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## EFFECTS OF THE AGRICULTURAL FOOD SECURITY PACK PROGRAMME IN ZAMBIA: THE CASE OF MPULUNGU DISTRICT

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## ABSTRACT

Agricultural food programmes are one of the means to improve household food security for vulnerable small-scale farmers in sub-Saharan Africa. In Zambia, household food insecurity is entrenched among small-scale farmers. Despite the implementation of the food security pack programme by the Zambian government, there is scanty scientific information on the performance of the programme. The study reviewed the effects of the food security pack programme on land cultivation and maize crop productivity in Mpulungu district using a mixed-methods design. Using a simple random sampling and Slovin's Formula, 147 beneficiaries and 152 non-beneficiaries were selected as questionnaire respondents. The study purposely selected two government officials, one traditional leader, and five focus groups for interviews and focus group discussions. Descriptive data were generated using SPSS and content analysis. The study revealed that 66% of the beneficiaries, cultivated between a quarter (0.25) and half (0.50) a hectare compared to the non-beneficiaries, whose 61% cultivated less than a quarter (<0.25) hectare. Similarly, 70.1% of the beneficiaries, harvested more than 20 (50kg) bags of maize grain on average, per 0.25 hectares of land compared to 8% of the non-beneficiaries for three farming seasons reviewed. The land cultivated by the beneficiaries had a larger mean ( $M = 2.00$ ) than the land cultivated by the non-beneficiaries ( $M = 1.59$ ). Maize crop productivity by the beneficiaries had a larger mean ( $M = 4.25$ ) than the non-beneficiaries ( $M = 2.45$ ). There was a statistically significant difference in land cultivation and maize crop productivity between the beneficiaries and non-beneficiaries, with the former having more land cultivated and higher maize crop productivity than the latter. Administrative challenges in programme implementation were noticed. Farming inputs were received late and outside the planting period due to the centralised purchase system despite the beneficiaries performing better than the non-beneficiaries. Funds for the purchase of agricultural inputs were released late by the Zambian government. The study concluded that the food security pack programme had a significant positive effect on land cultivation and maize crop production for benefiting households. The study recommends decentralisation of the supply of farming inputs to the districts for timely delivery to the beneficiaries, increasing the number of beneficiaries, and timely release of funds for the purchase of farming inputs by the Zambian government.

**Key words:** Agriculture, food security, small-scale farmer, empowerment, vulnerable farmers



## INTRODUCTION

Agriculture is one of the most critical production ventures in sub-Saharan Africa. As a production undertaking, it meets essential human needs such as food and clothing. Agricultural production can bring prosperity, peace, good health, wealth creation, and household food security [1]. It elevates communities and provides a better social, cultural, political and economic life [2].

In some sub-Saharan African countries, Zambia included, a large population could be living in hunger and starvation, while the nation has plenty of food in aggregate, all year round [3]. For this reason, sufficiency in an aggregate does not automatically guarantee adequacy and capability at the household or individual levels. What matters is to have access to the available food [4].

The general population living in rural areas in sub-Saharan Africa is about 58% but, in Zambia, this figure is around 55% [5] and approximately, 90% of this rural population is dependent on agricultural food crop production through small-scale farming [6]. In Zambia, a significant population of small-scale farmers is affected by household food insecurity due to reduced agricultural food crop production [7]. This is attributed to shock occurrences, such as floods, droughts, and a lack of resources by vulnerable small-scale farmers to purchase farming inputs.

Household food insecurity weakens the economy by incapacitating potential contributors to economic development through increased mortality and disease burden. Food insecurity bloats the direct economic costs of coping with health effects and massive decreases in economic productivity and human ability because of a lack of food and undernourishment [8]. Therefore, government-sponsored programmes, such as the food security pack programme aimed at enhancing household food security to prevent the burden of hunger and disease, are inevitable in any country that espouses human rights.

