Breeding Resources Initiative

Sharifah Syed Alwee and Young Wha Lee

Breeding resources

Lead
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CGIAR

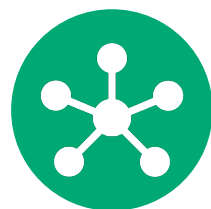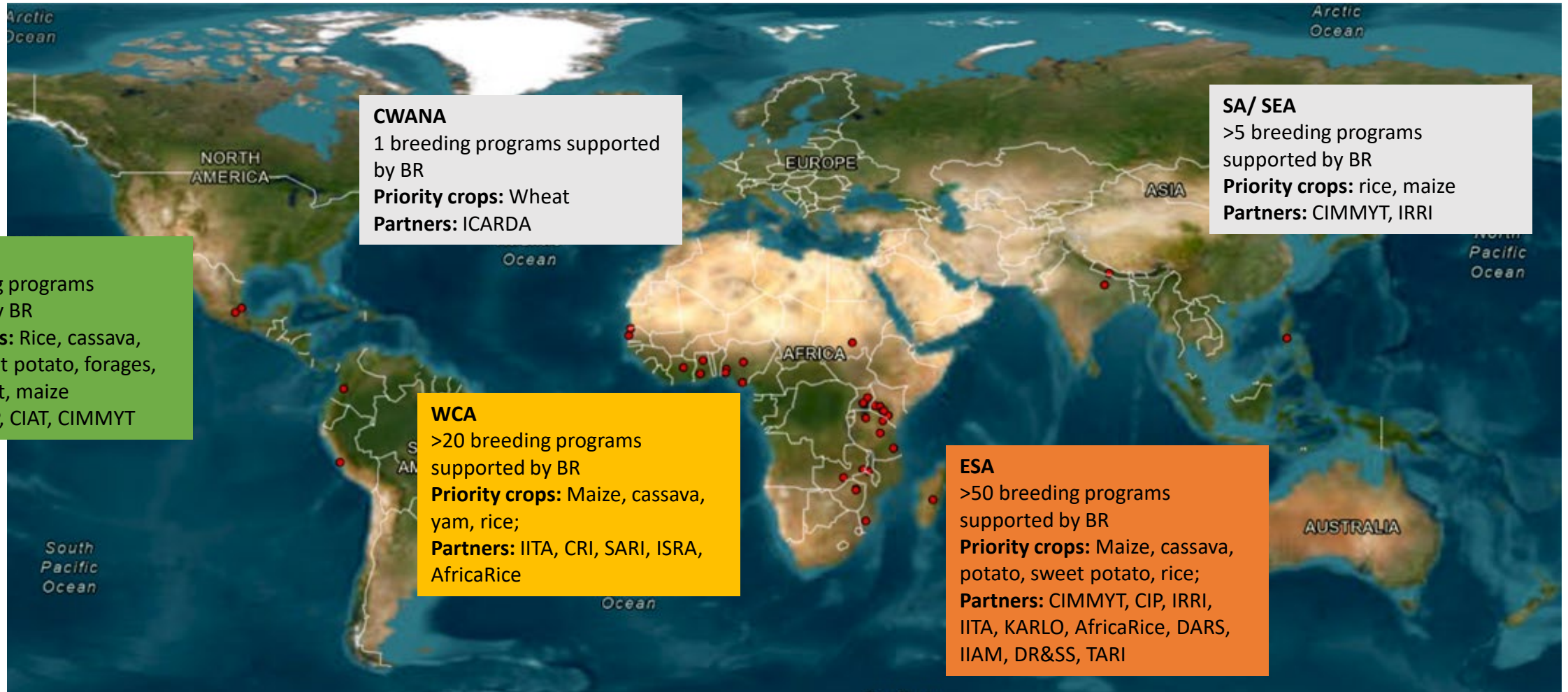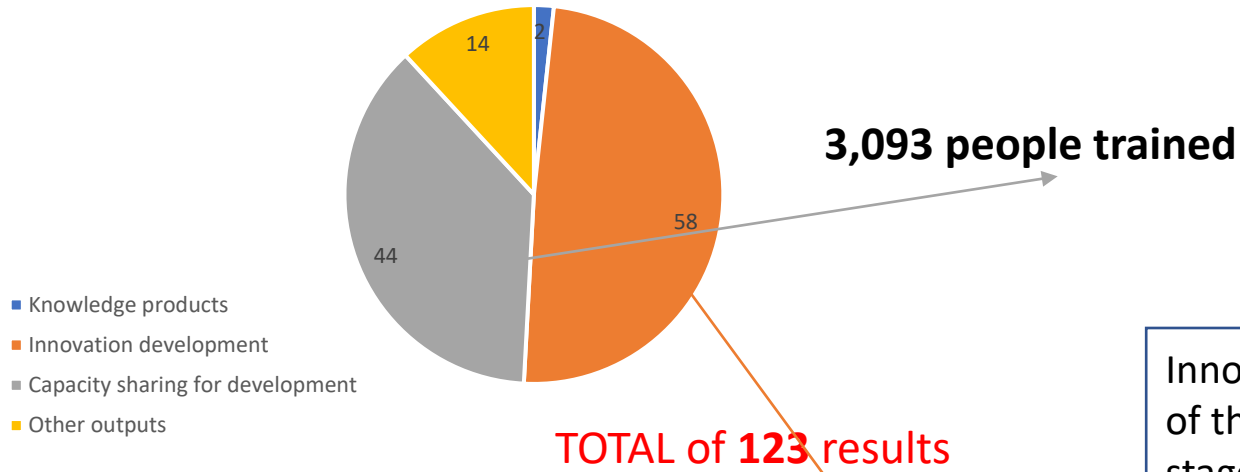|		
	1. Strategic Modernization	Simulation and forecasting to inform investment decisions
	2. Cost-effective Shared Services	Routine use of tools, technologies and services
	3. Performance Management of Consistent, Connected Operations	Continuous improvement of operations
	4. Smarter use of more data	Larger, powerful shared datasets for analysis and decision-making
	5. Innovation Development and Research Exchange (IDare)	Adoption across the CGIAR-NARES breeding network

