



Contributions of Agricultural Improved Technologies to Rural Poverty Alleviation in Developing Countries: Case of Imazapyr-resistant Maize in Western Kenya

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Outline

- ❑ Problem statement
- ❑ Objective
- ❑ Data and methods
- ❑ Findings
- ❑ Conclusions and recommendations



□ Problem statement

- Poverty in Kenya has worsened consistently over the past two decades
- In western Kenya, low productivity is attributed to many factors of which *Striga* the most important (Kanampiu *et al.*, 2006; Manyong *et al.*, 2008a)
- Maize losses/year valued at \$29 million (Woomer & Savala, 2008)
- *Striga* traditional control methods inefficient
- What to do?
- Use of new technology: Imazapyr-resistant maize
- Is it contribution to increasing maize productivity for poverty alleviation?



Striga susceptible line

Striga resistant maize line

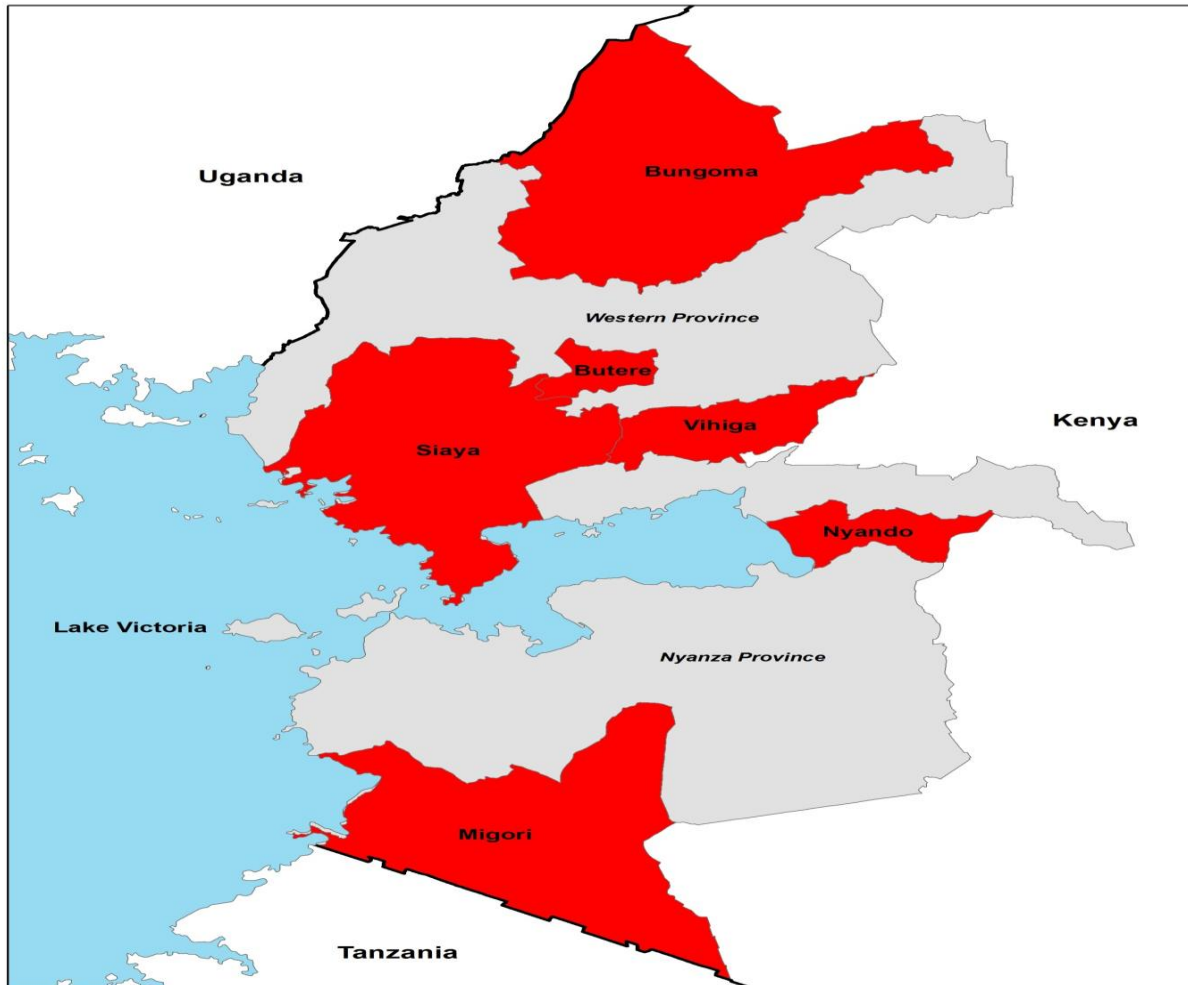


□ Objective

This study intends to show the contributions of IRM technology in poverty alleviation in western Kenya

□ Data and methods

- Study area



□ Data and methods cont...

