

# Advancing Genomic Innovations: **CGIAR Breeding Research and Services** for Global Agricultural Progress

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# Breeding & Research Service (BRS)

## Finance and Admin

- New services (contracts, operational, grants, etc.)
- Support other units with admin activities (payments, etc)

## Digital Solutions

- Development, implementation and support
- Enterprise Breeding System (EBS)

## Global Shared Service and Support

- Trialing & Nursery services
- **Lab services**

## Business Process management

- QMS
- Process Management
- Capacity development
- Communication

## Breeding Analytics

- Define Breeding analytics framework/ standards for CGIAR

# Global Shared Services - Lab Services Portfolio

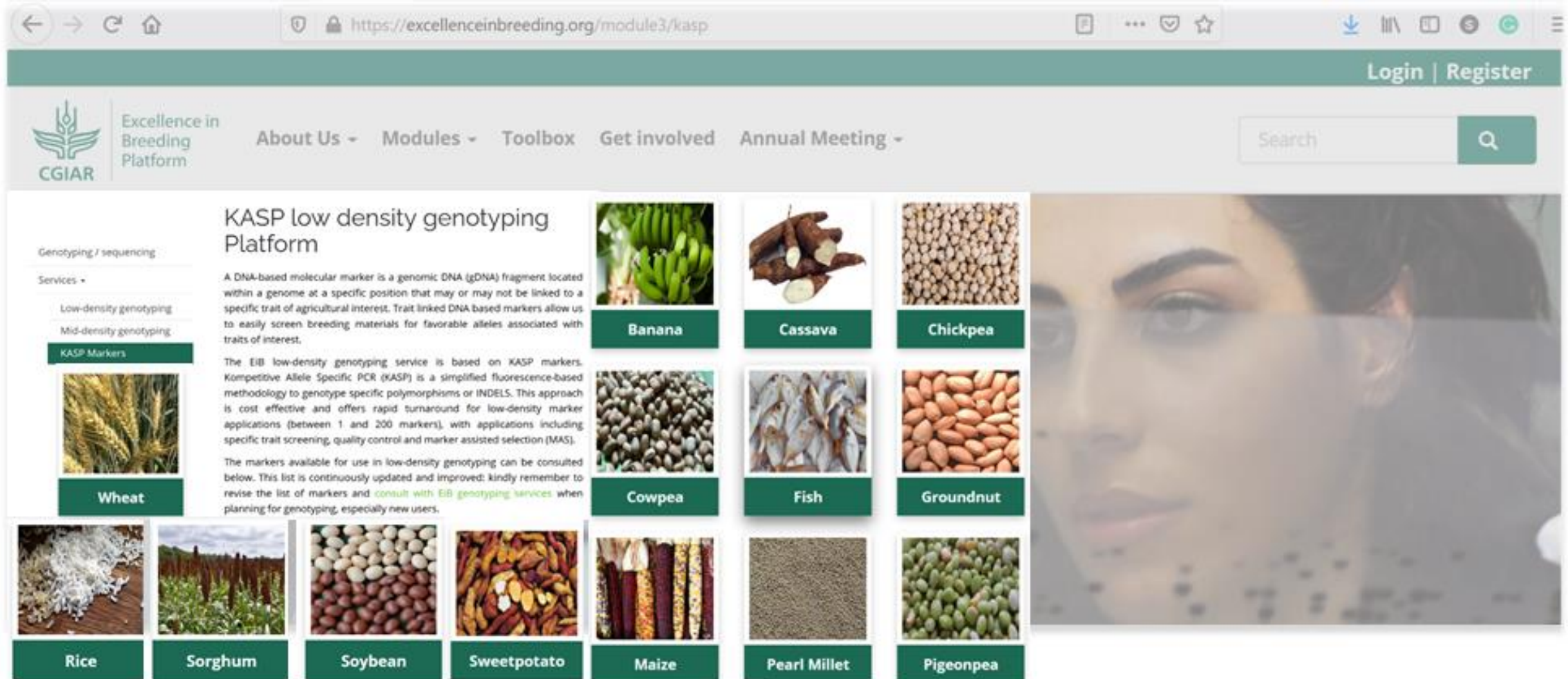
We connect the demand with service providers (Internal (CGIAR/ NARES) or external)

