An assessment of support provided to smallholder farmers: A case study of the Vhembe District, South Africa

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This paper assesses some support strategies provided to randomly selected smallholder irrigation farmers in Vhembe District, South Africa. Although irrigation farmers were selected as units of study, the focus is on all smallholder farmers. In particular the study investigates the extent to which smallholder farmers benefited from the new government policy of redressing injustices in South Africa by providing support to the previously disadvantaged in the country’s rural areas. The study established the dominance of men and the elderly, less educated members, poor access to credit, non-membership to cooperatives, and substantial access to irregular extension services, and dependence on other farmers for market information. Inferential statistical analyses detected a negative impact of educational achievement and investment in production costs (inputs) to accessing credit. Amongst others the study recommended planned exit strategies for elderly farmers, support to new entrants (graduates), exposure to beneficial effects of cooperation and dependence on traditional market information sources, rather than ill-informed colleagues in the smallholder farming sector.

Key words: Support, smallholder farmers, extension, cooperative, credit, market information, production inputs.

INTRODUCTION

Failure of large-scale farming to address the plight of the rural poor and thus to bring about anticipated development shifted the policy agendas of many developing countries to supporting the smallholder farming sector, particularly in the 1980s to 1990s. One of the first African countries that made a swift shift from a focus on the former was Ghana, in response to observations that rather than benefitting the rural masses, large scale farming ended up accruing benefits to fewer rich commercial farmers and bureaucrats (Torah, 2001). At independence in 1994, the government of South Africa was faced with massive challenges of redressing inequalities within the country’s rural landscape following many years of apartheid-based policies. In particular support to the white commercial farming sector occurred within an environment in which unsupported black dominated subsistence farming characterized the heavily congested communally-based homeland areas. Redressing inequalities entailed concerted efforts at the formulation of policies that would transfer effective support to the black small-scale farming sector, including those that are the focus of this study.

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(that is, creating a conducive environment for credit availability, access to markets, promotion of cooperative enterprises, provision of extension services, access to inputs and farmer education) (Cooperatives Act, 2005; Department of Justice, 2011).

As a starting point, the new democratic government amalgamated all the former departments that were initiated to serve various agencies established under the apartheid agricultural sector regime (Department of Justice, online). This paper seeks to evaluate the extent of support provided to small-scale irrigation farmers within one of South Africa’s rural district, that is, Vhembe District Municipality (VDM) in Limpopo Province. The study does not purport to investigate the levels of productivity (and thus income) nor the effectiveness of the irrigation system employed, but rather the level of support provided. The central problem to be unravelled by this study therefore centres on whether support services that are being provided in South Africa are in line with the new policy agenda that focuses on the previously disadvantaged. In the end both the targeted beneficiaries and government agencies will benefit from subsequent report back sessions to be cascaded within the district. To do justice to such an assessment however, it is imperative to provide an expose’ of previous support services as attested by literature. The following section therefore provides a general review of the above mentioned support strategies, prior to articulation of the methodology, results, discussions and conclusions, and recommendations based on an empirical study of the VDM.

This paper sought to prioritise the contribution of credit to successful smallholder farming, particularly the extent to which it was impacted by other support strategies identified above. This view emanates from previous studies that have provided both success and challenging outcomes that relate to this variable. Some positive spinoffs that emanated from credit provision to smallholder farmers included participation in income generating activities, contribution to total family income and general improvement in the quality of life of rural people (Torah, 1994; Ferdoushi et al, 2011). As shown by the study conducted by Torah (1994) credit provision that is attached to funder’s pre-conceived outcomes such as shifting crop production away from traditional systems could prove detrimental. In response to the failure of large scale commercial farming, the Bangladeshi government under the auspices of Agricultural Extension Services (AES) provided credit in kind to smallholders (seeds, equipments etc) with the proviso that they replace traditional staple food crops with their high value market oriented counterparts. In turn government assured farmers of procuring all their produce at acceptable prices. However, factors beyond farmers’ control (bad weather, diseases etc) resulted in low and poor quality crop yields that were unsuitable for the market. As government agencies were reluctant to purchase the crop, higher repayment defaults were quite prevalent. Measures instituted by AES to improve repayment rates (group loans, loan delivery via traditional leaders, holding extension staff accountable for loans advanced to smallholders under their supervision) only succeeded in perpetuating the predicament as traditional leaders were also defaulters, whereas extension officers were reluctant to be associated with poor performing smallholders.

