Improving Market Access for Smallholder Farmers: Socio-economic determinants of pre-and post-harvest practices – and their potential role for microbial contamination of fresh produce

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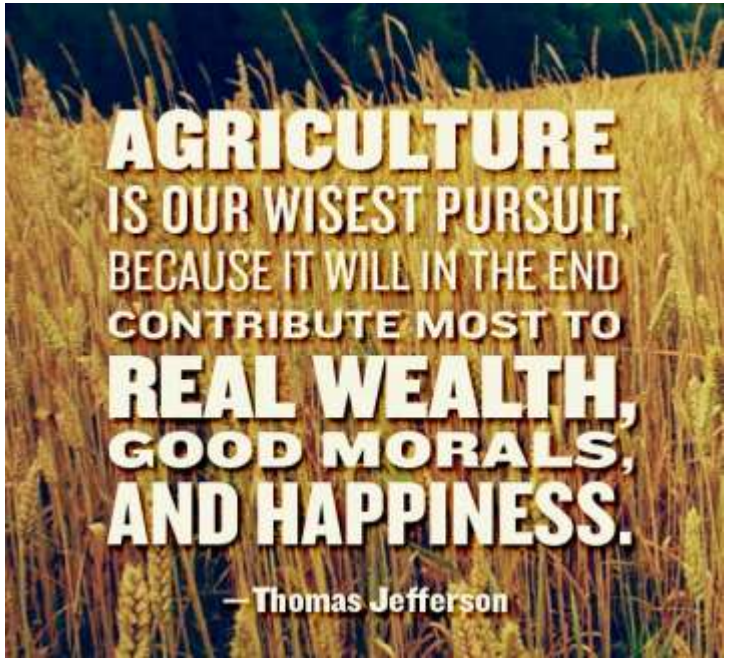
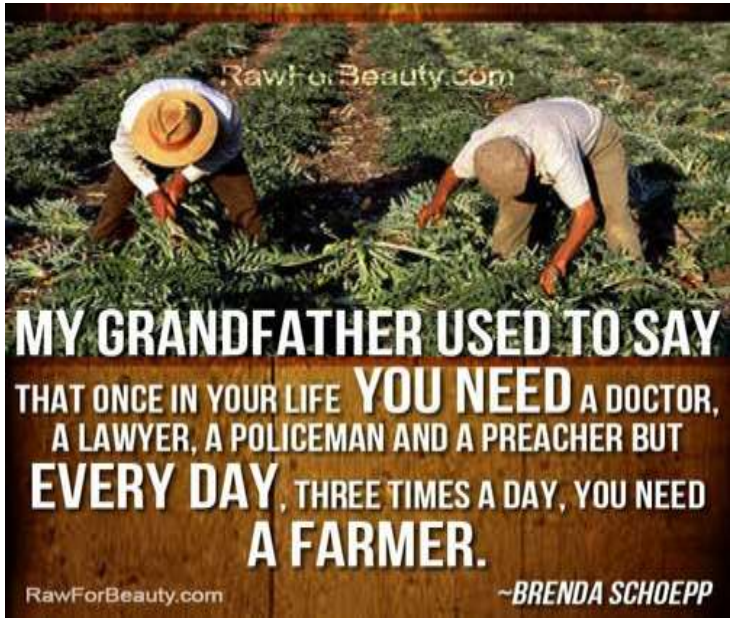
PROVINCE OF KWAZULU-NATAL

- Increased food insecurity
- Agriculture is viewed as a solution to food insecurity
- Increased demand for fresh produce
- Increased demands = increased market potential
- South African smallholder farmers have the potential to supply fresh produce to these new high-value markets





Market Access Determinants

- Stable Volume of Produce (often large volumes)
- Consistency of Delivery (consistent supply, at least once a month)
- Understanding and entering into contractual agreements
- **Food safety and quality standards**

WHAT CAN GO WRONG?

- Fresh produce has been recognized as the causative agent in many recent foodborne disease outbreaks

- German outbreak of 2011- *E.coli*

- American outbreak of 2016- *Salmonella* spp.

The Mail Online seems to think so. A story published on the website warns that: “Getting your five a day is responsible for half of all food poisoning cases.”

- Stringent market standards= BIGGEST Challenge
- High value markets = Stringent standards

- Entering high-value markets is determined by the hygiene quality and safety of fresh produce

- Smallholder farmers use a multitude of different pre- and post-harvest practices which are often reliant on indigenous knowledge

- These methods may not be satisfactory in terms of hygiene and quality required by high-value retail markets.

