# Project Report

**Project title**
Enhancing Access to Kenya’s Agricultural Sciences and Technology (AS&T) Information in Institutional and KAINet e-Repositories

**Grant recipient**
Kenya Agricultural Information Network (KAINet/KARI)
P.O. Box 57811-00200
Phone, fax
http://www.kainet.or.ke and http://www.kari.org

**Dates covered by this report**
01 – 12 – 2013 / 31 – 05 – 2014

**Report submission date**
31 – 05 – 2014

**Country where project was implemented**
Kenya

**Project leader name**
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Zachary Chepukaka(MoA) - chepkaka@yahoo.com

**Partner organizations**
Kenya Forestry Research Institute
Ministry of Agriculture

**Total budget approved**
US $ 9,990

**Project summary**
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<td>9.0 CONCLUSION</td>
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</table>
1.0 BACKGROUND

The Kenya Agricultural Information Network (KAINet) was officially launched on 14 May 2009. The project’s overall objective was to establish a pilot implementation of an electronic repository as part of the Kenyan national agricultural sciences and technology information system in relation to the Strategy for Revitalizing Agriculture (SRA). The pilot project was also responding to the need for a platform that would support information management, exchange and impact on food security and development within the sector agricultural in Kenya and the global need for coherence in the management of agricultural information to enhance information exchange and access.

KAINet was set up to foster improved archiving, dissemination and sharing of agricultural content between researchers and other stakeholder groups. KAINet’s vision is to make public domain agricultural information and knowledge accessible to all. Its mission is to build a common and freely accessible information system through partnership in the generation, collection, processing archival, and dissemination of agricultural information. Providing access to metadata and their associated full-text documents is one way of working towards achieving the network’s vision.

The proposed project is aimed at addressing the above problem and contributing to making public domain agricultural information and knowledge generated in Kenya accessible to all.

The founding partners of KAINet are:

- Kenya Agriculture Research Institute (KARI)
- Kenya Forestry Research Institute (KEFRI)
- Ministry of Agriculture.

2.0 GOAL OF THE PROJECT

The main goal of the project is to enhance access to Kenya’s agricultural sciences and technology (AS&T) information by research scientists, extension agents, public policy officials, lecturers, students, and members of the public, through increasing the number of full-text documents available in the institutional e-repositories and on the KAINet e-Repository.

3.0 SPECIFIC OBJECTIVES

The specific objectives of the project are:

1. To digitize and process (based on agreed standards, tools and mechanism for information exchange and long-term preservation) agricultural sciences and technology information documents in the KAINet member institutions and include them in institutional e-repositories;
2. To establish a mechanism for harvesting metadata and associated full-text digital documents for the KAINet e-Repository;
3. To promote KAINet e-Repository and services in Kenya and international level.
4.0 ACTIVITIES AND SUB-ACTIVITIES PLANNED

The following are the main project’s activities.

1. **Digitize and process agricultural sciences and technology information documents for the institutional e-repositories, based on agreed standards, tools and mechanism for information exchange.**

   **Sub-Activities**
   - Obtain copyright clearance for the documents, where this is required (i.e. for documents co-produced with another institution, articles published in journals, etc), to be digitized and included in the e-repositories;
   - Link already digitized documents to their associated metadata;
   - Digitize the documents following the established institutional document workflows;
   - Create metadata, based on agreed standards and methodologies for information exchange adopted by KAINet;
   - Conduct quality control of both the digital documents and metadata.

2. **Enhance the visibility of AS&T content in the institutional and KAINet e-Repositories on the Internet**

   **Sub-Activities**
   - Review the existing technical infrastructure supporting institutional repositories in KAINet member institutions;
   - Migrate from WebAGRIS tools to AgriDrupal and AgriOceanDspace “suite of solutions” for agricultural information management and dissemination;
   - Develop mechanism and guidelines for the exchange of metadata and full-text documents between institutional repositories and KAINet e-Repository, based on AgriDrupal and AgriOceanDspace.