This paper is therefore premised on the economic theory of capital enhancement that supports intervention strategies leading to efficient allocation of resources, increased production and higher welfare (Schallock et al., 1994). Specific strategies for achieving the envisaged enhancement include access to credit, extension services, market and marketing information, membership to agricultural cooperatives (coops), investment in productive farm inputs and improved educational opportunities. A literature search on support and impact of capital enhancing strategies yielded a gap that this paper sought to close. As stated above, smallholder irrigation farmers in the Vhembe District of South Africa were targeted as units of investigation. The following paragraphs present a review of literature on associated support strategies.

Availing credit to smallholder farmers has both positive and negative spinoffs. Lack of credit facilities for smallholder farming in South Africa was sought to be one major contributing factor towards the collapse of many smaller enterprises and a major cause for higher transaction costs in both input and output markets (Randela et al., 2008; Drimie et al., 2009). Previous attempts at providing credit support to female farmers in particular focussed on bank guarantee and government credit schemes, banks for the poor and village based banks (Abee, 1996). While these had strengths and weaknesses, selection of one against another depended on management style and centres of decision making processes, adoption of centrally managed strategies over centralized and owner based management were crucial for to determination of the level of success that finally ensued. As noted by du Toit et al. (2010), the major challenge that is closely associated with credit provision to female farmers is entrapment into vicious circles of indebtedness as experienced recently in South Africa. As compared to their male counterparts, women were generally excluded from participation in the formal credit market, with commercial banks according preferential treatment to men (Mikalista, 2010).

Lack of support related to market access is a critical challenge that confronts smallholder farmers in South Africa (Mbatha et al., 2010). These farmers are faced with adverse produce marketing choices that are characterized by many producers and fewer buyers confining them to be price takers with little opportunity for flexibility as market players. The challenge is further exacerbated by lack of access to market information, a
critical factor in the reduction of high transaction costs that are usually associated with agricultural markets (Randela et al., 2008). In response to this challenge some smallholders in South Africa negotiate with bigger supermarkets for preferential procurement of their produce under reasonable price arrangements. Such an arrangement allows smallholders to participate in regional trade as most South African supermarkets have invested extensively in neighbouring countries such as Botswana, Zambia and Namibia (Emongor and Kirsten, 2009).

Cooperatives have been recognized in most developing countries as important vehicles for the facilitation of both vertical coordination and horizontal integration of smallholder farmers and thus providing them with opportunities for venturing into the mainstream supply chain (Ortman and King, 2010; Lyne and Collins, 2008). In South Africa, several programmes such as those inclined towards the provision of direct cash grants, training, business advisory services, access to loans and technical support have been established (DTI, 2010; DWCPD, 2011). As advanced by Holloway et al. (1999) and Kherallah and Kirsten (2001) cooperatives assure members uninterrupted supplies of the right inputs at the right time, leading to a reduction in the transaction costs for both input and product markets. Cooperatives are also critical for improving the negotiation power of smaller farmers visa-a-versa large buyers or sellers. Bulking and bargaining services also enable cooperatives to increase access to market outlets and to avoid the hazards associated with perishability of crops and low rural produce demand. Cooperation also addresses the challenge that usually confronts smallholder farmers particularly in supplying produce that meet the required grades, quality standards and safety regulations (Kherallah and Minot, 2001; Mangisoni, 2006; Barnard et al., 2002).

A major challenge that confronts the South African cooperative sector is dependence on the above mentioned support strategies as major funding mechanisms. In most developing countries cooperatives are initiated to address specific economic needs of members rather than promotion of state dependent business entities (Ngwama et al., 2010; Ortmann and King, 2010). Some challenges that have characterized many cooperatives relate to lack of adherence to cooperative principles (purpose, rights, obligations and management of cooperatives) (Chibanda et al., 2009), South African cooperatives are faced with the added challenge of poor bargaining power as most supermarkets preferred direct dealing with individuals rather than a collective of farmers (Emongor and Kirsten, 2009; Machete, 1990).

