



KENYA FORESTRY RESEARCH INSTITUTE

ENVIRONMENTAL MANAGEMENT SYSTEM MANUAL

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Approved by: Dr. Ben N. Chikamai
Director/CEO, KEFRI

Signature: 

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Environmental Management Representative

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PREAMBLE

Background

Kenya Forestry Research Institute (KEFRI) was established in 1986 under both the Science and Technology Act Cap 250 Laws of Kenya, and the State Corporations Act (Cap 446).

Mandate

KEFRI is mandated to:

- Conduct research in forestry and allied natural resources
- Disseminate research findings
- Co-operate with other research bodies within and outside Kenya
- Establish partnerships with other organizations and institutions of higher learning in training on matters of forestry research

Vision

To be a centre of excellence in forestry science through technology development, deployment and dissemination of scientific information

Mission

To conduct research and provide information and technologies for sustainable development of forests and allied natural resources

Core values and principles

KEFRI embraces the following core values and principles in carrying out its mandate:

(i) Team work

Promotes collective participation of its staff in implementation of its mandate to achieve its goals.

(ii) Integrity

Upholds fairness, openness, transparency and accountability within the Institute and in provision of services to clients.

(iii) Collaboration

Builds strong synergistic linkages with stakeholders and partners.

(iv) Clean and Healthy Environment

Aims to receive and maintain international accreditation in environmental management systems (ISO 14000 Series).

KEFRI Research Programmes

KEFRI's current Research and Development (R&D) programmes have the following objectives:

- **Farm Forestry Programme:** Aims at diversifying and intensifying supply of forest products on farms, developing technology for improved productivity and market systems for tree products.



- **Natural Forests Programme:** Undertakes research to guide conservation and management of natural forests. Focus is on participatory forest management, policy research, natural forest product valuation, restoration and rehabilitation of degraded forest areas and promotion of non-wood forests products for wider utilization.



- **Drylands Forestry Programme:** Aims at effective and sustainable management of forest and woodland resources and developing rehabilitation technologies most suitable for drylands.



- **Industrial Forest Plantations Programme:** Aims at improving management and productivity of plantation forests to meet industrial wood demand. Focus is on supply of high quality propagation materials, reducing productivity losses caused by pest and disease incidences, human interference, fires or game damage. Also carries out economic analysis of plantations while improving harvesting and utilization technologies.



- Tree Seed Programme:** The current Forest Policy emphasizes the need for availability of planting materials to support afforestation and forestation programmes. In order to meet the demand for quality tree seed, KEFRI is mandated to produce tree seed for all types of planting programmes and has also de-centralized seed distribution to make it easily accessible to farmers countrywide.



- Technology Dissemination and Service Programme:** Provides supportive services to research programmes through information documentation and dissemination. Training programmes are conducted at national and international levels in the Social Forestry Training Centre. The programme manages a research cum commercial forest estate and a workshop for processing tree products.



- **Partnership and Networks:** Coordinates networks and partnerships with collaborating institutions within and outside the region.

