IMPACT OF AGRICULTURAL DEVELOPMENTAL PROGRAMMES ON SMALLHOLDER FARMERS OF BRONKHORSTSPRUIT REGION IN TSHWANE METROPOLITAN MUNICIPALITY, GAUTENG PROVINCE

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ABSTRACT

The aim of the study was to assess and document the impact of agricultural developmental support programmes on smallholder farmers focusing on the city of Tshwane, Bronkhorstspruit area. A sample size of 30 farming units was chosen using a purposive sampling technique. Primary data were collected using semi-structured questionnaires during focus group meetings and on-farm visits. Quantitative data were sorted, coded, edited and analysed using both descriptive and inferential statistical methods. The findings indicated that 63% of smallholder male farmers benefitted on developmental programmes and the majority of farmers who benefitted were above the age of 41. The study revealed that jobs created in the study area increased by 30% due to programme interventions. However, access to proper farm infrastructure, formal markets, and finances have remained challenges even after the intervention. In conclusion, it was generally found that agricultural development programmes improved the livelihoods of smallholder farmers and the community in general in the study area. The study recommends that support should focus on commodity and production capacity that can sustain farming enterprises and generate income.

Keywords: Agricultural developmental programmes, Extension support, Impact

1. INTRODUCTION

Agriculture has a central role to play in building a strong economy, and in the process, reducing inequalities by increasing income and employment opportunities for the poor, while nurturing the inheritance of natural resources (Nchabeleng, 2016). Smallholder agriculture in South Africa has been identified as the vehicle through which the goals of poverty reduction and rural development can be achieved (Pienaar & Traub, 2015). However, smallholder farmers face various constraints that hamper their growth and ability to contribute efficiently to food security comparative to commercial farmers. Some of the constraints faced by the smallholder farmers relate to lack of access to land or property rights, lack of access to information, lack of technical skills, poor physical and institutional infrastructure, high transaction costs, lack of reliable or limited access to markets, limited access to credit, inputs, and lack of human capital leading to low quality and volumes (Aliber & Hall, 2012; Department of Agriculture, Forestry and Fisheries (DAFF), 2012; Ortmann & Machethe, 2003; Sikwela & Mushunje, 2013). The result is a high failure rate and high levels of unsustainability of smallholder farming enterprises.

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In response to that, the Southern African government has since the dawn of democracy, introduced and implemented several policies and programmes aimed at promoting smallholder agricultural development and redress historical injustices of the past. The budget spent on these programmes increased over time and interventions include infrastructure grants, production inputs support, access to loans, and extension service programmes (Chaminuka *et al,* 2008). The link between poverty reduction and high agricultural growth rates is well established (Baffes & De Gorter, 2005). However, other studies have shown that agricultural development programmes have been ineffective in stimulating rural growth and poverty alleviation (Everatt & Zulu, 2001; Mabaso, 2014). Everatt and Zulu (2001) reported that government initiatives to improve the quality and quantity of infrastructure in the rural areas through programmes, such as the Comprehensive Agricultural Support Programme, have registered limited impact on the lives of many emerging farmers.

Several agricultural development programmes have been implemented in the Bronkhorstspruit area since 1994, none of which have been formally evaluated to date. It is against this background that this study was conducted to asses and document the impact of agricultural support programmes in different farming enterprises and whether the interventions enhanced agricultural productivity and the livelihoods of smallholder farmers.

