NATIONAL MUSEUMS OF KENYA

WHERE HERITAGE LIVES ON

1910

2010

Centre of Excellence in Biodiversity Informatics in East AFrica

1910-2010

Celebtrating a Century of Heritage Management

Background

- East Africa has been involved in BI projects for nearly two decades

- Those projects and initiatives have been focused to leverage the capacity of the region in:
  - Digitization of biological information stored in museums, herbaria, and other institutions
  - Application of *state of the art* technologies:
    - Geographic Information Systems (GIS)
    - Data modeling (e.g. ecological niche modeling)
    - Interactive identification keys (e.g. Lucid)
    - Remote sensing
  - Indigenous Knowledge (IK) systematization (e.g. traditional medicine)

Background

- As a result, there is now in East Africa (EA):
  - A critical mass of experts who help to mobilize biodiversity information effectively
  - An important quantity of data in digital format
  - More and better hardware and networking equipment than some years ago
  - A more positive attitude towards data sharing
  - An active involvement in global and regional biodiversity networks (e.g. GBIF, BioNET)

Some of those projects and initiatives

- The EA Regional Project on the Global Strategy for Plant Conservation (2007-2009)
  - It as also known as the "EA Biodiversity Informatics Project"
  - Capacity of key botanical institutions was built to provide data about taxonomy, biodiversity status, and biodiversity usage
  - The use of BRAHMS was standardized as a common platform for data entry
  - The regional list of EA plants was updated, as well as a A Red List of Threatened Plant Species
  - Conservation Assessment and Management Plans for Medicinal Plants in the region were generated

Some of those projects and initiatives

- The BioNET/EAFRINET UVIMA Regional Project for EA (2008 – 2011)

  ○ Focused on pollinators, invasive species, and pests
  ○ Taxonomic information for generating tools and products relevant to the environmental, food, and poverty crises in Africa was mobilized
  ○ Reference databases at national and regional levels were compiled

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Some of those projects and initiatives

- The TanBIF portal (since 2008)

  - Extensive and decentralized web-based system of national units that intends to provide free and universal access to data and information regarding Tanzania biodiversity

  - Is the output of a programme designed by the Global Biodiversity Information Facility (GBIF) and implemented in Tanzania by the Commission for Science and Technology (COSTECH) in collaboration with GBIF

Some of those projects and initiatives

- KenBIF
- UgaBIF

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Important challenges, needs, and gaps

- Lack of technological *know-how*
  - Database development/maintenance
  - Analysis of information
  - Application of standardized methods to share information
- Scarce technical resources
  - Networking equipment and ICT personnel are difficult to access for some institutions
- Limited communication between ICT staff and scientists
  - The few ICT staff members available are mainly prepared to give support to users in general applications and hardware maintenance, but not in BI applications

A Centre of Excellence as a big opportunity

- The existing potential and incoming opportunities could be better harnessed through a regional support structure to
  - Address pertinent needs
  - Provide advice, support, and training
- After the outstanding results achieved by the previous initiatives, a concept was developed to seek funding to establish a Centre of Excellence (CoE) in Biodiversity Informatics in East Africa
- The JRS Biodiversity Foundation provided funds to develop a project proposal for the establishment of such a centre

# Methodology of the Feasibility Study for the CoE

- Techniques of qualitative research were applied using questionnaires and interviews as sources of primary information in the 15 visited institutions
- Some secondary sources, like the web sites of the stakeholders and documentation about related projects, were used as well
- Four seminars were given in the three countries in order to share with the stakeholders Indian and Costa Rican experiences in BI

Main outputs of the study

- Contextual analysis
  - Global view
    - Main global BI initiatives (TDWG, GBIF, Encyclopedia of Life, Catalogue of Life)
    - Main standards and protocols (Dublin Core, Darwin Core, TAPIR, Internet Publishing Toolkit)
  - For each visited institution
    - Background
    - Status of ICT infrastructure, policy framework, and human resources
    - Key needs, gaps, and opportunities

