SHORT, NON-REFEREED PAPER

POSITIVE INFLUENCE OF DEMONSTRATION PLOT EXTENSION METHODOLOGY IN A RURAL SUGARCANE COMMUNITY

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Abstract

A thriving sugarcane community exists in a rural district in the KwaZulu-Natal Midlands North area, and the local mill has benefited through increased cane supply. To sustain yield and related socio-economic stability of this grower community in the long term, Extension Specialists have implemented a demonstration plot programme as a means to (1) train through transfer of technology around best management sugarcane farming practices; (2) increase productivity and (3) establish and maintain biosecurity awareness of pests, diseases and weeds to ensure crop sustainability. Prior to the establishment of each demonstration plot, soil potential assessments were conducted. Since each soil type is suited to a range of sugarcane varieties with specific yield potential, estimated yields from the selected varieties in the demonstration plots were actually realized, thereby helping to develop trust and credibility between all parties involved in the programme. All of these factors are integral to the success of the programme. Under-delivery between achievable yield potential and actual yield in the demonstration plot can lead to project failure. This short paper discusses the increased grower yields, increased mass of cane deliveries by the community, and increased grower income.

Keywords: Extension Technology Transfer, Demonstration Plot Extension Methodology, soil potential, best management practices, biosecurity

Introduction

From 2004 to 2017, Extensionists have employed the Demonstration Plot Extension Methodology (DPEM) intensively at Noodsberg in KwaZulu-Natal Province. The aim is to transfer new technology to the growers and to supply pest and disease-free seedcane of high sucrose yielding varieties (Gillespie *et al.,* 2009*),* thereby increasing production while simultaneously maintaining biosecurity standards through compliance to regional Pest, Disease and Variety Control Committee regulations. This type of technology is documented in detail by Gillespie and Mitchell (2014).

Technology transfer

The technology was disseminated to sugarcane growers during 141 training days which were all well attended, with 152 growers attending one of the meetings. Topics were aligned in timing to the seasonal sugarcane agronomic cycle and included (1) soil potential assessment, (2) seedcane procurement, (3) regular pest and disease inspections of seedcane and other fields, (4) adequate fertiliser regimes based on results from soil samples (since 2014, 235 samples were submitted to the Fertilizer Advisory Service (FAS) at the South African Sugarcane Research

Institute (SASRI)), (4) weed, pest and disease survellience, (5) cultivation of new varieties and (6) business skills. Producing quality seed requires initially determining potential sugarcane yield based on soil form and climatic conditions, which then represents the target yield for economic analyses. This aspect is covered in detail by Gillespie *et al*. (2016). Figure 1 gives area harvested and revenue obtained from this District. From 2004 to 2016 there was an increase in revenue from R10.86 to R26.3 million (excluding seedcane sales of R3 million)) as a result of the increased area and yield per hectare. The area under cane harvested annually in this District increased from 267 to 595 ha (total area under cane 1585 ha), and the number of sugarcane growers delivering cane annuallly to the mill has increased from 224 to 613 individuals (total number of growers 1105). Improvements in yield and income can be directly attributed to improved management practices and biosecurity through DPEM which also enabled the production of local seedcane.