Microbiological limits (benchmark values) for raw fruit and vegetables (ready-to-eat) in accordance to the South African, EU, DGHM and Hong Kong recommendations.

Microorganism	South Africa (cfu/g)	Europe (cfu/g)	DGHM (cfu/g)	Hong Kong (cfu/g)
Total coliforms	<200	N/A	*$5X10^{7(APC)}$	N/A
E. coli	0	100	100	20
***Salmonella* spp.**	0/25g	0/25g	0/25g	0/25g

Influences of socio-economic characteristics of smallholder farmers on pre- and post- harvest practices employed in production of fresh produce, in line with attaining market access, health and household food security

- Integrated/Mixed methods methodology

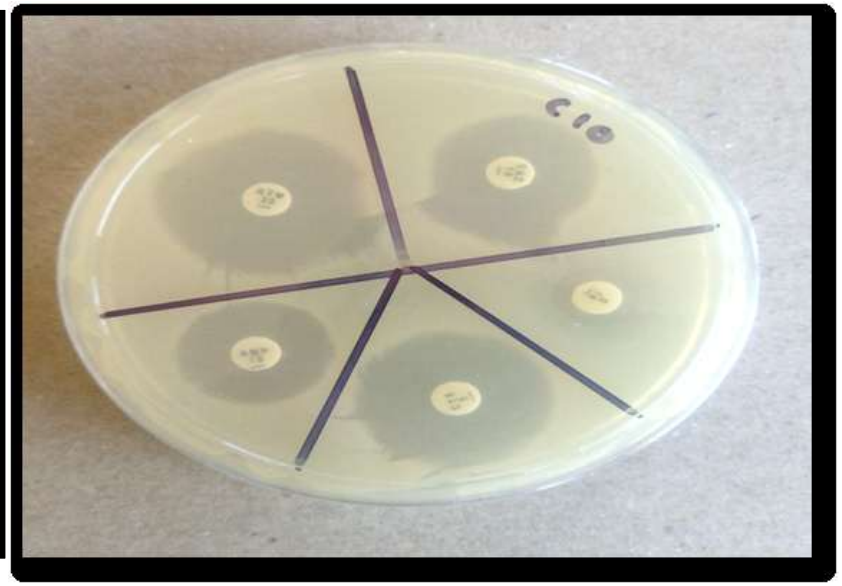
- Combination of qualitative and quantitative methods

- Semi-structured questionnaires and focus group discussions

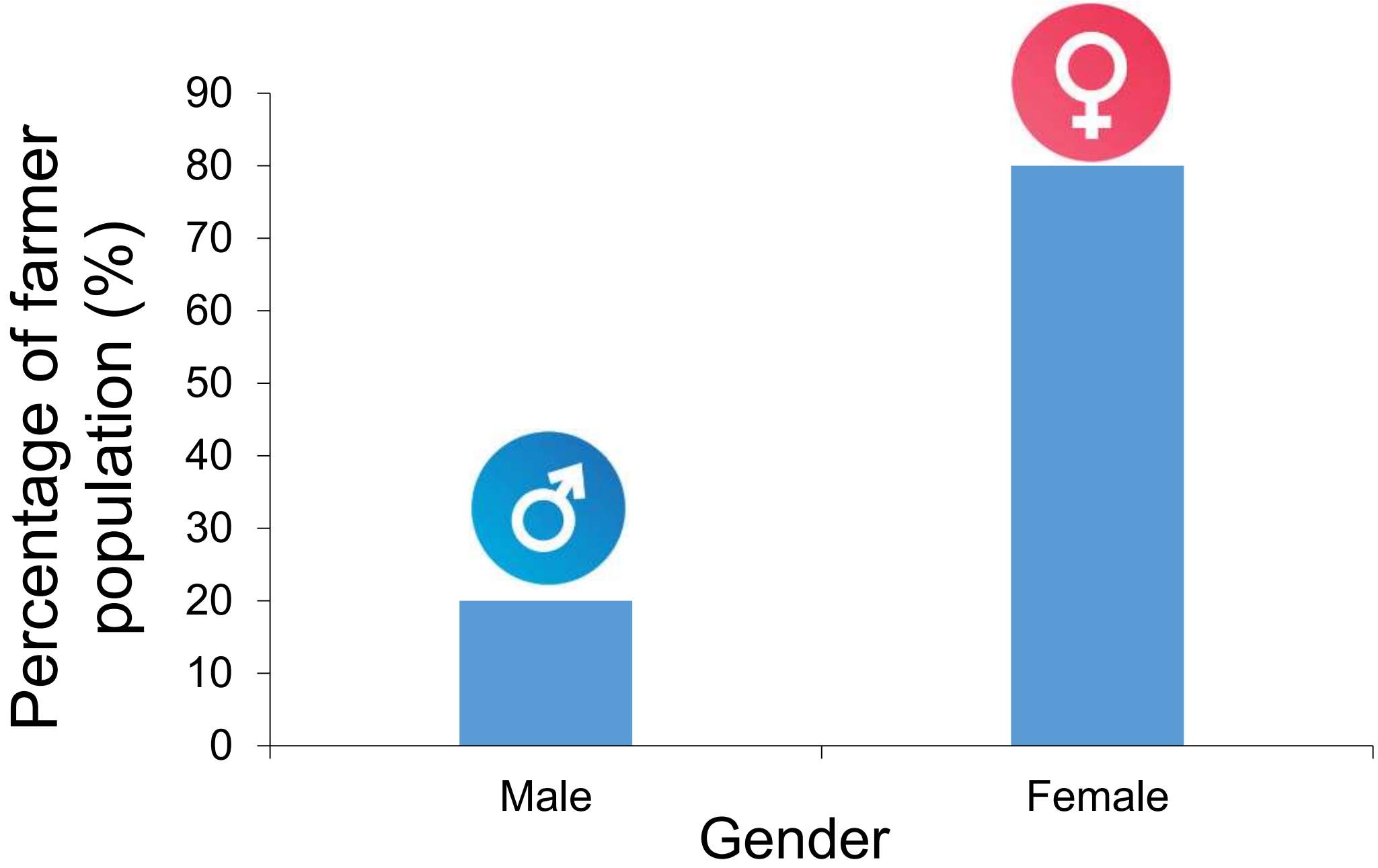
Isolation and enumeration of selected hygiene indicator organisms

