Modernising ICRISAT Crop Improvement Through the Support of AVISA

BILL & MELINDA GATES foundation

Adapting Industry-Proven Processes for Public Institutions

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Scope and Approach

AVISA aims to modernize breeding programs and strengthen seed production and delivery systems by:

1. Improving the effectiveness and efficiency of the Africa-focused breeding programs of ICRISAT, CIAT, IITA and NARS partners by adopting modern approaches similar to those employed by private sector breeding companies.

2. Engaging the public and private sectors in innovative and gender-responsive ways to enhance the supply of and access to high quality seed of improved varieties and hybrids.

Consolidating breeding activities and complimentary disciplines

Kano, Nigeria

Samanko, Mali

Patancheru, India

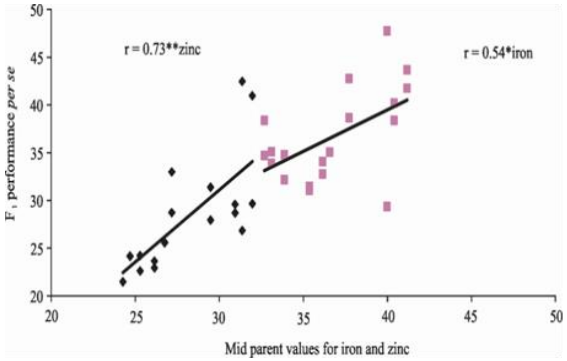
Matopos, Zimbabwe

Kawanda, Uganda

Regional Crop Improvement Hubs to Increase Productivity and Effectiveness

Upgrading and implementing of modern technologies

- Mechanization of key activities such as planting, harvesting and seed processing, coupled to DB
- High-throughput phenotyping (NIR & XRF)
- Digitization of data collection and transfer
- Centralized data management and analyses
- Rapid generation turnover cycling capabilities and capacity; digital ID tracking is essential.