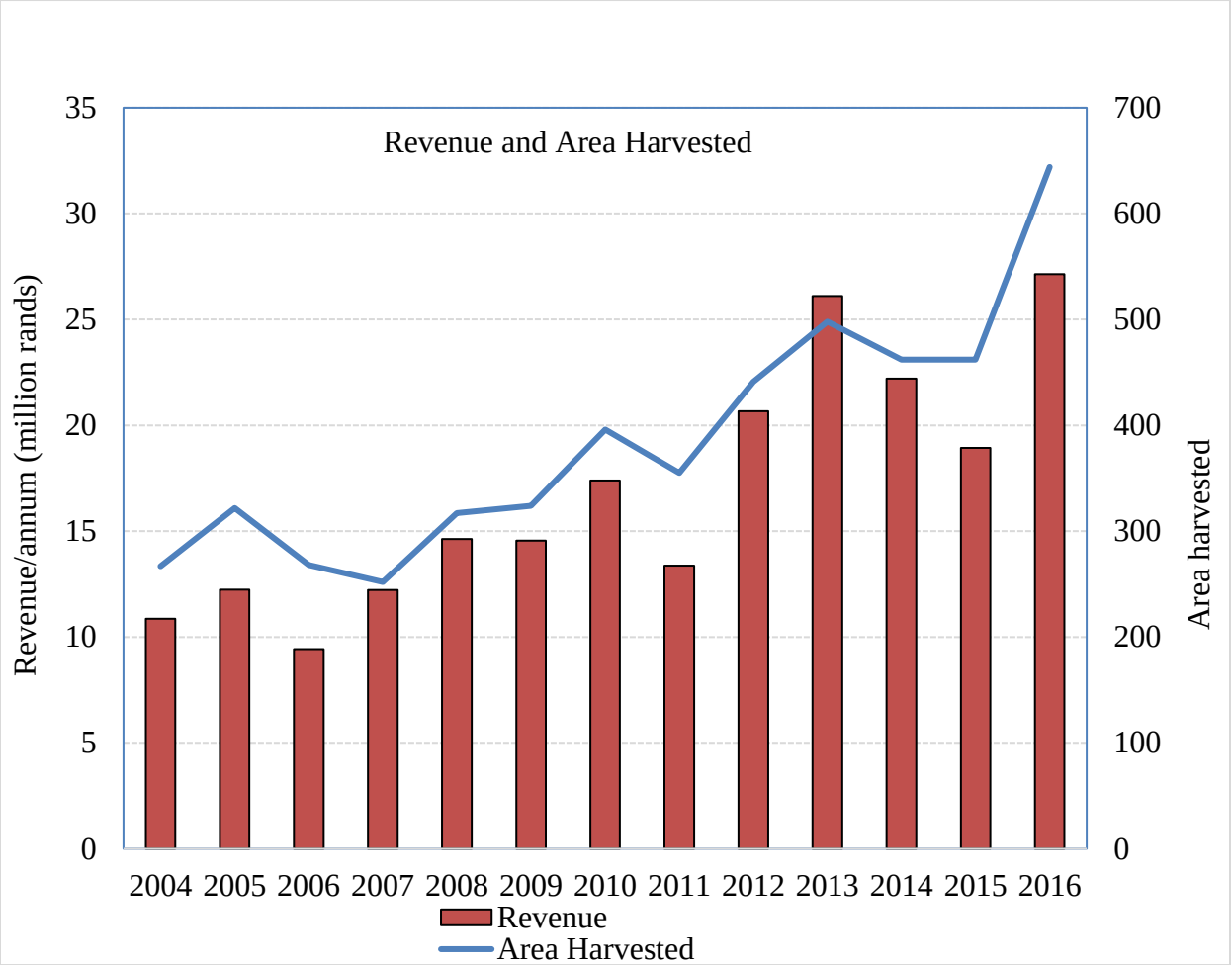

Figure 1. Sugarcane areas harvested by small-scale sugarcane growers and revenue generated in the Noodsberg District of KwaZulu-Natal from 2004 to 2016 following establishment of the Demonstration Plot Extension Methodology (DPEM) model.

Biosecurity

Biosecurity for the programme was directed and implemented by the Midlands North Local Pest, Disease and Variety Control Committee (LPD&VCC), in close cooperation with the Department of Agriculture and Rural Development (DARD). New varieties suited to the climate and soil types were cultivated in this District. Where variety N12 previously dominated, increasing areas have

been cultivated to N37, N48, N51, N52 and N54. Regular pest surveys were carried out according to methods given by Way *et al*. (2003) with adherence to gazetted varieties and regional threshold pest and disease levels. Smut and mosaic remain below industry maximum permissible levels and no ratoon stunting disease was recorded. Although the area (hectares) inspected for the stem borer *Eldana saccharina* Walker (Lepidoptera: Pyralidae) has doubled since 2012, only two fields were positive in 2016 and these were both harvested immediately (Table 1).

Table 1. Pest and Disease levels detected on small-grower sugarcane farms in the Noodsberg District from 2014 to 2016.

	2012	2013	2104	2015	2016
Area inspected (Ha)	35	50	60	70	94
Farms inspected	30	45	56	65	83
Smut	0.02	0.24	0.15	0.10	0.09
Mosaic	0.43	0.37	0.32	0.25	0.18
Off types	0,80	1.02	0.52	0.32	0.21
RSD	No	No	No	No	No
Area inspected (Ha)	92	87	100	105	180
Farms inspected	82	85	95	97	147
Farms positive	Nil	Nil	Nil	Nil	2
Average e/100	0	0	0	0	0.03
Maximum e/100	0	0	0	1	5

Maximum permissible level, expressed as a percent is 0.5%.
Threshold *Eldana saccharina* level (e/100) set by the LPD&VCC at Noodsberg is 5e/100.

Conclusion

DPEM has been highly successful in containing pests and reducing disease levels, by providing high quality seedcane of new suitable sugarcane varieties. In addition soil potential and resource management has been optimized, resulting in significant improvement in yield, income and livelihoods.

Acknowledgements

GM Mdunge: DARD Agricultural Advisor; F Horn: New Cane Development Manager at Noodsberg Illovo Sugar South Africa Ltd, Noodsberg Mill.

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