Extension services have been adopted by many sub-Saharan governments as strategies for strengthening national agricultural support and increasing agricultural production (Evenson and Mwabu, 2001). It has however, been noted that agricultural transformation in many Sub-Saharan countries has largely been negatively impacted by the exclusion of women in the provision of extension support (Farinde and Taiwo, 2003). Poor extension services in South Africa have been identified as critical contributors to the marginalization and decrease in agricultural production activities of smallholder farmers, more especially in the country’s poverty nodes (both rural and urban) (Drimie et al., 2009). Poor extension services were also observed in a Kenyan study (Mikalista, 2010). Any support strategy that enhances access to educational opportunities will indirectly impact on agricultural productivity. It can therefore be safely concluded that the level of education attained will contribute significantly to farm efficiency. Research work has attested to a positive relationship between income generation and the level of education held by smallholder farmers (Hellin et al., 2011; Evenson and Mwabu, 2001). This observation has also been confirmed in a South African study on modernizing agriculture, which has shown that the application of technological inputs called for certain skills such as reading instructions on packaging material (Kidane et al., 2005). In addition, as noted by Talimi and Masuku (2010), poorly educated and illiterate farmers were more likely to engage in illegal activities, such as employment of children in their farm production activities. In their study, Talimi and Masuku (2010) found that almost a third of households that employed child labour were illiterate as compared to a lower proportion of their literate counterparts. Illiteracy amongst smallholder farmers in South Africa is a long-term creation of the pre-1994 apartheid education policy that discriminated against blacks (Jogo and Hassan, 2010).

One major concern that impacts on support to smallholder farmers is the dominance of the elderly, especially women, in farming activities (Blake, 2011). In Nebraska for example, the average age of female farmers (59.7 years) was eight years higher than that of their male counterparts. This is a disturbing observation as individual job performance has been observed to decrease from around the age of 50 years, particularly for tasks that require problem-solving, learning and speed (Verhaeghen and Salthouse, 1997). Elderly farmers are however, desirable in jobs requiring experience and verbal abilities, particularly in maintaining a high level of productivity. Arguments in support of the former observation centre around the slow pace at which elderly people grasp new technological concepts that differ from what they have already mastered as against in those that they had acquired many years of experience (Colonia-Willner, 1998). Minois and Boug (1997) also observed age related reductions in memory and learning capabilities among non-human species, ranging from fruit flies to primates. Some recent studies have however, negated the hypothesis of an inverse relationship between age and productivity (Nakana and Mkhabela, 2011; Barbierie and Mshenga, 2008). This paper however
subscribes to the former views.

Support to farmers in the form of inputs is also critical for improved farmer participation in farming activities. James et al. (2009) have conveniently grouped agricultural inputs into four categories, namely, land, labour, capital and material inputs. The land input is further subdivided into pastureland, non-irrigated cropland and irrigated cropland while labour is usually subcategorised into family and hired components. Employing the multi-factor productivity (MFP) approach, a measure of the ratio of the index of aggregate output quantity to the index of aggregate quantity of input. James et al. (2009) noted substantial growth in output against declining but high quality inputs. The study also found that labour productivity was positively influenced by higher levels of educational achievements. The positive role of input application for increased agricultural production has also been observed in a Malawian study that sought to improve the distribution of agricultural inputs to rural smallholder farmers (Farrow et al., 2011).

MATERIALS AND METHODS

Location of the study site

The study was conducted in the VDM, which is situated in the northern side of Limpopo Province, South Africa. The district shares international borders with Zimbabwe in the north, Mozambique in the east and Botswana on the northwestern side. It is composed of four local municipalities, namely; Makhado, Musina, Thulamela and Mutale. The VDM covers an area of 21 407 km² with a population of over 1.1 million inhabitants. It is predominantly rural with critical basic services backlogs, characterised by semi-arid conditions with rainfall ranging from 300 to 1000 mm per year. Farming under smallholder system is characterized by low levels of production and small farm sizes of approximately 1.5 ha with production being primarily for subsistence and little marketable surplus. Maize is the dominant cereal grain despite the dry and drought prone agroecology of much of the district (Statistics South Africa, 2001). Although the district is strategically located on the N1 corridor that connects South Africa to the rest of Africa, it mainly serves as throughway for trade traffic with very little direct spin-offs accruing to the local economy (apart from the limited shopping in Musina and Beit Bridge).