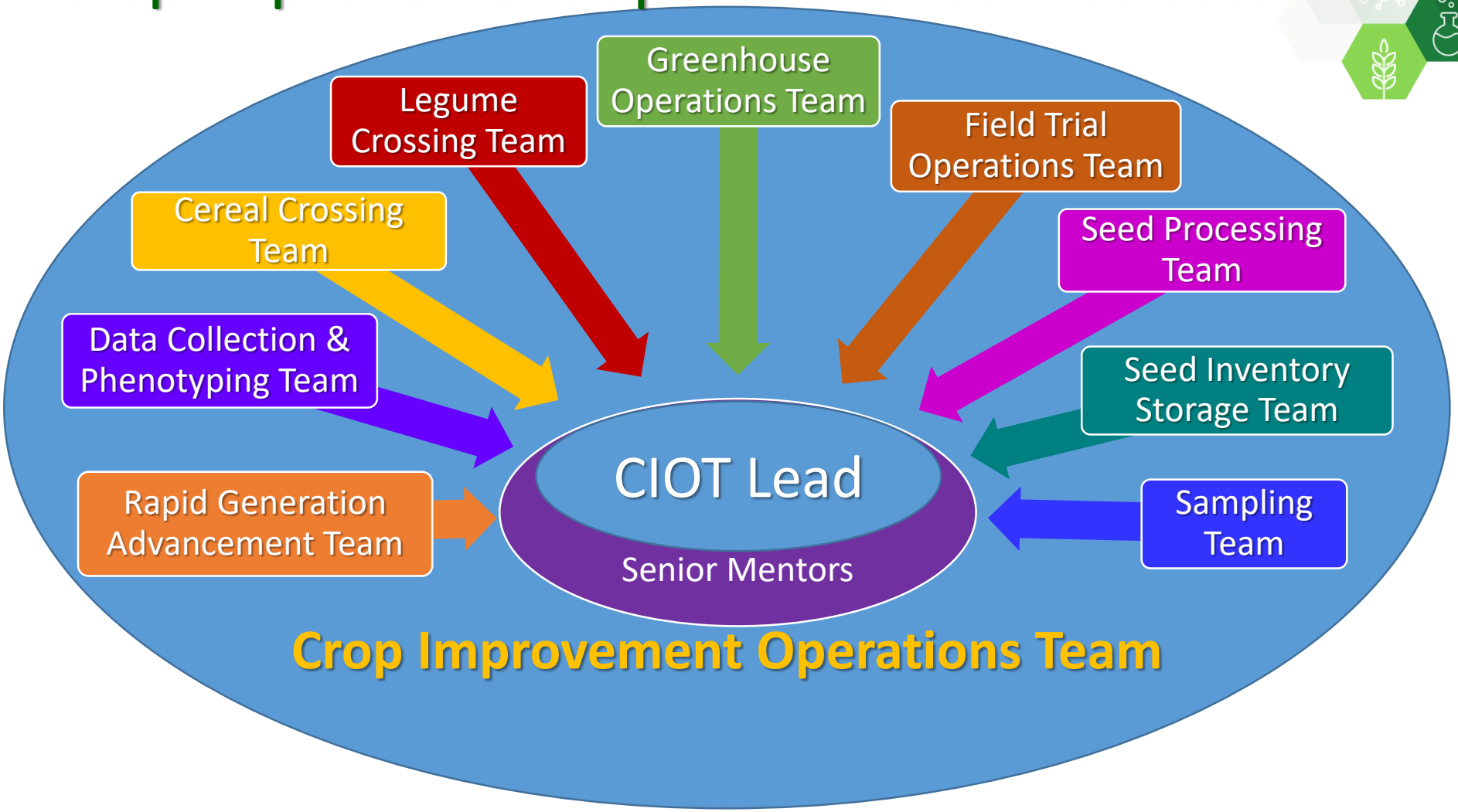


RCIHs to Increase Effectiveness and Productivity

All early-generation breeding activities are managed at the RCIH for all crops

- Crop Improvement Operations Team (CIOT) shared by all breeders
- Regional Breeding Lead to guide and mentor breeding team and direct the CIOT
- Close interaction with the complementary disciplines, sharing the hub
- Provide training grounds for partners and trainees

Crop Improvement Operations Team Structure



Technical staff will move between teams, depending on seasonal demand.

- Each staff member will be assigned to a primary team for administrative reporting purposes.
- Each team will have at least one primary and secondary team lead.
- Each team will have a scientific advisor/consultant (Ph.D. level expert scientist).

