

THE MARKET ORIENTATION AMONG SOUTH AFRICAN SMALLHOLDER FARMERS IN A DISASTER CONTEXT

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Abstract. Market-orientation is widely used to predict the interaction of smallholder farmers with both input and output markets. Commonly used in the market participation discourse, it is fast becoming a key milestone towards smallholder commercialisation. This study introduced it into the disaster, resilience, seed systems, food security and livelihood context. Using a mixed-methods approach, 120 smallholder farmers in a drought-affected district of South Africa were sampled, and information collected for analysis. The result showed that most of the farmers relied on purchased seeds and fertilisers for crop production, and on average sold 62% of their farm produce. It was estimated that the market orientation index (MOI) was 55%, showing that the farmers were market-oriented. The farm size (0.004), quantities of seeds (0.007) and fertiliser (0.024) purchased, the value of crops produced (0.043), the amount received from crop sales (0.001), distance to markets (0.048) and access to credit (0.034) were found to be significant in determining their market orientation. Policy recommendations were made to improve access to seeds and credit for farmers in the area while assisting with increasing farmland size. The findings have implications for development efforts aimed at rebuilding after natural disasters, as well as sourcing food aid from local smallholder farmers by humanitarian actors.

Keywords: agro-input, commercialisation index, disaster, farmers, markets, resilience, seed system

INTRODUCTION

Market orientation is a frequently used concept in the smallholder agriculture policy and development dis-

cussion. In Sub-Saharan Africa, countries with agrarian economies are prevalent and the transformation of smallholder farming is generally viewed as a pre-requisite for economic growth and development (Ayenew, 2016). From an agricultural point of view, market orientation among smallholder farmers denote a production decision influenced by prevailing conditions and market signals. Seen from the input side, it pertains to how resources are allocated for the production of goods meant for the market (Gebremedhin and Jaleta, 2010; Moti et al., 2009). Commercialisation among smallholder farmers has an intrinsic relationship to their market orientation, and the terms are sometimes used interchangeably (Osmani and Hossain, 2015), or couched in related terms such as commercial-oriented and less commercial-oriented (Bekele et al., 2010; Nwafor, 2015). However, the relationship between market orientation and market participation seems tenuous, though both are elements contained within the commercialisation diction. While measures of market orientation determine the volume of a farmer's crop portfolio that is relatively more marketed, market participation is measured by the proportion of the actual crop output sold. Commercialisation behaviour involves the adoption of market orientation as an approach at the input level, and the facilitation of market participation at the output level (Yaseen et al., 2018). Hence, the determinants of market orientation and market participation may not be the same.

Most studies of market orientation among smallholder farmers usually adopt the output-side analysis by

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examining the quantity of produce supplied to the markets. It is on this basis that Asuming-Brempong et al. (2013) have classified commercialisation among smallholder farmers into the low, medium and high groups. Shalmani et al. (2019) underlined that commercialisation involves not only the sale of output but also product choice and input use decisions. Hence, in their definition of commercialisation, Gebremedhin and Jaleta (2010) emphasized both produce offered for sale and use of purchased inputs in the production process. However, many studies have not utilised the later component of this definition – the use of inputs – mostly due to data limitations (Muricho et al., 2017). Nonetheless, it is assumed that input-side commercialisation in most cases proceeds in tandem with the degree of participation in output markets. The role of uncertainty is pronounced in agricultural activities, whereby uncertainties, occasioned by natural and man-made disasters such as prolonged drought, floods, fire, civil strife and others, leave farmers vulnerable to various risks including income and asset loss. These uncertainties are an important factor in the farmers' decision-making and enter the utility framework in their preference for security amidst several risk factors.

In implementing a policy aimed at smallholder farmer commercialisation – such as in South Africa – the exploration of the market-orientation trend is a means for enabling the participation of smallholders in the output market (Adenegan et al., 2013). A growing trend in exploring market participation at the expense of market orientation has also been reported (Abafita et al., 2016), as commercialisation is fast becoming synonymous with output market participation in the literature.

