

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 1 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

1. Introduction and Purpose

Information Management (IM) refers to the activities related to the custodianship, documentation, protection and accessibility of the genebank's body of knowledge which may include documents, databases, images, video, web sites, metadata, software, IT system configuration, manuals, reports, policies, procedures and records related to genebank staff.

The purpose of this SOP is to ensure consistency in the management of all information in compliance with IM standards.

2. Scope

This SOP applies to the management of information at the National Centre for Genetic Resources and Biotechnology (NACGRAB) genebank. It may be used to guide management activities undertaken by NACGRAB staff at headquarters, regional and countries offices, colleagues at the National Agricultural Research System (NARS) and other institutions.

The following Information Management activities are described in this SOP (see Annex 1 for a detailed description of activities listed below.)

1. Accession numbers, temporary numbers and DOIs
2. MCPDs, crop descriptors and customizations
3. Completeness of data
4. Data verification (methodology)
5. Document control: this topic includes several activities listed in Annex 1
6. Retention schedules for specific information assets and types
7. Site controls, permissions and protections for data and databases
8. Triggers and alerts
9. Backup of all genebank assets
10. Disaster recovery, retrieval of backup information and verification of integrity
11. Barcoding and its integration to a centralized IM database or network
12. Genebank Data in other Platforms such as Genesys, FAO WIEWS, GLIS etc.
13. Visibility and accessibility of genebank accessions and its associated data.
14. Support and problem-solving for internal groups, units, field stations and regional offices

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 2 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

3. Definitions & Abbreviations

The following definitions and key terms are pertinent to this SOP:

Accession	A district uniquely identifiable sample representing a cultivar, breeding line or a population, which is maintained in storage for conservation and use.
Active collection	Active collection is composed of accessions which are immediately available for multiplication and distribution for use. It is conserved at 2-5°C and 15% RH.
MCPD	The MCPD (Multi-crop Passport Descriptors), developed jointly by Bioversity International (formerly IPGRI) and FAO, is a widely used international standard to facilitate germplasm passport information exchange. These descriptors are compatible with Bioversity's crop descriptor lists, with the descriptors used by the FAO World Information and Early Warning System (WIEWS) on plant genetic resources (PGR), and with the GENESYS global portal.
DOIs	DOI (Digital Object Identifier) associated with the PGR sample in the Global Information System of ITPGRF
PUD	A persistent unique identifier (PUID) is assigned to an accession so it can be unambiguously referenced at the global level and the information associated with it harvested through automated means. One PUID should be reported for each accession.
GLIS	Global Information System (GLIS) facilitate access to sources of PGRFA and associated information to increase utilization, promote and facilitate interoperability among existing systems.
WIEWS	WIEWS (World Information and Early Warning System) is a global information system on PGRFA facilitating information exchange as well as periodic assessments of the state of the world's PGRFA, which FAO prepares at the request and under the guidance of the <u>Commission on Genetic Resources for Food and Agriculture</u> (CGRFA).
ICT	ICT (Information and communications technology) incorporates electronic technologies and techniques used to manage information and knowledge, including information-handling tools used to produce, store, process, distribute and exchange information.
SMTA	The Standard Material Transfer Agreement (<u>SMTA</u>) is a private contract with standard terms and conditions that ensures that the relevant provisions of the International Treaty are followed by individual providers and recipients of plant genetic material. This System has been developed by the Secretariat of the International Treaty to assist users with.
MTA	A Material Transfer Agreement (MTA) is a contract governing the transfer of materials between two parties. It defines the rights of the provider and the recipient with respect to the materials and any derivatives.

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 3 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

MSSQL	Microsoft SQL Server is a relational database management system. As a database server that stores and retrieves data as requested by other software applications on the same computer or a remote computer using the client-server model. Microsoft provides APIs to access SQL Server over the internet as a web service.
-------	--

4. *Procedure*

The activities in the procedure include:

1. Accession numbers, temporary numbers and DOIs
2. MCPDs, crop descriptors and customization
3. Completeness of data
4. Data verification (methodology)
5. Document control: this topic includes several activities listed in Annex 1
6. Retention schedules for specific information assets and types
7. Site controls, permissions and protections for data and databases
8. Triggers and alerts
9. Backup of all genebank assets
10. Disaster recovery, retrieval of backup information and verification of integrity
11. Barcoding and its integration to a centralized IM database or network
12. Genebank Data in other Platforms such as Genesys, FAO WIEWS, GLIS etc.
13. Visibility and accessibility of genebank accessions and its associated data.
14. Support and problem-solving for internal groups, units, field stations and regional offices

