Determinants of No-Till Conservation Agriculture Adoption in Maize and Bean Cultivation in Lesotho

DAY 3: PROMOTING CONSERVATION AGRICULTURE-BASED KNOWLEDGE

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INTRODUCTION

- Araya et al (2024) assert that the common farming practices in Sub-Saharan Africa (SSA) that include intensive and repeated tillage, complete crop residue removal and biomass burning create risks of soil degradation.
- Conservation Agriculture (CA) uses minimal soil disturbance, crop residue retention and crop rotation to reduce risks of soil degradation.
- United States of America has credit for pioneering the use of such practices far back in the 1930s

INTRODUCTION

- In Africa, the significant use of CA started in the 1970s in Zimbabwe, following the introduction of economic sanctions which forced farmers to use economic production techniques that minimised machinery wear and fuel use in cropping.
- In Lesotho the pioneer of promotion of CA is Rev. Basson who was passionate about improving local agriculture and he set out to identify farming practices that relied on low external inputs but suitable to the local socio-economic conditions (Silici, 2010).
- He travelled to South Africa in 2000 where he learnt more about CA, which he eventually started to promote in Qacha's Nek with a Sesotho name 'Likoti', through an NGO called Growing Nations (Silici, 2010).

STATEMENT OF THE PROBLEM

- Since 2002 conservation agriculture captured the interest of local and international actors in Lesotho.
- The Food and Agricultural Organization (FAO), the World Food Programme (WFP), the National University of Lesotho (NUL) and several NGOs actively promote CA.
- Conservation agriculture (CA) has been promoted to address low agricultural productivity, food insecurity, and land degradation in Southern African countries, Lesotho included.

STATEMENT OF THE PROBLEM

- NGOs, donors and development partners work the Government of Lesotho in promoting CA.
- However, despite significant experimental evidence on the agronomic and economic benefits of CA and large scale investments by the donor community and national governments, adoption rates among smallholders remain below expectation.
- It is within this context that this study embarks on a journey to explore the determinants of no-till CA adoption among maize and bean producers in Lesotho.

MATERIALS AND METHODS

- The research used a quantitative design meaning that it utilized numerical data coded and analysed through the use Statistical Package for Social Sciences(SPSS); and was cross-sectional, meaning that data were collected at one point in time.
- This study was conducted in seven (7) districts of Lesotho to determine the factors that influence the adoption of CA, specifically narrowing down the focus of the study to the CA principles.
- It used a dataset that was collected from 807 farmers through a structured questionnaire. A systematic random sampling technique was used to collect data from the households that were picked from the villages in the districts that were sampled purposively.

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MATERIALS AND METHODS

- The data was analysed through descriptive statistics (such as frequency count and percentages) and a multinomial regression analysis.
- Data analysis involved assessing the impact of various factors such as demographic profiles, economic status, and farming characteristics on the adoption of three CA principles and four CA practices.
- The study used a multinomial regression analysis to investigate the determinants of no-till CA adoption in Lesotho.
- The choice to employ multivariate regression models was driven by the interconnected nature of variables affecting the adoption of CA principles.

TABULATED RESULTS

Minimum Soil Disturbance	Coefficient (B)	Std. error (SE)	t-value(t)	P>|t|
Constant	.1421254	.1408799	1.01	0.313
Gender	.0891028	.0329986	2.70	**0.007**
Age	-.0002507	.0013305	-0.19	0.851
Household Size	-.0086512	.0066896	-1.29	0.196
Education Level	-.0462251	.020232	-2.28	**0.023**
Occupation	.0377935	.0510681	0.74	0.459
Household Monthly Income	.0411645	.0230665	1.78	**0.075**
Farming Experience	.0035042	.0166393	0.21	0.833
Yield Changes	.0020158	.016536	0.12	0.903

Minimum Soil Disturbance	Coefficient (B)	Std. error (SE)	t-value(t)	P>|t|
Motivation for practicing CA	.0002583	.0080345	0.03	0.974
Field size(Acres)	-.0065996	.0027395	-2.41	**0.016**
Fertility	-.0164535	.0331668	-0.50	0.620
Training on CA	.4024113	.0381465	10.55	**0.000**
Farming Group Member	.0288345	.0371395	0.78	0.438
Extension Access	.0044625	.0415952	0.11	0.915
Credit Access	.0049897	.057698	0.09	0.931
Promotion of CA	.1682861	.0896971	1.88	**0.061**