For the above reasons, the Zambian government introduced the food security pack programme in 2000 to provide vulnerable small-scale farmers with free agricultural inputs in the form of a food security pack, throughout the country [9]. The programme's primary objective is to enhance household food security through food crop production [9]. The start-up package provides inputs such as cereal seed (maize, sorghum, millet, or rice), legume seed (sugar beans, cowpeas, soya beans or groundnuts), potato vines (optional), cassava cuttings (optional), basal and top-dressing fertiliser (mandatory), and lime for areas with acidic soils (optional) [10].



Despite the provision of free farming inputs by the Zambian government through the Ministry of Community Development and Social Services to the vulnerable small-scale farmers in Mpulungu district, there have been few or no attempts to conduct a scientific review of the performance of the food security pack programme in the district. Most of the information on the performance of the food security pack programme is found in the departmental periodic progress reports [11]. Therefore, the contribution of the food security pack programme towards the realisation of household food security among the beneficiary households has not been scientifically clear in the district. This has led to some stakeholders including donor agencies, policymakers, civil society and opposition political parties, among others, questioning the implementation and realisation of the main objective of the food security pack programme in the district.

Therefore, this study sought to fill this gap by establishing the performance of the food security pack programme in Mpulungu district of Zambia. Specifically, the study focused on comparing the demographic data, amount of land cultivated, and maize crop productivity by both the food security pack beneficiaries and non-beneficiaries, and to assess the period of receipt of farming inputs by the food security pack beneficiaries.

The results of this research add to the existing body of knowledge that can aid policy makers, planners, implementers, and other stakeholders to understand the opportunities and challenges that come with implementing demand-driven agricultural poverty reduction programmes. The results can be used to improve back-stopping strategies for implementing agricultural food security programmes targeted at small-scale farmers in Zambia. The results also provide an opportunity for new research to examine the gaps that have not been addressed in this study, as they relate to household food security, considering current development policy debates.

## METHODS

### Study area

This study was conducted in 2020 in Mpulungu district, situated in the Northern Province of Zambia. Mpulungu district was selected because it is one of the locations where the agricultural food security pack programme was implemented, in addition to its accessibility, and fertile land suitable for crop production, which, in an ideal situation, should ensure household food security among small-scale farmers [12].



## Research design

This study used a mixed-methods design which combined both quantitative and qualitative methods [13]. This research design was ideal because it allowed the researcher to solicit both descriptive and numerical data to realise objectivity and get diverse views from research participants [14] on the performance of the food security pack programme.

## The population of the study

The population of the study were the food security pack programme beneficiaries and non-beneficiaries who were registered but waiting to be absorbed by the programme. The non-beneficiaries were included in the study as a control group. The other participants were the key informants that included the District Agriculture Co-coordinator, the District Community Development Officer, a traditional leader, a group of agro-dealers, as well as Area Food Security Pack Committees.

## Sampling methods

Non-probability sampling, employing purposive techniques, was used to select Mpulungu district as the area of study considering the reasonable number of small-scale farming households that participated in the food security pack programme and the availability of registered non-beneficiaries of the programme. This technique was relevant for selecting the target groups because it does not claim representativeness as samples were chosen for a specific purpose [15].

Probability sampling, using a simple random technique was used to select the food security pack beneficiaries and non-beneficiaries (control group) aged eighteen (18) years and above as respondents [16]. This sampling strategy made it possible for all the beneficiaries and non-beneficiaries in the sampling frame to have an equal chance of being picked [17].

## Sample size

This study drew 172 household heads for the food security pack and 174 non-beneficiaries as respondents using Slovin's Formula [18]. On key informants, the study involved two technocrats, one traditional leader, four Area Food Security Pack Committees, and a group of agro-dealers comprising 12 representatives from agro-business entities that were operating in the district.

## Data collection

Researcher-administered questionnaires, interviews and focus group discussions were used to collect data for this study.



