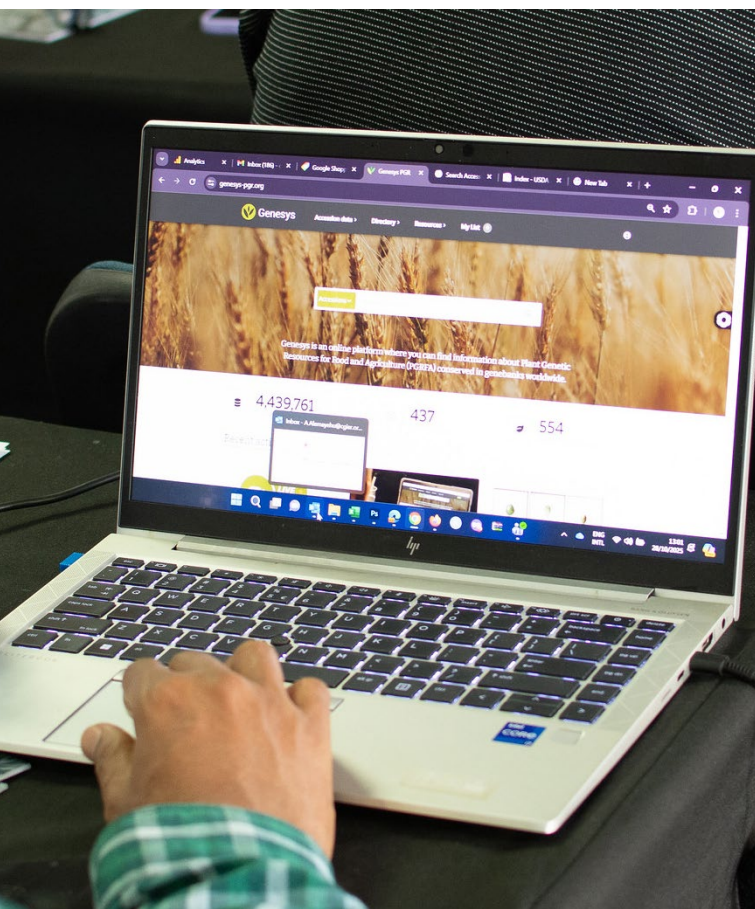


# Secure, Standardized and Accessible Accession Passport Data Made Available Through Genesys by BOLD



## Summary

Just as we have passports holding information for our own identification, each conserved plant genetic resource (or known as accession) in genebanks also requires informative passport data. This data was initially “insecure”, “inaccessible”, “unstandardized” due to the lack of technical equipment and limited training in data security, management, database platform. With IT equipment and training funds provided by the BOLD project and tailored training support from the Genesys team, 12 genebank partners were able to prepare, upload, and secure over 71,000 accession passport data in the Genesys platform out of which over 25,000 are geo-referenced. This centralized platform paves the path for international information sharing and future global collaboration possibly through more efficient requesting for germplasm.

## Background

Genesys is the world’s largest, openly accessible database of plant genetic resources conserved ex situ, aggregating standardized accession-level data from over 500 genebanks worldwide.

As an interoperable, global gateway, Genesys facilitates data sharing and integration among BOLD project partners and the wider plant genetic resources community, including researchers, breeders, farmers, and public users. To put this in the simplest form: Genesys is Amazon.com for plant breeders to find seeds. Passport data linked

to each accession is its product description. It should not be hard to understand why standardized and detailed passport data is important, as this information allows global seed users to find accessions at ease and with high precision. If you are a sunflower farmer or breeder in dry regions, it will only take you a few minutes on Genesys to find some candidate accessions collected from a location with high annual temperature and low annual precipitation, indicating possible heat and drought tolerance for your need.