3. **Capacity Development in Agricultural Information Management and Dissemination**

   - Train information professionals and IT support staff in KAINet member institutions on AgriDrupal “suite of solutions” for agricultural information management and dissemination.

4. **Promote KAINet e-Repository and Services in Kenya and the International Level**

   **Sub-Activities**
   - Hold KAINet introductory seminars/presentations in agricultural research institutes and universities of agriculture
   - Design and print KAINet brochures and posters
   - Register the KAINet e-Repository with DOAR
   - Develop and print promotional materials
5.0 STATUS

5.1 Inception Workshop

To kick off the project, an inception workshop was held in the month of December bringing together members of the 3 participating institutions:

- Kenya Agriculture Research Institute (KARI)
- Kenya Forestry Research Institute (KEFRI)
- Ministry of Agriculture.

The members were briefed on the objectives of the project and they agreed on the modalities and framework of the projects as follows:

i) That the training on technologies of information management should be carried out in early January to facilitate the digitization and input of the same onto the repositories. The training was planned to cover the agricultural knowledge management platforms that meet international standards of sharing, disseminating and management information.

ii) The meeting to also develop the criteria of recruitment of the staff to assist in the digitization and input of the repository. The meeting recommended the use of universities students managing in ICT and library studies.

iii) KAINet would then at a later stage harvest from the institutional repositories.

5.2 Training

Of the 3 institutions, only KARI’s repository is accessible at http://www.kari.org:8080/repository while the other 2 institutions repositories are accessible on the local area networks. It was therefore important to identify technologies that improved access to agricultural information. To achieve this we look at 2 approved, tested and open access technologies developed with the management and sharing agricultural knowledge:

- **AgriDrupal**: AgriDrupal is a “suite of solutions” for agricultural information management and dissemination, with special functionalities for repository management, built on the Drupal Content Management System.
- **AgriOceanDspace**: AgriOceanDSpace (AOD) is a joint initiative of the United Nations agencies of FAO and UNESCO-IOC/IODE to provide a customized version of DSpace 1.7.1 (JSPUI version), an open source, digital repository software.

Its main objective is to make scientific literature in the field of oceanography, agriculture and related sciences available in digital form. AgriOceanDSpace is set-up for the digital repository communities of AGRIS (FAO) and Odin (UNESCO-IOC), but can be downloaded and used by any research institution interested.

The training was contacted during the first week of the month January 2014 with 12 officers of the 3 institutions being trained on 2 institutional repository information management platforms. For us to achieve our objectives, we trained a team of librarians and ICT personnel from each institution.
The Librarian’s main responsibility on the systems is to manage the information and the ICT person to manage the ICT system.

The training included both theory and practical where the officers were able to develop institutional repositories.

**Attendances of the Training**

![Registration Form]

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>P/No</th>
<th>Institution</th>
<th>Dates</th>
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<tr>
<td>1</td>
<td>Stephen Bonu</td>
<td>0664524</td>
<td>AIRC</td>
<td>⬤ ☑ ☑ ☑</td>
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<tr>
<td>2</td>
<td>John Kimani</td>
<td>80536</td>
<td></td>
<td>HANR</td>
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<tr>
<td>3</td>
<td>Lucy Muchiri</td>
<td>0921263</td>
<td>RUOA</td>
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<td>Zachary Chipungu</td>
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<td>7</td>
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<td>9</td>
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<tr>
<td>10</td>
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<td>6677</td>
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<tr>
<td>11</td>
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</tbody>
</table>
5.3 **Technical Back stopping**

A technical follow-up exercise at all the 3 institutions is on-going to ensure that each institution have a functional institutional repository. KARI’s repository is accessible at [http://www.kari.org:8080/repository](http://www.kari.org:8080/repository) while the other 2 institutions repositories are accessible on the local area networks.

All the three institutions were able to engage 2 personnel to start the scanned and the metadata entry onto the developed institutional repositories.

Technical support has been offered fortnightly to ensure that the partner institutions repositories and digitization activities are run smoothly and accessible via local area networks and online. Technical expertise has been given on strategies to ensure that all the partner institutions make their information accessible online.

