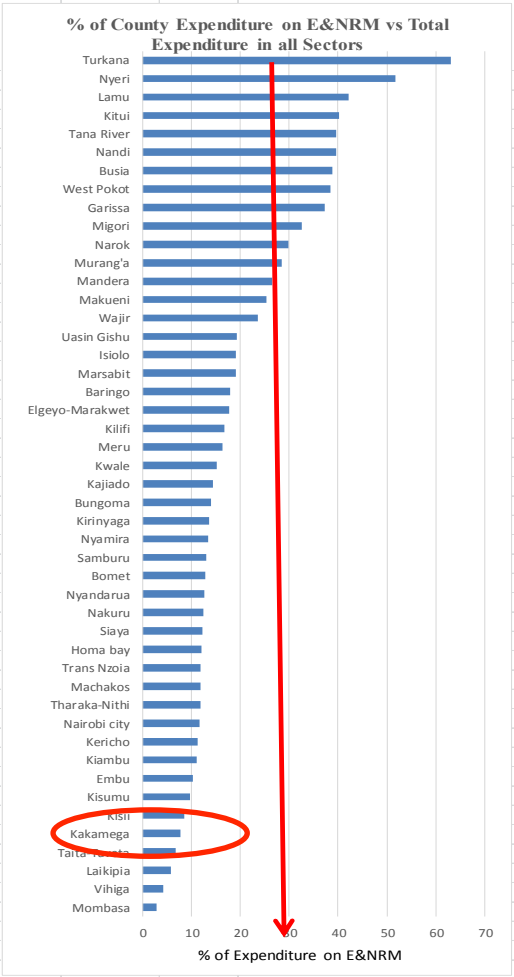
Expenditure by MDAs in E&NRM Sectors for FY 2016/17 (Kshs. Millions)

Ministry/ State Department	Net Expenditure
Water Services	29,889.30
Irrigation	6,372.60
Environment	1,663.20
Natural Resources (Forestry)	1,546.10
Agriculture	9,442.10
Livestock	1,808.90
Fisheries & Blue Economy	1,570.70
Mining	1,310.10
Tourism (& wildlife)	3,375.50
Total E&NRM Sectors:	**56,978.50**
Total Net Expenditure in All Sectors	**557,166.00**
% Expenditure in E&NRM Vs Total:	**10.23**
EPI Score	**29.39**

Source: Office of the Controller of Budget, Annual National Governments Budget Implementation Review Report (2017)

Expenditure by County E&NRM Sectors for FY 2016/17 (Kshs. Millions)

	County	Total Expenditure in all sectors (Kshs. Mill)	Expenditure on E&NRM Sectors (Kshs. Mill)	% of County Expenditure on E&NRM vs the total	EPI Score	PTT
1	Mombasa	9133.57	260.76	2.85	8.20	8.20
2	Vihiga	3718.67	156.44	4.21	12.09	12.09
3	Laikipia	4710.66	274.8	5.83	16.76	16.76
4	Taita-Taveta	3385.05	226.09	6.68	19.19	19.19
5	Kakamega	10845.12	836.98	7.72	22.18	22.18
6	Kisii	7985.61	684.2	8.57	24.62	24.62
7	Kisumu	6837.85	664.55	9.72	27.93	27.93
8	Embu	5669.24	580.58	10.24	29.43	29.43
9	Kiambu	10811.57	1199.05	11.09	31.87	31.87
10	Kericho	5600.72	636.29	11.36	32.65	32.65
11	Nairobi city	24858.64	2905.8	11.69	33.59	33.59
12	Tharaka-Nithi	2773.85	329.75	11.89	34.16	34.16
13	Machakos	9148.77	1088.67	11.90	34.19	34.19
14	Trans Nzoia	6004.44	717.05	11.94	34.32	34.32
15	Homa bay	5737.16	693.44	12.09	34.73	34.73
16	Siaya	5630.16	688.13	12.22	35.12	35.12
17	Nakuru	10663.22	1322.47	12.40	35.64	35.64
18	Nyandarua	4963.02	627.7	12.65	36.34	36.34
19	Bomet	5303.97	685.97	12.93	37.16	37.16
20	Samburu	4167.1	539.47	12.95	37.20	37.20
21	Nyamira	4501.6	603.52	13.41	38.53	38.53
22	Kirinyaga	4246.58	576.04	13.56	38.98	38.98
23	Bungoma	7992.16	1123.15	14.05	40.38	40.38
24	Kajiado	5061.92	732.62	14.47	41.59	41.59
25	Kwale	5860.64	888.81	15.17	43.58	43.58
26	Meru	8344.02	1360.52	16.31	46.85	46.85
27	Kilifi	10184.21	1712.5	16.82	48.32	48.32
28	Elgeyo-Marakwet	3964.68	703.58	17.75	50.99	50.99
29	Baringo	5214.39	929.98	17.83	51.25	51.25
30	Marsabit	6141.49	1167.11	19.00	54.61	54.61
31	Isiolo	3493.1	668.47	19.14	54.99	54.99
32	Uasin Gishu	5594.57	1078.42	19.28	55.39	55.39
33	Wajir	8242.89	1936.95	23.50	67.52	67.52
34	Makueni	8922.51	2255.64	25.28	72.64	72.64
35	Mandera	10196.94	2704.9	26.53	76.23	76.23
36	Murang'a	6432	1832.29	28.49	81.86	81.86
37	Narok	7473.71	2231.75	29.86	85.81	85.81
38	Migori	5816.62	1892.14	32.53	93.48	93.48
39	Garissa	7123.5	2649.5	37.19	106.88	100.00
40	West Pokot	4804.09	1850.73	38.52	110.70	100.00
41	Busia	5881.4	2279.4	38.76	111.37	100.00
42	Nandi	5364.9	2128.18	39.67	113.99	100.00
43	Tana River	3546.37	1408.18	39.71	114.10	100.00
44	Kitui	8314.6	3339.41	40.16	115.41	100.00
45	Lamu	1993.53	840.83	42.18	121.20	100.00
46	Nyeri	5685.1	2936.73	51.66	148.44	100.00
47	Turkana	11191.41	7071.97	63.19	181.58	100.00



Source: Office of the Controller of Budget, Annual County Governments Budget Implementation Review Report (2017)

SOER Drivers, Pressures, Status, Impact and Respons (DPSIR)

Drivers: If E&NRM budget does not match GDP, County cannot sustain its green economy.

Pressure: Low County expenditure means poor enforcement and unsustainable E&NR use.

State: National budgets at 40% GDP, County is bottom 5, <8% expenditure on E&NRM.

Impact: Low investment leads to poor E&NRM favoring a brown growth trajectory.

Response Increase E&NRM allocations in CIDP to match E&NR sector economic contribution.

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