The information management procedure encompasses the following activities:

- I. Assignment of accession numbers, temporary numbers and DOIs
 - 4.1 The database officer is responsible for assigning accession numbers and DOIs. For accessions being acquired, the conservation team supervisor assigns the accession a temporary identification number that is chronologically given following acquisition dates. The accession information availed is captured on a tablet and forwarded in an electronic file to the database officer.
 - 4.2 Using the information captured on the tablet, the database officer then assigns the unique accession identification and updates the accession information in the database.
 - 4.3 In consultation with the database officer, the conservation team supervisor prints a barcode that reads the accession numbers, and the barcode is affixed to the sample.
 - 4.4 The following accession details are recorded in the genebank's database:
 - Sample ID

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 4 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

- Ancestry
- PUD
- Provider name
- Provider address
- Provider country
- Shipment receipt date
- Document location-file number

DOIs are assigned when the account is enabled to assign DOIs through GLIS with minimum required data for each concerned accession....

II. MCPDs, crop descriptors and customizations

4.5 Table 1: Lists of the descriptors used in genebank operations.

Standard of data	Version	Link
MCPD (Multi-crop passport descriptors), 29 main descriptors.	2.1 December 2015	Publication
GLIS passport descriptors	2.1 July 2017	http://www.fao.org/3/a-bt113e.pdf
FAO WIEWS codes for institutions	August 2019	https://www.fao.org/wiews/data/organizations/en/?no_cache=1
Glossary term for WIEWS		http://www.fao.org/wiews/glossary/en/
Genesys-PGR extensions to MCPD	2019	https://www.genesys-pgr.org/documentation/basics#mcpd-genesys
Country codes	ISO 3166-1 alpha-3	https://en.wikipedia.org/wiki/ISO_3166-1_alpha-3
Genesys validator	-	https://validator.genesys-pgr.org/

III. Completeness of data

4.6 Definition: The completeness of data is the rate of available Passport information for a material conserved or to be conserved in the genebank depending on the species of that material.

4.7 Measurement: In Genesys, completeness of published passport data is measured by Passport Data Completeness Index (PDCI). The PDCI uses the presence or absence of data

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 5 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

points in the documentation of a genebank accession, taking into account the presence or value of other data points (van Hintum et al. 2011). For example, a wild accession should have a well-defined collection site but no variety name. The PDCI ranges from 0 to 10, where 0 is the minimum score assigned to rather incomplete passport records and 10 is the maximum score assigned to very complete passport records. Any type of accession, wild, landrace, breeding material or modern variety, can attain the PDCI's maximal score.

4.8 The genebank average PDCI score for 7,682 accessions is 5.08, with minimum score of 1.40 and maximum score of 7.65. PDCI score is improved through time by filling the gaps in data and is monitored quarterly? by the data manager.

4.9 The following link provides the genebank's PDCI score in Genesys <https://www.genesys-pgr.org/views/NGA010>.

IV. Data verification (methodology)

Genebank data generated during operations is first verified before uploading it to GRIN-Global or sharing it in public databases or Genesys.

Prior to allowing an accession to be introduced into the genebank's collection database, the accession must meet the criteria for introduction as specified in the acquisition procedure. Once the information is verified by the genebank manager, the acquisition procedure can proceed.

For distribution to proceed, the database must have data on the requester's name, recipient country and the type of agreement (SMTA/MTA) that was signed. Once the criteria for distribution have been met and it passes the quality control checkpoint, the distribution process can proceed.

The responsibility for data verification is coordinated by the conservation team supervisor, database officer and the Genebank manager. Designated staff who verify and/or update data for various genebank activities is shown in the table below.

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 6 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

Table 2: Staff list for designated genebank activities.