Market orientation

Market orientation is a prominent term driven by three factors that include rapid population growth, high rate of urbanisation and market liberalisation, which directly affect farming (Kahan, 2013). These factors bring new challenges that require farmers to develop competencies for coping with the rapidly changing environment. Many farmers, especially smallholders in developing countries, struggle to make critical choices regarding their farming activities. Due to globalisation and the requirements of cash-based economies, producing food for family consumption and selling of surplus is becoming obsolete, replaced by the need to have cash for

meeting the family needs – an invariable entwining of the traditional and cash economies. This requires many to become more entrepreneurial and to run their farming activities as a business. While remaining linked to a farm household, the goals and decisions are less directly influenced by the household and more by the markets – through the price of produce and cost of inputs.

Unfortunately, any agenda promoting market orientation among smallholder farmers may have negative implications for the environment, as market-driven farmers tend to prioritise increased but short-term productivity, profitability and income, which often are unsustainable. Current development theories favour models aligned to regenerative agriculture and other conservation-linked approaches that emphasize reducing intensive external input usage, as well as carbon sequestration (Burgess et al., 2019; Elevitch et al., 2018; Oberc and Schnell, 2020).

Market orientation studies were traditionally based on the research of large firms in developed countries, with little information about small firms in developing countries (Boohene et al., 2012). The empirical relationships involved have not been adequately captured or adapted to smallholder producers in the agricultural sectors of developing and low-income economies, especially in Sub-Saharan Africa (Benos et al., 2016). The key inputs purchased by smallholder crop farmers in developing countries include seeds and fertilisers, which make up the cost of production inputs. In the event of a disaster, the vulnerability and subsequent ability of farmers to recover depends on their seed security, which requires a secure seed system. Understanding local seed systems often involves implementing a seed system security assessment and is crucial to the livelihoods of smallholder farmers.

Seed system

A seed system security assessment determines the security of farmers' seed system which considers both acute stress and more chronic long-term challenges; the focus also includes broader analysis of the cropping and livelihoods system, especially focusing on vulnerability and resilience (Sperling and McGuire, 2012). It reviews the functioning of seed systems – both formal and informal – that farmers use and assesses whether adequate quality seeds are available and accessible to farmers (CIAT et al., 2009). The seed security-linked response

might be applicable for a range of situations that involve acute and chronic stress, such as natural disasters or man-made crises. With this in mind, appropriate development practices require an exploration of the nuances and shaping responses based on what actions might be feasible, as well as lessening the challenges and seizing any associated opportunities.

Problem statement

However, a vast number of studies on farmers' market orientation have been conducted without due consideration given to smallholder farmers in a disaster, relief and recovery context. Unlike many commercial farmers who protect their livelihood activity from weather-related risks using market-based instruments such as weather insurance, smallholder farmers in developing countries lack access to knowledge, formal instruments and other relevant risk-management solutions. Arias et al. (2013) professed that there is little possibility for protection against the diverse risks prevalent in the agricultural sector among smallholder farmers. Given the changing weather patterns and erratic rainfall caused by a rapidly changing climate, a better understanding of market orientation among smallholder farmers in a disaster context is necessary. Since smallholder farmers significantly contribute to food security in developing countries, the study of their market orientation in a disaster context is essential. The prolonged drought (2015–2019) in the western part of the Eastern Cape province was declared a disaster, as it affected more than 5500 smallholders and nearly 55,000 subsistence farmers (Karoo Space, 2019). According to official figures, the drought was one of the worst in a long time and followed five years of persistent poor rainfall. As such, the foregoing provided context for the setting of the study.

Study objective

The objective of the study was to determine the market orientation among smallholder maize farmers in the Mhlaba local municipality. Specifically, it identified demographic characteristics and investigated the use of purchased inputs for crop production while estimating the commercialisation and market orientation indices. Finally, it also determined the factors contributing to market orientation among the smallholder farmers. The following research questions guided the study:

1. What are the demographic characteristics of smallholder farmers in the area?
2. Do smallholder farmers in the area purchase inputs for production?
3. How do smallholder farmers rate on the market orientation index?
4. Which factor(s) affect the market orientation among smallholder farmers in the area?

METHODOLOGY

Study area

The Raymond Mhlaba local municipality is part of the Amatole District of the Eastern Cape province of South Africa, where persistent drought has been reported since 2015, based on the official report of the Department of Rural Development and Agrarian Reform (DRDAR). The local municipality was created from the merger of the Nkonkobe and Nxuba local councils in 2016 and has an approximate population of 151,379 residents, with nearly half of the population engaged in various forms of smallholder farming within an area of 6,358 km². It is the largest of the six local municipalities that comprise the Amatole District and is largely rural, with its administrative offices located in Fort Beaufort.

