Welcome to Sharing Excellence: EiB Virtual Meeting 2020

Michael Quinn, EiB Director
Jan Debaene, Deputy Director

Nov 10-12, 2020

Welcome to Sharing Excellence

- Excellence through sharing principles, concepts and paradigms
- Excellence through initiatives being implemented in CGIAR & NARS programs
- EiB mandate firmly working towards transformation – together with partners
- Promising results and talented partners – more to come!

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Day 1: EiB Mandate: updates & progress

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Presentation overview

1. A look back
2. Where we are now
3. Looking forward and next steps
    a. Responding to CtEH funders' requests
    b. CtEH investments for modernization of CGIAR-NARS breeding networks
    c. Updating improvement plans

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Leading up to this point

Current rates of production increases will not meet projected demand.

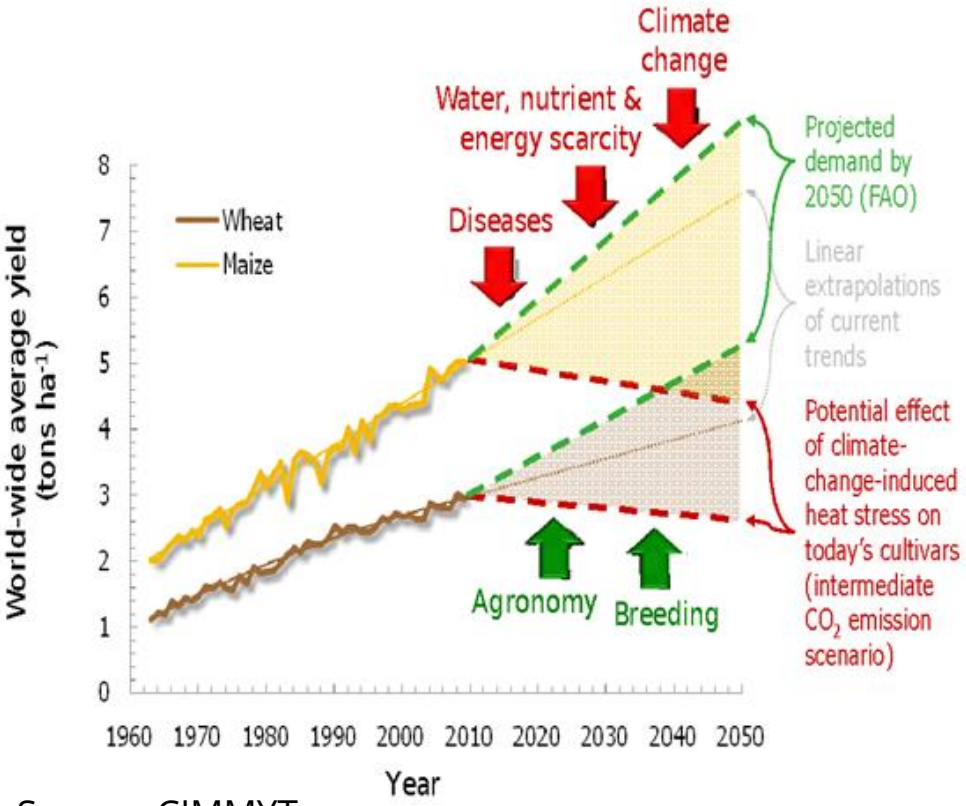
BPAT reviews conducted - opportunity to increase rates of genetic gain delivered to farmers

- Opportunities for execution of fundamentals
- Opportunities to implement new technologies, approaches and methods

Funders are mandating higher rates of genetic gain and faster rates of variety turn over - for farmers.

Showing great interest in supporting us to deliver this.

Production gains are critical



Source: CIMMYT

- Using maize and wheat as an example, annualised production increases must be >1.7% to prevent price rises.
- Not only the staples: Role of RTB and legume crops play a critical role for poverty alleviation.

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Six funders' requests

Funders of CGIAR breeding have made 6 explicit requests of CGIAR breeding programs:

1. Aligning breeding pipelines with market segments, development of pipeline investment cases, product profiles, etc.
2. Incentivization of breeding teams and individuals aligned with genetic gain and variety turn over.
3. Effective delivery mechanism of varieties from breeding program to farmers.
4. Increased rate of genetic gain.
5. Commitment to shared services.
6. NARS breeding networks and NARS capacity

So then….What does good look like?

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Where are we now?

