



Evaluation of CGIAR Excellence in Breeding Platform

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List of Acronyms

ABI	Accelerated Breeding Initiative
ACIAR	Australian Centre for International Agricultural Research
AFS	Agri-food system
BMGF	Bill and Melinda Gates Foundation
BMS	Breeding management system
BP	Breeding program
BPAT	Breeding Program Assessment Tool
CapDev	Capacity development
CAS	CGIAR Advisory Services (Secretariat)
CGD	Context Global Development
CGIAR	Consultative Group on International Agricultural Research
CIAT	International Center for Tropical Agriculture
CIMMYT	International Maize and Wheat Improvement Center
CoP	Community of Practice
CRPs	CGIAR Research Programs
CSO	Civil society organization
CtEH	Crops to End Hunger
DArT	Diversity Arrays Technology
DFID	Department for International Development
EBS	Enterprise Breeding System
EIB	Excellence in Breeding Platform
ET	Evaluation Team
FAO	Food and Agriculture Organization
FGD	Focus group discussion
FISH	CGIAR Research Program on Fish Agri-Food Systems
GIZ	Gesellschaft für Internationale Zusammenarbeit
IAB	International Advisory Board
IBP	Integrated Breeding Platform
IDO	Intermediate Development Outcome
IFPRI	International Food Policy Research Institute
IITA	International Institute of Tropical Agriculture
IRRI	International Rice Research Institute
ISDC	Independent Science for Development Council
KALRO	Kenya Agricultural and Livestock Research Organization
KII	key informant interview

KPI	Key performance indicator
MAS	Marker-assisted selection
M&E	Monitoring and evaluation
MEL	Monitoring, evaluation, and learning
MELIA	Monitoring, evaluation, learning, and impact assessment
NARS	National Research and Agriculture Systems
NARES	National Research and Agriculture and Extension Systems
N4ETTSS	Network 4 Enabling Tools, Technologies, and Shared Services
NGO	Nongovernmental organization
OB	Organizational behavior
OD	Organizational development
OECD–DAC	Organization for Economic Co-operation and Development–Development Assistance Committee
One CG	One CGIAR
Platform	Platform for Excellence in Breeding
PSC	Program Steering Committee
QC	Quality control
ROI	Return on investment
SIMEC	Strategic Impact, Monitoring and Evaluation Committee
SLA	Service Level Agreement
SLO	System-Level Outcome
SME	Subject matter expert
SO	CGIAR System Office
SPIA	Standing Panel on Impact Assessment
ToC	Theory of change
ToR	Terms of reference
UoQ	University of Queensland
USAID	United States Agency for International Development
W1, W2, W3	Window 1, Window 2, and Window 3 Funding

Preamble

CGIAR contributes to the Sustainable Development Goals with interconnected and partnership-driven agri-food system research. In 2022, CGIAR adopted an Evaluation [Framework](#) and [Policy](#) that nest within the broader CGIAR Performance Results Measurement Framework in support of CGIAR's 2030 Research and Innovation Strategy. The Evaluation Framework spells out standards that are important to CGIAR and rooted in global evaluation industry standards. This preamble to the 2021 CGIAR Excellence in Breeding Platform External Evaluation ('EiB Evaluation') places the evaluation report within the context of these standards and gleans lessons on the institutional culture within which the evaluation took place.

The 2021 CGIAR EiB Evaluation is the first evaluation delivered since the approval of the CGIAR Evaluation Framework and Policy. Yet the timing of its delivery is not by original design. Adaptive and responsive management required a prolonged evaluation. We reflect on this here.

The CGIAR Advisory Services (CAS) Shared Secretariat is an independent assurance office within CGIAR. Alongside shared secretariat functions, the CAS Secretariat implements CGIAR's multi-year evaluation plan as approved by the System Council. As an independent assurance office, the CAS Secretariat maintains a roster of subject matter and evaluation experts who are external to CGIAR. To implement evaluations, the office calls up and manages teams of experts.

In lay terms, the weighty task of external evaluators is to arrive on the scene of a program, platform, or process (the evaluand) and work to rapidly understand layers of complexity reflecting, in most cases, years of decisions and choices. Their window into the reality, or the truth, of the program is evidence, secondary and primary. Using mixed-method approaches, the evaluators review programmatic and monitoring documents, purposefully sample key informants for interviews and focus group discussions, draw on relevant preexisting assessments, and may conduct new surveys. Guided by a documented methodological approach, agreed upon in an inception report, and with data in hand, the evaluators' work is to describe, from an arm's length, retrospectively and constructively, the true reality of the evaluand and to create actionable recommendations for the future.

The delivery of the draft 2021 CGIAR EiB Evaluation report and subsequent exchanges elicited concerns on the part of some stakeholders

and demonstrated a need to validate the evaluation result. Although this validation prolonged the exercise, ultimately finding moderate to high confidence in more than 90% of contested evaluative statements, validation was an important moment to uphold the standards of the CGIAR Evaluation Framework and to consider CGIAR's culture of evaluation. There are 15 standards and principles in the CGIAR Evaluation Framework. The standards to reflect on here are: relevance, use, and utility; legitimacy and participation; independence and lack of bias; credibility and robustness; evaluability; and fairness.

• *Relevance, use, and utility*

According to the 2021 CGIAR evaluation plan, the 2021 CGIAR EiB Evaluation was scheduled to begin in August 2021 and proceed for three months. In preparation, CAS Secretariat began engaging the evaluand for evaluation scoping in January 2021. Delivery of the report was scheduled for November 2021 to allow it to be finalized and presented alongside the Excellence in Breeding Platform Management Response at the 14th meeting of the CGIAR System Council in December 2021. The timing of the delivery of recommendations was set specifically to support decisions at all levels related to the Genetic Innovation Science Group initiative proposals. Despite the original plans, which were endorsed in the evaluation terms of reference at the 13th meeting of the System Council (June 2021), great flexibility was needed by all parties. For, during the same period, CGIAR confirmed the proposal deadlines for a new portfolio of major CGIAR initiatives; while the ultimate proposal timing was not within the evaluation's planning control, work on the proposals exerted competing pressures on the evaluand.

• *Legitimacy and participation*

A participatory evaluation practice engages the evaluand and closest participants early and systematically. The evaluand is invited to participate *inter alia* in scoping, where they are asked to make available all pertinent programmatic documentation; in developing terms of reference; in reviewing the inception report; in validating initial findings; and in reviewing the draft report.¹ Early introduction of the external evaluation team to the evaluand seeks to assure that there are no concerns about the appropriateness of the team. The validation of findings and subsequent review of the draft report provide the opportunity to point out factual inaccuracies.

¹ In this case, in addition to the EiB Platform principals, the University of Queensland had the potential to furnish secondary source, novel data collected systematically and periodically that could provide a window into a baseline assessment of breeding programs. Thus, UQ was contacted

early and involved robustly during the scoping. Given the sensitivity that the data should not be attributed to individual breeding programs, the CAS Secretariat offered to share the draft report for UQ review.

All of these steps occurred for the 2021 CGIAR EiB Evaluation, but many took place while the Platform leadership were in the throes of developing initiative proposals. As a result, the early stages could not elicit the type of participation needed. When the penultimate draft of the report was shared, the evaluand and a separate partner (engaged as a key data source, see footnote 1) voiced corrections and differences of opinion extensive enough to raise concerns about the ability of CGIAR to take up and use the evaluation. The feedback at this last stage revisited many of the items, like the team and scope, where participation had been earlier invited but not received. New documentation was made available not previously shared with the team.² The CAS Secretariat quality assurance identified several other factors to address. Most important, the CAS Secretariat required a further review through appropriate offices related to a concern regarding independence, in keeping with the first principle of the CAS Secretariat terms of reference (that is, independence and lack of bias).

Among the red flags for an independent evaluation practice (MOPAN, 2019), during the factual check, without prior agreement, it is apparent that at least one recipient party shared the internal draft report with a funder to solicit its views.

• *Independence and lack of bias*

An external evaluation team's ability to grasp the overarching context in which the evaluand has been operating is of vital importance. Hence, many of the individuals in the CAS Secretariat expert roster have past exposure to CGIAR. Understanding of context facilitates efficiency and grounds the evaluation. It also represents one of the most challenging and fundamental aspects of the CAS Secretariat's work: to actively manage bias and competing interests. Thus, according to the Advisory Services Conflict of Interest Policy, all experts declare interests prior to work. This allows team leaders and CAS Secretariat to manage perceived or real bias and competing interests actively and carefully. Whenever doubt might arise, CGIAR's Ethics and Business Conduct department becomes involved.

The operating principles of the CAS Secretariat itself are rooted in independence. First among the operating principles in the Secretariat's 2018 terms of reference is operational independence: the Secretariat is neither a funder nor implementer of CGIAR research and avoids other potential conflicts of interest. Thus, concerns about the independence of the process—in terms of both the membership of the external evaluation team and the involvement of a funder in commenting on draft outcomes of the evaluation—are of great importance. These factors

were a major driver in the need to pause the report delivery and undergo a validation.

• *Credibility and robustness*

Given the range of concerns, and in concert with the System Council's Strategic Impact Monitoring and Evaluation Committee (SIMEC), the CAS Secretariat decided to systematically validate the evaluation. Validation required the creation of a novel process and the engagement of a new evaluation and expert team under new terms of reference vetted by SIMEC. One of the key areas of learning has been the development *de novo* of a rigorous process for evaluation validation.

The validation took, as its basis, the core EiB Platform documentation. It homed in on priority areas of the evaluand response, co-identified with the Genetic Innovation Science Group and EiB Platform leadership. The validation team grouped the Platform feedback by theme, mapping 36 contested areas. It analyzed core evidence along prioritized lines of inquiry. It collected supplementary primary data through 16 key informant interviews. The factual check from the evaluand was transformed into a response matrix; along with its verbal response, the team coded the matrix, assessing the strength of the evidence supporting the findings.

Overall, the validation team reported that it had high confidence in two-thirds of the findings and conclusions in the response matrix, and moderate confidence in one-quarter. Its confidence was lowest in less than 10% of findings and conclusions contested. On the basis of the data and analysis, the validation team revised the report and its underpinning component studies in a multi-stage revision process, to triangulate evidence and bring forward recommendations from component studies (see Annex 2). Consequently, the report is both evaluation report and validation, i.e., the evaluation report was amended by the validation team according to the confidence level in the evidence supporting the evaluative claims made.

The methods and results of the exercise are spelled out in this report, including in Annex 2, which provides specific coverage of the validation conclusions. Separately, the Director of Ethics and Business Conduct reviewed two specific concerns of competing interest; the Director noted that one identified issue was of concern. However, the ethics review concluded that the measures taken, in particular during the validation exercise, were, in the Director's view, sufficient to mitigate that concern.

• *Evaluability*

Whether CGIAR interventions can be evaluated is as much a design and logistical question (for

² The external evaluation team duly sought out specific pieces of documented evidence, which the Excellence in Breeding Platform leadership provided in February 2022.

instance, formulation of indicators, their monitoring and later data availability) as a question of CGIAR culture. The aim of the CGIAR-wide evaluation practice³ is, among other things, to produce evaluations that provide accountability by constructively communicating an account of the truth of the program, platform, or process, with a strong understanding of its context, through the eyes of an external evaluator. Evaluation relies on the good faith and participation of evaluands and stakeholders throughout the process. The exercise is greatly facilitated when Monitoring, Evaluation and Learning (MEL) professionals of the evaluand interact closely with the evaluators (which was not the case in this evaluation). The process requires humility and willingness to learn on the part of both the evaluand and the evaluation team. It requires all concerned to state their biases out loud, to be intentional, and to engage fully to mitigate bias. These attributes of culture complement the “culture of results” that underpin evaluability. The 2021 EiB Evaluation afforded the opportunity to think deeply on what attributes of One CGIAR, including CAS Secretariat operation, support a culture shift around evaluation.

- *Fairness, confidentiality, and no harm*

To assure the fairness of this evaluation, the CAS Secretariat requested an extension and support of the validation exercise from SIMEC. A total of nine

external evaluation and subject matter professionals contributed to the final evaluation report. It was peer-reviewed at multiple stages by four professionals who are familiar with the subject matter and with CGIAR. The validation exercise allowed the careful reexamination of findings and conclusions, and their reformulation where applicable, to produce timely and actionable recommendations for the rollout of the One CGIAR initiatives. Parallel work implemented by the Ethics and Business Conduct department confirmed that the measures taken to ensure fairness, in particular during the validation exercise, were sufficient to mitigate concerns of competing interest. The additional level of effort the validation process required has allowed the CAS Secretariat to uphold the fairness standard that is central to the conduct and use of external evaluation in CGIAR.

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³ CGIAR Evaluation Framework (2022)

Executive Summary

Background and Context

CGIAR and its partners have a long history of investing in research aimed at delivering genetic gains to farmers' fields across the globe. In 2016 the System Council approved the Excellence in Breeding (EiB) Platform (hereinafter, the Platform), which is designed to address two key challenges—increasing the rate of genetic gain delivered directly by CGIAR breeding programs and supporting the modernization of national breeding systems—that serve as the rationale underpinning EiB. Since its inception, EiB has evolved from a facilitator of access to breeding tools and services, with a strong focus on data, to a more proactive and directive driver of change. The most significant shift came in 2018 with six requests from the funders of Crops to End Hunger (CtEH),⁴ which assigned EiB responsibility for modernizing breeding programs across the system with a strong focus on genetic gain and varietal turnover. As part of the ongoing One CGIAR reform, EiB will cease to exist by the end of the 2021, though most of its work will continue under the global "Genetic Innovation" Science Group, including its CGIAR initiatives. The conclusions and recommendations presented in this evaluation report have therefore, to the extent possible, taken this evolving context into account with a view to informing the continuation of EiB workstreams under the One CGIAR structure.

Scope, Methods, and Limitations

Part of the CGIAR Advisory Services Shared Secretariat (CAS Secretariat) 2021 workplan, this independent evaluation serves the dual purposes of accountability and learning. It is designed to facilitate decision-making by the CGIAR System Council, the global Genetic Innovation Science Group management, and new initiative leaders, with other key stakeholders including the CGIAR System Board and Executive Management and participating partners. The scope of the evaluation was defined by the Terms of Reference (ToR), detailed in the inception report. The evaluation covers the activities, outputs, and outcomes of the Platform regardless of the source of financing (i.e., the evaluation is not limited to EiB activities funded under CGIAR Windows 1 and 2). Given that additional Window 3 (effectively, bilateral) funding from a handful of System Council funders finances core aspects of EiB's work, the W3 activities they funded were included in the scope of the evaluation.

The evaluation was guided by evaluation questions along the five evaluation criteria of the Organization for Economic Co-operation and Development's Development Assistance Committee (OECD DAC). In line with CGIAR evaluation policy, effectiveness is understood to entail an assessment of the Platform's achievement of outcomes as well as outputs, even though the former fall beyond the range of control of the Platform. In other words, the EiB Platform is accountable for achievement of the planned results that fall within both its zone of control and its zone of influence, reflecting the de facto co-dependence of the success of the Platform on the success of the breeding programs.

The evaluation adopted a mixed-methods approach. Quantitative methods included an online survey of specific internal and external stakeholder groups. Qualitative methods included over 60 semi-structured key informant interviews, including four in-person interviews in India; document analysis; and deep dives into five modules and three breeding programs.

Following the evaluation, the CAS Secretariat organized in concert with the Strategic Impact Monitoring and Evaluation Committee, an additional validation phase. An extraordinary step in standard evaluation practice, the validation phase allowed additional data collection and further triangulation toward validated findings and conclusions.

Key Findings and Conclusions

Relevance

The rationale underpinning EiB was solid and aligned with the needs of Centers, which faced an urgent need to modernize and improve their breeding programs. In many ways EiB could be seen as a precursor to the One CGIAR, cross-center, cross-crop approach, with centralized services and tools, common approaches and methodologies, promotion of best practices, and economies of scale. Nonetheless, there

⁴ [Crops to End Hunger Funders Announce Six Requests | Excellenceinbreeding, accessed 09/2021](#)

appeared to be scope for improving the relevance of the services that EiB provided to CGIAR Centers and national agricultural research and extension services (NARES).

The evaluation found that internal and external EiB stakeholders lacked a common understanding of the agreed overall Platform objective. This absence hindered articulation of a clear strategy and development and use of a viable theory of change with intermediary goals and milestones. Assessing whether progress was on track to deliver expected results and reporting back to funders and other key stakeholders in a meaningful way on results achieved were challenging, impeding accountability and lesson learning.

To build NARES's breeding networks and capacity, a CGIAR-NARES collaborative model with defined roles and responsibilities was developed and signed by 8 of the 14 targeted NARES by May 2021. The proposed generic model was intended to be customized for each NARES based on its stage of development, though this customization had not yet occurred. Respondents to data collection believed that more responsibility needed to be transferred to those capable of assuming it, given that NARES play a critical role in delivering improved varieties to farmers. In some countries, such as India, engagement built on the fact that NARES were seen to be better equipped in many respects than CG Centers, e.g., in terms of infrastructure, equipment and personnel. In other countries and operational contexts, a different model of collaboration built expectations of requester-provider arrangements.

The EiB Platform's alignment with end users⁵ had been in line with the recent shift in plant breeding from a research-driven endeavor to a demand-driven one. Conversely, recent modeling work shifted EiB's focus further on rice, wheat, and maize. This example of how priorities were set represented top-down, or supply-driven rather than demand-driven, decision making.

Evaluation found an overall agreement on the low quality of the breeding programs' initial Improvement Plans (IPs); some of these plans subsequently improved substantially. The early plans failed to generate adequate collaborative engagement, were not sufficiently holistic, and did not resolve limiting factors. EiB was powerless to force change at Centers; it could flag gaps and weaknesses, but Centers were ultimately responsible for making changes. There was a lack of clarity on accountability and follow-up to the IPs; for example, the repercussions of a lack of progress in implementing IPs were not determined.

Coherence

EiB demonstrated coherence with several other CG entities, including the Gender and Breeding Initiative (GBI). Two gender-related tools were piloted in a selected set of breeding programs. Collaboration between the Big Data Platform and several breeding programs such as maize and rice resulted in the use of big data to advance breeding goals. The EiB Platform was also well aligned with the CGIAR Strategy and Results Framework and the One CGIAR approach, which relies on integrated cross-center, cross-crop systems research.

Interaction between modules of the Platform, however, was weak. Module 1 was supposed to provide information to guide the prioritization and work of the other modules, but this logical sequencing did not materialize. Market segments, pipelines, and product profiles were set only in the final two quarters of EiB's existence. This lack of appropriate sequencing made it difficult to adopt a systems-driven approach organized in terms of portfolios of projects rather than independent projects. Because there was no defined process for inter-module collaboration, modules operated largely in silos.

The EiB Platform prioritized addressing the CtEH funders' six requests, increasing coherence between the Platform and CtEH funders. Still, the absence of a functional theory of change with intermediary goals and milestones and corresponding indicators prevented the EiB Platform from being able to track its own progress and to report back to donors in a meaningful way on results achieved. Donors sought to fill the vacuum with stricter conditions that reflected their own needs and priorities rather than a unified approach.

The relationship between the Platform and the private sector exemplified both cooperation and complementarity. A strong relationship was formed with some of the bigger private sector players such as Bayer, Corteva, and Syngenta, with the positive relationship between Bayer and IITA frequently cited as a good model of collaboration. In terms of complementarity, findings related mainly to the need for EiB-supported breeding programs to avoid competing with the private sector and to focus on niche areas where they could add most value. Planning and reporting in the [current] Genetic Innovation portfolio should have steered Centers toward the system-level outcomes⁶ where they may have had a

⁵ End users defined as farmers, traders, consumers, etc.

⁶ Linking to the five key impact areas in the new One CGIAR Research Strategy.

comparative advantage: climate adaptation and mitigation; environmental health and biodiversity; gender equality, youth, and social inclusion; nutrition, health, and food security; and poverty reduction, livelihoods, and jobs. Even countries with significant commercial activity may well have market segments that are not served by private companies—the niche that CGIAR breeding programs must serve and that it was EiB’s mandate to support.

Efficiency

The technical expertise and motivation of team members was regularly cited as one of the best aspects of the EiB Platform. Interviewees regularly referred to the world-class individuals working for the EiB. However, a slow start and recent recruitment meant that there were a lot of new people trying to get up to speed. Both partners and EiB staff expressed concern that the interaction and cooperation between teams could have been more effective, raising the concern that EiB was not greater than the sum of its parts. While the independence and freedom to act were appreciated, several EiB team members would have liked clearer direction and better coordination. Along with the praised scientific expertise, EiB team members required an equal level of people skills - crucial to efficiently and effectively manage people and continuing change processes. A learning and development program tailored to meeting this need would have been valuable. For “soft” skills and other aspects, clear SMART (specific, measurable, achievable, relevant, and timebound) performance standards for individuals, teams, and the whole Platform were not in place.

Funding mechanisms and practices also caused frustrations in EiB and donors. The two major challenges related to managing and monitoring the inflow of funding beyond standard W1/W2 windows—namely, the CtEH W3 flows. A related challenge was the grant-awarding process, which suffered from large direct and indirect costs, a heavy administrative burden, and other inefficiencies. A significant amount of time was wasted on upgrading the quality of the investment proposals submitted by CGIAR Centers and NARES and navigating the various legal, administrative, and contractual obligations of these different entities. The CtEH funds were intended to facilitate implementation of the IPs by plugging the funding gap for large-scale investments, but uptake was extremely low (4%). Center breeding programs were initially misinformed by the System Office about the rules surrounding CtEH grants, and EiB was slow to provide clear guidance. The result was limited and patchy investments that acted as “band-aids” rather than transformative investments leading to higher-level goals.

Effectiveness

EiB contributed to modernizing some breeding programs, though progress was patchy and limited, with the different modules delivering at different speeds. After recent work carried out by Module 1, all CGIAR breeding programs and a number of NARES had product profiles; the addition of relative trait priorities to profiles would have enhanced their utility in supporting breeding decision making. EiB worked with breeding teams to create full descriptions of the portfolio of CGIAR breeding pipelines, the market segments targeted, and the investment case for each pipeline. EiB worked on the costing of breeding operations (many for the first time), and methods for estimating costs and analyzing them for opportunities for efficiency gains were also identified as a positive achievement.

Particularly effective was the recent work carried out by the NARES outreach team. Since NARES are accountable to different stakeholders than the CGIAR, EiB’s role often consists of influencing, where personal relationships can be hugely important.

Assessing EiB progress toward planned results was challenged by the lack of a robust monitoring system that would allow the Platform to collect and use monitoring information in a meaningful and reliable way, as well as a limited understanding or appreciation of monitoring. Given EiB’s platform approach—where many activities were launched across numerous disciplines, crops, and breeding programs—learning from a single breeding program for which all major limiting factors had been resolved also was not possible. Although the EiB team frequently reported that breeding programs resisted change, a lack of change management experience and associated people skills in the breeding programs may also have played a role.

Some concerns were expressed about the governance of the EiB. There was no evidence that the Platform Steering Committee (PSC) held the leadership to account on an ongoing basis. Major decisions regarding EiB seemed to have been taken with no signoff from the PSC. Some interviewees questioned

the independence of the PSC, and the role of the CtEH committee in relation to the PSC was not fully clear.⁷

Monitoring, evaluation, and learning were not treated as a priority. The lack of clarity around the overall objective of EiB, the frequent change in the direction and role of the modules, the absence of an updated and complete theory of change, and the lack of commonly agreed indicators consistent over time prevented the Platform from setting up an adequate monitoring and reporting system. During 2021, some positive steps were taken to improve the quality of indicators, monitoring, reporting, and learning, such as the dashboard tracking the CtEH funders' six requests. Still, lacking was information on the indicators used to assess progress and the criteria underpinning the rating system.

Sustainability

Using the funders' six requests as a proxy, the evaluation noted a certain degree of progress on requests 1, 5, and 6, though continued effort was required. The level of progress toward requests 3 and 4 was unknown owing to a lack of monitoring data, while request 2 was considered the most challenging. With regard to the uptake of EiB functions by the One CGIAR Initiatives, the work of EiB modules is strongly reflected in the recently drafted preliminary CGIAR Initiative Outlines under the Genetic Innovation Area [available at time of evaluation data collection]. For example,

- "Market Intelligence for More Equitable and Impactful Genetic Innovation" closely reflects the work of Module 1,
- "Accelerated Breeding Initiative (ABI): Meeting Farmers' Needs with Nutritious, Climate-Resilient Crops" closely reflects the work of Module 2, and
- "Enabling Tools, Technologies, and Shared Services" reflects the work of Modules 3, 4, and 5.

