SMALLHOLDER COMMERCIALIZATION OF MAIZE AND SOCIAL CAPITAL IN THE EASTERN CAPE PROVINCE OF SOUTH AFRICA

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Abstract

Smallholder subsistence agriculture in the rural Eastern Cape Province is recognised as one of the major contributors to food security among the resourced-poor household. However, subsistence agriculture is thought to be unsustainable in the ever changing social, economic and political environment, and climate. This has contributed greatly to stagnate and widespread poverty among smallholder farmers in the Eastern Cape. For a sustainable transition from subsistence to smallholder commercial farming, strategies like accumulated social capital through rural farmer groups/cooperatives have been employed by the government and NGOs. These strategies have yielded mixed results of failed and successful farmer groups/cooperatives. Therefore, this study was aimed at establishing the impact of social capital on farmers' household commercialization level of maize in addition to farm/farmer characteristics. The findings of this study established that smallholders' average household commercialization index (HCI) of maize was 45%. Household size, crop sales, source of irrigation water, and bonding social capital had a positive and significant impact on HCI of maize while off-farm incomes and social values had a negative and significant impact on the same. Thus, innovation, adoption and use of labour saving technology, improved access to irrigation water and farmers' access to trainings in relation to strengthening group cohesion are crucial in promoting smallholder commercial farming of maize in the study area.

Keywords: Commercialisation of Agriculture, Social Capital, Smallholder Farmers, Factor Analysis, South Africa

INTRODUCTION

Commercialization of agricultural production in many developed and developing countries have proved their efficacy in catalysing industrial and economic growth (Eicher and Staatz, 1985, von Braun, 1995; Jaleta *et al.,* 2009; Kofi Annan Foundation, 2011). Large-scale commercialised agriculture using modern machinery and sophisticated technologies has largely contributed to economic and industrial growth in developed countries like North America, and European countries, Israel in the Middle East, and Southern American countries like Brazil and Argentina, Asian economies like China and India (Eicher and Staatz, 1985).

In developing countries especially in Sub Saharan Africa, Asia and South America, commercial farming was mainly introduced by European colonial masters for purposes of feeding their industries in Europe (Eicher and Staatz, 1985). According to Robbins and Ferris (2002), commercialisation of agriculture led to the development of infrastructure and introduction of cash crops of which up-to-date are still a major contributor to the national GDP of most developing countries (like coffee export from Uganda and tea export from Kenya). In the post-independence era most of these large-scale commercial farms have not been sustained because of insufficient management and operational skills, lack of resources and fluctuating prices of especially non-consumable products. For survival, most African farmers resorted to smallholder subsistence farming although this type of farming yields less marketable surplus not enough to lift them out of poverty.

There is no definite definition of commercialization of agricultural production but can be described based on the farmers' aims/goals and aspirations. Smallholder commercialization of agriculture production can be defined as; small scale farmers that are more integrated into available local, national and international markets (Doward and Kydd, 2002). Farmer's goals and aspirations that shape the definition of commercialization of agricultural production include production aimed mainly for sale, oriented towards profit maximization while satisfying the different needs and interests of the consumer (Mahaliyanaarachchi and Bandara, 2006). According to Mahaliyanaarachchi and Bandara (2006), commercial farmers can be classified based on the marketable surplus produced and these include; subsistence farmers who produce marketable surplus of under 25% of the total production. The second group comprises the emerging farmers who produce a marketable surplus ranging between 25-50% of total production. The third group is made up of commercial farmers who produce marketable surplus of more than 50% of the total production.

According to Chandra (1992), Robbins and Ferris (2002), Jedwab and Moradi (2012), some positive attributes of commercialization of agricultural production in developing countries during and after colonial periods included: construction of the infrastructures like roads from

farms to the exiting point for export; establishment of agro-industries; identification and categorisation of specific crops for specific regions with countries and international boundaries; commercialisation also contributed to a relatively efficient land markets; new crops (coffee, tea, cotton and jute) and livestock exotic cattle, goats and sheep), and new variety of crops and livestock breeds were introduced; and commercial agriculture played a great role of employing a large number of most peasant farmers.