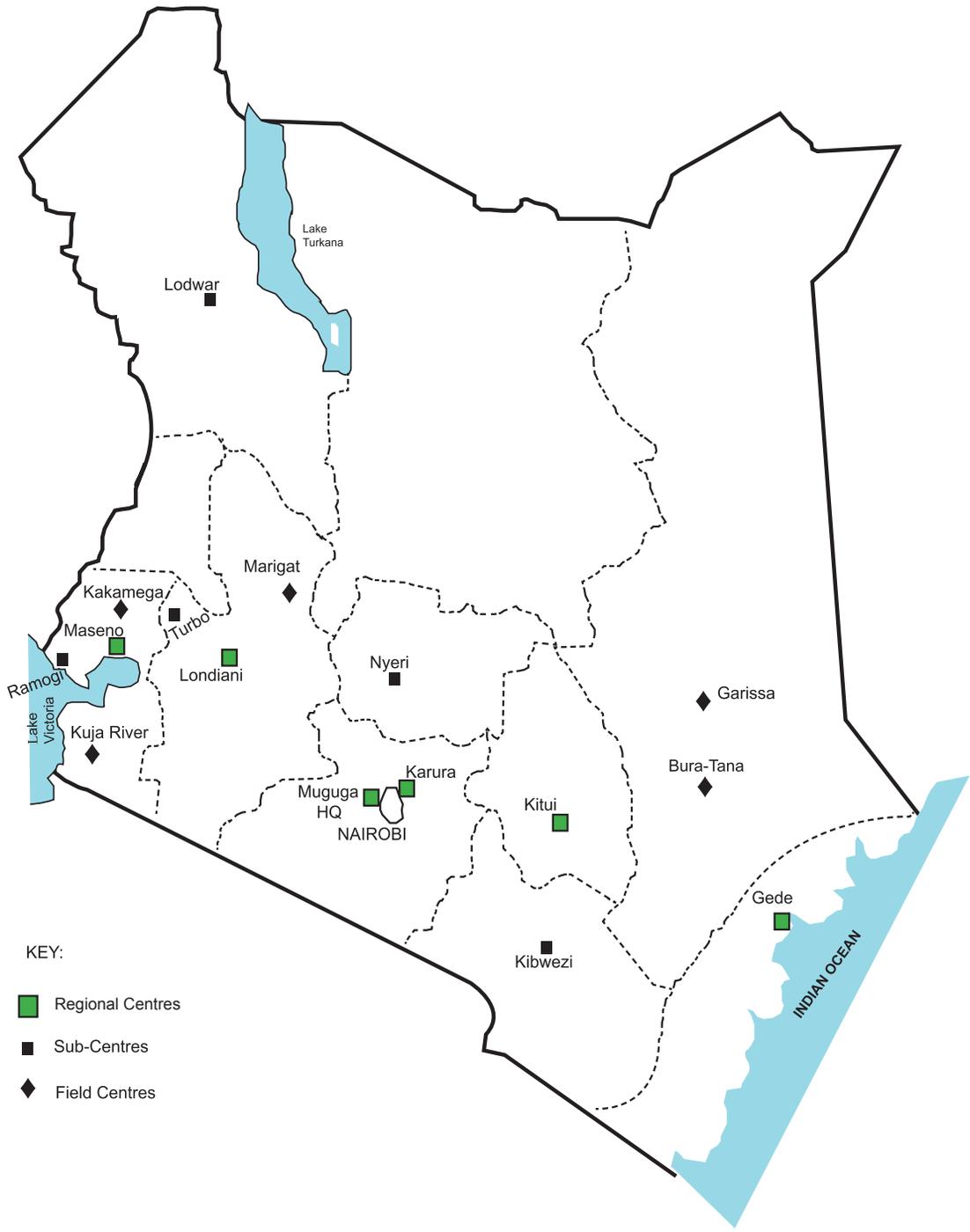


KEFRI programmes are coordinated by National Programme Coordinators (NPCs) who oversee budgetary allocation and set targets for research projects. They monitor and evaluate projects in progress.

Research and Development activities are implemented in 6 Regional Research Centres (Muguga - Highlands east of the Rift Valley; Londiani - Highlands west of the Rift Valley; Maseno - Lake Victoria Basin; Gede - Coastal zone; Kitui – Drylands; and Karura Forest Products Research Centre with well-developed Sub-centres in Nyeri, Turbo, Kibwezi, and Kakamega.

KEFRI intends to carry out its activities in a clean, safe and secure environment in line with ISO 14001:2004 environmental management system requirements. Consequently, KEFRI will mainstream EMS in all its activities as provided in this EMS manual.





- KEY:
- Regional Centres
 - Sub-Centres
 - Field Centres

DISTRIBUTION OF KEFRI'S RESEARCH CENTRES

Purpose of the Manual

This manual defines the scope of the Kenya Forestry Research Institute's Environmental Management System (EMS). It describes the organization-wide implementation of the main elements of the EMS and ensures KEFRI activities are conducted in a manner, which minimizes adverse environmental impacts and enhances KEFRI's role in environmental stewardship. The manual provides a linkage of system documents to the various elements of the ISO 14001:2004 standard.

The principal elements of the system described in this manual are:

- Environmental Policy
- Environmental Aspects
- Legal and Other Requirements
- Environmental Objectives and Targets
- Environmental Management Programs
- Organizational Structure and Responsibility for implementation
- Competence, Training and Awareness
- Communication
- Document Control
- Operational Control
- Emergency Preparedness and Response
- Monitoring and Measurement
- Non-conformity, Corrective action and Preventive Action
- Control of Records
- Internal Environmental Management System Audit
- Management Review

It is intended that the manual can also be used to give interested parties a clear view of how KEFRI is organized to achieve and control its environmental performance. Through periodic review and evaluation of the EMS, KEFRI will identify opportunities for continuous improvement.