Information	Data entry	Data verification	Data table update frequency
Passport	Database officer	Genebank manager / Database officer	Quarterly
Taxonomy	Database officer	Genebank manager / Database officer	Annually
Seed inventory	Conservation team supervisor	Conservation team supervisor/ Genebank manager/ Database officer	Monthly
Field inventory	Seed production officer	Seed production officer	Monthly
Distribution	Conservation team supervisor	Conservation team supervisor / Genebank manager/ Database officer	Monthly
Germination	Germination team supervisor	Germination team supervisor	Quarterly
Plant health	Germplasm health unit supervisor	Germplasm health unit supervisor	Monthly
Regeneration	Seed production officer	Seed production officer	Monthly

V. Document control: this topic includes several activities listed in Annex 1

Document control is the governance of document quality for the purpose of mitigating risks stemming from human error in document preparation, revision, maintenance and retirement.

The ICT unit and the database officer work together to grant privileges to the shared network directory according to the level of access. The database officer and the Genebank manager have an administrator level privilege that allows them to add, edit and delete documents. Other genebank staff have a limited privilege to read and copy documents found in the shared directory folder. The ICT unit is responsible for managing the shared folder, making back-ups of the files and granting access to the genebank staff.

Record keeping requirements for all documents are subject to the following:

- a central repository for documents
- document classification and title (for example SOPs, flowcharts, instruction sheets, training records, user manuals)

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 7 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

- authorizations and access controls
- use of templates (unique document reference numbers, headers and footers, key sections, versioning, revision history and approval dates, pagination)
- creation of master database and copies
- ownership and approval system
- encryption
- availability
- publication

Creating a document:

- The database officer in consultation with the genebank manager drafts, reviews documents for adequacy and proposes revisions to documents relating to Genebank data management activities including, flowcharts, instruction sheets, training records, user manuals, SOPs, templates and record keeping. Key documents related to data management are identified by number, document type and document identification code assigned by the data manager.
- SOPs are created in a standard format which includes Title, Owner, SOP Number, Status, Approver, Approval Date, Last Review Date, Review Frequency, Issue Date, Contributors, Keywords, Document Id, Version Number, Competent Personnel, Related Clauses, Related Documents, Contacts. Each SOP is numbered and the date it was originally issued or revised is indicated in the revision history.

Document approval, distribution, disposal and protection:

- The Genebank manager reviews all documents, templates and SOPs for adequacy and approves prior to issuance.
- The approval date by the Genebank manager is documented on all documents.
- Approved documents including SOPs are uploaded in the genebank's shared folder. The documents are protected with appropriate privilege that prevents unauthorized changes.
- Newly approved documents are communicated to the appropriate personnel (e.g., all laboratory, cold room, and field personnel) and are available to staff for which they are designated, used, or otherwise necessary.
- All obsolete documents are promptly removed from all points of use by the unit supervisors or their deputy and prevented from unintended use.

Changes to documents and historical file maintenance:

- Changes to documents are reviewed and approved by the Genebank manager
- Approved changes are communicated to the appropriate personnel and are available to all personnel either via providing proper access to the files or through email
- Records of changes to documents are maintained. Document version number and effective date are recorded on all tracked documents.

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 8 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

- Changes to documents include a description of the change, identification of the affected section and approval by the Genebank manager
- Obsolete documents and SOPs are marked “VOID” and a copy kept in the genebank’s historical files.

VI. Retention schedules for specific information assets and types

Retention schedules for specific information assets and types corresponds to the period of time that the genebank keeps specific information types and the frequency that the retention schedule is reviewed.

All genebank information, both in hardcopy and electronically, is considered a record and no record may be destroyed unless its retention period is approved. Files in an individual's workstation or office or on a personal hard drive or personal network drive are usually considered work-in-process or personal reference materials. Completed work is filed in a record series folder in the genebank’s hard copy files, on the genebank’s shared drive, destroyed at the end of their retention period or transferred to archive for long-term preservation.

Record retention periods are reviewed every five years and decisions regarding record viability, authenticity, accessibility is reviewed by the genebank manager.

Table 3: Document type and time period to retain

Type of Document/Record	Time period to retain
Hard copies	10 years for electronic files and archived documents. Destroyed depending on type of data/information
Soft copies	Are added in the shared folder Saved Permanently
SOPs	Are added in the Web Page for the Genebank Quality System and in the shared folder Saved Permanently
Characterization data	Are added in the shared folder Saved Permanently
Training materials and videos.	Are added in the shared folder Saved Permanently
Images	Permanently
E-mails	10 years
Contracts and agreements	Permanently

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 9 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

Germplasm acquisition data	Permanently
Germplasm distribution data	3 years-then archived
Germplasm regeneration data	3 years -then archived
Publications	Permanently

The retention schedule for IT Databases: The MSSQL databases and genbank documents are stored and consolidated in tape drives every month by the ICT unit.