2. METHODOLOGY

2.1 Study area

The study was conducted in Bronkhorstspruit within the Tshwane Metropolitan Municipality of Gauteng Province. It is a small town situated at 50km east of Pretoria. It lies on the border between the Gauteng and Mpumalanga Provinces. Bronkhorstspruit falls under region 7 of Tshwane Metropolitan Municipality (Figure 1). According to Tshwane Economic Agency, region 7 has some of the best farming land in Gauteng and this is further supported by the significantly high location quotient for agriculture in the region.
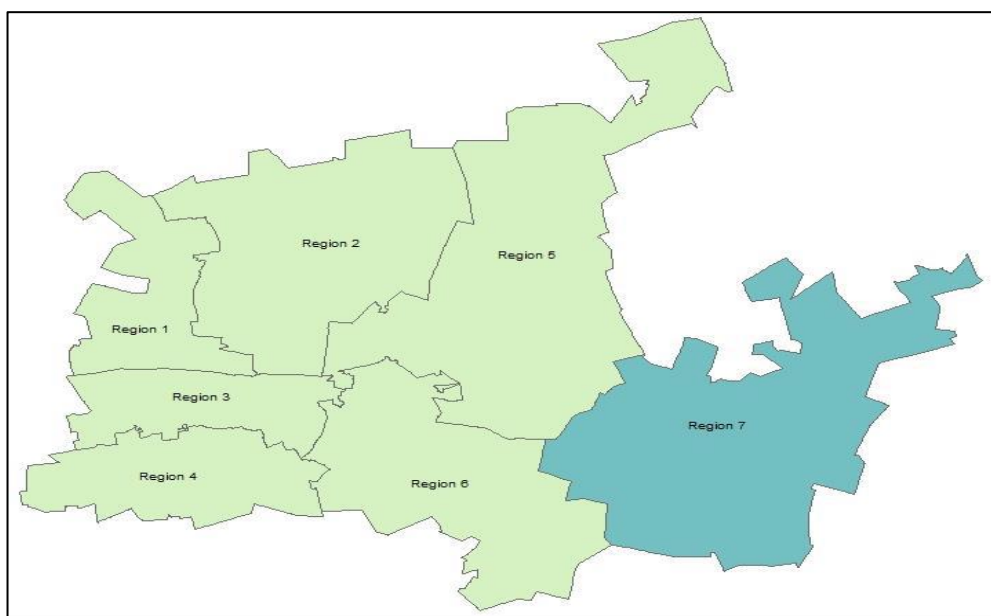

Figure 1: City of Tshwane Map position region 7

Some of the smallholder farmers in the study area benefitted on government agricultural developmental programmes such as production inputs (maize seeds, fertilizers, chickens, pigs, feeds), farm infrastructure (boreholes, poultry structures, pig structures, shade net or hydroponic tunnels), extension and advisory services, as well as training and capacity building. Before the interventions, there were no farming activities taking place in some farms while others produced at a low production scale.

2.2 Data collection

Smallholder farmers participating in agricultural developmental programmes were selected to participate in the study. The list of farmers was obtained from the Gauteng Department of Agriculture and Rural Development (GDARD) in Tshwane regional office. A sample size of 30 farm units was chosen using a purposive sampling method for the study. A total of 30 smallholder farmers (decision makers) from the selected farm units were interviewed during focus group meetings and farm visits. Thus, the response rate achieved was 100%. According to Lindner, Murphy and Briers (2001) procedures for control of non-response error are not necessary when a response rate beyond 85% is achieved.

Primary data were collected using semi-structured questionnaires designed for collecting information on socio-economic characteristics, institutional support, production, marketing, and job creation. The questionnaire was pre-tested before use to non-selected smallholder farmers and modified accordingly to improve the quality of the questionnaire.

2.3 Statistical analysis

The captured data were analysed using both descriptive and inferential methods. Quantitative data was sorted, coded, edited and classified into categories using Microsoft Office Excel®. Graphs were used to portray a general description of categorical data such as age and gender. The Stepwise Logistic Regression (PROC LOGISTIC) was used to determine the odds ratio to evaluate the relative contribution of support measures to income production in different farming enterprises. The variables fitted in the logit model included programmes, commodity, job creation, production capacity, and market access. The model used was:

$$Y = \mathrm{Ln}\ [P/1-P] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

Where:

Y	= Probability of a farmer experiencing increased income
$P-1$	= Probability of a farmer not experiencing increased income
β_0	= Intercept
$\beta_1...\beta_5$	= Regression coefficients of predictors
$X_1... X_5$	= Predictor variables
ε	= Random residual error

The prediction of the probability that an event will occur (probability of success) is done by fitting data to a logit function. It makes use of several predictor variables where $Y = 1$ for an occurrence and $Y = 2$ for a non-occurrence (Agresti, 1996). When computed for each predictor

(X1... X7), the odds ratio was interpreted as the proportion of farmers that experienced increased income in different farming enterprises.