Change is a Process, Not an Event

We are Committed to Help You Grow through Change

KNOWLEDGE + APPLICATION = PERSONAL POWER

ICRISAT-HQ Research Station Assessment by Excellence in Breeding

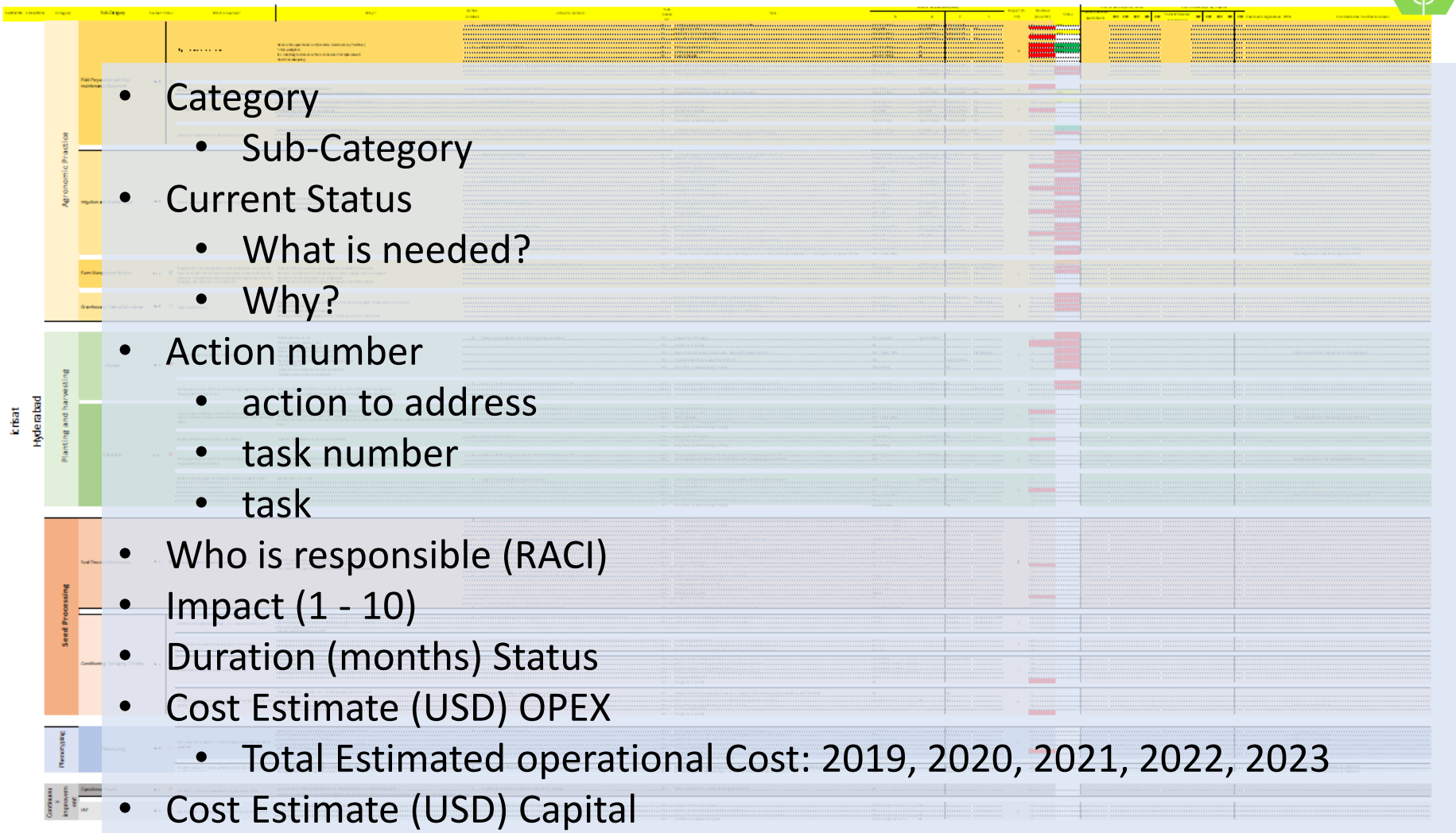
EiB Module IV - Priorities

- Approaches to increase plot throughput/reduce costs through mechanization, automation.
- Approaches to increase plot throughput/reduce costs through HT phenotyping (Qualitative / Quantitative)
- Streamlined processes with lab providers for physico-chemical composition and nutritional properties
- Inventory of NIRS uses and joint calibration efforts.
- G x E x M methods

CGIAR

Excellence in Breeding PLATFORM

Suggested Action Plan from EiB Visit



- Category
  - Sub-Category
- Current Status
  - What is needed?
  - Why?
- Action number
  - action to address
  - task number
  - task
- Who is responsible (RACI)
- Impact (1 - 10)
- Duration (months) Status
- Cost Estimate (USD) OPEX
  - Total Estimated operational Cost: 2019, 2020, 2021, 2022, 2023
- Cost Estimate (USD) Capital
  - Total Estimated Capital Cost: 2019, 2020, 2021, 2022, 2023

Total Workforce Costs for Seed Processing-Related Operations in 2018

	Crop Improvement			Genomics & Trait Discovery		
	Man Days/ha	Total area (ha)	Cost @ $ 6.48/ Man Day	Man Days/ha	Total area (ha)	Cost @ $ 6.48/ Man Day
Total	4261	53.26	**$ 300,255**	4088	5.8	**$ 37,979**
					Grand Total:	**$ 338,234**

Seed Processing – Annual Volume of Samples

Season	Rainy	Post-rainy	Summer	Total
Samples	**84,000**	**114,000**	**28,000**	**192,000**

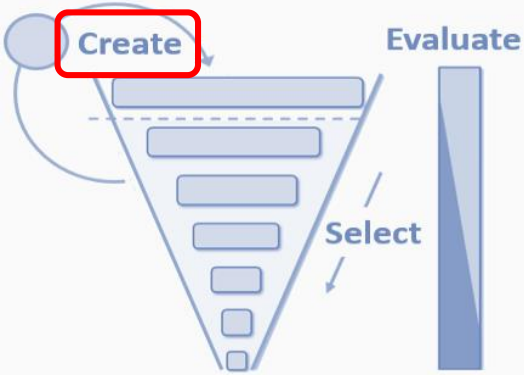
Shortcomings of Present Inventory System

- SOP – not in place
- Sample size – not standardized, resulting in space crunch
- Hand-written labels – prone to mistakes
- Inventory in Excel sheets – no real-time update on current inventory
- Old material – no information on viability
- Regeneration – no protocol in place

Respecting the fundamentals of breeding

Seed Inventory and Preservation of Identity (Avoiding Seed Mixtures)