Semi-structured questionnaires were used on the food security pack beneficiary and non-beneficiary household heads [14]. This type of questionnaire was ideal for collection of demographic data, information on the area of land cultivated, maize crop harvested, and the period of receipt of farming inputs by the food security pack beneficiaries.

Semi-structured interviews were used with the key informants namely, the District Community Development Officer, District Agriculture Coordinator, and a traditional leader because of the flexible nature of questions and minimal restrictions in answering questions [19].

Focus group discussions, comprising 12 members in each group [14], were held with Area Food Security Pack Committees (that is, Mpulungu Central, Kashimango, Mweenda, and Muswilo) and a group of agro-dealers. The combination of questionnaires, interviews, and focus group discussions helped to triangulate the data to ensure both the validity and reliability of findings [17].

### Data analysis

The data was analysed quantitatively and qualitatively. The quantitative data was analysed using the Statistical Package for Social Sciences (SPSS) version 20 to generate descriptive statistics that presented frequency distributions, percentages, arithmetic mean, standard deviations, and standard errors. The quantitative analysis enabled the study to make performance comparisons between the food security pack programme beneficiaries and non-beneficiaries [20]. To determine the statistical significance, the two groups were subjected to a t-test to compare the mean. To establish the effect size of the food security pack programme on the area of land cultivated and maize crop productivity, Cohen's  $d_2$  was computed for both variables using the formula: Cohen's  $d_s = (M_2 - M_1) \div SD_{\text{Pooled}}$  (Overall equation), where  $M_2$  is the mean of group 2 (experimental group, in this case, the food security pack beneficiaries) and  $M_1$  is the mean of group 1 (control group, in this case, the non-beneficiaries) [18]. To compute the Cohen's  $d_s$ , SD pooled was calculated first using the following formula:

$$SD_{\text{Pooled}} = \frac{\sqrt{(n_1 - 1) \times SD_1^2 + (n_2 - 1) \times SD_2^2}}{n_1 + n_2 - 2}$$

Where  $n_1$  is the size of group 1 (non-beneficiaries),  $n_2$  is the size of group 2 (food security pack beneficiaries),  $SD_1$  is the standard deviation of group 1 (non-beneficiaries), and  $SD_2$  is the standard deviation of group 2 (food security pack

beneficiaries) [18]. The result was inputted into the overall equation to compute Cohen's  $d_s$  [18]. Using this formula, the general guidelines for interpreting the effect size were as follows: 0.2 to 0.4 = small effect, 0.5 to 0.7 = moderate effect, and 0.8 or greater = large effect [21].

The qualitative data was analysed using categorical variables generated from content analysis of information captured from open-ended questions of the questionnaires, interviews and focus group discussions [22].

### Limitations of the study

The study had methodological and researcher-centred limitations [23]. With the purposive sampling method used to select Mpulungu district as the case study, the research findings may not be generalised beyond Mpulungu district [24]. However, generalisation within Mpulungu district was guaranteed because the selected food security pack beneficiary and non-beneficiary household heads were picked using a simple random sampling method, which ensured the representativeness of the targeted population of the study in the district [24].

With the use of researcher-administered questionnaires, the researcher did not reach all the sampled 172 and 174 food security pack programme beneficiaries and non-beneficiaries, as intended. Long distances and impassable pathways to cover respondents living in remote areas posed a challenge. However, questionnaires were administered to 85% of the sampled beneficiary household heads. Likewise, 87% of the sampled non-beneficiary household heads were reached. The percentage of the targeted respondents not reached was negligible to affect the generalisation of the findings within Mpulungu district.

## RESULTS AND DISCUSSION

### Socio-economic characteristics of the respondents

#### ***Gender, household family size and educational levels (demographic data) of the food security pack beneficiaries and non-beneficiaries***

Most respondents in both groups of the food security pack beneficiaries and non-beneficiaries, in this study, were males with statistics standing at 51% and 53%, respectively. Female participants were the minority at 49% of the beneficiaries and 47% of the non-beneficiaries as shown in Table 1.