Main outputs of the study

- Needs analysis
  - Supply and demand of data and information
    - Pyramids (flows) of data/information/knowledge were searched
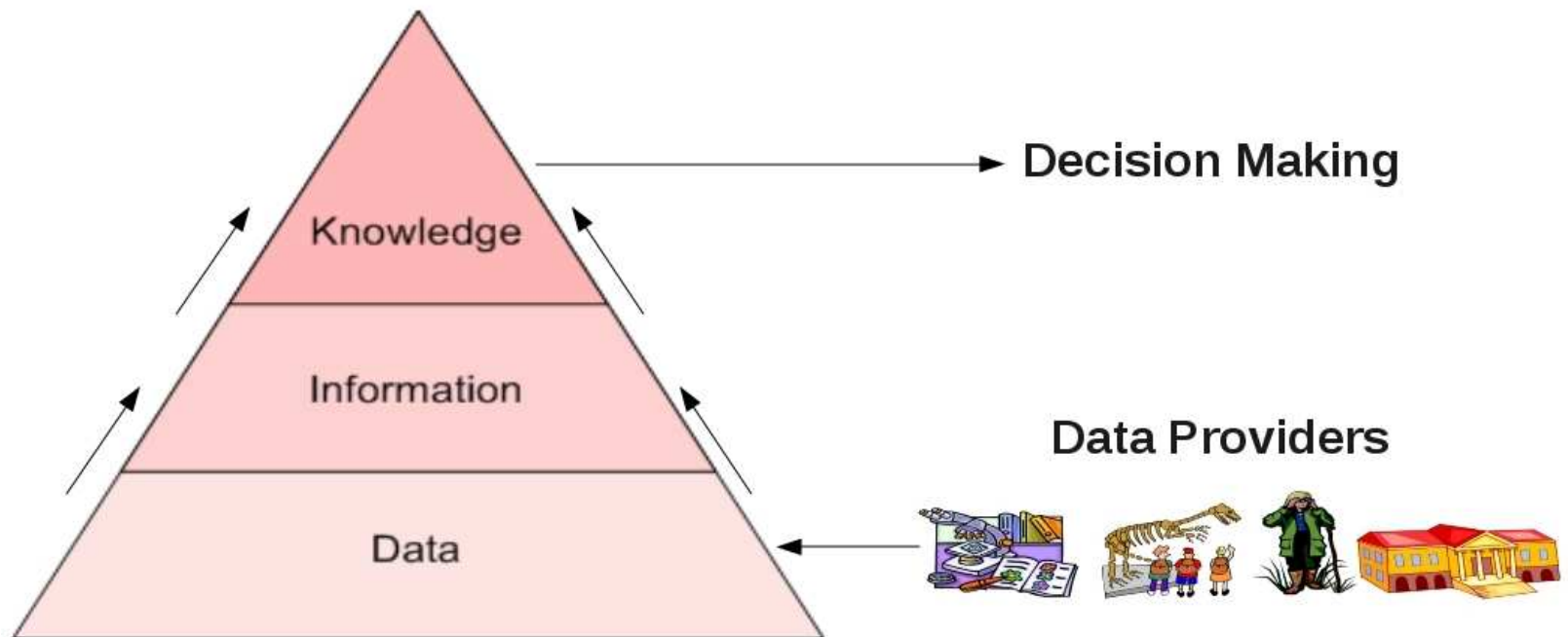
Main outputs of the study

- Needs analysis
  - Supply and demand of data and information
    - At the first level, primary biodiversity data is collected at the fields (e.g. specimen vouchers, remote sensor outputs)
    - The data is then synthesized in information models and representations (e.g. distribution maps, identification keys, species descriptions)
    - Knowledge is then generated at the top of the pyramid to be used by decision makers (e.g. managers, policy makers)
  - EA countries have progressively moved from basic technologies for managing primary biodiversity data to more advanced software tools which can generate information and, in some cases, even knowledge
  - Nevertheless, there are still some important gaps that need to be covered in order to guarantee a continuous flow of data/information/knowledge in the pyramids

Main outputs of the study

- Needs analysis
  - Hardware and Networking
    - With some particular exceptions, hardware was not a major problem at present time
      - Of course, it is always recommended to renew personal computers every three years (approximately) and keep software licenses updated with latest versions
    - Network /Internet connectivity is a more serious problem, both at institutional and national level, particularly in Tanzania and Uganda
  - Software
    - It was noted that most users prefer Windows operating system and typical accompanying applications
    - The use of free software is still incipient, but many people expressed their openness to consider it as an option, mainly because of licensing costs

Main outputs of the study

- Needs analysis
  - Data access and sharing policies

    - There are laws pertinent to biodiversity and environment
    - Some of those laws have not been approved or are not operational yet
    - In general, there are no formal policies for data sharing
    - Sometimes, *ad-hoc* agreements are signed between institutions for particular projects

Main outputs of the study

- Needs analysis
  - Human resources
    - There is scarcity of computer-related staff
    - Lack of general support for BI applications
    - The role of "BI technical support" and, even the role of the "BI application developer", have been, in many cases, assumed by scientific staff
    - There is lack of communication between available technical personnel and scientific personnel
    - There is lack of motivation, attitude, and incentives for sharing information

Conclusions

- EA counts on a capable group of institutions to generate and offer the most important types of biodiversity data
  - Specimens/Observations
  - Species
  - Ecosystems
- There are great opportunities to spur and boost development of specialized knowledge and skills in EA agencies which could be shared with the rest of the world

Conclusions

- Kenya, Tanzania, and Uganda have progressively moved from basic technologies for managing primary biodiversity data to more advanced software tools which can generate information and, in some cases, even knowledge

- Despite the important achievements that have been reached, this emerging movement is facing some important challenges, needs, and gaps

Centre of Excellence

- The CoE would be an entity whose nodes (members) would be research centre's, universities, wildlife services, governmental institutions, private corporations, and non-governmental organizations which are related to biodiversity data management

- These nodes would include keepers of data related to specimens, observations, taxonomy, ecology, cartography, bibliography, and ethnobiology, catalogues about natural resources, genetic resources, conservation, and others

Functions of the CoE

- ◦ To integrate data of EA biodiversity in a single web site
- ◦ To provide a distributed architecture for data sharing
- ◦ Strengthen Biodiversity Heritage Libraries
- ◦ To offer these data to the different types of consumers
- ◦ To provide software tools and standards for biodiversity information management
- ◦ To analyze and agree on intellectual property rights and quality control policies
- ◦ To establish alliances, synergies, and strengthen the links among institutions and investigators
- ◦ To support the establishment of periodic and continuous data digitization processes
- ◦ To promote participation of associates in workshops, seminars, and interchanges

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Thank you

Lawrence Monda
Lmonda@museums.or.ke