EiB support for modernisation in 2020

Michael Quinn - EiB Director
EiB Annual meeting, Amsterdam November 6th 2019
How to achieve the vision from Technical perspective

- This EiB annual meeting has previously been used to better understand where and how EiB can support you – Right now we a clearer understanding of this through extensive engagement via development of improvement plans

- Looking at the vision presented there are clearly many discussions, tools, services and transfer of know-how that will be required

- This meeting is more about the need for active and effective sponsorship and coaching and less about the technical aspects of driving toward the vision

- We do need to have the technical discussions also. They’re included in the EiB 2020 work plan
Focussed and scalable approaches to supporting change

• In our role of leading, coordinating and supporting change, we will work in a very focussed and targeted way with a number of programs to support implementation of prioritised changes as indicated through your improvement plans.

• ➔ This will involve EiB working intensively with you to implement agreed changes

• EiB will also have scalable approaches to support changes. These will often take the form of development and deployment of tools, services and training / know-how / consultancy

• So first, the scalable approaches…
Product design / Product management

• Improved version of product profile tool, with users manual and online training. Available by the end of March.
  – Enabling each CGIAR and NARS breeding program to develop a high quality product profile

• BPAT for animals, fish, forestry and forages

• A global product management network established
  – Will coordinate across existing capacity and new capacity funded by CtEH

• That alignment between breeding decisions and the product profile will be achieved through the incorporation of product profiles into the Enterprise Breeding System
Optimisation of breeding schemes

• Tool for documenting and describing breeding schemes

• Simulation tool, with manual and online training, available to all CGIAR and NARS breeding programs to enable simulation of alternative breeding schemes/decisions. To be used for optimisation of breeding schemes

• Quantitative genetics, simulation tool and breeding scheme optimisation training (Amsterdam)
  – February
  – July
  – September

• Tools, methods for genetic gains assessment, $h^2$, and for defining and assessing the target population of environments (TPEs).
  – Delivered through training workshops
    • When and where??
  – Tools, manuals and online training available through toolbox
Genotyping and sequencing

• Sampling training
  – East Africa; January
  – West Africa; May/June

• Access to high quality, low cost genotyping low, mid and high density services brokered for CG and partner breeding programs
  – Mid density becoming available for $10/sample for all priority crops (full service, inc. DNA extraction)
  – Forward MAS (10 markers) $2/sample (full service, inc. DNA extraction)

• Integration of genotyping workflows into EBS (2021 completion)

• Continue to look for opportunities to drive down cost of genotyping
  – Through increasing volume
  – Working with Vendors – How can we be better customers?
Breeding Operations and Phenotyping

• Training;
  – Continuous improvement methods
  – Cost analysis of all areas of breeding operations
  – Irrigation methods
  – Soil management

• Access to high quality, low cost quality/nutritional/physico-chemical analysis through aggregated demand and use of centralised shared service

• Digitisation of breeding processes and operations (supported by CtEH)
Data Management and Bioinformatics

- Development and maintenance of key data management systems
  - EBS (including B4R, sample tracker, etc.)
  - BMS
  - GOBii
  - BreedBase (not funded by EiB)

- Development of key metrics for defining optimum use of data management systems
Biometrics

- Standardized and effective experimental design and analysis tools implemented in EBS

- Training for use of EBS experimental design and analysis tools
Moving to intensive interactions to support change

- That concludes the scalable approaches, so now the focused and intensive approaches

- To provide more intensive interaction supporting implementation of changes this can’t be applied to every CGIAR and NARS program immediately; therefore, prioritization is required

- Sticking with the data driven approach, a list of priority crop by region combinations has been developed based on ability to alleviate poverty and the 2018 IFPRI analysis
# Funders’ Priority Crops

| Crops with highest poverty relevance | IITA: Cassava, Yams, Maize, Plantain  
ICRISAT Africa: Sorghum  
AfricaRice: Rice |
|-------------------------------------|------------------------------------------------------------------|
| Large gaps in breeding programs     | IRRI Rice for Asia  
CIMMYT Wheat for Asia  
CIMMYT Maize for Africa |
| Crops with highest poverty relevance | Legumes, Banana, Sweet potato and Millets for Africa  
Potato for Africa & Asia  
Cassava, Chickpea, Maize for Asia  
Maize for LAC, Wheat for CWANA |
| Smaller gaps in breeding programs   |                                                                  |
| Crops important for diversification |                                                                  |
| Smaller breeding programs that need strengthening |                                                                  |

Capture >70% of the poverty weighed gross value of crop production (GVCP)

Capture >90%
Product design / Product management

• Support priority crops to:
  – Refine and validate target product profiles
  – Establish a high quality annual germplasm advancement meeting
  – Establish a product management network (supported by CtEH)

• GPK to confirm the above applies or CIMMYT wheat since I’ve said it is for priority crops yet it isn’t in the work plan
Optimisation of breeding schemes

• Alternative breeding schemes simulated and feasibility discussed considering logistical, biological and organisational constraints resulting in a plan developed for optimisation of breeding schemes
  – For priority crops

• Review and make recommendations to CIMMYT wheat breeding in areas of:
  – breeding scheme
  – parental selection, and,
  – trialing network

• Support to accurately and fully define and document breeding schemes and desired modifications to reach targets
  – For priority crops
Genotyping and sequencing

• Support AfricaRice and IRRI to develop and implement a unified trait deployment strategy

• Develop business plan for genotyping coordinator role for rice

• Support routine application of QC and MAS for:
  – IITA Maize and Cassava
  – AfricaRice and IRRI
  – CIMMYT Maize and Wheat

• Implementation of mid density panel for GS proof of concept and fingerprinting for maize, wheat, rice and cassava
Breeding Operations and Phenotyping

• Support priority programs to fully and accurately cost all their breeding operations

• Develop irrigation and soil management improvement plans for 3 key IITA stations

• Support implementation of operational excellence methods and processes for priority crops

• Support CIMMYT Wheat to develop a high level plan for breeding operation and trial management improvements

• Conduct opportunity analysis and develop recommendations for Breeding Operations and Phenotyping improvements for AfricaRice and IRRI

• Develop recommendations for abiotic stress, irrigation and soil management for CIMMYT maize Africa trials and nurseries
Data Management

• Advancement meeting templates developed for breeding programs using BrAPI enabled breeding systems

• Advancement meeting template tested by IITA cassava, musa, yam and ICRISAT sorghum programs
For National Programs

- Baseline assessments conducted for:
  - NARO: rice, maize, cassava, sweet potato, musa and groundnut
  - KALRO: maize, bean, potato, maize, wheat, rice cassava and musa
  - ICAR: rice, wheat, chickpea, and pearl millet

- Develop high level plan for CSIR, NARO and KALRO breeding operations and trial management improvements
Other key areas still being determined

- Working more effectively with partners
- Development of and extracting value from shared services
- Key metrics and performance indicators (for teams and for individuals)
  - For desired breeding outcomes (e.g. high value germplasm)
  - For implementation toward the vision for CGIAR breeding
Thank you!

Questions / Discussion