Full Length Research Paper

The impact of farmer support programmes on household income and sustainability in smallholder production: A case study of the Eastern Cape and KwaZulu Natal farmers, South Africa

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A number of Farmer Support Programmes have been implemented in South Africa to reduce the risk of a lack of capacity and a lack of economic and/or financial experience in smallholder farms. Intervention measures have been instituted to these smallholder farmers to assist them to move out of poverty through agricultural production. Unfortunately, smallholder farmers are further constrained by institutional obstacles which include lack of access to information, lack of technical skills, high marketing and transaction costs leading to low quality and volumes. The aim of this study was to assess the role played by Farmer Support Programmes in addressing income and welfare of smallholder farmers in South Africa. Using a Tobit and Propensity Score Matching technique potential, diffusion effects were eliminated between farmers supported by Farmer Support Programmes and farmers that do not belong to support services. Findings show that household size, education level of household head and distance to the nearest market were found to be significant at 10 and 5%. Farmer Support Programmes and collective marketing activities such as the collection and sale of members' output appear to have a significant and positive impact on smallholder welfare of those farmers engaged in them.

Key words: Smallholder farmers, farmer support programmes, income, welfare, Tobit regression, propensity score matching.

INTRODUCTION

In South Africa, agricultural produce from smallholder farmers is often lost after production due to poor quality, spoilage and the farmers' inability to access the better paying markets (Kirsten and Sartorius, 2002). This is mainly because most smallholder and emerging farmers are faced with a range of technical and institutional factors influencing marketing access. Whereas the marketing infrastructure is poorly developed, smallholder and emerging farmers lack supportive organizations that represent and serve them (Magingxa and Kamara, 2003; Reardon and Berdegue, 2002). These factors reduce smallholder and emerging farmers' incentives to participate in formal markets. In the opinion of Aliber et al. (2006), a reduction in formal market participation, in turn, makes it difficult for these farmers to shift into commercial farming and thus, a reduction in economic development.

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Literature suggests that smallholder farmers in South Africa have received little attention since the transfer of the farms in 1994. In fact, despite numerous policy interventions and programmes meant to address the farmers' challenges, the reality is that these farmers still face several problems in accessing better paying markets. In particular, dismantling Bantustan agricultural development corporations (for all their faults) in the 1990s left a vacuum in production and marketing support for the now-estimated 200,000 commercially-oriented smallholder farmers practicing agriculture mainly for subsistence purposes (Hall, 2007; Hall and Aliber, 2010). The past decade, and particularly the past five years or so, has seen the growth of budgets to provide financial support to black and disadvantaged farmers in the form of grants from government and loans from banks and private parastatals for infrastructure, production inputs and other items, and recently through an extension service 'recovery programme' to access markets (Bromberge and Antonie, 1993). Yet evidence shows that most black farming households receive little, if any support, largely because available resource allocations are highly skewed towards certain farmers over others.

Since 1994 the Department of Agriculture has come up with policies that would re-address these imbalances regarding smallholder farmers support programs in South Africa. The Department of Agriculture emphasized the need to support smallholder farmers because this would offer long term solutions to the problems of unemployment and rural neglect. To address the challenges faced by smallholder farmers, the government created local government structures in line with the Land Reform and Agriculture and Marketing Acts as way to support the noble idea of development of small and emerging farmers (NDA, 2009). As a result of this, commercial, development banks and non-governmental organizations (NGOs), private parastatals came up with policies in order to improve access to markets through assisting the farmers with finance, technical and management skills. As a result, the Department of Agriculture is in a process of trying to specifically address the inadequate support to smallholder or emerging farmers. As argued by Hall (2007), this is because factors such as the lack of access to land, water, markets, finance, communications infrastructure, education, skills development facilities and flows of information and opportunities still prevent marginalized South Africans from making substantive progress in farming, forestry and fisheries across the entire value chain

According to Oettle and Koelle (2003), the other reason for this failure has been that most national programmes explicitly targeting smallholder farmers fall short because they were not designed to impact at the scale required to make a difference at a socio-economic level of the farmers. Furthermore, they have acted in isolation of each other, leaving beneficiaries seeking support from a fragmented array of projects and programmes. There is also a lack of capacity within government and state-owned enterprises to reach out and offer efficient and sufficient support, limiting their scope to achieve the scale required (Umhlaba Rural Services, 2006).