3. RESULTS AND DISCUSSION

3.1 Socio-economic characteristics of respondents

Table 1 depicts the socio-economic profiles of sampled smallholder farmers of Bronkhorstspruit region in the City of Tshwane Metropolitan Municipality. Male respondents accounted for 63% of the sample, while females accounted for 37% of the smallholder farmers who received agricultural developmental support from the Gauteng Department of Agriculture and Rural Development (GDARD). This shows that males are dominating participation in the agricultural development programme or are preferred for support in the study area, even though the South African government is promoting and advocating for the participation of women in all economic spheres, including agriculture (Mokgadi, 2012). According to Oluwatayo and Rachoene (2017), this might be due to the fact that females do more of the marketing than males, or that the females do engage more in household chore. However, Deere and Doss (2006) indicated that the lack of women's ownership of land feeds into the system whereby women are not regarded as real famers. This, in tum, limits their access to credit, extension services and access to other inputs.

Analysis of the age categories of sampled smallholder farmers shows that farmers participating in the programmes were within the age range of 20 to 70 years. Those who fell within the age range of 20 to 30 years accounted for 3%, about 27% of the respondents were in the age range of 31 to 40 years, while the remaining 70% (the majority) of the respondents were above the age of 41. These findings indicate that the majority of the respondents belong to the middle and old age group in the study area. Oluwatayo and Rachoene (2017) reported that this is an advantage since the middle aged group are usually very active and productive with more energy to channel into agricultural production activities. In addition, the older group is likely to have more experience in farming activities which may also enhance productivity.

However, Mokgadi (2012) argued that the old age group (50-59 years) poses a threat and negative implication to sustainability of agricultural projects for poverty alleviation since older people are at risk in the aspects of transformation regarding adoption of new technologies and are not strong because agricultural labour requires physically strong individuals. According to Maoba (2016), low participation of youth is a concern, along with threat to food security and clear demonstration of a lack of succession plan.

Additional analyses of the data showed that the majority of respondents (93%) are full-time farmers, while 7% are employed. The implications of the findings is that the majority of farmers are focused and in a better position to make decisions, implement and monitor farm activities. As a result, they stand a better chance to enhance productivity and succeed in their farming enterprises. According to Osanyinlusi and Adenegan (2016), this finding is objectively in line with the notion that rural dwellers are predominantly farmers.

The educational status of sampled farmers showed that 7% of respondents had no formal education, 53% had secondary education, while 37% had tertiary education. This implies that the majority of farmers in the study area are literate and their level of adoption and application of agricultural practices is high. Moreover, Mokgadi (2012) reported that lower education

levels of the farmers have an effect on sustainability of agricultural projects because they take time to adapt to the changes of a marketing environment. Therefore, education is one of the fundamental factors that can enable a farmer to easily understand basic farm management, financial management, agricultural marketing principles, and the ability to create business networks (Mokgadi, 2012).

The results further revealed that 40% of respondents privately owned the land while 37% are occupying state land. This implies that development was more concentrated to privately owned farms as compared to state owned farms. This finding corroborates with the finding of Maoba (2016) which revealed that 76.9% of government investment was on privately own land or farms, while state land accounted for 23.1% in the Germiston region. Mabaso (2014) emphasises that access and ownership of land determines the people's ability to perform agricultural practices.

Table 1: Socio-economic profile of the respondents

VARIABLES	CATEGORIES OF VARIABLES	FREQUENCY	PERCENTAGE
GENDER	Female	11	37%
	Male	19	63%
AGE GROUP	20-30 years	1	3%
	31-40 years	8	27%
	Above 41 years	21	70%
EMPLOYEMENT STATUS	Employed	2	7%
	Student	0	0%
	Full-time farmer	28	93%
LEVEL OF EDUCATION	None	2	7%
	Primary	1	3%
	Secondary	16	53%
	Tertiary	11	37%
LAND OWNERSHIP	Private	12	40%
	Communal	4	13%
	State owned	11	37%
	Leased	3	10%

3.2 Impact of developmental programmes

Some of the expected outcomes for the programmes (CASP, Ilima/Letsema) are to increase sustainable employment, reduce poverty, increase enterprise income, and improve farming productivity or efficiency (DAFF, 2012). Therefore, Figure 2 demonstrates farm status before and after intervention of agricultural developmental programmes of sampled respondents in the study area. The results indicated that before intervention, the sustainable (permanent) employment rate was at 6.7%, and after the support was provided, sustainable employment improved to 46.7%. This implies that job creation in the study area increased by 30% due to developmental programmes as compared to before interventions and that is a significant contribution in terms of job creation.