Although commercialization of agriculture is normally anticipated to act as a catalyst in increasing agricultural productivity for increased household incomes and improved general livelihood of rural farmers as reported by von Braun (1995) and Timmer (1997), it was not the case for most European colonies in developing countries. Evidence reveals that most commercial farms failed during the early post-national independence of most developing countries due to poor human capital, agricultural organization and lack of external social capital, out-dated technologies, lack of access to physical and financial resources, and lack of entrepreneurship drive to manage these large farms (Romer, 1994). Consequently, the peasant farmers resorted to small scale farming mainly for subsistence farming. Despite its ability to bring food at the table, subsistence farming in the long run may not be sustainable in terms of food security and improved general livelihood (Jaleta*et al.,* 2009).

In South Africa, smallholder commercialization of agriculture production started as early as 2,500 years ago by (Khoisan) people who traded in livestock with people from North and Bantu group who settled along Limpopo river banks (Byrnes, 1996). Bantu group were practicing subsistence food crop production mainly for household consumption. In year 1658, European settlers introduced large scale commercial agricultural farming (Seneque, 1982; Thwala, 2003; Kodua-Agyekum, 2009; McAllister, 2010). To date, the white farmers are the major contributors to commercial agriculture in South Africa. Thus, most rural farmers especially in former homelands in the Eastern Cape Province of South Africa are still locked in low agriculture production with no or less marketable surplus extremely below threshold to uplift them out of widespread increasing poverty (Seneque, 1982; Thwala, 2003; Kodua-Agyekum, 2009; McAllister, 2010; Zuma, 2011).

Evidence displayed in literature report a decline in the number of commercial farms in South Africa, exposing the country to food insecurity and increased poverty levels among rural communities especially in former homelands like Transkei and Ciskei. Therefore, this calls for potential policies that promote investment incentives in the sector. Furthermore, the development of entrepreneurial skills across the agricultural sector especially among small-scale farmers may be of great importance to catalyze the transition from subsistence to

commercial farming. According to Agriseta (2010), there has been a decline in the number of commercial farming businesses of -10.97% in the Eastern Cape Province.

Among challenges responsible for stagnant and declining commercialization of smallholder agricultures in South Africa include: The slow rate of land redistribution and restitution programmes, limited support and reduced government support of smallholder irrigation schemes. The reduced support and services withdrawn by the government included provision of machinery, provision of water at no cost, input subsidies and working capital on the irrigation schemes (Tshuma, 2009). Government programmes like Comprehensive Agriculture Support Programme have benefited a few farmers and failed to support a large number of black farmers who benefited from land reforms programmes (Aliber and Hall, 2009). In addition, farmers lack collateral to access credit or meet conditions set by banks, microfinance institution and government-private partnerships.

Factors for Improved Smallholder Agricultural Commercialisation

Jaleta *et al.*(2009) and Doward and Kydd (2002) indicated that the promotion of smallholder commercialization in the rural Sub Saharan Africa including South Africa is inevitable for improved livelihood and reduced levels of poverty among the rural population. The essential components for a sustainable and feasible smallholder commercialization of agricultural production especially in rural areas of the Sub Saharan Africa include improved physical infrastructure such as roads, railways and ICT facilities (Sibale, 2010). Improved access to natural resources, increased adoption of new technologies, level of specialization in fewer staple food and cash crops coupled with availability of assured markets through contracts and legal agreements are also vital in promoting increased commercialisation of smallholder farmers (Sibale, 2010). Other factors considered to be of great importance for increased commercialisation among subsistence farmers includes availability of agro-industry, farmers' entrepreneurial and managerial skills, physical assets, labour, and farmers' participation in planning and management of rural development programmes (Eicher and Staatz, 1985; Romer, 1994; Sibale, 2010; and Jedwab and Moradi, 2012). Accumulated internal (bonding) and external social capital through group/cooperatives is also considered important in promoting smallholder commercialization of agriculture (Jaleta *el at.,* 2009).