VII. Site controls, permissions and protections for data and databases

The IM is responsible for the protection of the Genbank information and maintains the list of permissions to access Genbank databases. Each time a staff contract is ended, or in case he/she is assigned permanently to a different role, his/her permissions to access the Genbank database is canceled or are reviewed.

Table 4. Permissions and protections of site or databases

Source of information	Who assigns permissions	What protections	Periodicity to review or update the permission
GrinGlobal database	Data manager	VPS, SSL	1 year
GrinGlobal web site	Data manager	VPS, SSL	1 year
Genbank web site	Data manager	https	1 year
Official genbank document Opening	Genbank manager and Data manager	Password	When the new document was edited
Other sources??			

VIII. Triggers and alerts

Existing trigger and alert utilize the information from inventory with known threshold for viability (85%) and quantity (300grms). However, future trigger and alerts will involve the use of GGCE program that will automatically notify the officer in charge of viability and regeneration for necessary action with reverence to viability and regeneration.

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 10 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

IX. Backup of all genebank assets

Genebank assets in SharePoint are backed up automatically using Office365 in CGIAR platform. Concerning the database, the documents, photos, and videos of the genebank, their backup procedure is summarized in the Table 5.

Table 5. List of different backups and responsibilities

Assets	Backup Type	Responsible	Task
GeneBanks SOPs, Flowcharts, Training sheets, Posters, staff documents	Automatically on recording	Each staff	Copy or create related document in OneDrive synchronized with SharePoint
GRIN-Global Database cloud Backup	Every day	Genebank Database Manager	Generate automatically a full back up at 11:00 PM every day using SqlBackupFree software
GRIN-Global Database Backup on disk	Manually, every 15 days	Genebank Database Manager	Copy or drag and drop the generated backup to the backup folder on the Backup drive and local computer as needed
EQ-Tool database backup	Manually, every month	Genebank Database Manager	• If there is no full backup, generate one • Generate a differential backup. Copy the generated backup to the backup folder on the external hard drive.
GRIN-Global VPS system	Automatic	ICT Unit	
Distribution files hard copies, videos and photo	Manual	Data archivist	• Print copies of digital documents • Range printed copies in a workbook as record • Digital copies are backed once the distribution is completed.

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 11 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

- X. Disaster recovery, retrieval of backup information and verification of integrity
- Backup recovery of simple documents (when the user still has account credentials):to recover documents like Genebank SOPs, Genebank manuals, Flowcharts, Training sheets, Posters, staff documents, etc., a user who has a Microsoft account and credentials information needs to connect to SharePoint via direct link or via Microsoft Team to have access to documents saved on the cloud.

Recovery when the user loses access to his account: the Genebank user who forgets the password can send an e-mail to ICT Helpdesk for its account recovery.

Backup recovery from database disaster

To recover from database disaster,

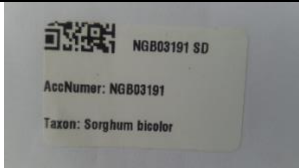
1. Ensure SQL server 2017 express and SQL server Management studio are installed on the targeted server (10 mins)
2. If not, install SQL server Management studio(2h)
3. Select the last backup containing the data to be restored from disk or cloud (15 min)
4. Connect to the Grin-Global test server and copy the backup on the server (15-60 min)
5. Connect to SSMS and rename the current Grin-global database
6. Follow the database restore assistant of SSMS to restore the copied backup as the current Grin-Global database
7. Follow step by step guide on how to configure users and connection string after database backup recovery in the Grin-global server documentation
8. Verify with the requested user that the recovery is complete
9. Copy the backup on the production server do the same from step 5 to 8
10. Report the incident in EQ-Tool

- XI. Barcoding and its integration to a centralized IM database or network

There are 3 types of barcode labels used for specific purposes in the Genebank data management workflow. Labels are adhesive (4mm x 7.5mm) for LTS, safety backup, MTS and distribution. Labels for LTS and safety backup labels are waterproof and placed on aluminium foil packets. Labels for MTS and for distribution are placed on aluminium foil packets and on paper seed packet, respectively. Labels for field and green houses are stick-on labels (2.5 mmx 11.5mm) and placed on field stakes and on pots for pre-germination of seeds.

