Breeding African Cabbage (*Cleome gynandra* L.) to improve dry season production in East Africa

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Introduction

- *Cleome gynandra* L.
  - Common: African Cabbage, Spiderwisp,
  - Family Capparaceae, Order: Brassicales
- Erect, annual, subtropic and tropic, herbaceous, pink and white flowers, allogamous

- Uses:
  - Traditional food and medicine
  - Consumption of leaves, flowers also edible

Exploitable Traits:

- Leaves → Yield
- Nutritional value (Ca, Fe, Vit. E, protein, beta carotene, antioxidants)
- Bitter taste → Sweet taste
- Seeds → Oil production
- Drought tolerant
- Medicinal properties (Anti-inflammatory)
Traits for selection

Goal:
Improve regional well-being by diversifying vegetable provision in the dry season

- Yield: Big leaves and quantity of leaves
- Delay flowering → Longer harvest period
- Drought tolerant

(Modified from P. Nekesa and B. Meso in Guarino 1997)
Market Analysis

Rising Star Seed Company
- A start-up of young plant breeders in Kenya
- Est. shareholders equity – 650,000 Euros
- Area of interest
  - Short Term: EAC - East African Community
    - Kenya → other EAC Countries

Current production:
- Subsistence and direct consumption
- Informal trade at markets
- No dry season sale due to low yield
Market Analysis

Open Market:
- Low traditional vegetable production for dry-season

<table>
<thead>
<tr>
<th>DRY SEASON PRODUCTION</th>
<th>CROP ENGLISH NAME</th>
<th>BOTANICAL NAME</th>
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</thead>
<tbody>
<tr>
<td>LOW</td>
<td>AMARANTH</td>
<td>Amaranthus sp.</td>
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<tr>
<td>MEDIUM</td>
<td>COWPEAS</td>
<td>Vigna unguiculata</td>
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<tr>
<td>MEDIUM</td>
<td>PUMPKIN LEAVES</td>
<td>Cucurbita sp.</td>
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<tr>
<td>LOW</td>
<td>BLACK NIGHTSHADE</td>
<td>Solanum nigrum</td>
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<td>LOW</td>
<td>SUNNHEMP</td>
<td>Crotalaria brevidens</td>
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<td>LOW</td>
<td>JUTE PLANT</td>
<td>Cochorus olitorius</td>
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<td>LOW</td>
<td>KALE</td>
<td>Brassica sp.</td>
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<tr>
<td>LOW</td>
<td>PIG WEED</td>
<td>Amaranthus sp.</td>
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Target Market

Producers
- Commercial vegetable farmers
- Smallholder farmers & cooperatives
- Backyard producers

Consumers
- Open market (rural & urban)
- Households (urban & rural)
- Restaurant & supermarket chains

Low cost production
- Public available germplasm
- Open field
- Mass selection

Traditional Kenya Production Chart (http://www.bioversityinternational.org/)
# Gantt Chart

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<tbody>
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<td>21/10/2016</td>
<td>15/01/2018</td>
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<td>Task 2: Collect Germplasm</td>
<td>16/01/2018</td>
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<td>Task 3: Evaluating Germplasm and Breeding</td>
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<td>01/10/2020</td>
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<td>Task 4: Field Trials</td>
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<td>Task 5: Seed Production</td>
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<td>Task 6: Launching 1st Variety</td>
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SWOT Analysis

**Strengths**
- Human Knowledge (breeding, marketing, biotechnology, plant physiology)
- Local knowledge
- Low cost
- No chemical product and no fertilizer

**Weakness**
- Limited knowledge on genetic diversity and traits for agronomic importance
- Funding

**Opportunities**
- No competitor in the dry season
- Improve regional well-being
- Germplasm available
- External support and funding
- Common food species
- Secondary transformation - fresh vegetables, dried material, fermentation
- Supply for local markets and to cities in a grocery store
- Lower price-point option in dry season

**Threats**
- Time of flowering
- Diseases and pests from other Brassicas
- Weather
- Social acceptance for formal trade of the crop
Stakeholders
Thank you!
References