PROTOCOLS FOR YIELD DATA COLLECTION: FOCUS ON CROP CUTS

SPHI

Sweetpotato for **Profit** and **Health** **Initiative**

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Productivity Enhancement Major Outcome for Many Programs

- Thoughts from Bill Gates circa 2013:

- Gates told IFAD, the World Food Programme (WFP), and the Food and Agriculture Organization (FAO) that the approach being used today to fight against poverty and hunger is outdated and inefficient. He urged these food agencies to commit to a concrete, **measurable target for increasing agricultural productivity** and to support a system of public score cards to maximize transparency for themselves, donors, and the countries they support.

- "The goal is to **move from examples of success to sustainable productivity** increases to hundreds of millions of people moving out of poverty," said Gates. "If we hope to meet that goal, it must be a goal we share. We must be coordinated in our pursuit of it. We must embrace more innovative ways of working toward it. And we must be willing to be measured on our results."

Productivity Enhancement Major Outcome for Many Programs

- Thoughts from USAID 2015
  - USAID considers the impact of agricultural production and processing on communities and ecosystems and promotes practices that ***sustainably intensify* farming system productivity**, allowing more to be produced on less land.

- Key Questions:
  - Are our improved varieties delivering– more productive than existing local varieties? Are they holding up over time?
  - Is cleaning-up (removing viruses) really paying off? Do we see meaningful differences between quality planting material and farmer retained material and/or negatively selected material?

Obtaining Yield Data

- Two approaches
  - Recall Information
    - Production during previous season or year
      - Challenges with a piecemeal harvested crop; no differentiation by variety
      - Tool: Major vs minor seasons
            Within season: frequency of harvest X amount harvested (kgs)
    - Area under cultivation
      - Farm estimation of field size recognized as being very inaccurate
      - Estimations based on amount number of vines distributed
    - Yield: Production within given area/area estimated
  - Actual Measurement
    - Available tools for measuring **area** using geo-referencing software
          Areacalc and similar programs can be downloaded on mobile phone
            Most accurate on fields greater than 1000 sq meters
    - Crop cuts or on-farm trials/demonstration plots for varietal specific yield assessment

Obtaining Yield Data, cont.

- On-farm trials/Demonstration plots
    - Standardized area, usually in ridges
    - Consistent planting density
    - Joint researcher-farmer management
        - 4-9 visits during the growing season
    - Double purpose: Breeding program, acceptability
    - Tends to be conducted with better off farmers
- Crop cuts
    - More representative of average farmers
    - Farmer-managed– greater variation in input use
    - Three visits per farmer maximum
- Challenge: loss due to animals; theft; poor management

Suggested Protocol for Crop Cuts

- Costly to set up and collect yield data
- Recommend setting up 8 plots per variety per agro-ecology
  - 4 managed by men; 4 managed by women
  - 4 with children under 5 years of age
  - Assume 2 will be lost to animals/poor management
- Plot is 3 m X 2 m–
  - Random select of plot within field. ½ way down length; 1/3 inside
  - Mark with poles and request no piecemeal harvesting
  - After setup: 2 visits, capturing management practices
    - Monitoring 45 days after planting
    - Harvesting at appropriate time

Information Collected for Crop Cut at Monitoring visit

Farmer identification and practices

1) Location, Name of Major Sweetpotato Farmer, Gender, Plot Number, and Household Identification *+

2) Number of varieties planted for a crop cut on the farmer's land *+

3) For each variety on farm:

4) Name of variety planted (use code list; other specify to type in if not on list) *+

5) Location: a) Lowland   b) Upland   c) Highland (>1500 m) *

6) Slope: a) Flat   b) Very gentle   c) Gentle   d) Steep *

7) Description of agro-ecological zone*

8) Date of planting*

9) Source of planting material*:   1) Own field   2) Nearby farmer 3) Farmer far away 4) Specialized vine multiplier 5) Extension agent-Government 6) Extension agent-NGO 7) Research Center   8) Market 9) NGO 10) This project 11) Other, specify

10) If own field (1): How many seasons have you reused the vines for this variety?*

11) If not from own field: Did the vines come with a label?*

Information Collected for Crop Cut at Monitoring visit

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12) Was sweetpotato on this plot last season/year?*
13) Was manure/compost applied on this field last season/year?*
14) Was manure/compost applied on this field before planting?*
15) Was inorganic fertilizer applied on this field last season/year?*
16) Was spray used to control pest problem?*+
17) How many times has the plot been weeded since planting? *+

Plant density
18) Sweetpotato planting in: a) ridges   b) mounds   c) flat*
19) Total number of plants that have established*
20) Distance between plants (within same row or on mound) in centimeters*
21) Distance between rows/mounts in centimeters*
22) Distance from homestead: a) <500 m   b) 500- 1 km   c) 1.1-3 kms   d) >3 kms*
23) Soil type: a) Very sandy   b) sandy   c) sandy-loam d) light clay   e) heavy clay
 f) Other*

Information Collected for Crop Cut at Harvesting Time

25. Date of harvest+
26. Was plot: a) No b) By watering can c) Drip irrigation 4) With other equipment+
27. Was any manure/compost applied after planting? +
28. Was any inorganic fertilizer applied after planting? +
29.   *If so:* Kind of inorganic fertilizer applied: _____   +
30.   *If so:* Amount of inorganic fertilizer applied: _____+
31. How many times was the plot weeded since planting?+
32. Was spray used to control pest problem since planting?+
33. Total number of plants in plot to be harvested+
34. Number & weight (kgs) of commercial roots+
35. Number & weight (kgs) of roots with weevil or rot damage+
36. Number & weight (kgs) of other non-commercial roots+
37. Weight (kgs) of vines+

Analysis

a. Determination of average root yield in tons/hectare

For each site per variety:
<u>Total root weight (tons) = (commercial + non-commercial weight in kgs)/1000 kgs</u>
Area estimation (hectares)= 0.0006 hectares   (10,000 sq meters=1 hectare)

Sum up all the yields/site/variety and take the average.

b. Determination of average foliage (stems + leaves) yield in tons/hectare

For each site per variety:
<u>Total foliage weight (tons) = (foliage weight in kgs)/1000 kgs</u>
Area estimation (hectares)= 0.0006 hectares   (10,000 sq meters=1 hectare)

Sum up all the yields/site/variety and take the average.

Analysis

c. % of root yield that is commercial:
 kgs of commercial roots/(kgs of commercial + non-commercial roots) X 100

d. Alternative root yield determination (tons/hectare)

1) Calculate the kgs roots produced/plant harvested: total roots and commercial only
2) Determine the planting density per hectare:
        Number of plants ESTABLISHED X 1666.67
3) Multiply kgs/plant X planting density per hectare divided by 1000 kgs/ton

e) Compare two methods for root yield determination and decide whether to
     take an average of the two methods or rely on one of the two methods

Optional Analysis

f) Compare yields between agro-ecologies and yields by gender of farmer across all agro-ecologies

g) *If have sufficient cases of fertilized plots:* Compare yields within the same variety on fertilized versus unfertilized plots

h) Compare yields from crop-cut method to yields from harvesting on-farm trials or demonstration plots (if applicable)

i) Calculate the harvest index for each variety: weight of roots/(weight of roots + weight of the foliage)

Remember: Garbage In, Garbage Out
Take Care in Recording

We will test
ODK program
for recording..
tomorrow