It is against this back ground that this research was undertaken in order to determine whether the investment in smallholder farming will give the farmers a competitive edge and improved incomes through the Farmer Support Programmes. There has been an increasing number of requests by government and private organizations for evidence to be supplied on the impact of public and private programs such as the Industrial Development Corporation (IDC), Lima, Small Enterprise Development Agency (SEDA), Eastern Cape Development Corporation (ECDC) and non-governmental organizations (NGOs) to improve the living condition of the farmers. Among the questions often asked and for which answers are being sought are: Do the various initiatives work? How much impact do they have?

This study seeks to identity the causal impact of different support services or structures (governance arrangements) by analyzing the multi-faceted effects of market support interventions from these organizations, irrespective of their origin. It is hypothesized that such interventions act through their impact on assets and capabilities of farmers to influence access to markets. These farmer support interventions aim to improve smallholder access to better paying markets by providing technical skills, information, training, advisory services and on and off farm infrastructural services. Through the application of the propensity scoring matching the study explored whether support services are most effective in improving incomes of smallholder farmers.

LITERATURE REVIEW

In Africa, agriculture is the economic backbone of most rural areas in developing countries (Barrett et al., 2001). Depending on a country's level of advancement in the economic sphere, agriculture contributes to overall economic growth by creating jobs, supplying labour, food, and raw materials to other growing sectors of the economy; and helping to generate foreign exchange. Despite these significant contributions, however, rural areas are the most marginalized in most parts of developing countries (Ellis, 2000). They are characterized by poverty, food insecurity, unemployment, inequality and lack of important socioeconomic services.

Farmer support organizations in smallholder farming

A number of studies including those by Vink and van Rooyen (2009) have tried to contextualize the challenges faced by smallholder farmers. Vink and van Rooyen (2009) claim that smallholder production has declined

over the past 10 years and that the divide between smallholder and commercial farmer productivity levels appears to be growing. One reason for this is probably the level of support provided to these smallholder farmers or resource poor farmers. The Department of Agriculture's (DoA) Integrated Growth and Development Plan states that commercial, smallholder and subsistence farmers in SA currently receive less support from the state than their counterparts in any industrialized country in the world (DAFF, 2010). Despite significant progress in addressing the long-standing equity issues in land distribution in South African agriculture, there is evidence from a number of studies that agricultural production and income are not improving among the black smallholder population (World Bank, 2008; Denison et al., 2010). Of particular interest are the newly-settled black farmers many of whom experience serious production problems and face insolvency in a large number of cases. Many analysts have attributed this problem to the skewed distribution in infrastructure provision between white and black areas, the fall-outs of recent reform measures instituted since 1994, and the fact that post-settlement support to the land reform beneficiaries has failed to address the urgent capacity constraints of individuals who may be entering farming for the first time in their lives (Van Zyl and Binsgwanger, 1996; Lahiff, 2005; The De Klerk Foundation, 2007). It is now increasingly recognized that the crucial post-settlement support necessary to overcome this disadvantage was either completely absent or so badly structured that it was irrelevant (IFAD, 2003).

A comprehensive review conducted under the Belgian Technical Cooperation in December 2006 concluded that a large number of support schemes have been established in response to the foregoing problems (Umhlaba Rural Services, 2006). These support schemes are categorized according to whether they are state-sponsored or private-sector operations.

The state-sponsored schemes have generally focused on addressing the resource gap such as improving access to land and credit and developing infrastructure. Among these is the Land Redistribution for Agricultural Development (LRAD), the Micro-Agricultural Financial Institution of South Africa (MAFISA) and the Comprehensive Agricultural Support Programme (CASP). On the other hand, the private sector initiatives have focused on coordination issues, skills development and mentorship with facilitation to access high value chains or better markets for smallholder famers, both nationally and internationally (Umhlaba Rural Services, 2006; IDC, 2010). Nevertheless, many of these programmes have been criticized for being uncoordinated and not paying adequate attention to land reform beneficiaries.