The area lies between two different bio-geographical regions, i.e. the warm, temperate south coast and the sub-tropical east coast. Summers are warm and wet and take place between December and March while short cold and windy winter periods occur from May to August. Temperatures range from an average high of 22.9°C in summer to a low of 14.4°C in winter. Soils in the area are deep and sandy clay-loam, characterised by a well-drained surface. While extensive livestock farming is practised in the area, citrus and vegetables, as well as pineapples, are also widely cultivated.

Sampling

The sample population consisted of smallholder farmers within the selected local municipality and was selected based on an existing list of maize-based farmers, compiled by extension officials in the Amatole district for its 2016–2017 Siyakhula Programme. Following a stratified, random sampling technique, 120 smallholder farmers from 5 communities (Alice, Bedford, Hogsback, Middel drift and Seymore) were identified to participate in the questionnaire survey. In the first instance, five out

of eleven communities were chosen based on their contribution to the number of registered smallholder farmers in the list. Male and female farmers from these communities – as well as those belonging to commodity groups – were classified into sub-populations. The percentages of each sub-population group in the community were then used to randomly select several farmers for the survey. From the prepared list of 1189 farmers, six sub-groups were noted and every alternate third name was selected to be interviewed. Twenty farmers were then included from each sub-group with a target for 10% of the population.

Measurement

This study examined how farmers in the study area engaged with markets from the input side. It follows the view that market orientation studies need to be crop-specific within an identified geographical area or context (Osmani and Hossain, 2016). It adopted a seed system approach due to the recent prolonged drought within the Eastern Cape and Northern Cape provinces and examined how maize farmers in the selected communities have adapted based on the seed systems existing in their communities. Maize farmers were chosen because maize is the most common and important crop cultivated by rural farmers in South Africa, both for livelihood and household food security.

Data collection and analysis

The information collected from individual farmer interviews includes their seed sources, changes in the normal size of the area or amount of the seeds sown – if any – reasons for any changes, the farmers’ assessment of seed performance, their input use, as well as any use of new seed varieties and aid received. Also included was how much money farmers spent on seeds and other inputs. Where various crops were cultivated, the data collected included details of each crop and concerned the current season. The data collected was entered into the Seed System Security Assessment (Version 4.1) Excel template, specifically prepared for automated analysis.

Empirical model

To obtain the crop input commercialisation index, the survey instrument solicited information regarding the respondent’s crop production values, as well as the amount

received from crop sales. The crop input commercialisation index was calculated by using the following equation;

$$HCICI = a/b \quad (1)$$

where:

HCICI – the household crop input commercialisation index

a – the value of inputs purchased

b – the total value of crops produced.

The crop input commercialisation index indicates the extent to which a farming household participates in the input market as a buyer (Kabiti et al., 2016). Various socio-economic variables affect the farmer’s engagement with markets and are often modelled to explore their effect on the level of market orientation. The functional form is as follows:

$$MOI_j = f(X_i) \quad (2)$$

where:

MOI_{*j*} – is the market orientation index of a specific farmer *j*

X_i – represents the assumed socio-economic variables affecting the level of market orientation.

The regression model is hence specified as:

$$MOI_i = \beta_0 + \beta_1 X_1 + \dots + \beta_n X_n + \mu_i \quad (3)$$

MOI – market orientation index

$\beta_0 \dots \beta_n$ – are the parameters to be estimated

$X_1 \dots X_n$ – represent explanatory variables affecting the level of market orientation, and the stochastic error term given by μ_i .

The explanatory variables (X) included in the regression equation were age, farm size, experience in farming, level of education, seeds purchased, fertiliser purchased, the value of crops produced, access to credit, distance to market and farm visits by extension agents.

The model shows a linear relationship between the dependent and explanatory variables and is provided as follows:

$$MOI = \beta_0 + \beta_{age} + \beta_{fsize} + \beta_{exp} + \beta_{edu} + \beta_{seeds} + \beta_{fert} + \beta_{crop} + \beta_{credit} + \beta_{ext} + \beta_{dist} + \mu_i \quad (4)$$

Table 1 shows the variables included in the equation and type, including its measurement and expected direction.

