



IT-based Online System for Coordinated Multi-Institutional Administration of Research and Development

Wednesday, 6 March 2019
15:00 -15:45 p.m. (CET)

Dr. Hartmut Meyer

Thanks for joining our series of Online-Events
“Be part of GIZ.digital — Share your digital experiences“
The events take place every second week,
alternating Wednesday (3:00 p.m. CET) & Friday (9:30 a.m. CET)
Your Division Methods, Digital Transformation, Innovation



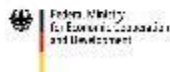
GIZ.digital Gateway
Internal platform for digital topics in
development and international cooperation
www.giz.digital

L'INITIATIVE DE
RENFORCEMENT
DES CAPACITES
POUR L'APA

Dr. Hartmut Meyer, ABS Capacity Development Initiative

“Be part of giz.digital – Share your digital experiences”

in order to:



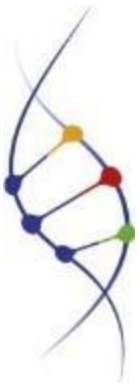
Seit 1992 ist die Universität
Leoben an der
Technischen Universität
Zürich angeschlossen.

Journal Department of Economics, University of Colorado, Boulder, CO 80502, USA
 e-mail: seemab@colorado.edu

implemented by

giz

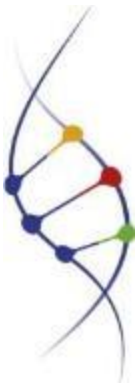
Business Excellence
for Financial and
Operational Success



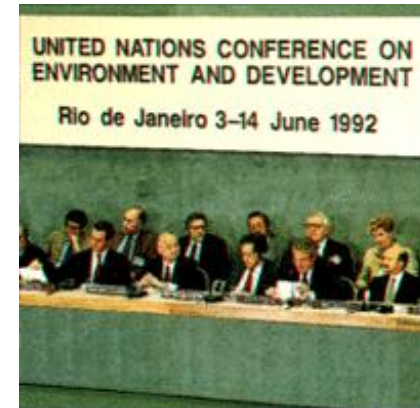
Content

- International framework: CBD and Nagoya Protocol on ABS
- Basic concept for ABS applications, permitting and provider-triggered tracking utilisation
- Selection of data for tracking
- Multi-institutional coordination in Kenya
- Integration of international data banks
- Machine learning approach in India
- Analysis of R&D and patent landscapes
- Lessons learnt

Objectives of the Convention on Biological Diversity

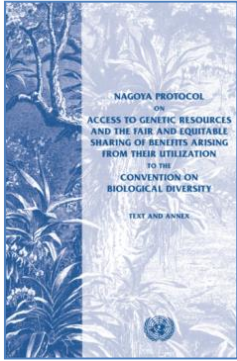


| | | |
|--|--|--|
| 1) Conservation of biological diversity | 2) Sustainable use of its components | 3) Fair and equitable sharing of benefits from the utilization of genetic resources |
| | | via |
| Appropriate access to genetic resources | Appropriate transfer of technology and know how | Appropriate funding: <ul style="list-style-type: none"> • Up-front payments • Mile stone payments • Licence fees / royalties |





Nagoya Protocol on ABS



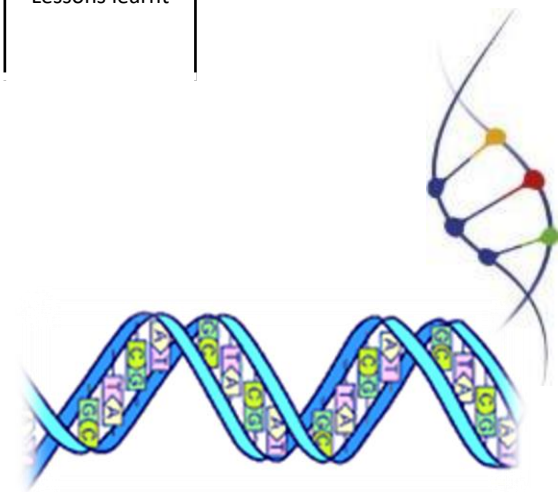
- Adopted in October 2010
- Entered into force in October 2014
- Currently 114 Parties
- Contribution to biodiversity conservation and better livelihoods

Legal certainty and transparency

- **Preventing misappropriation (biopiracy)** of genetic resources (GR) and associated traditional knowledge (aTK)
- For **users**: providing for **clear and transparent procedures for access** to GR and aTK
- For **providers**: ensuring **benefit-sharing** once GR and aTK leave the provider country for utilisation

Scope of the Nagoya Protocol

- **Genetic resources** within the territory of a State and the benefits arising from the utilisation of such resources
Genetic resource: Any organism and its parts
- **Traditional knowledge associated with genetic resources** and the benefits arising from the utilisation of such knowledge
- **Utilisation** = research and development on the genetic and/or biochemical composition of genetic resources, including through the application of biotechnology