Study design and sampling procedure

A cross-sectional survey of smallholder farmers was conducted in the VDM in May 2011. The district had 30 irrigation schemes that were located within the three local municipalities, that is, Thulamela (14), Makhado (9) and Mutale (7).

Water sources were mainly storage dams and boreholes. These schemes accommodated 2100 farmers (900 in Thulamela, 700 in Makhado and 500 in Mutale respectively). A multistage clustered random sample of 370 farmers was carried out in the three local municipalities, that is, 162 from Thulamela, 126 from Makhado and 90 from Mutale respectively. In the first stage only smallholder irrigation farmers from the VDM were considered. Secondly smallholder irrigation farmers were selected on the basis of the local municipality in which they were located. The final stage involved selecting approximate proportional samples from three local municipalities (as Musina had no small-scale irrigation farming).

Data collection

Both qualitative and quantitative approaches were used to collect primary data using a pretested questionnaire between May and September 2010. The questionnaire was specifically designed to collect selected biographical data (gender and level of education), age composition (youth: 35 years and younger, adults: between 36 and 64 years, aged: 65 years and above), access to credit, extension services (access, extent of access and services provided), cooperatives (membership and benefits), markets (access to information, sources of information and marketing channels). The questionnaire was also designed to collect qualitative data, particularly as regards challenges faced by irrigators.

Data analyses

The IBM SPSS Version 19 computer program was used to capture and analyse data. Collected data were subjected to a descriptive analytical technique that focused on percentages of female and male led irrigation schemes accounted for within a particular variable and as a percentage of the total sampled farmers (gender biased). A logistic regression model, which considered credit availability as a dependent variable versus age, gender, level of education attained; access to extension services, market information, membership to cooperatives and input cost as predictor variables was also run on the basis of the probability equation as derived from the logistic regression model (Field, 2005):

$P(Y) = \frac{1}{1 + e^{-(b_0 + b_1 AG + b_2 EDU + b_3 GEN + b_4 EXT + b_5 MINF + b_6 MIF + b_7 MCOP + b_8 INPCO + E)}}$

Where: $P(Y)$ = probability of credit being accessed by the $i^{\text{th}}$ irrigation scheme leader (1 = accessed credit, 0 = not accessed); $e$ = base of natural logarithm; $b_0$ to $b_8$ = coefficients of t predictor variables; $AGE$ = Age of irrigation scheme leader (categorical); $EDU$ = Education attained by irrigation scheme leader (categorical); $GEN$ = Gender of irrigation scheme leader (1 = female, 0 = male); $EXT$ = Access to extension services (1 = access, 0 = not accessed); $MIF$ = Access to market information (1 = access, 0 = not accessed); $MCOP$ = Membership to agricultural cooperatives (1 = member, 0 = non-member); $INPCO$ = Production inputs cost (Rands), and $E_i$ = Error term.

Diagnosis of the data was achieved through the log-likelihood and Wald statistics. The log-likelihood ratio is a measure of how well a particular model fits the data by comparing the observed and predicted values of the outcome. For example, for a given irrigation scheme leader, $Y$ could either be 1 (credit has been provided) or 0 (credit was not provided). As noted by Field (2005), the log-likelihood is analogous to the residual sum of squares in multiple regression (an indicator of the extent of unexplained information after fitting the model, that is, larger values of the log-likelihood reflect poorly fitting statistical models). Log-likelihoods of different models are calculated and compared by looking at their differences, that is, comparing the state of a logistic regression model against a baseline, usually the logistic model when only the constant is included. The improvement of the model as additional predictors are added is computed using the following equation (Field, 2005):

$X^2 = 2[LL(\text{New}) – LL(\text{Baseline})]$  
$(df = K_{\text{new}} – K_{\text{baseline}})$

Multiplication of the value by 2 produces an $\chi^2$ distribution, and $k$ = degrees of freedom.

