Exploring the feasibility of **Push-Pull for management of *Eldana saccharina*** by small-scale sugarcane growers

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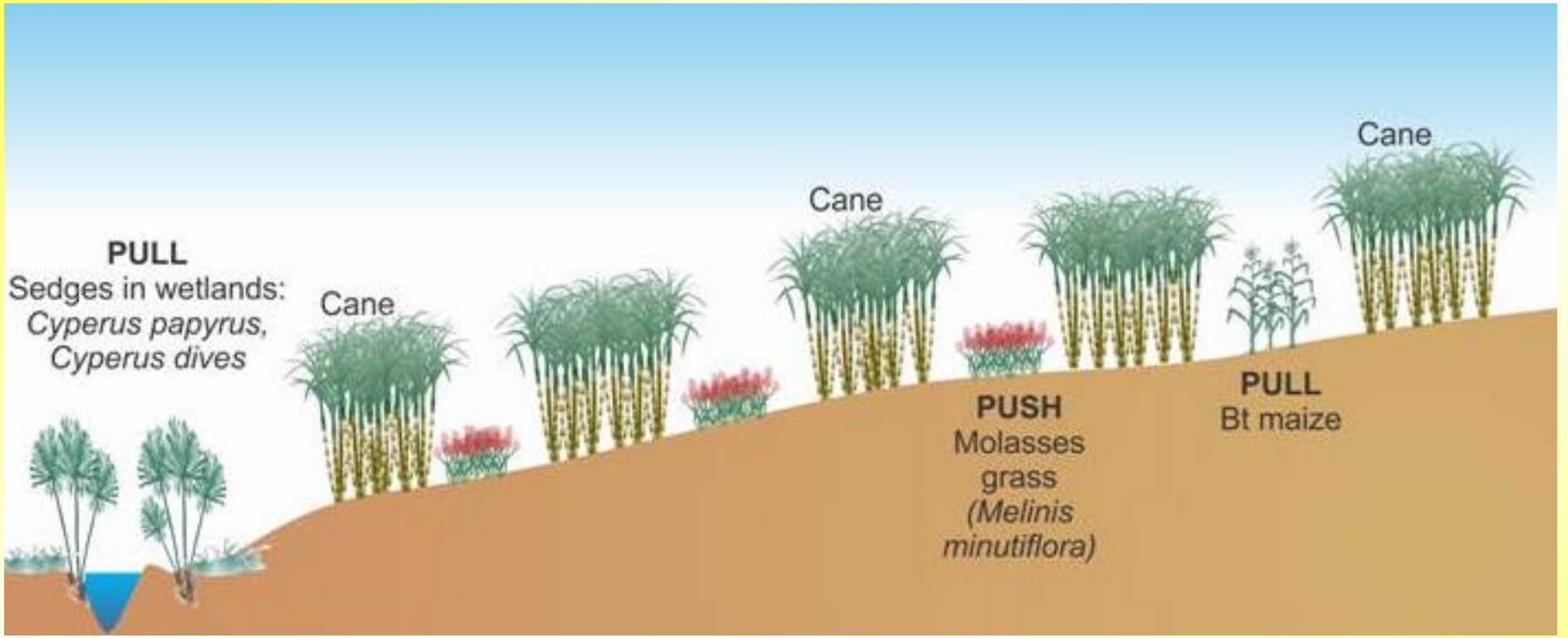
The sugarcane stalkborer
Eldana saccharina

- Widespread, indigenous African stem borer
- Natural host plants: *Cyperus dives, Cyperus papyrus*
- “Host shift” onto sugarcane in the 1940s: destruction of wetland habitats
- Worst insect pest of sugarcane in South Africa

- Revenue loss: estimated at R60-150 million per annum
- High fecundity
- Increases rapidly in stressed crops
- Cryptic biology: control is difficult
- Range increasing inland

What is push-pull?