ABC of ABS – Logic of the Nagoya Protocol

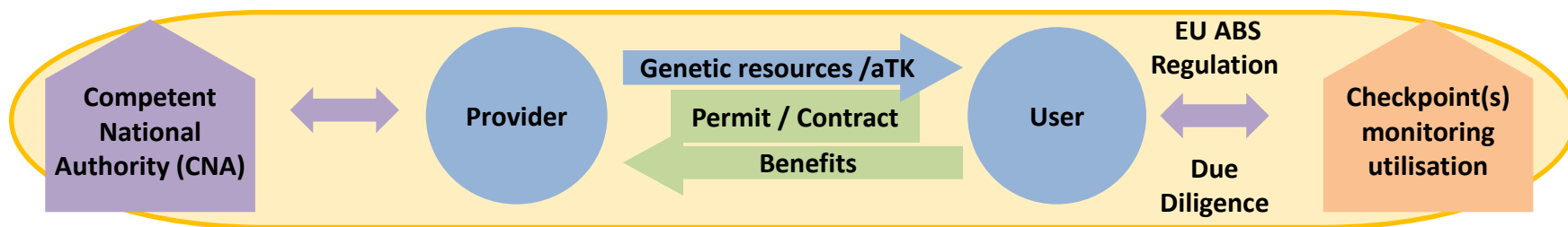


Access
Benefit-sharing
Compliance

CBD

National ABS
Regulation

„biodiversity-rich“ countries facilitate
access to genetic resources



„technology-rich“ countries share benefits arising from genetic
resources; facilitate the access to technologies and means important
for conservation and sustainable use

ABS Permit

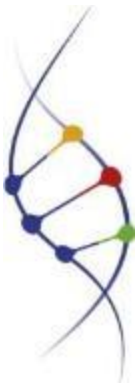
ABS-CH

Certificate of
Compliance

National ABS
Regulation

ABS Clearing House

Nagoya
Protocol



Development of basic concept

GEF4 / GEF6 projects for six African Countries & The Bahamas - 2012 - 2016

Starting point 1: Paul Oldham/ ABS Initiative developed innovative text mining codes for revealing the use of genetic resources from a specific country in patents or publications

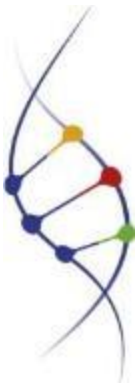
Starting point 2: The research permit system of The Bahamas with up to 100 applications annually offer a wealth of data on researchers and institutions having accessed genetic resources and undertaken research

The Idea: Using the permit data to screen public data (publications and patents) to follow critical points in the biodiversity-based value chain

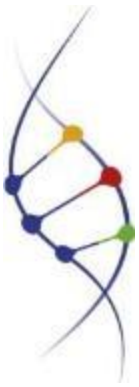
The Concept: Using text mining codes and open source software in an automated system combining application and tracking process

The Effect: Increased clarity and transparency for access, increased confidence in and effectiveness of the benefit sharing system

Innovative IT-based approaches for e-governance for our partners



- **Kenya:** Integrated application, permitting and tracking system within a highly complex institutional setting
Innovative approach: Well-designed IT tools for simple user navigation, multi-institutional coordination and mobile surveillance by rangers
- **India:** Tracking module attached to existing online application and permitting system for one authority
Innovative approach: Cutting-edge machine-learning approach for better tracking results in multi-million data sates
- **The Bahamas:** Integrated application, permitting and tracking system in a weak institutional setting
Innovative approach: Effective IT tools for surveillance of extended marine territory, hundreds of islands and users who might never leave their ships or meet customs



Concept publically available

[About](#)
[The Model ▾](#)
[Planning ▾](#)
[Schematics](#)
[Resources](#)

The Nagoya Protocol: A Model Online Research Permit and Monitoring System

This is the project site for a model Online Research Permit and Monitoring System to support national implementation of the [Nagoya Protocol](#).

The idea behind the model is to assist Parties to the [Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization](#) of the [United Nations Convention on Biological Diversity](#) with implementing the Nagoya Protocol.

The model focuses on the creation of an online permit and monitoring system to make it easier for governments to administer research permit applications involving genetic resources and traditional knowledge and to monitor compliance under the Nagoya Protocol as well as making it easier to prepare national reports.

Download in Word and PDF

You can download Word versions of the sections in a .zip file [here](#). For pdf versions go [here](#).

You will also need to view the schematics which demonstrate the basic functions of the system. You can view them online from the Schematics menu or download them in [powerpoint](#), [keynote](#) or [pdf](#). The schematics are meant to be viewed as a slide show in presentation mode.

The draft workplan can be downloaded as headings to assist with project planning [here](#).

Who Developed This?

The original model was written by Dr. Paul Oldham as part of work with Hartmut Meyer and Olivier Rukundo on implementation of the Nagoya Protocol in the Bahamas. The updated version is a joint work in progress and much better for it.

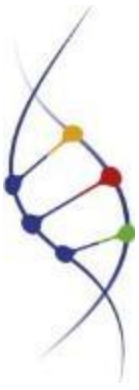
Financial Support

The model was developed with the support of [The Bahamas Environment, Science & Technology Commission \(BEST\)](#) of the Government of the Bahamas under the UNEP/GEF project "Strengthening Access and Benefit Sharing (ABS) in the Bahamas" as set out in [Oldham, P \(2015\) Concepts for an Electronic Monitoring Tool. UNEP/GEF project "Strengthening Access and Benefit Sharing \(ABS\) in the Bahamas"](#). The present paper was written with the additional support of the multi-donor [ABS Capacity Development Initiative](#) hosted by the German Federal Ministry for Economic Cooperation and Development (BMZ) and implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. We express our sincere thanks to the BEST Commission, UNEP/GEF the ABS Capacity Development Initiative, BMZ and GIZ for their support. The views expressed are solely those of the authors and should not be interpreted as reflecting the views of the Government of The Bahamas, BMZ, GIZ or the ABS Initiative.