5.4 **KAINet Repository**

The Kenya Agricultural Information Network (KAINet) [http://www.kainet.or.ke](http://www.kainet.or.ke) has been upgraded to meet international RDF and XML standards of sharing agricultural information. AgriDrupal offers an integrated environment where several types of contents can be managed, searched and browsed on one website, like:

- documents or bibliographic records, using standardized descriptive metadata and controlled subject-indexing based on AGROVOC;
- news, events and vacancies;
- institutions and experts.

**Document repository features**

The AgriDrupal reference tool has advanced features for managing open access repositories in compliance with widely adopted library standards and the OAI-PMH protocol. The document repository features include:

- a cataloguing interface that out of the box provides the most commonly used metadata elements in bibliographic databases, in particular those defined by the AGRIS AP, but is easily extendable to include any other element;
- internal authority lists for authors (personal and corporate), journals and conferences;
- special input interface for subject indexing with the AGROVOC thesaurus;
- search and browse functionalities;
- exposure of records through the OAI-PMH protocol;
- exposure of records also as RDF feed, XML file, RDF individual records and (in the D7 version) RDF response to SPARQL queries. The XML file is compliant with the above mentioned AGRIS AP, while RDF feeds and query results can be customized in order to include properties from any vocabulary, thus making the repository fully interoperable - the use of Agrovoc URIs also linking it to a published Linked Open Data (LOD) triple store;
- extensible import and harvesting functionalities that also facilitate the exchange of information with other Institutions and the building of networks.
RDF and linked data

AgriDrupal manages documents, news, events, vacancies, institutions, experts and of course web pages. The resulting integrated information system exposes RDF feeds for each type of information managed in the system, and the vocabularies and properties used in the RDF output can be customized, thus making an AgriDrupal installation a potential Linked Data provider.

Besides RDF feeds, AgriDrupal version 7.x.7.9 and above exposes a SPARQL endpoint that accepts queries using several widely used vocabularies: DC and BIBO for documents, FOAF for experts and institutions.

All triples containing terms from AGROVOC are linked to the AGROVOC original URIs, thus making data managed in AgriDrupal Linked Data.

Interlinking with other important agricultural resources and databases has been incorporated into the new KAINet look.

5.5 Promotional Material

The design and development of the promotional material that is complete is shown by the attached images. 1000 flyers and 1000 brochures are planned to be printed and shared among the partners to be used as promotional materials.

5.5.1 Flyer

![Flyer Image](image-url)
5.5.2 Brochure

- Advise on strategic priorities and sustainability of ICT activities of both institutional and national levels.
- Promote organizational systems and services through adoption of approved principles and standards to ensure the research information systems still value in data to benefit in the overall knowledge systems.

Participating Institutions
- Ministry of Agriculture (MOA)
- Kenya Agricultural Research Institute (KARI)
- Food and Agriculture Organization of the United Nations (FAO)
- Kenya Farmers Research Institute (KEPRI)
- Jomo Kenyatta University of Agriculture and Technology (JKUAT)
- Application for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA)
- CABI International (CABI)

Membership
Public and private institutions committing to providing their information to the public domain.

How to join
Participants in KAINet through membership registration. Details are found at: www.kainet.org

The KAINet approach

Benefits
- Access to a national consolidated content on agriculture information
- Visibility of information products and services nationally and internationally
- Exposure to new tools and standards for managing agricultural information
- Access to technical support and consultation from a team of experts.

Background
The framework was established in 2000 in response to demand from national and international communities to provide information availability and access among stakeholders in the agricultural sector. The network evolved from the Kenya Agricultural Information Networking project, which aimed at building capacities to manage, organize, and deliver information services in the agricultural domain.

Objectives
- To establish and manage a comprehensive and accessible national information and communication management (ICM) network for the promotion, coordination, and sharing of information and knowledge.
- To establish and manage an information and communication management (ICM) network, resource mobilization, and partnerships mechanisms.
- To facilitate the development and implementation of appropriate information and communication technology (ICT) policies and frameworks.
- To promote the development and maintenance of strategic ICT infrastructure and facilities.
- To promote the development and maintenance of strategic ICT infrastructures and facilities.

