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**NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY**

**DEVELOPMENT OF KENYA NATIONAL ENVIRONMENTAL PERFORMANCE INDEX**

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**INCEPTION REPORT**

**JULY 2017**

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# **LIST OF ABBREVIATIONS**

|  |  |
| --- | --- |
| AFA | Agriculture and Food Authority |
| CDE | County Director of Environment |
| CIDP | County Integrated Development Plan |
| DANIDA | Danish International Development Assistance |
| DOSH | Directorate of Occupational Health and Safety |
| EMCA | Environmental Management and Coordination Act |
| EPI | Environmental Performance Index |
| FAO | Food and Agriculture Authority |
| GGEP | Green Growth and Employment Program |
| KALRO | Kenya Agricultural and Livestock Research Organisation |
| KIPPRA | Kenya Institute for Public Policy Research and Analysis |
| KMFRI | Kenya Marine and Fisheries Research Institute |
| KFS | Kenya Forest Service |
| KNBS | Kenya National Bureau of Statistics |
| KWS | Kenya Wildlife Service |
| KWTA | Kenya Water Towers Authority |
| MDA | Ministries, Departments and Agencies |
| MENR&RDA | Ministry of Environment, Natural resources and Regional Development Authorities |
| NBSAP | National Biodiversity Strategy and Action Plan |
| NEAP | National Environmental Action Plan |
| NEC | National Environmental Council |
| NECC | National Environment Complaints Committee |
| NEMA | National Environmental Management Authority |
| NET | National Environment Tribunal |
| NETFUND | National Environment Trust Fund |
| PTT | Proximity To Target |
| SDG | Sustainable Development Goals |
| SERC | Standards and Enforcement Review Committee |
| SOE | State of Environment Report |
| TOR | Terms of Reference |
| WHO | World Health Organisation |
| WRMA | Water Resources Management Authority |

# **EXECUTIVE SUMMARY**

*Background*

NEMA is a supreme environmental government agency created by an Act of Parliament, i.e. the Environment Management and Coordination Act CAP 387. Its mandate is to coordinate and supervise all environmental matters country-wide as well as to implement environmental policies on behalf of the government. This context provides a coordinating mechanism for NEMA to work with and through the National and County Governments, ministries, departments and state agencies (MDAs) and other stakeholders.

NEMA is one of the implementing partners for the Danish International Development Assistance (DANIDA) funded Green Growth and Employment Program (GGEP). The NEMA component of GGEP is ‘Greening Kenya’s Development Pathway’ whose outcome by June 2020 is a greener development pathway for Kenya. A greener development pathway for Kenya outcome will be assessed through an indicator - the Environment Performance Index. The same index will be used to measure the outcomes of other GGEP engagements especially the component to be implemented by the Ministry of Environment, Natural Resources and Regional Development Authorities (MENR&RDA) aimed at “Creating an enabling environment for green growth”.

The environmental planning role of NEMA also includes development of the State of Environment (SOE) reports and the National Environment Action Plan (NEAP). Counties Environmental Action Plans (CEAP) feeds to the National Environment Action Plan. Arising from these, NEMA is best placed to undertake development of an index to be used in measuring the national and counties performance in environmental management. Such index will also be used as an indicator for environment interventions such as the GGEP at both County and National levels.

The National Environment Management Authority (NEMA) has engaged the services of Log Associates to develop *Kenya National Environmental Performance Index*. The main objective of the consultancy is to assist in the development of an Environment Performance Index to be used as an indicator of the national and county levels performance in implementing environmental management programs, initiatives and also to be used to measure achievement of key outcomes of the Green Growth and Employment program. Quality environmental management policies, programs and initiatives under public and private sectors will get opportunity to be monitored regularly using the EPI for enhanced environmental enforcement and compliances. Since EPI is a new environmental management frontier, it will lead to further creation of opportunities in environmental management knowledge, skills and experience at County and National levels.

*Objectives*

The specific objectives of the consultancy include:-

1. Assist in the development of the Environmental Performance Index and hence provide the baseline(s);
2. Provide recommendations on the required infrastructure for hosting and sharing of the Environment Performance Index; and,
3. Undertake trainings on the development and use of the Environment Performance Index targeting mainly those drawn from implementing partners of the GGEP.

An Environmental Performance Index is a method of ranking countries or Counties on performance indicators tracked across policy categories in government, private sector, public and at community level.

*Approach and Methodology*

In conducting the assignment, the Consultant will adopt interactive, collaborative and integrative approaches. Emphasis will be put on mutual learning and exchange of ideas between and among partners, key stakeholders including County governments and relevant line ministries and other stakeholders such as CSOs. Consultative workshops will be organised at both National and County levels to provide a platform for exchange of ideas on the National EPI.

The methodology to be adopted in development of the Kenya National EPI will to a large extent borrow from the methodology adopted by the global EPI established by Yale and Columbia Universities. The Kenya National EPI will be generated through the calculation and aggregation of all the indicators reflecting National and County level environmental data. A “proximity-to-target methodology” will be used to assess how close each County is to an identified policy target. County scores will be determined by how close or far they are to the set policy targets. Scores will be standardized (i.e., on a scale of 0 to 100) for comparability, weighting, and aggregation.

A summary of the methodology to be adopted per objective is as follows:

| SN | Objective | Stepwise Methodology |
| --- | --- | --- |
|  | **Assist in the development of the Environmental Performance Index and hence provide the baseline(s)** | * Literature Review * Establishment of the EPI framework * Development of a model * Baseline Data Collection on Indicators * Data management ((including cleaning, checking for quality, consistency, accuracy, completeness) * Statistical analysis (Analysis using a developed model running on an *R* platform, Computation of Proximity-to-Target (PTT) for each indicator, Weight assignment for each policy category and indicator, Aggregation of indicators into policy category, objective and index, Generation of EPI profiles for each County in Kenya) |
|  | **Provide recommendations on the required infrastructure for hosting and sharing of the Environment Performance Index** | * Identification of infrastructure gaps across key institutions (hardware and “soft” (capacities, software, systems and procedures, etc)) in data collection, management and onward transmission * Recommendations on infrastructure requirements with cost estimates where necessary |
|  | **Undertake trainings on the development and use of the Environment Performance Index targeting mainly those drawn from implementing partners of the GGEP** | * Training needs assessment * Identification of training modules * Development of a training programme and training materials * Training workshops for key stakeholders on development, use and sharing of EPI * Evaluation of training support * Training report |

*Study Work Plan*

NB: Estimated Total project Duration is 117 Business days.