Suggested Citation

Oldham, P; Rukundo, O; Meyer, H (2016) An Online Research Permit and Monitoring System to Support National Implementation of the Nagoya Protocol. Concept Paper. [DOI:https://doi.org/10.5281/zenodo.57436](#)

<http://abspermits.net/>



Core components of the concept

Authorities
Provider

Online Front Page

Applicants
User

Core System

Backups

Monitoring

Physical Archive

Reporting

Mobile access



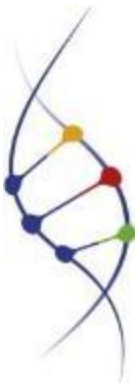
Two aspects of the provider-triggered tracking concept

Starting point 1: Tracking the results of R&D where no attempt has been made to secure permission by ABS Permit and no ABS contract exists, commonly described as biopiracy

➤ **using external data from the public domain**

Starting point 2: Tracking the results of R&D where a researcher or company has received permission by ABS Permit entered into an ABS contract

➤ **using internal data from administrative processes**



What are sources for external data?

- Scientific literature
- Patent documents
- Products (possibly)
- Samples in ex-situ collections
- DNA and protein sequences in data banks
- ...



What are sources for administrative data?

- National ABS permits / Internationally Recognised Certificate of Compliance
 - Various permits for researchers to conduct research, collect material and transport the material across borders
 - These administrative data consist of names, addresses, institutions, locations, types of species, sample types etc.
 - These are “dormant” data because they usually not used for systematic monitoring purposes
- **combining tracking results for external and administrative data provides a basis for detecting utilization which is non-compliant with the national ABS framework**

Step 1: Online application



ABS - Paul

Secure | <https://abskenya.tk>

ABS Permit Application System Welcome Paul

My Profile Log Out

Home My ABS Permits My Messages News Support Desk

ABS
Permit Application System

ABS
ABS Research Permit Application System

Read More

ABS IT PERMIT APPLICATION SYSTEM.

The ABS Online permit application system was developed by the Kenyan government to expedite permit application process for researchers at the same time improving the efficiency and transparency of the entire permit application process. The ABS Online permit application system also enforces and monitors the MAT that the permit applicant signed with the respective lead agency that granted the permit.

- ✓ Expedite Permit Application
- ✓ Improving efficiency
- ✓ Enforces and Monitors the MAT

ABS PERMITS IN KENYA

Below is information related to ABS permits in kenya. You are required to read and understand content before registration.

Biological resources that require an ABS permit

<https://abskenya.tk/>



Personal data

ABS :: Harmonized Application x

Secure | <https://abskenya.tk/ApplicationForm#step-1>

ABS Permit Application System | Welcome Paul | My Profile | Log Out

ABS Permit Application System

Home | My ABS Permits | My Messages | News | Support Desk

Step 1 Personal | Step 2 Documents | Step 3 Resources | Step 4 Requirements | Step 5 Project Area | Step 6 Research & Samples | Step 7 PIC/MAT Desk | Step 8 PIC/MAT/MTA | Step 9 Payment | Step 10 Finish

Are you a student? *

No

ORCHID *:

0000-0002-1013-4390

Other Researcher ID :

Institutional Contact person

My Contracts Office

Institution Contact person Email

contractsoffice@myorganisation.com

Choose option

- Individual
- Academic Institution
- ✓ Company/Research Program
- Research Institute
- Private Company

Back | Save & Continue | Finish | Reset

Copyright © 2017 - 2018 ABS. All Rights Reserved

Location(s) of access



ABS Harmonized Application Form - Step 5: Project Area

Home My ABS Permits My Messages News Support Desk

Step 1 Personal Step 2 Documents Step 3 Resources Step 4 Requirements Step 5 Project Area Step 6 Research & Samples Step 7 PIC/MAT Desk Step 8 PIC/MAT/MTA Step 9 Payment Step 10 Finish

