

Module 3 update

Genotyping / sequencing tools and services

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Module 3 Genetic Gain contribution



Genotyping / sequencing tools and services

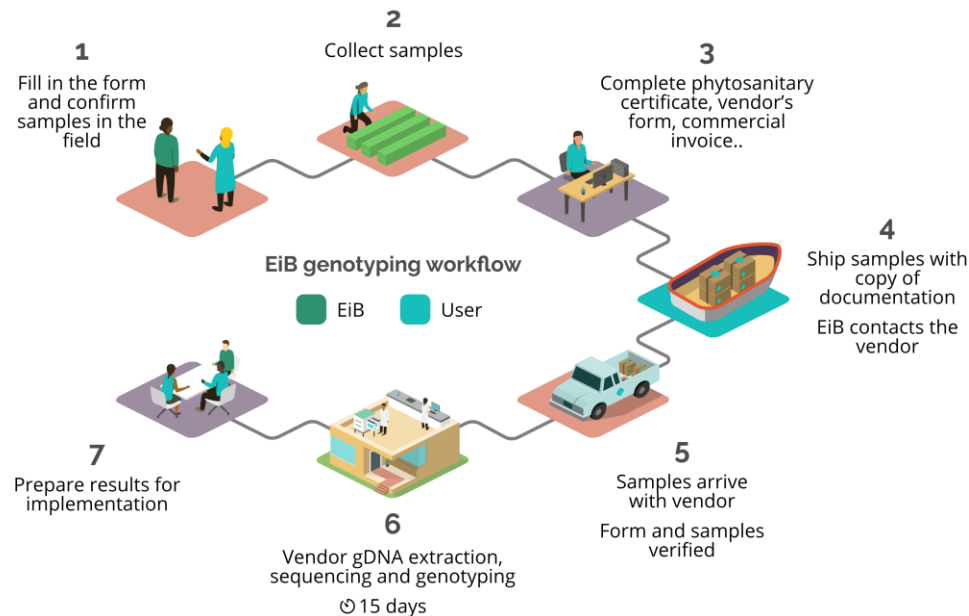
- 1) Enabling access to shared genotyping services
- 2) Improving procedural workflows for sampling logistics and tracking
- 3) Centralization of genotyping service within the OneCGIAR ambit for efficiency



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Enabling access to shared genotyping services

Overview: enabling the access to shared genotyping services (low and mid density) by AFS network for routine QC, MAS and GS applications. High density solution(s) to be made available for genome assemblies and resequencing of elite core lines for all priority crops. Make data publicly available.



- **Tactics:** Coordination of different crop networks make available the marker resources already existing and that are continually build. Aggregate demand and engage with different partners to sensitize the advantage of shared services. Initiate new groups in the practice of genotyping within their BPs to eliminate discrepancies in knowledge and utilization.

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Low-density genotyping

Mid-density genotyping

KASP Markers

Wheat

KASP low density genotyping Platform

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. Trait linked DNA based markers allow us to easily screen breeding materials for favorable alleles associated with traits of interest.

The EIB low-density genotyping service is based on KASP markers. Kompetitive Allele Specific PCR (KASP) is a simplified fluorescence-based methodology to genotype specific polymorphisms or INDELS. This approach is cost effective and offers rapid turnaround for low-density marker applications (between 1 and 200 markers), with applications including specific trait screening, quality control and marker assisted selection (MAS).

The markers available for use in low-density genotyping can be consulted below. This list is continuously updated and improved; kindly remember to revise the list of markers and [consult with EIB genotyping services](#) when planning for genotyping, especially new users.

Banana

Cassava

Chickpea

Cowpea

Fish

Groundnut

Rice

Sorghum

Soybean

Sweetpotato

Maize

Pearl Millet

Pigeonpea

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Refer to: <https://excellenceinbreeding.org/module3/kasp>

MDSG Status

Marker availability

Crop	Panel name	Vendor	Marker density	Status
Cowpea	Cowpea DArTag EiB (1.0)	DArT	2.6K	Implemented 
Groundnut	Groundnut DArTag EiB (1.0)	DArT	2.5K	Implemented 
Potato	Potato DArTag EiB (1.0)	DArT	2.1K	Implemented 
Rice	1K RiCA (v4)	Agriplex / DArT	1K	Implemented 
Wheat	Wheat DArTag EiB 2.4K (1.0)	DArT	2.4K	Implemented 
Wheat	Wheat DArTag 3.9K EiB (2.0)	DArT	3.9K	Validation 
Maize	Maize DArTag EiB (2.0)	DArT	3.5K	Validation 
Sorghum	Sorghum DArTag EiB (1.0)	DArT	3.5K	Design 
Pigeonpea	Pigeonpea DArTag EiB (1.0)	DArT	2K	Design 
Finger Millet	TBA	DArT	2K	Planning 
Cassava	TBA	DArT	3-4K	Planning 

Plus:
common bean soon

Elite line reference assembly & WGRS

CROP	CROP	CROP
Wheat	Potato	Cassava
Sweet potato	Pearl Millet	Chickpea
Common bean	Finger Millet	Yam (D. Rotundata)
Cowpea	Sorghum	Rice
Groundnut	Pigeon Pea	Maize



Challenges:

1. Different groups is at different stage which requires crop specific strategies
 - a. Different groups have different needs
2. Bioinformatics support
 - a. Different needs & wills
 - b. Several projects going at the same time with the similar objectives
3. Understand the importance of business continuity
 - a. Genotyping is not planned much ahead



Improved procedural workflows for sampling logistics and tracking

- **Overview:** Training and support to improve the procedural workflows for sampling logistics and tracking
 - a. India
 - b. Africa: **2021:** TZ, ETh, MZ, ZIm, MO, EG, KN, UG
 - c. North and South America
- **Tactics: 2020:** 1. Training modules and tutorials to support sampling logistics
 - 2022.** 2. In person training workshops to support capacity building
 - Since 2020** 3. User friendly tools

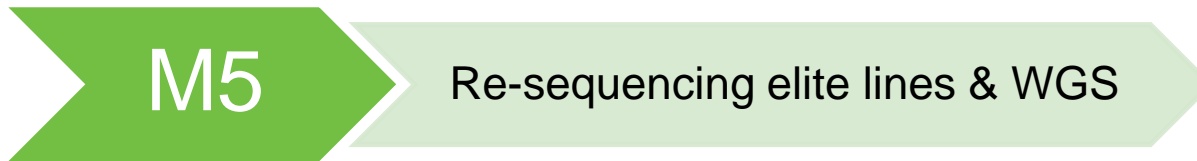
Challenges: 1. Covid restricts in-person training and workshops 2. addition of new users require continuous training sessions 3. existing users needs constant backstopping

Centralization of genotyping services

- **Overview:** Centralization trait introgression/ augmentation strategy and operation by crop and region and to enable fully costed support services for shared genotyping users.
- **Tactics: *In development stage*** a centralization strategy for trait introgression/augmentation by having an automated and online submission system
- **Challenges:** Genotyping activities, storage of data and associated operations are yet to be centralized

In progress

EiB connectivity



Brainstorming time



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