FARMERS KNOWLEDGE OF BANANA CROP MANAGEMENT AS RELATED TO THE CONTROL OF BANANA DISEASES IN BURUNDI

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Contents

• Introduction:
  - Banana in Burundi
  - Constraints of banana plantations
• Survey methodology
• Results
  - Place of banana
  - Status of the plantations
  - Main constraints
  - Diseases constraints (photos & distribution)
  - Banana leaf symptoms in soils with poor fertility
• General status of banana plantations in Burundi
• Conclusions
Banana in Burundi

1. Different uses:
   • Cooking
   • Drinks
   • Dessert

2. Staple crop

3. Source of income

4. Social & cultural crop

5. Soil fertility and protection

6. Others: Livestocks, arts, house construction,..
Constraints to Banana production

- **Main biotic constraints:**
  - Fungi diseases (*Fusarium oxysporum* /black sigatoka),
  - Bacteria disease (*Banana Xanthomonas wilt*),
  - Nematodes (*Meloidogyne spp.*) and
  - Virus diseases (BBTV)
  - Weevils (*Cosmopolites sordidius*),

- **Abiotic constraints:**
  - poor soil fertility
  - weak farmers’ awareness on cropping practices
  - Weak support of the policy
Survey methodology

• Carried out in 16 provinces (2 communes/province except 5 for Makamba province) of Burundi and in
  August 2011

• Six farms randomly selected per commune making a total of 208 farms

• 6240 mats were assessed considering 30 mats/farm, older than one year
Survey-con’t

• A structured questionnaire was used in two stages:

1. Interview with one member of the household: farm characteristics, farmers’ knowledge and practices, banana constraints according to farmers

2. Surveyors evaluated different banana constraints in each field conditions and diseases incidences based on 30 mats/farm randomly selected
Banana compared with other main crops

First crop with domestic earning of 263.6 M$ (FAO stat 2009)
## Result 1. Place of banana in the surveyed zones in Burundi

<table>
<thead>
<tr>
<th>Variable</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banana as main crop (% of households)</td>
<td>77.9</td>
</tr>
<tr>
<td>Final use of harvested banana bunches for only food</td>
<td>9.1</td>
</tr>
<tr>
<td>Final use of harvested banana bunches for only cash</td>
<td>2.9</td>
</tr>
<tr>
<td>Final use of harvested banana bunches for both food and cash</td>
<td>88.0</td>
</tr>
<tr>
<td>Farm area under banana crop</td>
<td>40.9</td>
</tr>
<tr>
<td>Household income allocated to banana production</td>
<td>15.8</td>
</tr>
<tr>
<td>Household members involved in banana management</td>
<td>25.0</td>
</tr>
<tr>
<td>Time spent by surveyed farmers in farming:</td>
<td></td>
</tr>
<tr>
<td>25.0</td>
<td></td>
</tr>
<tr>
<td>Less or equal to 5 years</td>
<td>2.4</td>
</tr>
<tr>
<td>5-10 years</td>
<td>9.1</td>
</tr>
<tr>
<td>&gt; 20 years</td>
<td>87.9</td>
</tr>
</tbody>
</table>
The status of banana fields in surveyed farms

- Well managed: 39.9%
- Poorly managed: 59.6%
- Abandoned: 0.5%
Type of planting material used (%)

- Suckers: 95.6%
- TC-plantlets: 0.5%
- Macropropagation Plantlets: 0%
## Ranking of main banana constraints in Burundi

<table>
<thead>
<tr>
<th>Banana constraints</th>
<th>Rank 1 (%)</th>
<th>Rank 2 (%)</th>
<th>Rank 3 (%)</th>
<th>Rank 4 (%)</th>
<th>Overall (%)</th>
<th>Overall Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pests and diseases</td>
<td>39.9</td>
<td>6.7</td>
<td>2.9</td>
<td>7.7</td>
<td>48.3</td>
<td>1</td>
</tr>
<tr>
<td>Lower soil fertility</td>
<td>15.4</td>
<td>20.7</td>
<td>15.9</td>
<td>7.2</td>
<td>40.7</td>
<td>2</td>
</tr>
<tr>
<td>Lack of fertilizers</td>
<td>13.0</td>
<td>19.2</td>
<td>13.9</td>
<td>5.3</td>
<td>35.7</td>
<td>3</td>
</tr>
<tr>
<td>Limited land size</td>
<td>10.1</td>
<td>14.9</td>
<td>13</td>
<td>8.7</td>
<td>30.0</td>
<td>4</td>
</tr>
<tr>
<td>Lack of clean planting material</td>
<td>6.3</td>
<td>11.1</td>
<td>10.6</td>
<td>11.1</td>
<td>22.7</td>
<td>5</td>
</tr>
<tr>
<td>Lack of labour</td>
<td>3.4</td>
<td>1.0</td>
<td>2.4</td>
<td>1.4</td>
<td>5.7</td>
<td>6</td>
</tr>
<tr>
<td>Climate fluctuations</td>
<td>1.0</td>
<td>1.4</td>
<td>1.4</td>
<td>2.9</td>
<td>3.5</td>
<td>7</td>
</tr>
<tr>
<td>Poor access to markets</td>
<td>0.5</td>
<td>1.0</td>
<td>1.9</td>
<td>1.0</td>
<td>2.5</td>
<td>8</td>
</tr>
</tbody>
</table>
### Main pests and diseases