Social Capital

Due to its complexity, the concept of social capital has been defined, measured and applied differently by different authors (McHugh and Raphael, 2002). Most conceptual frameworks have acknowledged the role of individuals and groups (Bonding social capital) and societal

interrelations (Exclusive Social Capital) in defining social capital. Further, identified structures (state institutions, rules and laws) and cognitive factors like trust, norms and values (Paxton, 1999; Grootaert and Van Bastelaer, 2002) important in defining social capital. The group cohesion and societal interactions coupled with rules, norms, laws and rules are critical in enhancing proper management and utilization of natural resources for both social and economic gains. Several socioeconomic researches have been carried out and attested the importance of social capital in increasing agricultural productivity (Tshikolomo, 1996; Wolz, Fritzsch and Reinsberg, 2005; Yamaoka, 2007; McAllister, 2010; Hongmei and Mangxian, 2011). Thus, accumulated social capital both bonding and external networks has a potential of transforming smallholder subsistence to commercial farming especially among the rural resourced-poor farmers working in groups or cooperatives.

RESEARCH METHODOLOGY

Population and Sampling

Due to high poverty levels faced by most farmers located in the Eastern Cape Province although they are endowed with irrigation schemes created a need to understand why they are still poor despite such investment. This study employed purposive sampling techniques targeting farmers at Qamata and Tyefu irrigation schemes located in the Eastern Cape Province of South Africa to identify the contribution of social capital on improved commercialization of smallholder agriculture. Further, maize crop was chosen because it is regarded as a staple food, animal feed and source of incomes among households in Qamata and Tyefu area.

Data Collection

The study used primary survey data which was collected through administering structured questions and physical observations. Farm/farmer characteristics, farm production and market related data was collected. Edwards and Smith observed three factors likely influence a participant's decision to falsely report via the neutral option: cognitive effort, ambivalence, and social desirability. To avoid such false report, this study used a 4 point Likert scale where respondents were asked to indicate their level of agreement in response to the 15 social capital related attitudinal statements, where "1" being strongly disagreed and "4" being strongly agree. The attitudinal statements included farmers' perceptions towards exclusive/external social networks like government, NGOs and private companies' for improved agricultural productivity. Also the statements were aimed at establishing farmer's attitude towards bonding social capital (farmer groups) and its role in aiding productivity and marketing. All the attitudinal statements used in this study were adapted from literature review and redesigned to suit the research. Sixty

four and 44 smallholder farmers were interviewed in Qamata and Tyefu communities, respectively, making a total sample of 108 respondents.

Analytical Methods

Factor analysis method was employed using SPSS to generate the principal component of perceived farmers' perception about social capital's contribution to agricultural production and market participation. The purpose of using the factor analysis was to reduce the large number of variables (i.e. social capital related attitudinal statements) to a smaller set of new composite factors. This process also ensures limited loss of information contained in the large number of attitudinal statements. The eigen values greater than one, the Kaiser-Meyer-Oklin KMO score greater than 0.6 and the Bartlett's test of sphericity were used to verify the suitability of data for Principal Component Analysis (PCA) (WIDCORP, 2008; Kisaka-Lwayo and Obi, 2012). Following Kisaka-Lwayo and Obi (2012), the principal component (PC) of a given dataset of P numeric variables can be presented mathematically as:

$$PC_n = f(a_{ni}X_i, \ldots\ldots\ldots\ldots a_{1j}X_j) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Where,

PC is the principal component, n represents a number greater than one. The PC can take different forms of measurement and these include continuous variables, quantity of related products of values that makeup a component, and weighted values or generated values from the component loading. The a_{1j} is the regression coefficient for the jth variable and it is known as the eigenvector of the covariance matrix between variables. X_j is the value of the jth variable. Explicitly the equation can be written as:

$$PC_1 = a_{11}X_1 + a_{12}X_2 + \ldots\ldots a_{1j}X_j\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Where,

PC_1 = the first principal component. X_1 and X_2 are the first and second independent variables of PC_1 in the linear additive model needed to derive the principal component, and the a_{11} and a_{12} are coefficient (component loadings) associated with the X_1 and X_2 variables.