**Table 1:** Reporting dates

|  |  |
| --- | --- |
| ***Reports*** | ***Date*** |
| Inception Report | 20/7/17 |
| Progress Report | 3/10/17 |
| Draft Report | 7/11/17 |
| Draft Final Report | 5/12/17 |
| Final Report | 15/12/17 |

# **1.0 INTRODUCTION**

## 1.1 Preface

The National Environment Management Authority (NEMA) has engaged the services of ***Log Associates*** to develop a Kenya National Environmental Performance Index. This Inception Report presents our Understanding on the Terms of Reference, proposed Methodology and a Work Plan for carrying out the assignment.

## 1.2 Background

NEMA is a supreme environmental government agency created by an Act of Parliament, i.e. the Environmental Management and Coordination Act CAP 387. Its mandate is to coordinate and supervise all environmental matters country-wide as well as to implement environmental policies on behalf of the government. This context provides a coordinating mechanism for NEMA to work with and through the National and County Governments, ministries, departments and state agencies (MDAs) and other stakeholders.

A clean and healthy environment is at the center of Kenya’s sustainable development agenda and is enshrined in the Constitution 2010 in Chapter 4 on the Bill of Rights. Specifically, Article 42(a) calls upon the government and other relevant institutions to protect the “environment for the benefit of present and future generations through legislative and other measures”. Further, NEMA has the role of ensuring that environmental rights are enforced as provided under article 70 of the constitution.

NEMA is one of the implementing partners for the Danish International Development Assistance (DANIDA) funded Green Growth and Employment Program (GGEP). The NEMA component of GGEP is ‘Greening Kenya’s Development Pathway’ whose outcome by June 2020 is a greener development pathway for Kenya. Quality environmental management policies, programs and initiatives under public and private sectors will get opportunity to be monitored regularly using the EPI for enhanced environmental enforcement and compliances. Since EPI is a new environmental management frontier, it will lead to further creation of opportunities in environmental management knowledge, skills and experience at County and National levels.

## 1.3 Rationale/ Justification

A greener development pathway for Kenya outcome will be assessed through an indicator - the Environment Performance Index. The same index will be used to measure the outcomes of other GGEP engagements especially the component to be implemented by the Ministry of Environment, Natural Resources and Regional Development Authorities (MENR&RDA) aimed at “Creating an enabling environment for green growth” to effect environmental management improvements in both public and private sectors in the country.

The environmental planning role of NEMA also includes development of the State of Environment (SOE) reports and the National Environment Action Plan (NEAP). Arising from these, NEMA is best placed to undertake development of an index to be used in measuring the national and counties performance in environmental management. Such index will also be used as an indicator for environment interventions such as the GGEP. NEMA also supports integration of environmental aspects in all policies, laws and regulations at national and county levels.

## 1.4 Objectives of the Consultancy

The main objective of the consultancy will be to assist in the development of an Environment Performance Index to be used as an indicator of the national and county levels performance in implementing environmental management initiatives and also to be used to measure achievement of key outcomes of the Green Growth and Employment program.

Specific objectives of the consultancy include:-

1. Assist in the development of the Environmental Performance Index and hence provide the baseline(s);
2. Provide recommendations on the required infrastructure for hosting and sharing of the Environment Performance Index; and,
3. Undertake trainings on the development and use of the Environment Performance Index targeting mainly those drawn from implementing partners of the GGEP.

**1.5 Expected Tasks**

The consultant shall:-

1. Undertake desk reviews/research on similar indexes in other jurisdictions while taking into consideration key environmental issues of national importance within NEMA’s mandate
2. Engage in consultations/interviews with various stakeholders both at the National and County Governments level
3. Train and capacity build the target group on the development and use of the Environmental Performance Index
4. Carry out the tasks diligently and in a professional manner
5. Ensure high quality of output
6. Be guided by the Terms of Reference

**1.6 Deliverables**

1. Inception report detailing among others the methodology on how the task will be undertaken, work schedule and timelines.
2. Progress Report
3. Draft Report
4. Draft Final Report – To be submitted upon incorporation of comments from national stakeholders validation workshop
5. Final Report detailing among others:

* The Environment performance index developed including the processes followed, consultations done, etc.
* Baseline index(es) using the environmental performance index so developed
* Trainings/capacity building undertaken to NEMA staff and other stakeholders
* Any necessary recommendations arising from the consultancy assignment.

# **2.0 OUR UNDERSTANDING ON THE TERMS OF REFERENCE**

## 2.1 Terms of Reference

The Consultant understands that the specific objectives of this Consultancy are as follows:

* *Assist in the development of the Environmental Performance Index and hence provide the baseline(s);*
* *Provide recommendations on the required infrastructure for hosting and sharing of the Environment Performance Index; and,*
* *Undertake trainings on the development and use of the Environment Performance Index targeting mainly those drawn from implementing partners of the GGEP.*

## 2.2 Our Understanding

### 2.2.1 Development of the Environmental Performance Index (EPI) and providing Baselines

A generalized definition for environmental indicator has been provided by *Malkina-Pykh* (1999)[[1]](#footnote-1) as a number that refers to the state, response or the development of important aspects of the environment. An index is often constructed from several indicators, weighted together to describe total impact on a certain aspect within the “broader environment”. It normally has no unit of measurement. The combination of indicators and indices in the description of specific elements of the environment (state, response, development) is always a delicate compromise between scientific accuracy, concise in formativeness and usefulness for strategic decision making.

Over the last two decades, there have been several efforts at defining environmental indices starting with the Environmental Sustainability Index (ESI) in 2000 and several others[[2]](#footnote-2). In an attempt to consolidate data and information for decision makers, Yale Centre for Environmental Law and Policy and the University of Colombia in collaboration with the World Economic Forum developed the Environmental Performance Index (EPI); a method of assessing and ranking countries on performance of specific environmental indicators tracked across various policy categories.