Map Satellite Search Box

Kenya

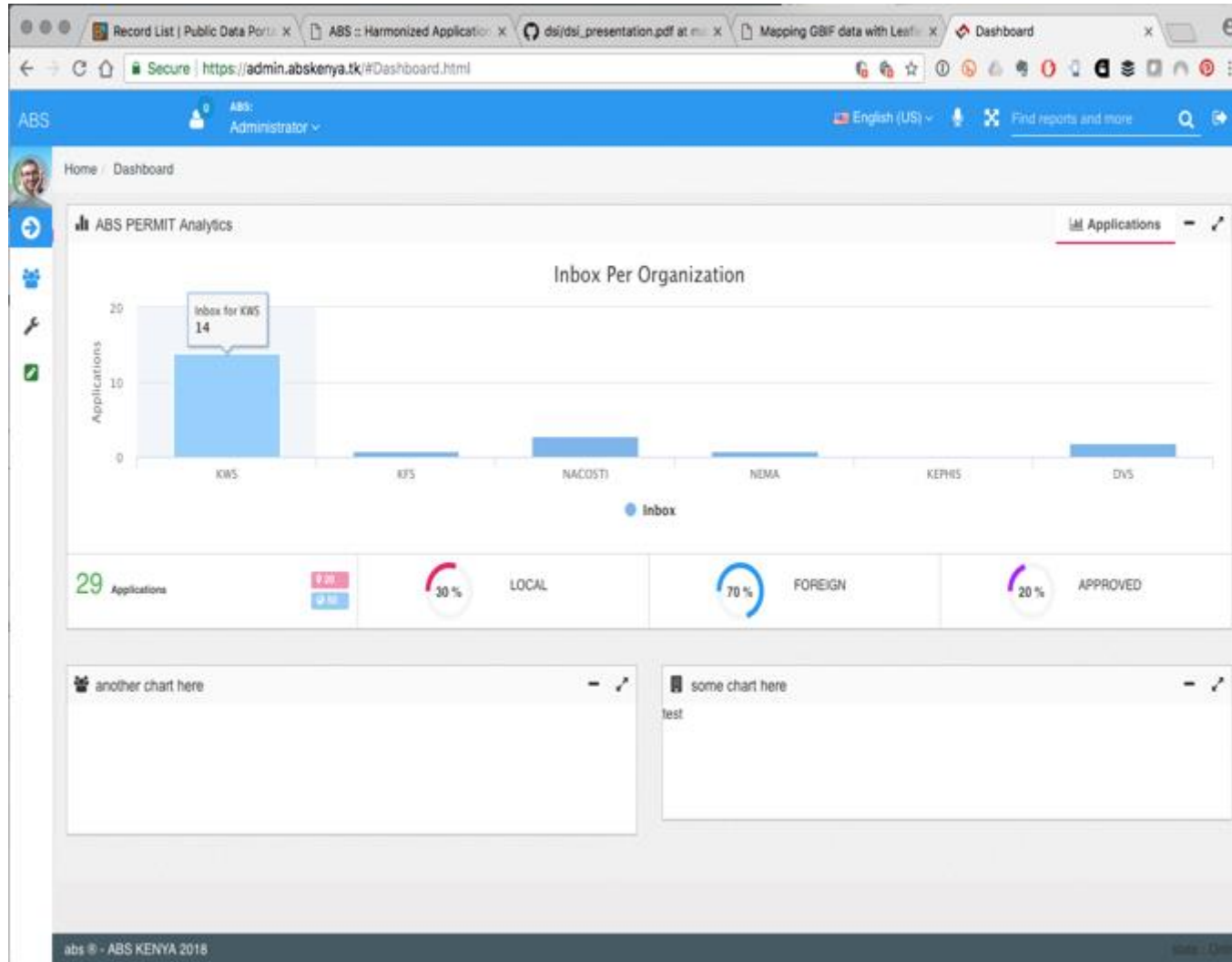
Location or project area for genetic resource collection *:

Lake Nakuru

Back Save & Continue Finish Reset

Copyright © 2017 - 2018 ABS. All Rights Reserved

Integrated dashboard overview

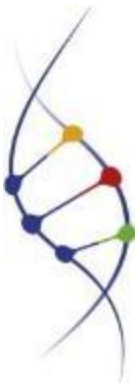


Desk Officers at each Authority can view progress and consult inside the system by email



Step 2: Agreed principle on synchronous permit issuing

- Basic agreement of involved institutions:
No permit is issued until all permits are issued
- The previous sequential permit system caused “escapes” of users
- The Unique Identifier e.g. KE20180605
 - appears on all documents and sample labels
 - has to be included in all publications and patent applications
 - is mentioned in the IRCC
- CNA in the country in which utilization will occur will be informed directly by Kenyan CNA
- This basic principle secures legality of access and utilization to the benefit of the provider as well as of the user



Step 3: Linking administrative and external data

- Online system requires an ORCID identifier, now commonly required by research funding agencies and major journals
- ORCID is a public researcher identifier that follows researchers throughout their careers
- Administrative data provided by applicants in the form of names, ORCID ID, organisations, species and locations become the basis for monitoring
- Using a combination of online web services (Application Programming Interfaces / APIs) to automate the retrieval of external data such as publications or patent documents

ORCID system



ORCID

Connecting Research and Researchers

FOR RESEARCHERS FOR ORGANIZATIONS ABOUT HELP SIGN OUT

MY ORCID RECORD INBOX ACCOUNT SETTINGS DEVELOPER TOOLS LEARN MORE

4,423,280 ORCID IDs and counting. [See more...](#)

Paul Oldham

ORCID ID

<https://orcid.org/0000-0002-1013-4390>

[View public version](#)

[Display your iD on other sites](#)

[Public record print view](#)

[Get a QR Code for your iD](#)

Also known as

Country

United Kingdom

Keywords

Social Anthropology, Science and Technology Studies, Biological Diversity, Biodiversity, Intellectual

Biography

Education (3)

London School of Economics and Political Science: London, London, United Kingdom

to 1996-05-01 | PhD (Social Anthropology)

Source: Paul Oldham

University of Cambridge: Cambridge, Cambridgeshire, United Kingdom

1989-09-01 to 1990-09-01 | MPhil (Social Anthropology)

Source: Paul Oldham

Lancaster University: Lancaster, Lancashire, United Kingdom

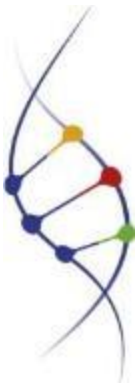
1985-10-01 to 1988-06-01 | BA(Hons) (Religious Studies)

Source: Paul Oldham

Employment (3)

