Production of quality seed-cotton in West and Central Africa

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Production of quality seed-cotton: the actors concerned

- Research organisms
- Seed services
- Certifiers
- Services of follow-up and support for farmers
- Management advisers
- Heads of village associations
- Farmers
- Heads of ginning factories
- Seed-cotton conditioning agents
- Marketing services
- …
Production of quality seed-cotton:  
3 main stages

1. Production of quality seeds

2. Crop management and fibre quality

3. Organization of the primary marketing
1. **Production of quality seeds**
   - Categories of seeds
   - Seed multiplication scheme
   - Norms of production
   - Technical precautions regarding the production
   - Technical precautions regarding the produce of the harvest
   - Quality control and seeds certification
Production of quality seed-cotton: production of quality seeds

The objectives of seed multiplication

- To preserve the whole characteristics of the varieties created by the breeders
- To multiply and to distribute the varieties (technical innovations) to the farmers
### The categories of seeds

<table>
<thead>
<tr>
<th>Name</th>
<th>Codification</th>
<th>Description</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother seeds (matériel de départ)</td>
<td>G0</td>
<td>Line, bulk... (breeder’s seed)</td>
<td>White purple-crossed</td>
</tr>
<tr>
<td>Fundation seeds (semences de pré-base)</td>
<td>G1 à G2 (ou G3)</td>
<td></td>
<td>White purple-crossed</td>
</tr>
<tr>
<td>Certified seeds (semences de base)</td>
<td>G3 ou G4</td>
<td></td>
<td>White</td>
</tr>
<tr>
<td>Registered seeds (semences certifiées)</td>
<td>R1</td>
<td>1st reproduction</td>
<td>Blue</td>
</tr>
<tr>
<td></td>
<td>R2</td>
<td>2nd reproduction</td>
<td>Red</td>
</tr>
</tbody>
</table>
Production of quality seed-cotton: production of quality seeds

Technical precautions regarding the produce of the harvest

• **Collection** (transfert field → ginning plant)
  ➢ Calendar, storage area, identification…

• **Seed-cotton storage at the ginning plant**
  ➢ Temporary, prior cleaning, batches separation…

• **Ginning**
  ➢ Calendar, cleaning, state and settings of the machines
  ➢ By variety and by category (from G1 to R2), in 1 time

• **Delinting** (optional)

• **Seeds conditioning**
  ➢ Cleaning, screening, calibration, pesticide treatment, weighing, bagging, labelling and bags closing

• **Seeds storage**
  ➢ State of the seeds and ambient conditions (t° and RH)
Production of quality seed-cotton: production of quality seeds

Quality control and seeds certification

• **Sampling**
  - Conditions, identification

• **Laboratory analysis** *(norms Int. Seed Testing Assoc.)*
  - Germination ability, water content, specific purity, sanitary state…

• **Certification**
  - Respect of certification norms, marking (label, bag)
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2. Crop management and fibre quality
   - fibre quality: result of the expression of the potential of a variety
   - Quality at the boll stage
   - Quality at the plant and the field stages
   - Cultivation technics to produce quality cotton
   - The key points for a quality cotton production
Production of quality seed-cotton: crop management and fibre quality

Fibre quality = expression of the potential of a cotton variety
Production of quality seed-cotton: crop management and fibre quality

Quality at the boll level

• Each boll has its history
  ➢ Trophic conditions (minerals, water)
  ➢ Environmental conditions (t°, radiation, pests…)

• Each boll has a value
  ➢ ABW (average boll weight)
  ➢ % fibre
  ➢ Technological characteristics

Source: Cotton Farming 1997
Production of quality seed-cotton: crop management and fibre quality

Quality at the boll level

• The « boll / axillary leaf » system determines the average boll weight
Production of quality seed-cotton: crop management and fibre quality

Quality at the boll level

- The components of the average boll weight

![Graph showing the growth of fibres, seeds, and hulls over days after flowering.](image)
Production of quality seed-cotton: crop management and fibre quality

Quality at the boll level

• The components of the average boll weight
Production of quality seed-cotton: crop management and fibre quality

Quality at the boll level

• The components of the average boll weight

Relationship between ABW and number of seeds
Benin 2002

Relationship between ABW (g) and number of seeds per boll.
Elaboration of the technological characteristics of fibre

Production of quality seed-cotton: crop management and fibre quality

Quality at the boll level

- Elaboration of the technological characteristics of fibre
Production of quality seed-cotton: crop management and fibre quality

Quality at the boll level

- Elaboration of the technological characteristics of fibre

Average boll weight (PMC)

Number of seeds \times Average weight of a seed + Number of fibres \times Average weight of a fibre

Seed Index (SI) / 100

Length (ML) \times Standard fineness (Hs) \times Maturity (MR)
Production of quality seed-cotton: crop management and fibre quality

Quality at the plant and at the field levels

Quality of the fibres of a field

- Average technological characteristics in the field
- Within-field variability of technological characteristics
  - Within-plant variability
  - Between-plant variability
Production of quality seed-cotton: crop management and fibre quality

Quality at the plant and at the field levels

- Precocity of the cultivation cycle
  - Variety
  - Sum of average daily temperatures
  - Sowing date
  - Mineral deficiencies...