The global EPI is jointly developed by the Yale Centre for Environmental, Law and Policy of Yale University and the Centre for International Earth Science Information Network of Columbia University[[3]](#footnote-3) is published every two years since 2006 during the World Economic Forum in Davos, Switzerland. In the latest EPI 2016 release, Kenya was ranked position 123 among 178 countries around the world.

The EPI simplifies the complex multi-faceted environmental issues into a simple reporting system that is useful for policy makers and implementers at different levels of government as well as other stakeholders and the public to focus on areas where new initiatives are needed towards improvement.

The goal of the Kenyan National EPI to be developed under this study will be to communicate information about the state of the Kenyan environment as well as about the population, activities and systems and processes that affect it, in ways that highlight emerging problems and draw attention to the effectiveness of the current policies, legislations, programmes and interventions in general.

The Kenya National EPI will be part of a knowledge management system aimed to inform future policy and programming, thereby contributing to the promotion of policy dialogue. The Consultant will recommend how this “knowledge” will be disseminated and shared through identification of the most appropriate channels according to the target audience which will include NEMA, National and County Governments, research institutions etc.

**Core Elements in Developing the National Environmental Performance Index**

1. **Objectives**

The first major component of the EPI indicator framework is the measurable objective. Measurable objectives relate to the overall goals of an index and can be assessed with data. They comprise the top-level of aggregation in the EPI indicator framework. The objectives of the index will be determined through review of existing policy goals and other relevant literature to ensure that the chosen objectives mirror the priorities expressed by policymakers with respect to the environment and natural resource protection. These national and sector priorities are expected to be found from the various documents and processes including Vision 2030, the State of Environment, the Sustainable Development Goals (SDGs) and indicators, National Environment Action Plan (NEAP) and National Action Plan (NAP).

1. **Policy Categories**

Policy categories of an index are elements that reflect components of an objective. Core categories of an index help to summarize the types of metrics used to support measurable objectives and meet the overall objectives / goals of the index. Identification of core policy categories will assist in defining and selecting relevant indicators.

1. **Indicator Identification Process**

The third component of the EPI framework includes the indicators defined as a means of measuring the extent to which program / project objectives are achieved at different levels. The indicators to be considered for various policy categories will be used to help reveal trends and draw attention to particular policy issues. The key performance indicators of the National EPI will be identified from review of relevant literature such as existing policies, the global EPI, indicators from the Green Growth and Employment Programme, existing processes both at the national and regional level and through expert opinions.

1. **Weight Assignment and Aggregation**

Assigning of weights to objectives, policy categories and indicators that comprise the EPI is done in order to create the aggregate EPI score. Weights for the EPI will be assigned after considering expert recommendations including perceived quality of data, importance of the indicators and categories for policymaking, and the degree to which the indicators provide direct measurement of environmental performance.

To begin with, weightings at every level of aggregation will first be divided equally and later adjusted to reflect the relative importance of given issues and the relevance of indicators to category performance. Another important consideration when determining weightings will be the underlying distribution of the indicator, policy category, and objective scores; or how much variation exists in the data available. Once the weights are established, the individual component scores will be aggregated into an overall score using a developed mathematical model which adopts a proximity-to-target method detailed in Section 3.

1. **Baseline Data for Indicators**

Baseline measurements for each indicator have to be undertaken at an early stage of implementation, so that any progress over time can later be compared to the original situation and possible trends can be analyzed. As such, upon consensus on all the indicators for the Kenya National EPI, the Consultant will proceed to collect the baseline data for each of them. It is expected that NEMA will facilitate continuous measurement programs of data on indicators after an agreed period of time for comparison purposes and policy decision making. The key components of the EPI will also be reviewed from time to time.

1. **Selection Criteria for the EPI Baseline Data**

Baseline data to be considered for the EPI must meet the following threshold:

1. Reliability: Published data from reliable sources such as Kenya Meteorological Department, Kenya National Bureau of Statistics (KNBS), United Nations or other international institutions such as FAO will be given first priority in determining the baseline values.
2. Approved scientific methodology for data collection: Baseline data on indicators should be on scientific data collected using approved scientific methodologies.
3. Time series availability: The data to have been consistently measured across time
4. Completeness: The dataset needs to have adequate coverage to be considered.

All potential datasets will be reviewed for quality and verifiability. Those that will not meet baseline quality standards will be discarded and recommendations on approved scientific data collection methods recommended in consultation with the client.

1. **Development of a Model for Analysing Data**

Baseline datasets collected on indicators will undergo transformation in order to be useful in producing the overall index results. Raw baseline data will therefore be cleaned to ensure that all datasets are in a compatible format ready for statistical analysis.

The cleaned data will be statistically analysed using a developed mathematical model running on an *R* platform. The model adopts a proximity-to-target method to transform data of various indicators having different original formats so that they can be aggregated into an index.

1. **Policy Targets**

Policy targets against which to measure observed environmental outcomes will be consultatively set. Where national targets will be found missing, we will adopt internationally accepted targets and standards from recognised institutions such as World Health Organisation (WHO). A clear basis for assigning weights to constituent indicators to permit aggregation to the index level will also be defined.

### 2.2.2 Provision of recommendations on the required infrastructure for hosting and sharing of the Environment Performance Index;

To effectively achieve its goal, the Kenya National EPI framework would require the necessary platform, systems/structures, skills, hardware and software to enable it to function. These systems, structures, skills, etc would require to be put in place, not only by NEMA, but also by all partners involved in data collection, management, analysis and transmission.

The TOR requires the Consultant to provide recommendations on the required infrastructure for hosting and sharing of the Environment Performance Index. As such, the consultant will interrogate any key infrastructure gaps that might exist at various levels. The recommendations therefrom shall include quantities, capacities and other specifications with regard to the hardware while also detailing the systems/structures that should be put in place or enhanced. Where specific skills may be lacking, or inadequate, specific recommendations on how these can be enhanced will be made.

### 2.2.3 Undertaking trainings on the development and use of the Environment Performance Index targeting mainly those drawn from implementing partners of the GGEP

Capacity building for project implementation staff and partners is an important element of the overall strategy for improving the performance of a project. Training on development and use of the EPI will be aimed at developing and strengthening stakeholders’ capacities for effective and efficient data capture and reporting on the EPI.