ORCID record
of Paul Oldham

R code to screen ORCID records



```
kws_test.Rmd | kws_permits | orcid_lookup.R | kws_works
Source on Save Run Source
19 #' # retrieve a data table with the researcher works
20 #' oldham_works <- orcid_lookup(given = "paul", family = "oldham",
   country = "GB", retrieve_works = TRUE)}
21 orcid_lookup <- function(given = NULL, family = NULL, affiliation =
   NULL, keyword = NULL, country = NULL, retrieve_works = NULL){
22   # for build_query, iterate and get_works see zzz
23   query <- build_query(given, family, affiliation, keyword)
24   res <- iterate(query, rorcid::orcid, timer = 3) %>%
25     dplyr::bind_rows()
26   # regularize column names
27   names(res) <- stringr::str_replace_all(names(res), "[.]", "_") %>%
28     stringr::str_replace_all(., "-", "_")
29   res
30
31   # test if more than one entry for a name
32   nrow <- nrow(res)
33   # null country cases
34   if (nrow > 1 && is.null(country)) {
35     message("More than one entry found. No country code provided.
   Returning raw data frame")
36   }
37   return(res)
38 }
22:28 orcid_lookup(given, family, affiliation, keyword, country, retrieve_works) : R Script
Console
```

**rOpenSci is a
programming
community
providing open
source tools to
access ORCID, GBIF,
CITES, CROSSREF
and many other
data sources using R**

Tracking global data banks



global data banks

110 million*
patent records

166 million*
scientific literature

6 million*
species

1 billion*
species records

IT MONITORING TOOL METADATA MANAGEMENT REPOSITORY

Patent

0.2 million*

Indian/EU/US
Patents, WIPO
etc.

patent_id,
author_uid, title
etc.

Scientific Literature

1.35 million*

WOS, MAG,
Crossref etc.

pub_id,
author_uid,
journal_id etc.

Taxonomic Data

80,000*

GBIF, BSI, ZSI,
TKDL etc.

DNA barcode,
identifier,
taxonomy etc.

Admini- strative Data

Many 100s*

E Filing System,
Offline
applications

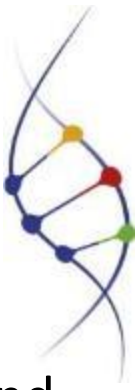
Applicant_id,
list_resource,
source etc.

* marked figures are approximate for India



Supervised machine-learning

- Cooperation with Center for Development of Advanced Computing (C-DAC) in Chennai
- Using the Word2Vec concept by Mikolov et al. (Google)
- Applying Fasttext software (Facebook)
- Words in a text are numbered, word of interest (e.g. species name, country name) gets 1, neighboring words get 2, 3 etc.
- Analysis of labelled data with IT system
- Proximity analysis is performed
- Analysis of true and false answers
- Level of 94% correctness is easy, above becomes difficult