Furthermore, state-sponsored programmes are hampered by the fact that they are under-funded, poorly-designed and fragmented (Umhlaba Rural Services, 2006). A study conducted by the Human Science Research Council (HSRC) concluded that the majority of the land settlement programs, especially those operated by the smallholder and emerging farmers, have failed to get off the ground for various reasons, including lack of technical know-how, poor business skills on the part of the principal, conflict among and within groups, loss of interest from some of the beneficiaries, lack of adequate infrastructure and insufficient farm income (HSRC, 2005). As a way of addressing these challenges, a number of Farmer Support Programmes have emerged in the smallholder sector to specifically target those resource-poor farmers with the greatest potential to benefit from participation in better paying markets (Fényes et al., 2008). Enhanced access to profitable markets may be due to exogenous factors in the external environment of smallholder farmers. Of particular interest are policies such as the implementation of the Land Reform Programme (LRP) and Black Economic Empowerment in Agriculture (AgriBEE) programmes, other forms of agrarian restructuring schemes, or support schemes implemented by Non-Governmental Organizations (NGOs) and parastatals. A number of organizations have entered the sector to provide farmer support interventions as a means of speeding up the pace of reform in the country. These include formal sector parastatals like the IDC, SEDA, and established producer associations, along with several NGOs. There are several other support schemes by organizations such as Farm Africa, Oxfam and service providers such MAFISA, Ilima-Letsema and Comprehensive Agricultural Support Programme (CASP), and others in operation in South Africa.

Various studies have shown that most of these above-mentioned support schemes specifically addressing market access and inclusion in better paying markets hold enormous promise for enhancing smallholder welfare in terms of income and sustainability of their farms (Umhlaba Rural Services, 2006). Most of these programs have not yet been subjected to systematic evaluation to determine their potential for replication. Similarly, as far as is known from literature, the potential of these programmes to serve as a pivot for designing successor schemes to the on-going poorly-performing government schemes has also not been assessed (Ellis, 2000).

The other reason for this failure has been that most national programmes explicitly targeting smallholder farmers fall short because they were not designed to impact at the scale required to make a difference at a socio-economic level of the farmers and they have acted in isolation of each other, leaving beneficiaries seeking support from a fragmented array of projects and programmes (Coetzee et al., 1993). There is a lack of capacity within government and state-owned enterprises to reach and offer efficient and sufficient support, limiting their scope to achieve the scale required (Umhlaba Rural Services, 2006).

The role of partnerships and development in emerging and smallholder farmers

After 1994, the South African Department of Agriculture emphasised the need to support and develop small black farmers or emerging farmers to solve some of the problems that were related to unemployment and rural neglect. The creation of Local Government Structures, review of the Agricultural and Marketing Acts and the introduction of the land reform were ideas that were put to develop the small and emerging farmers (Kirsten and Vink, 2000).

In South Africa, commercial and development banks such as Land bank and Development Bank of South Africa (DBSA) amended their policies in order to improve access to finance by these smallholder farmers (Singini and Van Rooyen, 1995). The DBSA was at the forefront in providing support services to these smallholder farmers in the 1980s through the FSP (Kirsten et al., 1997). The premise of this organization was on which the approach was based that it accepted the ability of traditional smallholder farmers to respond rationally to economic incentives. Since smallholder farmers are different in nature, they are seriously restricted by both technical and financial skills (Mellor and Johnston, 1984). It can be argued that farmers that received such support benefited a lot in terms of improved access to inputs, extension services, and mechanization services which were more readily available and more reliable (Vink et al., 2008). Apart from the government's effort to ensure that smallholder farmers have access to agricultural support services, some of the challenges have been brought about by the incompetence of service providers in dealing with farmers (Van Rooyen et al., 1987). The role of these service providers was to support smallholder farmers at a base level. For example, CASP's main objective was to assist farmers who had benefited from the land reform program but the majority of these targeted farmers failed to access this assistance leading to more poverty among these black farmers. Machete (2004) argues that these services are not available to these smallholder farmers and where the support services were available only a single services (e.g. extension) is provided. An initiative by the government through the Skills Development and Land Reform Act was designed to improve access to technical and farm management skills in order for the small and emerging farmers to access markets (Provincial Government of the Eastern Cape, 2003).