A training needs assessment helps in identifying the training needs of a particular audience. As such, the Consultant will assess training needs of key stakeholders of the EPI during various consultation forums and document capacity gaps. These capacity gaps will be instrumental in identifying the training modules to be used after development of the EPI. Training sessions for identified key stakeholders will be conducted in a 3 day workshop in Nairobi. The Consultant will prepare adequate training materials for all the participants.

# **3.0 APPROACH AND METHODOLOGY**

## 3.1 Generalized Approach

To enrich the outcome of the study, the Consultant will adopt interactive, collaborative and integrative approaches. Emphasis will be put on mutual learning and exchange of ideas between and among partners, key stakeholders including County governments and relevant line ministries. Consultative workshops will be organised at both National and County levels to provide a platform for exchange of ideas on the National EPI. Some of the key stakeholders we will consult are presented in Table 3.1 below.

#### Table 3.1 List of Key Stakeholders

| Category of Stakeholder | Stakeholder to be Consulted |
| --- | --- |
| GGEP Implementing Partners | * Danish International Development Assistance (DANIDA) * National Environment Management Authority (NEMA) * EMCA Institutions such as National Environment Complaints Committee (NECC), National Environment Tribunal (NET), National Environmental Council (NEC), National Environment Trust Fund (NETFUND) and Standards and Enforcement Review Committee (SERC) * Ministry of Environment & Natural Resources and Regional Development Authorities (CDA, KVDA, TARDA, LBDA, KVDA, ENSDA) |
| Line Ministries and Departments | * Ministry of Agriculture, Livestock and Fisheries, Ministry of Health, Ministry of Devolution and Planning, Ministry of Water and Irrigation etc * Kenya Forest Service (KFS) * Kenya Wildlife Service (KWS) * Kenya Water Towers Authority (KWTA) * Water Resources Management Authority (WRMA) * Directorate of Occupational Health and Safety (DOSH) * Kenya National Bureau of Statistics (KNBS) * Agriculture and Food Authority (AFA) * National Museums of Kenya * Kenya Water Towers Authority * Kenya Institute for Public Policy Research and Analysis (KIPPRA) * Public Procurement Oversight Authority (PPOA) |
| County Governments | * Council of Governors (COG) * Governor / Deputy governor * CECs in charge of Environment and Tourism * County Departments of Environment |
| Research Institutions | * Kenya Forestry Research Institute * Kenya Agricultural and Livestock Research Organisation (KALRO) * Kenya Marine and Fisheries Research Institute (KMFRI) * Universities |
| UN Institutions and Private Sector Institutions | * Food and Agricultural Organisation (FAO) * World Health Organisation (WHO) * United Nations Environment Programme (UNEP) * Kenya Association of Manufacturers (KAM) * Kenya Private Sector Alliance (KEPSA) * Private sector institutions under the Strategic Sector Corporation (SSC) * Environment CSOs |

## 3.2 Methodology

### 3.2.1 Development of the Environmental Performance Index (EPI) and providing Baselines

The methodology to be adopted in development of the Kenya National EPI will be based on that adopted for the global EPI established by Yale University and Columbia University (www.epi.yale.edu). The EPI will also to a large extent be informed by the existing national environment resources and processes, SDGs and multilateral environmental agreements. The National EPI will be generated through the calculation and aggregation of all the indicators reflecting National and County level environmental data. A “proximity-to-target methodology” will be used to assess how close each County is to an identified policy target. County scores will be determined by how close or far they are to the set policy targets. Scores will be standardized (i.e., on a scale of 0 to 100) for comparability, weighting, and aggregation.

The Consultant will follow the following steps during the development of the Kenya National EPI:

1. **Literature / Desk Review**

The Consultant has undertaken analytical review of key documentation and publications on environmental management and policies in Kenya, the region and in the world. Some of these documentation include:

* GGEP Programme design document
* State of Environment Report (SOE) and manual
* Sustainable Development Goals (SDGs)
* The Constitution and Vision 2030
* National Environment Action Plan (NEAP)
* State of Environment Reports
* Kenya Green Growth Development Guideline (by KENINVEST)
* Kenya Programme 2016–2020 Green Growth and Employment Thematic Programme Document
* Relevant National Policies and Strategies e.g. National Environmental Policy (Draft), Land Policy, National Biodiversity Strategy and Action Plan (NBSAP)
* EMCA Regulations (Air Quality Regulations, Noise and Excessive Vibration Regulations 2007, Waste Management Regulation, 2006
* National Climate Change Action Plan 2013–17
* National Climate Change Response Strategy
* International Conventions which Kenya has ratified e.g. Convention on Biological Diversity (CBD), Convention on Wetlands (Ramsar, 1971)
* Environmental Action Plans preparation guidelines (2016 – 2022)
* County Environment Action Plans
* County Integrated Development Plans (CIDPs)

Literature review is a continuous exercise and additional pieces of literature will be reviewed as the study progresses.

1. **Establishment of the EPI Framework**

Establishing the structure of the Environmental Performance Index will be an iterative process that will require several rounds of revisions with the client, GGEP partners and key stakeholders. The EPI framework will start from an “ideal” perspective including identifying the index objectives, policy categories and indicators. This will be refined with stakeholder and expert input during consultations at the onset of the study.

1. **Baseline Data Collection on Indicators**

Upon identification of all the indicators under various policy categories for the Kenya National EPI, the Consultant will proceed with baseline data collection for each of the indicators for the most recent year of data available preferably 2016 . As emphasized in the previous Chapter, the baseline data to be considered for the EPI must meet a certain threshold. Even though baseline data will eventually be provided for all the 47 Counties, the Consultant will sample pilot Counties which will be visited. The baseline data used for the EPI will come from a variety of sources including but not limited to the following:

* Official published data that are measured and formally reported by governments
* International organizations that serve as central agencies for global data collection such as FAO
* Spatial data compiled by research or international organizations;
* Observations from monitoring stations
* Modeled data
* Field research and data collection programs through efforts of scientists and organizations

**Participation of Counties in the EPI Process**

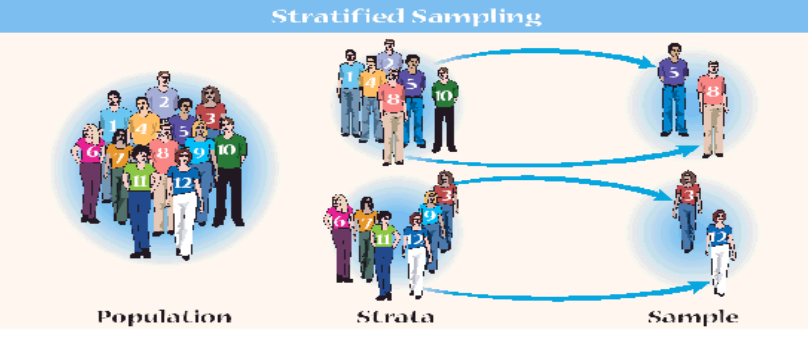
It is understood that baseline information for the Kenya National EPI will be collected from all the 47 counties. Most of this baseline information will also be collected from programme partners, statutory institutions charged with management of various data sets and authorized global institutions.

