Cultivar group: ___AAA-EA__________

1. Estimate yield potential in monoculture without limiting factors:

   Biggest recorded bunch weight: ___75____ kg   Days to harvest: ___450____

   Plant density for high density annual planting ___1500______ plants/ha

   Plant density for perennial monoculture ___1500______ plants/ha

   Formula for estimating yield potential (Ortiz and Vuylsteke, 1998):

   \[
   \text{Yield Potential in tons/ha} = \frac{\text{biggest recorded bunch weight in kg} \times 365 \times \text{plant density ha}^{-1}}{\text{days from planting to harvest} \times 1000}
   \]

   Calculated yield for high density annual monoculture ___91__ tons/ha

   Calculated yield for perennial monoculture ___91__ tons/ha

2. Estimate yield variability for two important contrasting production systems or production zones for the cultivar group following the diagram:

   - Global yield potential – 91 t/ha
   - Above (BEST) average farmer yield – 60 t/ha
   - Average farmer yield – 20 t/ha
   - Below average farmer yield – 10 t/ha
   - Worst case scenario yield – 5 t/ha
2.1 Identify major production zones/production systems you are most familiar with:

Production zone 1: Mid-altitude (<1350m down to 900m)
Production zone 2: High-altitude (>1350m up to 2000m)

2.2 From the list, select two contrasting production systems in different production zones or common production system in two contrasting zones and estimate yields:

*Production system 1:*

Location: __Lake Victoria zone (central/south Uganda, NW Tanzania, East Rwanda) (country, zone)
Cultivar name: ___AAA-EA________
Production system: __Dominant highland cooking banana_________________________
Brief description of total rainfall, length of dry season(s), altitude, longitude/latitude:
Rainfall 1000-1200mm annually, dry seasons 2 per year (<2 months per dry season)
For this zone, estimate the average yield/ha/yr, above average farmer yield and below average farmer yield (using bunches ha/yr and mats/ha). Finally indicate yields/ha/yr if important pest/disease and production problems are severe (worst case scenario).

**Above average farmers – production system 1:**
Yield __30___ t/ha/yr Bunches/ha/year _________ Mats/ha 1500

**Average farmers – production system 1:**
Yield __15___ t/ha/yr Bunches/ha/year _________ Mats/ha 1100

**Below average farmers – production system 1:**
Yield __8___ t/ha/yr Bunches/ha/year _________ Mats/ha ___1000___
Worst case scenario – production system 1: Yield __5__ t/ha/yr

Production system 2:

Location: ___High altitude (Albertine Rift, Mt. Elgon, Mt. Kilimanjaro, Pare Mountains)

Cultivar name: _________AAA-EA________________

Production system: ___Mixed highland cooking and beer banana systems__________

Brief description of total rainfall, length of dry season(s), altitude, longitude/latitude:

_1200-2000mm/yr (average 1600mm/yr)___2 x dry season (<2 months per season)

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

For this zone, estimate the average yield/ha/yr, above average farmer yield and below average farmer yield (using bunches ha/yr and mats/ha). Finally indicate yields/ha/yr if important pest/disease and production problems are severe (worst case scenario).

Above average farmers – production system 2:

Yield _70_ t/ha/yr Bunches/ha/year _________ Mats/ha __2500___

Average farmers – production system 2:

Yield _25_ t/ha/yr Bunches/ha/year _________ Mats/ha __1800___

Below average farmers – production system 2:

Yield _15_ t/ha/yr Bunches/ha/year _________ Mats/ha __1300___

Worst case scenario – production system 2: Yield __10__ t/ha/yr
2.3 Identify major factors explaining yield differences as shown in the diagram