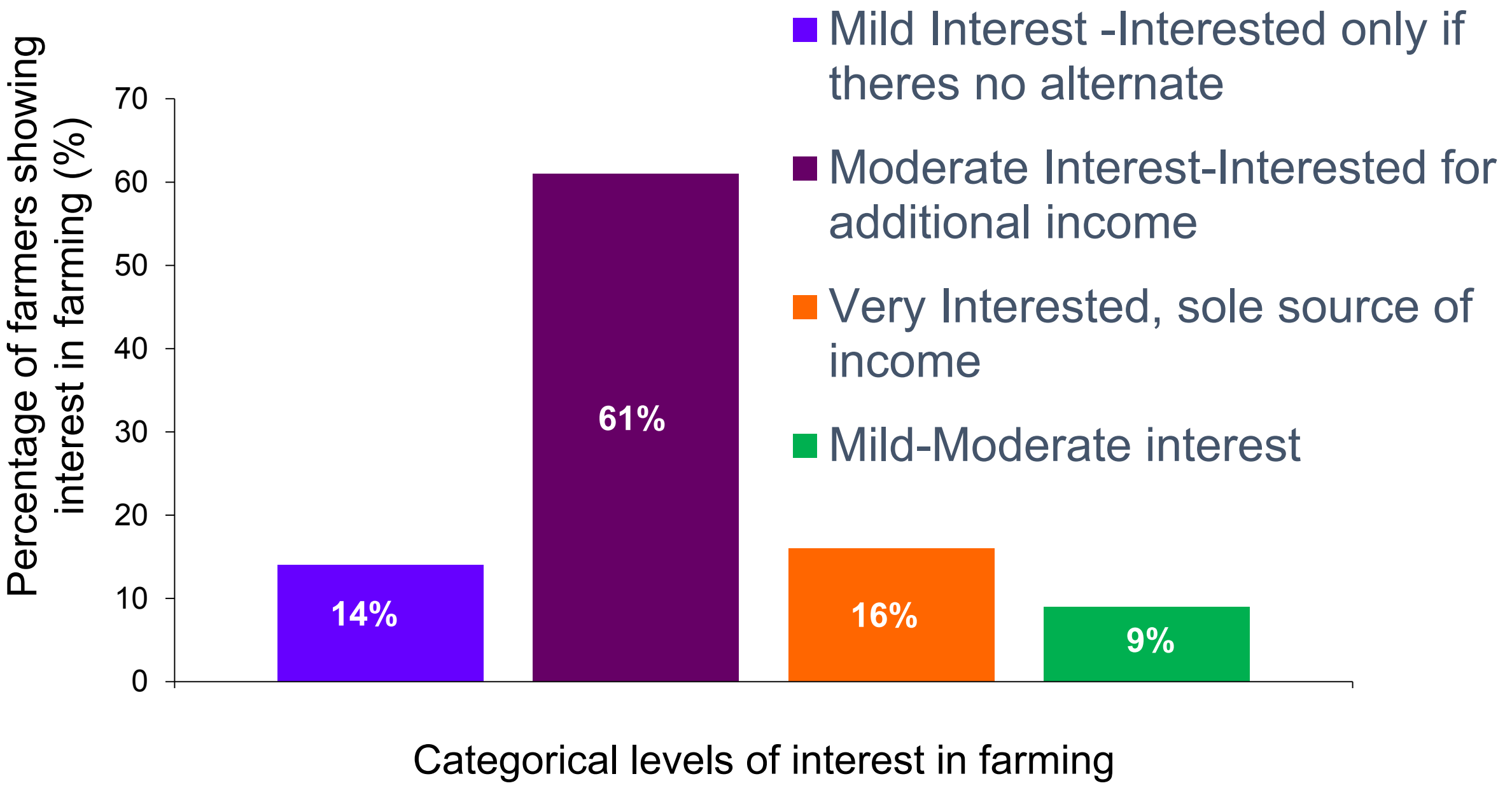
Surface swabbing- presence /absence testing using selective media