However, as part of encouraging participation and the contribution of the counties, a two-pronged approach has been proposed.

1. Consultant to visit specific counties that have been strategically sampled based on the factors of population, ecological distribution, water resource distribution, among others
2. All other counties not sampled to participate in a national workshop through their various CDEs.

**County Sampling Framework**

The Consultant will adopt a *Stratified Random Sampling Technique* which involves dividing a population into homogeneous subgroups and then taking a simple random sample in each subgroup. It allows the researcher to representatively sample even the smallest and most inaccessible subgroups in a population. This technique adopts the use of a sampling fraction for each stratum regardless of the differences in population size of the strata.

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##### Figure 3.1 Illustration of stratified sampling technique

The following key aspects have been considered when dividing the population into homogenous subgroups to come up with a representative sample.

1. Population density
2. Distribution of water catchment areas and forest zones (water towers)
3. Agricultural land zoning in relation to total land area
4. Ecological zoning
5. **Population Density (persons per sq km)[[4]](#footnote-4)**

#### Table 3.2 Population Density (persons per sq km)

| High Density (>500 persons per sq.Km) | Medium Density (170 – 499) | Low Density <200 |
| --- | --- | --- |
| Bungoma | Bomet | Baringo |
| Kakamega | Busia | Elgeyo Marakwet |
| Kiambu | Embu | Garissa |
| Kisii | Homabay | Isiolo |
| Mombasa | Kericho | Kajiado |
| Nairobi | Kirinyaga | Kilifi |
| Nyamira | Kisumu | Kitui |
| Vihiga | Machakos | Kwale |
|  | Meru | Laikipia |
|  | Migori | Lamu |
|  | Muranga | Makueni |
|  | Nakuru | Mandera |
|  | Nandi | Marsabit |
|  | Nyandarua | Narok |
|  | Nyeri | Samburu |
|  | Siaya | Taita Taveta |
|  | Transzoia | TanaRiver |
|  | Uasin Gishu | Tharaka |
|  |  | Turkana |
|  |  | Wajir |
|  |  | West Pokot |

|  |  |  |  |
| --- | --- | --- | --- |
| **Stratum** | A (High Density | B (Medium Density) | C (Low Density) |
| **Population size** | 8 | 18 | 21 |
| **Sampling Fraction (proportionate)** | 1/8 | 1/8 | 1/8 |
| **Final Sample size** | 1 | 2 | 2 |
| **Counties selected** | Vihiga | Machakos, Siaya | Kwale, Taita Taveta |

1. **Distribution of Water Catchment Areas and Forest Zones**

#### Table 3.3 Distribution of Water Catchment Areas / Forest Zones / Biodiversity (5 Key Water Towers)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| The Mau Forest Complex | Mt. Kenya | The Aberdares | Cherangani Hills | Mt. Elgon |
| Kericho | Embu | Nyandarua | Elgeyo Marakwet | Bungoma |
| Nakuru | Kirinyaga | Nyeri | Transzoia | Transzoia |
| Narok | Laikipia |  | WestPokot |  |
|  | Meru |  |  |  |
|  | Nyeri |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Stratum | Mau Forest Complex | Mt. Kenya | The Aberdares | Cherangani Hills | Mt. Elgeyo |
| Population size (Counties) | 3 | 5 | 2 | 3 | 2 |
| Sampling Fraction (proportionate) | 1/2 | 1/3 | 1/2 | 1/2 | 1/2 |
| Final Sample size | 1 | 1 | 1 | 1 | 1 |
| Counties selected | Nakuru | Laikipia | Nyeri | Transzoia | Transzoia |

1. **Agricultural Land Zoning – Category of agricultural land with the highest total land area**

#### Table 3.4 Agricultural Land Zoning

| High Potential Counties[[5]](#footnote-5) | Medium Potential Counties[[6]](#footnote-6) | Low Potential Counties[[7]](#footnote-7) |
| --- | --- | --- |
| Bungoma | Embu | Kilifi |
| Busia | Kitui | Kwale |
| Elgeyo Marakwet | Machakos | Lamu |
| Homabay | Makueni | Taita Taveta |
| Kakamega | Mombasa | TanaRiver |
| Kericho |  | Isiolo |
| Kiambu |  | Marsabit |
| Kirinyaga |  | Tharaka Nithi |
| Kisii |  | Meru |
| Muranga |  | Nairobi |
| Migori |  | Garissa |
| Nakuru |  | Mandera |
| Nandi |  | Wajir |
| Narok |  | Kisumu |
| Nyamira |  | Siaya |
| Nyandarua |  | Baringo |
| Nyeri |  | Kajiado |
| Transzoia |  | Bomet |
| Uasin Gishu |  | Laikipia |
| Vihiga |  | Samburu |
|  |  | Turkana |
|  |  | WestPokot |

|  |  |  |  |
| --- | --- | --- | --- |
| Stratum | High Potential Counties | Medium Potential Counties | Low Potential Counties |
| Population size (Counties) | 20 | 5 | 22 |
| Sampling Fraction (proportionate) | 1/5 | 1/5 | 1/11 |
| Final Sample size | 2 | 1 | 2 |
| Counties selected | Muranga, Vihiga | Mombasa | Nairobi, Turkana |