1. Environmental Management System (EMS) Scope

The Environmental Management System (EMS) has been designed to cover the activities, products and services offered by KEFRI and conforms to requirements of ISO 14001:2004

2. References

- 2.1 Environmental Appraisal of KEFRI Facilities and Services – Report, 2006
- 2.2 ISO 14004:2004 Environmental Management Systems – General guidelines on principles, systems and support techniques
- 2.3 ISO 19011:2002 Guidelines for quality and /or EMS auditing
- 2.4 ISO 14001:2004 Environmental Management System- Requirements with guidance for use.
- 2.5 Kenya Forestry Research Institute (KEFRI) Strategic Plan 2008 – 2012

3. Terms/Definitions/Abbreviations And Acronyms

3.1 Terms and definitions

For the purpose of this manual, the following definitions shall apply:

- 3.1.1 Auditor – person with competence to conduct an audit
- 3.1.2 Continual improvement – recurring process of enhancing EMS to achieve improvements in environmental performance, consistent with the organization’s environmental policy
- 3.1.3 Corrective action – action to eliminate the cause of detected non-conformity
- 3.1.4 Document - information and its supporting medium
- 3.1.5 Environment - surroundings in which KEFRI operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelations. Surroundings in this context extend beyond the organization to the global system
- 3.1.6 Environmental aspect - element of KEFRI activities or products or services that can interact with the environment. An aspect can have a significant environmental impact or not
- 3.1.7 Environmental impact - any change to the environment whether adverse or beneficial, wholly or partially resulting from KEFRI’s environmental aspects
- 3.1.8 Environmental Management Representative (EMR) – An officer appointed by the Director/CEO KEFRI to ensure that environmental management system requirements are established, implemented and maintained in accordance with ISO 14001
- 3.1.9 Environmental Management System (EMS) – part of an organization’s management system used to develop and implement its environmental policy and manage its environmental aspects
- 3.1.10 EMS Section Head – An officer who oversees an area of work where there are significant environmental aspects and has responsibility to ensure EMS requirements and procedures as applicable to that area are implemented

- 3.1.11 EMS Team – Officers appointed by KEFRI top management to carry out environmental reviews; document, implement and maintain the EMS; carry out EMS awareness training and conduct internal environmental audits in line with ISO 19011 requirements to determine conformance to ISO 14001
- 3.1.12 Environmental objective - overall environmental goal consistent with the policy that KEFRI sets itself to achieve
- 3.1.13 Environmental performance – measurable results of KEFRI’s management of its environmental aspects
- 3.1.14 Environmental policy – overall intentions and direction of KEFRI related to the performance as formally expressed by top management
- 3.1.15 Environmental target - detailed performance requirement, applicable to KEFRI or parts thereof that arise from the environmental objectives and that needs to be set and met in order to achieve those objectives
- 3.1.16 Interested party - person or group concerned with or affected by the environmental performance of KEFRI
- 3.1.17 Internal audit - systematic, independent, documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the environmental management system audit criteria set by KEFRI are fulfilled
- 3.1.18 ISO 14001:2004 - This standard specifies requirements for an EMS to enable an organization to develop and implement a policy and objectives, taking into account legal requirements and information about significant environmental aspects
- 3.1.19 Non-conformity – non-fulfillment of a requirement
- 3.1.20 Preventive action – action to eliminate the cause of potential nonconformity
- 3.1.21 Prevention of pollution – use of processes, practices, techniques, materials, products, services or energy to avoid, reduce or control (separately or in combination) the creation, emission or discharge or any type of pollutant or waste, in order to reduce adverse environmental impacts
- 3.1.22 Procedure – A specified way to carry out activity or a process. Procedures can be documented or not
- 3.1.23 Record - a document stating results achieved or providing evidence of activities performed
- 3.1.24 Top management - A person or group of people who direct and control an organization at the highest level. The top management of KEFRI is Director /Chief Executive Officer with his or her Executive management committee working on delegated responsibility of the Board of Management
- 3.1.25 Management review - periodic review of the EMS activities conducted by the top management to address emerging concerns and ensure continuous improvement

3.2 Abbreviations and Acronyms

CEO	- Chief Executive Officer
CFCs	- Chlorofluorocarbons
DoS	- Degree of Significance
EMCA	- Environmental Management Coordination Act
EMP	- Environmental Management Programme
EMR	- Environmental Management Representative
EMS	- Environmental Management System
F	- Form
GoK	- Government of Kenya
GP	- General Procedure
IAEA	- International Atomic Energy Agency
ISO	- International Organization for Standardization
KEBS	- Kenya Bureau of Standards
KEFRI	- Kenya Forestry Research Institute
KEPHIS	- Kenya Plant Health Inspectorate Service
KFS	- Kenya Forest Service
KIPI	- Kenya Intellectual Property Institute
KWS	- Kenya Wildlife Service
M	- Manual
MoA	- Ministry of Agriculture
NEMA	- National Environment Management Authority
OP	- Operational Procedure
OSHA	- Occupational Safety and Health Act
PAO	- Principal Administrative Officer
PCPB	- Pest Control Products Board
PPDC	- Public Procurement and Disposal Committee
SSO	- Senior Supplies Officer
UV	- Ultra-violet
WTO	- World Trade Organization

4. Environmental Management System Requirements

4.1 General requirements

KEFRI has established, implemented, maintains and continually improves an EMS in accordance with the ISO 14001:2004.