Criteria: Pricing, turnaround time and quality

Low-density genotyping ( <b>LDSG</b> ) services	Mid-density genotyping ( <b>MDSG</b> ) services	Reference assembly services	Whole genome resequencing services ( <b>WGRS</b> )	Elemental Analysis services
<ul style="list-style-type: none"> <li>• KASP Platform</li> <li>• 18+ Crops / 1 Fish</li> <li>• LDSG Trait Markers               <ul style="list-style-type: none"> <li>• 1000+</li> </ul> </li> <li>• LDSG QC Markers               <ul style="list-style-type: none"> <li>• 1500+</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• DArTaq Platform</li> <li>• 12+ Crops</li> <li>• MDSG Panel               <ul style="list-style-type: none"> <li>• 12 Available</li> </ul> </li> <li>• MDSG Panel               <ul style="list-style-type: none"> <li>• 5 Upcoming</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Combined Pacbio HiFi, Bionano and Hi-C sequencing technologies</li> </ul>	<ul style="list-style-type: none"> <li>• Customized based on crop objective</li> </ul>	<ul style="list-style-type: none"> <li>• Non-destructive - XRF services (Fe and Zn testing)</li> <li>• NIRS Services (Compositional)</li> <li>• Destructive - ICP services (Fe, Zn, Al, Cr and Ti testing)</li> </ul>



# Low-density genotyping (LD SG)



The screenshot displays the 'Excellence in Breeding Platform' website. The main heading is 'KASP low density genotyping Platform'. Below this, a text block explains that a DNA-based molecular marker is a genomic DNA (gDNA) fragment located within a genome at a specific position that may or may not be linked to a specific trait of agricultural interest. It further states that the EIB low-density genotyping service is based on KASP markers, which are a simplified fluorescence-based methodology to genotype specific polymorphisms or INDELS. The text also mentions that the markers available for use in low-density genotyping can be consulted below, and that the list is continuously updated and improved, advising users to consult with EIB genotyping services when planning for genotyping, especially new users.

On the left side, there is a sidebar with a 'Services' menu. Under 'Genotyping / sequencing', the 'KASP Markers' option is selected. Below this, there is a grid of images representing various crops and their corresponding KASP markers. The crops shown are:

- Banana
- Cassava
- Chickpea
- Cowpea
- Fish
- Groundnut
- Rice
- Sorghum
- Soybean
- Sweetpotato
- Maize
- Pearl Millet
- Pigeonpea
- Wheat



# Mid-density genotyping (MDSG)

Crop	Panel name	Vendor	Marker density	Status
Common bean	<a href="#">Common bean DArTag EiB (1.0)</a>	DArT	1.9K	Implemented
Cowpea	<a href="#">Cowpea DArTag EiB (1.0)</a>	DArT	2.6K	Implemented
Groundnut	<a href="#">Groundnut DArTag EiB (1.0)</a>	DArT	2.5K	Implemented
Maize	<a href="#">Maize DArTag 3.3K EiB (2.0)</a>	DArT	3.5K	Implemented
Pigeonpea	<a href="#">Pigeonpea DArTag EiB (1.0)</a>	DArT	2K	Implemented
Potato	<a href="#">Potato DArTag EiB (1.0)</a>	DArT	2.1K	Implemented
Rice	<a href="#">1K RiCA (v4)</a>	Agriplex / DArT	1K	Implemented
Sorghum	<a href="#">Sorghum DArTag EiB (1.0)</a>	DArT	3.5K	Implemented
Wheat	<a href="#">Wheat DArTag 3.9K EiB (2.0)</a>	DArT	3.9K	Implemented
Cassava	<a href="#">Cassava DArTag EiB (1.0)</a>	DArT	3K	Implemented
Finger Millet	<a href="#">Finger Millet DArTag EiB (1.0)</a>	DArT	2K	Implemented
Yam	<a href="#">Yam DArTag CGIAR (1.0)</a>	DaRT	2k	Implemented