Several interviewees believed that as of January 1, 2022, with reporting by breeding leads shifting from Centers to the Global Head of Breeding (Genetic Innovation group), most of the challenges encountered by the EiB team in bringing about change would disappear. The evaluation concludes that more than a revised organizational structure is needed to overcome the obstacles identified by this evaluation. A shift in reporting would not make the challenges encountered by the EiB team in bringing about change simply disappear. It will take effective relationships and trust between the right individuals and teams, in the right places at the right times and with access to the right level of skills and resources. The evaluation team is concerned that a lack of clarity about where to direct the lessons and recommendations not directly related to the modules—e.g., with respect to people, change management, and leadership skills—is likely to hinder "technical" successes.

The evaluation asserts much good work being done by a highly qualified and respected group of scientists in the EiB Platform. Their work has supported the CGIAR breeding programs in their start to modernize and, perhaps more important, it has highlighted the needed change in the programs. EiB Platform has a difficult mandate with large objectives but little control over the implementation of its outputs, and so its targets of 1.5% genetic gain and variety turnover are aspirational, and EiB Platform can only contribute to their achievement.

The validation confirmed several weaknesses in the governance and management of the Platform: it would have benefitted from stronger M&E and HR, a results framework, a clear goal, greater training and ability in change management, more inter-module communication, team building and collaboration, and a more active and supportive steering committee. Responsibility for these weaknesses is spread among many stakeholders including: the Platform steering committee for not providing sufficient oversight and support; donors, for adding new tasks to the platform midstream; and EiB platform management, for not recognizing and finding solutions to the problems.

⁷ Clarification note: although CtEH funders were not technically constituted as a committee, at least *de facto*, there is an indication from informants the group was perceived as such.

Recommendations

Nine core recommendations have been developed based on the findings and conclusions of the evaluation⁸, recognizing that the main form of One CGIAR is agreed but that many aspects remain to be finalized. The recommendations cover not only technical and scientific issues (largely based on Module reports) but also aspects of program management. Where possible, the recommendations are targeted at specific initiatives, but there is also a degree of overlap among initiatives under Genetic Innovation action area. The presentation of core recommendations in section 7 is prefaced by a discussion of conclusions and lessons learned in section 6, with an aim to further contextualize recommendations.

- 1. At the system level, One CGIAR must address issues of “end-to-end” thinking and ensure that the career development of all staff is well managed.**
 - a. Units should establish mechanisms for **bringing teams and individuals** together to ensure trans-disciplinary teamwork, a sense of belonging, and awareness of the big picture and to encourage new ideas, collaboration, and synergies between groups. The risk of a silo mentality is high, particularly for units with wide geographical spread.
 - b. Make available a professional, strategic, and well-resourced **HR function** to all staff to facilitate mitigating the problems associated with a highly diverse multinational organization.
 - c. Maximize the value of its human resources through the **developing career** streams that separately identify science and management roles, competencies, and skill level(s), and in particular recognize and reward those with excellence in skills such as breeding as highly as excellence in research outputs.
- 2. One CGIAR units must set and meet high standards of governance and project management, with clear roles, responsibilities, decision-making, and accountability systems. This should include their independent steering committees, mechanisms to ensure collaboration and teamwork, deliberate change management, and transparency regarding grant-awarding processes.**
 - a. Ensure that a strong and independent **steering committee** are in place from the start of the program, composed of fully independent members with recognized management and scientific expertise. The agreed committee ToR should stipulate providing support to, and oversight of, management. Its ToR should include the review of progress toward and quality of planned results, and assistance with strategic shifts in programs.
 - b. CGIAR units should develop and implement best practice **change management** approaches, including by ensuring that staff has access to basic training, with deep immersion for those directly involved in designing and managing change. The unit should consider the merits of a separate program management team with specialists in change and program management, focusing on the delivery of larger-scale projects and supporting those working on smaller-scale projects. It should be recognized that those who are excellent in research and breeding may not also have the skills and temperament to lead change management.
 - c. Ensure that **grant-awarding processes are transparent** and follow clear guidelines while keeping administrative burdens to a minimum.
- 3. Successful project planning and management depends on clarity of goals and purpose, a comprehensive results framework based on a theory of change, and integrated monitoring, evaluation, with learning (MEL) mechanisms. The more complex the program, the more important it is to ensure that CGIAR units:**
 - a. Clearly define the **goal** of the unit and its subunits in the chain from science delivery and coordination through to end users and consumers (mainly around decision support services).

⁸ CAS/Evaluation note: The 9 recommendations do not directly align to the 10 recommendations in the draft report by the original evaluation team, presented to the evaluand in December 2021. Those 10 recommendations largely reflected recommendations in the Component study on cross cutting themes: Governance, the use of people as a valuable resource, and change management (see Annex 4). Considering the evolving context of One CGIAR reform and new operational structure of the action area and initiatives since Jan 1, 2022, the validation team, including CAS/Evaluation function lead, worked to ensure that the learning and accountability purpose of this exercise were reflected in the revised recommendations.

Develop a corresponding strategy with clear timelines and priorities and ensure strong engagement of downstream stakeholders in the process.

- b. Develop a clear **results framework** aligned with the 2022–2030 CGIAR Results Framework. Operationalize by incorporating all levels of results and milestones, from outputs through to impact, based on agreement with CGIAR, donors, and other stakeholders such as NARES. Results frameworks for CGIAR Initiatives should serve as a common reporting framework for all partners, significantly reducing transaction costs.
- c. Ensure that **SMART interlocking objectives with deliverables**, covering both science and non-science aspects, are in place for each team and individual, and ensure effective feedback loops for performance management, reporting internally and externally.
- d. Develop a **theory of change (ToC)** and identify assumptions underpinning the proposed levels of change and corresponding milestones and indicators, based on lessons learnt. Donors and other stakeholders should participate in this process to ensure that the ToC covers all evidence-based assumptions and risks considering distinct lessons learned. All funding sources should be linked to the ToC, and well-integrated into planning and reporting.
- e. Put in place an integrated **monitoring and evaluation** system that enables continuous learning, reflection, validation of the ToC, feedback loops among program components, and adaptation of activities based on the learnings.

The other recommendations below cover the technical/scientific issues with respect to individual CGIAR or NARES breeding programs, and should guide all **Initiatives** under the Genetic Innovations portfolio⁹, including:

- **Accelerated Breeding:** Meeting Farmers' Needs with Nutritious, Climate-Resilient Crops (ABI)
- **Precision Genetics:** Accelerated Crop Improvement through Precision Genetic Technologies (ACI)
- **Breeding Resources:** Enabling Tools, Technology, and Services for Genetic Gains (N4ETTSS)
- **Seed Equal:** Delivering Genetic Gains in Farmers' Fields (SeEdQUAL)

4. Ensure the new One CGIAR structure encourages and enables strong links between initiatives to ensure that programs and goals reflect all the needs of the pathway from gene discovery to sustainable production systems and food consumption.

- a. Any initiative-level **theory of change** should link to the ToC of the Genetic Innovation Action Area, and be based on lessons learned, stating evidence-based assumptions and risks about spheres of control and influence.
- b. The Genetic Innovation Action Area and initiative-level results frameworks should ensure continuity and consistency to facilitate learning, planning and reporting, and, subsequently, evaluability.
- c. **Listen to all CGIAR breeders and implementing partners** and ask what they need. Change is built on equal and equitable partnerships built on trust, which takes time and proximity.
- d. Ensure that breeding programs recognize the need to breed **for likely future needs**, including the need for climate change tolerance/resilience and better nutritional quality.
- e. Establish formal mechanisms to monitor that the end-users and most **vulnerable and poor are not left behind**, in line with the first Sustainable Development Goal.
- f. Put Genetic Innovation staff on the ground: significant change will be achieved only if GI staff are sufficiently numerous and close to breeders and other stakeholders. Leading and managing such profound changes is rarely successful if conducted from a distance (not necessarily physical, but in terms of mindset).

5. Accelerated Breeding (ABI) should play a crucial role in further modernizing CGIAR and NARES breeding programs by being the link between upstream disciplines and breeding programs and knowing both in detail. In particular, the ABI must consider the following:

- a. Target breeding programs that have not yet 'modernized' and consolidate gains in others. The work of EiB is **changing the mindset** of CGIAR breeding programs, requiring follow-up [consolidation] activities.

⁹ Initiative titles were updated during the validation exercise; revised titles are used here for ease of reference.

- b. **Use breeding program assessments** to develop modernization strategies, improvement plans, and investment plans. Investment plans should be embedded in tailored, transformative, and integrated improvement plans with clear milestones and results linked to the CGIAR performance results measurement and common results frameworks. Assessments and plans should be followed up and renewed at regular intervals.
- c. **In simulation studies, establish a fine balance** between many factors. Theoretical and operational issues typically require a lot of assumptions that do not always hold. While simulation studies can create a lot of value toward the improvement of breeding schemes and approaches, this may not happen without a detailed understanding of each target breeding program. EiB was able to achieve this, and there will be continued need for improved capabilities and capacity to conduct this type of work within CGIAR-NARES partnerships.
- d. Support the development of **trait-specific markers** relevant to specific breeding programs (high-priority trait objectives from product profiles) to help increase the adoption of molecular breeding for faster development of market-ready varieties.
- e. Widen scope in terms of disciplines, add **phenotyping technologies** and methodologies in addition to breeding operations. Equip breeding programs with highly efficient phenotyping for improved decision-making and higher selection gains.

6. One CGIAR should support breeders with information and tools to allow them to determine priorities and traits. Breeding programs should incorporate the following considerations into decision-making:

- a. Formalize agreement with stakeholders, including donors, on how to balance priorities between major and minor crops and on prioritization and funding allocation to CGIAR or external programs (e.g., NARES). Recognize that progress is likely to be slower with some activities than others, and reflect this in evidence-based planning that is in-built in the results framework for tracking and measurement.
- b. Develop and regularly validate complete and useful product profiles as needed, at least for a number of breeding programs, possibly those involving the most interested or willing CGIAR or NARES breeders.
- c. Simultaneously, ensure that the market segmentation developed by crop breeding is used to define priority levels and that practices and resources are adequate for high-priority markets. Markets, as currently identified and described, should be validated with actors on the ground, including NARES and local private companies. Based on informative product profiles and market segmentation information, help partners—both people and organizations (CGIAR, donors, crop breeding leads, etc.)—develop action plans to use this information to make strategic decisions about which markets to serve and which products to develop.
- d. Complement the private sector in a meaningful way instead of merely copying [emulating] it.
- e. Continue to fully enable specific breeding programs rather than attempting to cover all programs and spreading resources too thinly for impact.

7. Highly technical facilities with resources and skilled staff are required for many modern breeding operations and services. Accelerated Breeding (ABI) should learn from previous experience in relation to these services:

- a. Maximize efforts to increase the reliability of **genotyping services**, from tissue sampling all the way to data or information delivery. Reflect on developing a different operational and business model to address logistical and operational issues that limit the potential of shared services and result in sending plant material overseas.
- b. Systematically engage **service providers and CGIAR or NARES stakeholders** in considering how to establish regional external service centers.
- c. Include proactively a holistic financial approach in the **planning of service externalization**. Establishing external services to replace internal capabilities without properly handling the internal capabilities is inefficient and may impact and potentially disrupt internal capabilities and structures.
- d. Engage with multiple **internal and external providers** as the demand for services increases to mitigate risks associated with dependence on a single external provider.

8. Seed Equal and Accelerated Breeding initiatives should continue to build long-term relationships with NARES and other partners through the following enhancements:

- a. Increase the breeding capacities in **NARES and SMEs** for improved genetic gain in farmer-preferred varieties (ABI).
- b. Increase awareness of the value of **molecular breeding at NARES** through trainings and capacity building. Ask for and listen to feedback from participants to facilitate increasing adoption of the approach and the use of shared services (ABI).
- c. Ensure that **seed multipliers provide quality seed of new improved varieties**, from CGIAR and NARES networks, at greater scale, tailored to the needs of the beneficiaries and thereby increasing varietal turnover and contributing to achieving genetic gains in farmers' fields (SeEdQUAL).

9. Commit to developing informatics systems for a diverse range of breeding programs, even though the effort is complex, expensive, and long-term. Accelerated Breeding initiative (and CGIAR as a whole) must include the following in its decision-making process:

- a. Develop **clear and strong objectives and strategies for breeding informatics activities, validated by an independent steering panel**. Such objectives and strategies, with the proper governance model in place, should be able to withstand any isolated attempts to significantly change them, thereby avoiding radical and unproductive changes in direction and maximizing the chance of delivery of value to end users.
- b. **Monitor the progress of enterprise breeding system (EBS)** development and its likely uptake by breeders. Maintain a dialogue with **users, donors, and platform maintainers** to ensure that decisive steps to cut support for legacy systems are taken at the right time to maximize resource allocation efficiency.
- c. Continue to support **other platforms and linkages** when EBS is not universally available or accepted.
- d. Fill in skills gaps within CGIAR and in partners with training (e.g., in the use of digital breeding tools, change management), matching breeding experts in various locations (e.g., Africa and Asia) with the needs of field support teams (BMS support teams).
- e. Keep the administrative burden of database use to a minimum.

1 Introduction

1.1 Rationale and Context of the EiB Evaluation¹⁰

The CGIAR Advisory Services Shared Secretariat (CAS Secretariat) supports and facilitates the CGIAR's independent advisory and evaluation services, comprising the Independent Science for Development Council (ISDC), the Standing Panel on Impact Assessment (SPIA), and an independent Evaluation function. The Evaluation function supports the implementation of the CGIAR System's multi-year evaluation plan to meet the CGIAR System's need for rigorous high-quality independent evaluations to inform decision making across CGIAR. As part of its 2021 approved workplan, it commissioned an external evaluation of the EiB Platform in August 2021. As the ongoing One CGIAR reform process resulted in the closure of the EiB Platform by the end of 2021, the evaluation team took this evolving context into account, to the extent possible, with a view to informing the work of the EiB Platform that will be continued by the various Initiatives under the One CGIAR structure. It should be noted that these initiatives were still under discussion at the time of the evaluation.

The evaluation team consisted of subject matter experts (SMEs) and a team leader (TL). Each SME was responsible for delivering the relevant module report, summarized in the Annexes 3-4 to this Evaluation Report. The evaluation TL was responsible for collating the unified evaluation report. Although they worked as a team, each SME and team member took editorial/authorial responsibility only for their expert input and content. A validation exercise was added to the evaluation on an extraordinary basis. For the validation exercise, CAS/Evaluation engaged the services of evaluation expert and two additional SMEs drawn from the CAS roster of vetted experts, with combined expertise in genetic innovation, plant breeding, and independent evaluation and familiarity with the CGIAR portfolio.

The final report combines the evaluation and the validation exercise and was confirmed with all parties involved in developing this evaluation product.

1.2 Purpose and Scope of the Evaluation

Consistent with the ToR and reiterated in the [Inception Report](#),¹¹ "This evaluation will serve the dual purposes of accountability and learning. It will be both summative and formative in nature and will assess the design, scope, implementation status and achievement **of EiB Platform objectives**. It will collate and analyze lessons learned, challenges faced, and best practices obtained during implementation to guide future planning. **It will assess the performance of the project against planned results**¹² and the preliminary indications of potential sustainability of results. The evaluation will provide essential evaluative evidence for decision-making by the CGIAR System Council, Excellence in Breeding Platform management, and its partners. **The evaluation will cover all the activities of the Platform from its initiation in 2017 through end of 2020** considering the need for timely evidence with the drivers, the transition to One CGIAR. The evaluation will integrate cross-cutting themes of Gender, Diversity, and Inclusion (GDI), youth, climate change and capacity development as well open data and intellectual assets."

Therefore, this evaluation covers the activities, outputs, and outcomes of the Platform from its inception in 2017 through middle of 2021, **regardless of the source of financing**—i.e., it includes all funding windows (W1/W2/W3/bilateral). Although bilateral (W3) funding by some of the System Council funders is governed by specific grant agreements, the W3 funding was de facto covered in EiB platform planning and reporting (EiB Platform POWBs and Annual Reports, respectively). Although some of this bilateral/multilateral funding extended beyond December 2021 under CtEH, beyond the life cycle of the EiB Platform per se, findings and conclusions around activities would fall within the scope of this evaluation, as this funding was made available to EiB during the timeframe covered by the evaluation.¹³

¹⁰ This section draws on the data provided in the relevant section of the EiB Platform Evaluation ToRs.

¹¹ Submitted to EiB management on September 28, 2021.

¹² For the purpose of this evaluation, original proposal, annual POWB and Annual reports are the core documents.

¹³ The financial data in scope are only those portions of bilateral grants that were scheduled to spend by the end of the period in scope. Thus, only a portion of a 50 million grant that runs through end of 2023 is in scope, only the portion of it that was scheduled to spend by the end of the period being evaluated.

1.3 Structure of the Evaluation Report

Section 3 covers evaluation scope and methodology, including data collection tools, with more detail provided in Annexes 1 and 2 (separate link). Section 4 outlines the main limitations encountered by the evaluation team, while Section 5 presents the key findings, according to the five OECD DAC evaluation criteria of Relevance, Coherence, Efficiency, Effectiveness, and Sustainability in line with the evaluation questions (and sub-questions) laid out in the evaluation matrix.¹⁴ Section 6 describes the main conclusions, while Section 7 presents nine core corresponding recommendations, with sub-recommendations on operationalizing them. The Annexes to this evaluation report appear in a stand-alone document. They include additional details on the methodology of the evaluation and validation exercise, as well as lists of documents consulted; the evaluation matrix; summaries of the five module-studies study on the Platform's governance, use of human resources, and change management and results of the online survey; an overview of data collection tools; and the executive summary of the evaluation terms of reference. The entire report main body and methodology annex fully incorporate the results of the evaluation validation exercise.

2 Overview of CGIAR Platform for Excellence in Breeding

CGIAR and its partners have a long history of investing in research aimed at delivering genetic gains to farmers' fields across the globe. Increasing the rate of genetic gain delivered directly by CGIAR breeding programs and supporting the modernization of national breeding systems are considered key challenges and serve as the rationale underpinning the Excellence in Breeding Platform, approved by the System Council in 2016. Individually, even the largest CGIAR breeding programs are considered too small to support rapid modernization by adapting and mainstreaming state-of-the-art breeding technologies. By combining efforts, and through the support of the EiB, it was expected that smallholders in the developing world would "be able to harvest the benefits of genetic gain much more effectively." As noted in the original **EiB Platform proposal** (2016), the aim was "to become the one-stop place to go for advice, tested resources and best practices for any breeding program targeting the developing world." The same document goes on to describe the "Vision of success for the Excellence in Breeding Platform" as "to enable staple crop and animal breeding programs targeting the developing world to make step changes in increasing genetic gains of cultivars and breeds delivered to farmers, for impact on food and nutrition security, climate change adaptation and development at large."¹⁵

After the 2016 proposal, the mission of EiB Platform underwent several changes, from facilitating access to breeding tools and services with a strong focus on data to a more prescriptive role of driving change by targeting specific breeding programs and providing guided support.

The stated overall objective of the EiB Platform and its understanding among stakeholders seemed to vary. An alternative version in the "Impact Pathway and Theory of Change for the EiB Platform" in the 2016 Proposal identifies a series of System Level Objectives (SLOs) to which the Platform is expected to contribute: "reducing poverty (SLO1), improving food and nutrition security for health (SLO2), improving natural resources systems and ecosystem services (SLO3), and enhancing the cross-cutting issues of climate change (A), policies and institutions (C) and capacity development (D)."

Box 1: Genetic Gain and Varietal Turnover

Genetic gain is defined as the improvement in average genetic value in a population or the improvement in average phenotypic value due to selection within a population over cycles of breeding.

Varietal turnover is defined as the replacement by farmers of an improved variety with a more recently developed improved variety; a process that entails a genetic change.

A major shift in the role of the EiB came about as a result of the six [requests made by the Funders of the Crops to End Hunger \(CtEH\)](#) initiative (see Box 2). The System Council (2019) approved the creation

¹⁴ See Annex 7 to this evaluation report; a stand-alone document.

¹⁵ EiB Coordination Platform: Full Proposal 2017-2020.

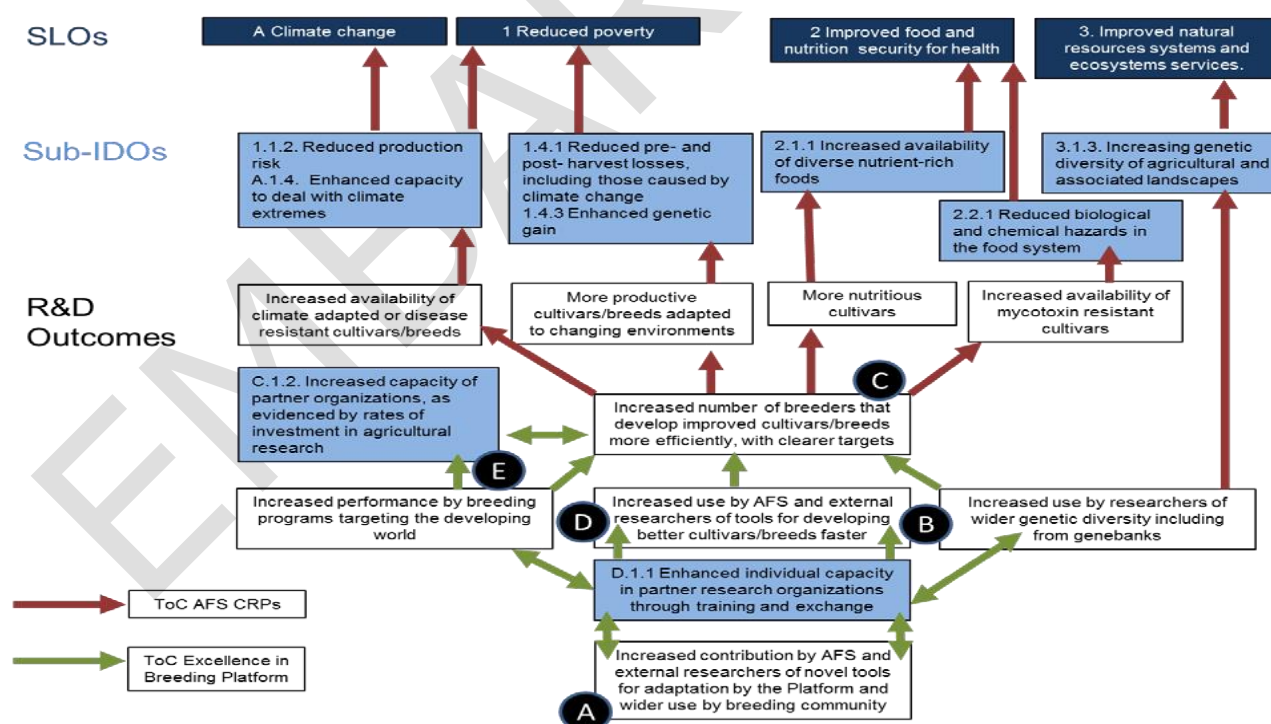
of a new EiB Funding Support Module for the CtEH Initiative for immediate implementation for the period 2019–2021.¹⁶

At the time of this evaluation, **the vision for the EiB Platform** was described as follows: "CGIAR-NARS breeding networks generate rates of genetic gain of $\geq 1.5\%$ p.a. and the average area weighted age of varieties in farmers' fields is <10 years."¹⁷ In the development of theories of change (ToCs) for each of the Platform modules in which members of the EiB evaluation team participated during inception phase of this evaluation,¹⁸ there was frequent reference to genetic gains as the overall aim and expected impact, and more specifically the target of "Increased rate of genetic gain to $>1.5\%$ p.a. or 2 x 2019 levels—whichever is greater." Also mentioned as overarching objectives were increased varietal turnover and improved quality of breeding programs.