RESULTS AND DISCUSSION

- The multivariate regression results show that gender has a positive relationship with the adoption of Minimum Soil Disturbance (B = 0.089, p = 0.007), where males were more likely to implement this practice.
- The results show that males are likely to No-Till principle, than female farmers.
- Males are also physically more energetic and fit compared to women and the males physique adapts better to physical labour.
- Gender dynamics also influence resource ownership and control, males are the household heads and own the means of production.
- Therefore, males are the decision makers, since resource owners make decisions.

RESULTS AND DISCUSSION

- Higher level of education had a negative influence on adoption of Minimum Soil Disturbance CA principle (B = -0.046, p = 0.023), suggesting that more educated farmers might prioritize other innovative farming techniques.
- Educated farmers in most cases have off-farm income and afford hiring tractors, therefore they are more inclined to CF practices.
- The effect of field size on adoption of Minimum Soil Disturbance principle was negative (B = -0.006, p = 0.016), indicating that farmers with larger fields might find it challenging to maintain minimal soil disturbance across extensive areas.
- Farmers with small field size can manage to "**pot holing**" on small pieces of land, however when field size increases mechanisation is a necessity.

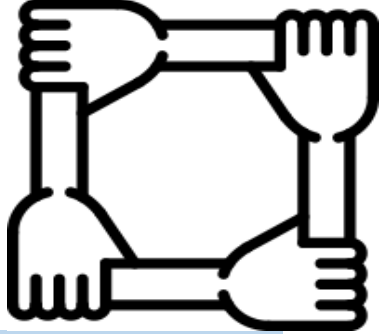
RESULTS AND DISCUSSION

- **Household Monthly Income** is positive and statistically significant at 10% significance.
- Therefore, the study concludes that a one unit increase in household monthly income increases adoption of No Till principle by .0412 units.
- Adoption of innovations requires income, CA performance in the first years is not good.
- A good household income can increases chances of adoption as families with good income can cushion themselves from lower yields at the onset of CA adoption.
- Low income farmers are likely discouraged from adopting no-till CA.

RESULTS AND DISCUSSION

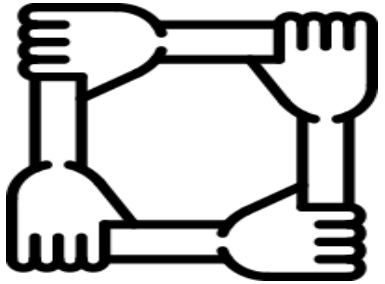
- The coefficient of **Training on CA** is positive and significant at 1 percent significance.
- This result implies that farmers that have received training are more likely to adopt No-Till CA principle compared to those who have not received training.
- The coefficient of Promotion of CA is positive and significant at 10 significance level.
- **Promotion of CA** creates more awareness as farmers are informed of the benefits of NO till.
- Promotion of CA must be accompanied with training so that by trainings to equip farmers with skills and knowledge.

CONCLUSIONS AND RECOMMENDATIONS



- This study reveals complex interplays between socio-economic factors and the adoption of No Till CA principle.
- The study results highlight that gender, education level, field size, household income, training, promotion of CA influence the adoption of No Till CA principle.
- Therefore, tailored educational and support programs may foster broader adoption of No-Till CA principle.
- Policymakers and development partners when prescribing CA interventions may need to consider the demographic and socio-economic factors identified in the study that inhibit or encourage farmers to adopt No-Till.

CONCLUSIONS AND RECOMMENDATIONS



- The study results underscore training as a pivotal factor in adoption of the no-Till CA principle, suggesting that comprehensive training initiatives could substantially increase No-Till adoption rates.
- Tailoring the training programs to address specific regional needs and existing farming practices can improve their effectiveness.
- Utilizing the expertise of experienced farmers as champions for CA principles and specific practices can help in mentoring less experienced farmers and showcasing the benefits.
- Strengthening the link between agricultural education and CA practice adoption through formal education and community outreach programs can facilitate a deeper understanding and quicker uptake of these practices.

THE END

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QUESTIONS AND ANSWERS