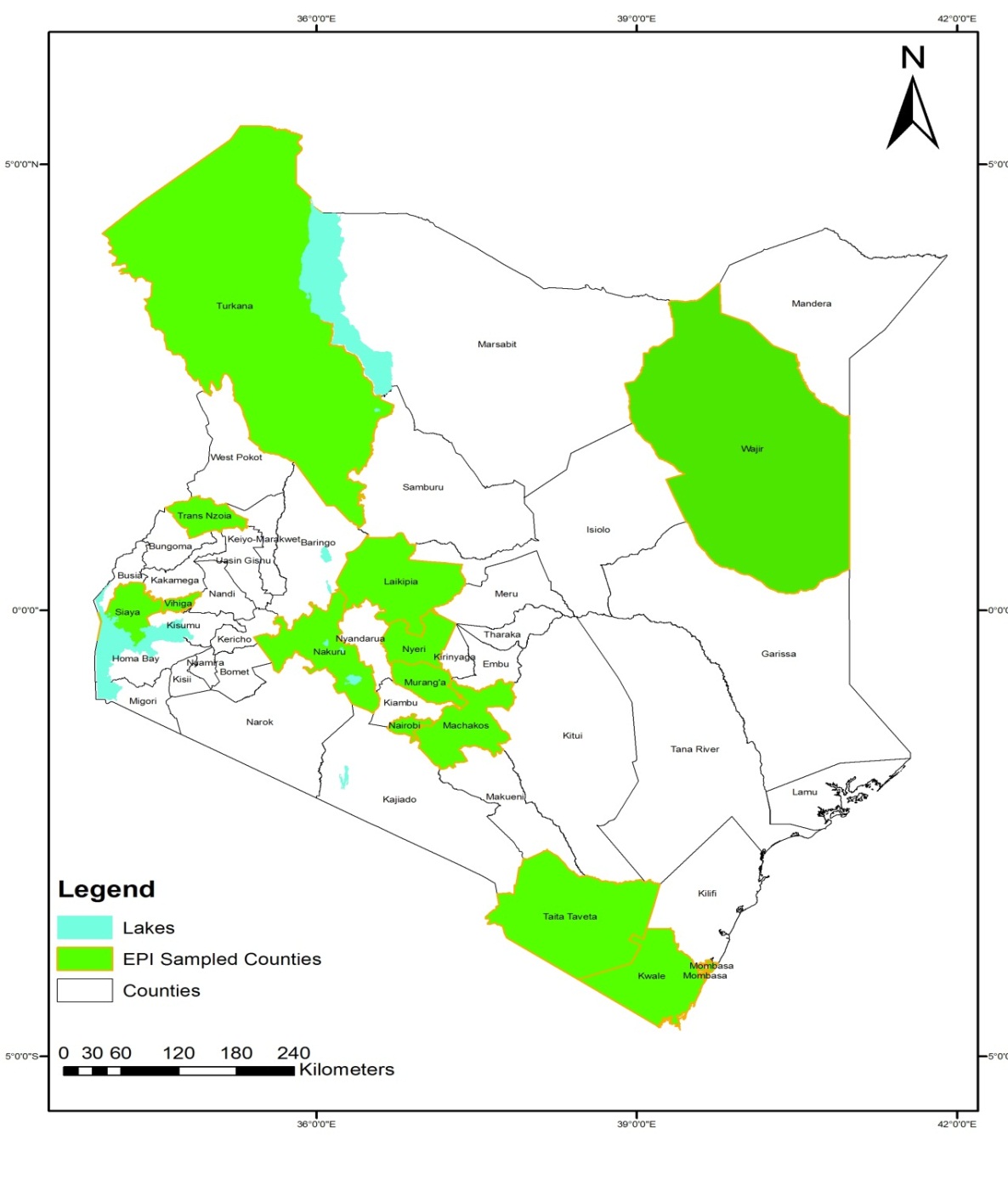
1. **Ecological Zones**

#### Table 3.5 Ecological zoning of Counties

| Humid, Sub Humid and Semi Humid to Arid | Semi Arid, Arid and Very Arid |
| --- | --- |
| Baringo | Baringo |
| Bomet | Garissa |
| Bungoma | Isiolo |
| Busia | Kajiado |
| Embu | Kilifi |
| Homabay | Kitui |
| Kakamega | Kwale |
| Keiyo - Marakwet | Laikipia |
| Kericho | Lamu |
| Kiambu | Machakos |
| Kirinyaga | Makueni |
| Kisii | Mandera |
| Kisumu | Marsabit |
| Laikipia | Narok |
| Meru | Samburu |
| Mombasa | Taita Taveta |
| Migori | Tana River |
| Muranga | Turkana |
| Nairobi | Wajir |
| Nakuru |  |
| Nyamira |  |
| Nyandarua |  |
| Siaya |  |
| Tharaka Nithi |  |
| Transzoia |  |
| Uasin Gishu |  |
| Vihiga |  |
| West Pokot |  |

|  |  |  |
| --- | --- | --- |
| **Stratum** | A (Humid, Sub Humid and Semi Humid to Arid) | B. (Semi-Arid, Arid and Very Arid) |
| **Population size** | 28 | 19 |
| **Sampling Fraction (proportionate)** | 1/10 | 1/19 |
| **Final Sample size** | 1 | 1 |
| **Counties selected** | Nairobi | Wajir |

The figure below presents the distribution of the total sampled Fourteen (14) Counties.



##### Figure 3.2 Distribution of sampled Counties

**Summary of Sampled Counties**

1. Vihiga
2. Machakos
3. Siaya
4. Kwale
5. Taita Taveta
6. Nakuru
7. Laikipia
8. Nyeri
9. Transzoia
10. Muranga
11. Mombasa
12. Nairobi
13. Turkana
14. Wajir

**Data Collection Criteria**

The data collection exercise in these Counties will be done through County workshops which will bring on board all the key stakeholders at the County level including but not limited to the County governments. The workshops will be facilitated by the County Director of Environment.

The Consultant will also conduct Key Informant Interviews with research institutions and those mandated to collect and publish national data to discuss the methodology, frequency of data collection and existing data challenges. Recommendations will be provided on quality improvement measures in data collection if need be.

1. **Data Management**
2. **Data Management**

The EPI is a composite index that utilises a wide range of data from different fields and different sources to try and present simplified comparisons. When improperly presented, composite indices can easily mislead rather than properly direct policy interventions. Key within the framework of establishing the index is how data from the various sources is collected, handled, analysed, interpreted and generally managed. The OECD has provided a detailed framework for data handling when developing composite indices[[8]](#footnote-8). The technical guidelines provide a framework for developing the theoretical framework, selection of data, imputation of missing data, guidelines for multivariate analysis, normalisation, sensitivity analysis, weighting and aggregation, establishment of linkages between indicators and presentation and visualisation which may affect interpretation. The consultant will to a large extent rely on these and other similar guidelines to ensure the Kenya National EPI is technically anchored on the best global practices.