- manipulate eldana **moth behaviour**
- increase activity of **natural enemies**
- **fewer eggs** are laid on the sugarcane, **less damage**
- **environmentally sustainable, low input**
- part of **AW-IPM together** with **good crop management**

Push Plant

Molasses Grass

Melinis minutiflora

Pull Plants

Bt maize

Cyperus dives

Cyperus papyrus

Project Aim:

Exploring the feasibility of

Push-Pull for management of *Eldana saccharina*

by small-scale sugarcane growers

For successful implementation of knowledge intensive integrated pest management (IPM) and push-pull we need to understand farmers'

- production systems & constraints (Snapp *et al.* 2003, Nederlof *et al.* 2004)
- knowledge and perceptions of pests and pest management (Röling et al., 2004; Meir and Williamson, 2005; Khan et al., 2008).

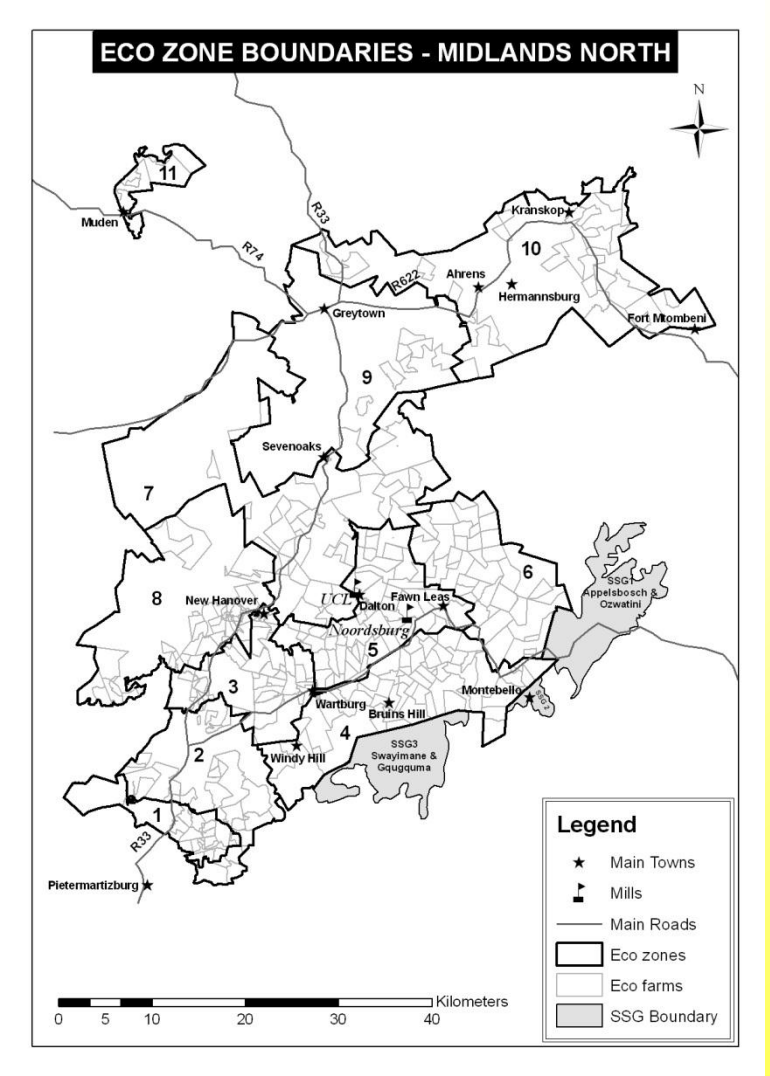
Objectives

To gain an understanding of:

1. the **role of sugarcane** in livelihoods
2. the broader farming systems: **other enterprises**
3. sugarcane **production constraints**
4. **knowledge** of **pests** and **pest management**

Study Area & Sample

- Noodsberg Mill supply area: near Wartburg, KZN: north-east of PMB
  - Swayimane
  - Appelsbosch - Ozwathini
- Household interviews:
  - 35 farmers
- Group discussion:
  - 4 communities
  - 72 farmers