2.1 Initial Impact Pathways and Theory of Change

Figure 1 depicts the impact pathway and ToC for the EiB Platform as presented in the original (2016) proposal. It demonstrates how EiB tools and services applied by agri-food system (AFS) CGIAR Research Programs (CRPs) would contribute to the Intermediate Development Outcomes (IDOs) of the respective CRPs, and thereby to the SLOs of the CGIAR: "By increasing the effectiveness of breeding programs targeting the developing world, the Platform will thereby contribute to the achievement of eight Sustainable Development Goals outlined by the United Nations (SDGs 1, 2, 3, 8, 12, 13, 15 and 17)." According to the proposed impact pathway, the EiB Platform, which did not have an independent R&D agenda, supported the AFS CRPs and external users in generating the sub-IDOs, emphasizing **the de facto co-dependence of the success of the EiB Platform on the success of the breeding programs.**

Figure 1: Theory of Change for the EiB Platform in Support of the AFS CRPs' Theories of Change (2016 Proposal)



Source: EiB Proposal, 2016.

¹⁶ Proposal for a Funding support module for the Crops to End Hunger Initiative as part of the Excellence in Breeding Platform, 16 May 2019 (System Council 8 Meeting) https://storage.googleapis.com/cgiarrg/2019/05/SC8-08_Rev1-CtEH-Module-Web-version.pdf

¹⁷ This vision was described in various presentations delivered by EiB management and in the proposed ToCs for the different modules, based on documentation presented to CAS and evaluation team.

¹⁸ TOC-related workshops were held in August 2021

2.2 EiB Platform Structure and Modules

The EiB Platform comprised 5 Modules that changed their scope and focus according to the evolving mandate of the Platform, as described above and depicted in Table 1. Two dedicated workstreams on **NARES engagement**¹⁹ and **Adoption and Outreach** activities were also added. The former was created in acknowledgment of NARES's key role in ensuring alignment with local needs, while the latter focused on encouraging digital technology adoption by breeders and breeding centers combined with capacity building.

Table 1: Mapping of EiB Platform Modules and Their Objectives

2016 Proposal	2021 Version ²⁰
 <p>1. Breeding program excellence Generic tools and services to support breeding program excellence across CGIAR and NARS breeding programs, based on (1) common metrics and standards for monitoring performance and indicators of genetic gains in researchers' and farmers' fields; and (2) advice, including from the private sector, on product and breeding program design, tool implementation, and dissemination.</p>	<p>1. Product design and management Performance management and metrics of success, from breeding station and laboratory to farmers' fields. Support client-oriented, gender-responsive product profiles. Define breeding processes, identifying gaps and investment needs.</p>
 <p>2. Trait discovery and breeding tools and services Drawing on the innovations taking place in breeding and research programs worldwide, lower the transaction costs to identify, access, and adopt newly emerging tools that support trait discovery and breeding. This module also provides the web platform where user groups upload successful applications from all modules and where feedback from users is captured.</p>	<p>2. Breeding scheme optimization Defining breeding schemes and identifying where optimization can occur. Applying quantitative genetics theory and population modeling (e.g., simulation) to optimize decision making and resource investment. Match market segment investment and right-sizing breeding pipelines. Building capacity and developing tools.</p>
 <p>3. Genotyping/sequencing tools and services (1) Procurement and coordination of common genotyping/sequencing services; (2) in collaboration with Module 5, customization of generic tools to support the sampling to data analysis pipeline; and (3) access to advice, including from the private sector, for the effective use of genotypic/sequencing information in breeding programs.</p>	<p>Support genotyping as a value-added service alongside EiB centralized comprehensive support. Assessment of appropriate genotyping applications. Lowest-cost services. Delivery of timely quality data to breeders and partners.</p>
 <p>4. Operations and phenotyping tools and services (1) Common approaches, tools, accelerated learning, and advice for using cutting-edge remote sensing, high-throughput precision phenotyping, targeting, mechanization, and automation approaches in breeding programs; (2) access to better value-for-cost laboratories for assessing physico-chemical composition and functional properties in plant and animal materials.</p>	<p>Current state assessments of agronomic practices, phenotyping, planting and harvesting, seed processing, and continuous improvement culture. Expert advice, manuals, and training in best practices and technologies. Support networks and reduced-cost services.</p>
 <p>5. Bioinformatics and data management tools and services Open-access tools and services linked to core databases to support both complex and integrated data analysis and management of breeding program data, necessary for CGIAR, NARS, and SMEs to increase genetic gains and also as a prerequisite for applying genomic and high-throughput phenotypic information in cultivar/breed development.</p>	<p>5. Breeding Informatics Deliver integrated and centralized analytic capability. Deliver software (i.e., Enterprise Breeding System) and support its adoption. Coordinate long-term strategy on data management systems for public breeding with EBS team, stakeholders, funders.</p>

¹⁹ Note that the two terms "NARS" and "NARES" are used throughout the report. The two terms are used by EiB, though there is a noticeable tendency to use "NARES" in recent documents.

²⁰ This 2021 description reflects information published on the EiB Platform website accessed in May 2021.

2.3 EiB Platform Management and Governance

The Platform worked across CGIAR and was hosted by the International Maize and Wheat Improvement Centre (CIMMYT), a CGIAR Center. The EiB Platform director reported to the CIMMYT's director general, who was also responsible for the performance management of the Platform director. The Platform director and CIMMYT held the primary operational responsibility toward the CGIAR System Office and System Council.

The EiB Platform was governed by a Platform Steering Committee (PSC) consisting of 13 regular members as outlined in the 2018 ToR for the PSC²¹: 12 representatives of CGIAR Centers, NARES, and the private sector plus the EiB Platform director. The ToR outlined the following main duties of the PSC: (a) providing strategic direction and oversight, setting priorities and evaluation of results of the Platform (b) guiding effective ways of working for CGIAR and NARS to help improve breeding programs, and (c) reviewing and making recommendations on the annual work plans and budgets as well as progress reports. The ToR also detailed that at least three meetings per year should be held, and the PSC should carry out an annual self-evaluation. Evaluation found evidence of six meetings (1 annual meeting in 2017, 2018, 2020; two (2) in 2019, 1 in 2021 through evaluated period). ²² In July 2019, prior to the six requests, the PSC rejected a request by the CtEH funders²³ that the EiB Platform PSC include funder representatives, as confirmed by interviews. In 2020, a CtEH committee was created with the participation of donors and key Center breeding leads²⁴ as "a mechanism to keep CGIAR Centers focused on progress on their Improvement Plans, which were developed in accordance with the conclusions and

Box 2: Crops to End Hunger (CtEH)

The **Crops to End Hunger (CtEH)** initiative is a multi-funder global initiative aimed to accelerate and modernize the development, delivery, and wide-scale use of a steady stream of new crop varieties that are developed with a view to **meeting the food, nutrition, and income needs of producers and consumers** in Africa and other vulnerable regions. Endorsed by System Council in 2019, the CtEH Initiative planned to embrace both a modernization (or uplift) aspect as well as continued support to the optimized breeding activities of CGIAR Research Programs (CRPs) and CGIAR Centers. To this end, the Funders and One CGIAR addressed six specific requests to CGIAR Breeding Programs:

1. Develop pipeline investment cases
2. Incentivize management and staff to deliver higher genetic gain
3. Develop strategic plans for delivery to farmers and varietal turnover
4. Quantitatively optimize pipelines to increase genetic gain
5. Implement shared services
6. Build national agricultural research systems' (NARS) breeding networks and capacity.

In 2020, the EiB was tasked with realization of the full potential of the CtEH initiative by:

- Coordinating and facilitating improvements to meet the "Six Requests"
- Overseeing and facilitating subgrants with targeted Centers/NARS to overcome barriers in implementing their improvement plans
- Facilitating shared, system-wide breeding support services
- Linking to external contributors such as private sector or research institutions.

The CtEH proposal (2019) stated that "the Excellence in Breeding Platform ('EiB') exists to lead, coordinate and support the response to the CtEH Initiative at both a System level and for individual CGIAR Centers and breeding pipelines." **The Funders' six requests essentially rewrote the mandate of the EiB Platform**, assigning it responsibility for breeding program modernization across CGIAR, and adding an implementation and accountability function to the capacity building and coordination roles it was initially designed to perform.

²¹ <https://excellenceinbreeding.org/sites/default/files/u107/TORs-%20EiB%20Platform%20Steering%20Committee%20%28002%29%5B1%5D.pdf>.

²² Three PSC meeting records were provided and three were accessed online by the validation team (September 2017, December 2018, April 2019, July 2019, April 2021). The evaluation team did not find evidence of annual self-evaluation occurring in practice.

²³ <https://storage.googleapis.com/cgiarorg/2019/04/SC8-08-CtEH-Module.pdf>.

²⁴ An interview. Clarification note: although CtEH funders were not technically constituted as a committee, at least de facto, there is an indication from informants the group was perceived as such.

recommendations of the [Breeding Programme Assessment Tool](#) (BPAT) reports.” The relationship between this CtEH committee and the PSC will be discussed later in this report.

2.4 EiB Platform Funding and Budget

According to the EiB Platform proposal, the foreseen six-year budget amounted to just over US\$68m with annual budgets of between US\$10 million and US\$12 million (Table 2).

Table 2: CGIAR Excellence in Breeding Platform Funding and Budget (US\$), 2017 Proposal

Module	2017 Period 1	2018 Period 2	2019 Period 3	2020 Period 4	2021 Period 5	2022 Period 6 ²⁵	Total
M1. Breeding program excellence	1,824,627	1,915,858	2,011,651	2,112,234	2,217,846	2,328,738	12,410,954
M2. Trait discovery and breeding tools and services	2,146,559	2,253,887	2,366,582	2,484,911	2,609,156	2,739,614	14,600,710
M3. Genotyping / sequencing tools and services	936,116	982,922	1,032,068	1,083,672	1,137,855	1,194,748	6,367,381
M4. Phenotyping tools and services	1,534,011	1,610,712	1,691,248	1,775,810	1,864,600	1,957,830	10,434,211
M5. Bioinformatics and data management tools and services	3,101,892	3,256,987	3,419,836	3,590,828	3,770,369	3,958,887	21,098,798
Management & support cost	456,794	479,634	503,615	528,796	555,236	582,998	3,107,073
Sub-Totals/Total	10,000,000	10,500,000	11,025,000	11,576,250	12,155,062	12,762,816	68,019,128

In terms of the budget allocation per module, Module 5 was to receive the largest share, with US\$21,098,798 (31%). Module 3, with US\$6,367,381, was allocated the smallest budget (9%). Notably, Period 6 would have been truncated, as the sixth year of the project was not implemented owing to CGIAR reform; this partially explains the -37% difference. Table 3 compares proposal and POWB-based estimates. While POWBs account for carry-over from the previous year, in totality the planned funding by module illustrates significant differences between what was originally envisioned and what later occurred in planning.

Table 3: EiB Platform 2016 Funding Proposal Versus 2017–2021 POWBs, by Module (US\$)

Module	2016 Proposal	2017–2021 POWBs	Difference between POWBs and proposal	% Change
M1. Breeding program excellence	12,410,954	6,287,044	-6,123,910	-49%
M2. Trait discovery and breeding tools and services	14,600,710	6,589,782	-8,010,928	-55%

²⁵ Funding for all 12 CGIAR Research Programs and 4 Platforms was truncated by 12 months: 2017 to 2021, instead of 2022.

Module	2016 Proposal	2017–2021 POWBs	Difference between POWBs and proposal	% Change
M3. Genotyping/sequencing tools and services	6,367,381	4,239,518	-2,127,863	-33%
M4. Phenotyping tools and services	10,434,211	5,466,211	-4,968,000	-48%
M5. Bioinformatics and data management tools and services	21,098,798	13,973,684	-7,125,114	-34%
Management & support cost	3,107,073	6,011,689	2,904,616	93%
Total	68,019,128	42,567,928	-25,451,200	-37%

Source: 2016 EiB Proposal and POWBs 2017–2021

Table 4 shows EiB Platform figures from Plans of Work and Budget (POWBs) and annual reports. When considering the overall pattern between POWB estimates and final annual report figures, for 2021 POWB figures were taken as a proxy. The EiB Platform budget for the duration through the end of 2021 was planned for US\$77,997,777, and final spent amounts would be US\$56,609,818; this puts the original 2016 proposal budget roughly in the middle at US\$68,019,128. It should be noted that neither the 2021 POWB nor an annual report proxy fully accounts for CtEH funding for selected grants scheduled to run through 2022²⁶.

Table 4: Excellence in Breeding Platform POWBs Versus Annual Reports, 2017–2021 (US\$)

Funding window	Year	POWB, 2017–2021	Annual report 2017–2020, proxy 2021
Total W1/W2		2,000,000	1,190,000
Total W3/bilateral		8,000,000	104,000
Subtotal	2017	10,000,000	1,293,000
Total W1/W2		1,955,000	2,087,000
Total W3/bilateral		1,866,812	1,329,000
Subtotal	2018	3,821,812	3,416,000
Total W1/W2		2,561,216	1,559,000
Total W3/bilateral		2,993,450	4,153,000
Subtotal	2019	5,554,666	5,712,000
Total W1/W2		1,700,000	2,560,000
Total W3/bilateral		6,208,002	3,609,000
Subtotal	2020	7,908,002	6,169,000
Subtotal	2021	23,428,818	(23,428,818) *
EiB Platform Total		77,997,778	56,609,818
EiB Platform Proposal (2016)		68,019,128	

* Proxy number in the absence of 2021 spending figures.

Source: EiB POWB documents and annual reports.

The POWB for 2021 further highlights the complementarity of CtEH funding in the funding sources: "Funding for the Excellence in Breeding (EiB) Platform comes from CGIAR Trust Fund and generous donors including national governments, foundations, development banks and other public and private agencies, as well as the Crops to End Hunger initiative." This underscores the importance of including

²⁶ CAS/Evaluation note: From a separate grant-related document provided by the EiB project manager in June indicated the 6 out of 25 grants to finish throughout 2022. Of those under 'funding' 2 were labeled as CtEH (USD 1,476,678), 1 – BMGF (USD 3,508,599) and 3- other (USD 717,255). Comprehensive triangulating of evidence was not possible since further explanation on a relationship between grant funding tracking by project manager and budget figures from the finance manager was not provided upon request.

both funding streams in the scope of the evaluation. Section 4.3 provides a targeted discussion of the evaluation criterion Efficiency.

3 Evaluation Scope, Methodology, and Limitations

3.1 Scope of the Evaluation

Consistent with the evaluation purpose and scope (see section 2 and the [Inception Report](#)²⁷), “*This evaluation will be both summative and formative in nature and will assess the design, scope, implementation status and achievement of **EiB Platform objectives**. . . . It will assess the performance of the project against planned results²⁸ and the preliminary indications of potential sustainability of results. The evaluation will provide essential evaluative evidence for decision-making by the CGIAR System Council, Excellence in Breeding Platform management, and its partners. **The evaluation will cover all the activities of the Platform from its initiation in 2017 through end of 2020** considering the need for timely evidence with the drivers, the transition to One CGIAR.*”

Therefore, the scope of the evaluation covers the activities, outputs, and outcomes of the Platform from its inception in 2017 through to the end of 2020²⁹ **regardless of the source of financing**—i.e., it includes all funding windows (W1/W2/W3/bilateral). Although funding by some of the same (System Council) donors, such as the Bill and Melinda Gate Foundation (BMGF), the U.S. Agency for International Development (USAID), and Gesellschaft für Internationale Zusammenarbeit (GIZ), is also governed by specific grant agreements, these funds were de facto covered in planning and reporting (according to EiB Platform POWBs and annual reports, respectively) and therefore are within the scope of this evaluation. It is also important to point out that although some of this bilateral/multilateral funding extends beyond the life cycle of the EiB (which ended in December 2021), this does not imply that spending planned to occur during the life of the Platform is beyond the scope of the evaluation, as this funding was made available to EiB during the timeframe covered by the evaluation.³⁰

Consistent with the evaluation purpose, the evaluation was guided by five evaluation criteria, aligned with the CGIAR Evaluation Policy. Seven core evaluation questions (EQs) were elaborated to meet the evaluation objectives and were validated with the Strategic Impact, Monitoring, and Evaluation Committee (SIMEC)³¹ (see Table 5). The sub-questions are presented in the evaluation matrix in Annex 5, aligned with key EQs within the scope of this evaluation.³²

Table 5: EiB Platform Evaluation Criteria and Key Questions

Criteria	Key evaluation questions
Relevance	1. To what extent are the EiB Platform’s objectives relevant to the needs of its internal and external partners and stakeholders, including end-users?
Coherence	2. How synergetic is the EiB Platform with other platforms and CRPs in CGIAR and comparable public and private sector programs/ initiatives?
Efficiency	3. Have resources (funds, human resources, time, expertise, etc.) been allocated strategically and timely to achieve Platform outputs and outcomes?

²⁷ On August 20 evaluation team requested feedback on the evaluation design matrix, key building block towards the development of the Inception report; subsequently pre-final version of the Inception report was shared with EiB management on September 28, 2021, for feedback. EiB platform did not comment on either of the documents.

²⁸ For the purpose of this evaluation, the original proposal, annual POWBs, and annual reports are the core documents for framing assessment of planned versus achieved results.

²⁹ This evaluation also drew on more recent data, when available.

³⁰ This timeframe extended to August 2021 in the case of financial data.

³¹ <https://www.cgiar.org/how-we-work/governance/system-council/system-council-standing-committees/>

³² Consistent with annual reports, selected evaluation questions specifically refer to the work of EiB funded by diverse funding sources—e.g., EQ 3.5 How efficient was the grant awarding process? 6.1 How well has EiB platform been positioned to respond to the 6 requests from CtEH Funders (2020)? 6.2 What are the key lessons learnt for sub-grant projects continuing past 2021, and for future design of similar initiatives?

Criteria	Key evaluation questions
Effectiveness	<ol style="list-style-type: none"> 4. To what extent did the Platform achieve progress towards planned results? 5. Which internal and external mechanisms and factors, including inputs, contributed to, or inhibited, achievement of outputs and outcomes, intended and unintended?
Sustainability	<ol style="list-style-type: none"> 6. What mechanisms have been put in place to ensure that EiB Platform assets, products, and mechanisms are positioned to respond to donor requests (CtEH)? 7. Which elements of the EiB Platform assets are likely to sustain and contribute towards One CGIAR?

In line with standard evaluation practice, Effectiveness is understood to entail an assessment of the Platform's achievement of outcomes as well as outputs, even though the former may fall beyond the range of control of the Platform. In other words, the **EiB Platform was accountable for achievement of the planned results that fall within both its zone of control and its zone of influence**. This reflects the de facto co-dependence of the success of the Platform on the success of the CGIAR breeding programs (BPs), as validated by the EiB director.³³

3.2 Methodology

In accordance with the evaluation TOR, the evaluation adopted a mixed-methods approach (qualitative and quantitative) to collect data and assess EiB Platform achievements and progress toward results (outputs and outcomes). The evaluation design and implementation were guided by the following principles: participatory, learning-oriented, utilization-focused, and gender responsive.³⁴ Limitations in 4.3 describe selected challenges in operationalizing those principles, and Annex 1 includes more detail.

By request of the evaluand, particular attention was given to organizational development and the management of change both within the Platform and by partners. The following definitions and framework guided the presentation of findings and the formulation of conclusions and recommendations:

- **Organizational development (OD)** is understood as a set of interventions developed with a systematic mindset that create alignment with an organization's goals and activities in a planned and intentional way, with a view to bringing about a particular result that will improve the overall performance of the organization. OD focuses on the organization's strategy, goals, and core purpose, as well as on maximizing the value gained from the organization's resources, including:
 - ✓ *People*: e.g., people, processes, leadership, culture, human resources policies, and organizational behavior. Driven by the behavioral sciences, typical interventions include performance management, reward and motivation, employee surveys, psychometrics, coaching, mentoring, and training.
 - ✓ *Technology and operations*: e.g., science/R&D, operations, and physical structure. Typical interventions include Lean/Six Sigma, business process re-engineering, outsourcing, and training.
 - ✓ *Strategy and structure*: e.g., business planning, transformation programs, corporate/central services.
- **Change management** is a collective term for all approaches to prepare, support, and help individuals, teams, and organizations to bring about organizational change. Critical within change management is the role of the individual. It therefore requires an understanding of resistance, organizational defence routines, pervading cultures, and the engagement process required to bring people along.

The evaluation matrix (see Annex 5) formed the main analytical framework and set out how to answer evaluation questions. The evaluation matrix breaks down the main questions into sub-questions, mapping them to indicators, data collection and analysis methods and/or lines of inquiry, and sources of information. Its use helped ensure that all data collected was analyzed and triangulated, resulting in a robust, credible (reducing subjectivity in the evaluative judgment), and transparent evaluation report. The validation of results and quality assurance relied on triangulating data and findings from different data sources and methods—e.g., cross-checking the results of surveys with key informant interviews

³³ This co-dependence was pointed out by the EiB Platform director at the 2020 annual meeting; in his address to the breeding program representatives, he stated, "Our success depends on your success."

³⁴ CAS/Evaluation: Despite feedback provided, clarity on how the principle of gender responsiveness was operationalized was not provided by the original evaluation team.

(KIIs). This approach allowed the evaluation team to ensure transparency, independence of judgment, and minimization of bias.

The qualitative methods included semi-structured KIIs, document analysis, and deep dives into three breeding programs³⁵. Summaries of the five module assessments and one cross-cutting study (on governance, the use of human resources, and change management) are included as Annexes 3 and 4 of this report, and interview and survey guides appear in Annexes 6 and 7.

In October 2021 a subject matter expert (SME) carried out a field visit to a partner organization in India, Indian Council of Agricultural Research (ICAR). For the focused reviews, the visit included with four face-to-face interviews of scientists related to ICAR wheat, rice, and chickpea breeding activities, under the auspices of a BMGF-funded project.³⁶

Together, the evaluation and validation³⁷ teams conducted 71 interviews. Figure 2 shows the distribution of interviewees by category: 22 were with EiB staff, 17 were with CGIAR Center staff (non-EiB), 12 were with private sector representatives, 9 were with NARS, 6 were with donors, and 5 were with members of academia; 31% were women (see Annexes 7 and 8).

Figure 2: Interviews by Categories of Affiliation (N=71)

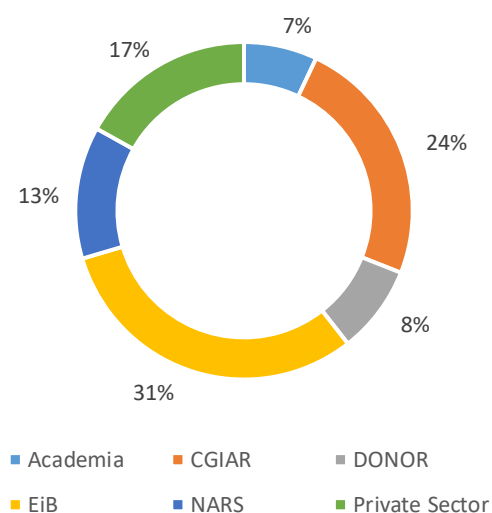
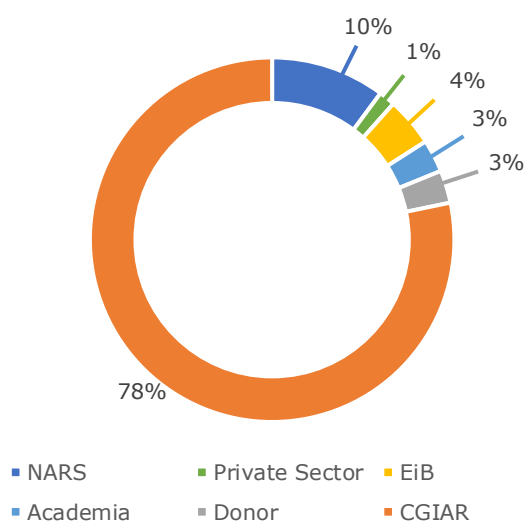


Figure 3: Survey Respondents by Categories or Affiliation (N=68)



Among the quantitative methods used, in addition to drawing on available statistical data, the team conducted an **online survey** targeting ninety-six individuals from both EiB Platform team and external partners (see Figure 3)- response rate was at 73%. The **survey** was open between from October 6 to 21, 2021; respondents were 21% female and 79% male. Questions covered the following themes: the Platform work environment and leadership, change management, partner engagement, and insights into things that were working/not working well in the Platform (see Annex 7). EiB team members were asked about their work environment, Platform leadership, and change management. External partners were asked about the Platform's purpose, recent change efforts, and their level of satisfaction with the Platform's products and services. All survey responses were triangulated with other evidence throughout this report (see Annex 7.1 for questionnaire and 7.2 for responses).