<table>
<thead>
<tr>
<th>Major factors in yield variability</th>
<th>Production zone 1</th>
<th>Production zone 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type 1:</strong> difference between global potential and above average farmer yields</td>
<td>Moisture</td>
<td>Soil fertility (nutrient balance/ micronutrients)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(moisture)</td>
</tr>
<tr>
<td><strong>Type 2:</strong> difference between average and above average farmer yields</td>
<td>Soil fertility Mulching/moisture Pest &amp; Diseases</td>
<td>Soil fertility Crop management (plant densities)</td>
</tr>
<tr>
<td><strong>Type 3:</strong> difference between average and below average farmer yields</td>
<td>Pest and Diseases Soil fertility Mulching / moisture</td>
<td>No Soil and water conservation Poor plant density management BXW</td>
</tr>
<tr>
<td>Type 4: difference between below average farmer yields and worst case scenario</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor management leading to complex of yield constraints (poor soils * drought -&gt; pest and diseases finish the job)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note: Weevil &gt; Nematodes &gt; Sigatoka &gt; BXW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor management leading to complex of constraints (soil, BXW, water conservation)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.4 For each of the production zones, identify 2-3 additional possible intervention options for smallholder systems which would contribute to yield or income:

### i) post-harvest, processing and marketing:

<table>
<thead>
<tr>
<th>Production zone 1</th>
<th>Production zone 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Effective access to input markets – possibly collectively (reduce price)</td>
<td>1) Produce for high-price period by selective planting/deskuckering</td>
</tr>
<tr>
<td>2) Effective quality control of input markets (tissue culture, fertilizer)</td>
<td>2) Post-harvest processing for reducing transport cost, post-harvest losses (shelf life) and add value (vacuum packed, chips, flour)</td>
</tr>
<tr>
<td>3) Organized access to fresh output markets – ensure supply (quantity and quality – shelf life) to buyers</td>
<td>3) Collective marketing to reduce cost of transport and improve bargaining power (improve access to market information)</td>
</tr>
<tr>
<td>4) Improve institutional support</td>
<td></td>
</tr>
</tbody>
</table>

### ii) intra-household roles, decision making, and resource allocation

<table>
<thead>
<tr>
<th>Production zone 1</th>
<th>Production zone 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Improve land access and security for smallholders (particularly focus on heritage and impact on women and children)</td>
<td>1) Plots very small – access / security / control of land is key issue and needs to improve.</td>
</tr>
<tr>
<td>3) Teach young/children on opportunities along the banana value chain and integration with other enterprises</td>
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</tr>
</tbody>
</table>

### iii) household resource endowment (labor, capital, land, information)

<table>
<thead>
<tr>
<th>Production zone 1</th>
<th>Production zone 2</th>
</tr>
</thead>
</table>
1. Labor costs are high -> go for low-labor options (fertilizers, herbicide, tissue culture)

1) Market information
2) Explain nutrient flows – improve nutrient use efficiency

2.5 Identify trends or (likely) future changes (e.g. climate change, spread of diseases) which may alter the importance of limiting factors or the opportunities for smallholders producing this cultivar group?

1. Urbanisation -> increases profitability in peri-urban production area and allows intensification (high-tech) opportunities.

2. Soil nutrient mining likely to affect the buffer function (for food security particularly in areas far from the market)

3. Fuel costs will increase and will favor intensification close to the market and less for areas far away from the market

4. Tap into process market – growing urban middle class: improve shelf life, reduce bulk transport (chips, vacuum, beverage, flour)

5. Climate change to increase pest and disease vectors -> pre-emptive action required and making systems more resilient.

6. Bananas more resilient to erratic rainfall, providing opportunities to reduce vulnerability.
2.6 Based on the factors explaining yield variability, other intervention options and trends and changes, select up to 8 priority intervention options for the cultivar group which have applicability across major production zones. Please rank them by order of importance (1. = highest importance).

1. Presence of diseases and pests: banana weevil, nematodes, BXW, Black Sigatoka_
2. Poor soil and water management________________________________________
3. Lack of clean & quality planting material__________________________________
4. On and off farm post harvest losses: perishability, bulkiness, lack of value addition raises transportation costs
5. Poor markets access: fragmented (producers not organized), unlinked, disorganized
6. Limited policy support and financial investment___________________________
7. Low genetic yield______________________________________________________
8. Lack of coordination of banana research agenda at the discipline level________

For Parking lot:
Narrow genetic base leading to all AAA-EA susceptibility to biotic and abiotic stresses
Unknown post-harvest holding for cooking bananas