35

Analysis of data on income generation revealed that there was no profit realised by sampled farms prior to developmental support. However, post developmental support, almost 70% of sampled farm units recorded an increase in income. The finding indicates that 70% of households in the study area have managed to improve their purchasing power due to the interventions of the programme. Thus, poverty level (ability to meet basic needs) findings shows that there was a high poverty rate (80%) before intervention, but the situation drastically reduced to 30% after implementation of the programmes. This means that the livelihoods of the farming community in the study area has improved. Furthermore, it was found that before intervention, only 6.7% of farms were in production, while post intervention, 43.3% remained productive. This finding signifies a great contribution towards a food security in the study area. Osanyinlusi and Adenegan (2016) defined productivity as the level of output in relation to levels of resources employed in a given period of time. According to Mabaso (2014), agriculture has proven to have the highest potential for growth and poverty alleviation in the short and medium terms in many developing countries.
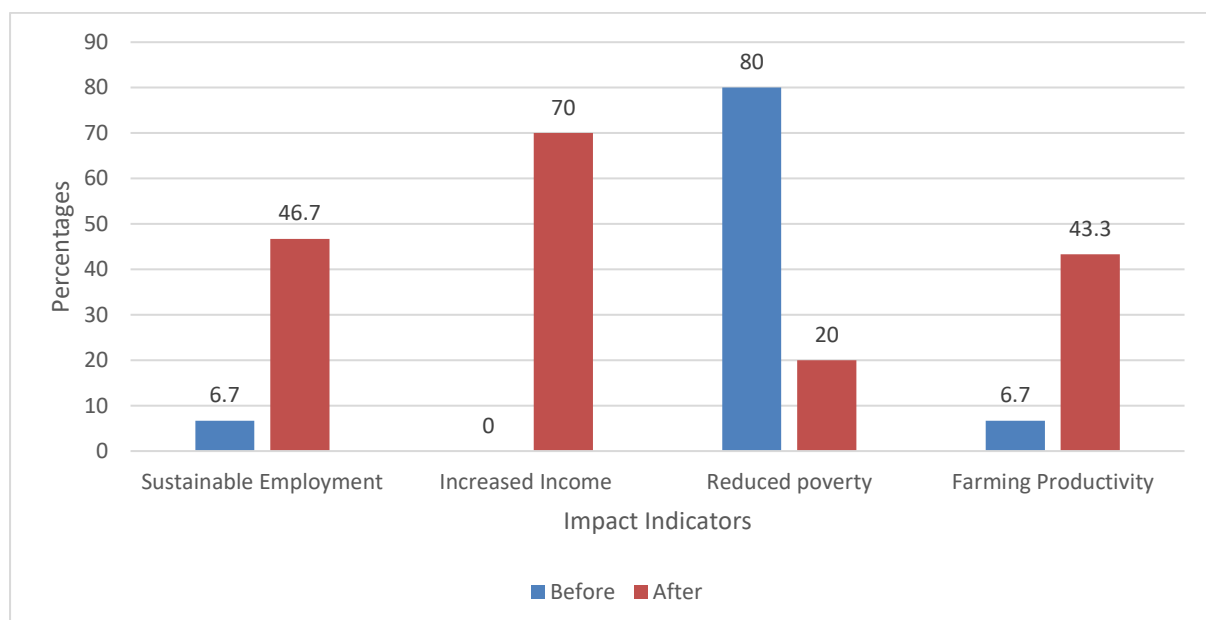

Figure 2: Impact of developmental programmes on farmers

3.3 Institutional farmer support

The results in Figure 3 illustrate institutional support to farmers prior and post developmental support programmes. The survey data revealed that prior to the developmental support programme, only 26% of smallholder farmers in the study area were able to afford production inputs. The situation changed drastically after being supported with production inputs and the majority of smallholder farmers (64%) were able to buy inputs on their own after benefitting from the programme. Constraints faced by the remaining 36% of the sample might include the volumes of production inputs received, high production costs, and business management skills. In terms of access to farm infrastructure, it was found that only 17% of smallholder farmers had proper infrastructure. However, after the intervention, the number of smallholder farmers with proper infrastructure increased to 53%. Although there is improvement, a lot still needs to be done as 47% of smallholder farmers in the study area still do not have proper infrastructure.

