Modernising ICRISAT Crop Improvement Through the Support of 

Adapting Industry-Proven Processes for Public Institutions

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Global Head – Breeding
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

Matopos, Zimbabwe

Samanko, Mali

Kano, Nigeria

Kawanda, Uganda

Patancheru, India
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
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

increased knowledge

experience

greater personal growth

application

greater understanding

the power to choose

old and familiar

new and un-chartered
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.
- \( G \times E \times M \) methods
## Total Workforce Costs for Seed Processing-Related Operations in 2018

<table>
<thead>
<tr>
<th></th>
<th>Crop Improvement</th>
<th>Genomics &amp; Trait Discovery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Man Days/ha</td>
<td>Total area (ha)</td>
</tr>
<tr>
<td>Total</td>
<td>4261</td>
<td>53.26</td>
</tr>
<tr>
<td>Grand Total:</td>
<td></td>
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</tbody>
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## Seed Processing – Annual Volume of Samples

<table>
<thead>
<tr>
<th>Season</th>
<th>Rainy</th>
<th>Post-rainy</th>
<th>Summer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samples</td>
<td>84,000</td>
<td>114,000</td>
<td>28,000</td>
<td>192,000</td>
</tr>
</tbody>
</table>
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)

Cold room status

Average Yield vs. Breeding Cycle

- Perfect
- Minor Problems
- Major Problems
- Apocalyptic

Courtesy of Dean Podlich
Concept of Seed Processing Line

In → Threshing → Aspirating → Grading (Optional) → Out

Trials
Cold stores

Bar code label printing

Seed counting + weighing
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
Progress is impossible without change.

Change makes us grow.
Thank You