Biofilm formation capability testing



Antibiotic susceptibility testing


Percentage of farmer population (%)
90
80
70
60
50
40
30
20
10
0
Male
Female
Gender


Percentage of farmers showing interest in farming (%)
70
60
50
40
30
20
10
0
14%
61%
16%
9%
Mild Interest -Interested only if theres no alternate
Moderate Interest-Interested for additional income
Very Interested, sole source of income
Mild-Moderate interest
Categorical levels of interest in farming

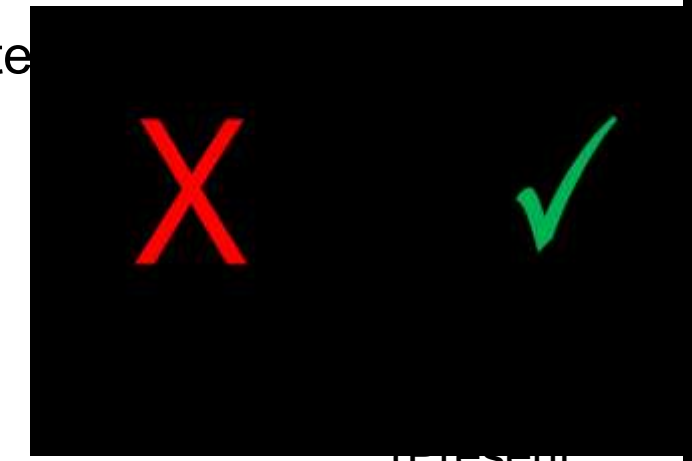
Relationships between selected pre- and post-harvest farming practices and socio-economic characteristics of the Marianhill Agri-hub farmers

Selected Pre- and Post-Harvest Practices	p-value					
	Gender	Age	Education Level	Income Source	Trained	Farmer Group Member-ship
Type of irrigation water used	0.157	0.707	0.055	0.229	**0.023***	0.574
Type of fertilizer used	0.845	0.136	0.685	**0.021***	**0.014***	0.424
Treatment of manure	**0.027***	0.072	**<0.001***	0.257	0.716	0.926
Time of Harvest	0.270	0.493	**0.033***	0.563	0.393	0.6222