The Need for Collaboration and Networking
- At national level, KAINet is a national information management system that promotes the development and implementation of strategic ICT infrastructures and facilities.
- To ensure availability, access, sharing, and utilization of agricultural information and knowledge.

Functions of KAINet
- To provide access to the national agricultural information repository for information in full text and metadata. The content includes technical reports, regional conferences proceedings, research notes, annual reports, occasional papers, journals, and project reports.
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- To promote the development and maintenance of strategic ICT infrastructure and facilities.
- To promote the development and maintenance of strategic ICT infrastructure and facilities.

Vision
To make public domain agricultural information and knowledge in Kenya freely accessible to all.

Mission
To build a common and freely accessible information system through partnerships in the generation, collection, processing, archival, and dissemination of agricultural information.

In Research to the Environment (SIARE), Kenya, Ask Parliament and Agricultural Organization of the United Nations (FAO), Information Management Resource Net (IMRN) and open access tools:
- Open access to public domain agricultural information.
- Technical backstopping on agricultural information management to member institutions.
- Build capacity in the areas of management of electronic documents, digitization, web development, marketing, and dissemination of agricultural information services, open access, monitoring and evaluation of information projects and strategy formulation for members.

Products and Services
- Access to the national agricultural information repository for information in full text and metadata. The content includes technical reports, regional conferences proceedings, research notes, annual reports, occasional papers, journals, and project reports.
- Web portal with access to other national and international agricultural resources such as Access to Global online Research in Agriculture (AGORA), Online Access.
5.6 Institutional Report

5.6.1 KAINet

Kenya Agricultural Information Network

Documents
- Catalog
- Advanced search
- Browse catalog
- OA data provider

Related & Quick Links
- Repository
  - KARI Journal
  - KARI Data
- KARI-KAL Institute
- KARI-KAL Website
- KARI-Internal
- KARI-External
- KARI-KAL Project
- KARI-Other
- KARI-Contact

Market Information
- Market information provided by the Ministry of Agriculture
- Market information within the country
- Wholesale commodity prices

KAINet

Mobile and Development Intelligence Portal
The OSRA recently launched the Mobile and Development Intelligence (MDI) portal – an open data portal for the developing world mobile industry. MDI apprives and makes publicly available data from multiple sources... read the whole post >>

Bridging the Information gap in agriculture – AGORA tenth anniversary celebrated
AGORA makes online scientific literature available to over 100 poor countries – Tenth anniversary celebrated in Rome. AGORA, a programme that brings key scientific literature on food agriculture and related fields to students... read the whole post >>

KARI Repository

Kenya Agricultural Research Institute with the technical support of FAO and ASEEREA have customised version of DSpace using standards and controlled vocabularies in oceanography, marine science, food agriculture, development, fisheries, forestry, natural resources and related sciences

KARI carries out research in oceanography and food agriculture, development, fisheries, forestry, natural resources and related sciences will provide a bespoke repository software based on DSpace to offer Open Access to the literature. They will use the same high standards for metadata, thesauri and other catalogues ensuring advanced access to the scientific publications in the field and the possibility to create new services for their researchers.

Search
Enter some text in the box below to search DSpace.

Recent Submissions

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<th>Type</th>
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<tr>
<td>Impact of ground water quality on irrigation in Waqir district, Kenya...</td>
<td>Proceedings</td>
</tr>
<tr>
<td>Demolished and unsustainable for sustainable natural resource base, food...</td>
<td>Paper</td>
</tr>
<tr>
<td>Kenya Agricultural Research Institute, Nairobi (Kenya)</td>
<td>Paper</td>
</tr>
</tbody>
</table>
5.6.3 AIRC and Kilimo Repository

A collaborative research agenda to develop sustainable agricultural production technologies for East Africa.