Quality and quantity of produce can easily be compromised without proper infrastructure and that can easily lead to unsustainability of the farming business. Analysis on marketing revealed that none of the smallholder farmers had access to formal markets before the intervention, and afterwards 10% of them did. This means that the majority of smallholder farmers (90%) still have no access to marketing and business development opportunities. This finding demonstrates failure of government initiatives to open market opportunities for smallholder farmers in the study area. Thus, smallholder farmers are unable to grow their farming business and participate in the mainstream of the agricultural economy. This clearly shows that the majority of farmers participating in the programme are still supplying informal markets despite the intervention, even though the programmes are aimed at improving quality and volumes produced by smallholder farmers.

Sikwela and Mushunje (2013) reported that smallholder farmers are still unable to produce good quality and higher volumes because of a number of constraints. In fact, despite the numerous programme interventions to address the farmers' challenges, the reality is that smallholder farmers in the region are still unable to access better paying markets. The study found that prior to the intervention, only 20% of smallholder farmers attended training and capacity building on their own. However, the situation changed post intervention as all of the smallholder farmers attended training and capacity building in the study area. This finding implies that farmers in the study area are well equipped with knowledge and have a better chance of success in their farming enterprises.

In terms of access to finance mechanisms, the study revealed that before and after intervention, smallholder farmers do not have access to financial assistance. This could be attributed to stringent requirements of financial institutions. As a result, smallholder farmers without access to finance stand no chance to become commercial farmers, since funding and credit are critical for sustainable agricultural development. Analysis of data indicated that 27% of smallholder farmers had access to technical and advisory services before the developmental support programme. Due to the intervention through extension services, 100% of smallholder farmers in the study area now have access to technical and advisory services. Furthermore, results demonstrated that only 25% of smallholder farmers were able to receive information and knowledge management through their own means before the developmental initiatives. Currently, post intervention, 100% of smallholder farmers have access to information and knowledge management through agricultural extension support services. Therefore, findings relating to extension support indicate visibility and efficiency of extension services in Bronkhorstspruit area.
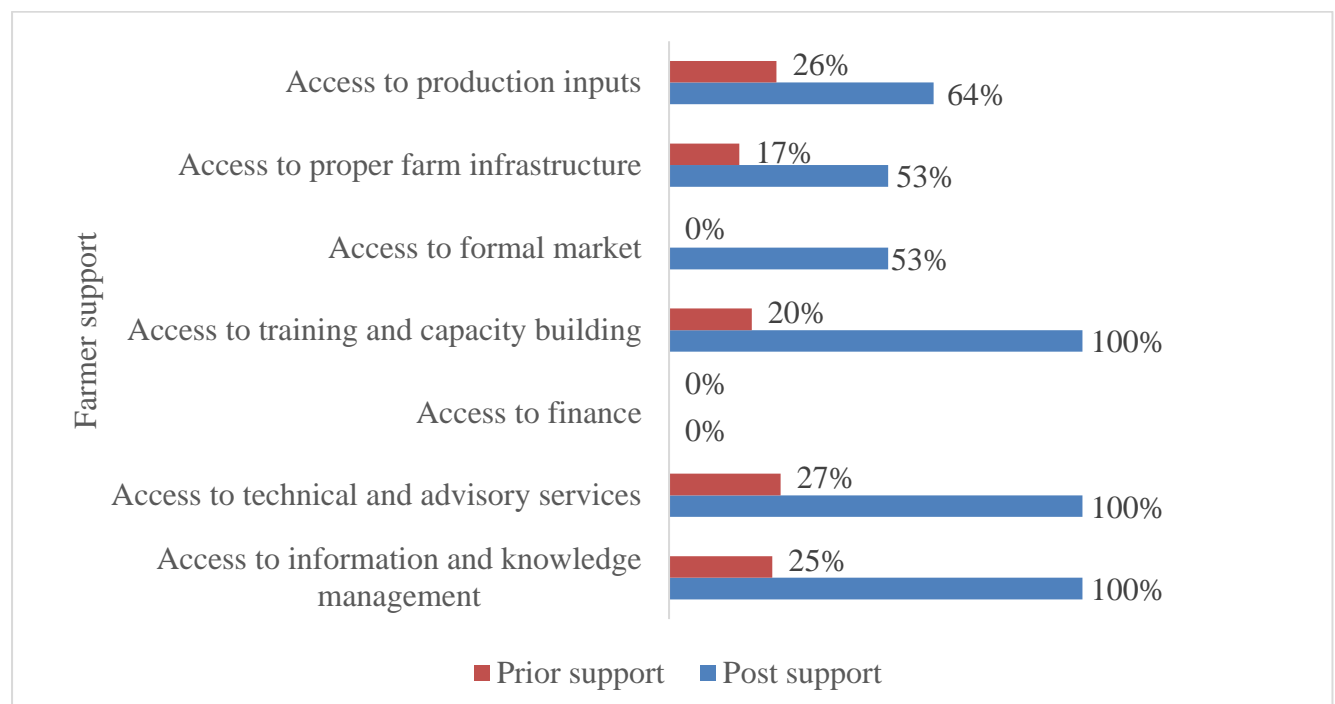
Figure 3: Increase in institutional farmer support as a result of developmental programmes