In line with CGIAR Evaluation Policy and standards in the Evaluation Framework, across the evaluation lifecycle a multilayered quality assurance system was followed. CAS quality assurance of evaluations includes external peer review at two stages in the evaluation process. Evaluation peer reviewers checked the choice of methodology for quality and technical soundness and reviewed the draft evaluation report; the SME peer reviewers reviewed the module and component study reports. Issues raised during quality

³⁵ CIMMYT-Maize and CIAT-bean and NARS [ICAR- (Wheat, Rice, and Chickpea) and CRI-Rice.

³⁶ Owing to limited availability of documentation, focused reviews were conducted in lieu of the case studies planned in the inception report. Additional detail on the focused reviews is available by request.

³⁷ Fourteen interviews with 16 individuals were conducted during the validation exercise; see Annex 2 for more detail.

assurance were mitigated only to a certain degree, which changed the evaluation timeline and necessitated the validation exercise.

As per agreement with SIMEC and the endorsed TOR, CAS/Evaluation Lead agreed to an independent external validation review of the EiB Platform evaluation pre-final report, which was submitted by the commissioned external evaluation team on February 22, 2022. This systematic validation process was meant to review the report's findings and conclusions, beyond the original list of recommendations made. The methodology for the validation exercise and overview of findings are presented in Annex 2. The consequence of the exercise, intended to bring the evaluation to a close, is that the views in this report do not necessarily represent all views of the original evaluation team.

The evaluation and validation teams followed the confidentiality clauses as outlined in standard CGIAR contracts and complied with CAS Secretariat's [conflict of interest \(CoI\) policy](#). They declared and CAS assessed any actual, perceived, or potential CoI for each of the selected consultants (see Annex 10).

3.3 Limitations

The EiB Platform evaluation faced several limitations, the majority of which could not be mitigated as envisioned in the Inception Report. A validation exercise (see Preamble and Annex 2) was conducted to address the contested areas and attempt to further mitigate limitations.

The EiB team's limited understanding of the purpose and nature of the evaluation was one of the root causes of the need for the validation step. As they are responsible for the evaluation function within CGIAR, evaluation team thought that CAS should have ensured that EiB management understood the purpose of the evaluation and the importance of their engagement prior to the launch of the evaluation³⁸. Although the Platform leadership and subsequently the coordination team were engaged early in the process and invited to participate actively in the evaluation through the review of the evaluation matrix, the inception report, data collection instruments, only limited feedback was received (e.g., no feedback was provided on the evaluation TOR and inception reports).

Another root cause contributing to the lack of engagement and other limitations was the timing of the evaluation. The evaluation followed the timeline agreed in the ToR and vetted by SIMEC. However, when the deadline for submitting One CGIAR initiative proposals was shifted from June to September 30, 2021,³⁹ this meant that the EiB Platform leadership had limited availability in the first two months of the evaluation owing to their intense involvement in the CGIAR reform and design of initiatives. While a worthy and notable exercise, the development of ToC in response to donors' requests (August 2021) also hindered ability to engage with the evaluation team on document provision; the ToC workshops were largely forward looking. In many cases, core interlocutors such as the module leads and high-level management were not available until after 1 October, requiring extension of the evaluation timeline beyond the originally foreseen four months.

A related constraint has been the partial and incomplete nature of the information made available to the evaluation team, with some provided information later disputed by the evaluand as incomplete or misleading. Only limited documentation was shared proactively by EiB from the evaluation team onboarding in August through development of the inception report (October 2022). Notwithstanding the extensive list of documents consulted by the evaluation and validation team (Annex 9), access to documentation, including key documents such as BPAT (Breeding Program Assessment Tools) reports, was extremely challenging. It was also difficult to locate information related to some of the activities carried out by the EiB Platform team—e.g., trainings/capacity-building events, number of participants—but more important, it proved challenging to access data that capture the outcomes of the Platform's work. For example, the evaluation team was unable to find information on the impact or effectiveness of training/capacity building. Likewise, in the case of the toolbox, feedback from internal IT and other toolbox developers and managers indicates that the value and impact of toolbox use was not formally

³⁸ CAS/Evaluation note: Despite significant engagement of the evaluand by CAS at the scoping stage in development of the TOR and subsequently quality assurance, the limitation was not fully mitigated. This lack of understanding can be partially attributed to the limited involvement of the M&E professional on the evaluand's side during the development of the evaluation design matrix and, subsequently, the inception report. The EiB Platform M&E expert left in February 2021, and a new consultant started in March 2021. Her task related to the actual evaluation was limited to provision of selected documents during the scoping. This presents an important lesson, and a prerequisite for future evaluations (i.e., assigned M&E professional committed to interact throughout the evaluative process and accompany the evaluand management).

³⁹ Originally planned to June 2021.

assessed and that user feedback mechanisms were not applied. Compounded by the reduced time available for interviews of the EiB team, opportunities to cross-check information and views from different stakeholders based on evidence from the EiB team were limited and generally insufficient.

A further complication resulting from the tight deadlines faced by the evaluation team has been the impact on the planned sequencing of the evaluation. Initial plans called for the findings identified in the various studies (modules, components, and focused study on breeding programs) to feed into the overall evaluation report, but in an attempt to respect deadlines, these had to be developed in parallel⁴⁰.

At the validation stage, all the core documents were available, but interview notes from the initial evaluation were anonymized and grouped, and often paraphrased, reducing their value. The validation team was given less than 40 person days (excluding the time of CAS Evaluation Lead) to finalize validation of the evaluation. This included a rapid learning phase to understand the work of the EiB Platform, the original evaluation, and the details of the response by the Platform. Validation was not a repeat of the evaluation and focused on areas of contention in the initial report and to building a more substantial set of recommendations for use by CGIAR (see preamble and Annex 2 for additional detail).

4 Key Findings

Findings below are presented by evaluation criteria and EQs and related evaluation questions (Table 4).

4.1 Relevance

This section presents findings related to the extent to which the Platform's objectives were relevant to the needs of its internal and external partners and stakeholders, including end users in target groups.

As regards the **relevance of the EiB Platform's objectives**, understanding of what these objectives were varied widely both across and within stakeholder groups as well as in the relevant documentation (see section 2.3.1). Definitions of the overall goal/objective of the EiB Platform range from poverty reduction, improved livelihoods, reduction of hunger, improved nutrition, women's empowerment, and climate change (CC) mitigation and/or adaptation to modernization of breeding programs, improved quality of breeding programs, genetic gain, varietal turnover, reduced breeding cycle times, improved selection intensity, and the Funders' six requests. The goal of the platform was not clearly set out in the proposal or in subsequent documents; at different stages⁴¹ the Platform expressed its aims as increasing genetic gain and variety turnover, modernizing CGIAR breeding programs, "tools and services that create synergies and accelerate genetic gains of breeding programs targeting the developing world," and developing world-class CGIAR and NARS breeding programs. Without clearly defined goals, it was not possible to define a Platform strategy, either in terms of what the Platform was pursuing or in terms of how to get there (theory of change). Furthermore, the absence of a coherent, commonly agreed, robust Platform strategy facilitated the abrupt, sharp changes in approach made by some of the individual modules (commented on below). Without clearly defined goals, it was not possible to develop a viable theory of change that correctly identified intermediary goals and milestones as well as levels of control, influence, and interest. It was also not possible to assess whether processes were on track to deliver their expected results or to report back to donors and other stakeholders in a meaningful way on results achieved. This shortcoming also made accountability and lesson learning difficult. The importance of clearly defined and realistic objectives for broad partnerships, such as those foreseen by EiB, had already been identified in the case of CGIAR Challenge Programs, which can be considered precursors of EiB, in a 2008 study.⁴² In that study, the author stresses that "clearly defined and realistic objectives, which can be primarily reached by the partnership alone must be established and are crucial for program success measurement."

The rationale underpinning the EiB Platform was solid and aligned with the needs of Centers.

According to the external reviews carried out by the University of Queensland (UoQ) using the Breeding Program Assessment Tool (BPAT), there was a strong and urgent need to modernize and improve all CGIAR breeding programs. The evaluation team found overall agreement among EiB Platform

⁴⁰ CAS/Evaluation note: CAS/evaluation engaged with the evaluation team on adjusting the timelines. The evaluation team did not communicate changes in their schedules which conflicted with the changing evaluation timeline, and hence caused quality issues. Annex 2 and Preamble provide additional background on timelines and their effect on the evaluation completion.

⁴¹ These different stages include the EiB website, KIIs, and proposal title page.

⁴² Palenberg, 2008

stakeholders about its role as a cost-effective means of modernizing CGIAR breeding programs—by combining efforts, aggregating demand across the CGIAR system, and providing centralized, standardized services—thanks to the ensuing increase in scientific relevance as well as operational and financial efficiencies (economies of scale). In many ways, the EiB Platform can be seen as a precursor to the One CGIAR cross-center, cross-crop approach with centralized services and tools, common approaches and methodologies, economies of scale, and the promotion of best practices. **However, although the concept was sound in theory, in practice it was less so:** the Platform ran into difficulties in the form of lack of buy-in from partners to the proposed modernization and improvement effort.

This was borne out by the responses to the online survey, which suggested that there was (or, given the small sample of 21, *might* have been) scope to improve the relevance of the services that EiB provided to CG Centers and NARES. To the question “do the EiB Platform’s products and activities address your new and evolving needs?” although 1/3 said “yes,” 2/3 answered “somewhat” or “no” (Annex 7). Various cited reasons included lack of buy-in (the Centers, used to pitching themselves as the best, may not have been very open to suggestions that they need to improve); a lack of culture of combining efforts and embracing organizational change; the perceived top-down approach promoted by the EiB (a perception of telling people what changes they need to make rather than working collaboratively with them to reach agreement on what is needed); and problems with some aspects of the underpinning logic, such as the links between the results/recommendations of breeding program assessments that would lead to the development of improvement plans, which in turn would be supported by investment plans (see Box 3 below⁴³).

Alignment with priorities and capacities of NARES was given a push by being included as one of the Funders’ six requests, which called for building national agricultural research systems’ (NARS) breeding networks and capacity. To this end, a CG-NARES collaborative model with defined roles and responsibilities was developed and had been signed by 8 of the 14 targeted NARES by May 2021.⁴⁴ The proposed model was a generic framework intended to be customized for each crop network and each NARES participating in that network. Although there was a clear acknowledgment that all NARES are at different stages of development and so will have different roles to play—those with more capacity having more upstream functions, while others may prefer to focus entirely on downstream functions due to lack of resource capacity or market opportunity—the feedback received by the evaluation team was that **although things are improving, NARES are not yet treated according to their attributes.** The relationship with NARES is described variously: some interviewees point to improving relationships between EiB and NARES staff whereas others, from EiB primarily, characterize the relationship as patronizing (e.g., “we will send you breeding lines to test”)⁴⁵. In some countries such as India, NARES can be better equipped than CG Centers (in terms of infrastructure, equipment, people, and resources in general). There is a strong sense among NARES, EiB staff, PSC members, and other interviewees that more responsibility needs to be transferred to those NARES capable of assuming it; NARES are a critical element of a fully functional pathway to delivering improved varieties to farmers. As such, NARES are the “boots on the ground,” interacting with farmers, pushing for change, and getting feedback, and so are best placed to develop more relevant profiles. Evaluators noted two missed opportunities: First, to adaptively replicate and expand collaborative models (exemplified by co-creation models such as the CIAT PABRA and FLAR models and the Syngenta Foundation for Sustainable Agriculture approach). Second, NARES needed to be consulted more by EiB in the market segment/pipeline work carried out under Module 1 (interviews and document analysis). For an organizational effectiveness perspective on the assessment-planning-implementation cycle and change management, see section 5.4.

Regarding **alignment of the EiB Platform with end users**, EiB, through the work being carried out by Module 1, continued and expanded the work of CRPs in shifting the paradigm by placing emphasis on market segments and product profiles—i.e., presenting breeding as a product development exercise

⁴³ CAS note: The original evaluation team found improvement plans (IPs) inadequate, failing to generate collaborative engagement, insufficiently holistic, and not resolving limiting factors. The original evaluation team found IPs are often not seen as part of a transformational change process. For the record, content in Box 3, by the original evaluation was scoped down and evaluative statements surrounding other projects and parties not subject to the evaluation, hence out of scope, were redacted. The validation team called up more information from a case study performed during the original evaluation, to triangulate findings.

⁴⁴ Information supplied by EiB, evidence as of May 2021. The eight NARS are NARO (Uganda), KALRO (Kenya), SARI (Ghana), ISRA (Senegal), FOFIFA (Madagascar), NRCI (Nigeria), TARI (Tanzania) and CORAF (West Africa).

⁴⁵ For the record, the original evaluation team found relationship with NARES is often described as patronizing, and the validation corroborated their finding of clear acknowledgement that NARES are at different stages of development so will have different roles to play.

rather than research.⁴⁶ Some interviewees expressed dissatisfaction with what they consider to be the more restricted focus of EiB work. As noted above, originally, the Platform was to become the hub for advice, tested resources, and best practices for **any breeding program targeting the developing world**. With the launch of the CtEH initiative, USAID commissioned the International Food Policy Research Institute (IFPRI) and the U.S. Department of Agriculture's Economic Research Service to estimate the impacts of faster productivity growth for 20 food crops on income and other indicators in 106 countries in developing regions in 2030. According to their modeling,⁴⁷ faster productivity growth in **rice, wheat, and maize** would increase economy-wide income in the selected countries in 2030 by US\$59 billion, US\$27 billion, and US\$21 billion respectively, followed by banana and yams with increases of US\$9 billion each. According to this paper, faster productivity growth in rice and wheat reduced the population at risk of hunger by 11 million people and 6 million people respectively, followed by plantain and cassava with reductions of about 2 million people each. The findings of this paper significantly impacted the focus of the EiB Platform, inducing a shift away from "any breeding program targeting the developing world (including fish, livestock)" to the current focus on rice, wheat, and maize, which accounted for 57% of W1/W2 funding in 2019.⁴⁸ According to data provided by the EiB team, the proposed funding under One CGIAR, with the Accelerated Breeding Initiative (ABI) proposing that \$16.2 million out of a total of \$33.7 million (48%) target these three crops (rice, wheat, and maize).

As noted in section 2.3, EiB's role shifted from the provision of services and tools (reactive role) to driving the breeding modernization process (proactive), with the CtEH Funders' six requests completely rewriting EiB's mandate, including that of the modules. Some modules have also evolved and changed course, in certain cases taking sharp turns that, in the absence of compelling justification or steering from the PSC, appear to reflect different individual priorities.

- During the period 2017–2020, Module 1 essentially promoted and engaged in the development of product profiles aimed at setting breeding targets toward varietal turnover. The module developed and collected 372 product profiles that provide some insights into traits and trait levels on which breeding programs should focus. After early 2020, all work on product profiles stopped, and Module 1 shifted its focus towards identifying and characterizing the market segments underpinning CGIAR's crop and geographic mandate referred to above.
- Likewise, during its first two years, Module 4 operated as a global platform aiming to serve all breeding programs with phenotyping tools and services. However, after 2019 it acted more as a preferred partner for a few BPs,⁴⁹ tailoring tools and services to their priorities and capacities. The module conducted assessments of a limited number of breeding operations, providing advice on trialing operations and helping them improve practices and secure critical small equipment.

EiB proved adaptive from early 2020 as the global pandemic started. During the early stages of the spread of COVID-19, EiB adapted as best it could. In the case of Module 3, low-density services performed by external providers (such as Intertek, DarT) remained fully operational and provided a critical service for quality control (QC) and marker-assisted selection (MAS). This ensured that the samples from both CGIAR and NARES were processed without delays. Capacity development through training and workshops was also maintained to a large extent.⁵⁰ EiB addressed the limitations on face-to-face training by upgrading the Platform's Learning Management System (EiB-LMS). This continuation of service can be considered an important achievement under COVID conditions. Given the importance of face-to-face interactions and site visits, Module 5 and the NARES engagement workstreams were the most impacted by the restrictions imposed by the pandemic, though that work was resuming throughout 2021.

⁴⁶ In recent years, plant breeding has shifted from a research-driven endeavor to a demand-driven one. This shift has been taking place globally, mostly in large seed companies. It has been formalized through the development of so-called product profiles. The concept of product profiles started to make its way into CGIAR breeding programs in the mid-2010s, as can be seen in the case of some CRPs.

For the record, the original evaluation team found supported product profiles fall short of contemporary standards, lacking relative trait priorities.

⁴⁷ Wiebe K, Sulser TB, Dunston S, Rosegrant MW, Fuglie K, Willenbockel D, et al. (2021) Modeling impacts of faster productivity growth to inform the CGIAR initiative on Crops to End Hunger. *PLoS ONE* 16(4): e0249994. <https://doi.org/10.1371/journal.pone.0249994>

⁴⁸ Figures were supplied by the Module 5 lead.

⁴⁹ Under 3.1 in Module 4: CIMMYT maize, IITA, ICRISAT, Africa Rice + 2 NARS = CSIR (Kumasi) and ARI (Tamale)

⁵⁰ For example, under 3.1 in Module 4: CIMMYT maize, IITA, ICRISAT, Africa Rice + 2 NARS = CSIR (Kumasi) and ARI (Tamale)

Box 3: The Assessment, Improvement Plan, Investment Plan Cycle

Individual CGIAR Centers and NARES are responsible for their own improvement and change management. As part of its mission, the EiB worked with select breeding programs in their efforts to achieve transformational progress, bearing in mind that the EiB did not have the power to implement changes. It is useful to split the overall change process into three phases: assessment, improvement, and investment.

Assessment

Several tools are used for the assessment of breeding programs, including BPAT of the University of Queensland and EiB's own assessment tool, mainly used for breeding programs in NARES. Both EiB and the BPAT team were well aware of the variation in the resources available for various breeding programs and did not apply a one-size-fits-all approach, despite the perception of some stakeholders. EiB accessed the assessment reports with the intent that they would form a basis for breeding program improvements. In the EiB 2017 annual report, BPAT output was presented as essential to the delivery of EiB objectives, given that BPAT recommendations form the foundation of action plans for each CGIAR Center to increase rates of genetic gain, which EiB is tasked with enabling. The general opinion was that assessment reports provided valuable and often novel information about the corresponding breeding programs. The reports showed wide variation among breeding programs and revealed that some breeders were not able to understand clearly what their [own improvement] needs were. Despite being high-performing scientists in an academic sense, these breeders were not fully aware of what was needed to run highly effective breeding programs (key informant, March 2022). Wheat, rice, and maize were deemed to be the highest-performing programs while several other programs were deemed weak. EiB used approximately 50% of 2019 funding to further improve the breeding of the former three major, high-performing crops, while the other 50% of funds were invested in other crops. During the ICAR visit the following was found: strengths and areas for improvement highlighted in the BPAT report were appropriate, and recommendations were considered reasonable by interviewees of this evaluation, and they decided to implement them in order to have a positive impact on the delivery of market-driven products in a short time.

EiB Platform stakeholders expressed the following broad observations regarding breeding program assessments:

- Decisions about which breeding programs undergo assessments seemed driven by donors rather than by the needs of the breeding programs.
- The assessment process relied on a narrow diversity-base of assessors. While all of these assessors had relevant technical expertise, they had similar perspectives and backgrounds. This seems a missed opportunity. It limits rigor by essentially having a single "source" of knowledge for assessment, and it sends the message that only a certain demographic understands plant breeding.
- Several assessments were conducted on-site but at times when no material was growing in the fields. This is suboptimal, given the importance that breeders give to their proximity to "their" plants. On the other hand, breeders have less time when their crop is in the field. Further, from a cost-effectiveness viewpoint, multiple crops were reviewed in single visits of international assessors to Centers' (multiple) breeding programs. Considering crops have different growing cycles, to have breeding plots of all crops in the field at the time of the assessment is not possible under regular conditions, and it would not be cost-effective to send in international assessors when all crops were in breeding plots (multiple visits to one Center).
- Others pointed to the need for **any assessment team** and breeding optimization scheme to work together more closely to ensure consistency and to streamline recommendations and suggestions to breeders by both teams.

In summary, EiB and BPAT teams developed good synergies regarding reference to assessments for the improvement plans (IPs). Where a BPAT was available, EiB built on BPAT assessment results—i.e., the IPs for CGIAR breeding programs developed under EiB largely addressed the BPAT recommendations.

Improvement Plans (IPs)

Corresponding to the variation in BPs as revealed in their assessments, the IPs were of variable quality. The IPs needed to meet the partner breeders where they were, and the stage and quality of each breeding program and the breeders' knowledge and skills, were likely to differ significantly. This resulted in some weaker IPs, despite the coordination of EiB, which plays more of an advisory role. In addition, relationship building with each breeding program takes time. The use of virtual rather than face-to-face interactions due to the COVID-19 pandemic might have impeded relationship building, which is key to effectively working together.

Box 4: Box 3 CONTINUED The Assessment, Improvement Plan, Investment Plan Cycle

The evaluation found a range of views related to Improvement Plans (IPs). According to survey data, among respondents using IPs, 10 respondents said IPs were “reasonable or somewhat reasonable” and 4 said they were “not reasonable.” Assessment by BPAT stakeholders suggest that the EiB was highly effective in many areas supporting IPs (interview, March 2022). For instance, assessor teams noticed a large positive shift in the articulation of product profiles which they attribute to the efforts of two expert Module 1 leads. A key informant (March 2022) also considered the IPs well written, detailed, and largely consistent with the recommendations made by the assessment teams. Taken together, the data suggest the IPs might have been hitting the mark scientifically but that some breeders might have had difficulty accepting assessment recommendations (and IPs) because some of the suggested changes fell *out of their comfort zone* (key informant interview).

While the initial focus was on CGIAR Center breeding programs, interviewees noted that recent closer involvement between EiB and NARES allowed EiB to assist with NARES IPs without excessive accompaniment (“hand holding”). Major improvements have recently been made in certain African NARES and for certain crops such as bananas and cassava (interviews with EiB).

A key issue related to the IPs is the lack of clarity about the mandate of the EiB vis-à-vis the Centers. On several occasions, the evaluation team was told that the EiB has “no authority” over what Centers do and holds limited carrots and sticks (though one funder interviewed was clear that their funding is linked to progress with IPs). EiB can flag gaps and weaknesses, but ultimately it is the Center that is responsible for making the change. Clarity is also needed about accountability for following up on IPs. What are the repercussions, if any, for lack of progress? For example, in one instance where a breeding program assessment was done twice, with a separation of several years, many recommendations had not been implemented, and there were no apparent repercussions.

Another issue noted with the IPs was that multi-crop Centers were drafting different plans for each crop rather than a Center-level plan (document review and interviews). Also, there was no succession planning in the event of staff turnover. Often one person was assigned responsibility for a whole IP—e.g., in one CGIAR center, staff turnover meant that no one now [at the time of the evaluation] owns the IP and there is no institutional buy-in. Some funders interviewed criticized the IPs’ absence of milestones and a missing commitment to investing in organizational restructuring. Many of these criticisms are leveled at EiB, which is often not the responsible entity, such as with succession planning and staff turnover. However, lessons learned include the importance of taking such factors into account during the development of IPs. Bearing in mind the scope of EiB, activities had to be targeted, and this they did by choosing a finite number of crops on which to focus (interview with EiB management).

Investments

The IPs included both recommendations that would not require additional funding and recommendations that required additional funding. EiB Module 4, especially in its second phase, attended to some of these investments. It focused on a relatively small number of breeding programs, such as CIMMYT-Maize, IITA, ICRISAT, Africa-Rice, and two NARES (CSIR and SARI) rather than attempting to develop a “catalogue” of gaps and necessary improvements across all target crops and geographies. Module 4’s assessment-based recommendations, followed by implementation in 75% of the programs, aimed to resolve limiting factors, such as irrigation design, facilities, phenotyping under biotic stresses, and equipment, to ensure the delivery of superior products at the end of these breeding pipelines. These investments were highly appreciated by the respective programs.