4.2 Environmental policy

KEFRI has a publicly available environmental policy that has been endorsed by the top management. The policy sets forth the environmental commitments of KEFRI, which cover all activities, products and services of the Institute. It includes a commitment to continual improvement, prevention of pollution and meeting or exceeding relevant environmental legislation, regulations and other requirements to which KEFRI subscribes as related to its environmental aspects. The policy shall provide a framework for setting and reviewing environmental objectives and targets and will be reviewed annually by the top management as part of the management review. The policy shall be communicated to all persons working for or on behalf of KEFRI and made available to the public in accordance with the communications procedure (GP 4.4.3).

KEFRI'S Environmental Policy is as given below.

Environmental Policy Statement

Kenya Forestry Research Institute (KEFRI) recognizes that maintaining a healthy work environment is crucial for the well being of its staff, stakeholders and the society at large. As a centre of excellence in forestry research, development of technologies and dissemination of research findings for sustainable development, KEFRI seeks to undertake its operations in a safe work environment as appropriate to the nature, scale and environmental impact of its activities, products and services. The Institute shall meet or exceed requirements of relevant environmental legislation and other regulations to which it subscribes and that relate to its environmental aspects, in order to ensure environmental conservation and prevent pollution. Steps will be taken to minimize production and ensure safe handling and disposal of wastes. Based on this policy, KEFRI will review its environmental objectives and targets periodically to ensure that they are in tandem with emerging environmental concerns for the purpose of continual improvement. KEFRI's top management shall ensure that this policy is implemented, maintained and communicated to all staff and the general public.

Ben E. N. Chikamai (PhD)
Director/CEO
Kenya Forestry Research Institute
June 2010

4.3 Planning

4.3.1 Environmental Aspects

KEFRI has established a procedure (GP 4.3.1) to identify environmental aspects and their associated impacts.

An EMS team was appointed by the Director/CEO to carry out an initial environmental review in order to determine KEFRI's environmental aspects and their associated impacts. Using the review methodology in Appendix 1, significant environmental aspects were determined and are listed below:

1. Generation, handling and disposal of non-hazardous solid waste.
2. Handling and disposal of effluent.
3. Handling and disposal of hazardous materials.
4. Use of chlorofluorocarbons (CFCs).
5. Exposure to radiation emission (UV-/X-rays, radioactive particles).
6. Invasion by introduced species

As an ongoing element of the EMS, the EMS team will conduct biennial reviews of the Institute's activities according to the procedure set forth (GP 4.3.1). The EMS will be modified when required by changes in regulations or when new significant environmental aspects arise (i.e. objectives and targets revised, operational controls modified, etc.).

4.3.2 Legal and other requirements

KEFRI has established a procedure (GP 4.3.2) for identifying, accessing and communicating legal and other requirements that are applicable to its activities. The relevant requirements are identified, accessed and communicated to all personnel as necessary. These requirements are listed in the register of applicable environmental regulations in F- 4.3.2 in Appendix 2. On annual basis, the EMS team shall re-evaluate this list to keep track of the current national legal and other requirements as applicable to KEFRI.

4.3.3 Objectives, Targets and Programme(s)

The EMS team has developed and maintains documented environmental objectives and targets for each significant environmental aspect. The objectives and targets are to be measurable and consistent with the environmental policy as approved by top management. They define:

- The performance objectives for each significant environmental aspect
- The specific, quantified targets which define those performance objectives and
- The planned deadlines for the achievement of those targets

Objectives and targets were developed while considering the following criteria:

- The availability of specific performance data and the opinion of the EMS team as to where the greatest environmental performance improvements could be made
- Significant environmental aspects, based on the initial environmental review

- Projected technological developments
- Legislative requirements
- Financial, operational and business requirements
- Views of interested parties
- Commitment to prevention of pollution

For each objective and target, an environmental management program has been established and is maintained. These programs define the principal actions to be taken, those responsible for undertaking them at each function and relevant level, resources required and the means and time frame for their implementation.

Objectives, targets and EMPs are documented and recorded using F- 4.3.3.

4.4 Implementation and Operation

4.4.1 Resources, roles and responsibility and authority

Human skills, technology and financial resources are required to establish, implement and improve the EMS. In addition, this element of the EMS is established to ensure that responsibilities, roles and authorities are defined, documented and communicated to facilitate effective environmental management.

The organizational structure for KEFRI's environmental management is as described in Table 1. An Environmental Management Representative (EMR) has been appointed by the Director/CEO with defined roles, responsibility and authority to take charge of the EMS. In addition, an EMS team has also been appointed to work with the EMR.