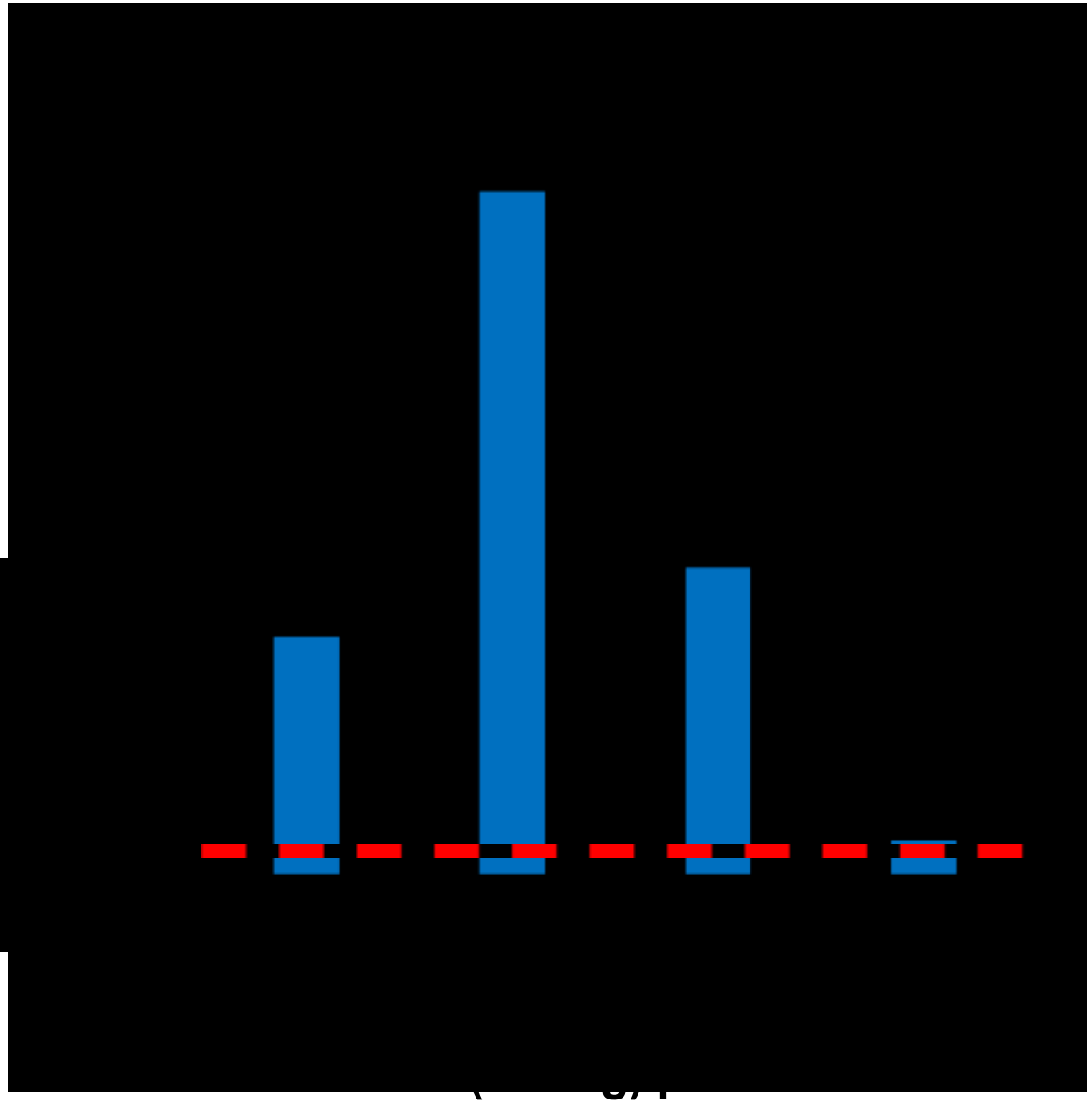
***significant as p-value is <0.05**

Presence/Absence of *Salmonella* spp. and *E.coli* on selected contact surfaces within the processing line of Marianhill Agri-hub.

Surface Tested	January- April2016	
	Salmonella spp.	*E. coli*
Bakkie bin		
Plastic Collection Crate		
Metal Scale		
Steel Pitch Fork		
Steel Spade		
Steel Garden Hoe		
Staff Bathroom Basin		
Staff Kitchen Counter		



(Present on 6 out of 8 surfaces)



produce samples in April 2016

- Pre- and post-harvest practices -> Microbial Contamination
- Good hygienic pre- and post harvest practices = good quality marketable fresh produce
- Leading to healthier and nutritious fresh produce available for household consumption
- Increased income from sale of fresh produce

- Market opportunities exist
- Socio-economic characteristics influence farmers decision making
  - Careful assessment of smallholder farmer communities

derive context specific recommendations

facilitate market access

Community Engagement & Research Transfer

- A manual versed in improving pre-and post-harvest hygiene practices is being developed and will be transferred to the farmers.

It will address:

- Pre- and post-harvest practices that can contribute to microbial contamination

- Outlining market standards, and illustrating manners in which to achieve these standards leading to safer, healthier and nutritious fresh produce available for household consumption

I would like to and acknowledge Paula Osborne, Gabriel Mngoma and the smallholder farmers of the Marianhill Agri-hub for their willingness to participate, without their meaningful contributions this study would have not been possible.

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ngiyathokoza!

ro livhuwa!

dankie!

ke a leboga!

enkosi!

thank you!

ndo livhuwa!

inkomu!

ke a leboha!

ngiyabonga!

siyabonga!

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