3.4 Impact evaluation

Table 2 depicts the difference estimates odds ratios and level of confidence intervals of various variables in different farming enterprises of smallholder farmers in the study area. Predictors included were support programmes, commodity, job creation, production capacity, and market access. Odd ratio is a measure of association between an exposure and outcome (Szumilas, 2010). Therefore, in this study, an odds ratio obtained with a Stepwise Logistic regression model represents the increase in income in different farming enterprises is likely to occur given a particular exposure and as a result of identified variables or predictors. The estimated odds ratios were 0.79, 1.52, 0.41, 0.98 and 0.57 for programme, commodity, job creation, production capacity, and market access respectively. The lower confidence intervals were found to be 0.45 on programme variable, 0.21 on job creation variable, and 0.18 on market access variable. The highest confidence was found to be 3.12 on commodity variable and production capacity variable. Various predictors identified in this study were found to affect income of farming enterprises in the study area. Out of five variables identified, two variables (commodity and production capacity) were found to have high probabilities of influencing the income in different farming enterprises. The other three variables (programme, job creation, and market access) were found to have less probabilities of influencing the income in the study area. This implies that smallholder farmers in the study area have to consider type of commodity and production capacity in order to enhance income in different farming enterprises.

Table 2: Odds ratio estimates to evaluate the relative contribution of support measures to income production in different farming enterprises

Predictors	Odd ratio	Lower CI	Upper CI
Programme (Letsema VS Letsema & CASP)	0.79	0.45	1.41
Commodity (Poultry, Piggery, Maize)	1.52	0.74	3.12
Job creation (Yes vs No)	0.41	0.21	0.78
Production capacity (Decrease vs increase)	0.98	0.50	1.90
Market access (Yes vs No) **Goodness-of-Fit Tests** Method Chi-Square DF P Pearson 1226.61 857 0.000 Deviance 222.33 857 1.000	0.57	0.18	1.74

CI: Confidence interval

4. IMPLICATIONS ON AGRICULTURAL EXTENSION

Extension practitioners play a critical role in the planning, implementation and monitoring of agricultural developmental programmes. The current study provides baseline information on how the programmes impact on the livelihood of smallholder farmers in the study area. Therefore, this study provides information that will assist decision makers to make informed decisions when planning future projects.

5. CONCLUSION

Based on the findings of the study, the following conclusions are drawn:
1. The majority of smallholder farmers that benefitted from the programmes were male farmers. Most of the smallholder farmers were above 41 years of age. Furthermore, the majority of smallholder farmers were full-time farmers.
2. Developmental programmes, as compared to before interventions, improved job creation, income generation, poverty alleviation, and farm productivity in the study area.
3. Post developmental programme intervention, most smallholder farmers were able to purchase production inputs on their own, some have proper agricultural infrastructure, and attended training and capacity building. Furthermore, smallholder farmers have access to technical and advisory services, as well as information and knowledge management through extension services.
4. Access to farm infrastructure, marketing and business development, and financial mechanisms remained challenges post intervention.
5. The type of commodity and production capacity are key elements to enhance income in different farming enterprises.
6. In general, agricultural development programmes improved the livelihoods of smallholder farmers and the community in general in the study area.

6. RECOMMENDATIONS

The following recommendations were made from the study:
1. More support should be given to vulnerable groups such as female farmers, youth and people with disabilities.
2. Promote higher participation of youth in the programmes.
3. Smallholder farmers should be provided with adequate support on infrastructure, market access and business development, and financial mechanisms.
4. Support should mainly focus on commodity and production capacity that can sustain farming enterprises and generate income.

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