We are, all of us, in the process of a vital initiative to modernize CGIAR and NARS breeding

A vision for CG breeding shared last November:

CGIAR-NARS breeding networks generate rates of genetic gain ≥1.5% p.a. and that the average area weighted age of varieties in farmers' fields is <10 years

Detailed vision for CGIAR breeding:

https://excellenceinbreeding.org/sites/default/files/u107/EiB%20Vision%20for%20CGIAR%20Breeding.pdf

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Modernisation = Implementation of change

Change can be really, really difficult

To be successful, a change initiative needs:

- Clear lines of accountability
- Sponsorship; particularly from senior leadership
- Technical support
- Financial support
- Standards and a unified platform
- Consideration of emotional responses to change

Need clear goals and a plan for achieving these goals

- Improvement plan

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Success factors

Accountability

- Breeding lead from each center appointed by DGs; accountable for developing plans, implementation
- EiB mandated to monitor progress, provide support

Sponsorship of modernization initiative

- Full endorsement / sponsorship of DGs, DDG-Rs, breeding leads, SMO, SMB and SC

Technical support

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Financial support

- CtEH funding managed by EiB supports modernization of CGIAR-NARS breeding networks

Support for non-technical aspects to drive change

- Change management professionals to partner with breeding leads through process

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Looking forward…

Implementation of change and response to six funders' requests

Funding support for modernization - EiB managed CtEH investments

Ongoing modification of improvement plans

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Developing a pipeline investment case

- Define market segments.
- Map breeding pipelines to market segments.
- Develop the “pipeline investment case”. This will be the unit of investment.
  - Costs for pipelines need to be presented as part of the investment case
  - (costs for operations need to be calculated for schema optimization)
- Develop the product profile for each market segment.

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Incentivisation

- Breeding teams and individual scientists' performance assessed on basis of contribution to genetic gain, variety turnover and NARS support.
- Annual "health check" of programs required.
- Realised genetic gains must be calculated in a standardized way.
- Predicted genetic gain to be calculated annually (and in the schema re-design process).

Effective delivery mechanism

- Working with the seed sector (NARS, private sector, NGOs, etc) to ensure effective pipeline of delivery from breeding program to farmer

- Ensuring there is high quality handover of germplasm; for example:
  - High quality, pure seed/stock
  - Backed up by sufficient performance data under relevant conditions

Increased rate of genetic gain – Optimising breeding scheme

$$\Delta G_{year} = \frac{i \; r_{AI} \; \sigma_A}{L}$$

- Shortening breeding cycle time
- Investment in accuracy of trials, particularly in early generations
- Multi-location trials in early generations highly predictive of performance in TPE across years. Including managed environments
- Population improvement focus rather than product development
- Exclusively elite by elite crossing
- Separation of variety or parent development / trait development from population improvement

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Shared Services

Partnership is key

Establish and use shared services instead of investing in duplicated internal capacity

Ensuring increased capacity can benefit multiple crops and centers – development of centralised business units

A flexible, region-expedient approach will likely be used – e.g. biometrics

Examples:

- Breeding IT
- Genotyping
- Phenotyping
- Soil testing
- Biometrics
- Nutritional testing
- Equipment maintenance
- & more

NARS breeding networks and NARS capacity

- Funders will sponsor CG-NARS networks rather than stand-alone CG breeding programs
- We must partner strongly with NARS programs
- We must work actively with them to build their strength and capacity
- Eventually NARS should have increased role for product identification & release; CGIAR for population improvement & parent development

Looking forward…

Implementation of change, and response to six funders' requests

Funding support for modernization - EiB managed CtEH investments

Ongoing optimization of improvement plans

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EiB managed CtEH investments

A center-agnostic, One CGIAR approach: Hub and spoke model at each sub-region.

Investments to achieve specific goals for all CGIAR targeted crops within a region, to focus on Africa, S. Asia.

Opportunities to develop centralized operations and services, including across centers, acting as business units.

- Ensures long term sustainability, focus on delivery of quality through specialization, resulting in efficiencies.

Partnerships will be critical to success.

Example goals:

- Increasing heritability and phenotyping capacity
- Establishment of multi-location trials, particularly in stage 1
- Rapid generation advancement + RTB multiplication
- GEBVs of stage 1 lines (or pre-stage 1 for GS) & trait introgression
- Supporting rice transition to direct seeding
- Seed inventory management
- Health, safety and environment

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Looking forward…

Implementation of change and response to six funders' requests

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Ongoing optimization of **improvement plans**

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Improvement plans

Plans developed first half 2019. Need updating

Detailed plans needed for:

- A management tool for breeding leads and center level management
- To be confident of successful implementation

Condense headings. Begin with a higher-level plan, focused on objectives and immediate outcomes as a suggested starting point

A high level plan is needed as a communication tool:

- For the CtEH accountability / implementation mechanism – tool to use for discussions between EiB and breeding leads. For accountability + support.
- To help early diagnosis when plans get off-track
- For alignment; internally and externally
- For communicating to funders the specific commitments to respond to the six requests

