Thinking about quality assurance for sweetpotato planting material: what are we learning?

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Quality assurance for sweetpotato planting material

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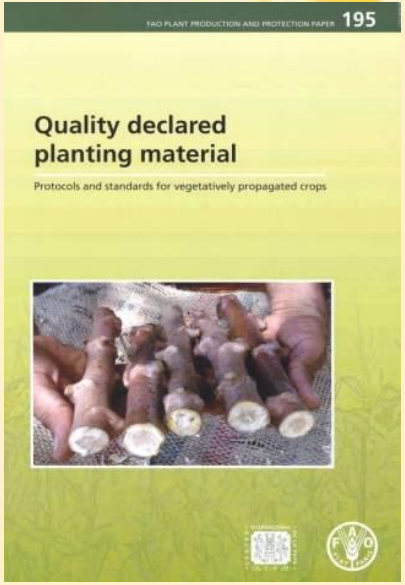
- Quality sweetpotato planting material (pest and disease free, of known source and varietal purity) can contribute to higher productivity

- An inspection process can:
  - Provide assurance to farmers & “protection” from unscrupulous seed dealers
  - Reduce risk of spread of disease and pests if PM is moved between different locations
  - Provide recognition to multipliers



- QDPM is appropriate where resources are limited, & is complementary to certified schemes;
- As sweetpotato seed systems move towards commercialisation & the “formal” sector – what are the issues?

Experiences

- **Tanzania: pilot of community based inspection scheme using 3 models:**
  - 12 Decentralized Vine Multipliers (DVMs) (~< 0.25ha) supplying to farmers in community
    - Self inspection; team inspection; external inspection
  - 2 inspections visits per multiplication cycle; pilot over 2 multiplication cycles
  - PHO, LZARDI, DALDO

- **Ethiopia:** pilot of informal seed inspection system for sweetpotato vines by committee at woreda level:
  - 3 commercial vine multipliers (~2 ha) supplying to FAO and INGOs
  - 3 inspections planned during one multiplication cycle (+ at harvest & packing)
  - SARI, EIAR, Bureau of Agriculture


Production of Quality Declared Planting Material (QDPM) of Sweetpotato, Ethiopia

Reference Book for an Informal Seed Inspection System for Sweetpotato Vines

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Cut offs for QDPM Pilot Tanzania

Table 2: FAO and Marando Bora tolerance levels: QDPM				
Parameter	FAO QDPM Standard	Marando Bora (MB)		
		Very Good	Acceptable	Not acceptable
Mosaic & stunting	1%	1%	5%	>5%
Leaf curl	5%	5%	10%	>10%
Purpling	5%	5%	10%	>10%
Other varieties	2%	2%	2%	>2%
Weevil	0%	0%	10%	>10%
Alternaria				
Butterfly				

Data collection: growing plants

1st visit: 4 weeks after planting; up to 5 varieties to be inspected

- History of previous crops and isolation distance observed
- Documented source of material (records)
- Beds labelled with name of variety and date of planting
- Evidence of roguing practice
- *Varietal purity in bed*
- *Presence of symptoms of serious diseases*
- *Incidence and severity of virus symptoms*
- *Presence of serious pests*

2nd visit: 2 weeks prior to harvest

- Physiological age of material & estimated quantity of ma harvested

Comparison of inspection results: FAO & MB tolerance levels: 1st cycle

Table 3 : Comparison of inspection results using FAO and MB tolerance levels											
No. & % plots meeting MB and FAO tolerance levels	Sweetpotato varieties										Total
	Ejumula		Jewel		Kabode		Polista		Ukerewe		
	Jan	Mar	Jan	Mar	Jan	Mar	Jan	Mar	Jan	Mar	
Total plots inspected (n)	6	7	1	1	7	9	8	10	7	8	64
No. MB acceptable (n)	2	3	0	0	6	7	7	10	3	3	41
Acceptable (%)	**33**	**43**	**0**	**0**	**86**	**78**	**88**	**100**	**43**	**38**	**64%**
No. FAO acceptable (n)	0	0	0	0	2	3	5	2	1	2	16
Acceptable (%)	**0**	**0**	**0**	**0**	**29**	**33**	**63**	**20**	**14**	**25**	**25%**

Source: Field data from 1st and 2nd rounds of inspection visits 2012.

Comparison of inspection results: FAO & MB tolerance levels: 2nd cycle

Table 4 : Comparison of inspection results using FAO and MB tolerance levels											
No. &% plots meeting MB and FAO tolerance levels	**Ejumula**		**Jewel**		**Kabode**		**Polista**		**Ukerewe**		**No. Inspt.**
	Aug-12	Nov-12	Aug-12	Nov-12	Aug-12	Nov-12	Aug-12	Nov-12	Aug-12	Nov-12	
Total plots inspected	8	6	4	5	9	7	5	7	6	8	65
No. MB acceptable (n)	3	2	1	3	6	5	4	5	2	5	36
Acceptable %	38	**33**	**25**	**60**	**67**	**71**	**80**	**71**	**33**	**63**	**55%**
No. FAO acceptable (n)	1	1	0	1	1	1	1	2	0	1	**9**
Acceptable %	13	**17**	**0**	**20**	**11**	**14**	**20**	**29**	**0**	**13**	**14%**

Source: Field data from 2nd cycle 3rd and 4th rounds of inspection visits 2012.