Whereas in linear regression the estimated regression co-efficients ($b_k$) and their standard errors are used to compute the $t$-statistic, an
Table 1. Biographical characteristics and access to support services by irrigation scheme project leaders in the Vhembe District, May 2011.

<table>
<thead>
<tr>
<th>Description</th>
<th>Gender</th>
<th>% Within main descriptor</th>
<th>% Within sub-descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Total</td>
</tr>
<tr>
<td>Level of education attained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No school</td>
<td>3.8</td>
<td>9.7</td>
<td>13.5</td>
</tr>
<tr>
<td>Primary</td>
<td>11.4</td>
<td>30.8</td>
<td>42.2</td>
</tr>
<tr>
<td>Secondary</td>
<td>10.8</td>
<td>25.7</td>
<td>36.5</td>
</tr>
<tr>
<td>Tertiary</td>
<td>1.9</td>
<td>5.9</td>
<td>7.8</td>
</tr>
<tr>
<td>Age category</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Youth (&lt; 35 years)</td>
<td>3.8</td>
<td>7.7</td>
<td>11.4</td>
</tr>
<tr>
<td>Adults (35 ≥ 65 years)</td>
<td>13.2</td>
<td>25.7</td>
<td>38.9</td>
</tr>
<tr>
<td>Elderly (&gt; 65 years)</td>
<td>10.8</td>
<td>38.9</td>
<td>49.7</td>
</tr>
<tr>
<td>Credit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessed</td>
<td>1.6</td>
<td>3.2</td>
<td>4.9</td>
</tr>
<tr>
<td>Not accessed</td>
<td>26.2</td>
<td>68.9</td>
<td>95.1</td>
</tr>
<tr>
<td>Extension services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessed</td>
<td>20.5</td>
<td>57.8</td>
<td>78.4</td>
</tr>
<tr>
<td>Not accessed</td>
<td>7.3</td>
<td>14.3</td>
<td>21.6</td>
</tr>
<tr>
<td>Agricultural cooperative</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Member</td>
<td>2.2</td>
<td>5.4</td>
<td>7.6</td>
</tr>
<tr>
<td>Non member</td>
<td>25.7</td>
<td>66.8</td>
<td>92.49</td>
</tr>
<tr>
<td>Market information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessed</td>
<td>27.8</td>
<td>71.6</td>
<td>99.5</td>
</tr>
<tr>
<td>Not accessed</td>
<td>0</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Total</td>
<td>27.8</td>
<td>72.2</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Study results; n = 370; \( d = \frac{\text{Gender} \times 100}{\text{Total}} \)

Table 2. Logistic regression model results: Small-scale irrigators in the VDM.

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRODCOST</td>
<td>-0.51</td>
<td>0.024**</td>
<td>4.645</td>
<td>0.031</td>
<td>0.950</td>
</tr>
<tr>
<td>EDUCL (1)</td>
<td>-2.992</td>
<td>1.049***</td>
<td>8.132</td>
<td>0.004</td>
<td>0.050</td>
</tr>
<tr>
<td>EDUCL(2)</td>
<td>-3.667</td>
<td>1.136***</td>
<td>10.427</td>
<td>0.001</td>
<td>0.026</td>
</tr>
<tr>
<td>AGE</td>
<td>0.011</td>
<td>0.014</td>
<td>0.635</td>
<td>0.425</td>
<td>1.012</td>
</tr>
<tr>
<td>MCOP</td>
<td>-0.223</td>
<td>0.830</td>
<td>0.073</td>
<td>0.788</td>
<td>0.800</td>
</tr>
<tr>
<td>Constant</td>
<td>5.174</td>
<td>1.310***</td>
<td>15.608</td>
<td>0.000</td>
<td>176.698</td>
</tr>
</tbody>
</table>

Source: Study results; n = 370; ** = 5% level of significance; *** = 1% level of significance; Hosmer and Lemeshow Test: \( x^2 = 8.21; df = 8; p = 0.1946; \) Cox & Snell \( R^2 = 0.076; \) Nagelkerke \( R^2 = 0.234. \)

Analogous statistic for logistic regression is the Wald statistic, with its special distribution (the chi-square distribution). The Wald statistic reflects whether the b-coefficient of the predictor variables are significantly different from zero, that is, if significantly different, then the predictor is assumed to be making a significant contribution to predicting the outcome (Field, 2005).