Relationship between Social Capital and Farmer/Farm Characteristics

The impact of socioeconomic characteristics on farmer's social capital was estimated using factor analysis and multiple regression analysis. The multiple regression analysis used standard factor scores generated after the factor analysis was performed, and these scores were regressed on farm and farmers' socioeconomic characteristics.

Thus:

$FS_{ij} = \beta_0 + \beta_3 HHSZE + \beta_1 AGE + \beta_2 EDUC + \beta_4 MJOCUP + \beta_5\ EXPE + \beta_6 LANDSIZE + \beta_7 CRPINCOM + \beta_8 LVTINCOM + \beta_9 RMGP + \beta_{10} SOURCWAT + \beta_{11} IRSLOC + e$ ....(3)

Where,

FSij (dependent variable) = generated regression factor analysis scores, β = coefficient parameters to be measured, e = error term, explanatory variable include *HHSZE* = household size, *AGE* = Age of the farmer (years), *EDUC* = education level of the farmer (years), *MJOCUP* = major occupation of the farmer, *EXPE* = farming experience (years) of the farmer, *LANDSIZE* = size of land owned (ha), *CRPINCOM* =crop incomes (Rand), *LVTINCOM* =livestock incomes (Rand) , *RMGP* = remittances, social grants and pension amount received by the farm household (Rand), *SOURWAT* = Source of water for crop production (Rain, tap, dam, river, or spring) and *IRSLOC* = Location of the irrigation scheme (1 = Qamata and 2 =Tyefu irrigation scheme)

Estimating the Commercialization Level of Smallholder Farmers

There are several methods of measuring household commercialisation level among smallholder farmers (Jaleta *et al.,* 2009). Some studies like de Janvry *et al.* (1991) and Fafchamps (1992) cited by Jaleta *et al.* (2009) used dichotomy between food and cash crops and examine household decision on resource allocation to these crops as a proxy for smallholder commercialisation. However, this study used the ratio of marketed output to the total value of agricultural production. Estimation of commerciality levels help to establish the farmer's entrepreneurial ability for different enterprises.

Agriculture of Commercialization (Output-Side)

$$= \frac{Value\ of\ agricultural\ \ sales\ in\ markets}{Agricultural\ \ product\ \ value}$$ ....(4)

Following Goverehe*t al.* (1999); Strasberg *et al.* (1999) as cited by Jaleta *et al.* (2009) the Household Commercialization Index (HCI) can be estimated as follows;

$$HCI_i = \left[\frac{Gross\ value\ of\ crop\ sales\ _{hh\ i'\ seasonj}}{Gross\ value\ of\ all\ crop\ production\ _{hh\ i'\ seasonj}} \right] * 100 $$....................(5)

ANALYSIS AND RESULTS

Table 1 indicates that overall 66% of farmers were men with an average age of 61 years, and mean household size of 6 persons with the household head having at least obtained some primary school education (6 years in School). Interviewed farmers had farming experience of

about 12 years. Smallholder farmers' major source of water for crop production was mainly river (41%) and dams (35%). Results presented in Table 1 further indicated that crop incomes earned by smallholders was about R2079 per cropping season and few incomes were earned from livestock (about R920).