Yield and income benefit from using cleaned up & improved varieties

Table 5 : Yield and income benefit from using improved and cleaned up varieties distributed by Marando Bora

Variety	Yield t/ha	Diff. t/ha	% diff.	Price $/kg	Gross income US$/ha	Gross Income benefit US$/ha	Cost of planting material for 1 ha US$	Net income US$/ha	Net income benefit US$/ha
Kabode	12.9	5.6	43.4	0.18	2,322	1,008	177	2,145	831
Polista MB	9.7	2.4	24.7	0.18	1,746	432	177	1,569	255
Polista farmer	7.3	0	0.0	0.18	1,314	0	86	1,228	

Source: Yield data from demonstration plot data for 2011/2012.

Costs of inspection

Table : Cost of inspection as a percentage of value of vine sales for different scales of multiplication			
Multiplication and cost parameters	**Scale of Multiplier: plant population/area under multiplication**		
	300 (1 bed)	**1500 (3 beds)**	**250,000 (0.5 ha)**
Nominal multiplication rate	10	10	10
No. of cuttings produced	3,000	15,000	2,500,000
Sales price @ 7 Tsh (US$0.0045) cutting	$14	$68	$11,250
District inspection cost (US$)	$51	$51	$51
Total cost of DPPO inspected cuttings (US$)	$64	$118	$11,301
External Inspection cost as % of vine value	375%	75%	0.5%
VEO inspection cost (US$)	$20	$20	$20
Total cost of VEO inspected cuttings (US$)	$34	$88	$11,270
VEO Inspection cost as % of vine value	148%	30%	0.2%

Source: QDPM inspection visits August and November 2012

Findings

Tanzania

- in 1st and 2nd season respectively: 64% and 55% of all plots inspected achieved the "acceptable" MB standard; 25% and 14% of plots achieved FAO standard;
  - FAO standards: zero tolerance for weevils
  - farmer multipliers performed better than trained multipliers
- "local" inspectors can perform the inspections to the same level of confidence as "external" inspectors;
- 25% and 43% yield increases translating into $255 and $831 net income benefit/ha from using cleaned-up planting material of Polista and Kabode, respectively compared to farmer selected Polista;
- the total inspection cost per site is estimated at $50 and $20 for inspection by a DPPO and VEO, respectively
  - on small plots the cost of inspection is 375% of the value of the planting material;
  - once the scale of multiplication increases to around 0.5 ha, then the cost of inspection as a percentage of the value of the planting material reduces to 0.5% and 0.2% for inspections conducted by the DPPO and VEO, respectively.

Ethiopia

Table 5: Recommended tolerance levels for field inspection - SNNPR

No	Requirements/defects/diseases	Tolerance
1	Isolation distance (with suitable barrier like maize, Napier grass, etc) (otherwise: 100 m away)	**5 meters**
2	Other varieties (off-type)	**2 %**
3	Viruses (mottling, mosaic, leaf curl and stunting)	**5 %**
4	Diseases (mainly stem blight caused by ***Alternaria*** sp.)	**0 %-**
5	**Sweetpotato butterfly** (*Acrea acerata*)	**0 %**
6	Weevil (*Cylas puncticollis*)	**0 %**

Ethiopia: summary results

- 3 sites inspected: none achieved standard
- Not acceptable for PM distribution: virus, alternaria, SP butterfly and vectors
- Challenges with inspection process: lack of records for source of PM, rotation, DoP; scattered fields, and fields at different stages
- Institutionalisation issues relate to:
  - Who does inspections (woreda or region)
  - Who will pay
  - Tender process by large organisations

Engagement with national regulatory bodies

1. **Tanzania**: results of pilot discussed with stakeholders in Lake zone and at national level
    a. Recommendation to draft & validate tolerance levels for all classes of seed (pre-basic to QDS)
    b. Validation process for other seed classes
2. **Ethiopia:** 3 regional stakeholder validation workshops undertaken. Findings to be incorporated into national policy guidelines
3. **Uganda:** tolerance levels for all seed classes drafted on basis of Tanzanian document. Pilot for validation under discussion
4. **Malawi:** standards drafted but need to be piloted and validated?

Reflections

- **FAO standards: an ideal to work towards**
  - What standards are currently appropriate at each level of multiplication
  - Who should do the inspection (knowledge, cost)?
  - Who pays for inspection
- **How relevant are grain crop seed protocols for VPCs?**
  - Need for decentralized approach
  - When are lab-tests appropriate & when is visual inspection appropriate
  - What level of quality are farmers willing-to-pay for – should standards be negotiated locally?
- **Capacity building to identify & manage pests & diseases**
  - Emphasis on learning rather than policing?

Conclusions

- Ensure that over-regulation and bureaucracy do not stifle emerging seed entrepreneurs at birth;
- Increased yields are important, but only if farmers have access to output markets;
- A multi-pronged strategy is needed:
  - breeding efforts are continuing to develop virus resistant varieties;
  - strengthening the efforts of farmers to maintain seed quality;
  - advocating for formal inspection processes to focus on the up-stream seed chain where pre-basic and basic planting material is produced.

Thank you!

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