1. **Statistical Analysis**

Whereas the detailed statistical procedures for data handling and analysis with respect to specific indicators are probably too in-depth to present in this inception report, it suffices to mention that the consultant will develop a statistical data analysis model in *R platform*. The model will adopt the generalised P*roximity-to-Target (PTT)* method described under the Yale model for each of the indicators agreed upon. The PTT approach is briefly described below.

1. **Computation of Proximity-to-Target (PTT) for each indicator**

Performance scores on indicators will be expressed as a proximity to a predetermined target (score). This is a concept applied in EPI to transform data of various indicators but having different original formats so that they can be aggregated into an index. As such, performance of each County with respect to a given indicator will be measured based on its relative position within a range established by the lowest performance (equivalent to 0 on a 0-100 scale) and the target (equivalent to 100).

Data on various indicators will first be classified under two categories:

1. Type A indicator – Where high values represent good performance e.g. access to water and sanitation
2. Type B indicator – Where high values represent bad performance e.g. indicators on air pollution

The statistical formula to be used to convert raw data into proximity – to – target will depend on the categorisation of indicators.

1. Formula for type A indicators

(1)

1. Formula for type B indicators

(2)

Where n is the total number of indicators under the category.

A Basic Mathematical model: Policy and objective score computation

1. Policy Category Score

(3)

Where m is the total number of indicators under any given policy category

1. Objective category score

(4)

Where *l* is the total number of policy categories

1. EPI Score

EPI Score  (5)

This process is summarised by the figure below



##### Figure 3.3 Aggregation of indicators process

The results for different Counties will then be normalised to make the data comparable across Counties.

### 3.2.2 Provision of recommendations on the required infrastructure for hosting and sharing of the Environment Performance Index;

It is envisaged that the EPI will have three distinct levels of stakeholders namely:

1. On the input side (input users)
2. Central process or management side
3. Consumption side or the users of the system output.

On the input side, specific institutions are mandated to capture and collect, clean, analyse and transform data into the required format and thereafter transmit the same. The EPI central information processing system collates synthesises and transforms the information received from a system of input stakeholders into an index. It also stores this information for research, review and retrieval purposes by the public, policy makers and/or other stakeholders who are the consumers of the information.

Each of the three levels requires specific infrastructure in place for their functionality. Such infrastructure may include skilled manpower, adequate hardware (computers, instruments for data capture, equipment for mobility, laboratory facilities among others), specific software (properly programmed and with adequate capacity for data management) and institutionalised systems (organisational structure, operational procedures, etc). The above infrastructural system, especially the software, shall require to be adequately secure to ensure data protection and continued functionality.

The consultant shall, throughout the assignment assess the required infrastructure based on best practices and make specific recommendations for the proper maintenance (where systems exist), enhancement (where weaknesses are identified, establishment (where the need exists) and/or restructuring (for instance, where there is duplication) of the same. The designed data collection tools will capture these issues at all levels of the study.

Figure 3.4 schematically summarises the relationship between the above three levels of the EPI infrastructural system envisaged under the study.



##### Figure 3.4 Levels of the EPI infrastructural system envisaged under the study

### 3.2.3 National Stakeholder Validation Workshop

The Draft National EPI Report will be subjected to stakeholders at a National stakeholder’s validation workshop to seek opinions and perspectives of partners and stakeholders and experts in relation to the Draft EPI Report and to receive feedback to improve the value of the report.

Upon incorporation of issues arising from the Stakeholders Validation Workshop, the Draft Final Report will be submitted to NEMA.

### 3.2.4 Undertaking trainings on the development and use of the Environment Performance Index targeting mainly those drawn from implementing partners of the GGEP

1. **Training Needs Assessment**

As indicated earlier, the Consultant will assess training needs of key stakeholders mainly the implementing partners of the GGEP during various consultation forums and document capacity gaps in EPI development. These capacity gaps will be instrumental in identifying the training modules to be used after development of the EPI.

1. **Training Materials and Plan**

The Consultant will prepare adequate training materials capturing the identified modules to be covered during training and also share the training programme to participants prior to conducting the training. To ensure effective participation in the training exercise, a series of both plenary and group sessions will be employed during the training exercise. The key objective will be to enable participants acquire and re-enforce knowledge in EPI data collection, management and analysis; development and use of the EPI, reporting and communication among other modules to be identified after conducting a training needs assessment.

1. **Evaluation of the Training Support**

At the end of the training sessions, the participants will be requested to undertake an evaluation of the training workshop and make specific recommendations for improvements in the future.

A training report detailing the training modules covered during the training, evaluation of the training programme and the list of participants will be appended in the Final Report.