- Data

Multistage sampling procedure:

- purposive selection of 2 provinces and 3 districts/province.
- random selection of 100 respondents sub-stratified into adopters and non-adopters.
- Therefore a total of 600 households were envisaged good for the study.

□ Data and methods cont...

- Methods

The Gross Margin analysis:

Returns to land (gross margin per hectare)

Returns to labour (gross margin per person-day)

The long-term economic viability:

Net Present Value (NPV)

Benefit/Cost Ratio (BCR)

Findings

Table 1: Yield of maize under different types

Type of maize	Descriptive statistics of yield (ton/hectare)		
	N	Mean	Standard Deviation
Local maize	291	1.4	0.22
IRM	169	2.8	0.44
Hybrid maize	312	2.5	0.19
Local Vs. IRM: -t = 26.02*** Local Vs. Hybrid: -t = 25.86*** IRM Vs. Hybrid: t = 5.88***			

*** Significant at $P < 0.01$

Findings

Table 2: Maize productivity differential by maize variety

Category	Maize yield (ton/ha)	Standard deviation	T-Value
IRM	2.8	0.45	7.92*
Non-IRM	2.2	0.73	

*Significant at $P < 0.05$

Findings cont...

Table 3: GM across different maize enterprises, values in Ksh, 2008

Item	Maize farming system typical for		
	Local maize (N=291)	IRM (N=169)	Hybrid maize (N=312)
Gross revenue in Ksh/ha	28 494	55 555	49 240
Total operational costs in Ksh/ha	1 928	3 802	4 196
Gross margin in Ksh/ha	26 566	51 753	45 032
Gross margin in Ksh/ha (St. Dev)	4 628	9 455	4 663
Gross margin in Ksh/ha (Min)	11 400	21 067	9 590
Gross margin in Ksh/ha (Max)	39 450	67 967	53 330
Gross revenue			
Local Vs IRM: -t = 26.02***	Local Vs Hybrid: -t = 25.86***	IRM Vs Hybrid: t = 5.88***	
Total operational costs			
Local Vs IRM: -t = 7.69***	Local Vs Hybrid: -t = 5.39***	IRM Vs Hybrid: t = 3.93***	
Gross margin (Mean)			
Local Vs IRM: -t = 22.26***	Local Vs Hybrid: -t = 20.48***	IRM Vs Hybrid: t = 4.32***	

***Significant at P<0.01

Findings cont...

Table 4: Returns to land from different types of maize

Type of maize	Descriptive statistics of returns to land (Ksh/hectare)		
	N	Mean	Standard Deviation
Local maize	291	9 522	6 572
IRM	169	12 457	9 752
Hybrid maize	312	18 436	11 881
Local Vs. IRM: -t = 8.72***		Local Vs. Hybrid: -t = 8.80***	IRM Vs. Hybrid: t = 3.08***

*** Significant at P<0.01

□ Findings cont...

Table 5: Returns to labour from different types of maize

Type of maize	Descriptive statistics of returns to labour (Ksh/man-day)		
	N	Mean	Standard Deviation
Local maize	107	363	287
IRM	79	600	411
Hybrid maize	144	501	303
Local Vs. IRM: -t = 2.30**		Local Vs. Hybrid: -t = 2.45**	IRM Vs. Hybrid: t = 5.03***

Significant at $P < 0.05$, * Significant at $P < 0.01$

□ Findings cont...

Table 6: Economic viability between local maize and IRM

Indicative parameters (in US \$)	Entire IRM yield	Entire local maize yield
Net benefits/capita	42.26	35.38
Benefit/Cost Ratio (BCR)	4.77	5.60
Net present value (NPV)	21 680 401.78	158089.53

□ Conclusion and recommendations

- Gross margins and returns to labour for the three types of maize are positive. Therefore, farmers are able to recover their costs and remain with a positive balance.
- IRM: viable and potential option in western Kenya devastated by *Striga*. It guarantees significantly higher yields than local and other hybrid maize.
- Long-term economic worth indicators (NPV, BCR & Net benefits/capita attractive): IRM has the potential for poverty reduction by minimizing food security problems.

□ Conclusion and recommendations Cont...

To improve the adaptive capacity of western Kenya farming households and communities against *Striga*:

- ✓ IRM should be prioritized: significant positive public investment and technology transfer are needed to improve IRM use and efficiency
- ✓ Investigations remain to be carried out to improve IRM performance in a way that is economically, environmentally, and socially sustainable
- ✓ We are however very confident that the integrated approach of investigation followed by AATF, CIMMYT, IITA will permit to overcome the constraints that limit the full exploitation of IRM potentialities

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THANK YOU