## Upcoming Panel

- ✓ Pearl Millet Panel
- ✓ Soybean Panel
- ✓ Banana Panel

## Upcoming Rice Panel (Under Validation)

- ✓ 4-5K Haplo Panel

## ✓ Updated RiCA Panel

## New Wheat Panel

- ✓ DW Panel



# Elite line reference assembly & WGRS

CROP
Wheat
Sweet potato
Common bean
Cowpea
Groundnut

CROP
Potato
Pearl Millet
Finger Millet
Sorghum
Pigeon Pea

CROP
Cassava
Chickpea
Yam (D. Rotundata)
Rice
Maize

**Blueprints for new varieties: CGIAR prepares new lab service with release of key crop reference genomes**

From	Published on	Impact Area	Funders
CGIAR Initiative on Breeding Resources	24.05.23	Big data, Climate adaptation & mitigation	Bill and Melinda Gates Foundation, United States of America

<https://www.cgiar.org/news-events/news/blueprints-for-new-varieties-cgiar-prepares-new-lab-service-with-release-of-key-crop-reference-genomes/>

Eight banana, one cowpea, two common bean, one potato, one sweet potato, four yam, and four cassava, one Guinea grass reference genomes have been sequenced and released

Data Access link: <https://data.cimmyt.org/dataverse/ctehdvn>



Ongoing!!!

# Elemental Analysis services

- Services will include

## Non-destructive

XRF (X-Ray Fluorescence) services (Fe and Zn testing )

NIRS (Near-infrared spectroscopy) services (Protein, Oleic acid)

## Destructive

ICP (Inductively Coupled Plasma) services (Fe, Zn, Al, Cr and Ti testing)

Select Analysis method

ICP-OES

Select Crop

Please Select...

Select Lab

Cassava

Please fill in details that are important for the lab to know. Information in email will be shared with the lab.

Additional Comments:

Potato

Rice

Wheat

Bean

My Requests

+ New Nut. Analysis request

— View all my requests

Admin

— View all requests

— Assign requests

Support

— Tickets

Nutritional Analysis Sample List

Save

Analysis Type:

You can select one analysis type to be applied to samples in your order. Please submit a separate order for a different analysis type. Note the Limit of Detection (LOD) in the table at right for each analysis type – do not proceed with the request if this does not meet your requirements.

Bulk Updating:

You can add your own customer sample names if you wish. If you have a lot of information to add, you can download this list as a template in Excel and then re-upload it in order to bulk add your information.

Comments:

Please note any issues which might affect the quality of the samples.

Cost:

Please note that the cost of submission is per sample.

Select any combination of matrix, sample volume, and analysis type to be applied to a set of samples

Analysis type	LOD (mg/kg)
Zinc (Zn)	1
Iron (Fe)	1
Aluminium (Al)	1
Chromium (Cr)	0.2
Titanium (Ti)	0.2

# CGIAR Service Portal



Already a member? Just sign in here

Sign In

## CGIAR Service Portal

### Welcome to the CGIAR Service Portal

Through the CGIAR Service Portal, registered partners can access a variety of services related to agricultural research.

Your access request for the available services will need to be reviewed and signed off by the team managing each service. You will have the option to sign up for one or more services when registering for the first time.

#### Current CGIAR Service Portal Services

- **Genotyping Analysis:** Low-cost DArTag and LDSG analysis services.
- **Elemental Analysis:** Low-cost nutritional analysis services for "zinc (Zn), iron (Fe), aluminum (Al), chromium (Cr), and titanium (Ti)."
- **Operational Services:** Technical support area for CGIAR team members to submit requests in a variety of areas.

»» Registration Link: <https://cgiar-service-portal-prd.azurewebsites.net/register>



Tool Demo Link: <https://youtu.be/BYFlsXj5Ps>

**Note:** If you are already registered as a CGIAR Service Portal user, you can simply log in by navigating to the top right corner of the screen.