Breeding Resources – geographic focus of results

CWANA
1 breeding programs supported by BR
Priority crops: Wheat
Partners: ICARDA

SA/ SEA
>5 breeding programs supported by BR
Priority crops: rice, maize
Partners: CIMMYT, IRRI

LAC
>10 breeding programs supported by BR
Priority crops: Rice, cassava, potato, sweet potato, forages, beans, wheat, maize
Partners: CIP, CIAT, CIMMYT

WCA
>20 breeding programs supported by BR
Priority crops: Maize, cassava, yam, rice;
Partners: IITA, CRI, SARI, ISRA, AfricaRice

ESA
>50 breeding programs supported by BR
Priority crops: Maize, cassava, potato, sweet potato, rice;
Partners: CIMMYT, CIP, IRRI, IITA, KARLO, AfricaRice, DARS, IIAM, DR&SS, TARI

Progress 2022 - overview

Work Package	Initial Focus Area	Scope Changes	Status
1: Strategic Modernization	Informed investment into breeding modernization, guided by quantitative genetics simulation and costing of breeding programs and services	Costing of breeding programs now led by ABI. Quantitative genetic simulation moved to ABI. **Focus on services costing and forecasting.**	🟧
2. Cost- effective shared services	Cost effective data generation and analysis services through consolidation and collective bargaining	No major change in data generating services. Changes in data analyzing services: 1. Pause in hiring global breeding analytics lead as strategy and sponsorship of setting up a service unit is re-assessed 2. bioinformatics support capacity uncertain/deprioritized in funding.	🟩
3. Performance management of consistent, connected operations	Harmonize processes in breeding operations for generation of quality data across the CG-NARES network through a quality management system.	none	🟩
4.Smarter use of more data	Reliable, responsive and future-looking Data Management System (DMS) for modern breeding.	none	🟩
5. Innovation Development and Research Exchange	Increase global adoption of modernized breeding through a dedicated Modernization Facilitators service and change management support	Removed "modernization facilitator" – role determined to have too much overlap with CG-NARES network coordinators in ABI. Focused innovation scaling to those relevant for WP 2,3,and 4. Change management focus shifted to continuous improvement training and support, complementing Work Package 3. Reduced scope of capacity development to that relevant for delivery or uptake of services.	🟧