Table 1. Roles and Responsibilities

Individual/Group	Responsibilities
Board of Management	Approves strategic policy and allocates resources for implementation of the EMS
Director / Chief Executive Officer	<ul style="list-style-type: none"> - Gives the general direction in implementation of the EMS and ensures that allocated resources are effectively utilized - Appoints EMR and EMS team members and - Approves EMS documents - Chairs management review meetings at institutional level
Top Management	<ul style="list-style-type: none"> - Ensures availability of resources essential to establish, implement, maintain and improve the EMS - Receives audit findings as the basis for corrective action and continuous improvement of environmental performance - Reviews the EMS at appropriate intervals to assess its continuing suitability, adequacy and effectiveness
EMR	<ul style="list-style-type: none"> - Ensures that environmental management system requirements are established, implemented and maintained in accordance with ISO 14001 - Reports to top management on the performance of the environmental management system for review, including recommendations for improvement
Centre Director	<ul style="list-style-type: none"> - Ensures EMS is implemented and maintained in each respective KEFRI Regional Research Centre - Chairs management review meetings at regional level
EMS Team	<ul style="list-style-type: none"> - Carries out environmental reviews - Documents, implements and maintains the EMS - Carries out EMS awareness training - Conducts internal environmental audits in line with ISO 19011 requirements to determine conformance to ISO 14001
Section Head	<ul style="list-style-type: none"> - Ensures that respective staff working under him/her are aware of and complying with the environmental policy, EMS requirements and procedures as applicable to their area of work - Following internal audits, assists in determining the root cause of non-conformities and coming up with corrective actions for continued improvement
KEFRI staff	<ul style="list-style-type: none"> - Are required to be aware of the Institute's environmental policy and EMS implementation process, each taking responsibility for impact that comes from individual activity - Participate fully during the implementation of the EMS

4.4.2 Competence, training and awareness

KEFRI shall ensure that any personnel performing tasks for or on its behalf whose work may create significant environmental impact(s), as identified by the Institute, are competent on the basis of appropriate education, training and experience and shall retain associated records.

KEFRI shall identify training needs associated with its environmental aspects and its environmental management system. It shall provide training or take other action to meet these needs, and shall retain associated records.

KEFRI has established, implements and maintains a procedure (GP 4.4.2) to make persons working for or on its behalf at each relevant function and level aware of:

- a) The importance of conformance with the environmental policy, procedures and requirements of the environmental management system
- b) The significant environmental impacts, actual or potential of work activities and benefits of improved personal performance
- c) Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with requirements of EMS including emergency preparedness and response requirements
- d) The potential consequences of departure from specified operating procedures

4.4.3 Communication

With regard to its environmental aspects and environmental management system, KEFRI has established, implements and maintains procedures (GP 4.4.3a and 4.4.3b respectively) for:

- (a) Internal communication among its various levels and functions
- (b) Receiving, documenting and responding to relevant communication from external interested parties

KEFRI will not communicate externally about its significant environmental aspects.

4.4.4 Documentation

KEFRI EMS documentation includes:

- a) EMS manual
- b) Environmental Policy, objectives and targets
- c) A description of the scope of the EMS
- d) A description of the main elements of the EMS and their interaction and reference to related documents (Refer to Appendix 1),
- e) Documents, including records required by ISO 14001:2004 and

- f) Documents, including records, determined by KEFRI to be necessary to ensure the effective planning, operation and control of processes that relate to its significant environmental aspects

KEFRI has established and maintains information to describe the core elements of the EMS as described in this manual. The EMS documentation includes the policy, manual, procedures, work instructions and EMS records. This manual identifies all documents relevant to the EMS. A template master list of EMS documents is outlined in F- 4.4.4.

4.4.5 Control of Documents

KEFRI has established a procedure (GP 4.4.5) for controlling all documents related to the EMS. This procedure describes where documents are located, how and when they are reviewed. The procedure ensures that current document versions are available at point of use and that obsolete versions are removed from use or are suitably identified.

4.4.6 Operational Control

Operational control procedures are in place for those activities associated with each identified significant environmental aspect. The operational control procedures are listed below:

1. Handling and disposal of non-hazardous solid waste (OP 44.6.1)
2. Handling and disposal of effluent (OP 44.6.2)
3. Handling and disposal of hazardous materials (OP 44.6.3)
4. Phasing out chloro-fluoro-carbon (CFC) sources (OP 44.6.4)
5. Detection and control of radiation emissions (UV-/X-rays, radioactive particles) (OP 44.6.5a and 5b)
6. Handling invasion by introduced species (OP 44.6.6)

KEFRI has established, implements and maintains procedures related to the identified significant environmental aspects. Requirements of these procedures will be communicated to suppliers using GP 4.4.3b.