Table 1: Demographic Characteristics of Smallholder Farmers

Characteristics	Description	Percentage
Non-continuous Variable		
Sex of respondent	Male	66
	Female	34
Source of water for crop production	Rainfall	20
	Tape water	4
	Dam	35
	River	41
Major occupation of farmer	Farmer	89
	Self-employed	6
	Civil servant	5
Continuous Variable	**Average Mean**	
Household size	numbers	4.65
Age of farmer	years	61.21
Education level	years	6.13
Faming Experience	years	12.02
Crop incomes	Rand	2079.33
Livestock incomes	Rand	919.64

Household Commercialization Level/Index (HCI) of Maize Enterprise

Results presented in Table 2 indicate that on average, smallholder farmers at Qamata and Tyefu irrigation scheme cultivate approximately 0.747 hectares of maize. The total average maize yields and quantity sold were about 1229.3 Kg/ha and 835.4 Kg/ha, respectively. According to statistics presented by Fanadzo et al.(2009), the potential grain yields of maize production under irrigation farming ranges from 7,000 to 12, 000 Kg/ha. Thus, smallholder farmers on both Qamata and Tyefu irrigation scheme produce extremely low maize yields far below the expected potential yield. Further, the findings of this study indicated that smallholder farmers' household commercialization index of maize was 0.45. This implies that smallholder farmers have a relatively low participation in the maize market since most of the produce is consumed at home (55%) and only 45% of the average total produce is sold. These results further mirror the importance of this crop in ensuring household food security among the resourced-poor rural farmers in the study area.

Table 2: Mean value of Maize Yields and Household Commercialization Index of Maize

	Mean	Standard Deviation
Amount of land under maize production (ha)	0.747	1.070
Total yields of maize (Kg/ ha)	1229.300	1979.790
Quantity of maize sold (Kg/ha)	835.400	1604.037
Household commercialization level (ratio)	0.4503	0.345

According to results presented in Table 3, 29% of smallholder farmers in the study area were not participating in the maize market since their household commercialization index was recorded as zero, thus, producing for home consumption only. Results in Table 3 further indicate that 30% of these farmers scored 10% to 50% of household commercialization index while 41% of farmers scored above 50% of household commercialization index. Based on Mahaliyanaarachchi and Bandara (2006) classification of commercial farmers, the 29% and the 30% of smallholders in the study area can be identified as subsistence or emerging farmers while 41% of smallholders whose marketable surplus exceeds 50% of HCI can be identified as commercial farmers.

Table 3: Estimating Household Commercialization level/Index (HCI) (n = 100)

Category of HCI (%)	Frequency	Percentage
0	29	29
10 - 50	30	30
51 - 90	33	33
>91	08	08
Total	100	100

Average Mean Scores of Smallholders' Perception on the Importance
of Social Capital in Farming

Results in Table 4 were generated using SPSS descriptive statistics. Based on large body of literature (Tshikolomo, 1996; Wolz, Fritzsch and Reinsberg, 2005; Yamaoka, 2007; McAllister, 2010; Hongmei and Mangxian, 2011), social capital has a diverse role boosting and ensures more efficient agricultural production and marketing. In this study, statements reflecting smallholders' perception on the importance of social capital to farming with an average mean score of approximately or greater than 3were regarded crucial. Smallholder farmers acknowledged the importance of working with government departments (≈ 3.00), support fellow farmers in times of hardship (≈ 3.10), access to farm information through fellow famers (≈ 3.00), cultural rules and norms (≈ 3.20), and participation in voting (≈ 3.17) as crucial social capital aspects important for increased productivity and access to agricultural markets.

According to the results displayed in Table 4, smallholders at Qamata and Tyefu irrigation schemes are more likely no to recognise the importance of social capital for farmers' acquisition of agro-inputs and implements, and adoption of new technologies. This can be explained by farmers' low scores attached to statements related to the importance of group membership in accessing farm inputs, farm implements and adopting of new technologies for improved agricultural productivity and market access.