Register

## Create Account

Email Address:



Service Request Portal



Hub  
Home

Lab  
Services

Operational  
& Costing

Biometrics

E-  
Learning

Digital  
Solutions

Rajaguru Bohar

Hub



Admin



— Manage users / roles



— Manage organisations



— Accounts approval



Support



— Tickets

## CGIAR Service Portal

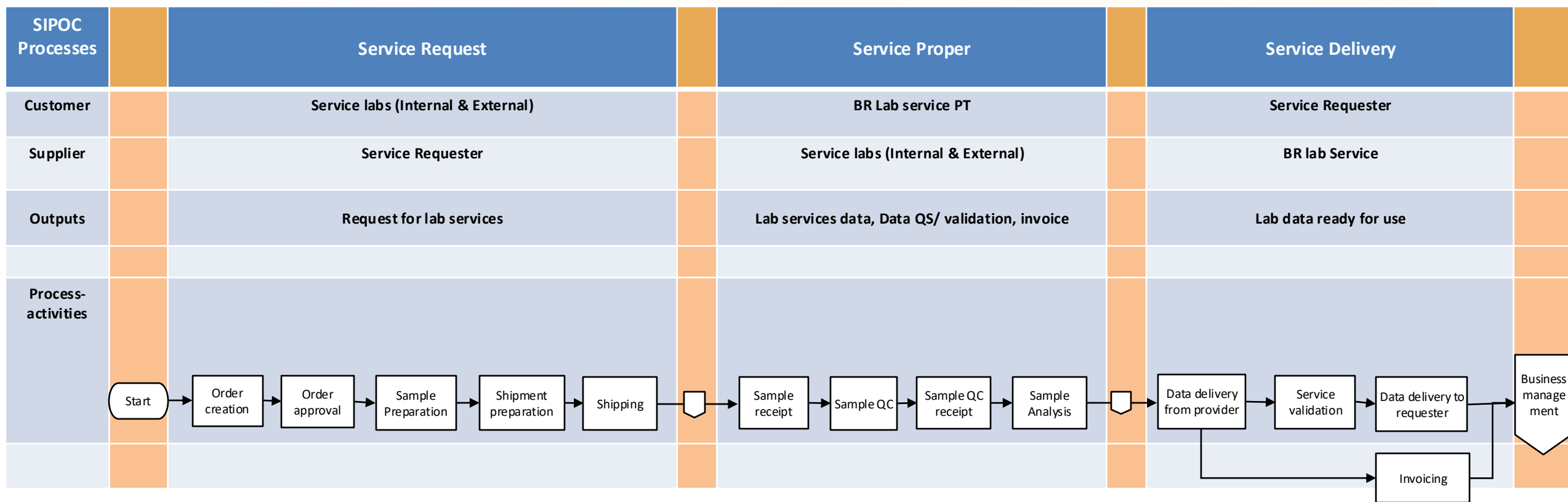
Hi Rajaguru!

Welcome to the CGIAR Service Portal. Through this platform, you can manage the services that have been assigned to you as an administrator. These services can be accessed using the top menu.

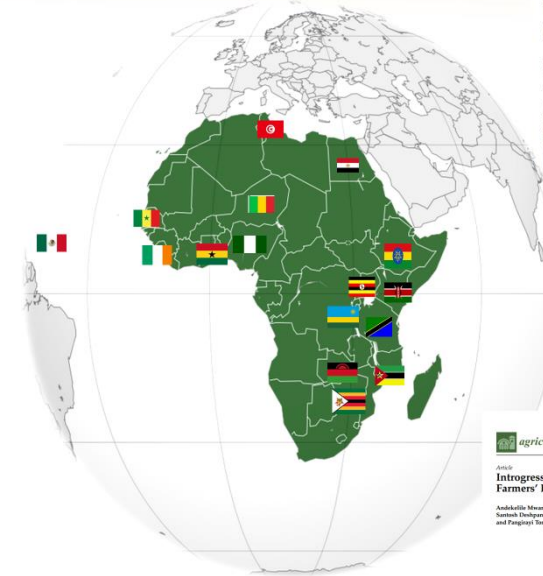
You will be able to perform a range of actions including approving new requests submitted by service users who wish to make use of the service(s) and viewing/processing the orders submitted by existing service users through the platform.