4.4.7 Emergency Preparedness and Response

KEFRI has established an environmental procedure (GP 4.4.7) to identify potential for and appropriate response to accidents and emergency situations, and for preventing and mitigating associated environmental impacts.

The procedure specifies the responsibilities and actions to be taken and includes contact and communication details within KEFRI and with external emergency support providers.

Whenever practicable, the emergency preparedness and response procedure will be tested at least once annually by simulation of incidents as part of training exercises and drills. Appropriate records shall be maintained. The procedure is reviewed annually and after the actual occurrence of accidents and/or emergency situations.

4.5 Checking

Measuring, monitoring and evaluating are key activities of an EMS, which ensure that KEFRI is performing in accordance with the stated Environmental Management Programmes.

4.5.1 Monitoring and Measurement

KEFRI has established and maintains a documented procedure (GP 4.5.1) to monitor and measure the key characteristics of its activities that can have a significant impact on the environment. This procedure outlines requirements for recording information needed to track performance, relevant operational controls and conformity with the organization's environmental objectives and targets. KEFRI shall ensure that monitoring and measuring equipment are calibrated or verified before use. Records of calibration shall be maintained.

4.5.2 Evaluation of Compliance

KEFRI has established and maintains a documented procedure (GP 4.5.2) for periodically evaluating compliance with relevant environmental legislation and other requirements to which it subscribes.

4.5.3 Nonconformity, Corrective Action and Preventive Action

KEFRI has established and maintains an environmental procedure (GP 4.5.3) for handling and investigating non-conformities. It defines responsibility and authority for taking action to mitigate impacts caused and initiating and completing corrective and preventive action. Any changes in procedures resulting from implementing corrective and preventive actions are recorded. The EMR maintains these records.

4.5.4 Control of Records

KEFRI has established an environmental procedure (GP 4.5.4) for the identification, storage, protection, retrieval, and disposal of environmental records. A list of EMS records is provided in F- 4.5.4.

Records shall be legible, identifiable and traceable to the activity, product and service involved. They shall be stored in such a way as to make them retrievable, protecting them against deterioration, damage or loss. Retention times shall be established and recorded.

4.5.5 Internal Environmental Management System Audit

KEFRI periodically conducts internal audits to determine whether its EMS conforms to planned arrangements for environmental management, including requirements of ISO 14001. Internal audits are also conducted to determine whether the EMS has been properly implemented and maintained. An audit procedure (GP 4.5.5) has been established and comprehensively covers the audit scope, frequency, methodologies applied and the responsibilities and requirements for conducting audits and reporting results. All auditors are trained and their conduct should ensure objectivity. Audit records are analyzed by the EMR for use in the management review process.

4.6 Management Review

At least once a year, KEFRI top management will conduct a management review to cover all elements of the EMS so as to ensure its continuing suitability, adequacy and effectiveness in achieving the aims set out in the environmental policy, environmental objectives, targets and environmental management programmes. In addition, every KEFRI Centre will also hold a management review meeting at least once a year, which the Centre Director will chair.

The EMR or his appointed representative shall be responsible for setting the agenda for the management review meeting and recording and maintaining the minutes. The scope of the review, chaired by the Director/CEO or Centre Directors, shall include:

- Environmental policy, objectives, targets and performance
- Findings of internal and external audits
- Follow-up actions from the previous management reviews
- Status of corrective and preventive actions
- Evaluation of compliance with the statutory legislations
- Evaluation of legislative requirements new or forthcoming, advances in technology, lessons from environmental incidents, expectations and requirements from interested parties, including the public and regulatory authorities
- Resource needs (mobilization and allocation)
- Recommendations for improvement



APPENDIX 1: Initial Environmental Review Table

		Environmental Review Table										F – 4.3.1		
												Author: EMS Team Created: 15.04.2008 Modified: Version: 1		
DEPARTMENT (or process):	Environmental Aspect	Normal, Abnormal, Emergency	Environmental Impact Resource consumption: (Water/Electricity/Fuel /Material) Emissions: (Air emissions, waste waters, nuisances, waste, toxic waste) Others: Impacts on ecosystems, human health	Operational control already in place	Applicable Laws and Regulations	1. Legal Compliance	2. Frequency	3. Severity	4. Geographical dispersion	5. Time of recovery	6. Public Image	7. Business Implication	TOTAL SCORE	Degree of significance
Removal of ground cover through logging	N	Normal, Abnormal, Emergency	<p>1. Soil erosion</p> <p>2. Depletion of forests</p> <p>3. Soil compaction</p> <p>4. Biodiversity loss</p>	<p>1. None</p> <p>2. Replanting</p> <p>3. None</p> <p>4. None</p>	<p>The Wildlife (Conservation and Management) Act Cap 376, Revised 1985 (1977);</p> <p>Agriculture Act Cap 318, 1986;</p> <p>EMCA 1999; The Timber Act Cap 386 Revised 1972;</p> <p>Convention on Biological Diversity, 1993;</p> <p>The Kyoto</p>	5	10	3	1	3	5	3	30	