Information printed in each label varies according to the type of the barcode and its purpose. Common data printed in labels contains details of the accession such as Taxon name, DOI, accession number, lot number, production site name, plot number, year harvest. Additionally, location information is included on LTS and MTS labels, weight of seed sample is included on distribution labels and planting date is included on field labels.

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 12 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

Name	Picture	Description
MTS/LTS		This label is pasted on/in seed containers in the cold rooms and contains a QrCode coding the inventory number of the seed sample. It contains also, the coded DOI for the accession in the seed container, the ACCENUMB, the species and the regeneration date plus the position.
Other labels??	 	

XII. Genebank Data in other Platforms such as Genesys, GLIS, FAO WIEWS, etc.

Data generated from the genebank is published for outside users via different public websites as part of the commitment of NACGRAB open access policy. Data that is meant for internal use is maintained in a shared network directory <https://ggce.local> where it can be accessed by authorized staff.

- Passport data minimum descriptors and images (where available) are uploaded to online platforms via Genesys using a GRIN-Global link or NACGRAB web page. Other data may be made available on request with a data sharing agreement.
- Characterization data is fully availability online via Genesys and NACGRAB web page.
- Data from germination testing and seed health testing are analyzed and published online in the crop genebank knowledge base or in scientific publications.
- Data from distribution and use of the SMTA are provided to the International Treaty on Plant Genetic Resources for Food and Agriculture. This is done for each request using the 'Easy-SMTA' or sent annually by providing Excel files of the annual distributions to the Treaty Secretariat.

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 13 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

XIII. Visibility and accessibility of genebank accessions and its associated data.

The NACGRAB genebank website is easy to discover through the use of search engines. The table below shows who is responsible for verifying visibility and how often visibility is checked and improved. There is currently a general awareness to all genebank officers designated for seed distribution and other staffs on the need to re-route seed requests (verbal, letter, email or Genesys etc.) to the appropriate desk for onward review and prompt response. Responses will include acknowledgement of receipt of request to inquiry for easy processing of request and administration of SMTA with other relevant documentations. The officer on the desk of distribution has also been informed on the need to be prompt in responding to a requestor to ensure adequate time is given to the requestor to respond to requirements and alternatives in the event of inability to grant request (i.e inability based on low visibility and/or quantity). With the recent reviews on request and response time direct email to seedrequest@nacgrab.gov.ng received the timeliest visibility and minimum response time. There is also weekly reviews on request, response time and requestor satisfaction via the feedback system. The public website is verified for its accessibility when a new update is release or when the seed requesters report feedback.

Table 6: Genebank visibility and accessibility index

Website	Accessibility	Person in charge	Frequency of verification
Search and Order Germplasm	http://nacgrab.gov.ng	ICT officer/ Database manager	Daily
GGCE	https://ggce.local	Database manager	Daily
Genesys	https://www.genesys-pgr.org/	Database manager	Daily
Easy-SMTA	https://mls.planttreaty.org/itt/	Database manager/Distribution officer	Daily
E-Mail	seedrequest@nacgrab.gov.ng	Distribution officer	Daily

XIV. Support and problem-solving for internal groups, units, field stations and regional offices

The Database officer assesses issues that need technical support, including a need to replace devices, tools and any other requests to facilitate the work of the genebank. These include support on demand data request and specific information for internal staff and external seed requesters.

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 14 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

Table 7: Support and problem-solving information

Type of support			Person in charge
Genebank	IT	systems	Database officer Name: Oluranti John Afolabi
support			
IT support			ICT Unit email: afolabi_oluranti@yahoo.com
Other supports??			

5. *Staff Training and Competency*

Training and competency requirements to perform this SOP have been met by the following staff:

- Oluranti Afolabi, Data Manager/Training. Contact: afolabi_oluranti@yahoo.com
- Aiyemidun A. Ikupolati, Data Entry
- Kuyebi Ayoola, Data Entry
- Fashola Olutoye, Genebank Support
- Mary Adiat Adegoke, Genebank Support
- Adetoro Babatunde, Genebank Support

Genebank Staff undergo yearly training and periodic competency testing. The complete training, competency schedule and succession plans are available at NACGRAB Human Resource Office.

