Breeding Program Assessment Tool
maximizing genetic gain
http://plantbreedingassessment.org

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BPAT Phase 1  2015-2019

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA
BPAT objectives

• Independent review of CG and NARES plant breeding programs
  • apply private sector perspectives
    • better return on investments
    • focus on continual improvement
    • clear targets
    • understanding customers and market

• Assessment to drive improvements in genetic gain

• Assessment outcomes provided to Institutions and EiB to develop and implement Program Improvement Plans (PIP)

• Refine and improve BPAT tool
BPAT questions (155) – eleven components

Breeding Program Components

1. Breeding Objectives and Product Profiles
2. Breeding Organization
3. Infrastructure
4. Breeding Methodology
5. Product development and release
6. Program impact
7. Innovation
8. Engagement with NARES

Enabling Components

9. Alignment
10. Budget & finance
11. Organizational Effectiveness
## EiB and BPAT have a shared vision

<table>
<thead>
<tr>
<th>EiB Theme</th>
<th>EiB Vision (Outcome)</th>
<th>Issues</th>
<th>BPAT component</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Defining breeding targets and objectives</td>
<td>All breeding is oriented to development of products for maximum impact</td>
<td>rate of genetic gain, products that will be adopted by growers, understanding of for whom and what you’re breeding, high quality product profiles, distinct germplasm pools and breeding schemes</td>
</tr>
<tr>
<td>b.</td>
<td>Strategy for breeding scheme</td>
<td>Breeding scheme is optimized for rate of genetic gain and likelihood of developing products for impact</td>
<td>variety development, parent development, identification and validation of novel genetic diversity, short breeding cycle, stage gate system,</td>
</tr>
<tr>
<td>c.</td>
<td>Strategy for breeding operations</td>
<td>Breeding strategy is executed is such a way as to optimize data accuracy, cost and throughput</td>
<td>technology, data collection, good data management, quality control, parent and product selections, breeding program costs,</td>
</tr>
<tr>
<td>d.</td>
<td>Crossing</td>
<td>Best parental selection decisions are made and genetic diversity managed according to the breeding strategy</td>
<td>elite by elite, genetic diversity is measured</td>
</tr>
<tr>
<td>e.</td>
<td>Evaluation</td>
<td>Germplasm is tested in a way to maximize accuracy</td>
<td>genetic diversity is measured, trial designs, reliable data, phenotyping technologies</td>
</tr>
<tr>
<td>f.</td>
<td>Selection</td>
<td>Parents and products are selected on the basis of accurate data and aligned with the product profile</td>
<td>annual advancement meeting, accurate selection index, trial analyses, visualization tools, selection intensity and genetic diversity</td>
</tr>
<tr>
<td>g.</td>
<td>Product verification, release and delivery</td>
<td>There is a pipeline and process for maximum impact of breeding program outputs</td>
<td>effective pipeline, sufficient data is generated and available</td>
</tr>
<tr>
<td>h.</td>
<td>Collaboration and culture</td>
<td>There is a culture that allows for improvement, sustainability and synergy</td>
<td>external trialling and germplasm, breeding teams are the experts, culture of continuous improvement, deploy new and successful breeding methods, annual review, respect and safety</td>
</tr>
</tbody>
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NEW Component – Organizational Effectiveness
Vanda Morgan
50 BPATs completed to date

<table>
<thead>
<tr>
<th>CGIAR/NARES</th>
<th>Number</th>
<th>Crops</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICRISAT</td>
<td>15</td>
<td>pigeon pea, sorghum, chickpea, groundnut, pearl millet, finger millet</td>
</tr>
<tr>
<td>CIMMYT</td>
<td>5</td>
<td>bread wheat, tropical/sub tropical maize</td>
</tr>
<tr>
<td>IITA</td>
<td>11</td>
<td>Mchare banana, Matoke banana, plantain, maize, yam, cowpea, soybean, cassava (4)</td>
</tr>
<tr>
<td>AfricaRice</td>
<td>2</td>
<td>irrigated lowlands, Rainfed lowlands</td>
</tr>
<tr>
<td>IRRI</td>
<td>3</td>
<td>marginal environments, favourable environments, hybrids</td>
</tr>
<tr>
<td>CIAT</td>
<td>4</td>
<td>rice, cassava, common bean, Brachiaria forages</td>
</tr>
<tr>
<td>CIP</td>
<td>2</td>
<td>potato, sweet potato</td>
</tr>
<tr>
<td>NARO</td>
<td>1</td>
<td>Uganda Matoke banana</td>
</tr>
<tr>
<td>EIAR</td>
<td>7</td>
<td>chickpea, bread wheat, durum wheat, bean, sorghum, maize (2)</td>
</tr>
</tbody>
</table>
BPAT team for CIMMYT review -135y+

Dr Yilma Kebede USA – 40 y; Pioneer, BMGF

Prof Mark Cooper USA – 30 y; Pioneer, UQ

Dr Randy Holley USA – 30 y, Syngenta, Pioneer

Dr Christopher Lambrides – 35 y, Pioneer, CSIRO, UQ
BPAT what’s next

- BPAT phase 2 – 2020+
  - 50 NARES + CG programs
  - Return visits after 3 years

- BPAT workshop in Seattle Jan 2020
  - Frame new questions for the re-assessments
  - EiB
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Thank you and any questions?

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