Generation of dust (use of asbestos, fiber glass, fine dust in timber workshop, in laboratories during sample grinding in seed processing)	N	1. Air pollution 2. Ill health	Noise masks	OSHA Cap 514, 2007; EMCA, 1999; EMCA Noise Regulations, 2009	5	5	5	1	10	3	3	32
Effluent discharge (laboratory, wood treatment and preservation)		1. Water pollution 2. L and pollution	Neutralization plants partially available	EMCA, 1999; EMCA (Water Quality) Regulations, 2006	10	5	3	1	3	5		
Emission of gases/fumes (wood treatment and preservation, garage, laboratory)	N	1. Air Pollution 2. Ill health	1. Fume chambers (partial) 2. Gas exhausters (partial) 3. Personal protective equipment (partial)	EMCA, 1999; OSHA Cap 514, 2007; Weights and Measures Act Cap 513, 1988	5	5	5	1	5	2	2	25
Handling and disposal of hazardous materials (fungicides, pesticides, expired chemicals/drugs, medical waste-contaminated materials and sharps)	N	1. Ill health 2. Water pollution 3. L and pollution 4. Air pollution	1. Special storage (partial) 2. Decontamination (partial) 3. Incineration (Partial)	OSHA Cap 514, 2007; EMCA 1999, Public Procurement and Disposal Act Cap 491, 2005 and Regulations, 2006	5	3	10					

Use of CFCs (Cold Rooms and Fridges)	N	Ozone-layer depletion	None	EMCA 1999; Montreal Protocol on Substances that Deplete the Ozone Layer, 1987; Vienna Convention for the Protection of the Ozone Layer, 1985.	5	3	3	10	10	1		
Exposure to radiation emission (X-ray)	N	Ill health	Geiger Muller Counter	OSHA Cap 514, 2007; Radiation Protection Act Cap 243, 1985; IAEA Regulations; Weights and Measures Act Cap 513, 1988	5	5	5	10	5	3	34	
Exposure to UV and Glare	N	Ill health	None	Radiation Protection Act Cap 243, 1985; IAEA Regulations; Weights and Measures Act Cap 513, 1988	5	5	5	10	5	3		
Exposure to radioactive particles	N	Ill health	Users manual	IAEA Regulations; Weights and Measures Act Cap 513, 1988	5	5	5	1	10	5	3	34
Handling of effluent (oil, grease, fuel spills)	N	Air, soil and water pollution	Oil traps (partial)	EMCA 1999; OSHA Cap 514, 2007; Public Procurement and Disposal Act Cap 491, 2005 and Regulations, 2006	5	10	3	5	5	3	3	39

Evaluation Criteria

1. Legal Compliance

Score 1: No legal requirements attached to the environmental impact

Score 3: There is a relevant environmental legal requirement but the company is in full compliance

Score 5: There is a relevant environmental legal requirement but the company is in the process of complying

Score 10: There is a relevant environmental legal requirement but the company is not complying

2. Frequency and Probability of Impact to Occur

Score 1: The impact will only occur on major catastrophe, such as big earthquake, floods, tsunami, etc. or one time per (..your choice..)

Score 3: The impact (may) occur on major accidents or incidents such as fire, explosion, and spillage or one time per (..your choice..)

Score 5: The impact (may) occur due to lack of training, equipment failure or lack of procedures and abnormal conditions or one time per (..your choice..)

Score 10: Impact (may) occur on normal condition or on daily basis

3. Severity and Consequence of the impact

Score 1: No harm to environment, human, or equipment

Score 3: There is potential for disturbance to the surrounding environment

Score 5: Impact causes or may cause disruption on the surrounding environment and there is potential for harm to the human health

Score 10: Impact causes or may cause damage or destruction to the surrounding environment and could lead to death of humans

4. Geographical dispersion

Score 1: The impact is only on the spot

Score 3: Dispersion of impact (may) cover the whole area of the company (four walls)

Score 5: Dispersion of the impact (may) reach beyond the boundary of the company (four walls)

Score 10: Dispersion of the impact (may) reach up to a regional area

5. Time of Recovery or Purification

Score 1: Immediate recovery by nature

Score 3: The nature needs time over a year to recover

Score 5: The nature may only recover the impact with the help of remediation

Score 10: No recovery at all even with remediation, only containment of the impact

6. Public Image

Score 1: No impact on the image of the company

Score 3: The impact may cause local issues

Score 5: The impact (may) cause environmental issues up to the national level and involve the media

Score 10: The impact (may) cause environmental issues to the international community

7. Business Implication

Score 1: No business implication or cost for remediation or preventive measure derived from the impact

Score 3: The company may have or has to set aside funds for remediation of impact or preventive measures

Score 5: The impact may cause business implication, such as market share, value of stocks, trade barriers, violation of industrial codes, etc.