Ranking of banana pests and diseases in 208 surveyed farms

<table>
<thead>
<tr>
<th>Disease</th>
<th>Rank (%)</th>
<th>Rank 1 (%)</th>
<th>Rank 2 (%)</th>
<th>Rank 3 (%)</th>
<th>Rank 4 (%)</th>
<th>Overall (%)</th>
<th>Overall Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banana Xanthomonas wilt (BXW)</td>
<td>19.7</td>
<td>9.1</td>
<td>0.5</td>
<td>0.5</td>
<td>26.9</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Fusarium wilt</td>
<td>16.3</td>
<td>17.3</td>
<td>2.9</td>
<td>0.5</td>
<td>30.9</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Banana bunchy top disease (BBTD)</td>
<td>6.7</td>
<td>1.0</td>
<td>3.4</td>
<td>0.5</td>
<td>9.3</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Weevils and Nematodes</td>
<td>5.3</td>
<td>5.3</td>
<td>5.8</td>
<td>1.5</td>
<td>12.6</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Sigatoka</td>
<td>4.3</td>
<td>6.3</td>
<td>5.3</td>
<td>2.4</td>
<td>12.3</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
Fusarium wilt

Distribution of Fusarium in Burundi

Legend

Fusarium
Country
Admin Level 1
Admin Level 2
Insect

This map does not display official UN territories.
Distribution of BXW in Burundi

BXW Symptoms

Legend
- BXW
- Country
- Admin Level 1
- Admin Level 2
- Invader

This map does not imply official UN endorsement.
## Impact of BXW in banana plantations in Burundi

<table>
<thead>
<tr>
<th>Type of cultivars</th>
<th>Harvested bunches (Per year) before BXW infection</th>
<th>Harvested bunches (Per year) after BXW infection</th>
<th>Losses (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooking types</td>
<td>22</td>
<td>4.33</td>
<td>80.3</td>
</tr>
<tr>
<td>Brewing types</td>
<td>47.5</td>
<td>6</td>
<td>87.4</td>
</tr>
<tr>
<td>Dessert types</td>
<td>3.53</td>
<td>0.97</td>
<td>72.5</td>
</tr>
</tbody>
</table>
BBTD-distribution-vector and mode of spread
Sigatoka diseases

Yellow (Mycosphaerella musicola)

Black (Mycosphaerella fijiensis)
Weevils (*Cosmopolites sordidus*)
Nematodes

in poor soils in fertility
Weevils and nematodes
Banana leaf symptoms in soils with poor fertility

Phosphore

Azote

Potassium

Magnésium
The general status of banana fields in Burundi

- Intercropping system
- Dense and poorly maintained perennial crop
- Mixed constraints such as pests and diseases-soil fertility
Conclusions

1. Raising awareness of local communities in fighting the banana constraints (showing importance of banana)
2. Reduction of diseases inoculums in affected areas such as collective eradication for BXW & BBTD
3. Combination of use clean planting material and sanitary practices
4. Use of tolerant cultivars as strategy against pests and diseases which may destroy a single susceptible genotype
5. Include different stakeholders (Public, NGOs as well as private sector) for an integrated management program
6. Regional policy in an attempt to prevent spread of diseases across borders

“Put more efforts to reduce impact of diseases and pests on food security »
Support of policy

Projects: Clean planting material (control), access to credits, Quarantine measures

Other stakeholders (Research, FAO, NGOs, ...)

Farmer Knowledge

Communities organisations: Collective eradication of the infected mats/

Adoption of Integrated crop management practices
Actions undertaken