Table 4: Average Item Scores of Farmers' Perception about the Importance
of Social Capital on Farming

	Minimum	Maximum	Mean	Std. Deviation
Working with government improves production & market access	1.00	4.00	2.9630	1.00397
Working with private companies/NGOs improves production & access to markets	1.00	4.00	2.7407	1.13046
Working as farmer groups/cooperatives improves production & access to market	1.00	4.00	2.8519	0.94538
Attending group meetings regularly improve production & access to market	1.00	4.00	2.8796	0.86162
group membership ease access to farm labour,& improves production & marketing	1.00	4.00	2.8611	0.84785
Can easily access farm inputs like fertilizer when connected to group membership	1.00	4.00	2.5556	0.93061
Can easily access farm implements when belonging to farmer group	1.00	4.00	2.6944	1.03633
Access to information from fellow famers is vital in production, and output marketing	1.00	4.00	2.9907	0.58797
I support others (fellow farmers) and they support me in times of hardships	1.00	4.00	3.1759	0.82969
Group membership ease access and adoption of new technologies	1.00	4.00	2.6852	0.91353
Can contribute money towards a common goal in my community	1.00	4.00	2.7037	1.04353
Farmer groups/cooperatives with constitution/rules perform better than others	1.00	4.00	2.6111	0.97476
Culture rules and norms are vital in group formation, farm production and marketing	1.00	4.00	3.2037	0.90439
Trust among community members is a key factor for successful farmer	1.00	4.00	2.7407	0.97989
Participation in voting village committees is crucial for equitable access to resources	1.00	4.00	3.1667	0.96189

Note: *** and ** represents significance at 1% and 5% respectively

SD = Standard Deviation

The Principal Components for the Perceived Farmers' Social Capital

Three principal components were obtained out of nine farmers' social capital attitudinal statement using the Kaiser-Guttmann rule where the entire three principal components scored Eigen values greater than 1. To satisfy the KMO minimum value and Bartlett's Test of Sphericity, the fifteen farmers' social capital related statements were reduced to nine statements that best described the three principal components as indicated in Table 5. The Kaiser-Meyer-Olkin measure (KMO) of sampling adequacy was 0.603 and all the three principal components that explained 64.16% of the variance in the 9 statement were extracted from the covariance matrix. Based on the factor loading results presented in Table 5, principal components 1 to 3 can be best described as bonding social capital index, exclusive social capital index, and social values index, respectively.

The first principal component explained 31.30% of the variance in the explanatory variables. Smallholder farmers indicated that belonging to farmer groups can ease access to inputs and implements. Voluntarily, smallholder farmers were willing to contribute some money towards a common goal of the community. Voluntary participation or collective action is thought to strengthen social relations and bonds, and participating individuals are regarded as responsible members of the community. Collective action is one of the major instruments advocated for by most cooperatives especially in managing and use of resources in a more efficient and sustainable way for increased productivity and bulk marketing. Created social bonds sometimes serve as strategies to get rid of future risks and societal shocks. Smallholder irrigators who belong to groups believe in constitution/rules as vital instruments for better performance of groups/cooperatives.

Involving community members in farm work result into reciprocation within farm community members that creates a psychological bond. The constructed psychological bonds can then results into increased sustainability and achievement of the farm goals (Dillon, 1990). In their farming endeavours, Bantu groups shared group farming responsibilities among communities and in some cultures they exchange gifts in form of crop harvests and livestock. The socialisation creates farmer's sense of belonging to farming community and farmer groups. These activities avails a chance of interacting and transfer of a range of farm and community related information. Development programmes can purpose to use these social bonds to strengthen farmer groups in different farm business related activities like collective marketing, labour supply, bulk farm inputs and implement acquisition, and group/cooperative credit unions.

The second principal component (external social capital) accounted for 17.60% variation in the explanatory variables with two positive estimated coefficients above 0.30. The index suggests that smallholder farmers believe that exclusion/external social network is crucial for

improved farm production and market accessibility. Rural smallholder farmers view connections with government departments, private companies and NGOs and belonging to farmer groups/co-operatives improves access to farm inputs, implements and agricultural markets.