CtEH was designed to plug the funding gap for large-scale investments identified in the IPs (not provide coverage for day-to-day running costs) through the provision of grants. However, eligible programs interviewed often cited limited understanding of the rules surrounding these grants—e.g., confusion around operations versus improvement. The result, found by this evaluation, is limited and patchy investment—that some may consider a band-aid approach rather than holistic change leading to higher-level goals. This patchy investment approach may be evidenced in extremely low expenditure rate of CtEH funds committed to date (45 of 52 million remaining—14% used). Although resources are clearly needed to implement IPs for which EiB has CtEH funds, they were not being released, which may indicate a structural mismatch that requires further diagnostic exploration.

4.2 Coherence

The original ToC (Figure 1) shows that, **in theory**, the Platform is aligned with the 2016-2030 **CGIAR Strategy and Results Framework** and would maintain so under the One CGIAR [2030 Research and Innovation Strategy](#). As previously noted, the EiB Platform can be considered a precursor to the One CGIAR *modus operandi*, insofar as its underlying logic reflects the organization's objective of operating as a cohesive entity, with a single mission that relies on integrated cross-Center, cross-crop systems research. Some core elements of the ToC were absent, such as assumptions and indicators (this also appears to be the case in the ToCs developed for the Initiatives under One CGIAR). The TOCs will be addressed in section 5.5.9 (Monitoring, Evaluation, and Learning).

Evaluation findings around **synergies with other Platforms** show good collaboration with the Gender and Breeding Initiative (GBI), resulting in the piloting of two gender-related tools (G+ product profile and G+ customer profile) in a selected set of breeding programs (see section 3.4.5). With the Big Data Platform, collaboration with several breeding programs was ongoing (e.g., maize, rice) on the use of big data approaches in developing new traits, phenotyping technologies, integrated molecular breeding, etc. Conversely, the evaluation found no evidence of progress on potential areas of synergy with the Genebank platform, even if that platform was specifically identified as a partner in the EiB proposal (see section 1.1) and notwithstanding the efforts made by the Genebank platform to engage with the EiB (e.g., they had identified areas where they could collaborate such as digital object identifiers [DOIs]). RTB breeding programs at Sub-Saharan African NARSs were modernized to incorporate genomic tools through work with the EiB platform and agricultural research institution.⁵¹ Reference to EiB was also found in the MAIZE CRP review⁵²: the program operated a stage-gate system for germplasm advancement with support from EiB.

Inter-module coherence and interaction were found to be weak and exploring evolution over time helps to explore and diagnose the finding. At the start of EiB, Module 1 set the overall objectives, which other Modules were designed to deliver.⁵³ Later Module 1 moved away from this role. The logical sequencing of EiB actions did not work as smoothly and sequentially as originally envisaged; market segments, pipelines, and product profiles developed in the early stages of EiB needed to be revised and improved iteratively. After iteration, the quality of these documents was later reported as being of much higher quality.⁵⁴ However, according to the original vision, the platform did not achieve the smooth, unidirectional, and logical sequencing in the modernization of breeding programs as stated on CtEH's [web page](#): "The first step towards modernization of breeding programs is to identify the gaps—the areas that need to be addressed or improved." EiB carried out 23 baseline assessments (see section 4.3.2) in addition to the assessments carried out independently of EiB. Owing to the time taken to initiate the assessments and later prioritization, only 8 of these informed the improvement plans. This lack of timely/early gap identification was problematic for the envisaged logical sequencing as it prevented a combined/systems-driven approach that would have involved thinking in terms of portfolios of projects rather than independent projects.

In terms of inter-module collaboration, evaluation confirmed that biweekly meetings among modules took place. However, until 2021 collaboration among modules was not as close as desired within the EiB team. It was reported that modules operated in silos (multiple interviews). The survey results suggested that intra-module collaboration, continuity, and coherence suffered because of the change of several module leads, accompanied by major changes in module objectives and activities (Modules 1 and 4). According to sources consulted, including EiB team members, they missed the vision. Many individuals did their own thing, moving forward in different ways based on their own individual "philosophy"—e.g., on mechanization (multiple interviews). In the case of CtEH grants, proposals were supported by individual Module leads but without joined-up thinking regarding, e.g., mechanization and digitization. This may have been a missed opportunity to deploy CtEH funds programmatically.

External **coherence with donors** seemed to have been facilitated by the Funders' six requests. The resulting re-prioritization to address the requests somewhat increased coherence between the EiB Platform and this group of donors. Nevertheless, there were remaining fundamental issues to resolve.

⁵¹ CAS Secretariat (CGIAR Advisory Services Shared Secretariat). (2020). *CGIAR Research Program 2020 Reviews: Roots, Tubers and Bananas (RTB)*. Rome: CAS Secretariat Evaluation Function. <https://cas.cgiar.org/>

⁵² CAS Secretariat (CGIAR Advisory Services Shared Secretariat). (2020). *CGIAR Research Program 2020 Reviews: MAIZE*. Rome: CAS Secretariat Evaluation Function. <https://cas.cgiar.org/>

⁵³ EiB website, accessed July 2021.

⁵⁴ Interview during validation exercise. Clarifying note: the original evaluation team interviewed an extremely well-informed key informant who related a less positive impression of the quality of these documents.

Without clear agreement on CtEH IDOs (outcomes), milestones, and their corresponding indicators, the EiB Platform was not able to track its own progress. Thus, its ability to report back results to donors against CtEH intent was limited. To ensure that they were better able to account for their expenditure, funders of CtEH increased conditions to direct their needs and priorities unilaterally rather than taking a unified approach—i.e., different donors with different priorities such as certain global regions and certain breeding programs. Though it is to be expected in bilateral grant making that funders will have these priorities according to their aims for official development assistance (ODA), in the case of the EiB Platform, the high level of direction was particularly noticeable. In the absence of a commonly agreed set of priorities and way of working (between donors, CG, and NARES), donors took the lead, requiring fund recipients to adapt. Additionally, frequently changing donor priorities on such issues as gender, nutrition, food systems, and environment posed challenges.

The evaluation examined the relationship between the **Platform and the private sector** from two perspectives: cooperation and complementarity. Cooperative relationships were formed with some of the largest private sector players, such as Bayer, Corteva, and Syngenta⁵⁵. In Corteva, there was a focal point for each EiB module⁵⁶; the **positive relationship between Bayer and IITA** in the modern breeding project launched in 2020 was frequently cited as a model of collaboration.⁵⁷ As regards complementarity, the main issues flagged related to limited support from EiB to supported breeding programs to avoid competing with the private sector and to focus on niche areas where BPs can add most value. Stakeholders largely agreed that the private sector and CGIAR are essentially pursuing the same goal—i.e., to create value. Private and non-profit actors hold different perceptions of that goal and the impact of the goal owing to their different understandings of value creation. Even in countries with significant commercial activity, all farmers are not served by the private sector; there may well be market segments within those countries where it would make sense for CG to be operating.

The strong partnership links established with the BMGF-funded BPAT program at UoQ is another example of good collaboration/complementarity. Previously, EiB used BPAT to access information, but in 2021 EiB teams became more directly involved with BPAT; interviewees considered this a positive development. On the other hand, there are examples of **missed opportunities for collaboration**, such as the University of North Carolina, which had proposed collaboration with EiB but received no response.⁵⁸

4.3 Efficiency

4.3.1 Human resources

EiB Platform work was slow to start, mainly owing to the limited **human resources** available in 2017 (one person per Module). Even with significant team expansion,⁵⁹ given the changing scope of its mandate, EiB staffing was still insufficient, especially when donors issued CtEH requests in 2019. A series of recruitments in late 2020 and early 2021 introduced also the challenge of new people trying to get up to speed, many without meeting each other due to the pandemic. The 2020 retention rate of the EiB team,⁶⁰ in comparison with other programs supported by the CIMMYT HR team, was the lowest (67%), with many people leaving before the end of their probation period (within two years). Further, three of the five Module leads in place in 2017 left EiB. It takes time for people to become productive, especially at driving change, and this finding impacts the return on investment of those hires. There is also an opportunity cost when top management continuously is screening, interviewing and onboarding candidates.

The geographic dispersion of the management team, including outside of EiB's host country, Mexico, or main geographic target, Africa, did not facilitate engagement to develop, and this obstacle was compounded by remote work requirements during COVID-19 in early 2020. Several interviewees referred to the world-class individuals working for the EiB Platform but highlighted that they do not work as a team. **At the same time, the survey showed that people working at EiB are generally happy**

⁵⁵ Clarifying note: the original evaluation team found low evidence on actions with private sector. The validation team conducted additional KIIs with a wider range of private sector partners, to gather additional evidence, leading to the finding herein. See Annex 2.

⁵⁶ Interview, March 2022

⁵⁷ <https://www.cgiar.org/news-events/news/iita-and-bayer-launch-modern-breeding-project/>.

⁵⁸ Interview.

⁵⁹ 2021: Number of EiB staff reported by CIMMYT: 31/12/19 = 9, 31/12/2020 = 14, 1/10/21 = 36.

⁶⁰ The number of staff members that stayed with the EiB through the year, as % of the number of members at the start of the year.

with their immediate work environment and team, and the way their performance is supported and managed by their line manager.

The evaluation found that EiB staff members were motivated, engaged, and supportive of the underlying objectives of the Platform. The technical expertise and motivation of team members were regularly cited as among the best assets of the EiB Platform. However, several EiB team members would have liked more effective interaction and cooperation between teams. While the independence and freedom to act were appreciated, there was a general sense of working in silos, raising a concern that the EiB was not greater than the sum of its parts. EiB staff also advocated for clearer direction, greater coordination, and better interaction with the leadership and communication around change. Having said that, the evaluation team has noted the team and leadership meetings put in place later, as well as the communication around the move to One CGIAR, which were cited as more positive.

Performance objectives for individuals, teams, and ultimately for the organization (CGIAR) as a whole should be as specific, measurable, achievable, relevant, and timebound (SMART) as possible. The evaluation team did not find evidence of SMART objectives or a full and clear hierarchy of objectives, where the overall organizational targets are split into objectives for teams and individuals. For staff, as valuable organizational resources, to be most effective, objectives should align. The EiB Platform objectives are currently highly focused on output (and some outcome) variables, with only a few references to internal aspects of the organization (finance, learning and development, operational development, etc.). Several interviewees from both inside and outside the EiB Platform indicated that there was not a culture within the Platform (or in the wider CGIAR) for ensuring individual accountability if agreed individual or team objectives were not fully met. Of the large share of EiB staff survey respondents with responsibility for managing people, just over half indicated they would like “training or further training” in aspects of people management (e.g., performance management, giving feedback, having “difficult conversations,” situational leadership). Just under half say they feel confident in their abilities on these points. The evaluation team did not find a specific learning and development program tailored and available to meet these EiB team members’ needs. Although some training could be accessed through CIMMYT, it is important to realize that EiB’s needs were substantially different.

Managing change internally and in support of partner breeding programs has been widely reported as a new critical skill for the EiB and its team members. It is also quoted as a skill the EiB did not have sufficient expertise and experience in. Although the evaluation team saw several EiB presentations around this topic, there did not seem to be a common and deep enough understanding or set of principles on how to create and manage change.

The evaluation findings from the survey, interviews, and subsequent validation discussions indicate a clear awareness that alongside the existing scientific expertise, the EiB and its team members also required an equal level of efficiency and effectiveness in people skills—skills that are crucial to, among other things, people management, leadership, relationship management, and change management (addressed more specifically later). This became particularly noticeable with regard to the EiB’s role following the CtEH Funders’ six requests. There is an important need to build and embed people with the necessary insights, awareness skills, supporting processes, and structures for the EiB to make efficient use of its human resources. While the EiB Lead Center HR team (based at CIMMYT) performed an essential administration and hiring support function, it was not utilized as a strategic resource. Both the HR and the EiB teams commented on the lack of efficiency of the relationship.

Two interviews noted that career advancement for CGIAR research staff does not come from demonstrating increased genetic gain (see EiB platform objectives) but by the number and quality of research publications. In some key positions within CGIAR breeding programs, providing recognition (through career development) for breeding achievement may be more important than written research outputs for the global success of the program.

4.3.2 Finance-related efficiency

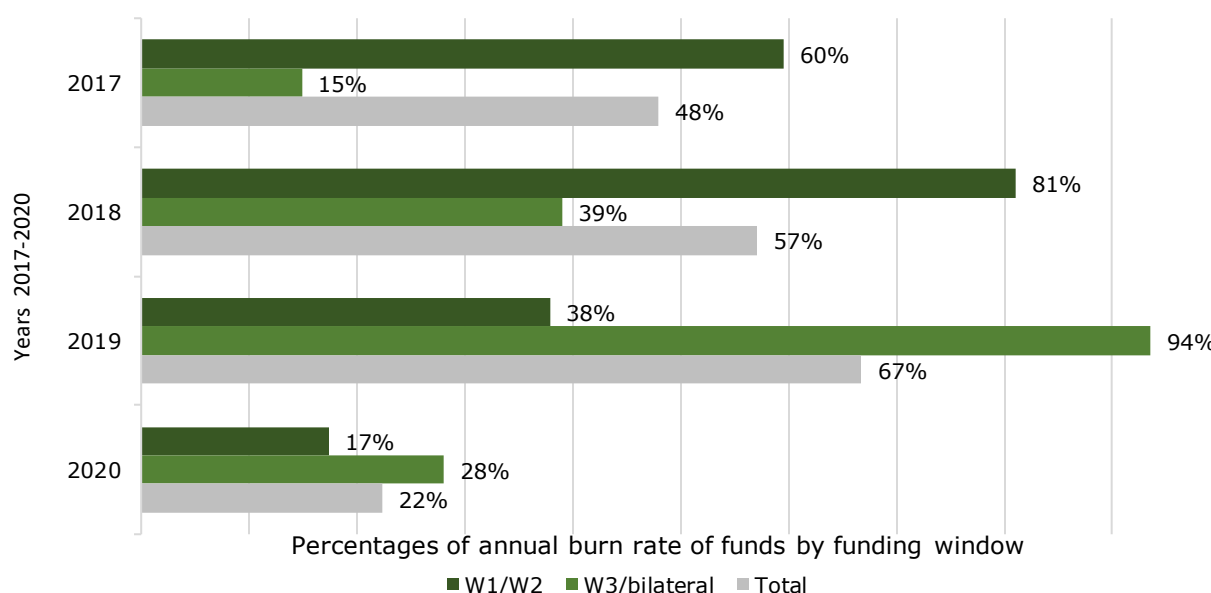
Assessment of efficiency was a challenging and contested part of the evaluation. As seen in Tables 2–5, the final operational budgets by key operational modalities, sourced from proposals, POWBs, and ARs, were somewhat inconsistent. Furthermore, analysis of financial data provided by the EiB financial manager (as of August 2021) and POWB/AR-sourced data outside of modules was hampered by different ways of presenting information from year to year and different budget presentation between POWBs and ARs even within the same year. Analysis by evaluation and validations teams confirmed that seemingly separate budget reporting lines for CtEH in 2021 figures provided outside the formal documentation in

POWBs and ARs⁶¹ did not reflect the narrative around planning and descriptions of “joint” achievements under all funding windows and streams in those standard EiB Platform-wide planning/reporting documents.⁶²

To facilitate analysis of efficiency with regard to **financial resources**, the evaluation team looked at the overall burn rate⁶³ for the EiB Platform by funding window and module. Figures provided in the annual POWB and the publicly available annual reports for 2017–2020 were considered; the 2021 annual financial report was not available at the time of this evaluation. While the financial tables were inconsistent,⁶⁴ the general picture on planning and spending in terms of lines and categories was assessed based on proxy measurements for 2017–2020 annual reporting.

In its first two years, EiB spent down 60% and 80% (respectively) of planned W1/W2 expenditures a year, whereas it spent down 15% and 39% of W3/bilateral funding. Thus, when assessing the burn rate⁶⁵ by funding window, W1/W2 funding had a higher burn rate than W3/bilateral funding for the first two years, and can be seen to gather momentum. A dramatic shift occurred in 2019, when W3/bilateral funding was spent down by close to 90% and W1/W2 less than 40%. In 2020 spending by all windows was comparatively very low, reaching little more than a quarter for any type. One presumed factor affecting 2020 burn rate was the global pandemic, impacting upon travel, recruitment, workshops/meetings, training, etc.

Figure 4: Comparison of Annual Burn Rates of Funds by Funding Window, 2017–2020⁶⁶



Source: EiB Platform Annual reports 2017–2020.

⁶¹ 2021 financial data were out of the scope of the evaluation, but the planning documentation was reviewed. The 2021 annual report was not available in time for the evaluation.

⁶² EiB proposal, POWBs and ARs dictated the parameters of the evaluative exercise. However the scope has been contested. Statement from the EiB Platform leadership: “the total platform budget by source of funds = US\$97,258,154; the actual total amount of all combined W1 and W2 funds received at the end of the project was \$11,138,474. Crops to End Hunger (CtEH) funds were included [by EiB leadership in submitted documents] in this total of US\$97,258,154 but should not have been since CtEH funds were not to be used to fund EiB outputs or to support the EiB plan of work or theory of change as the report currently suggests. CtEH had its own separate objectives, scope, and timeframe, so any review of use of CtEH funds should be conducted in the context of CtEH.” This all suggests that the POWB and financials would have been formulated differently at the time they were produced.

⁶³ AKA expenditure rate.

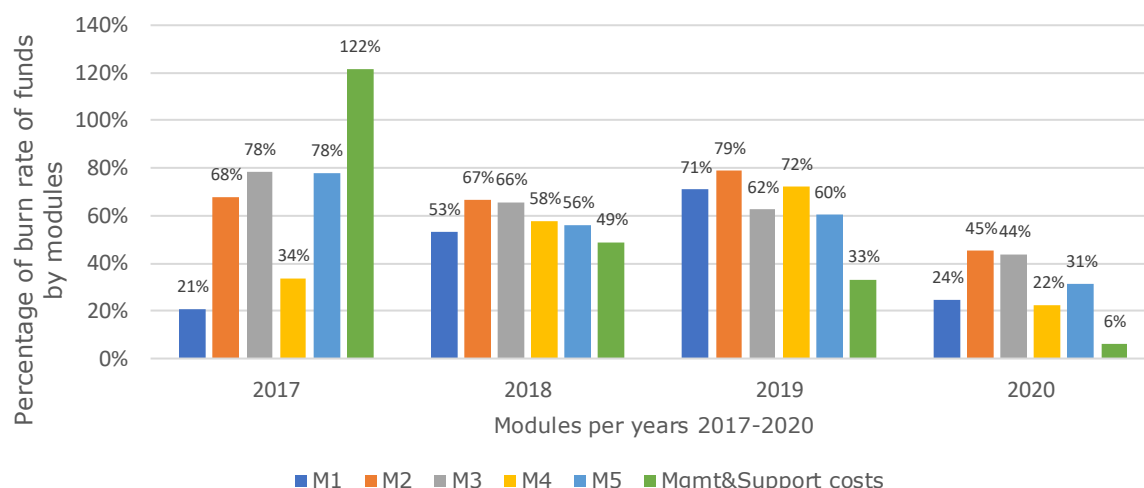
⁶⁴ The 2020 annual report reports on W1/W2 and W3/bilateral funding, without differentiating CtEH, whereas POWB 2021 provides information on W1/W2, W1/W2 CtEH plus W3 and W3 CtEH.

⁶⁵ The definition of “burn rate” is the expenditure to budget per a given period.

⁶⁶ A clear differentiation on CtEH or analysis by specific grant agreement per se was not something the evaluators were in a position to reconstruct.

The variability in burn rate per module over years (see Figure 5) is most stable for Modules 2 and 3. Modules 1 and 4 have the highest rate of fluctuation. On the one hand, this analysis points toward adaptive management, reflecting shifts in programmatic and funder priorities. On the other, the staffing constraints and 67% staff turnover were also due to a sense of instability, and limited communication around change, voiced in the survey and selected interviews- (discussed further elsewhere).

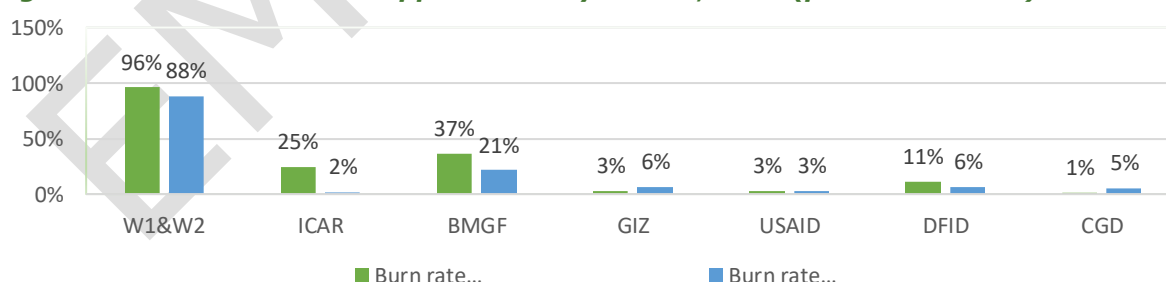
Figure 5: Comparison of Trends in Annual Burn Rate of Funds by Module, 2017–2020



Source: EiB Platform Annual reports 2017–2020

Considering that the EiB Platform as an implementing unit was winding down by the end of 2021, and that there are continuing [ongoing] CtEH funding commitments⁶⁷, the evaluation considered burn rate by specific ongoing funding source. Additional financial data provided September 2021 (in Figure 6) showed an extremely low burn rate.⁶⁸ For example, it was 1% in the case of Context Global Development (CGD),⁶⁹ 3% in the case of USAID and GIZ, and 11% in the case of FCDO,⁷⁰ when designated bilateral funding sources under CtEH are included.⁷¹ While these are ongoing grants, consideration might be given at the time of this evaluation to why the funds are being spent slowly, which the following section provides.

Figure 6: Burn Rate of EiB-mapped Funds by Funder, 2021 (per EiB Platform)⁷²



Source: Budget Monitoring – ICCs Mapping, 2021, provided by EiB Platform finance manager in August 2021.

⁶⁷ CAS/Evaluation note: From a separate grant-related document provided by the EiB project manager in June indicated the 6 out of 25 grants to finish throughout 2022. Of those under 'funding' 2 were labeled as CtEH (USD 1,476,678), 1 – BMGF (USD 3,508,599) and 3- other (USD 717,255). Comprehensive triangulating of evidence was not possible since further explanation on a relationship between grant funding tracking by project manager and budget figures from the finance manager was not provided upon request.

⁶⁸ The reasons for the low burn rate of CtEH funds are described in detail below.

⁶⁹ The CGD funding specifically targets genotyping access for varietal monitoring in three target countries.

⁷⁰ Figures supplied by the EiB Platform finance manager.

⁷¹ CAS/Evaluation note: From a separate grant-related document provided by the EiB project manager in June indicated the 6 out of 25 grants to finish throughout 2022. Of those under 'funding' 2 were labeled as CtEH (USD 1,476,678), 1 – BMGF (USD 3,508,599) and 3- other (USD 717,255). Comprehensive triangulating of evidence was not possible since further explanation on a relationship between grant funding tracking by project manager and budget figures from the finance manager was not provided upon request.

⁷² Figures supplied by the EiB Platform finance manager. Color code: green columns are budget expenditure over the course of the EiB Platform (2017 onward), whereas blue is the 2021 budget only.

Procurement by CIMMYT (as host) added efficiency-related challenges specific to provision and/or brokerage of materials and services by EiB. CIMMYT's procurement policies applied to EiB purchases and services; in the case of the genotyping service charge account, EiB was required to create an internal purchase requisition for each job, supply the invoice, and show proof of delivery on behalf of each client, despite there being a signed contract between the vendor and EiB. Inefficiencies arise even within CIMMYT—e.g., the purchase of a dryer for CIMMYT took more than a year. Administrative costs are incurred for capital infrastructure investments between CGIAR Centers, or between Centers and NARES, as each item needs to be characterized as a "donation," with ample justification required from EiB. Furthermore, owing to the project-based distribution of funds, partners do not always have the operational budget to cover the logistics costs related to capital items.