Table 1. Variables included in the regression and their description

Name of variable	Type	Measure	Expected effect
Farmer's age		years (yrs)	
Farm area cultivated		hectares (ha)	
Farming experience		years (yrs)	
Level of education	continuous	years (yrs)	
Amount of seeds purchased		amount (rand)	positive
Quantity of fertiliser purchased		amount (rand)	
Value of crops produced		amount (rand)	
Extension visits		1 = visit / 0 = no visit	
Access to formal credit	dummy	1 = has access 0 = no access	
Distance to market	continuous	kilometres (Km)	negative

Source: researchers' compilation, 2019.

RESULTS AND DISCUSSION

Respondent demographic features

Table 2 shows the relevant features of the survey respondents, including their gender, household type and farm size.

Among the survey respondents, approximately 57% were male and 43% were female while most of the

Table 2. Demographic features of survey respondents

Description	N = 120	Percentage
Male	69	57.5
Female	51	42.5
Adult-headed household	99	82.5
Child-headed household	2	1.7
Granny-headed household	19	15.8
Farm size <0.5 ha	26	21.7
0.5–1 ha	53	44.2
>1–2 ha	41	34.2
>2 ha	0	0

Source: questionnaire survey, 2019.

households were headed by adults (83%) and elderly grandparents (16%). The average age of respondents was 54 years, with a minimum and maximum age of 19 years and 76 years respectively. The mean household size was 4 persons, with a minimum of 2 and a maximum of 7 persons in the household. With a mean farm size of 0.94 hectares, 23% of respondents had a farm size smaller than half a hectare, 44% of respondents cultivated a farm size between half and one hectare, and approximately 34% of respondents cultivated a farm between one and two hectares. None of the respondents in the survey had a farm size greater than two hectares. Farm sizes less than two hectares restrict farmers to growing few crops and are commonplace across Sub-Saharan Africa, as reported by Freeman and Qin (2020), Kamara et al. (2019) and others. All respondents were maize-based farmers and many also planted other crops including Irish potato (29%), cabbage (21%), sweet potato (4%) and spinach (19%) during the last planting season. Furthermore, about 96.7% of respondents purchased fertilisers during the past season while 3.3% of them did not. The survey also showed that 89.2% of respondents had planted new maize varieties during the last 5 years, with such varieties mainly being purchased (97.3%) from agro-input dealers (85%), NGO sources (12%) and informal sources (3%) such as neighbours, other farmers and relatives.

Table 3. Seeds planted by respondents in the most recent season by their sources

Crop	Total sowed (kg)	Quantity and proportion by source							
		home saved / own stock		friends, neighbours, relatives		local market		agro-input dealer	
		kg	%	kg	%	kg	%	kg	%
Maize	8737	825	9	775	8	1 475	17	5 662	66
Irish potato	1430	0	0	25	2	180	12	1 250	86
Cabbage	110	0	0	4	4	30	27	76	69
Spinach	54	0	0	0	0	18	33	36	67
Sweet potato	65*	10	15	55	85	0	0	0	0

* Converted to kg equivalent for cuttings.
Source: questionnaire survey, 2019.

Estimation of purchased input (seeds and fertiliser) used for production

As part of the survey, the quantity of seeds used by the respondents for different crops cultivated and their sources were examined. The data in Table 3 indicates that 66% of total maize seeds planted were purchased from agro-input dealers while 17% of them were purchased from the local market. Maize seeds stored at home (own stock) comprise 9% of the seeds planted and 8% of such seeds were obtained from neighbours and relatives. Table 3 shows the quantities of other crops planted during the season examined, as well as their sources.

Agro-input dealers supplied most of the seeds used by respondents during the season, followed by traders in the local markets close to respondents. Some of the respondent-farmers planted their own maize seeds saved from the previous season or obtained from their harvest; other sources include relatives, neighbours and

other farmers, especially in the case of maize seeds. Seeds (planting materials) for crops such as Irish potato, cabbage and spinach were also mostly sourced from the market. Furthermore, the survey explored inputs (seeds and fertiliser) used during the previous season and quantified the amount for each crop cultivated by the respondents, as shown in Table 4.