Breeding Resources – 2022 key results

Output Result Categories

- Knowledge products
- Innovation development
- Capacity sharing for development
- Other outputs

Pie chart values: 2, 58, 44, 14

TOTAL of **123** results

Outcome Result Categories

- Innovation use
- Capacity change

Pie chart values: 4, 1
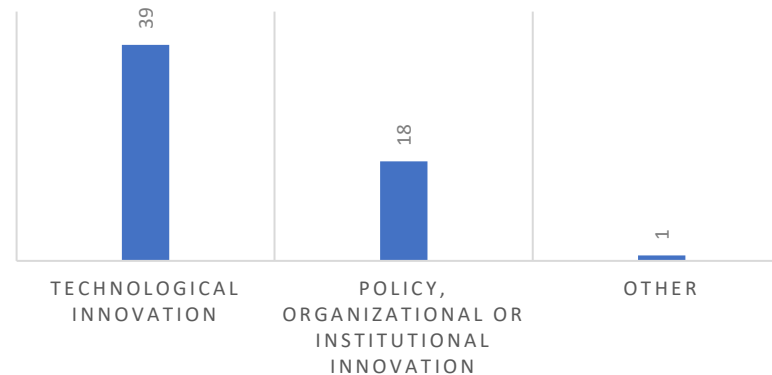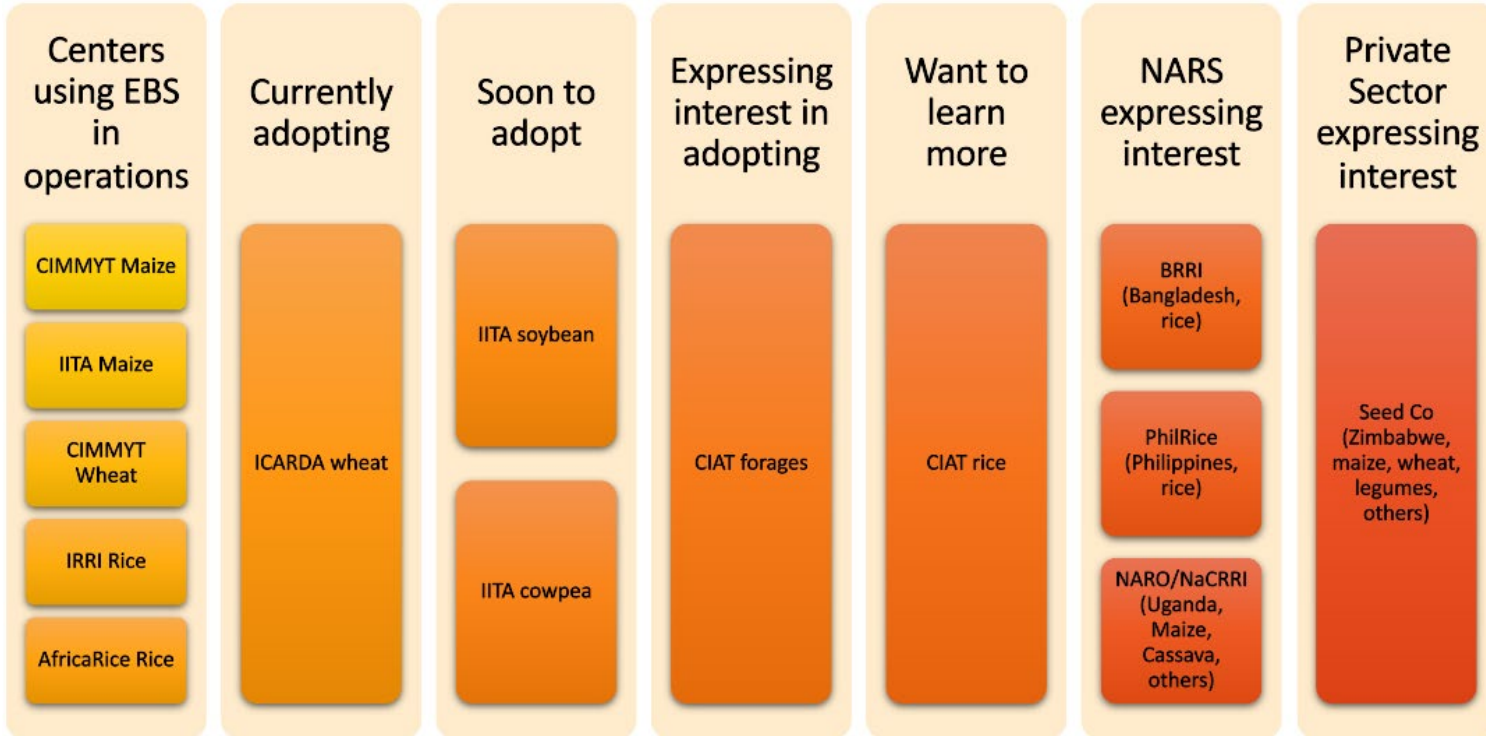
● Female ● Male