Score 10: The impact may cause the business to suffer severe financial lost or high potential to close down

Rule to identify the degree of significance of an aspect

Degree of significance: DoS = 33. Anything that has a score of 10 in legal compliance is significant.

Degree of significance	Qualified as..	Which means ...
Between 1 and 32	Moderately significant	Implementation plan to be done in the next two years
33 and Above	Significant	Implementation is immediate

APPENDIX 2: EMS Legal and other Requirements F- 4.3.2



S.NO	REGULATION	REGULATORY AGENCY	SPECIFIC PROVISION	AREA TO WHICH THE PROVISION APPLIES
1	EMCA, 1999	NEMA	All sections	KEFRI premises
2	EMCA (Waste management) Regulations, 2006	NEMA	Part II Part IV – 22, 24 Part V – 33, 34 Part VI – 36-44 Part VII – 48, 49	KEFRI premises Labs, clinic Labs Clinic Lab
3	EMCA (Water quality) Regulations 2006	NEMA	Part II 4,5,6,8,9	KEFRI water supply
4	The Environmental (Impact Assessment and Audit) Regulations, 2003	NEMA	Part 1 and 4, 6 Part 3	KEFRI research and development projects
5	Physical Planning Act, 1996	Ministry of Lands	Part 5, 36	KEFRI infrastructural projects
6	The Plant Protection Act Cap 324, 1979	MoA	Sec 3,4,8,	KEFRI research programmes
7	Biosafety Act, 2009	Public Health Department of veterinary services KEBS KEPHIS KIPI KWS PCPB NEMA	Part III, Part IV, Part V, Part IX	KEFRI research programmes
7	Forests Act, 2005	KFS	52 c	KEFRI research programmes
8	OSHACap 514, 2007	Ministry of Labour	70 76-79 83-90 100-102	Labs, garages, and clinic
9	Public Procurement and Disposal Act 491 2005 and Regulations, 2006	PPDC	126-132 Part X	KEFRI supplies section
10	Weights and Measures Act Cap 513, 1988	Ministry of Trade	27	Labs, Workshops
11	The Agriculture Act Cap 318	MoA	Part 12, sec 184	KEFRI research programmes

11	The Agriculture Act, Cap 318	MoA	Part 12, sec 184	KEFRI research programmes
12	The Pharmacy and Poisons Act Cap 244, Revised 1989 (1983)	Pharmacy and Poisons Board	20 (l) and 21(d) (2) 23 26 (d) 31 (l,(a),(b),(2) 34 (e) 41 (l)a,b The Pharmacy and Poisons Rules under section 44 The Pharmacy and Poisons (Control of Drugs) Rule The Pharmacy and Poisons (Registration of Drugs Rules)	Clinic and Labs
13	The Radiation Protection Act, Cap 243, Revised 1985	Radiation Protection Board	8.(b)(d) 10.(2)(3)(4) 11.(1) 12. (1)(2)	Labs
14	The Suppression of Noxious Weeds Act, Cap 325, Revised 1983 (1962)	Ministry of Agriculture	4.(1) 6 (1) Subsidiary legislation under section 3	KEFRI research programmes
15	The Timber Act Cap 386, Revised 1972	KFS	7. 8. (1)(2) The Timber Rules under section 13	Karura Regional Research Centres
16	The Public Archives and Documentation Service Act Cap 19, Revised 2003	National Archives	7	KEFRI documents and records
17	The Wildlife (Conservation and Management) Act Cap 376, Revised 1985 (1977)	KWS	15	KEFRI field research programmes within national parks or game reserves under the jurisdiction of KWS
18	Water Act Cap 372, 2002	Ministry of Water	25	KEFRI water supply
19	The Standards Act, Cap 496, 2002	KEBS	Building materials	KEFRI infra-structural projects

Other Requirements

1. Vienna Convention for the Protection of the Ozone Layer, 1985
2. Montreal Protocol on Substances that Deplete the Ozone Layer, 1987
3. Convention on Biological Diversity, 1993
4. Kyoto Protocol, 1997
5. WTO Agreement on the Application of Sanitary and Phyto-sanitary Measures, 1995
6. Convention on Biological Diversity, 1993
7. International Plant Protection Convention, 1952
8. International Atomic Energy Agency Regulations
9. United Nations Framework Convention on Climate Change, 1994