# **4.0 STUDY WORKPLAN**

**4.1 Activity Schedule**

#### Table 4.1: Activity Schedule

| ***No.*** | ***Task Name*** | ***Duration*** | ***Start and Finish Date*** | ***Responsibility*** | ***Status*** |
| --- | --- | --- | --- | --- | --- |
|  | Contract Signing and Negotiations | 1 day |  | Log Associates | Done |
|  | Resource Mobilisation and Planning | 3 days |  | Log Associates/ Client | Done |
| *Phase I* | | | | | |
|  | Literature Review and Preparation of Inception Report | Continuous |  | Log Associates | On-going |
|  | Submission of an Inception Report to Client | 0 days | 5/7/17 | Log Associates | On |
|  | Inception Meeting | 1 day | 11/7/17 | Client | On |
|  | Submission of a Revised Inception Report incorporating clients comments | 1 day | 20/7/17 | Log Associates | On |
|  | Development of the EPI Framework and Target Setting | 24 days | 25/7/17  25/8/17 | Log Associates/ Client | On |
| 1. **`** | Working meeting with NEMA Technical Team | 1 day | 25/7/17 | Log Associates/ Client | On |
|  | Key Informant Consultations and further consultations with NEMA | 14 days | 26/7/17  14/8/17 | Log Associates/ Client | On |
|  | Development of the EPI model | 9 days | 15/8/17  25/8/17 | Log Associates | On |
|  | National Workshop with key national Stakeholders | 1 day |  | Log Associates/ Client | On |
| *Phase II* | | | | | |
|  | National Workshop with RDAs and CDEs from non-sampled Counties | 1 day | 28/8/17  28/8/17 | Log Associates | On |
|  | Collection of Baseline Data from Non Sampled Counties through CDEs | 21 days | 29/8/17  26/9/17 | Log Associates | On |
|  | County Working meetings for 14 pilot Counties (3 Teams) | 21 days | 29/8/17  26/9/17 | Log Associates / Client | On |
|  | Statistical Analysis[[9]](#footnote-9) | 40 days | 13/9/17  7/11/17 | Log Associates | On |
|  | Submission of a Progress Report to Client | 1 day | 3/10/17 | Log Associates | On |
|  | Submission of a Draft Report to Client | 1 day | 7/11/17 | Log Associates | On |
|  | National Stakeholder Validation Workshop | 1 day | 28/11/17 | Client / Log Associates | On |
|  | Incorporation of Comments from Stakeholders Workshop | 5 days | 29/11/17  5/12/17 | Log Associates | On |
|  | Training on the Development and use of the National EPI | 3 days | 7/12/17  11/12/17 | Client / Log Associates | On |
|  | Submission of the Final Report to Client | 1 day | 15/12/17 | Log Associates | On |

**4.2 Completion and Submission of Reports**

Table 4.2 presents the reporting dates for various deliverables from the study.

#### Table 4.2: Reporting dates

|  |  |
| --- | --- |
| ***Reports*** | ***Date*** |
| Inception Report | 20/7/17 |
| Progress Report | 3/10/17 |
| Draft Report | 7/11/17 |
| Draft Final Report | 5/12/17 |
| Final Report | 15/12/17 |

* 1. **Study Work plan – Gann Chart**

Figure 4.1 Study Work Plan

# **REFERENCES**

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2. Hsu, A., L.A. Johnson, and A. Lloyd. 2013. *Measuring Progress: A Practical Guide From the Developers of the Environmental Performance Index (EPI)*. New Haven: Yale Center for Environmental Law & Policy.
3. Kenya Programme 2016 – 2020. *Green Growth and Employment Thematic Program Greening Kenya’s Development Pathway Development Engagement Document*, National Environment Management Authority
4. Kenya State of Environment Report 2014, National Environment Management Authority
5. Yale. *Environmental Performance Index*. 2014 [cited 2014 January 25, at 10.47 pm]; Available from: http://epi.yale.edu/epi.
6. Hsu, A., et al., *The 2014 Environmental Performance Index*, 2014: New Haven, CT: Yale Center for Environmental Law and Policy.
7. NRE, *Environmental Performance Index for Malaysia 2012*, R.b. Ahamad, Editor 2013, Ministry of Natural Resources and the Environment (NRE): Johor Bahru.
8. Emerson, J.W., A. Hsu, M.A. Levy, A. de Sherbinin, V. Mara, D.C. Esty, and M. Jaiteh, *2012 Environmental Performance Index and Pilot Trend Environmental Performance Index*, 2012, New Haven: Yale Center for Environmental Law and Policy.

# **6.0 APPENDICES**

**6.1 Data collection tools**

### 6.1.1 Discussion Guide for the National Workshops on Development of a Framework for the National EPI

1. Key thematic Policy Categories to be adopted for the EPI
2. Indicators to be included in the EPI under various categories
3. Consensus on the weighing assignment for each policy category and indicator
4. Target setting for various indicators
5. Data gaps and way forward

### 6.1.2 Discussion Guide for the County Workshops

1. Presentation of the general overview of an EPI
2. Presentation of the proposed draft framework for the Kenya National EPI
3. Discussions on relevance of the proposed indicators under various policy categories
4. Identification of Indicators applicable to the County under various policy categories
5. Discussions on baseline data for various indicators under the following thematic areas:

* Units of measurement
* National targets
* Reliability, validity and completeness of available data sets
* Data gaps and way forward

### 6.1.3 Discussion Guide for Stakeholder Organisations

**Consent**: We have been contracted by the *National Environment Management Authority (NEMA)* to assist in the development of a Kenya National Environmental Performance Index. to be used as an indicator of the National and County levels performance in implementing environmental management initiatives. In developing the Kenya National EPI, we are mandated to engage in consultations/interviews with various stakeholders both at the National and County levels to get their views on the same and also collect their latest published data where applicable. We would kindly request you to have an interactive discussion with us on the following items:

1. Organisation’s mandate, activities and responsibilities in regard to the EPI
2. Level of coordination and information sharing among relevant agencies
3. Provision of latest published data on indicators applicable to the organisation
4. Discussions on methods of data collection, frequency of collection
5. Key capacity challenges (Infrastructure, Human Resource)
6. Key recommendations for the National EPI

1. Malkina-Pykh, I. G. and Pykh Y. A (1999). Environmental Indices Design and integrated modelling: theory and application. Transactions on Ecology and the Environment vol 27, 1999. WIT Press, www.witpress.com, ISSN 1743-3541 [↑](#footnote-ref-1)
2. Yale Centre for Environmental Law in a review reported over 500 sustainability-related indicator efforts in existence in 2003. Of these efforts, 67 were global, 103 were national, 72 were state or provincial, and 289 were local or metropolitan [↑](#footnote-ref-2)
3. www.epi.yale.edu [↑](#footnote-ref-3)
4. KNBS, 2009 [↑](#footnote-ref-4)
5. High potential: Annual rainfall of 857.5mm or more (over 980mm in Coast Province). [↑](#footnote-ref-5)
6. Medium potential: Annual rainfall of 735mm-857.5mm.(735mm-980mm in Coast Region and 612.5mm-857.5mm in Eastern Region). [↑](#footnote-ref-6)
7. Low potential: Annual rainfall of 612.5mm or less. [↑](#footnote-ref-7)
8. OECD (2008). Handbook on Constructing Composite Indicators. Methodology and User Guide. OECD, 2008. *www.oecd.org/publishing/corrigenda.* [↑](#footnote-ref-8)
9. To commence in the course of Data collection during County Workshops [↑](#footnote-ref-9)