Conference Proceedings
A regional workshop for the Development of Agriculture in East Africa, Kampala, Uganda, 7-10 June 1983

A matemathical function to describe the correlation curves of crops used in national and household dairy production.

Conference proceedings of annual scientific symposium of the national dairy production society of Kenya 2011

A case-oriented grain mill working paper

A review of the biology and control of rice blast (Ceratigongaramya halstii) in the Eastern Province of Kenya.

Technical report

Agriculture Research and Development for Sustainable Resource Management and Food Security

Conference Proceedings

Agriculture Research and Development for Sustainable Resource Management and Food Security in Kenya

Agronomic land resources assessment for agricultural development planning: A case study of Kenya. Mainland land use choices

Technical report

Kenya Agricultural Information Network (KAINet)    Page 11 of 20
A collaborative research agenda to develop sustainable wheat production technologies for East Africa

Very few studies have been conducted in high lands of Eastern Africa to examine the long-term effects of wheat crop management practices on the farming community’s natural resource base. To generate information on sustainable wheat production practices that are appropriate to the context in Eastern Africa, KEFRI and its partners have initiated a collaborative research network. The long-term objective of the network is to enhance productivity and profitability of wheat farming systems in Eastern Africa through scientific rigor and participatory research.

Date and language:
Date of publication: 1994-01
Language: en

Personal Author:
Treacy, P. C. (International Maize and Wheat Improvement Center (CIMMYT), Nairobi; Drought Affected Crops Project)

Approved grant-in-aid of Agricultural Research, Addis Ababa (Ethiopian Agricultural Research Institute)

Machat, M. P. (National Plant Breeding Research Center, INFECT, Njoro, Kenya)

Negesse Tadesse (Debre Zeit Agricultural Research Center (AZA)), Debre Zeit (Ethiopia)

Corporate Author:
Kenya Agricultural Research Institute (KEFRI)

http://41.215.78.76:8282/
5.6.5 Digitized Documents

The table shows what has been digitized and what is on-going. The work is on-going since we began and we also institutionized the repository concept with KAINet and its participating institutions.

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<thead>
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<th>Institutions</th>
<th>Digitized</th>
<th>Planned to be digitized</th>
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<tbody>
<tr>
<td>AIRC and Ministry of Agriculture</td>
<td>558</td>
<td>Over 1,000</td>
</tr>
<tr>
<td>KEFRI</td>
<td>773</td>
<td>Over 1,000</td>
</tr>
<tr>
<td>KARI</td>
<td>1,158</td>
<td>Over 2,000</td>
</tr>
</tbody>
</table>

Please find below some screen shots of the scanned documents be carried out by the partners: -

Ministry of Agriculture
5.6.5 Google Analytics

Google Analytics has been implemented and displays of the usage and access to the KAINet repository.
5.7 Memorandum of Understanding (MoU)

A draft MoU was developed to streamline the operations with KAINet member institutions. The MoU would underline the workflows and the structures of operations of the institutional and national repositories. It gives clear guidelines and responsibilities to all the members of the network hence giving round for growth of the membership.

6.0 PROJECT IMPLEMENTATION

<table>
<thead>
<tr>
<th>Input</th>
<th>Project activities</th>
<th>Outputs</th>
<th>Outcomes</th>
<th>Timeline</th>
<th>Status</th>
<th>Assessment</th>
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<td>Financial, human and material resources</td>
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<td>Project Inception</td>
<td>Likely or achieved short and medium term effects. control</td>
<td>Dates were the listed activity was developed</td>
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<td>Project modalities and framework</td>
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<tr>
<td>Financial, human and material resources</td>
<td>Training</td>
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<td>Completed</td>
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<td>Human resources</td>
<td>Technical Back stopping</td>
<td>Repositories established in the 3 institutions</td>
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<td>Completed and on-going on the technical back stopping</td>
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### KAINet Monitoring and Evaluation Plan