Factors of earliness:
+ Variety
- Weeds
+ Sowing date
+ Mineral deficiencies
- Pests (pickers)

Growth stop "cut-out"

Beginning of flowering

Time

Shedding

- Mineral deficiencies
- Nitrogen stress
- Water stress
- Pests
Production of quality seed-cotton: crop management and fibre quality

Quality at the plant and at the field levels

• Precocity of the cultivation cycle

• Precocity and varietal factor
  - Date of 1st flower (Days After Emergence)
  - Date of 1st boll opening (DAE)
  - Rythm of flowering
  - Allocation of carbohydrates (bolls / other organs)
  - Physiological shedding
  - 1st harvest (50% boll opening) / total harvest
Production of quality seed-cotton: crop management and fibre quality

Quality at the plant and at the field levels

- Precocity of the cultivation cycle
- Precocity and varietal factor
- Split harvests and quality

<table>
<thead>
<tr>
<th>Harvest (DAE)</th>
<th>ML (mm)</th>
<th>UHML (mm)</th>
<th>UI (%)</th>
<th>STR (g/tex)</th>
<th>ELO (%)</th>
<th>IM</th>
<th>MR</th>
<th>PM (%)</th>
<th>H (mtex)</th>
<th>Hs (mtex)</th>
<th>Rd (%)</th>
<th>+b</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1 (110)</td>
<td>26,1</td>
<td>30,4</td>
<td>85,8</td>
<td>32,5</td>
<td>6,4</td>
<td>3,8</td>
<td>0,85</td>
<td>75,4</td>
<td>162</td>
<td>191</td>
<td>74,7</td>
<td>11,1</td>
</tr>
<tr>
<td>H2 (117)</td>
<td>26,7</td>
<td>30,9</td>
<td>86,5</td>
<td>34,6</td>
<td>6,1</td>
<td>3,0</td>
<td>0,69</td>
<td>60,5</td>
<td>145</td>
<td>211</td>
<td>75,7</td>
<td>11,0</td>
</tr>
<tr>
<td>H3 (124)</td>
<td>25,9</td>
<td>30,3</td>
<td>85,6</td>
<td>34,3</td>
<td>5,6</td>
<td>2,6</td>
<td>0,61</td>
<td>51,8</td>
<td>135</td>
<td>225</td>
<td>76,3</td>
<td>10,6</td>
</tr>
<tr>
<td>H4 (131)</td>
<td>24,5</td>
<td>29,2</td>
<td>84,0</td>
<td>33,7</td>
<td>5,2</td>
<td>2,0</td>
<td>0,46</td>
<td>35,1</td>
<td>124</td>
<td>270</td>
<td>75,6</td>
<td>10,2</td>
</tr>
</tbody>
</table>
Production of quality seed-cotton: crop management and fibre quality

Cultivation technic for a production of quality cotton

• Soil preparation
  ➢ If early: tillage
  ➢ If late: scrapping and mulch

• Varietal choice
  ➢ Compromise between potential (yield and quality) and precocity
  ➢ Interaction variety / sowing date

• Sowing
  ➢ Factor of homogeneity for the culture and for the technological characteristics

• Upkeep
  ➢ Reduction of the competition with weeds → precocity
Production of quality seed-cotton: crop management and fibre quality

Cultivation technic for a production of quality cotton

- **Fertilization (mineral and/or organic)**
  - Nitrogen ➔ gining out-turn
  - Potassium ➔ quality (length, strength, fineness)

- **Crop protection**
  - To avoid diversion of sap flow and/or direct damages to fibre

- **Harvest**
  - Split (in time), with 2 bags (good / low quality) made of cotton (PP prohibited)
  - Drying, screening, transport and domestic storage
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3. Organization of the primary marketing
   - Harvest storage and screening
   - Seed-cotton marketing and transport
Production of quality seed-cotton: organisation of the primary marketing

Harvest storage and screening

• First choice
  ➢ White, screened, dry, without spots, « orange quarters », stems, bracts, green or closed bolls, etc.

• Second choice
  ➢ White, non screened or spotted clean, without spots, « orange quarters », stems, bracts, green or closed bolls, etc.

• Third choice
  ➢ Screening residues: coloured, often immature and dirty.
Production of quality seed-cotton: organisation of the primary marketing

Seed-cotton marketing and transport

• Constitution of batches of homogeneous seed-cotton
• Organisation of the purchasing market
• Priority to transport of 1st choice
• Covers on seed-cotton trailers…
Production of quality seed-cotton: conclusion

Some key-points

✓ Choose a variety adapted to the growing conditions

✓ Control seed multiplication

✓ Protect bolls in position 1 et 2

✓ Promote bolls growth (plant density, nutrition, upkeep...)

✓ Promote a concentrated production (soil preparation, sowing, crop protection)

✓ Make early and split harvests

✓ Screen and protect the harvested seed-cotton
Le Manuel qualité pour les filières cotonnières UEMOA

Production de coton-graine de qualité

Pratiques du commerce de la fibre de coton

Plan Qualité

Egrenage du coton-graine

Classement de la fibre de coton

Standards « Afrique » de qualité du coton fibre
Thank you for your attention