In a nut-shell, the development of smallholder and emerging farmers has two critical points that need consideration, viz: (i) Promotion which should be undertaken by local municipalities and (ii) The development of the emerging agricultural industry which includes the supply of planting material, transfer of knowledge, information and market access. In order for these farmers to produce good quality produce they need to have support services or strategic partners to facilitate the identification of bankable projects and develop business plans through their professional associates. Management of these farms is entrusted on some service providers such as CASP, MAFISA and AgriSETA who have been identified to have experience with small-scale farmers in these provinces (Van Zyl and Vink, 2000). The role of these organizations would be then to provide extension services, credit and input and output markets so that smallholder farmers have better access to markets (Hall and Aliber, 2010). The partnerships and joint ventures that come through these support services seem to be the best approach in developing these smallholder farmers and emerging farmers.

METHODOLOGY

The study applied quantitative methods of data collection by visiting smallholder farmers producing the selected commodities to investigate the constraints facing them in the production and marketing of their products. A database from the different local municipalities of smallholder farmers was used to access the smallholder farmers producing the particular crops and livestock in the selected districts. Extension officers from the different municipalities were used as the initial contact people when visiting the farmers who were interviewed in the Eastern Cape and KwaZulu Natal Province. A total of eighty nine farmers where interviewed for this study from the Amathole, OR Tambo and UMkhanyakude District Municipalities. Respondent farmers were randomly selected from all each of these three district municipalities. Primary data was collected through structured questionnaires and administered through personal interviews. In some cases in these districts some projects were owned by groups of farmers, and in such scenarios one of the farmers from the project was interviewed to provide the overall information on the project. From the total number of respondents eighty nine (89), 50 respondents were from cooperatives and 49 were individual farmers. A number of questions regarding the history of the smallholder farms, the agricultural output and the markets for their produce were asked to find out the position of the farms in terms of their operations and resource endowments. The farmers were asked questions on the challenges faced and how these impacted on their incomes and welfare and what strategies they adopted to stay in the farming business.

Focus group meetings were conducted with farmers from all different enterprises. These included farmers who keep livestock and grow crops for sell and household consumption. The meetings included the key stakeholders from the farms who gave detailed information about how the farms were being operated under the current tenure system prevailing in under the reform programme. In these meetings the stakeholders also discussed their main challenges and how they were exporting their citrus fruits to international markets.

Analysis of the data

The analytical method used in this paper includes propensity score matching technique and Tobit regression to access the impact of farmers support programmes which draws from the work of Godtland et al. (2004) and Bernard et al. (2008). According to these authors, a way to obtain robust impact assessments is to compute the Average Treatment Effect on the Treated (ATT), which in this case refers to the average effect of smallholder farmers who have some form of assistance from farmer support organizations such as

non-governmental organizations and private parastatals. The empirical problem faced in this case was the typical absence of data concerning the counter-factual, for example, what would the smallholder farmers have done had they not had this support from these organizations. The challenge was to identify a suitable comparison group of non-participants whose outcomes on average provided an unbiased estimate of the outcomes that smallholder farmers would have had in the absence of the these farmer support organizations and how would their incomes change by being members to these organizations.