The above pattern of findings was supported by the outcome of the interviews with key informants. All the three key informants interviewed including the District



Community Development Officer, District Agricultural Coordinator and a traditional leader explained that the food security pack programme had almost equal representation but slightly more male-headed households imposed by politicians. It was further established from the interviews that males were favoured by politicians because of the role they played in political campaigns during the election period. The above explanation was also reiterated in focus group discussions, with one female participant giving a statement that was representative of the comments of many focus group participants to which most participants agreed:

*“It is like this programme was deliberately designed to take on more male than female beneficiaries. If this was the case, then the government is implored to put up a deliberate measure to allow more women than men to have access to the programme because it is the women in rural areas who suffer when there is food insecurity in their homes. It is a known fact that men find their way on the programme due to political connections”.*

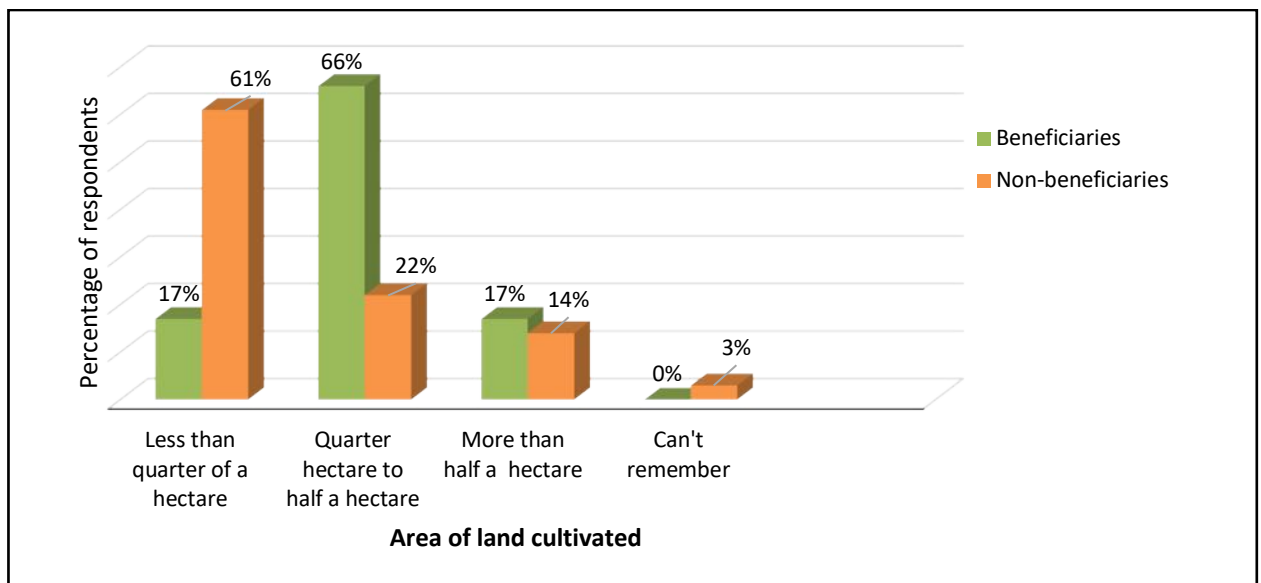
The favouritism of men by politicians to be included in welfare programmes, even when they do not deserve it, is one way of rewarding them for their political support [25]. The undeserved entry of some men on the food security pack programme is what is called biased political capital exploited through networks that encourage people to do work collectively and broaden their right of entry to vital programmes [26]. Poor households' access to rights through the concept of political capital is the ability to use influence in supporting political or economic standpoints to augment livelihoods [26]. Political capital represents both the lawful dissemination of rights and power, as well as the illegal operation of power, which frustrates efforts by poor households to access entitlements [26].