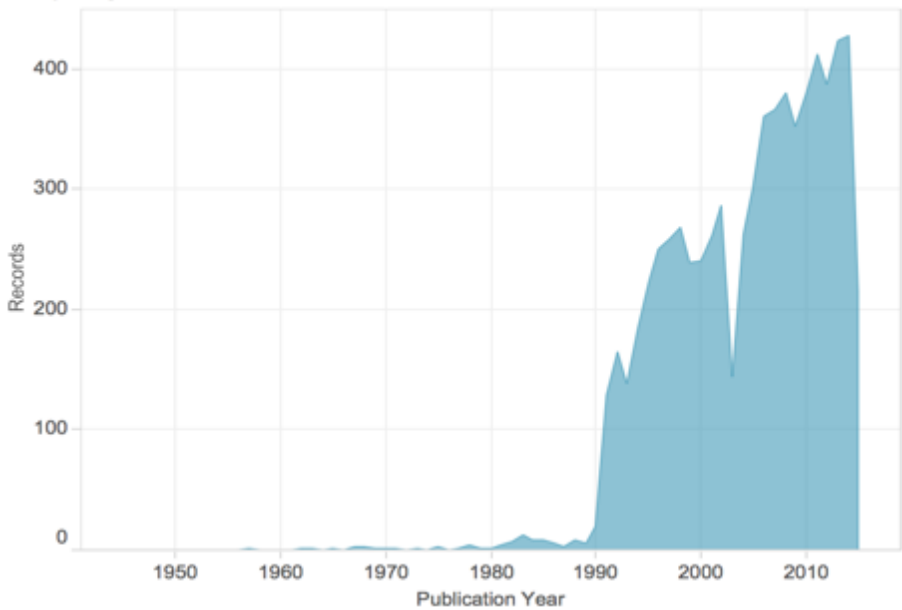


Online system enables analysis of R&D and patent landscapes

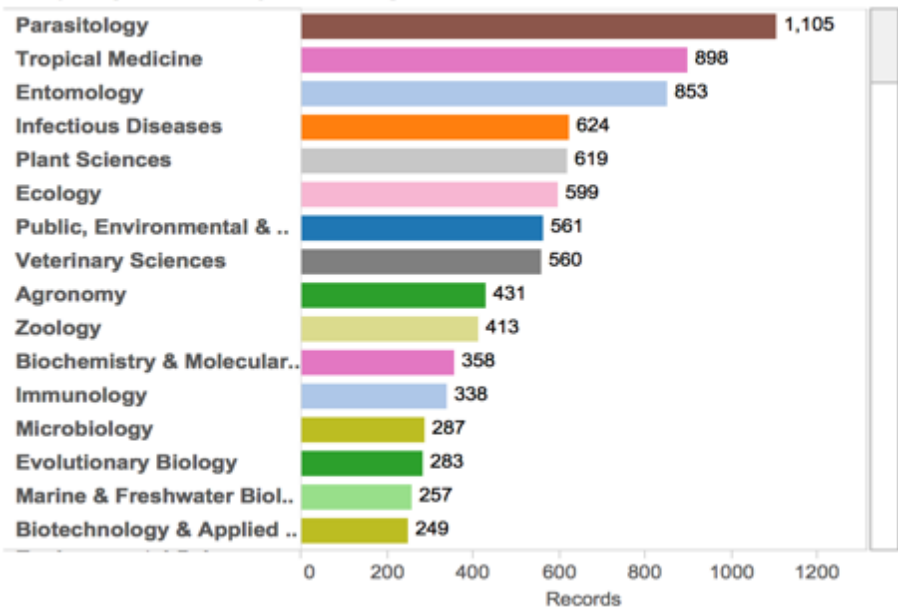
The ability to use web services for scientific literature, patent data, and geographic place names leads to:

- Overview about ABS compliance and increased trust in the national and international ABS system
- Creation of a national electronic repository of publications about biodiversity in the country
- Increased understanding of the topics and focus of research effort in the country related to biodiversity and traditional knowledge
- Sound data basis for developing science policies and targeting funding