Table 5: Estimated Principal Components for the Perceived Farmers' Social Capital

	Bonding Social Capital	External Social Capital	Social Values
Proportion of variance (%)	*31.30*	*17.61*	*15.25*
Eigen values	*2.817*	*1.585*	*1.372*
	Factor Loading		
Social Capital Aspects	PC1	PC2	PC3
Working with government departments improves production & market access	0.167	**0.855**	-0.075
Working with Private companies improves production & access to markets	**0.377**	**0.734**	0.140
Working as farmer groups/cooperatives improves production & access to market	**0.763**	-0.018	-0.186
Can easily access farm inputs like fertilizer when connected to farmer groups	**0.873**	-0.122	-0.245
Can easily access farm implements when belonging to farmer group	**0.813**	0.012	**-0.359**
Can contribute money towards a common goal in my community	**0.337**	-0.071	**0.673**
Farmer groups/cooperatives with constitution/rules perform better than others	**0.673**	**-.378**	**0.318**
Trust among community members is a key factor for successful farmer	0.055	**-.388**	**-0.312**
Culture rules and norms are vital in group formation, farm production and marketing	0.269	-0.031	**0.687**

Kaiser-Meyer-Olkin Measure (KMO) of Sampling Adequacy = 0.603
Bartlett's Test of Sphericity: Approx. Chi-Square = 299.053
df. = 36
Model Significance level = 1%.

Note: The bold and underlined factors > (0.3) qualify to constitute a given component. (n = 108)

The third principal component was mainly defined by social values and accounted for 15.25% of variance in the explanatory variables. Farmers valued cultural rules and norms, and group/cooperative constitutional rules and regulations as vital factors in farming with less importance attached to trust among community members. Availability of cultural rules and norms, and group/cooperatives constitutional rules and regulations ensures order in the management and operations of farm business. Thus, policy makers may need to consider farmers' social values to strengthen farmer groups and cooperatives for improved access to input/output markets. Strong social values can also aid the flow of information regarding efficient

and sustainable use of resources, diffusion of new technologies and good agronomic practices, and quality assurance along the agricultural produce value chain.

The Impact of Farmers'/Farmer Characteristics and Social Capital on Household Commercialization Index for Maize Enterprise

Based on results presented in Table 3, most smallholder farmers in the study area had low household commercialization index (HCI). Therefore, it was worth knowing the factors responsible for the low commercialization levels among smallholders. Using an OLS linear regression model, the relationship between HCI of maize enterprise and farm/farmer's characteristics, and farmers' social capital was estimated. Results in Table 3, indicate that there is a high correlation between the HCI and the explanatory variables since the F-value (5.076) is significant at 1% level. The Durbin-Watson statistic results (1.964) also indicated low extent of autocorrelation between the variables.

Table 6: Impact of Farmers'/Farm Characteristics and Social Capital on HCI

	Coefficients	Standard error	T-value	P-Value
(Constant)	-0.035	0.316	-0.111	0.912
Household size	0.024	0.012	2.060	0.042**
Age of the household head	0.002	0.003	0.581	0.563
Amount of land owned	0.014	0.038	0.381	0.704
Crop-incomes	0.000	0.000	2.685	0.009***
Off-farm incomes	-0.000	0.000	-4.033	0.000***
source of water for crop production	0.078	0.030	2.602	0.011***
location of irrigation scheme	-0.160	0.107	-1.506	0.135
Education level (Years in school)	-0.013	0.010	-1.294	0.199
Bonding Social Capital	0.215	0.091	2.370	0.020**
External Social Capital	0.022	0.067	0.325	0.746
Social values	-0.158	0.090	-1.746	0.084*