Regarding household family size, most of the households of the food security pack beneficiaries (41%) had a family size of more than ten (10) members, while the least (26%) had between 1 to 5 members. The pattern of the results was similar to that of non-beneficiary households which also showed the majority (66%) of the households having more than ten (10) members with the least (11%) having around 1 to 5 members (Table 1). A high number of family members is seen as an advantage among small-scale farmers in rural communities as a labour force. Small-scale farmers perceive large families as incentives to work in the agricultural fields. The bigger the family size, the more comfortable the household heads are as field work is guaranteed in rural areas [27]. As such, many men, in rural farming communities, resort to polygamy and embrace extended family ties to acquire large families to use as a labour force for farming [27].

On educational levels, the majority, 59% of the food security pack beneficiaries, did not go beyond primary education compared to the majority, 53% of the non-beneficiaries, who also did not go beyond primary schooling (Table 1). The non-beneficiaries had a higher percentage (22%) of household heads who had never been to school compared to the beneficiaries who had 15% of household heads who never went to school. There were low literacy levels among both the beneficiaries and non-beneficiaries. The findings confirm statistical projections that show continued illiteracy levels in Mpulungu district for the projected 2015 to 2021 period [12]. With little or no education, households can hardly comprehend the latest agricultural technologies thereby reducing the potential for agricultural production that ultimately affects household food security. A study conducted in Tanzania that used food consumption as an indicator of food security concluded that households with family heads with higher education levels had an improved household food security status than those with no or lower education levels [28].

#### Land cultivated by the food security pack beneficiaries and non-beneficiaries

The majority (66%) of the food security pack beneficiary households cultivated between a quarter (0.25) to half (0.50) a hectare compared to the non-beneficiaries whose majority (61%) cultivated less than a quarter (<0.25) of a hectare (Figure 1).



**Figure 1: Area of land cultivated by the beneficiary and non-beneficiary households of the Food Security Pack programme**

The results showed low land cultivation among the non-beneficiaries of the food security pack programme. This suggests that the programme had a positive effect on land cultivation for maize crop production during the three (3) farming seasons reviewed. There was a difference in mean on the amount of land cultivated between the beneficiaries' group (N = 147) and the non-beneficiaries' group

(N = 152) where the mean score for the beneficiaries' group was higher (2.00) than that of the non-beneficiary group (1.59) as shown in Table 2. Cohen's  $d_s$  test reveals a statistically significant difference in the area of land cultivated for maize crop production between the food security pack beneficiaries and non-beneficiaries, where the former cultivated more land than the latter. The calculation of the effect size of the food security pack programme on land cultivation using Cohen's  $d_s$  was estimated at 0.6. Therefore, the effect size of the food security pack programme on land cultivation was moderate or medium in line with the general guidelines for interpreting the effect size [21].

The cultivation of more land by the programme beneficiaries than the non-beneficiaries was due to beneficiaries' access to government-subsidised farming inputs, through the food security pack programme, which increased their farming capacity. This confirms the argument that small-scale farmers participating in government-subsidised farming inputs would farm between a quarter (0.25) of a hectare to five hectares [29]. With favourable weather conditions and adherence to good farming practices, the small-scale farming households that cultivated substantial amounts of land were likely to increase their yields compared to those that cultivated lesser amounts of land [29]. A study conducted in the Philippines, which supports the above argument, examined the role of the proprietorship of land on productivity amongst the farmers involved in rice farming and established that an increase of 1.0% in farm size improved the yield of rice by 0.40% [30].

### Period of receipt of farming inputs by the food security pack beneficiaries

The majority (81.6%) of the beneficiaries received the farming inputs late, outside the planting period, while 5.4% received them in good time (Figure 2).

