Accelerating Genetic Gains in Crop Breeding Programs through Center of Excellence in Genomics (CEG)

### Integrated genomics and breeding activities

#### Genotyping/sequencing platforms
- **SSR**
- **DA/T**
- **SNP**
- **GBS**
- **WGRS/GBS**

#### Genome and transcriptome sequencing
- 454/FLX
- HiSeq 2000
- DNA and RNA

#### Genetic maps
- QTL discovery

#### Trait phenotyping
- Superior lines with enhanced tolerance/resistance to abiotic and biotic stress

### Genome sequences
- **Pigeonpea** (Nature Biotech 2012, 30:83-89)
- **Chickpea** (Nature Biotech 2013, 31:240-246)
- **Sorghum** (available through US-led team)
- **Pearl millet and finger millet** (in progress)
- **3000 chickpea genome sequencing**
- **1000 pearl millet genome sequencing**
- **Re-sequencing initiatives in sorghum, groundnut and pigeonpea**

### Marker resources
- **Diagnostic markers for key traits**
- **>10,000 SSRs across mandate crops**
- **>10,000 SNPs across mandate crops**
- **High density DA'T arrays for chickpea, pigeonpea and groundnut**
- **Affymetrix 50K+SNP arrays in chickpea, pigeonpea and groundnut**
- **High throughput & low cost genotyping platform (US$ 1.5 per sample including DNA sample for 10 markers)**

### Molecular breeding
- **Chickpea**: drought tolerance and resistance to Fusarium wilt and Ascochyta blight
- **Groundnut**: resistance to rust and oil quality
- **Sorghum**: drought tolerance, resistance to shoot fly and Striga
- **Pearl millet**: resistance to blast, downy mildew and Fe and Zn
- **Pigeonpea**: markers for enhancing precision and efficiency of hybrid breeding

### Decision support tools
- **ISMAB for molecular breeding**
- **GDMS for data management**
- **ISMU for mining SNPs based on NGS**
- **ISMU v 2 for deploying Genomic Selection**
- **GOBII for high-density genotyping data**

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**ICRISAT’s scientific information**: http://EXPLOREit.icrisat.org