As shown in the table above, 67% of the amounts spent on inputs in the previous planting season was used for the maize crop. On average, the respondents spent 18% of total production spend on inputs for Irish potato while 14% of the total input budget was spent on cabbage cultivation during the previous season. The data highlights the importance of the maize crop among the respondents in the study area and corroborates many other studies in the Southern Africa region, which reported the importance of maize crops for smallholder farmers. Worthy of note is that smallholder farmers

Table 4. Amounts spent by respondents on inputs for each crop cultivated

Crop	N growing this crop	Average spending (rands)				
		neighbours	local market	input shops	all sources	% of the total
Maize	120	600.00	1 046.88	1 912.50	3 559.38	67
Irish potato	35	250.00	350.00	400.00	1 000.00	18
Cabbage	53	150.00	400.00	300.00	750	14
Total		1 000.00	1 796.88	2 612.50	5 309.38	100

Source: questionnaire survey, 2019.

Table 5. Values of inputs purchased and commercialisation indices

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
Total value of crops produced*	120	12 271	10 577.5	2 675	27 890
Amount received from crop sales*	120	8 494	8 607.9	1 050	23 950
Average spend on crop inputs*	120	5 309	4 093.8	520	9 800
Output commercialisation index	120	0.62	0.32	0.39	0.85
Input commercialisation index	120	0.29	0.34	0.17	0.48

*Values in South African Rands.

Source: own calculations based on survey data, 2019.

included in the survey did not plant only maize during the season analysed – other crops were planted as well. Such crops, which include Irish potatoes, cabbages, spinach and sweet potatoes, are used to improve the household’s food potential and income baskets.

Crop commercialisation index

Table 5 provides the computed commercialisation indices of the study respondents; based on the data, the maximum total value of crops produced by the respondents was R27,890 while a minimum was R2,675, with a mean of R12,271.

There is an observed high differential between the maximum and minimum values, which indicate the variance among the group of smallholder farmers. This pattern is highlighted in the average spend on crop inputs, where the maximum value is R9,800 and the minimum value is R520, with a mean value of R5,309. Though there are differences in farm size among the respondents, the range of values implies large variations in the quantity of inputs used between the farmers when the different farm sizes are considered. The purchased input use pattern is an important determinant of market orientation and the maximum output commercialisation index among the respondents in the study area was 0.85 while the minimum value was 0.32 with a mean index of 0.62. The farmers within the study area show high levels of commercialisation, as on average 62% of crops produced were sold. Even among farmers with the lowest commercialisation index in the area, the value of 39% is still higher than the reported average commercialisation index for smallholders in Sub-Saharan Africa, which is 30% (Abu, 2015; Agwu et al., 2012). Also, all farmers surveyed purchased inputs for their crop production, which further confirms their interaction with the markets.

Market orientation factors and determinants

While both market and home consumption play central roles in production decisions among smallholder farmers, it is common practice to allocate resources to overall farm production rather than individual crops for each season. Hence, the proportion of all crops sold (both for cash and in-kind payments) is compared to the total value of all crops produced, and the input purchased value in calculating the farmers’ market orientation index. Table 6 shows the crop marketing index and the market orientation index.

As shown in Table 6 above, when the value of crops produced by farmers is compared to the amount received for crops sold in the market, including the value of crops used to compensate for services obtained – such as labour and transport – and farm produce given as gifts, the average maize crop marketing index is 0.62. This indicates that a typical farmer in the study area sold 62% of his or her maize produce. To obtain market orientation index, the total production is compared to the values of produce sold in the market and inputs used for crop production during the given period. The smallholder farmers in the survey had an average market orientation index of 0.55, with a maximum and minimum values

Table 6. Crop marketing and market orientation indices of the respondents

Indicator	Minimum	Maximum	Mean	Std. dev.
Crop Marketing Index (CMI)	0.44	0.89	0.62	0.33
Market Orientation Index (MOI)	0.40	0.79	0.55	0.31

Source: own calculations based on survey data, 2019.

of 0.79 and 0.40 respectively. Following the criteria set by the World Bank (2007), based on which smallholder farmers who sell 50% of produce are considered to be market-oriented, the study respondents had an average market orientation index of 55% and sold approximately 62% of their crops in the market. The farmers in the survey are therefore described as market-oriented since they surpass the prescribed criteria.

Finally, in exploring the determinants of market orientation among smallholder farmers included in the survey, different variables shown to affect market orientation were identified and included in the regression with the results presented in Table 7.