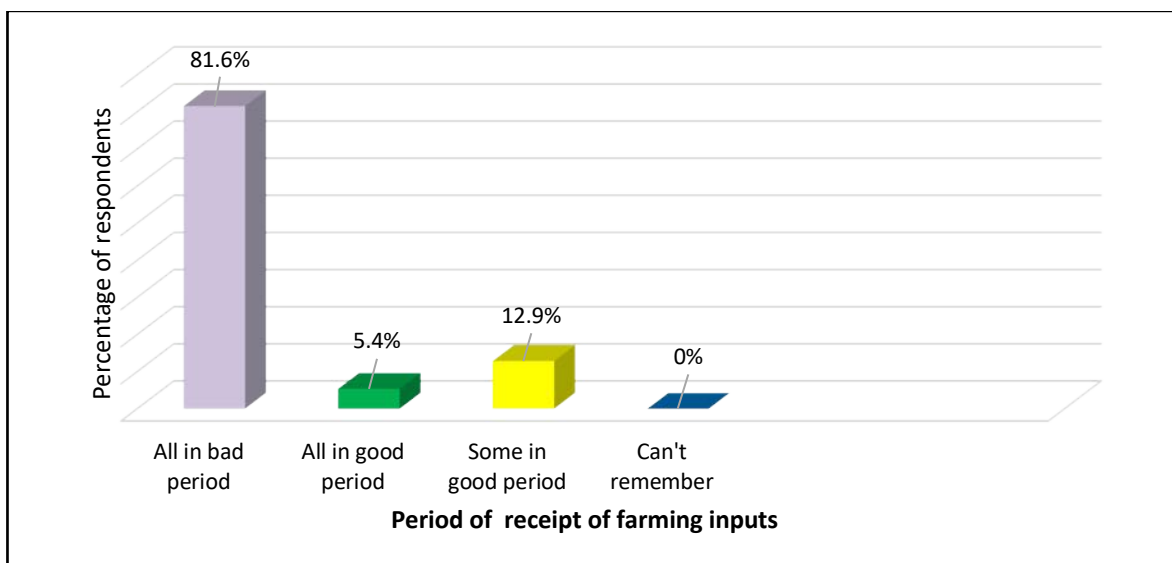


Figure 2: Period of receipt of farming inputs by the food security pack beneficiaries

The outcome of interviews with the Zambian government officials, a traditional leader, and focus group discussions confirmed the responses of the beneficiaries. Both the interviews and the focus group discussions revealed that the beneficiaries of the food security pack, often, received the farming inputs after the recommended period for planting, which is the first week of November. The Zambian government officials ascertained that the late distribution was a result of the failure of the Zambian government to release funds to suppliers on time for purchasing farming inputs.

The above statement by respondents was supported by the focus group participants. The participants also called for the Zambian government to engage local agro-dealers within the district to be suppliers of farming inputs. They argued that empowering local agro-dealers would help in the timely distribution of inputs to farmers as well as boost the local economy. One participant whose explanation was agreed by the majority said:

*“If, as agro-dealers, we are allowed to be engaged locally by the Ministry, prompt delivery of farming inputs to the door-steps of the food security pack beneficiaries would be done on time because we have stocks of inputs all year round in our warehouses. Currently, our readily available farming inputs only benefit those farmers that can afford to buy.”*