3,093 people trained

Female: 1,444
Male: 1,649

Innovation readiness: almost 50% of the reported innovations are at stage 9 (Proven Innovation), ready to be scaled
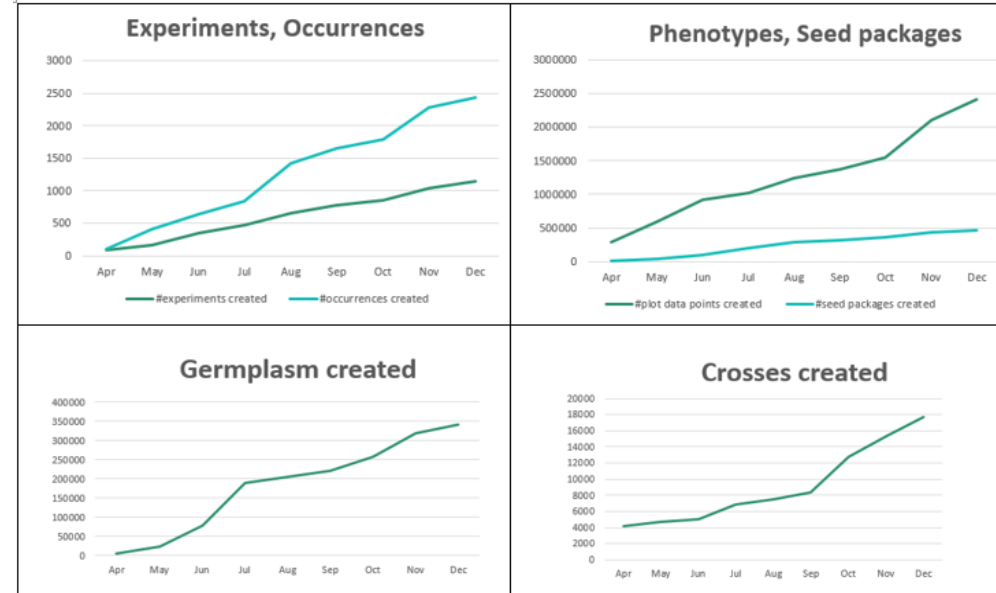
INNOVATION TYPE