Given the non-random selection of smallholder farmers who have assistance from these farmer support organizations (the farmer support organization are a result of government, non-governmental organizations and other private organizations) and farmers' self-selection into organizations (membership is a voluntary decision depending on farm resources, knowledge as well as farmer preference), a simple comparison of outcomes between farmers who have been assisted in terms of finance and other support services was compared with those that have not received any assistance. There are a number of potential sources of bias in naive comparisons. Individual farmers and farmers who are coop-members are likely to differ from individual farmers in the distribution of observable characteristics (such as agro-ecological conditions, public infrastructure and services, market institutions and demands, households characteristics, farm assets and practices, etc.) leading to a bias related to 'selection on observables'. Such a bias is likely to arise because these observable differences can also be expected to have a direct effect on commercialization of these projects in the absence of these farmer support services. A second source of bias in assessing the impact of an intervention or support service can arise in case of diffusion or spill-over effects between those farmers who have support and the surrounding communities/farmers. For instance, farmers who receive support are more likely to attract extension and input services. In many cases the benefits from these service providers can pass on to neighboring farmers that are not members of these support services, leading to an underestimation of these farmer support services. Another source of bias is that farmers with access to these services may differ from non-participants in unobservable characteristics (e.g. personal ability, motivations and preference), which may also affect agricultural output of their farms, resulting in 'selection on unobservable' or 'self-selection' especially for individual farmers.

To address these potential sources of bias, the following steps were taken. First, all individual farmers located in areas which are close to these farmers who have received these support services from any of these organizations were excluded from the sample. This procedure reduces further the size of the sample but eliminates any potential sources of diffusion bias. Second, in the absence of a suitable instrument, it was not possible to explicitly control for potential bias related to selection on unobservables. However, the strong incentives provided by these farmer support organizations were to promote farmer's participation in farming. This provided sufficient reasons to believe that selection on unobservables might also be negligible, especially after the exclusion of individual farmers located in areas close to those have received support services. In other words, it sounds logical that these organizations that provide these support services have enough incentives that are sufficient to convince farmers to easily access markets.

Third, the farm household variables presented to control for selection on observables were used. In the absence of reliable data at the community level, one cannot control for location-specific effects associated with market, agro-ecological and infrastructural conditions on the decision to have access to these support services. However, since most of these farmers who are into farming are located in the Eastern Cape and KwaZulu Natal Province which are areas considered to be favorable for agricultural

production, as well as major sources of agricultural commodities for the local and export market, the market, agro-ecological and infrastructural differences across sample sites were assumed to be negligible. Hence, control for potential bias caused by selection on observables was done using two separate techniques: Propensity Scores Matching (PSM) and Tobit regression analysis. The PSM technique involves the estimation of the propensity of farmers to be attached to these support organizations on the basis of farm household characteristics (using Probit models), and subsequently the matching of individual farmers and those cooperative farmers on the basis of propensity scores and the estimation of Average Treatment Effect (ATE).

The Tobit model was used to regress farmers who are members to a farmers support program and farm household characteristics and those who are not. Propensity Score Matching and Tobit model allow controlling for selection on observables and providing comparable estimations of membership impact. In both analyses, endogeneity (that is, simultaneity) problems were avoided by using explanatory variables that include household and fixed farm characteristics (such as fixed land asset and distance from the market). Moreover, farm-household characteristics were intentionally over parameterized using quadratic terms in order to take into account possible nonlinearities in the impact of these variables and to improve the predictions of both analytical models as suggested by Godtland et al. (2004).

A right and left censored Tobit estimator was used as farmers' incomes and welfare varied between zero and one. The Tobit analysis were tested for the presence of heteroskedasticity (using Breusch-Pagan/Cook-Weisberg test), which appears not significant, and improved through the exclusion of a few influential observations. Statistical robustness of the PSM analysis was instead promoted by matching farmers using two separate techniques Kernel and Nearest Neighbor, and by comparing the results obtained. To ensure maximum comparability of the treatment and control groups, the sample used for PSM was restricted to the common support position, defined as the values of propensity scores where both treatment and control observations can be found.

The objective was to estimate the impact of two treatments, participation with farmer support programme (W1) and those that have not participated in these support schemes (W2) on how the household income and welfare (Y) are affected. The ultimate goal was to estimate the average treatment effects ATE1 and ATE2 with Y1 and Y2 representing the income with treatment, and Y0 the income without treatment.

The Propensity Score Matching (PSM) was thus used to investigate the impact of farmer support organization on the income and welfare of smallholder farmers.

