DNA fingerprinting: Emerging Insights

Potential for scaling up as part of household surveys

will depend on several factors

- **Logistics** of collecting, tracking, storing and transporting the samples from farmers' fields to a lab facility to get high quality DNA
- **Capacity** to do high volume DNA fingerprinting within the country or easy access to such capacity internationally
- **Regulatory environment:** Government restrictions on the shipment of seeds, plant tissues or DNA samples to other countries for analysis
- **Cost** of DNA fingerprinting which includes—establishing the reference library, DNA extraction, genotyping service and data analytics.

Key insights: Cost Of using DNA technique for varietal tracking

- There are two major cost components:

1. **Cost of collecting the samples**
    - Field cost (logistics, supplies/materials, handling, shipping) – time and money cost
    - This cost may be marginal if it is integrated as part of a planned survey (the model of piggybacking)
    - However, cost may vary considerably depending on the type of sample collected vis-à-vis type of survey (e.g., collecting leaf samples in a HH survey planned after harvest may add substantial cost vs. collecting leaf samples in a survey where field visit is already planned during the growing season)

Key insights: Cost Of using DNA technique for varietal tracking

Major cost components (cont'd)

2. **Cost of analysis and interpretation.** This depends on:
    - Technique to be used (SSR, GBS, SNP)
    - Number of samples
    - Number of SNPs
    - Number of multiplexing
    - Economies of scale (datapoints)

The estimated cost per data point across these various studies is in the ~$30-50 range

- How fast is this projected to go down?

Food for thought for discussion…

- Given these costs and logistical challenges, is DNA fingerprinting method ready to be routinely applied as part of large scale representative HH surveys?
- What are potential ways to reduce the cost and to make the logistics more manageable?
  - Should DNA fingerprinting be used as a method of validation on a random sub-sample of households rather than all the households?
- Should all released varieties be subjected to DNA fingerprinting to establish its unique genetic identity? Should the seeds sold and distributed in the formal seed system be monitored using this method?
  - If the breeding programs are not generating varieties that have unique genetic fingerprints, there is no point in doing DNA fingerprinting on farmer samples (if the goal is to track adoption of improved varieties)

THANKS….

We welcome your contributions to the discussion