- TECHNOLOGICAL INNOVATION: 39
- POLICY, ORGANIZATIONAL OR INSTITUTIONAL INNOVATION: 18
- OTHER: 1

Pipeline overview
# of innovations

Stage	Description	#
9	PROVEN INNOVATION — The innovation is validated for its ability to achieve a specific impact under uncontrolled conditions	28
8	UNCONTROLLED TESTING — The innovation is being tested for its ability to achieve a specific impact under uncontrolled conditions	6
7	PROTOTYPE — The innovation is validated for its ability to achieve a specific impact under semi-controlled conditions	6
6	SEMI-CONTROLLED TESTING — The innovation is being tested for its ability to achieve a specific impact under semi-controlled conditions	2
5	MODEL/EARLY PROTOTYPE — The innovation is validated for its ability to achieve a specific impact under fully-controlled conditions	3
4	CONTROLLED TESTING — The innovation is being tested for its ability to achieve a specific impact under fully-controlled conditions	5
3	PROOF OF CONCEPT — The innovation's key concepts have been validated for their ability to achieve a specific impact	3
2	FORMULATION — The innovation's key concepts are being formulated or designed	5
1	BASIC RESEARCH — The innovation's basic principles are being researched for their ability to achieve a specific impact	0
0	IDEA — The innovation is at idea stage	0

Success in 2022 – EBS Adoption

Centers using EBS in operations	Currently adopting	Soon to adopt	Expressing interest in adopting	Want to learn more	NARS expressing interest	Private Sector expressing interest
CIMMYT Maize	ICARDA wheat	IITA soybean	CIAT forages	CIAT rice	BRRI (Bangladesh, rice)	Seed Co (Zimbabwe, maize, wheat, legumes, others)
IITA Maize		IITA cowpea			PhilRice (Philippines, rice)	
CIMMYT Wheat					NARO/NaCRRI (Uganda, Maize, Cassava, others)	
IRRI Rice						
AfricaRice Rice						

Current EBS users and adoption candidates for 2023.

Number of experiments created in 2022 using EBS.

October 2022 – In-person training at AfricaRice, M'bé Station.

Dr. John Derera during event that launched EBS Maize at IITA in April 2022.

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Success in 2022 – Genetic Innovations Process Model

The CGIAR Breeding Process Model (BPM) connects Genetic Innovations Departments

Genebanks

Genebank Processes
"Genebank WP 3"

Strategy, Delivery & Scaling

Strategy, Delivery & Scaling

MI and TPE Research	Product Development Process			Product LC Process
Tbd.	Product Design	Trait Discovery & Deployment	Population Improvement & Candidate Selection	Scaling, Launch & Lifecycle Management

Plant Breeding & Pre-breeding

Recurring Breeding Operations Processes

Breeding Analytics

Trialing & Nursery Service Processes

Lab Service Processes

Breeding Research Services

Mi = Market Intelligence; TPE = Target Population of Environments; LC = Lifecycle

Blueprint and Benefits

Current	Future
Breeding teams, centers, regions and stations define their processes in isolation in the absence of an overarching architectural model.	• All Breeding processes follow the guidance of a CGIAR Breeding Process Model • Transparent and structured overview, and hierarchy of all breeding processes across crops and functions