Research Methods:
Participatory Mixed Methods

Farming system			
Interviews & sketch map 			

Interviews & sketch map

understanding the broader farming system i.e. other agricultural enterprises

- "Ice-breaker: turn the flipchart around!" *Show us what you farm!*
- Identifying crops, livestock etc.
- Proportion of land allocated per crop
- Informal discussion about the importance of various agricultural enterprises

Research Methods:
Participatory Mixed Methods

Farming system	Role of sugarcane		
Interviews & sketch map	Interviews & matrix of matches		
			

Interviews & matrix of matches

exploring the role of sugarcane in livelihoods

- Interviews:
  - questions
  - informal discussions
- Matrix of matches:
  - Free-listing of top crops
  - quantifying contribution of multiple enterprises to livelihoods,
  - Analysing inputs and outputs from agricultural activities
  - Bonus: Ah-ha! moments

Research Methods:
Participatory Mixed Methods

Role of sugarcane	Farming system	Production constraints	
Interviews & matrix of matches	Interviews & sketch map	Interviews & field observations	

Interviews & field observations

learning about sugarcane production constraints

- Observations:
  - visual condition of sugarcane fields
  - activities which farmers were busy with
- Informal discussions about condition of sugarcane fields & sugarcane husbandry

Research Methods:
Participatory Mixed Methods

Farming system	Role of sugarcane	Production constraints	Pest knowledge
Interviews & sketch map	Interviews & matrix of matches	Interviews & field observations	Knowledge survey & Insect Box FGD
			

Knowledge survey & insect box focus group discussions

evaluating farmers' knowledge of pests and pest management

- Free-listing insects:
  - insects seen in cane
  - cane pests
  - food crop pests
- Naming insects in Zulu
- Discussing pest management, beneficial insects etc.

Results: *broader farming system*
i.e. other agricultural enterprises

- Sugarcane is grown in an **integrated system** with food crops & livestock

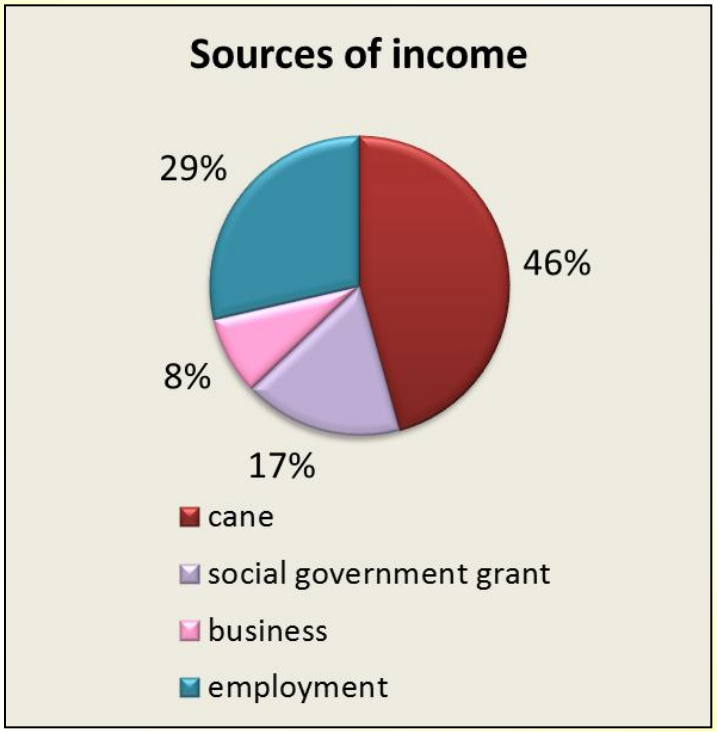
- Sugarcane is the **single most important crop**: income and food