Center breeding programs were initially misinformed by the System Office⁷³ about the rules surrounding CtEH grants, and EiB was slow to provide clear guidance; this caused considerable confusion about the eligibility of expenditure. The evaluation also found the **CtEH grant-awarding process** challenging and inefficient for the EiB team. According to a June 2021 progress report, *"Although CtEH is designed to provide a more comprehensive and efficient mechanism of driving modernization across CGIAR and NARES breeding programs, it is being implemented in a heterogenous system of institutions that has been designed to accommodate individual project-based funding, that prevents CtEH from transcending the project-based paradigm."* Specific challenges include large direct and indirect costs, administrative burdens, and other inefficiencies: a 2% CGIAR cost, 5% CIMMYT subgrant cost, and 15–16% CGIAR indirect cost on all CtEH investments. **As an implementing partner, EiB had limited influence over institutional investment decisions, working through consensus and the continual development of individual Improvement Plans.** Grants remained driven by Center- and crop-specific goals, with the result that bilateral projects with the same modernization objective coexist, each with their own approach, priorities, and activities that are not necessarily aligned with each other, with CtEH, or with an overarching institutional strategy. Furthermore, these bilateral projects motivate researchers to focus on the return on investment (ROI) for specific projects rather than their overall contribution or cost to Center efficiency. These challenges are compounded when working with NARES, where additional challenges include a lack of human and operational resources to take advantage of investments. Several EiB staff members noted a significant amount of wasted time on improving the quality of the breeding program investment proposals prepared and submitted by CG Centers and NARES and navigating the various legal, administrative, and contractual obligations of these different entities. It was described as a frustrating exercise for both the EiB team and recipients. This exercise of extensive revision translated into a very low burn rate for CtEH/bilateral funds (Figure 6).⁷⁴

The logic of designating EiB as custodian of the CtEH funding was not questioned by the evaluation. However, an assumption that a team of scientists could act as the necessary project and change management specialists, appears to have undermined efficient rollout. Having a highly qualified scientist as the CtEH coordinator was a questionable use of human resources; employing a procurement or grant administration specialist might have been wise. Further, the lack of clarity around the eligibility criteria, combined with (in some cases) limited capacities to develop investment proposals and frequent staff turnover, meant the EiB team found itself constantly having to explain the CtEH mechanism.

4.4 Effectiveness

Overall, the EiB Platform has made progress toward *the modernization of breeding programs across the system*.⁷⁵ Validation interviews found that changing the culture of CGIAR breeding programs has been an important achievement—breeders are now more willing to examine their programs to make them more effective. Survey results show that partners are *moderately* positive about the progress the EiB has made as a driver of change. In response to the survey question "Has EiB made progress in becoming a driver of systematic change since its initial design?" the majority, 56%, of partners answered "yes, the EiB has made progress." This was echoed in interviews during the validation phase: yet, despite progress, there is an acknowledged long way to go in the system change agenda. The partners' perception of added value to their work is another measure of progress toward results. The survey responses show that 9 of

⁷³ Interview during validation exercise.

⁷⁴ CAS note: necessary level of detail was not provided in funding documents for comprehensive triangulating of evidence on dates and a relationship between grant funding tracking by project manager and budget figures from the finance manager.

⁷⁵ EiB Platform objective as of 2016. As a note of clarification, the original evaluation team stressed that progress was limited whereas additional triangulation during validation tempered this finding. For the record: the original evaluation team stressed that progress was limited.

the small sample of 21 respondents say that the Platform's services, tools, or activities added substantial value to partners' work (see Annex 7)– a sentiment also echoed in interviews.

Interview data suggest that stakeholders believed that the targets of 1.5% genetic gain and 10-year turnover of crop varieties was not possible during the lifetime of the project and in any case was not within the control of the platform, only under its influence. The breeding programs were not under the control of EiB, and the release, registration, and multiplication of new varieties was outside the sphere of control of the CG system.

Module-specific study results⁷⁶ show some of the more salient achievements include the recent work carried out by Module 1, working with breeding teams to create a full description of the portfolio of breeding pipelines within CGIAR together with descriptions of the market segment(s) targeted and the pipeline investment case. EiB work on the costing of breeding operations (many for the first time), and methods for estimating costs and analyzing these for opportunities for efficiency gains, was also identified as a good achievement of EiB. The recent work being carried out by the NARES outreach team was also singled out as being particularly positive in terms of moving the current CGIAR-NARES partnership model toward a more collaborative one that will lead to greater empowerment of NARES.

The Platform aimed to achieve the following **planned outcomes** (2016 proposal):

1. Increased availability of climate-adapted or disease-resistant germplasm/cultivars/breeds
2. A steady flow of productive cultivars/breeds adapted to changing environments
3. More nutritious cultivars
4. Increased availability of mycotoxin-resistant cultivars
5. Increased use by researchers of wider genetic diversity including alleles derived from genebanks
6. Increased number of breeders who develop cultivars and breed more efficiently, with clearer targets
7. Increased use by AFS and external researchers of tools for developing better new cultivars and breeding faster
8. Increased performance by breeding programs targeting the developing world
9. Increased contribution by AFS and external researchers of novel tools for adaptation by the Platform and wider use by breeding community.

Given that EiB was launched in 2017 and that most of its focus (four out of the six Funders' requests) was on upstream stages of the variety development process, outcomes related to finished cultivars (1 to 4 above) were basically unattainable from the onset. Some actions may yield results more quickly on the following two Funders' requests: effective delivery mechanism of varieties from breeding program to farmers and building NARES breeding networks and capacity (particularly in those situations where NARES intervene downstream from CGIAR on variety positioning and dissemination). On the first of these, the indirect action of assisting breeding programs to reset their objectives to increase their value in the target market should eventually increase variety delivery; for the second, a NARES network was set up in the latter part of EiB implementation.⁷⁷

With respect to increased breeding efficiency (outcomes 5-9 above), whether through the use of wider genetic diversity (outcome 5), the availability of clear targets (outcome 6), or the use of modern tools (outcomes 7 and 9), the information provided to the evaluation team shows limited progress toward the breeding efficiency outcomes. EiB made some progress in helping to better define breeding targets and improve breeding schemes through modern tools or improved methods and this progress has benefited 8 of the 23 NARES programs assessed, as evaluation found. Given the lack of evidence-based monitoring and reporting, in most cases these efforts produced unknown and unmeasurable results.

The level of achievement of results varied across module, crop and institute (CGIAR Centers and NARES). Evaluation found only a few clear results, as discussed above, and little evidence of widespread success for any particular crop, Center, or NARES. Because of EiB's platform approach—i.e., where many activities are launched across a broad target base (numerous disciplines, crops, breeding programs)—no single breeding program was identified by the evaluation for which EiB's actions have resolved all major limiting factors. Breeding efficiency may be improved at one stage but not over the entire breeding process. It can be contrasted, however, that given the time constraints [resulting from module changes around 2019–2020], EiB limiting its scope to concentrate on a few NARES and a few important crops in those regions makes good strategic sense (validation interview, April 2022).

⁷⁶ Summarized in executive summaries in a stand-alone Annex report, Annexes 3 and 4.

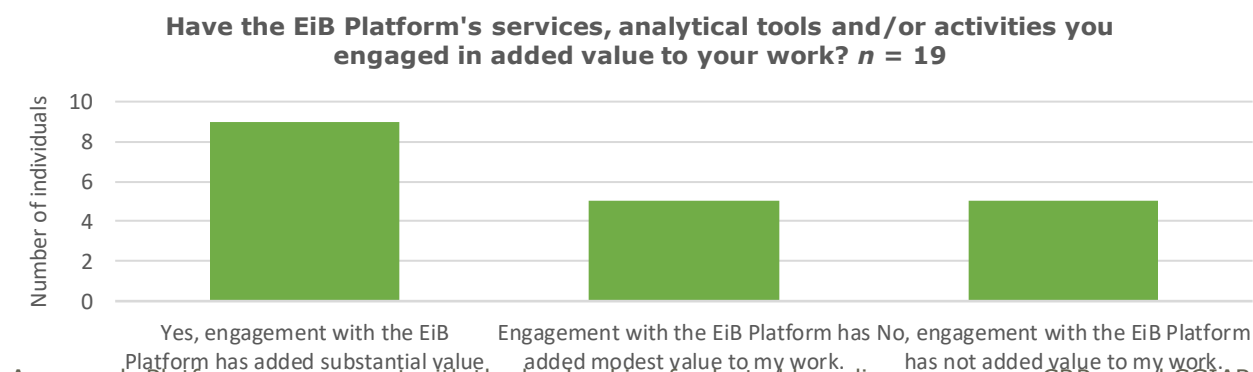
⁷⁷ <https://excellenceinbreeding.org/BOND>.

As regards the Platform's effectiveness in reacting to the need to change and adapt its objectives and plans, EiB evolved significantly between 2017 and 2021, especially in relation to the original 2016 proposal. Modules 1, 2, 4, and 5 all changed scope/objectives significantly about midway through the timeline (around 2019–2020). Module 1 changed from developing generic tools and services to support breeding programs to product identification. Module 2 changed from trait discovery to quantitative-genetics-based breeding scheme simulations. Module 4 changed from remote phenotyping to operational (infrastructure, equipment, protocols) improvements. Module 5 decreased efforts in bioinformatics to take on the continued development of the EBS.

While these changes coincided with establishing CtEH and the Funders' six requests, they do not appear to be the consequence of the launch of CtEH because post-change objectives are not more aligned with the Funders' requests than pre-change objectives. Rather, these often drastic changes are most likely to have resulted from module leadership changes and reflect the views or opinions of new module leads. These changes always coincided with changes in module leadership. New module leads generally abandoned all, or almost all, activities conducted by their predecessors to launch new activities. Furthermore, no evidence of any planning of these abrupt changes has been found in any strategic or planification document dating prior to their occurrence. Finally, the fact that these changes occurred just about two years into EiB reflects either a lack of preparedness of the Platform ("needing" to change the objectives of four out of five modules) or a lack of strategy (allowing such abrupt changes to take place).

Assessing EiB progress toward planned results was hindered by the lack of a robust monitoring system with information collected, accessed, and used in a meaningful and reliable way. This was particularly the case for higher-level results such as outcome and impact levels,⁷⁸ though issues also exist in the tracking of outputs in the annual report (the format of which is subject to frequent change, as per CGIAR Systems Office request). The platforms were subject to less stringent reporting requirements than the CRPs.⁷⁹ Evaluation found that although EiB contributed to the breeding modernization effort of some breeding programs, the limited documentation on results achieved, coupled with interview data showed halting and patchy progress, partially associated with poor monitoring of results. Furthermore, different modules delivered at different speeds without uniform ways of measuring results at the output and outcomes levels.

Figure 7: Added Value to Partner's Work



As regards Platform engagement with the leadership of selected breeding programs, CRPs, and CGIAR Centers with a view to meeting Platform objectives, survey results from both the EiB team and partners suggest there was a wish for better communication from, and interaction with, the EiB leadership. In fact, both EiB team members and external partners commented that they would appreciate it if communication and leadership were improved. There were clear indications that the communication with and toward the partners was less effective than toward EiB staff; responding to the same question about whether the changes relating to the six requests by CtEH donors were clearly communicated to them, 59% of EiB team respondents answered "yes," whereas only 22% of the partner respondents shared that opinion. This is important as effective communication is an essential enabler for change.

4.4.1 Results for Modules and Workstreams

⁷⁸ Presumably guided by the 2016–2030 SRF, <https://cgspace.cgiar.org/handle/10947/3865>

⁷⁹ Evaluation team KII.

This section summarizes the effectiveness of achievement of planned outputs and overall progress by module.⁸⁰

Module 1 was considered by many respondents the most important and challenging, as it challenged the way CGIAR works. One of the main achievements expected from this module was a shift in thinking of breeding as a product development endeavor toward definition of the product as a goal that meets users' needs or demands. The key deliverables of Module 1 were two workbooks. One was a collection of 372 product profiles where each product profile was a row. The other described 320 market segments⁸¹ covering 26 crops and all geographies falling within CGIAR's mandate. Each of the 372 product profiles was characterized by a maximum of 25 elements, including agro-ecology, up to six basic traits and three added-value traits. To better meet contemporary standards, profiles required further trait-level objectives (these were minimal) and relative trait priorities (these appeared to be absent). As a result, the product profiles in terms of informativeness and quality, fell short of contemporary standards. In particular the lack of relative trait priorities inhibited their use to set breeding objectives and making breeding decisions. On the other hand, the collection of market segments developed under the leadership of the second Module 1 lead represented a first for the CGIAR. Since market segmentation was developed mostly from documents and through consultation of CGIAR breeding leads, it could only be considered a first draft in need of validation by stakeholders who are closest to those markets—i.e., NARES and local private seed companies. All in all, Module 1 has partially delivered on its planned outputs, whether the original outputs (2016 proposal) or the revised outputs (post-CtEH) as listed in the POWBs. Bearing in mind the short time that the second phase of Module 1 was in operation, it is understandable that the outputs could not fully deliver (see section 5.6).

In the case of Module 2, optimization simulations were run for 17 CGIAR breeding programs, with some level of implementation of changes in all 17 programs, out of 259 inventoried (in the absence of information provided about the number of CGIAR breeding programs, the number of CGIAR product profiles, 259, was used as the most logical number of breeding programs).⁸² Using 259 as the number of breeding programs, Module 2 effectively reached between 7 and 15% of all programs (during the period within evaluation scope). Besides optimization simulations and recommendations, Module 2 delivered small/handheld digital equipment such as data loggers, barcode label printers, and small-scale farm machinery and equipment as well as tools and tutorials for breeding processes. These tools and tutorials are available online (see section 4.4 on cross-cutting themes and capacity building). Overall, however, when compared with POWBs, the performance of Module 2 with respect to delivery on planned outputs was below planned levels.

Module 3's key output consists of facilitating/securing access to a low-density marker platform for breeding, a mid- to high-density sequencing platform for genome-wide genotyping including genomic selection and fingerprinting, and quality assurance/quality control of breeding pipelines. The business volume of the services provided through Module 3 more than doubled every year. Module 3 did not operate laboratories and contracted some well-established genotyping service providers (Intertek, DArT – through Intertek) with negotiated rates and timelines, strengthening what was initiated by CGIAR's Generation Challenge Program, continued by the IBP, and with an important contribution from the High Throughput Genotyping Project. Technical and logistical issues remain, however, which significantly decreased the success of Module 3's facilitation—e.g., lots of old tissue was sampled out of which bad DNA was extracted, resulting in significant amounts of missing data⁸³ (noting that EiB is not directly responsible for oversight of this work).

In addition, Module 3 facilitated and coordinated externalization of services. However, without the elimination, or often, even reduction, of corresponding CGIAR internal expenses- Module 3's model appeared cost ineffective.

Table 6 summarizes the 32 capacity development activities implemented by Module 3 from 2018 to 2020; selected interviews indicated that they had helped NARS to understand the need for molecular marker-based approaches to improve their breeding efficiency.

⁸⁰ More details are provided in the module assessments in Annex 2.

⁸¹ 372 unique market segments were referred to by the module lead in his presentation at the 2021 Annual EiB meeting; however, the information provided to the evaluation team indicates 320.

⁸² EiB noted that there are 419 market segments and 121 breeding pipelines. The distinction between breeding program and pipeline is not clear in the CGIAR documentation.

⁸³ According to interviewees familiar with the matter, this should be corrected through training and clear directions on when and how to tissue sample.

Table 6: Capacity Development Activities Conducted by Module 3

Year	Type	Topic	Number
2018	Workshop	GOBii-HTPG	2
	Hands-on training	Sampling logistics	6
	Training	Genotyping applications for research assistants (M.Sc. students)	2
2019	Workshop	Sampling logistics	6
2020	Virtual meeting	Marker development, sampling logistics, etc.	15

In the case of **Module 4** the key outputs include assessments, including formulation of recommendations, of breeding operations for 18 stations within the CGIAR centers. Module 4 has also delivered small equipment to a few breeding programs. These outputs were delivered during Module 4's last two years (2019–2020). In contrast, no evidence was found for tangible deliverables during its first two years (2017–2018). As a result, and overall, Module 4's achievement of planned outputs is considered limited.

The initial objective (2017–2018) of **Module 5** was adoption and interoperability. In 2019 this objective was deprioritized in favor of the integration of all apps (GOBii, BMS and Fieldbook). In 2020, Module 5's agenda was significantly redefined, refocusing almost all activities and resources around the development of EBS, the development of which had been initiated at CIMMYT with BMGF funding. As a result, EiB moved from essentially being a developer of links/bridges among tools and promoter of tool adoption, to being a tool developer (of one specific tool). Triangulation by the evaluation team revealed that these changes were driven mostly by BMGF, the funder of EBS development at CIMMYT. Despite the positive communication delivered through press releases, as of July 2021, EBS was still not functional enough to move into production mode. By March 2022 (after the closure of EiB – and largely as a result of its work), however, it was stated in an interview that it had reached the “minimum functional” stage and was being introduced at CIMMYT and IRRI. However, the time needed to develop full operability is still unknown at the time of this evaluation.⁸⁴

In the case of **NARES**, EiB works with 23 breeding programs across 10 countries and 10 crops. Overall, evaluation found **a high level of appreciation of the work carried out by the NARES outreach team** despite its small size. As the UoQ was not resourced to conduct a sufficiently large number of BPAT-based assessments for NARES, EiB carried these out using EiB's baseline assessment tool, which is based on the BPAT method. At 8 NARES breeding programs across a range of CteH priority crops in Africa and India, both **baseline assessments and Improvement Plans** were developed.⁸⁵ Modernization priorities for these programs were jointly identified, and programs were supported to make changes including development of product profiles, implementation of QA/QC genotyping on all new breeding starts, costings of programs, adoption of BMS, skills-building webinars, and capacity development during COVID-19. Some concerns were expressed about the assessment questionnaire, which is continually adapted and now has over 60 questions. The importance of site visits was also stressed. Given the heterogeneous nature of NARES, a tailored approach is key, and the Tier System developed by EiB (Table 7) is considered an effective way of approaching this and serves as a good metric for NARES progress through the different tiers.

Table 7: NARES Tier Rating System (Developed by EiB)

Tier	Tier type	Grade	Breeding program description
Tier 1	Mature (1x)	A	Mature, continuous breeding pipeline, adequately budgeted (>\$80k) and sufficiently sized to meet market opportunity. Internally developed germplasm annually entered into CGIAR coordinated regional trials and is competitive. Regular release of internal germplasm. Strong breeding capacity (team) and germplasm base.
		B	
		C	

⁸⁴ Clarification note: It has been flagged to CAS/Evaluation function that CIMMYT, IRRI and IITA were adopters of EBS at the time of the final validated evaluation report release, in May 2022.

⁸⁵ EiB Platform documentation.

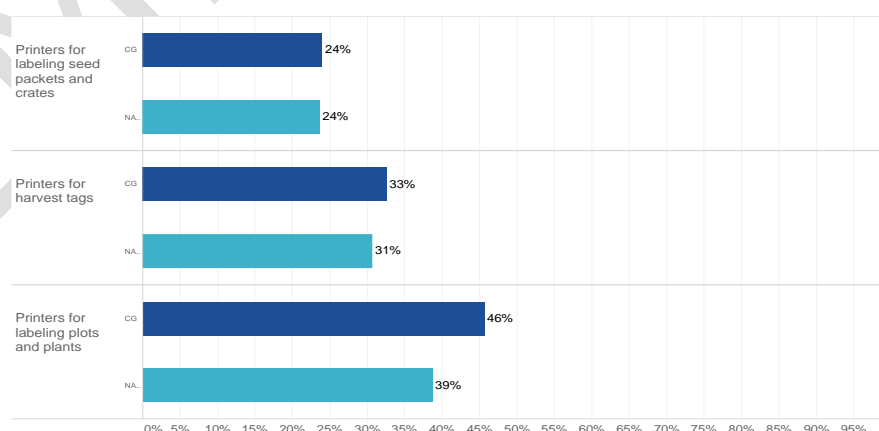
CAS Note: See Box 3 for additional information on improvement plans.

Tier	Tier type	Grade	Breeding program description
Tier 2	Mid Stage (0.5x)	A	Continuous breeding pipeline aligned to a defined product profile but pipeline undersized relative to market opportunity. Strong breeding capacity (team) and good germplasm base, operational budget restricted (\$60–80k). Internally developed germplasm entered into CGIAR regional trials with a mix of internal and CGIAR releases.
		B	
		C	
Tier 3	Trait Introgression	A	Internal breeding effort is trait focused. Elite, adapted germplasm from the CGIAR is routinely evaluated and deliberately improved for specific additional traits that are required in the national market. Strong internal breeding capacity with access to relevant germplasm. Occasional release of trait improved germplasm. Program budget (\$40–60k).
		B	
		C	
Tier 4	Testing	A	Routine evaluation of CGIAR regional trials and external partner trials. Products systematically evaluated for adaptation and release - good alignment of national requirements with CGIAR regional priorities. Internal breeding effort is ad hoc project based - not aligned to market segment or product profile. Breeding team in place but operational budget limited (\$20–40k)
		B	
		C	
Tier 5	Conceptual	A	Very limited internal germplasm dev activity. Some evaluation of CGIAR Regional trials and external germplasm but irregular. Variety release is ad hoc and opportunistic. Limited breeding capacity, internal germplasm and operational budget (<\$10k).
		B	
		C	

Increasing NARES' demands for EiB support services (measuring genetic gain, speed breeding, capacity development on molecular tools, costing, genotyping) mean that additional resources will be required. Since NARES are primarily accountable to different stakeholders than the CGIAR (their own governments, etc.), EiB's role was often more one of influencing, where personal relationships can be hugely important. As noted above, these are best cultivated through face-to-face interactions.

Good progress is noted with the 15 priority station upgrades with an estimated budget of USD15 million (CtEH funding) and with the provision of digitization equipment to expedite digitization and ensure proper adoption of breeding informatics services (in collaboration with the Adoption and Outreach workstream). A total of 393 pieces of equipment were distributed to 24 breeding programs as well as two facilities for phenotyping in Africa using CtEH funds. Interviews with breeders revealed that the devices are now being used for their breeding programs, although the impact of these improvements on breeding programs is yet to be documented.

Figure 8: Adoption Rate of Printers



Source: Presentation from EiB Technology Adoption Survey, 2021.

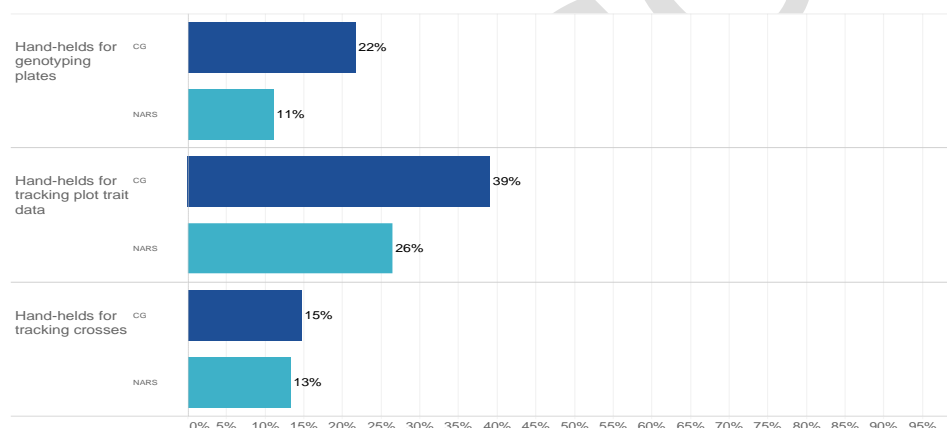
One of the biggest challenges facing most NARES breeding programs, particularly in Africa, is the lack of operational budget. On average, NARES breeding programs have less than \$25,000 operational budget.

It is close to impossible to run a full pipeline on this, hence the need to focus on where they have a comparative advantage such as evaluation of germplasm to ensure localized fit and gathering intelligence on market needs and trends. Support from EIB in this prioritisation process is key.

In the case of the **"Adoption and Outreach" workstream**,⁸⁶ the evaluation team identified progress with regard to digitization: Three categories of digital tools have been provided to some CG Centers and NARS: printers, hand-held electronic devices and seed counters. The baseline survey on EIB digital tools adoption showed that prior to the distribution of these devices, most respondents reported using hand and paper-based tools to conduct most activities (mainly NARS). After receiving the devices, an increase in their use by NARES' seed breeders is observed with adoption rates just slightly different from that of CG Centers, and for some devices (e.g., printers for labeling seed packets) both are equal (see Figure 9). In the case of adoption of hand-held devices, CG breeding programs are ahead of NARES for genotyping plates and tracking plot traits data and seed counting (see Figure 9) while both are equal for tracking crossing activities (see Figure 10).