ATE1 = E for W1: Non-participation with farmers support programme.
ATE2 = E for W2: Participation with farmers support programme.

The assumption was that there are two treatments, W1 and W2 for households that have either participated or not participated with these farmer support programme.

ATE'1 = E for (W1 =1, W2=0): Not a member of a farmers support programme.
ATE'2 = E for (W1 =0, W2=1): Member of a farmers support programme.

In the first model referred to as regression on explanatory, control for selection bias was done by including a large set of observable explanatory variables (X) as control functions in the regression on household income which are shown by Equations (1) and (2).

For (W1 =1, W2=0): where

Table 1. Probability of member of farmer support programme (FSP) (Probit).

Description of covariates	With FSP support	Without FSP support
Dummy for male household head	0.45(0.34)	-0.04 (0.35)
Age of household head (years)	0.02(0.670	0.12 (0.07)
Education of household head (years)	0.23(1,03)*	0.35 (0.33)*
Household size (no. of members)	-1.13 (0.78)	0.12(0.17)
Dependency ratio (children/adults)	0.12 (0.07)	-0.00 (0.00)
Fixed arable land (hectares)	-0.01 (0.05)	0.19(0.48)
Household size	0.21(0.34)	0.02(0.65)
Income from agriculture	0.02(0.01)**	0,60(0.04)**
Distance to nearest market	0.09(0.40)	0.36(0/16)
No. of observations	49	50
Pseudo R^2	0.31	0.62
Log-likelihood	-143.56	-86.07
Correctly classified observations (%)	76	81

Standard errors in parenthesis (); *significance at 10% level; **significance at 5% level.

$$Y_i = \theta + \alpha_1 + \beta\chi_i + \varepsilon_i \tag{1}$$

For (W1 =0, W2=1): where

$$Y_i = \theta + \alpha_2 + \beta\chi_i + \varepsilon_i \tag{2}$$

The model to be regressed using OLS is:

$$Y_i = \theta + \alpha_1 W_{1i} + \alpha_2 W_{2i} + \beta\chi_i + \varepsilon_i \tag{3}$$

The ATEs shown by Equations (3) and (4) were then estimated with the propensity-score matching method. Matching involves pairing farmers who have received some form of assistance with those that have not in terms of their observable characteristics (Abadie and Imbens, 2002). In this study the treated and the controls units were matched according to the estimated propensity score and calculated the ATEs as a weighted average of the outcome difference between treated and matched controls.

The propensity matching method estimates the ATEs as follows:

$$ATE_1 = \frac{1}{N_1} \sum_{i \in N_1} (Y_{1i} - Y_j) \tag{4}$$

$$ATE_2 = \frac{1}{N_2} \sum_{i \in N_2} (Y_{2i} - Y_j) \tag{5}$$

With N, the number of treated units Yj, the income of the control group is matched with that untreated group. It is important to note that households that participate or have some form of assistance are matched to those that do not have any assistance. Matching between the treated and control groups is done on the propensity scores estimated as bivariate probabilities from the bivariate probit model specified above. The ATEs can be estimated using OLS as the regression coefficients on W1 and W2 are unbiased and consistent with the OLS model.

RESULTS AND DISCUSSION

The results presented in the Table 1 show the propensity

score methods showing the estimation of the treatment effects which indicates that the estimated effects are robust to the changes in in the econometrics approach. The results from the probit model are significant at 10 and 5% significance level. Table 1 shows that education of household head and income from agriculture are significant 10 and 5% respectively, which means there a difference between people who have support and those without support services in the Eastern Cape and KwaZulu Natal Province.

The results are robust to the different estimation techniques and alternative models specifications. The findings imply that participation or access to FSP significantly contributes to better incomes; the income effect is larger for farmers who are under these FSP than those who are not. Being a member (that is, participation of) or having support from FSP is relatively larger for bigger farms and is biased towards smallholders farmers while participation leads to better agricultural output and better incomes. In this regard we can say the welfare of smallholder farmers is greatly improved.