Benefits

- **Improved comparability of performance and cost** between centers and crops
- **Easier to identify and prioritize improvement opportunities**
- **Faster** and **more effective scaling of** process **improvements**
- Higher level of standardization **facilitates technology design, deployment and adoption**
- **Improved cross-crop- and center communication through "one language"**
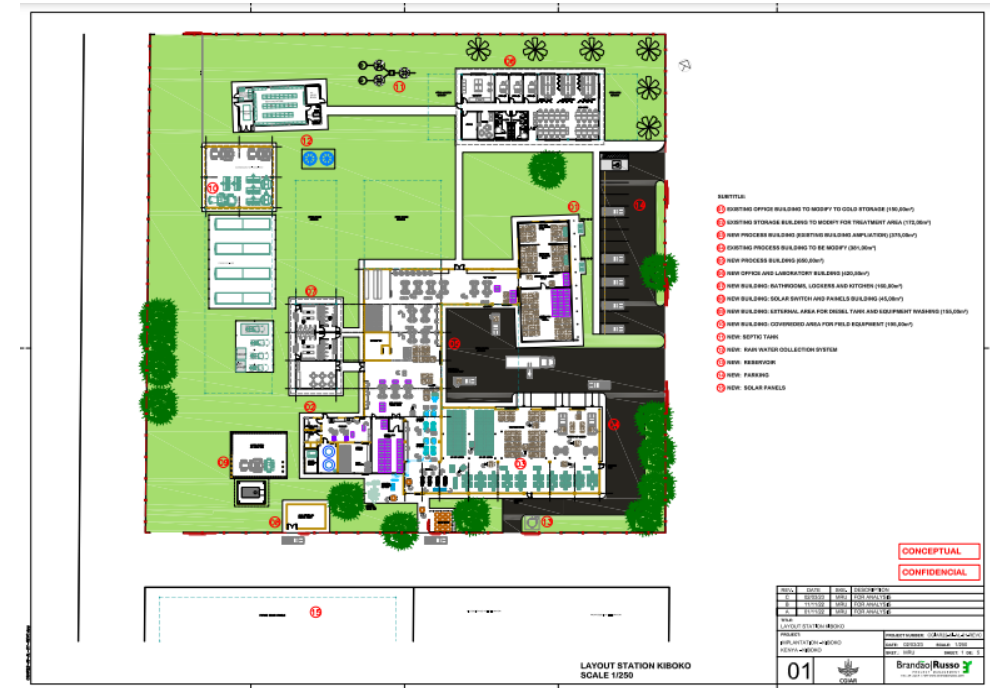
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Success in 2022 – Trialing & Nursery support services

Irrigation system layout CRI/CSIR - Kumasi Ghana
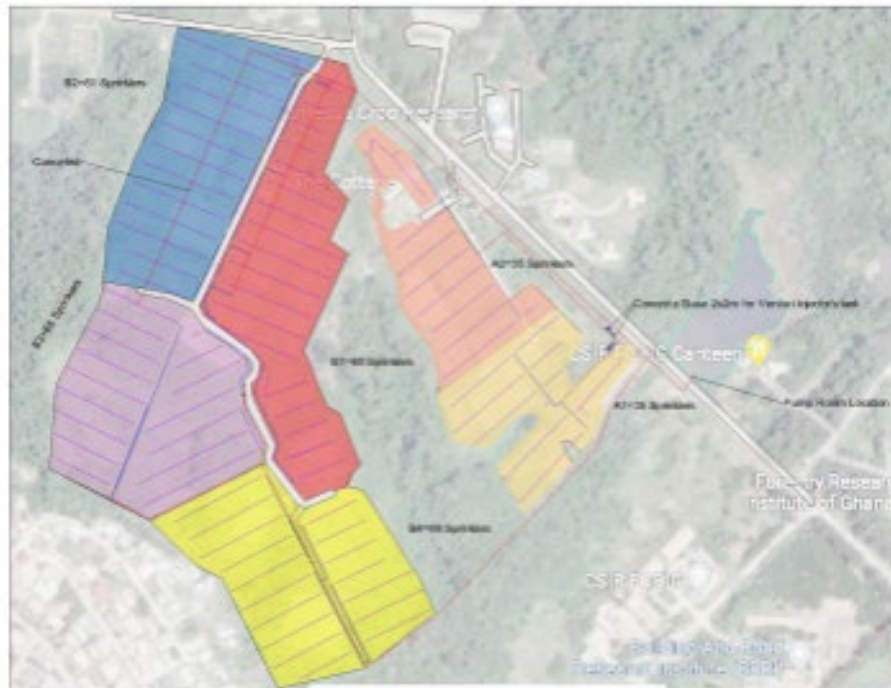
Seed processing infrastructure KARLO/CIMMYT - Kiboko / Kenya

Example of infrastructure projects being implemented (CtEH fund), supported by BR team

Success in 2022 – Capacity Building

Field day
KARLO - Kakamega/ Kenya

Continuous Improvement training
CSIR/ CRI – Kumasi/ Ghana