## The Challenges

Standardized and detailed accession passport data is essential, yet many crop conservation institutions lack the equipment, training and digital platform needed to document, standardize, archive or share this information efficiently and securely. Many still rely on paper-based systems, which are outdated, error prone, difficult to back up and share and vulnerable to damage. Others have developed their own digital databases but often lack tools for standardization, such as automated checks for spelling, geospatial coordinate accuracy and updated taxonomy classification.

## The Solutions

One of BOLD's core objectives is to support partner crop conservation institutions in overcoming challenges related to accession passport data, a key foundation for high-quality and internationally standardized germplasm conservation. To achieve this, the Genesys team collaborated with BOLD partners through a five-step process (Figure 1):

### Step 1: Baseline assessment

The BOLD team conducted a baseline assessment of each partner's data management status and identified the needs for uploading data to Genesys.

### Step 2: Capacity training

Genesys offered comprehensive and tailored training programs. These include flexible online training sessions and intensive week-long Data-

GOAL (Genebank Operations and Advanced Learning) workshops held twice a year, providing hands-on experience in data documentation and management. Additionally, to accommodate varying skill levels, the Genesys team conducted regular one-on-one training sessions with BOLD partners. This tailored training approach significantly improved both the quantity and quality of accession passport data uploaded to Genesys.

### Step 3: Standardized passport data

Aside from upgrade plans and capacity training, the Genesys team also provided easy-to-use tools designed to improve data completeness and standardization.

These tools help partners check for missing information, validate geographic coordinates, ensure taxonomic accuracy and prepare standardized passport data for upload to Genesys.

### Step 4: Global data completeness and accessibility

The next phase focuses on achieving full online visibility and usability of all participating genebanks' data through Genesys. The target is to publish the majority of partner's accession data and progressively integrate trait data (characterization and evaluation) for all collections.

### Step 5: Embedded Genesys

The next phase also focuses on supporting each genebank in embedding the Genesys interface within their institutional websites and to enable autonomous and regular data updates.



Figure 1. Genesys team collaborated with BOLD partners through a five-step process. Figure credit: Yue Yu

This will strengthen data quality, completeness, and accessibility for researchers and breeders worldwide. Embedded Genesys supports passport data browsing, map coordinate visualizing, accession data subsetting, calculating Passport Data Completeness Index for each accession and handling internal and external accession requests.

So far, the national genebanks of [Uganda](#) and [Azerbaijan](#) have already implemented Embedded Genesys in their institutional websites, and the Genesys team is ready to support the rest of the BOLD partners in future phases.

With improved infrastructure, standardized workflows and enhanced skills, BOLD partners are now equipped to upload secure, high-quality passport data to the international Genesys platform, ensuring both backup security and future global accessibility of these vital genetic resources.

## Impacts

BOLD's targeted support in data management and capacity building has already produced measurable results during Phase 1, reflected through progress in database standardization, data completeness and institutional confidence in digital systems. As the establishment phase, Phase 1 encountered many challenges and time-consuming steps, such as setting up infrastructure, training staff and building trust in digital data systems. However, with a strong foundation from Phase 1, BOLD's future phases will focus on expanding the number of accessions uploaded

to Genesys, improving data completeness and accuracy and fostering international data sharing and use among diverse users, including researchers, breeders and farmers.

Ultimately, conserved accessions are only as valuable as the information that identifies and describes them. Without accessible, standardized passport data, these genetic treasures risk becoming invisible, like travelers without passports, lost to the system. Through BOLD's partnership with Genesys, accession data is on its way in becoming more secure, standardized and globally accessible, ensuring that every conserved seed can be found, understood and used to strengthen our shared agricultural future.

## The BOLD Project

BOLD (Biodiversity for Opportunities, Livelihoods and Development) is a 10-year initiative to strengthen global food and nutrition security through the conservation and use of crop diversity. Funded by the Government of Norway since 2021, BOLD supports national genebanks in Africa, Asia and Latin America to better conserve, manage and share their collections with farmers, breeders and others for resilient, productive food systems.





Additional details can be found at <https://bold.croptrust.org/>

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