# Lab Service Process Team – Continuous Improvement



# Shared services in Asia & Africa: CGIAR & NARS



Source: [CGIAR Data Tool](#) | [ASTI](#)

**African breeding programs leap forward by accessing new genotyping data**

*With newly accessible genotyping technologies, African crop breeding programs have partnered with IIR to start using genotyping resources to improve accuracy and efficiency.*

As breeders strive for higher-yielding, climate-resilient and nutritious crops, genotyping is intensifying the speed and accuracy of achieving breeding goals. But new technologies have often been out-of-reach for national breeding programs in developing countries.

**Scientia Horticulturae**  
Volume 295, 15 March 2022, 110859

**KASP markers validation for late blight, PCN and PVY resistance in a large germplasm collection of tetraploid potato (*Solanum tuberosum* L.)**

Sahaj Sood<sup>a,\*</sup>, R.R. Vinay Bhargava<sup>a</sup>, Kumar N. Choudhary<sup>a</sup>, Ratna Prati Kaur<sup>b</sup>, Vinod Kumar<sup>a</sup>, Raj Kumar<sup>a</sup>, S. Sundaresha<sup>c</sup>, Rajaguru Bohar<sup>d</sup>, Anu Lakshmi Gauda-Oliveira<sup>e,f</sup>, R.C. Singh<sup>g</sup>, Manoj Kumar<sup>h,i</sup>

[Show more](#)

**Access to genetic analysis accelerates banana breeder East Africa**

This story is also available in Amharic: [View it here](#).

**Identifying New Resistance to Cassava Mosaic Disease and Validating Markers for the CM2 Locus**

Cy. Thi Ly Pham<sup>a</sup>, Louis Auguste Bessiere Eyohe Gashu<sup>b</sup>, Nguyen Anh Vu<sup>c</sup>, Nguyen Huu Ha<sup>d</sup>, Pham Thi Nhan<sup>e</sup>, Huong Chauhan<sup>f</sup>, Jonathan Nwagwu<sup>g</sup>, Nguyen Ba Hung<sup>h</sup>, Nguyen Trung Hien<sup>i</sup>, Le Ngan Son<sup>j</sup>, Nguyen Hong<sup>k</sup>, Nguyen Thi Thanh<sup>l</sup>, Do Thi Hong<sup>m</sup>, Pham Thi Thu Ha<sup>n</sup>, Le Thi Hong<sup>o</sup>, Lam Thi Pham<sup>p</sup>, Do Thi Nhu Quyen<sup>q</sup>, Ismael V. Ratti<sup>r</sup>, Peter A. Kachera<sup>s</sup> and Xianze Zhang<sup>t</sup>

[Show more](#)

**Introgession of QTLs for Drought Tolerance into Farmers' Preferred Sorghum Varieties**

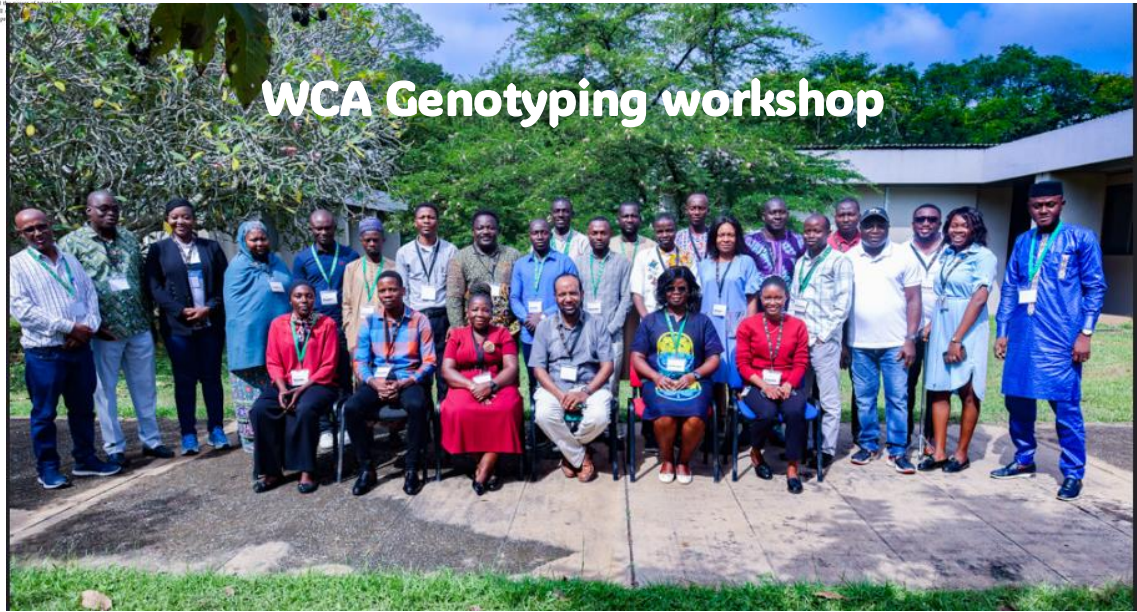
Andakollu Mounishappa<sup>a,b,c,d</sup>, John Saviour Yaw Eshete<sup>e,f</sup>, Kwadwo Osei<sup>g</sup>, Yitay Ferginay<sup>h</sup>, Samuel Dargatzis<sup>i</sup>, Anu Lakshmi Gauda-Oliveira<sup>j</sup>, Rajaguru Bohar<sup>k</sup>, Mithab Rajan<sup>l</sup>