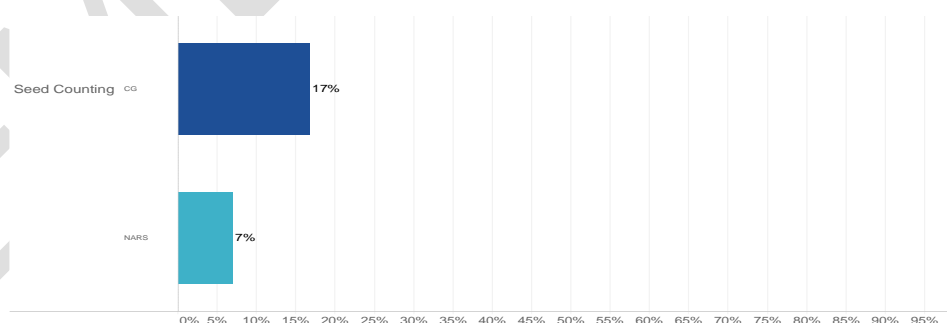
It is clear that good progress has been made in the use of digital devices compared with before their distribution by EIB. However, and according to interviewees, few breeders have continued to use the distributed tools. To maintain NARES' interest and sustain digital device adoption and use, training and in-the-field support should be provided coupled with a reduced logistic burden in terms of device delivery.

Figure 9: Adoption Rate of Hand-held Devices, CG Versus NARS



Source: Presentation from the EIB Technology Adoption Survey, 2021

Figure 10: Adoption Rate of Seed-counting Devices, by CG Versus NARS



Source: Presentation from the EIB Technology Adoption Survey, 2021.

As regards the extent to which the awarding of grants contributed to the overall results, the limited release of CtEH funds means that grants did not contribute to the effectiveness of the EIB Platform operations. The project-based funding model meant that EIB was not empowered to make investment decisions on behalf of breeding programs and although significant effort has been expended to develop

⁸⁶ A better name would be "Technology Adoption and Outreach"; it is about technology adoption by breeders, not product adoption by farmers.

adequate long-term improvement and investment plans, as noted above, the quality of these was variable and needed improvement, resulting in a “band aid” approach rather than holistic change leading to higher level results. Any grantee cost savings generated from CtEH investments and activities were not automatically reinvested within CtEH and there was no transparency over what these savings are and how they are used. In the case of NARES, there are similar challenges in terms of administration, strategy and prioritization, in addition to specific challenges relating to human capacity and access to resources. Furthermore, it takes time to gain management support, consolidate demands across commodities and properly define demand. There were multiple other projects active at each NARES which sometimes involve duplication of effort, appear to be unsustainable or that do not meet important needs, and there is a lack of human capacity to ensure the effectiveness and sustainability of investments.

4.4.2 Progress on Cross-cutting Themes

As regards key cross-cutting themes, in the case of **gender** (see Box 5⁸⁷), building on work by Module 1 around “product profiles,” which describe the traits that different actors want in a new variety, two gender related tools have been developed—the G+ product profile and the G+ customer profile. The tools were developed by the [CGIAR Gender and Breeding Initiative](#) (GBI) and are being jointly piloted with the EIB Platform on 2 breeding programs (cassava and sweet potato). The G+ product profile tool guides the collection of evidence to prioritize the traits in product profiles by examining both potential positive gender impacts of those traits, but also any negative impacts they might have. The G+ customer profile tool characterizes client groups targeted for new varieties, considering gender differences in knowledge, assets and decision-making which influence adoption, making it easier for breeders to develop the right product for the right customers. These two G+ tools, still in the piloting phase, would enable breeding programs to meaningfully think through social inclusivity, and especially women’s trait preferences and the special circumstances of different contexts, recognizing that one size does not fit all. Interviewees indicated that BPs will be likely to develop varieties with more favorable impacts for women and their livelihoods using the tools.

Box 4: Gender-Responsive Breeding

The main crop in Nigeria is cassava, with many farming households earning part of their income from its production, but the adoption rate of new improved cassava varieties by female farmers is relatively low in comparison to male farmers. On the other hand, 90% of the cassava produced in Nigeria is used for processing, a task for which women are almost entirely responsible. To address the incorporation of gender and generally enhance the alignment with end user preferences in new varieties, IITA and the Nigerian National Root Crop Research Institute (NRCRI) are currently using the tools in the product profile development process.

As regards **climate change adaptation**, EiB recognized that the design of new varieties is important to address climate change challenges in crop production and to create a sustainable farming system for future generations. However, outputs of EiB did not indicate significant contributions towards mitigating climate change-related issues faced by farmers and breeders. Module 1 had a small percentage of product profiles to address climate change conditions, e.g., only 10% of the product profiles for cereals have traits such as drought tolerance, high-temperature stress tolerance, and submergence tolerance. To perform breeding of the above stresses, Module 4 created two biotic screening facilities in Africa and promoted the adoption of best practices for phenotyping under stress conditions.

EiB used three main tools for **capacity development**: 1) workshops/trainings, 2) a Toolbox and 3) the Learning Management System (LMS). In 2018, capacity development programs were organized at IITA in Ibadan and at ICRISAT in Hyderabad, which was attended by 80 and 50 participants, respectively. In the same year, an event was also organized by Module 3 for Research Assistants working closely with breeders of Africa-Rice and ICRISAT Malawi Station. In 2019, a total of 274 participants (71 female and 203 male) engaged in activities of various Modules of the Platform. The Platform also conducted webinars/online meetings as face-to-face interaction was limited during the COVID pandemic period. In 2020, 75 CGIAR and 120 NARS employees were trained in “Lean Methodologies” through webinars. Interviews with participants of some of the training programs confirmed the usefulness of these programs to enhance knowledge and skills required for breeding new varieties. In 2020, Module 2 provided training to breeders on simulation studies, which was deemed useful to develop new skills. It has also made tools and tutorials, developed by EiB and others available in the online EiB toolbox. Their use is not being monitored by EiB making it impossible to comment on the uptake of EiB’s technical

⁸⁷ Data sourced from the CGIAR gender and breeding, <http://www.rtb.cgiar.org/gender-breeding-initiative/resources/>.

support by partners; however anecdotally, one university professor stated in interview that he makes substantial use of the online resources in his plant breeding courses. Module 3 provided services on genotyping and sequencing to modernize the conventional way of breeding or selection of germplasm. The Module also provided training to breeders on the use of molecular markers in their breeding programs, however, the adoption of molecular approaches for NARES programs is still low. Plant tissues or DNA samples were sent to an overseas service provider (Intertek-Dart) for genotyping, however, based on interviews, sampling logistics and phytosanitary permits remain issues that seriously hamper the efficacy of the service. The Platform could have resolved some technical issues through outlining crop-specific best practices for sampling logistics and opening a regional sample preparation center. NARES breeders from KALRO-Kitale and Njoro have been trained to use digital equipment and BMS for their breeding programs. The training report indicated that participants showed a good understanding of the use of the equipment and were impressed that the equipment will improve the efficiency of their breeding operations and confirmed that they plan to use them in the ongoing crop cycle. Interviews of a few NARES participants revealed that training programs organized by EiB were useful to upgrade both knowledge and skill. As the EiB Platform does not always collect feedback from the participants, the impact of capacity development programs is difficult to assess.⁸⁸ Based on discussions with NARES coordinators, limited follow-up visits were made to NARES coordinators to assess the adoption of equipment in the breeding programs.

As regards the **role of the private sector**, the first report of private sector (besides companies contracted for shared genotyping services) active involvement in EiB activities can be found in EiB's 2017 Annual Report (AR). Bayer (Monsanto at the time) is mentioned as providing consulting to IITA (among other things for infrastructure improvement), building on an existing relationship between Monsanto and IITA's cowpea program (established around the Cowpea Productivity Improvement Project). Other reports of specific input from the private sector appear in EiB's 2020 AR. Bayer is reportedly involved in the Breeding Informatics Network, in addition to its consulting relationship with IITA. Corteva is mentioned as a service provider for image analysis-based phenotyping (alongside Hyphen). And Syngenta is listed as a contributor to a webinar on continuous improvement. Bayer and Corteva also appeared in the 2019 AR with the following partnership description: "provides support for improving the strategy by sharing knowledge on how they have done similar projects and provide technical and feet on the ground when required". A notable and concrete example of private sector work with EiB partners is Bayer's participation with EiB and IITA in the Modern Breeding Project.⁸⁹ Corteva is also mentioned in EiB's 2017 AR as having committed as a contributor to EiB, along with a list of potential areas for collaboration, including "sharing of Corteva knowledge and participation in communities of practice, co-investment in partner capabilities and use of (Corteva) services, technical exchange programs, process documentation support, access to prior generation equipment and direct financial support." There is no further documented indication of any materialization of these intentions. Interviews (including with private companies) suggested that the private sector approach to resource management and to highly focused breeding objectives was beneficial to partners and that the private sector companies also benefitted from a greater understanding of seed systems and their constraints in developing countries.

Multinational private seed companies, such as the three discussed above, are frequently referred to in EiB documentation and are the only type of private companies mentioned. EiB's original proposal, for instance, contained multiple references to the benefits that the approaches that multinational private sector breeding programs take can be transferred to the CGIAR to improve their breeding programs. Multinational private seed companies are held up as a model of breeding efficiency for EiB and CGIAR. Some interviewees, although not all, confirmed that these multinationals are indeed EiB's model, indicating for instance that EBS is inspired by Corteva's system.

In addition, findings indicate that EiB placed a specific value on recruiting staff from the private multinational space⁹⁰. At the time of the evaluation, as evidenced by their LinkedIn profiles, all current and former Module leads, except Module 4's former lead, had worked for and had been recruited from one of these three companies: Bayer, Corteva or Syngenta (or legacy companies) prior to joining EiB.⁹¹ Furthermore, EiB's 2020 AR indicated that a cloud IT consulting company that had been contracted to

⁸⁸ In response to a specific request from the evaluation team, a document on training was provided that showed a total of 31 users, mostly EiB members. Also provided was a list of training by each module, but no information was included on year, total number of participants, outcome of training, sex disaggregation, etc.

⁸⁹ <https://www.iita.org/news-item/iita-and-bayer-launch-modern-breeding-project/>.

⁹⁰ EiB management believes this to be a misinterpretation. They acknowledge that private sector experience is not a guarantee of skills, experience, or results (KII).

⁹¹ LinkedIn profiles.

work on EBS within Module 5 had “75% of its current staff recruited out of Monsanto/Bayer IT.” One may infer that the AR suggests that having staff recruited out of Monsanto/Bayer IT is a guarantee of skills, experience, and results.

The relationship between the Platform and the private sector exemplified both cooperation and complementarity, however the evaluation found limited involvement of these companies in EiB activities, disproportionate to the expectations raised about public-private partnerships in EiB and CGIAR at large. EiB-supported breeding programs were not supposed to compete and rather focus on areas where they could add most value- market segments that are not served by private companies—the niche that CGIAR breeding programs must serve and that it was EiB’s mandate to support.

4.4.3 Contributing and Hindering Factors

Evaluation found a range of factors that influenced performance of the EiB platform, including those in and outside of control of EiB Platform management, or that of CGIAR at large.

Concerns were identified around the extent to which **EiB’s governance and institutional mechanisms** aided the achievement of results. Evidence of the PSC holding the leadership to account on an ongoing basis has not been found. Major decisions regarding the Platform seem to have been taken with no sign-off from the PSC. Furthermore, there seems to be little time and opportunity for discussion and the group is big and geographically dispersed. The independence of the PSC was also questioned, knowing that all but one of the members (or their organizations) receive some form of funding from one of the same donors that support EiB, and/or fulfill two roles, one of PSC membership and one of senior management or board membership in their institutions. Steering committee composition had already been raised in the context of CGIAR’s Challenge Programs and was to “be considered with care”⁸² This analysis of governance models recognized the dual necessity to have 1) programmatic decisions taken by the steering committee alone and, 2) full acknowledgement of the legitimate institutional interest of institutional partners. The role of the CtEH committee in relation to the PSC was not fully clear, with several interviewees suggesting that since its inception in 2019 the CtEH committee makes some of the key decisions for the EiB. ToR for the CtEH committee did not seem to exist. The evaluation team noted there was a discussion on governance and alternative scenarios for improvement of it in the April 2021 PSC meeting but has not found information on any decisions that might have been made.

Resistance to change was frequently cited as one of the main obstacles encountered by the EiB team. This resistance is said to come from various sources e.g., most public agricultural research systems are not used to change. Further, for many, it almost feels like an admission that established methods, in which they are heavily invested, are wrong. An example of this would be Centers that are used to a particular service provider and don’t see any need for change- e.g., even though outsourcing genotyping is much more efficient than doing it in-house, breeding programs are not always convinced of this and want to keep the service in-house. Another reason put forward is that breeding programs don’t have a strategic mind set and engage in project-based thinking.

Whilst there may be some truth behind these assertions of resistance to change and lack of strategic thinking, it seems a bit simplistic to put the lack of progress down to these two factors. It remains difficult to understand why, if EiB were delivering a very clear message of value creation (plus corresponding funding), breeding programs would not sign up. There are other possible reasons behind this lack of buy in such as the lack of consultation of the base and the promotion of a single model (GS, centralized data management system, etc.), all of this from (geographically) very far away. Concerns were expressed by some informants about the drive to implement a “one-size-fits-all-approach” and of a sometimes “heavy-handed,” “telling” way of working. Quotes from the online survey provide some examples: “engage with humility,” “tone down the bossy character.” The skills needed for working with people to overcome resistance, influencing others and implementing the necessary changes need to be developed for staff and units trying to achieve change. It is also interesting to note that according to the results of the consultation process carried out for N4ETTS, there is a real desire for “changing how we operate,” which clearly contradicts the frequently mentioned resistance to change of the breeding programs.

During discussions around assessment, improvement plans **and implementation** the evaluation team identified several factors that may have impeded achievements of EiB with regards to transformative change by CGIAR Centers and NARES:

1. Lack of clarity, e.g. around the responsibilities of each party, and criteria for funding- was one of the most significant barriers to implementing improvement plans. This was identified in a 2021 EiB

survey (A. Hunt EiB User Feedback March 2021) and confirmed by interviews with stakeholders on various sides.

2. Unbalanced focus on science, with insufficient consideration of other aspects that help deliver results—e.g., the organizational changes required for almost any transformative plan (and important for donors)
3. Vested interests in maintaining the status quo on the part of some individuals / organizations. Not all people will benefit from change and their resistance can be a logical response.
4. Less effective individual styles of engagement (communication, flexibility), eroding trust and commitment
5. Lack of SMART objectives, suitable feedback loops (an important criteria for some donors), or the poor fit of IPs with the existing situation and resources (survey in Annex 7)
6. Level of engagement; breeding program assessments only focus on the breeding programs whereas transformation often requires wider changes and influence across a Center
7. Poor ongoing change implementation, monitoring and management, e.g., looking at change as a one-off activity rather than a process through time, lack of focus on delivering the agreed benefits, lack of succession planning, and breeding program perception of insufficient implementation support by EiB (Annex 7)
8. The appointment of a senior project manager in 2021 to manage change internally was an important step forward in introducing expertise and progress in (changes to) internal operations. The appointment of an adoption and outreach manager also in 2021 provided additional support, with necessarily significant emphasis on the preparation and after-care required to not just introduce a new IT system, but to “drive” the promised benefits (i.e., outcomes) through training and ongoing support (e.g., monitoring of usage). The NARES engagement team is often cited as carrying out good work in terms of outreach and building relations.

Furthermore, a significant factor impeding effectiveness is that, to date, **Monitoring, Evaluation and Learning (MEL)** was not prioritized. The lack of clarity around the overall objective of the Platform, the constantly changing direction and role of the Modules, the absence of an updated and complete ToC and commonly agreed indicators that remain consistent over time hindered the setting up of an adequate monitoring and reporting system. **As basic issues such as what the Platform is accountable for, and to whom, were not resolved, the accountability/ monitoring role within EiB was unclear.** In the case of “what,” the evaluation assessed a mistaken understanding, on behalf of EiB, that it should only be accountable for what it has control over. In the case of “to whom,” accountability seemed to be mainly towards donors rather than final beneficiaries (farmers/consumers). Moreover, the EiB was operating in a context where partners (CG Centers and NARES) were not accustomed to tracking indicators; the exercise was demotivating for scientists and reporting was seen as a burden with frequently changing requirements and inaccurate data, rather than a learning exercise. As noted above, it has been extremely difficult to capture what the actual results of the work carried out by the EiB are. A good example of this is the lack of follow up given to the numerous training events carried out by the different Modules. Not only is information lacking on who has been trained on what, there is no indication of the effectiveness of this training. Likewise, in the case of the toolbox, feedback from internal IT and other Toolbox developers and managers confirms that the value and impact of toolbox use was not formally assessed, and that no user feedback mechanisms appear to exist.⁹²

The validity and relevance of the top line metrics were considered inadequate and questioned by some EiB stakeholders. The EiB started the process of implementing a standardized approach to measuring progress by means of 2 KPI; *genetic gain* and *varietal turnover*. While the genetic gain KPI, can be used to measure the efficacy of a breeding program by assessing aspects such as selection accuracy and intensity, and genetic variation, it will not provide any insights into progress toward the stated overall goals of the breeding programs related to hunger, nutrition, women’s empowerment, climate change and poverty, etc. Nor does this KPI incorporate the concept of product profiles promoted by the Platform e.g., it is perfectly reasonable to imagine a scenario where a 1.5-2% genetic gain is recorded, which does not result in any impact in farmers’ fields (due to lack of alignment with preferences). In this regard, it has to be considered an intermediary target on the way to a higher level one related to the EiB’s overarching goals (System-level outcomes). In the case of the target of less than 10-year varietal turnover, the justification for this is not always clear. For example, lots of vegetable varieties are much older than 10 years and are still considered sound. High varietal turnover is the private sector model—very technology oriented—and though there is a place for it, it should not be the only driver; CGIAR/EiB should not be

⁹² EiB management has indicated several surveys were conducted. However, EiB has not furnished the survey reports with result for use in this evaluation.

pushing one solution. Another weakness of these two prioritized KPIs is that they are **entirely focused on the science** and are not measuring change holistically or in terms of social impact.

Among contributing factors, some steps were taken in 2021 with a view to improving the quality of indicators, monitoring, reporting and ultimately, learning. A tool to collate and track progress towards the Funders' 6 requests was being developed with a view to providing EiB management with insights into progress and any barriers (the Breeding Program Dashboard of Progress towards Funders' Requests). The 6 requests were subdivided into more granular standard objectives, and these into activities. Each objective has been quantitatively evaluated within each CGIAR research Center, sub-divided under specific crop types (breeding programs). The traffic light-based scoring system is designed to provide a quick overview of the status of every objective within each CGIAR Center's crop type. Further refinements to the system are planned beyond the life of EiB. What is still missing from this tracking system is information on the indicators that are used to assess progress

A second system contributing to performance is the project management tool being developed during 2021 (for use after EiB has closed) by Scriptoria with a view to bringing greater transparency and collaboration within projects using a structured system, that removes the current use of excel files in managing CtEH improvement plans and activities.

And lastly COVID-19 brought significant challenges, which affected efficiency of spending, ability to manage and govern the Platform- especially for the recruitments made during that time, and across the globe.

4.5 Sustainability

Sustainability was assessed by means of two specific evaluation questions, one related to the likelihood of continued funding, using progress on the Funders' 6 Requests as a proxy, and the other relating to the uptake of EiB functions by the reformed One CGIAR Initiatives.

The "Breeding Program Dashboard of Progress towards Funders' Requests" in 2021 is likely to help better monitor progress against Funders' six requests. At the time of this validation, progress to date can be summarized as follows:

Request 1: Develop pipeline investment cases. Working with breeding programs, EiB identified 350⁹³ unique subregional market segments across 26 crops and 135⁹⁴ breeding pipelines.

Request 2: Incentivize management and staff to deliver higher genetic gain. CGIAR Centers are adopting more formal advancement systems and partners have started developing KPIs for staff.

Request 3: Develop strategic plans for delivery to farmers and varietal turnover. Interestingly, this is deemed "out of scope" of CtEH funding as "varietal development is operational in nature".

Request 4: Quantitatively optimize pipelines for higher genetic gain. According to EiB, as a result of EiB-supported practices and technologies, CGIAR breeding programs have been improving parent selection, enhancing accuracy, shortening breeding cycles, and standardizing data management but there is no evidence to demonstrate these achievements and no data to give a sense of scale.

Request 5: Implement shared services. According to EiB progress reports, services such as EiB's newly launched genotyping, EBS shared data platform, and operations and informatics networks are pushing CGIAR toward standardized services. The scale of progress is not however clear e.g., in the case of EBS, as noted above, this data management system is not yet fully operational.

Request 6: Build NARES breeding networks and capacity: According to EiB progress reports, an effective CGIAR-NARES collaborative breeding networks model was developed, with ongoing EiB support and mentoring provided to NARES. As noted above, support to NARES was indeed taking place but again the outcome of that support is difficult to grasp due to lack of robust data.

In summary, there was some degree of progress on R1, R5, and R6, though continued effort is required. Lack of data means it is not possible to comment on the level of progress towards R3 and R4, while R2 is considered the most challenging.

There was a clear and outspoken awareness at all levels of the organization that in order to achieve their objectives, the EiB needed to significantly improve their people, change management, and relationship

⁹³ Noted at the validation stage to be 372.

⁹⁴ Noted at the validation stage to be 142.

management skills. Nevertheless, after EiB it is hard to find concrete plans for the One CGIAR on how this essential task is going to be achieved. There is even some confusion among leaders about where these responsibilities will lie moving forward into One CGIAR (e.g., N4ETTS or Director People and Culture) and there still seems to be uncertainty about funding these activities. This is a major concern for the evaluation team.

In 2020, **as part of the One CGIAR reform**, CGIAR began streamlining the governance, operational structures and processes guided by the [2030 Research and Innovation Strategy](#). [Action Area 3](#) - on Genetic Innovations and Genebanks, stewards genetic resources and addresses barriers to achieving rapid improvement of crop varieties, thereby increasing genetic gain and varietal turnover in farmers' fields. Under this Action Area (AA) among the six pathways, specifically the following three would help accomplish through:

- Support for the optimization of breeding pipelines and implementation of genomics assisted breeding approaches
- Identification and incorporation of new traits, collaborating with the CGIAR Genebanks, and
- Regionally adapted, rapidly cycling source populations with genomic selection models, to help provide a continuous flow of diverse, elite materials for use as parents by NARES.

Investments in genetic innovations would provide foundational and multiplier outputs and outcomes for many crop-related innovations such as increased yield, biofortification, pest and disease resistance, and improved environmental tolerances that, in turn, deliver benefits across all five Impact Areas⁹⁵. CGIAR has committed, alongside partners, to improve genetic gains in farmers' fields across the dimensions of nutrition, livelihoods, equality, environment, and climate. The work of EiB modules is largely reflected in the new CGIAR Initiatives under Action Area 3; namely:

- **Market Intelligence:** '[Market Intelligence and Product Profiling](#)' closely reflects the work of Module 1
- **Accelerated Breeding:** '[Accelerated Breeding Initiative \(ABI\): Meeting Farmers' Needs with Nutritious, Climate-Resilient Crops](#)' closely reflects the work of Module 2
- **Breeding Resources:** Enabling Tools, Technology, and Services for Genetic Gains (N4ETTSS) '[Network 4 Enabling Tools, Technologies, and Shared Services](#)' reflects the work of Modules 3-5

⁹⁵ [Action Areas - CGIAR](#) accessed 03/2021.

5 Conclusions and Lessons Learned

This section presents conclusions and lessons learned based on findings of the evaluation. Figure 11 provides a word cloud of answers to the open-ended survey question to share “one thing that you feel is working really well in the EIB platform” and “one thing that you would really like to change about the EIB platform.” Results are disaggregated between EIB team and external partners. Selected key observations provide a useful entry point to summarize the evaluative conclusions and lessons learned.