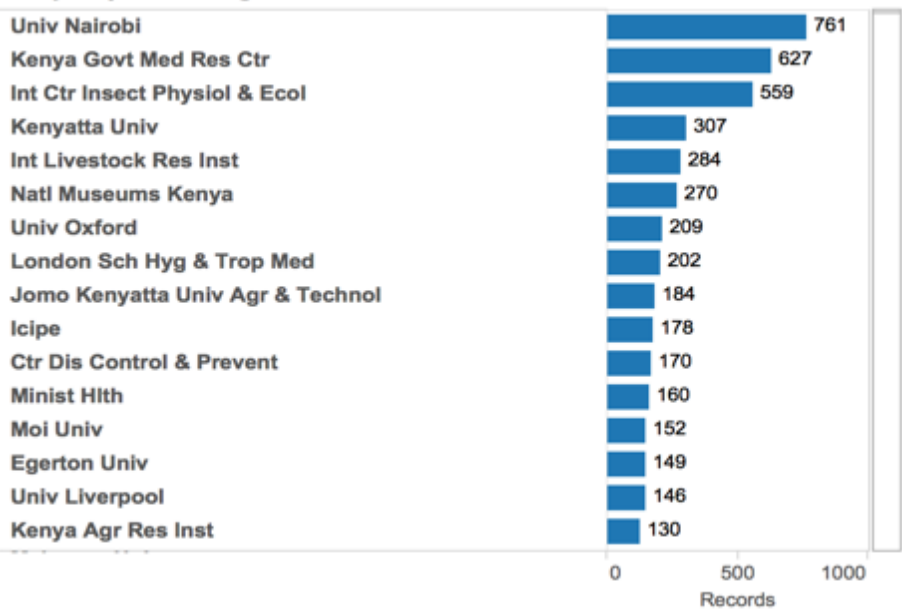
Kenya Species Trends



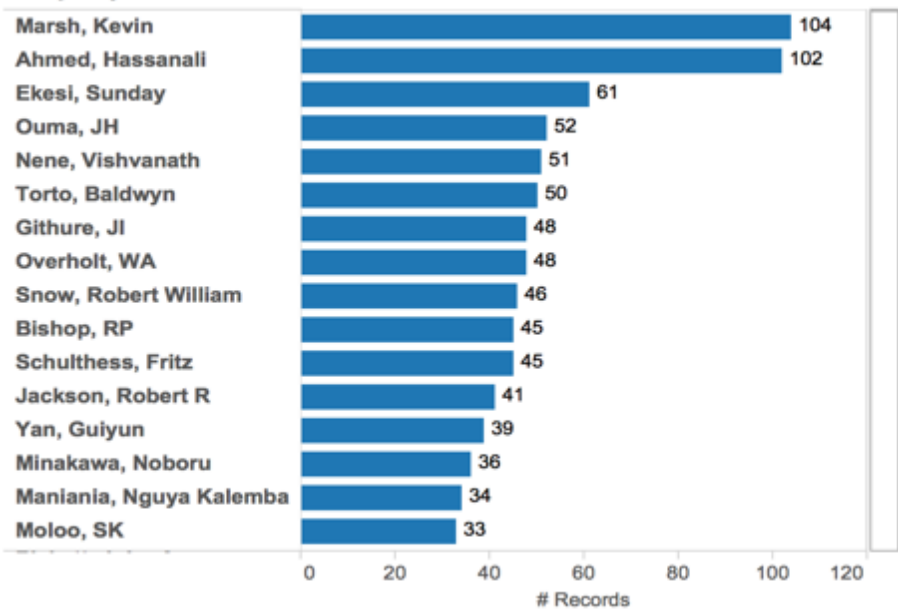
Kenya Species Subject Categories

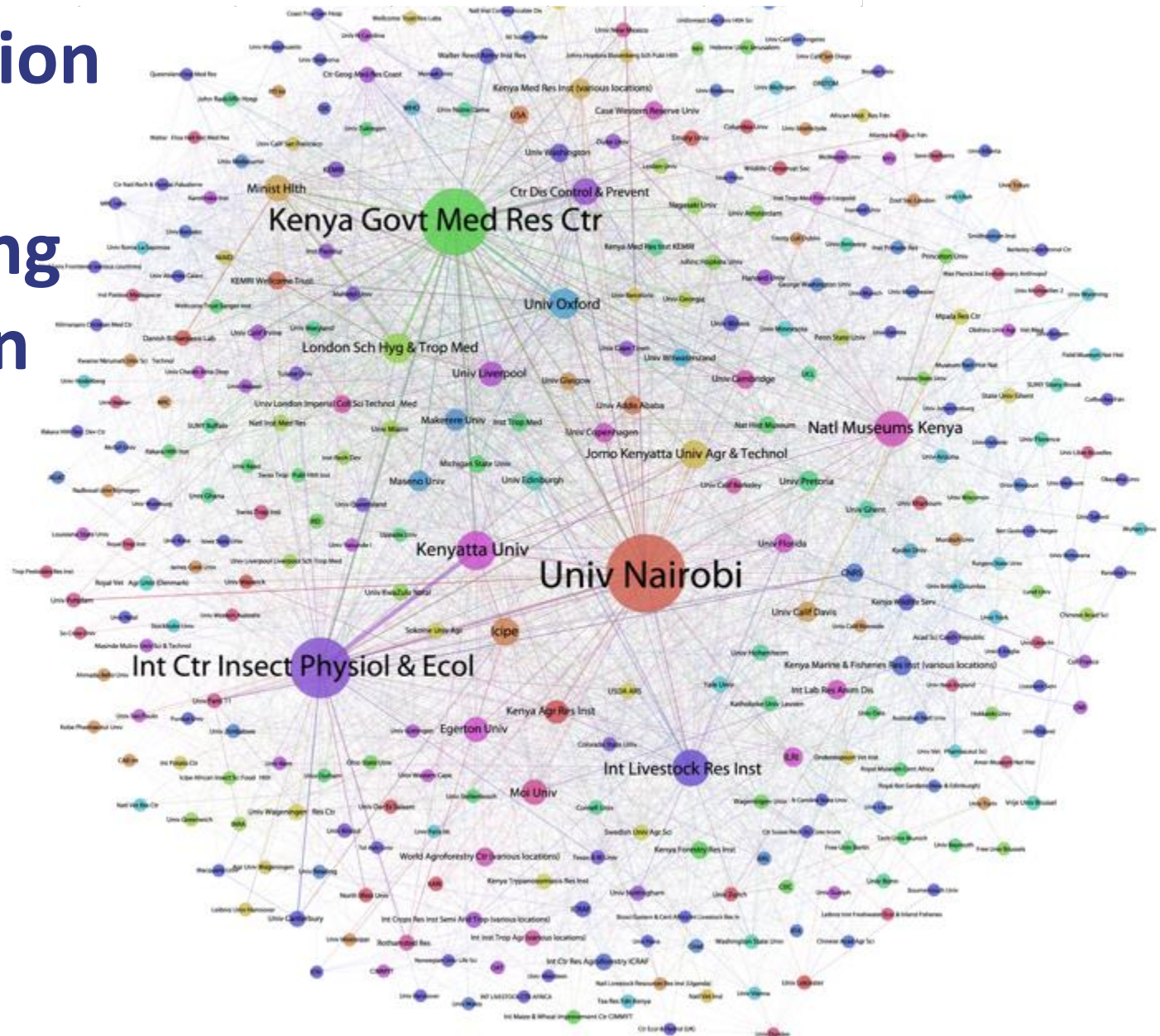


Kenya Species Organisations

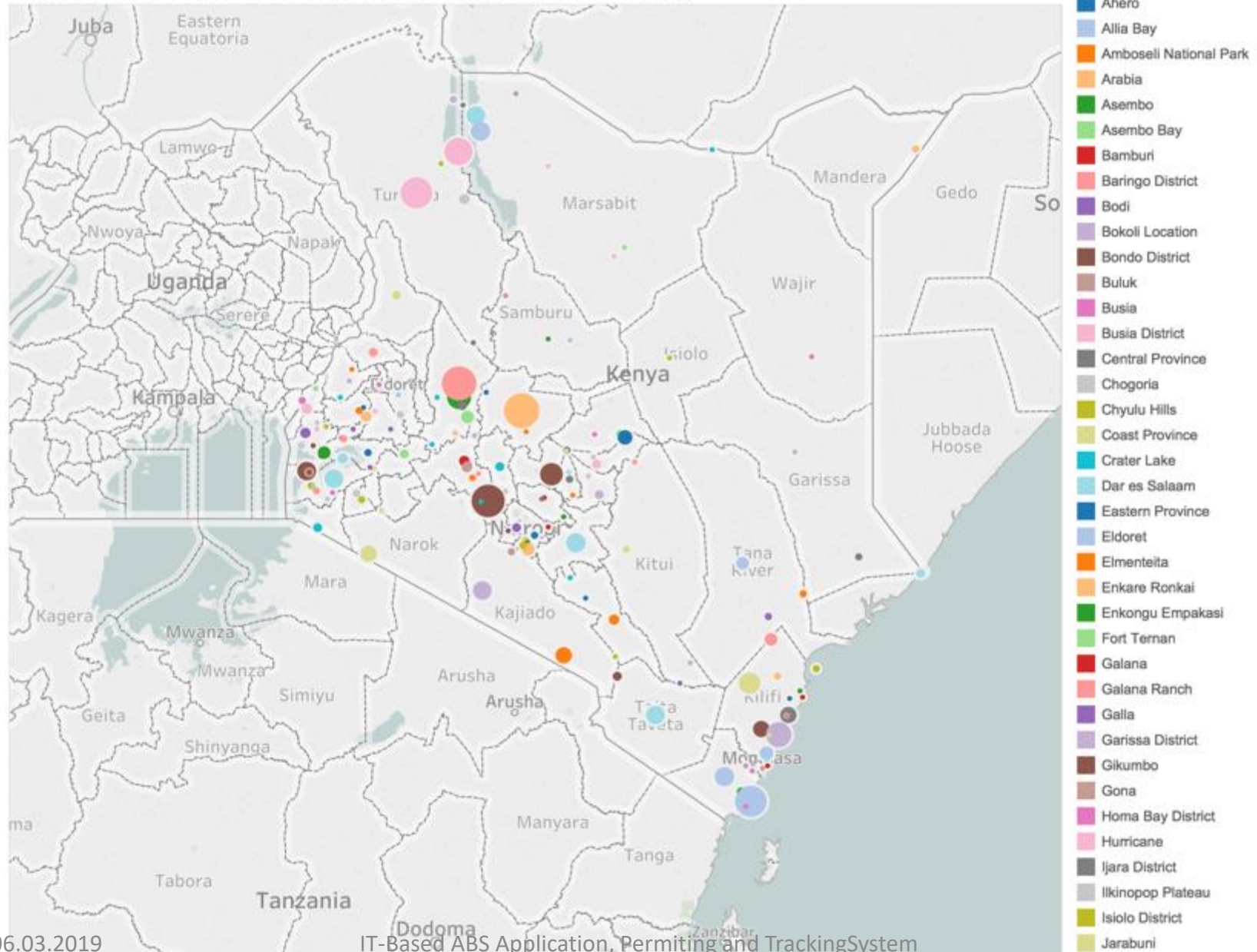


Kenys Species Author

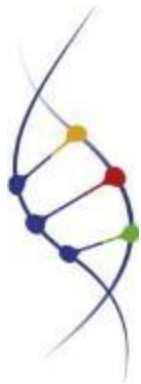




Research Locations Named in the Scientific Literature (draft workings)



Tracking patents on GR and aTK



Screenshot of the LENS.ORG website showing patent search results for "Lake Nakuru".

LENS.ORG | English | About | Innovation Apps | Guest Work Area | Register / Sign in | Support

40 Patent Results (15 families) | Lake Nakuru | Refine Search

Register
To create, manage and edit collections of Patent search results and soon Scholar results, save current work, you need to register a FREE account or sign in.
Register Sign in

Patent Filters

- Date Range
- Jurisdictions
- Inventors
- Owners (US)
- Applicants
- Cited Authors
- Cited Works
- Document Families
- Classifications

Patent Results
40 Results for: Lake Nakuru

Patents | Cited Works

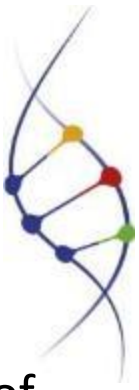
Patent Application
WO 2016/061438 A1
lens.org/131-831-477-450-664

Granted Patent
EP 1919490 B1
lens.org/068-928-780-988-086

Granted Patent
US 8697660 B2
lens.org/181-337-115-809-641

Patent Details:

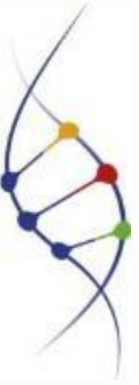
- Serine Proteases Of Bacillus Species**
Published: Apr 21, 2016 Family: 3 Cited: 3 Cites: 180
Sequences: 32