Adjusted R^2 = 0.274
F-Value = 4.677***
Durbin-Watson statistics = 1.971

Farmers with more household members, earning more incomes from crop and use river and dam water are more likely to produces higher market surplus. This is explained by the positive and significant impact of household size, incomes from crop sales and source of irrigation water on household commercialization level at 5%, 1% and 1% levels, respectively. In this case, household size may be considered as source of labour and crop incomes as source of capital for reinvestment to increase marketable output, and water availability for improved yields. According to Future Agricultures (2012) and Jaleta*et al.* (2009), availability of relatively a larger

number of household members participating in farming positively and significantly affects smallholder farmers' commercialization level. Off-farm income had a negative and significant influence on HCI at 1% level. This may be due to less time committed by farmers to participate in the agricultural markets but rather off-farm activities.

Farmers' bonding social capital had a positive and significant impact on household commercialization level of maize at 5% level while social values had a negative and significant impact on the same at 10% level. According to factor analysis results, bonding social capital principal component indicated that farmers recognized the importance of social capital in easing access to farm inputs, farm implements and group labour for improved productivity and market accessibility. This implies that increased accumulation of bonding social capital improves on farmers' access to agro-inputs, farm implements and labour, translated into increased productivity and hence more marketable surplus. According to Jaleta *et al.* (2009), social values constitute part of the institutional environment and arrangements that establish the basis for production, exchange, and distribution. Formal institutions like unclear property rights (including land tenure ownership) and inconsistencies within institutional arrangements have a negative impact on smallholder commercialization of agriculture. Thus, unclear land tenure ownership, and lack of trust within cooperative unions and communities members among smallholder farmers may result in low household commercialization index. In this study, smallholders' social values seemed less important in the commercialization of maize since its coefficient exhibited a negative sign.

CONCLUSIONS AND POLICY RECOMMENDATIONS

Smallholder farmers' participation in the maize market is low within the study area and thus, low household commercialization index (HCI). The low HCI may be attributed to several factors including limited access to natural, physical, labour, and financial resources import for increased production of marketable surplus. Therefore, policies and rural development programmes geared towards improved access of these resources by resourced-poor smallholders should be initiated or catalyzed by the government and other development agencies to boost maize productivity and markets access.

The findings of this study indicated that smallholder farmers recognized the importance of social capital in terms of government support, as media of exchanging information, as buffer to farm risks (support fellow farmers in times of hardships), and improved access to farm inputs and implements. Therefore, governments and development partners should promote more establishments and strengthening of existing farmer groups/cooperatives, and community based

organizations (CBO) to collective and efficient use of pooled resources among resourced-poor rural farmers for improved productivity and market access.

Household size was reported to have a positive and significant impact on household commercialization Index of maize production among smallholders. Thus, maize production requires more cheap labour. For improved commercialization of maize in the study area, government and development partners should put more emphasis on programmes that promote innovation, adoption and efficient use of labour saving technologies through research and development.

Incomes from crop sales were found to have a positive and significant impact on smallholders' household commercialization index. Therefore, government, Non-Government Organizations (NGOs) and CBOs programmes should avail more options of farmers' access to agricultural loans and credit at cheaper interest rates with longer pay back period for increased smallholders' investment in farming to boost production enough for the transition from subsistence to commercial farming.

Accessibility to irrigation water is inevitable for increased production of marketable surplus of any given crop especially in areas like the Eastern Cape Province faced with semi-arid conditions. The findings of this study indicated that source of irrigation water had a positive and significant impact on smallholder household commercialization index. Therefore, government and development partners should establish more or improve on farmers' accessibility to reliable sources of irrigation water for increased production of marketable surplus.

The generated principal component defined as bonding social capital (membership to farmer groups, belonging to farmer groups for easy access to farm inputs and implements) was found to have a positive and significant impact on household commercialization index of maize among smallholder farmers. Therefore, the study recommended that government and development partners in the study area should strengthen the establishment and operations of farmer groups/cooperatives through capacity building that promote more bonding social capital and collective action for increased household commercialization index of maize among smallholder farmers.

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