- External partners recognize EiB's technical prowess in breeding, directed towards programs, as well as technical capacities and genotyping services;
- EiB team is working very well, despite challenges with leadership and management, and some implementation processes require attention;
- External partners to EiB platform would like to see change in how EiB engages and supports breeding programs;
- Both sides would like improvements in leadership, costs and efficiencies.

The discussion that follows triangulates findings with other types of evidence to conclude.

Figure 11: Most Used Words from End of Survey Questions for the Platform Members and External Partners



The high **relevance** of the EiB Platform is shown by the solid underpinning rationale and alignment with the needs of Centers, and external NARS partners. In many ways, EiB can be seen as a **precursor to the One CGIAR's** cross-center, cross-crop approach with centralized services and tools, common approaches and methodologies, economies of scale, and promotion of best practices. The evaluation asserts truth behind difficulties EiB encountered in the form of lack of buy-in by partners to the proposed changes, due to various explanations, i.e. the independent nature of Centers, used to pitching themselves as the best; to a lack of culture of combining efforts and embracing organizational change, and to a perceived top-down, one size fits all approach promoted by EiB. Further, in practice there was no unanimous agreement on the relevance of the services that EiB provides to CG Centers and NARES (survey and interviews).

The lacking clearjoint understanding of defined goal of the platform, which led to a **varied understanding of the objectives of EiB** both across and within the different stakeholder groups, inhibited the development of a strategy, either in terms of what EiB is pursuing or in terms of how to get there. Without clearly defined goals, it was not possible to develop a viable theory of change (ToC) that correctly identifies intermediary goals and milestones, or to assess whether things are on track to deliver expected results, or to report back to funders and other key stakeholders in a meaningful way on results achieved. It also prevented accountability and lesson learning.

Despite the perception of some stakeholders, both EiB and the BPAT teams did not apply a one-size-fits-all approach in assessing BPs. While the low quality of the initial breeding programs' **Improvement Plans (IPs) may have hindered** collaborative engagement, it underscored a key and recurring weakness- the lack of clarity regarding the mandate of EiB Platform vis a vis Centers, and the **ultimate responsibility of the Center for making changes**. Evaluation found lacking clarity as regards follow-up to IPs, and accountability was not fully addressed by the **Crops to End Hunger (CtEH)** funds- with a low uptake. Limited understanding of the rules surrounding grants by Centers and unclear initial guidance resulted in very limited and patchy investments; a "band aid" approach rather than transformative change leading to higher level goals. The inefficient grant awarding process, one of the biggest challenges facing the EiB team, led to significant amount of time is wasted on upgrading the quality of the investment proposals submitted by CG Centers and NARES and navigating the various legal/ administrative/ contractual obligations of these different entities, **"a very frustrating exercise for both the EiB team and recipients."**

As regards coherence, inter-module interaction appears unstructured and incoherent and, hence, weak to deliver a systems-driven approach. According to the logic underpinning the EiB⁹⁶, Module 1 was supposed to provide information to guide the prioritization process and work of the other Modules, but this logical sequencing did not materialize as market segments, pipelines and product profiles are only being agreed now. This lack of appropriate sequencing prevents a combined/systems driven approach i.e., thinking in terms of portfolios of projects rather than independent projects. Although there are bi-weekly meetings between module staff, there is no defined process for inter-module collaboration and to a large extent, modules operate as silos. **Alignment with NARES** was given an additional push as one of the 6 Funders' requests and notwithstanding the small team, some progress has been made e.g., signature by 8 of the 14 targeted NARES of a CG-NARES collaborative model with defined roles and responsibilities. There is clear acknowledgement that NARES are at different stages of development so will have different roles to play, however, the evaluation team found this not yet a reality. The relationship with NARES was often described as patronizing by some EiB stakeholders (rarely by NARES themselves)⁹⁷; skewed relationship exemplified by limited consultation in the market segment/pipeline work carried out under Module 1⁹⁸.

General satisfaction of EiB team with their immediate work environment and the way their performance is supported and managed by their line manager, facilitated **effectiveness and efficiency** of implementation. Even with the world class individuals working for the EiB, evaluation found EiB did not become greater than the sum of its parts. With appreciation of independence and freedom to act, clearer direction and better co-ordination, and more interaction with the leadership, and better communication around changes are desired. Several important best practices did not seem to be in place, including (a) a clear and effective hierarchy linking specific, measurable, achievable, relevant and timebound (SMART) goals at individual level to those of teams (and EiB) (b) an EiB specific competency framework and (c) a tailored Learning and Development Program. Of the EiB staff that manage people, more than half surveyed said that they would like training on people management skills. The **change management capability** of EiB and its staff is hampered, by amongst others, a lack of an agreed methodology, of understanding and ability to address people related aspects, and of clarity of responsibility of the different stakeholders. As regards **financial resources**, the significant changes between POWBs and ARs, on an annual basis, drastic fluctuations in burn rates by modules, funders, reflected the changes in

⁹⁶ See original EiB proposal plus Annual Reports and POWBs.

⁹⁷ For the record, the original evaluation team found relationship with NARES is often described as patronizing, and the validation corroborated their finding of clear acknowledgement that NARES are at different stages of development so will have different roles to play.

⁹⁸ As confirmed by EiB staff.

direction, and related HR challenges. Staff turnover and significant level of new hiring to manage inflow of CtEH funding continued to pose serious challenges. If we consider the demonstrable, evidence-based results documented in the first four years that could be made available and triangulated through this evaluative exercise, and compare these with EiB expenses of approximately \$24Mio, cost efficiency would be deemed as very low.

In terms of **effectiveness**, evidence of EiB's progress towards contributing to the breeding modernization effort of some breeding programs has been inconsistent and limited, with the different Modules delivering at different speeds without uniform ways of measuring results at the output and outcomes levels.

Salient achievements by Module 1, to create a full description of the portfolio of breeding pipelines within the CGIAR together with descriptions of the market segment(s) targeted and the pipeline investment case; and EiB work on the costing of breeding operations (many for the first time) and methods for estimating costs and analyzing these for opportunities for efficiency gains were found by evaluation team as good achievements. The recent work being carried out by the NARES outreach team was also singled out as being particularly positive in terms of moving the current CGIAR - NARES partnership model towards a more collaborative one that will lead to greater empowerment of NARES. Partners are moderately positive about the progress EiB has made as a driver of change. Notwithstanding these achievements, delivery of planned results is below expectations set in annual POWBs. A major problem with assessing EiB progress towards planned results is the lack of clarity of what these planned results are supposed to be, as well as the lack of a robust monitoring system. Several interviews also suggested that the expectations in the POWB were set high given the complexity of the work and the time available.

Concerns were expressed about **the governance** of the EiB. Evidence of the Platform Steering Committee (PSC) holding the leadership to account on an ongoing basis was not found, although several members stated that there have been, and continue to be, problems to address. Major decisions regarding EiB seem to have been taken with no sign off from the PSC. The independence of the PSC was also questioned and the role of the CtEH committee in relation to the PSC was not fully clear and there are overlaps. Monitoring, Evaluation and Learning (**MEL**) has not been treated as a priority. The lack of clarity around the overall objective of EiB, the frequent change in direction and role of the modules, the absence of an updated and complete ToC, and the lack of commonly agreed indicators that remain consistent over time, prevented the setting up of an adequate monitoring and reporting system. **Some positive steps were taken in recent months to improve the quality of indicators, monitoring, reporting** and ultimately learning, such as the dashboard tracking progress towards the Funders' 6 requests. What is still missing from this tracking system is information on the indicators that are used to assess progress and, on the criteria underpinning the rating system.

The extent to which the work of EiB modules is reflected in at least three CGIAR Initiatives under [Action Area 3 of Genetic Innovation](#) is a strong testament towards likely **sustainability** of approaches and results. The evaluation concludes that more than a revised organizational structure is needed to overcome the obstacles identified by this evaluation. Shift in reporting by breeding leads shifting from Centers to the Action Area 3 lead as of Jan 1st, 2022, would not make the challenges encountered by the EiB team in bringing about change will simply disappear. It will take effective relationships and trust between the right individuals and teams, in the right places at the right times and with access to the right level of skills and resources. Lacking clarity as to where the lessons and recommendations not directly related to the modules, e.g., with respect to people, change management and leadership skills, may be directed to are a concern to the evaluation team, as likely to hinder 'technical' successes.

5.1 Lessons Learned

EiB is CGIAR's third attempt at cross-center partnerships; building on Challenge Programs, and then- two phases of CRPs. With the move into One CGIAR there are many lessons to be learnt from these three experiences⁹⁹. Of all three attempts, EiB is the most structured and most funded one. However (see discussion on governance and Platform Steering Committee in section 5.4), the evaluation team found

⁹⁹ See "The 2021 Synthesis and Lessons Learned from a Decade of CRPs," <https://cas.cgiar.org/evaluation/publications/2021-Synthesis>.

examples of the failure by EiB to learn lessons from past experiences, repeating mistakes that could and should have been avoided.

One key lesson identified by this evaluation is that change is a complex process, requiring not only effective influencing and leadership skills—e.g., to build trust and understanding—but also clarity of responsibilities, a culture of accountability, sufficient resources, and detailed and effective planning.

The lack of clarity around lines of responsibility and the hesitation to be accountable for things beyond EiB's direct control have proven to be major stumbling blocks for the EiB Platform. The roles of different parties—e.g., EiB vis-a-vis CRPs and CGIAR Centers and NARES—are unclear. Who is responsible for what, and who is accountable to whom and for what?

The absence of a clearly defined and commonly agreed overall goal for EiB with a corresponding ToC was only addressed toward the end of the EiB Platform, when ToCs started to be developed for each of the modules. An effective ToC with clearly stated outputs, outcomes, and impacts, as well as areas of control, influence, and interest, to guide the Platform would also have helped clarify roles and responsibilities. Likewise, realistic intermediary goals, milestones, and indicators would have allowed the Platform to track its progress, take corrective measures when necessary, and report on results achieved. These features would also have hindered the, sometimes dramatic, changes in direction by modules, without any strategic or technical justification, that rendered previous EiB activities and outputs redundant. Module 1 showcased a need to provide clarity regarding the reasons for such changes when they occur. A number of lessons stand out. Consult more widely, especially with NARS, when setting goals for a module. Interact more extensively with NARS about the role that a module or initiative can play in improving their breeding programs. Do not downplay the importance of individual NARS centers. They will resist any indication of patronization. One size does not fit all. Understand the nuances of geographical and market differences. Other more targeted lessons include:

- Product profiles need to be sufficiently detailed and of high quality. Poor profiles will (and should) not be used for making investment decisions. However, the activity of creating profiles can raise the awareness of their conceptual importance.
- Genotyping services are urgently needed, but engagement with a single service provider may reduce access to the technology as the need for services grows. When scaling up new technology such as this, it is important to understand the potential effects of developing external services to ensure that there are no adverse consequences to existing local suppliers.
- Combining breeding operation assessments with recommendations and implementation of improvements has been beneficial to recipient programs. Supporting a few programs in depth has been a successful approach.
- The overall cost of setting up and maintaining several data management systems by CGIAR (and others) is high, and the prioritization of EBS (supported by Module 5) means that CGIAR maize programs are still without that capability. Decision-making in this area is complex and the outcomes are uncertain. The decisions need to be taken with realistic assumptions about cost and success and in consultation with all other stakeholders in the process.
- People skills have proved important. Working for change with Centers, individuals, and NARS has required a careful approach to avoid preaching, being judgmental, or being patronizing, which all discourage willing cooperation. These lessons have been particularly true during the COVID-19 pandemic and One CGIAR development, when people are already anxious about the future of their work. Despite this, the mindset of many breeders has been changed through engagement in assessment and improvement planning.
- Developing and rolling out guides and tools can be improved by tailoring them to the specific needs of users. When dealing with product development, success can be hindered by the weakest link in the product development and delivery process. Steps to strengthen such links are important.
- The outputs of EiB Module 2 are generic rather than specific to users' needs. They are not sufficient to be used effectively. The module and perhaps EiB has suffered from being insufficiently well linked from one end of the product development chain to the other.
- The value of face-to-face workshops and training sessions—i.e., in Module 3—cannot be underestimated. This work should be continued to assist NARS in the adoption of molecular breeding approaches to improve genetic gains in their breeding programs. Similar approaches, including guidelines and standard operating procedures, are likely to increase NARS' adoption of procedures for logistics and sampling and other relevant materials in the EiB toolbox.

- Module 4 showed that good leadership results in good delivery. While this appears obvious, it still deserves attention. Modules can benefit from less of a platform approach leading to a broader scope with all breeding programs.

Other lessons learned from the challenges of investing the CtEH funding show the need for clarity and guidance around eligibility, planning for the huge administrative load given the different legal and administrative rules prevailing in the different Centers, and the different requirements set by each of the donors. The lack of suitably qualified staff to manage the fund—e.g., fund managers, change managers—hindered success.

6 Recommendations

The following recommendations have been developed based on the original recommendations of the evaluation team stemming from findings and conclusions, then corroborated and amended by the validation team from the module studies¹⁰⁰. The recommendations are evidence-based and grounded in CGIAR context as much as in the context of the breeding industry.¹⁰¹ They recognize that the EiB Platform no longer exists (as of 31 December 2021) and many operational aspects of One CGIAR remain to be finalized. Where possible, the recommendations are targeted at specific initiatives, but there is also a degree of overlap for GI portfolio and CGIAR at large. The recommendations cover both technical and scientific issues, as well as many aspects of One CGIAR and initiative-level program management.

- 1. At the system level, One CGIAR must address issues of “end-to-end” thinking and ensure that the career development of all staff is well managed.**
 - a. Units should establish mechanisms for **bringing teams and individuals** together to ensure trans-disciplinary teamwork, a sense of belonging, and awareness of the big picture and to encourage new ideas, collaboration, and synergies between groups. The risk of a silo mentality is high, particularly for units with wide geographical spread.
 - b. Make available a professional, strategic, and well-resourced **HR function** to all staff to facilitate mitigating the problems associated with a highly diverse multinational organization.
 - c. Maximize the value of its human resources through the **developing career** streams that separately identify science and management roles, competencies, and skill level(s), and in particular recognize and reward those with excellence in skills such as breeding as highly as excellence in research outputs.
- 2. One CGIAR units must set and meet high standards of governance and project management, with clear roles, responsibilities, decision-making, and accountability systems. This should include their independent steering committees, mechanisms to ensure collaboration and teamwork, deliberate change management, and transparency regarding grant-awarding processes.**
 - a. Ensure that a strong and independent **steering committee** are in place from the start of the program, composed of fully independent members with recognized management and scientific expertise. The agreed committee ToR should stipulate providing support to, and oversight of, management. Its ToR should include the review of progress toward and quality of planned results, and assistance with strategic shifts in programs.
 - b. CGIAR units should develop and implement best practice **change management** approaches, including by ensuring that staff has access to basic training, with deep immersion for those directly involved in designing and managing change. The unit should consider the merits of a separate program management team with specialists in change and program management, focusing on the delivery of larger-scale projects and supporting those working on smaller-scale projects. It should be

¹⁰⁰ CAS/Evaluation note: The 9 recommendations do not directly align to the 10 recommendations in the draft report by the original evaluation team, presented to the evaluand in December 2021. Those 10 recommendations largely reflected recommendations in the Component study on cross cutting themes: Governance, the use of people as a valuable resource, and change management (see Annex 4). Considering the evolving context of One CGIAR reform and new operational structure of the action area and initiatives since Jan 1 2022, the validation team, including CAS/Evaluation function lead, worked to ensure that learning and accountability purpose of this exercise were reflected in the recommendations.

¹⁰¹ See profiles of subject matter experts of the evaluation and validation teams in Annex 10.

recognized that those who are excellent in research and breeding may not also have the skills and temperament to lead change management.

- c. Ensure that **grant-awarding processes are transparent** and follow clear guidelines while keeping administrative burdens to a minimum.

3. Successful project planning and management depends on clarity of goals and purpose, a comprehensive results framework based on a theory of change, and integrated monitoring, evaluation, with learning (MEL) mechanisms. The more complex the program, the more important it is to ensure that CGIAR units:

- a. Clearly define the **goal** of the unit and its subunits in the chain from science delivery and coordination through to end users and consumers (mainly around decision support services). Develop a corresponding strategy with clear timelines and priorities and ensure strong engagement of downstream stakeholders in the process.
- b. Develop a clear **results framework** aligned with the 2022–2030 CGIAR Results Framework. Operationalize by incorporating all levels of results and milestones, from outputs through to impact, based on agreement with CGIAR, donors, and other stakeholders such as NARES. Results frameworks for CGIAR Initiatives should serve as a common reporting framework for all partners, significantly reducing transaction costs.
- c. Ensure that **SMART interlocking objectives with deliverables**, covering both science and non-science aspects, are in place for each team and individual, and ensure effective feedback loops for performance management, reporting internally and externally.
- d. Develop a **theory of change (ToC)** and identify assumptions underpinning the proposed levels of change and corresponding milestones and indicators, based on lessons learnt. Donors and other stakeholders should participate in this process to ensure that the ToC covers all evidence-based assumptions and risks considering distinct lessons learned. All funding sources should be linked to the ToC, and well-integrated into planning and reporting.
- e. Put in place an integrated **monitoring and evaluation** system that enables continuous learning, reflection, validation of the ToC, feedback loops among program components, and adaptation of activities based on the learnings.

The other recommendations below cover the technical/scientific issues with respect to individual CGIAR or NARES breeding programs, and should guide all **Initiatives** under the Genetic Innovations portfolio, including:

- **Accelerated Breeding:** Meeting Farmers' Needs with Nutritious, Climate-Resilient Crops (ABI)
- **Precision Genetics:** Accelerated Crop Improvement through Precision Genetic Technologies (ACI)
- **Breeding Resources:** Enabling Tools, Technology, and Services for Genetic Gains (N4ETTSS)
- **Seed Equal:** Delivering Genetic Gains in Farmers' Fields (SeEdQUAL)

4. Ensure the new One CGIAR structure encourages and enables strong links between initiatives to ensure that programs and goals reflect all the needs of the pathway from gene discovery to sustainable production systems and food consumption.

- a. Any initiative-level **theory of change** should link to the ToC of the Genetic Innovation Action Area, and be based on lessons learned, stating evidence-based assumptions and risks about spheres of control and influence.
- b. The Genetic Innovation Action Area and initiative-level results frameworks should ensure continuity and consistency to facilitate learning, planning and reporting, and, subsequently, evaluability.
- c. **Listen to all CGIAR breeders and implementing partners** and ask what they need. Change is built on equal and equitable partnerships built on trust, which takes time and proximity.
- d. Ensure that breeding programs recognize the need to breed **for likely future needs**, including the need for climate change tolerance/resilience and better nutritional quality.
- e. Establish formal mechanisms to monitor that the end-users and most **vulnerable and poor are not left behind**, in line with the first Sustainable Development Goal.
- f. Put Genetic Innovation staff on the ground: significant change will be achieved only if GI staff are sufficiently numerous and close to breeders and other stakeholders. Leading and managing such profound changes is rarely successful if conducted from a distance (not necessarily physical, but in terms of mindset).

5. Accelerated Breeding (ABI) should play a crucial role in further modernizing CGIAR and NARES breeding programs by being the link between upstream disciplines and breeding programs and knowing both in detail. In particular, the ABI must consider the following:

- a. Target breeding programs that have not yet 'modernized' and consolidate gains in others. The work of EiB is **changing the mindset** of CGIAR breeding programs, requiring follow-up [consolidation] activities.
- b. **Use breeding program assessments** to develop modernization strategies, improvement plans, and investment plans. Investment plans should be embedded in tailored, transformative, and integrated improvement plans with clear milestones and results linked to the CGIAR performance results measurement and common results frameworks. Assessments and plans should be followed up and renewed at regular intervals.
- c. **In simulation studies, establish a fine balance** between many factors. Theoretical and operational issues typically require a lot of assumptions that do not always hold. While simulation studies can create a lot of value toward the improvement of breeding schemes and approaches, this may not happen without a detailed understanding of each target breeding program. EiB was able to achieve this, and there will be continued need for improved capabilities and capacity to conduct this type of work within CGIAR-NARES partnerships.
- d. Support the development of **trait-specific markers** relevant to specific breeding programs (high-priority trait objectives from product profiles) to help increase the adoption of molecular breeding for faster development of market-ready varieties.
- e. Widen scope in terms of disciplines, add **phenotyping technologies** and methodologies in addition to breeding operations. Equip breeding programs with highly efficient phenotyping for improved decision-making and higher selection gains.

6. One CGIAR should support breeders with information and tools to allow them to determine priorities and traits. Breeding programs should incorporate the following considerations into decision-making:

- a. Formalize agreement with stakeholders, including donors, on how to balance priorities between major and minor crops and on prioritization and funding allocation to CGIAR or external programs (e.g., NARES). Recognize that progress is likely to be slower with some activities than others and reflect this in evidence-based planning that is in-built in the results framework for tracking and measurement.
- b. Develop and regularly validate complete and useful product profiles as needed, at least for a number of breeding programs, possibly those involving the most interested or willing CGIAR or NARS breeders.
- c. Simultaneously, ensure that the market segmentation developed by crop breeding is used to define priority levels and that practices and resources are adequate for high-priority markets. Markets, as currently identified and described, should be validated with actors on the ground, including NARES and local private companies. Based on informative product profiles and market segmentation information, help partners—both people and organizations (CGIAR, donors, crop breeding leads, etc.)—develop action plans to use this information to make strategic decisions about which markets to serve and which products to develop.
- d. Complement the private sector in a meaningful way instead of merely copying [emulating] it.
- e. Continue to fully enable specific breeding programs rather than attempting to cover all programs and spreading resources too thinly for impact.

7. Highly technical facilities with resources and skilled staff are required for many modern breeding operations and services. 'Accelerated Breeding' (ABI) should learn from previous experience in relation to these services:

- a. Maximize efforts to increase the reliability of **genotyping services**, from tissue sampling all the way to data or information delivery. Reflect on developing a different operational and business model to address logistical and operational issues that limit the potential of shared services and result in sending plant material overseas.
- b. Systematically engage **service providers and CGIAR or NARES stakeholders** in considering how to establish regional external service centers.
- c. Include proactively a holistic financial approach in the **planning of service externalization**. Establishing external services to replace internal capabilities without properly handling the internal capabilities is inefficient and may impact and potentially disrupt internal capabilities and structures.

- d. Engage with multiple **internal and external providers** as the demand for services increases to mitigate risks associated with dependence on a single external provider.

8. 'Seed Equal' (SeEdQUAL) and 'Accelerated Breeding' (ABI) initiatives should continue to build long-term relationships with NARES and other partners through the following enhancements:

- a. Increase the breeding capacities in **NARES and SMEs** for improved genetic gain in farmer-preferred varieties (ABI).
- b. Increase awareness of the value of **molecular breeding at NARES** through trainings and capacity building. Ask for and listen to feedback from participants to facilitate increasing adoption of the approach and the use of shared services (ABI).
- c. Ensure that **seed multipliers provide quality seed of new improved varieties**, from CGIAR and NARES networks, at greater scale, tailored to the needs of the beneficiaries and thereby increasing varietal turnover and contributing to achieving genetic gains in farmers' fields (SeEdQUAL).

9. Commit to developing informatics systems for a diverse range of breeding programs, even though the effort is complex, expensive, and long-term. "Accelerated Breeding" initiative (and CGIAR as a whole) must include the following in its decision-making process:

- a. Develop **clear and strong objectives and strategies for breeding informatics activities, validated by an independent steering panel**. Such objectives and strategies, with the proper governance model in place, should be able to withstand any isolated attempts to significantly change them, thereby avoiding radical and unproductive changes in direction and maximizing the chance of delivery of value to end users.
- b. **Monitor the progress of enterprise breeding system (EBS)** development and its likely uptake by breeders. Maintain a dialogue with **users, donors, and platform maintainers** to ensure that decisive steps to cut support for legacy systems are taken at the right time to maximize resource allocation efficiency.
- c. Continue to support **other platforms and linkages** when EBS is not universally available or accepted.
- d. Fill in skills gaps within CGIAR and in partners with training (e.g., in the use of digital breeding tools, change management), matching breeding experts in various locations (e.g., Africa and Asia) with the needs of field support teams (BMS support teams).
- e. Keep the administrative burden of database use to a minimum.



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