RESULTS

Descriptive and inferential statistical results of the study are presented in Tables 1 and 2 respectively.

The first noticeable observation from Table 1 was the overwhelming dominance of males (72.2%) in the leadership of irrigation schemes in the VDM, in contravention of government policy towards empowering the vulnerable, including women. The dominance of males above the total average of 72.2% is also discernible under the column “% within sub-descriptor” and calculated as reflected in the footnote to Table 1. Accordingly, males were above their average in tertiary and primary education (75.64 and 72.99% respectively), participation by the elderly (78.27%) and access to extension (73.72%). As evidenced in the review of literature for this paper, credit is a quintessential for the success of farming enterprises. Table 1 also revealed that a very small proportion (4.9%) of small scale irrigation
schemes had access to this resource, inferring that most rely on self-funding for survival. This result is not surprising and is thus expected, more especially due to high risks associated with defaults as attested by the reviewed literature above. However, one specific objective of this paper is to investigate inherent factors that could impact on credit access, given that few would be willing to venture into the associated risks. This will be achieved through the employment of inferential statistical analysis, with credit as a dependent variable.

Extension service support was relatively substantial (78.4%). When asked to reflect on the extent of access to this important resource, the majority of respondents pointed out that the process was quite irregular with almost a quarter (25.4%) of respondents reporting complete lack of contact with extension officers. The proportion that reported regular access was however, satisfactory at 36.2%. Table 1 also shows that most irrigation scheme leaders in the Vhembe District were either illiterate (13.5%) or semi-literate [attended primary schooling (42.2%)]. A substantial proportion (36.5%) had participated within the secondary school band (grades 8 to 12) with a small proportion that had reached tertiary level education (7.8%). Table 1 further illustrates that almost half (49.7%) of small-scale irrigation leaders were the elderly (above 65 years of age). In the SA context the elderly are expected to retire from active economic participation. The latter finding raises concerns regarding the sustainability of small-scale irrigation farming in the district. The situation is further exacerbated by the low participation of youth (11.4%) in leadership positions within small-scale irrigation schemes. Small-scale irrigators have made some inroads into the national fresh produce market (reported by 10.8% of respondents). An interesting finding regarding gender bias is however, that within the adult age category, female-controlled irrigation schemes were dominated by the adult group (36 to 65 years), in contrast to dominance by the elderly, as observed above for a combination of all irrigation schemes. A very small proportion (7.6%) of irrigation schemes had acquired membership to agricultural cooperatives with many reporting minimal benefits (97% of members).

The output for the logistic regression model that was fitted to the data is presented in Table 2. The model was run to assess the relationship between access to credit (dependent variable) and four predictor variables [that is, age (AGE), level of education (EDU), membership to agricultural cooperatives (MCOP) and production costs (PRODCOST)] following the elimination of some highly insignificant variables. It was noted in the descriptive analyses that the proportion of farmers that accessed credit was very small. However, the use of regression analyses allows researchers “to predict outcome” variables from some predictor variables (Field, 2005: 144), without regard to pertaining situations.

As can be observed from Table 3, the model correctly predicted 95.40% of the cases. The Hosmer and Lemeshow test produced a chi squared value of 2.81 with a p-value of 0.95, indicating that the model’s predicted estimates did not differ significantly from the observed data and thus an indication of an acceptable goodness of fit (Field, 2005). The high Wald statistics for all significant variables depicts that their b-values are significantly different from zero, thus making a significant contribution to credit access.

The categorical variable EDUCL had two categories EDUCL(1) (having secondary education) and EDUCL(2) (having tertiary education) being compared to a base category of no education/ primary education only. From the results in Table 2, it can be seen that production cost and having both secondary and tertiary education, negatively affected access to credit. This meant that for every R1000 increase in a farmer’s production costs, the odds of accessing credit decreased from 1 to 0.95. The more educated a farmer was, the less likely for him or her to have accessed credit since having secondary or tertiary education both affected credit access negatively relative to no education at all or having only primary education. Being a member of an agricultural cooperative also had a negative impact on farmers’ access to credit although this variable was not significant. Age, although not significant had a positive impact on the likelihood of accessing credit.