As shown in Table 7, several variables were identified as contributors to the market orientation of smallholder farmers in the study area. The variables found to be significant in the study were farm size, the quantity of seeds purchased, the quantity of fertiliser purchased, the value of crop produced, distance to the market, the amount received from crop sales and access to credit. Large farm size translates to increased output for farmers, with a significant effect for the value of crops sold,

as well as a positive influence on the farmers' decision to enter the market and sell their produce (Dlamini, 2019; Zivenge and Karavina, 2012). The value of crops produced has a significant positive impact on crop market participation; households with higher crop values are more likely to participate in markets and also sell greater proportions of their output. Additionally, the quantity of fertiliser purchased is associated with increased market orientation due to expected higher yields and the resultant provision of greater output for the market.

As shown in the study, the contribution of the inputs purchased (seeds and fertiliser) to the farmer's market orientation underscores the importance of input-side market interaction to the general market orientation of smallholder farmers. The increased use of purchased inputs in crop production positively affects farm yield, as well as the transition from lower to higher levels of market orientation (Freeman and Qin, 2020; Osmani and Hossain, 2015), which increases the probability for market participation among smallholder farmers. Interestingly, while access to credit was significant, it negatively correlated with market orientation in this study.

Table 7. Estimates of the determinants of respondent market orientation

Variable	Coefficient	Std. error	P-value	Marginal effect
Age	0.1366	0.1523	0.386	0.078
Farm size	0.0013	0.1161	0.004*	0.646
Farming experience	0.0024	0.0045	0.152	0.012
Education	0.0152	0.0531	0.771	0.531
Seeds purchased	0.0313	0.0141	0.007*	0.030
Fertiliser purchased	0.0518	0.0237	0.024**	0.012
Value of crops produced	0.0891	0.0051	0.043**	0.542
Crop sales amount	1.2089	0.0034	0.001*	0.053
Distance to market	-0.0054	0.0027	0.048**	0.001
Farm visits by extension agents	1.0104	0.2683	0.328	0.534
Access to credit	-0.5851	0.2972	0.034**	0.604
Constant	-3.72	2.23	-1.87	0.047
Log likelihood = -36.01483				
LR chi2 (10) = 6.76				
Prob > Chi2 = 0.000				
R ² = 0.081				

*, ** Significant at 1% and 5%.

Source: questionnaire survey, 2019.

This can be explained by the dominance of informal and unregulated loan sources in the area, which charge high interests on loan amounts.

Variables not found to contribute to market orientation in this study were age, farming experience, level of education and farm visits by extension agents. The findings by Adenegan et al. (2013) suggests that age had an inverse relationship with market orientation, where an increase in age reduced the farmers' market orientation. However, they found the level of education to significantly contribute to market orientation among cassava farmers surveyed in Nigeria. This finding was probably due to the high number of part-time farmers included in their study, indicating that many of the respondents had other formal occupation requiring education. The role of extension services in market orientation depends on their effectiveness while working with the farmers – the results reported in this case were mixed. While Abafita et al. (2016) found that they did not have a significant effect on market orientation in an earlier study, Osmani and Hos-sain (2015) concluded that extension services contributed to market orientation. This difference could be related to the varied forms of providing extension services in different countries and among the various group of farmers.

CONCLUSION

The research aimed to determine the market orientation among smallholder farmers within the Mhlaba local municipality. The research was conducted between November 2018 and August 2019 following a mixed-methods approach, within the context of a prolonged drought and weather uncertainties. The study found that the majority of smallholder farmers in the Mdlala local municipality were male with an average age of fifty-four years and a farmland size typically not exceeding two hectares. Maize-based farming was prevalent in the area, with some also planting crops like Irish potato and cabbage. Seeds for planting and fertilisers were mainly purchased by farmers from available agro-input shops, and many of the farmers had planted new maize varieties during the last five years.

The study estimated that the average output commercialisation index among the farmers is 0.62, indicating that an average of 62% of the crops produced by smallholder farmers in the study area was sold. Additionally, with a market orientation index of 0.55, farmers in the area were found to be market-oriented as they marketed more

than 50% of their produce. Variables found to contribute to market orientation among the farmers were farm size, quantities of seeds and fertiliser purchased, the value of crops produced, distance to market, the amount received from crop sales and access to credit. The evidence suggests that smallholder farmers in the area depended on purchased inputs for their agricultural production, which has positive implications for the local input supply sector. Furthermore, smallholder farmers in the area showed resilience notwithstanding the long period of drought, as they continued to engage with and produce for the market. Policy recommendations include providing improved drought-tolerant maize seed varieties, as well as increased access to credit services and larger farm sizes. The national government's on-going land reform programme currently provides farmers with opportunities.

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