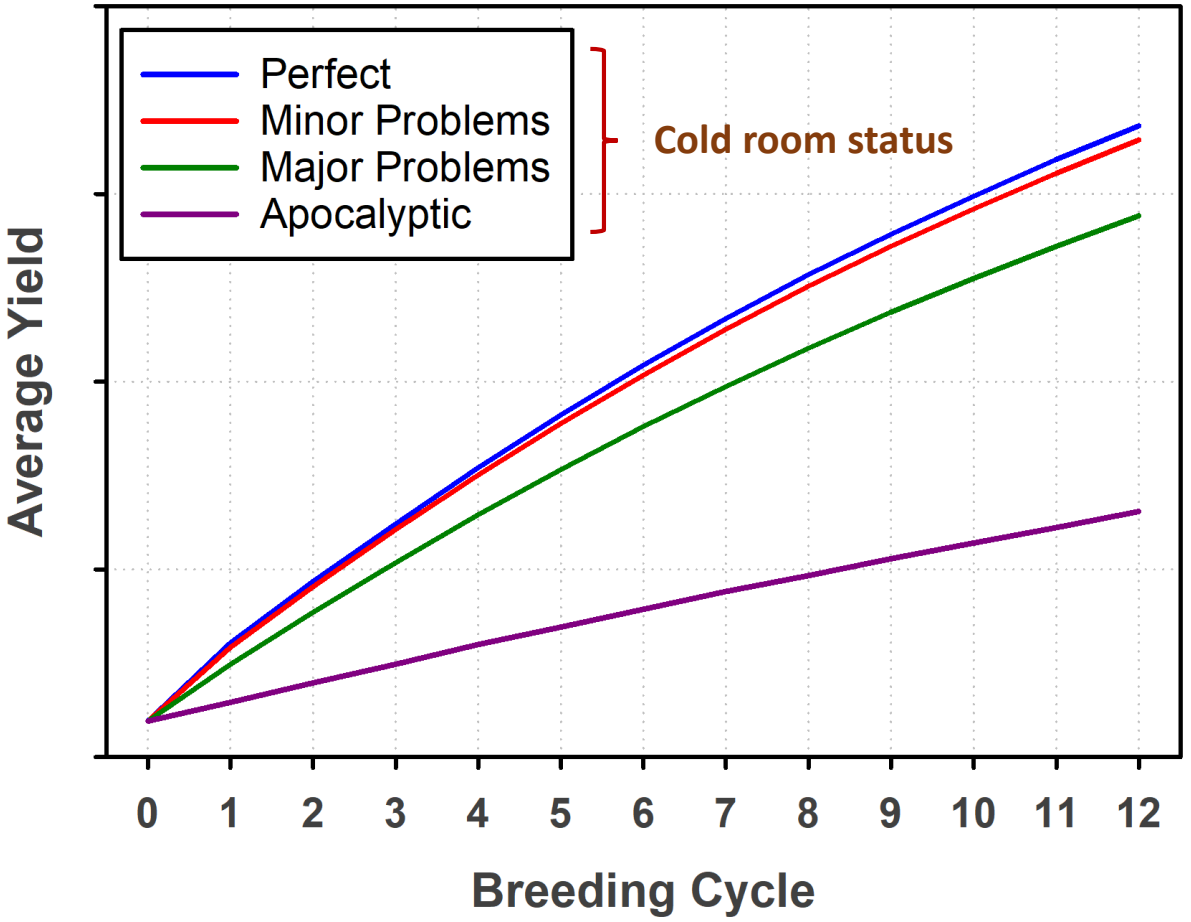
Take-home



Focus on the basics:

- Make sure you execute well

Seed Management (mix-up of seed)



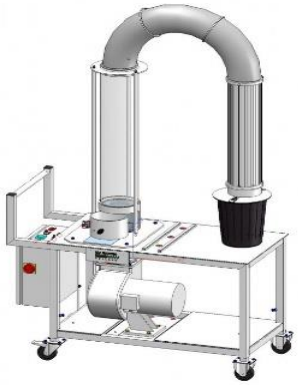
Courtesy of Dean Podlich

CORTEVA™ agriscience

Concept of Seed Processing Line

In

Threshing



Aspirating

Grading (Optional)

Seed counting + weighing

Bar code label printing

Out

Trials

Cold stores

Advantages of a Centralized Seed Processing Facility

- Reduction in seed turnover time from 30-45 days to less than 15 days
- Increase in quality and accuracy
- Standardized labelling, preventing mistakes, duplications and expedite seed handling
- Less maintenance and operational costs
- The investment on the facility will be paid off in less than 2 years
- Projected annual savings of:
  - $ 300,000 for Crop Improvement
  - $ 100,000 for the Genebank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Thank You