Apriori expectations were that access to credit would be positively influenced by all the variables. The negative impact of both higher educational attainment and membership production costs was unexpected. People who have been exposed to both higher educational opportunities and beneficial effects of investing in

<p>| Table 3. Observed vs. predicted frequencies for access to credit. |
|---------------------------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th></th>
<th>Observed</th>
<th>Access to credit</th>
<th>Correct (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Access to credit</td>
<td>Yes</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
<td>352</td>
</tr>
<tr>
<td>Overall percentage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Study results, 2011.
production costs (inputs) were expected to realize the critical role that credit provides in enhancing farm productivity. However, as noted in descriptive analyses of this study, most irrigation scheme leaders have low levels of education and are elderly, factors that impact negatively on access to new information and promotion of active economic participation in farming.

**DISCUSSION**

The finding that smallholder farmers in the VDM were male-dominated does not auger well with the South African government policy of women empowerment and capacity-building. The low proportion of women in leadership positions perpetuates inequality, poverty and unemployment in the country. As attested by several studies, many agricultural tasks that are performed in male-dominated projects were accomplished by women who made up to 57% of the labour force and produced 60% of domestic exports. The marginalization of women is more prominent amongst Indians, Latin Americans and African cultures (Rangnekar, 1998). African customary practices, for example, assigns property rights to males or male heirs, a practice that is widely applied in South Africa, as attested by the findings of this paper. According to the last census that was conducted in 2001, the proportion of females in South Africa was 60.15% (Statistics South Africa, 2001). The government’s agenda is seemingly not achieving its intended objectives. The situation will continue unabated unless it is arrested through appropriate intervention strategies, as recommended in this paper.

The observation that the leadership of most irrigation schemes had acquired primary education, with a large proportion that was illiterate, translates into a number of bottlenecks for their future sustainability. In the first instance such leaders will be denied access to published information particularly as regards to produce market activities and price trends. National fresh produce markets and parastatals such as the National Marketing Council in South Africa produce vital market related data that farmers can take advantage of on a daily basis. Such data can only be accessed by farmers who are not only literate but also exposed to secondary and tertiary educational opportunities. Low educational achievement as attested through descriptive statistical analyses for this study could be associated with reliance on other farmers and dependence on the already glutted local market for disposal of produce. Consequently, due to large numbers of sellers and a relatively low customer base, farming enterprises that target such a market are bound to be price takers with high attrition rates.

Lack of access to credit as noted for this study has negative consequences for the sustainability of smallholder farmers in the VDM. Almost all (save for about 5%) relied on own funding for their farming activities. Although lack of collateral (a characteristic of most smallholders farming) could be attributed to this observation, the dominance of the elderly and a high combination of leaders with lower educational qualifications or illiteracy cannot be excluded. A study conducted in Pakistan noted that increasing access to credit was not only associated with increasing technical efficiency, but also that farmers who had access to the resource were more efficient (technical efficiency score of 0.8 and above) than their counterparts (technical efficiency score of 2.0) (Ayaz et al., 2010). Through the application of the Tobit model to collected data, that study identified farming experience (5% level of significance) and number of schooling years (5% level of significance) as additional contributors to technical efficiency of farmers.

The finding of the irregular access to extension services, as articulated above, could be associated with failure of small holder farmers to take advantage of profitable marketing channels and investment into productivity enhancing inputs. In the absence of appropriate guidance to accessing the formal market, extension services become crucial as marketing agents. In particular the revelation of the study that only 0.3% of the irrigation schemes obtained market information from extension officers could have contributed immensely to reliance on other farmers for this vital service to the farming community. Lack of access to formal markets for smallholder farmers in the VDM could persist unless drastic measures are taken to transform the extension service.