In other words, the probability of being a member of a cooperative increases as the size of allocated land increases, up to a given threshold (approximately 2.5 ha) after which the relation becomes negative. This is because farmers are constrained by resources that force them to reduce production or completely not be involved in farming. As the average land size in our sample is less than two hectares, this finding indicates that larger farmers are more likely to be a member of a FSP (as also suggested by Bernard et al., 2008). Although small farmers need assistance from farmer support services more than large farmers to overcome high transaction costs, large farmers appear to have easier access to markets because of good quality products and huge volumes from their produce. It is also important to note

Table 2. The impact of farmers support programmes (FSP) on farmer's income (PSM).

Category	Matching technique	
	Kernel	**Nearest neighbor**
[FSP Members] – [Non FSP and Individual Farmers]	**0.43** (0.03) *48* members *41* individuals	**0.02** (0.08) *48* members *33* individuals
[Marketing Group Members] – [Individual Farmers]	**0.14** (0.06)* *42* member *28* individuals	**0.21** (0.004)** *22* members *25* individuals

ATT in bold, standard errors in parenthesis (), number of observations per group in italics; *significance at 10% level; **significance at 5% level.

that the insignificance of all other variables in explaining access to support services is crucial to these smallholder farmers' and should be interpreted as a positive result, suggesting that the only observables in which farmers with access to resources or FSP and control farmers differ is land size. This confirms the validity of our control group (which is farmers who have not received any form of assistance from these organizations).

The positive impact of marketing cooperatives on smallholders' on market access involve the implicit cost-saving and risk-sharing devices of collective marketing especially for farmers who belong to these cooperatives or market their products in groups, as supported by numerous studies (Stringfellow et al., 1997; Stockbridge, 2003). On the other hand, potential reasons underlying the insignificant impact of all cooperatives on farm output to market access involve the 'defensive' attitude, related to prevalent rent-seeking behavior, typical of non-marketing cooperatives. Table 2 shows the impact of these support programmes with regard to the nearest neighbor in producing better produce when compared to those assisted and those that are not supported.While the main role of marketing cooperatives is to reduce transaction costs and improve bargaining power of smallholders vis-à-vis the market, the role of cooperatives or coordination approach among farmers in rural areas is to reduce transactions costs and increase bargaining power of smallholders and the various services these cooperatives or individual farmers receive from these various NGOs, private parastatals and also from government are incentives provided to farmers to help them get out of poverty. In South Africa and the rest of Sub-Saharan Africa cooperatives or group formations are major channels for aid, providing incentives to smallholder farmer's entrepreneurship, while marketing cooperatives and individual farmers who have support services represent a major channel for agricultural output flow towards new and more profitable markets. Thus, there is a potential for these smallholder farmers for sustaining market access pathways and not just a matter of cost sharing mechanisms or economies of scale. It also

deals with dynamics of innovation and learning by doing and with different organizations getting involved for capacity building; priority setting, negotiation and also that the farmers speak with one voice when marketing their produce. It is also interesting to note that the findings of the PSM and the Tobit regression analysis partly contradict with the results of the t-tests for the comparison of means presented in Table 3. Using t-tests, access to profitable markets is found to be significantly higher among cooperative/group members and individual farmers with access to FSP, regardless of the type of cooperatives. In other words, the results between farmers who receive this support and those who do not might be naïve comparisons which may lead to wrong conclusions and confirm the need of using methods that control for diffusion effects and self-selection, and take control variables into account that could result in spillover of information between the participating groups and non-participating groups of farmers.

CONCLUSION AND IMPLICATIONS

In South Africa the role of NGOs and other support organizations in terms of agriculture has not been accessed to its full potential. South African smallholder farmers are witnessing the establishment of these support services through various organizations such as IDC, MAFISA, CASP, Land bank and DBSA just to mention a few. This support represents a great opportunity to boost agricultural development in South Africa especially among smallholder farmer who have been deprived support since South Africa attained its democracy. With these outstanding equity issues most smallholder farmers have been not been able to produce enough for markets to get out of poverty and improve their welfare. Agricultural growth and poverty alleviation are longstanding poverty issues in most rural areas South Africa. However, unless access barriers to markets can be reduced, smallholder farmers may remain once again at the margin of economic development and poverty. For

Table 3. The impact of FSP on smallholder farmers compared to those without support (Tobit).