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CtEH Funder request	Objective	Actions	Current state	3 month End Jan state	12 months End Oct 2021 state	Indicators (how will you know progress has been made?)
1	Market segments defined and characterised, product profile(s) developed for each, breeding pipelines aligned to market segments and a pipeline investment case for each pipeline.					
1	Costing: Cost of each pipeline is presented and broken out by staff, operations and capex.					
1	Costing: Cost of each component (e.g. plots, crossing, quality assay) is known and presented.					
2	Alignment of staff and team incentives with rate of genetic gain and variety turnover.					
2	Health check: realized genetic gains calculated					
2	Health check: Leading indicators of genetic gain calculated and reported.					
3	Development of strategic plan for delivery of varieties to farmers in partnership with NARS partners and delivery pipeline participants (i.e. private sector).					
4	Parent selection: Strictly only elite by elite crosses for population improvement. (First, program must see itself as a population improvement program not product development).					
4	Parent selection: heterotic pools established, heterosis measured and assigned to a group prior to crossing.					
4	Parent selection: Parents selected on basis on GEBVs (requires lines to be genotyped) and with use of a selection index.					
4	Shorten breeding cycle to 2 years.					
4	Establishment of a dedicated parent development / per-breeding / trait introgression pipeline to serve the population improvement pipeline. Includes stage gate for handover and for direction to be set by population improvement program.					
4	Development of strategy for sustainable deployment of disease resistance genes.					
4	Genotyping: All stage 1 lines whole genome profiled					
4	Genotyping: QA/QC applied.					
4	Accuracy: Increased accuracy (h2) of trials, especially stage 1 and 2 trials.					
4	Digitise breeding operations					
4	Accuracy: Multi-loc stage 1 trialing network established plus managed environments.					
4	Full use of BMS / EBS / BreedBase					
4	Accuracy: Assessment of predictive ability of selection environments for TPE (including characterisation of TPE for each market segment) and necessary modification resulting from analysis.					
4	Accuracy: Current best practice trial design and analyses applied and optimum trialing scheme for resources available.					
5	Development of centralised, cross crop, cross center operations units.					
6	Development of highly functional CG-NARS network with close partnership with NARS. Includes high quality annual advancement meeting, and highly functional hand over and release process, and supported by high quality data.					
6	Capacity improvement of NARS breeding					

Example of a single objective

CtEH Funder request	Objective	Actions	Current state	3 month End Jan state	12 months End Oct 2021 state	Indicators (how will you know progress has been made?)
2	Health check: realized genetic gains calculated	Implement standardised methods set by EiB for calculating. Calculate BLUPS. Ensure sufficient checks in late stage trials and continuity of checks across years.	Limited ability to compare performance of releases across years.	All new trials designed according to standardised designs for measuring realised genetic gains.	Same as 3 month state.	Designs and analyses verified by a breeding informatics network member.

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Summary

We are all part of CGIAR-NARS breeding modernization initiative

Many components in place for success

We each have a role:

- Breeding leads accountable for the plan and implementation strategy,
- breeding teams for implementation,
- EiB for technical support, tools and services

Implementation specifically refers to:

- Development of a plan to respond to each of 6 funders' requests / updating improvement plans
- Execution of that plan

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Thank you!

Discussion, questions, feedback:

Please request video/audio (then wait – moderator may or may not select you)

Or type a question into the chat

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Day 2: Toward One CGIAR

Michael Quinn, EiB Director
Jan Debaene, Deputy Director

Nov 11, 2020

One CGIAR: Intended benefits

- Greater impact through fewer institutional boundaries.
- Leveraging breeding capacity across crops and centers.
- Shared services, aggregated demand, etc.
- More consistent and a stronger regional presence for CGIAR.
- Unified voice, set of policies and services, partner interface, and pooled resources.
- Streamlined admin and corporate services.
- Strong NARS/CGIAR relationships and collaboration.
- Greater career progression options for staff.

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One CGIAR: What does it mean for CtEH and EiB?

CtEH and EiB both have very strong brands. Often cited as leading examples of approaches that are aligned with One CGIAR.

One CGIAR expected to provide a structure to support CtEH and EiB goals, and to support CGIAR / NARS breeding in ways not possible with separate independent centers.

Support provided by EiB will be required even more under One CGIAR. Breeding teams can expect to continue receiving this support.

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One CGIAR: What does it mean for breeding scientists?

Important to stay focused on science and genetic gains and to keep this on track - regardless of higher level changes being made.

Breeding is as important as ever. Strongly prioritized by EMT, funders and System Board.

Any potential changes to management structure does not affect mission of breeding scientists and teams.

One CGIAR: Operational structure

Proposed to have 3 science groups for research, delivery and impact; likely with a global director for each:

1. Genetic gains
2. Systems transformation
3. Sustainable and resilient production

Beyond this -- still a lot to be worked out. It is both premature and not useful to speculate.

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One CGIAR: Funding

More pooled and longer term funding. Less dependence on short term project-based funding.

More pooled funding with fewer proposals, reports, admin greater focus on delivering germplasm to farmers.

One CGIAR to provide structure to receive and allocate funding from a pooled source in alignment with funders wishes.

Funding for specific crop by region combinations in alignment with potential to alleviate poverty.

Important to develop pipeline investment cases.

Not looking to consolidate crops.

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Final points…

One CGIAR is being implemented for the good of CGIAR, CGIAR staff, the mission, including breeding and ultimately the farmers we serve.

Again, there is still a lot to be worked out. It is both premature and not useful to speculate.

Thank you!

Discussion, questions, feedback:

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