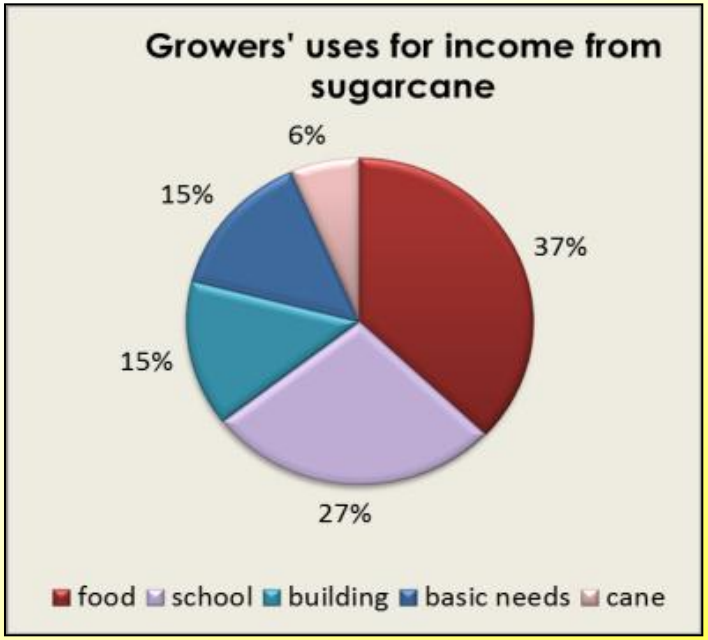
Variables for Wilcoxon signed ranks test: (median no. of matches)	***p*-value**
income from cane < total income from non-cane enterprises	0.592
income from cane > average income per non-cane enterprise	**0.000***
food from cane < total food from non-cane enterprises	**0.000***
food from cane > average food per non-cane enterprise	**0.001***

Results: *role of sugarcane in livelihoods*

- Cane is perceived as the **top source of income** by many
- Income from sugarcane is used predominantly for **food & education**
- The 'lump sum effect' allows farmers to improve their living conditions:

"I can't do anything big with my pension money. But with the sugarcane money I can. I can buy a cupboard if I want to. Sugarcane is the king of money."

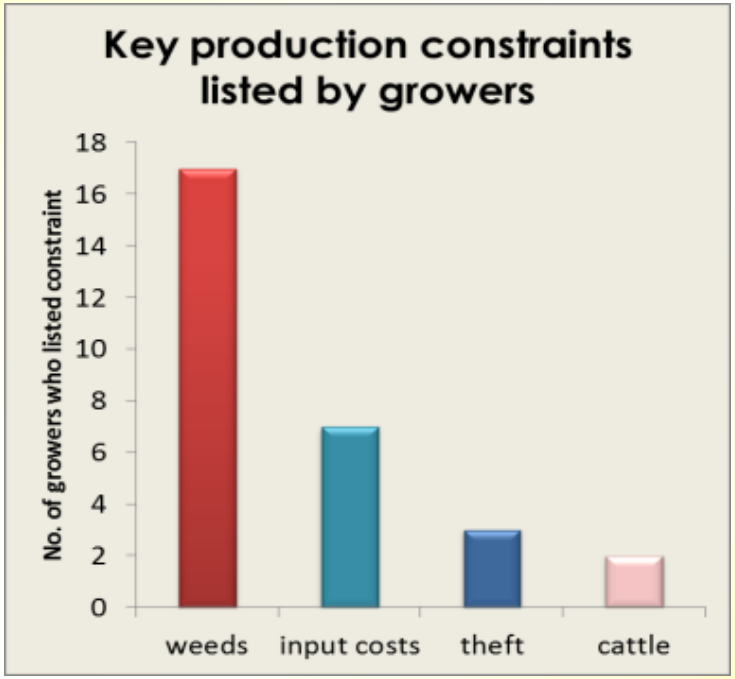




Results

sugarcane production constraints

- Weeds and high input costs are perceived as the biggest constraints
- Farmers know basics of weed control but technology is complicated
- Insect pests are not a serious production constraint: confirmed by pest records of LPD&VCC of SSG fields