Dependent variable	With FSP support	Without FSP support
Farmer support programme membership	0.14 (0.10)	0.26 (0.10
Fixed arable land (hectares)	0.05 (0.05)	0.02 (0.05)
(Fixed arable land)^2	-0.00 (0.00)	0.00 (0.00)
Household size (no. of members)	0.05 (0.03)**	0.07 (0.03)**
(Household size)^2	-0.17 (0.38)	-0.16 (0.39)
Education of household head (years)	0.05 (0.03)*	0.03 (0.03
(Education of household head)^2	-0.00 (0.00)**	-0.00 (0.00)
Age of household head (years)	0.01 (0.02)	0.01 (0.02)
(Age of household head)^2	-0.00 (0.00)	-0.00 (0.00)
Dummy for male household head	0.01 (0.13)	0.03 (0.13)
Distance to nearest market (km)	-0.03 (0.00)**	-0.03 (0.00)**
(Distance to nearest market)^2	0.00 (0.00)**	0.00 (0.00)**
No. of observations		
Pseudo R^2	0.1768	0.1674
Log-likelihood	-294.73	-254.16
Left censored observations	104	93
Uncensored observations	132	112
Right-censored observations	43	38

*Significance at p<10% level;** significance at p<5% level; *** significance at p<1% level.

these reasons, NGOs and private parastatals and partly the South African government needs to promote the formation of smallholders' cooperatives and farmer support services to rural farmers, as well as their close interaction with the mentorship programmes to assist these farmers to get out of poverty.

From the results from the PSM and Tobit regression analysis, it is found that membership to these organizations has a significant impact on the degree of market access. For members of marketing cooperatives and individual farmers, however, the degree of market access is between 12 and 28 percent higher than that of farmers who do not belong to a cooperative or have no access to these services. In this study we notice that collective action involves collective marketing, agricultural cooperatives may not help smallholders to access markets unless these farmers have some form of support to improve their quality and volumes. The robustness of these findings is supported by the fact that two separate estimation techniques (Tobit regression and PSM) yield similar results.

The difference in memberships to these support services are noted by the various effects they have on income and welfare of these farmers. Most of the farmers from these cooperatives have better access to markets and this is explained the heterogeneity in the responses of cooperative members to the cost-saving and risk-sharing advantages obtained through collective action. In particular, when facing a price increase smaller farmers (that is, farmers with less land) tend to reduce the fraction of output marketed (that is, sell less and consume more), whereas larger farmers tend to increase their produce and market high volumes. In particular the distinction made between farmers with access to FSP and those that are not, this allows us to advance and test the hypothesis that beyond heterogeneity in members' behavior, heterogeneity in organizational behavior among these farmers plays also an important role in determining the impact of these FSP in market access.However, we observe that most of the smallholder farmers in rural areas of South Africa do not engage in collective marketing but rather serve as a shield to protect semi-subsistence farming systems from market competition. In order to put these smallholder farmer in the farming mainstream and achieve food security at household level, it is necessary that studies be made on these FSP and their role in establishing cooperatives and support services to these smallholder farmers to achieve the objectives set by national public policy of improved market access (NDA, 2009). It is therefore crucial to improve the focus of development efforts towards the promotion of marketing cooperatives rather than any type of cooperatives, especially within the smallholder and emerging farmers in South Africa. However, because large farmers are more likely to become members of (marketing) cooperative than smallholder farmers, the extent to which promotion of marketing cooperatives contributes to poverty reduction is not yet clear. There is an urgent need for more empirical research on this issue. Further research is also needed to identify key factors

behind the choice to form either marketing or a defensive cooperative, as well as governance and managerial practices to maximize the sustainability of collective marketing activities over time. This will however, over time lead to sustainability of smallholder farmers and improved welfare through these farmer support organization. These organizations will link the farmer with output markets, input markets, credit, technical skills and better paying markets for their produce.

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