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 15 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

6. *References*

FAO. 2014. Genebank Standards for Plant Genetic Resources for Food and Agriculture. Rev. ed. Rome

FAO. 2022. Practical guide for the application of the Genebank Standards for Plant Genetic Resources for Food and Agriculture: Conservation in field genebanks. Commission on Genetic Resources for Food and Agriculture. Rome.

7. *Revision History and frequency*

Effective Date of the SOP	Version #	Description	Reviewed By
30/06/2023	1.0	Original SOP	Afolabi Oluranti John
15/08/2023	1.1	Audited SOP	Janny van Beem
15/02/2024	1.2	Edited SOP	Janny van Beem

Revision frequency: the review of this SOP is done on a yearly basis and is part of the staff's work plan and performance evaluation process.

8. *Citation, Copyright and Access Agreement*

Citation: NACGRAB, 2024, *Information management at NACGRAB Genebank*, (NACGRB-SOP-INFMAN-v.1.2). Contributors:

© NACGRAB 2024

NACGRAB has an explicit [access agreement](http://www.nacgrab.ng.org) (www.nacgrab.ng.org) that defines the terms of use of the information.

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 16 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

Annex 1. Checklist of key IM aspects for the operation of NACGRAB genebank

The checklist below is used to review and update key points in information management, either in INFMAN SOP or in another document. Within the INFMAN SOP include text (step-by-step instructions), links and images to describe how the activity is undertaken.

1. Accession numbers, temporary numbers and DOIs: how are they issued, assigned registered and/or minted? Who is responsible for assigning them and when?
2. Use of MCPDs and crop descriptors and customizations made to these. List crop descriptors used by the genebank and provide a link to those that are published.
3. Completeness of data: what is it (definition) and how does the genebank measure, monitor and improve it? How often is completeness of data measured?
4. Data verification: what methodology is used, when is data verified and by whom? This could be extended to the entire data “acquisition” pipeline: who generates (captures) data in each procedure, and then digitizes, processes, verifies and signs-off on it.
5. Document control: this topic includes several activities; the following questions can help determine if document control is in place and if it is properly captured in a document.
 - a. How are key documents identified? (by a code, number etc.)?
 - b. Who assigns these codes and is the assignation protocol described somewhere?
 - c. How does the genebank decide when to draft, review and approve key documents?
 - d. Who keeps track of the different versions of key documents, for example SOPs?
 - e. How does the genebank ensure that changes to key documents are done by the right people, i.e., protect against unauthorized changes?
 - f. Who reviews and approves new versions and how and when is this process done, (yearly, biannually)?
 - g. Is the revision history of key documents readily available, if so, where?
 - h. How are key documents stored and protected?
 - i. How are old documents handled and/or destroyed?
 - j. How does the genebank ensure that the latest copies or correct copies of key documents are readily available to staff and others?
6. Retention schedules for specific information assets: how long does the genebank keep specific information types? How often is the retention schedule reviewed? This may be applicable to only some information assets.
7. Site controls, permissions and protections for data and databases: who grants and maintains permissions and when are these reviewed?

	Information management at the National Centre for Genetic Resources and Biotechnology (NACGRAB)		
	SOP Number: NACGRAB INFMAN SOP v.1.2	Version: 1.2	Page 17 of 17
	SOP Owner: Afolabi Oluranti John	SOP Approver: Dr. Fashola Olutoye	

8. Triggers and alerts: identify the types of triggers and alerts that are currently used, for example when thresholds for inventory or viability are reached.
9. Backup of all genebank information assets: where and how are genebank information assets backed up? This can include websites, documents, databases, inventories, training materials, software, hardware and image repositories.
10. In the event of a disaster recovery, retrieval of backup information and verification of integrity: when, how and how often is the retrieval done to ensure successful retrieval? Include evidence of tests done periodically to simulate a disaster recovery.
11. Barcoding and its integration to a centralized INFMAN database or network: specify different kinds of barcodes and variations in label content; specify the extent of barcode integration with the genebank's database or centralized information management network
12. Genebank Data in other Platforms such as Genesys, GLIS, WIEWS, etc. This refers to data publication and the process of sharing data. How and when is it updated? State what are the Terms and Conditions of use of data.
13. Visibility and accessibility of genebank accessions and its associated data for genebank Users. How often does the genebank test its visibility to outside users? How often is it verified and improved?
14. Support and problem-solving for internal genebank groups, units, field stations and regional offices: explain how the Information management group supports the needs for software development, data capture and use of technology for the different customers within the genebank.