Additional Info: [Full text](#) [Published](#) [Sequences](#)
Applicant: Danisco Us Inc
- Medicinal Herbal Composition For Treating Infection**
Published: Dec 3, 2014 Family: 14 Cited: 0
Additional Info: [Full text](#) [Published](#)
Applicant: Internat Patent Holdings Llc
- Compounds And Compositions For Treating Infection**
Published: Apr 15, 2014 Family: 2 Cited: 0 Cites: 5
Additional Info: [Full text](#) [Published](#)
Owner: International Patent Holdings Llc



Lessons learned so far

- Interagency cooperation is essential through technical working group of ABS and IT officers, continuous information of the hierarchy and CEO involvement at milestone events
- Integrated systems do not change the legal system but aim to facilitate the exercise the mandates of involved institutions through logic processes, automatic notifications and easy communication
- Single-window systems accommodate needs of all players in a multi-institutional system
- A sound analysis of the existing permit systems is key for development of a logic sequence of procedures in the integrated system
- Focus on a method that is good enough and improve later

Thank you very much for your attention!



Contact

Dr. Hartmut Meyer
Senior Advisor, ABS Capacity Development Initiative
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Dag-Hammarskjöld-Weg 1-5
65760 Eschborn
Germany

t: +49 6196 793285

f: +49 6196 79803285

m: +49 171 1027839

e: hartmut.meyer@giz.de

e: abs-initiative@giz.de (Secretariat)