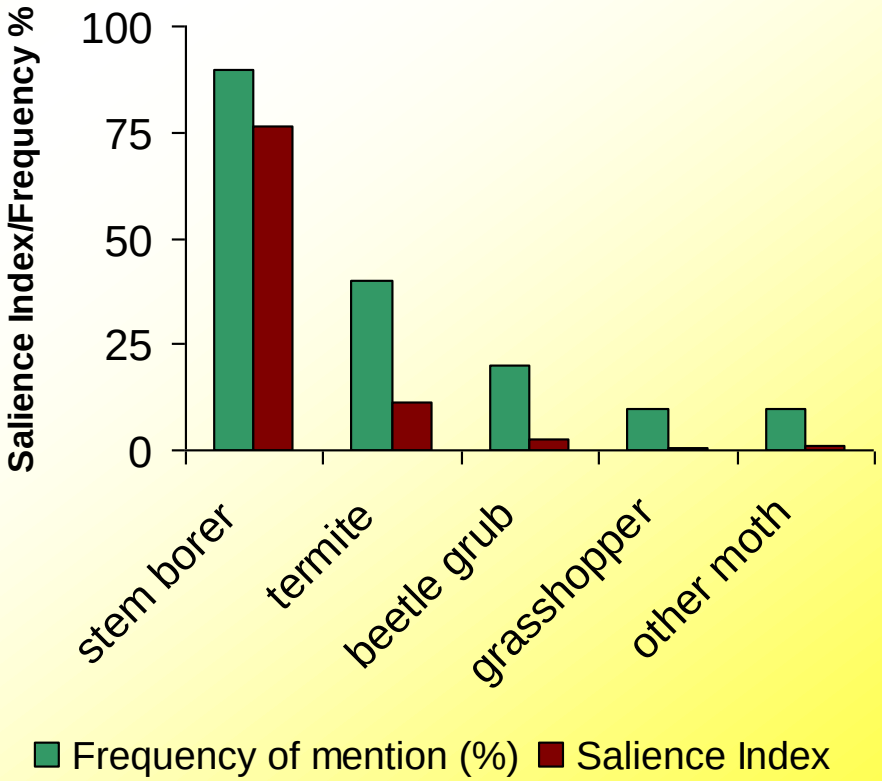


"Growing sugarcane takes a lot of expenses and the income is not that much. But half a loaf of bread is better than no bread."

Results

farmers' knowledge of pests and pest management

- **Sugarcane pest knowledge is basic:** they recognise that a stalk borer is the main pest
- **pest management is knowledge poor**
- **Food crop pests** are a much greater constraint than sugarcane pests
- Farmers use mostly chemical control on food crop pests



Conclusions

- **Sugarcane is important in livelihoods**: employment, income, food security, education
- **Integrated agricultural activities**:
  - multiple crops and livestock
  - sugarcane most important crop
- **Production constraints:**
  - Weeds & high input costs
  - NOT insect pests – confirmed by pest records
- Implementation of IPM will only be successful where there is *sufficient economic need* to reduce pest damage to crops e.g. Kenya's push-pull system (Orr 2003, Khan *et al.* 2008)
- Investing resources in implementation of push-pull and IPM in this area may not be feasible at this time.

Conclusions

Recommendations for Extension:

- Training on **pest monitoring by farmers**:
  - Eldana numbers ARE increasing in Midlands North
  - raise awareness about good crop husbandry which is the first line of defence against eldana
- **Molasses grass** could be used for weed management and as a preventative measure against pest incursions (Conlong & Campbell 2010)
- Training in better **weed control practices**
- Efforts to **reduce impact of high input costs**: multiple stakeholders

The important role which sugarcane plays in the farmers' livelihoods means that any improvement in yields will have a direct impact on improving household income and food security.

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"Umoba ubalulekile empilweni yethu. Kuyabonakala ukuthu lomsebenzi wenu ungalokho – ngempilo yethu."

"Cane is very important for our lives here. One can see that the work you are doing is about that – about our lives." *a farmer from Ekupholeni, Swayimane*