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**Kompetitive Allele Specific PCR (KASP) Markers for Potato: An Effective Tool for an Increased Genetic Gain**

Mohar Katar<sup>a</sup>, Hamada Lindigist Keme<sup>a</sup>, Maria David<sup>b</sup>, Leticia Portaf<sup>c</sup> and Manuel Gauda<sup>d</sup>

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# Global Impact of Lab Services on Crop Breeding



CGIAR, through CIMMYT and Breeding Resources, supports a global network across Latin America, Africa, Asia, and Europe. Funded by GIZ, the 'Crops to End Hunger' program plays a central role.

Story Link: <https://www.cgiar.org/news-events/news/the-reshaping-of-crop-breeding-programs-how-cgiar-genotyping-and-global-partnerships-are-bridging-gaps/>

- Argentina (INTA): Advanced genotyping enhances maize breeding
- Brazil (EMBRAPA) & Ghana (CSIR-SARI): Research advancements with maize, sorghum, potato, and wheat
- Zimbabwe (DR&SS) & Europe (SsCMU, MVCRI): Sophisticated improves genetic purity and supports maize/ bean genetic research.
- Portugal (INIAV): Genotyping to analyze rice heterotic groups, promoting genetic diversity.
- Mexico, India, Morocco (CIMMYT, BISA, ICARDA): MDSG for hexaploidy /tetraploid durum wheat
- Capacity Building: Training programs in Ethiopia and beyond integrate molecular markers into breeding strategies.

# Resources

- The data for the new reference genome developed through the services can be accessed at the  
URL: <https://data.cimmyt.org/dataverse/ctehdvn>.
- New users can access the Breeding Resources Service Request Portal by registering through the  
URL: <https://cgiar-service-portal-prd.azurewebsites.net/register>
- Video tutorial of the Service Request Portal is available at the  
URL: <https://excellenceinbreeding.org/event/introducing-new-service-portal-breeding-and-germplasm-resource-requests>
- A detailed walk-through of the service request portal is available at the  
URL: <https://excellenceinbreeding.org/video/tool-demo-pre-launch-cgiar%E2%80%99s-online-genotyping-sample-submission-system>.
- Mid-density genotyping (MDSG)  
URL: <https://excellenceinbreeding.org/toolbox/services/mid-density-genotyping-service>
- Low-density genotyping (LD SG) - KASP Marker List  
URL : <https://excellenceinbreeding.org/module3/kasp>
- Global Shared Services Microsite  
URL: <https://www.cgiar.org/initiative/breeding-resources/?section=what-we-do&child=Global%20Shared%20Services>
- Impact Story Link  
URL: <https://www.cgiar.org/news-events/news/the-reshaping-of-crop-breeding-programs-how-cgiar-genotyping-and-global-partnerships-are-bridging-gaps/>



**Thank You**



**Open to any Questions**