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<tr>
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<th>Measure taken every:</th>
<th>Date completed</th>
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<td>1. To avail full text content through the Institutional and National Repositories</td>
<td>1. Digitization of print institutional agricultural information materials</td>
<td>List scanned documents</td>
<td>Number of scanned Documents</td>
<td>Scanners, Institutional Publications, Computers</td>
<td>KAINet Coordinator</td>
<td>Do a baseline survey at the beginning of the project and then measure progress monthly</td>
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<td>Repository Software, standards and tools</td>
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<tr>
<td></td>
<td></td>
<td>Increased metadata and full text onto KAINet</td>
<td>Standards and tools</td>
<td>KAINet Coordinator</td>
<td></td>
<td>Monthly</td>
<td>1\textsuperscript{st} June, 2013, Continuous</td>
</tr>
<tr>
<td>2. To facilitating access to the scientific and technical literature in Kenya</td>
<td>Host KAINet e-repository</td>
<td>Linkage with institutional repositories</td>
<td>Assess number of visits to Institutional and KAINET repositories</td>
<td>Google Analytics KAINet Portal, servers, Internet connectivity</td>
<td>KAINet Coordinator</td>
<td>Monthly</td>
<td>Continuous</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trained staff at the Institutional level and KAINET coordination office</td>
<td>Number of trained staff</td>
<td>Agridrupal and AGROCEAN DSPACE software/trainers and computing facilities/technical Experts</td>
<td>KAINet Coordinator</td>
<td>After the training</td>
<td>Mid January 2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Currency of repositories, visits</td>
<td>Currency of repositories and number of visits to</td>
<td>Listed software (AGROCEAN DSPACE &amp; AGRIDRUPAL), and</td>
<td>KAINet Coordinator</td>
<td>Monthly</td>
<td>Continues</td>
</tr>
<tr>
<td>and full text and Follow up</td>
<td>and accessibility</td>
<td>partner institutions</td>
<td>back up facilities</td>
<td></td>
<td></td>
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<tr>
<td><strong>4. To Create Awareness of KAINet</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Hold multi-stakeholder workshop and consultative meetings</td>
<td>Consultations and workshops held</td>
<td>Number of new participating institutions and the number or new repositories and members</td>
<td>Attendance book, repositories, Google analytics</td>
<td>KAINet Coordinator</td>
<td>Monthly</td>
<td>Continuous</td>
<td></td>
</tr>
<tr>
<td>2. Develop promotional material</td>
<td>Leaflets and brochures</td>
<td>Number of leaflets and brochures</td>
<td>Software and promotional literature</td>
<td>KAINet Coordinator</td>
<td>Before each report is due</td>
<td>Mid March</td>
<td></td>
</tr>
</tbody>
</table>
8.0 WAY FORWARD

The repositories shall eventually been imported onto the KAINet repository to ensure that we have a one stop resources for agricultural information. We are therefore putting in place the structures in place in readiness of this particular exercise.

To improve usability and accessibility of the KAINet platform, we intend to create awareness of among the various stakeholders in the agricultural sector. We also plan to increase the partners onto the KAINet platform even as we market the resource so as to eventually have a one-stop platform of agricultural information in Kenya.

The digitations, knowledge management and making knowledge accessible kick off with the assistance of AFRINIC-FIRE within the partner institutions shall continue to ensure that all the repositories shall be available online with full text documents.

Recruitment of other research institutions into the KAINet membership is underway with the transitions of Kenya Agricultural Research Institute (KARI) to Kenya Agricultural and Livestock Research Organization which will comprise of over 9 Agricultural research Institute into one body (KALRO). This will therefore mean more agricultural information harvested and uploaded onto KAINet repository.

The success of the initiative has promoted the partner institutions to seek more funds to ensure the digitization of institutional content and making it accessible and available via local and online repositories.

9.0 CONCLUSION

All the partner institutions have embarked on the first of the project with institutions scanning information and knowledge in readiness of metadata entry and linking onto the institutional repository. The ICT teams within the institutions with the assistance of the backstopping team are also setting up and customizing the institutional repositories.

The AFRINIC FIRE initiative is timely in assisting institutions in the agricultural stake to manage, store, disseminate and share agricultural research findings.