Agricultural cooperatives have been considered as important vehicles for the provision of affordable inputs, market access and technical production skills to farmers. In appropriate access to formal produce markets by small-scale irrigators in the VDM could be linked to the high level of non-membership to agricultural cooperatives. Effective membership is based on the extent to which potential benefactors are exposed to the principles and perceived advantages of cooperation. The revelation from literature regarding access to government funding as a precursor to the formation of cooperatives, needs urgent attention and complete reversal. For effective participation, members should not only be educated but also exposed to productivity-enhancing mechanisms such as extension services. As this study has clearly articulated, these are limiting factors in the Vhembe District. One critical principle of cooperation relates to internal rather than external drive in the establishment of cooperatives. The observations for this study regarding the few members that had affiliated to local primary cooperatives and the derivation of minimal benefits from such affiliation attest to external influence in the formation of most cooperatives in the VDM. As reflected in the literature review above, most cooperatives in South Africa were initiated in order to source government funding. As soon as such funds dry-
up, the affected cooperative enterprises cease to exist.

CONCLUSIONS AND RECOMMENDATIONS

The main objective of this paper was to assess the support provided to smallholder irrigation farmers especially in the VDM, South Africa. Some support strategies that the study assessed included credit provision, extension services, access to markets and membership to agricultural cooperatives. A multistage random selection process yielded a sample of 370 small scale irrigation schemes scattered in three of the four local municipalities of the district. A pre-piloted questionnaire was administered to the leadership (either chairperson or his/her representative) of the irrigation schemes. The gender, education level and age of the respondents were also considered as important variables for assessing demographical impact on service provision. The collected data were captured and analysed through the IBM SPSS version 19 computer programme. A logistic regression model that considered credit availability as a dependent variable and seven other variables (age, level of education attained, gender, extension services, market information, membership to cooperatives, production costs) as predictor variables was fitted into the data. Through an elimination process, a number of variables were omitted from further analyses due to their insignificant predictive powers to the model.

The dominance of males in accessing most of the support services provided to small-scale irrigation farmers has been identified as a critical challenge for the VDM. This does not auger well in terms of food security as males have been observed to venture into farming mostly for self-enrichment, with little regard for family welfare. Strategies to increase women participation could include targeted interventions towards improvements in educational qualifications and preferential provision of credit. Such intervention strategies should also encompass training in financial management and technical production skills. Reducing the dominance of the elderly (65 years and above) will be a daunting task as many retirees look upon farming as an alternative to active participation in the formal job market. Exit strategies from the formal job market should therefore include workshops that would discourage new retirees from investing their life-long savings into new farming ventures as these will require physical strength and high level decision making skills. Retirees should instead be encouraged not only to look upon retirement as a period of rest but also as an opportunity to hand over existing farming ventures to their siblings. The benefactors (young farmers) should be exposed to training programmes and support mechanisms such as cheap finance, government grants and gradual exposure to private funding institutions. In the earlier years of their retirement, elderly farmers could be critical in monitoring and transmission of skills to younger farmers. As income from farming only accrues in the medium to long term, one strategy that could be used to attract youth into farming could be the provision of allowances - consistent with that prevailing in the formal job market. Perhaps the most critical challenge that prevents elderly farmers from abandoning their farming ventures could be linked to asset ownership and associated loss of esteem. To counteract the challenge, elderly farmers could be encouraged to hire out their farms to unemployed university and college graduates that are widespread in the VDM and other regions of South Africa. Targeted graduates should undergo relevant training in entrepreneurship, financial management and market development. Finance should initially be provided to cover both rental and living expenses for a predetermined period aligned to produce market readiness.

The high proportion of irrigation schemes lacking membership to agricultural cooperatives could be associated with lack of knowledge regarding benefits that can be derived from these business entities. Rather than encouraging farmers to form cooperatives in lieu of grant funding, public agencies should utilize their extension officials to expose farmers to the principles of cooperation as espoused by the International Cooperative Alliance (ICA) and the SA Cooperatives Act of 2005. In particular cooperatives should be established on the basis of perceived internal benefits rather than extrinsic rewards. Reliance on other farmers for market information should be mitigated through exposure to formal produce channels, especially fresh produce and export markets. The role of public agencies, particularly in exposing farmers to new technologies such as market based computer websites and cell phones, could be vital in opening up new markets for smallholder irrigation schemes in the Vhembe District. Funding received from the Land Bank of South Africa and the National Research Foundation is highly acknowledged.

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