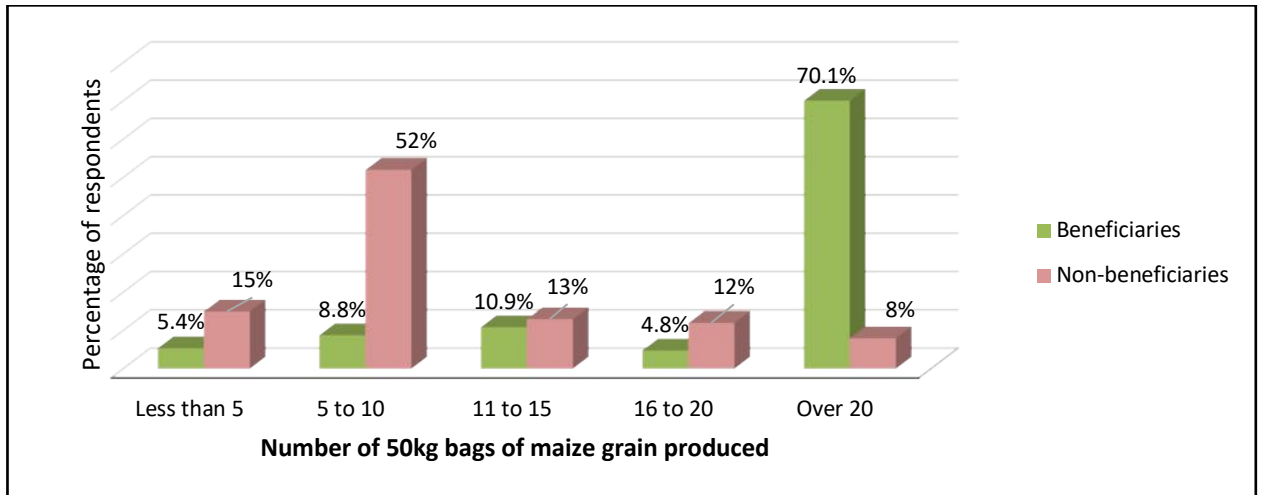
Although most of the food security pack beneficiaries received farming inputs late, this did not guarantee poor crop production. Long-term research by agricultural institutions and seed companies indicates that late planting does not necessarily translate to reduced yields [31]. With favourable weather conditions, small-scale farmers can record good yields, even with late planting, provided factors such as diseases, insect pressure, and risks of hot/dry conditions that affect crop production are controlled [31]. Nevertheless, the findings above indicate that a lot needs to be done to realise the full potential of the food security pack programme in Mpulungu district.

### **Maize crops harvested by the beneficiaries and non-beneficiaries**

The majority (70.1%) of the food security pack beneficiaries harvested more than 20 (50kg) bags of maize grain on average, per 0.25 hectares of land compared to the 8% of the non-beneficiaries that harvested the same amount of maize crop on the same size of land. The majority (52%) of the non-beneficiaries harvested between 5 and 10 (50kg) bags of maize grain per 0.25 hectares of land while the



minority 15% harvested less than 5 (50kg) compared to the minority 5.4% of the beneficiaries that harvested the same amount of maize grain on the same size of land (Figure 3).



**Figure 3: Number of maize grain bags harvested by food security pack beneficiaries and non-beneficiaries**

The study revealed higher maize crop productivity among the programme beneficiaries than the non-beneficiaries. This suggests that the programme contributed to high maize crop harvests during the three (3) farming seasons reviewed. The independent samples t-test indicated that the food security pack beneficiaries (N = 147) had a larger mean on maize crop productivity (M = 4.25) than the non-beneficiaries (N = 152) that had M = 2.45 (Table 3). These results show that the food security pack programme had a positive effect on maize crop productivity for the beneficiary households. Using Cohen's  $d_s$ , the effect size of the food security pack programme on maize productivity was calculated and estimated at 1.5. In this regard, the effect size of the food security pack programme on maize productivity was large based on Cohen's  $d$  parameters [21].

Therefore, there was very solid evidence that a statistically significant difference in maize crop productivity between the food security pack beneficiaries and non-beneficiaries existed, with the former having higher maize crop productivity than the latter (Table 3). Some arguments from focus group discussions agreed with the outcome shown in Figure 3. The food security pack programme was commended for enhancing agricultural productivity to the extent of having some beneficiaries yielding surplus maize crops for sale. One participant from one Area Food Security Pack Committee issued a statement that was emblematic of the remarks of several

focus group participants. This statement sums up the household agricultural productivity of the food security pack beneficiaries:

*“In most situations, people think that it is the laziness of farmers that contributes to poor agricultural productivity; forgetting that lack of resources to purchase farming inputs is the major cause.”*

The empowering of vulnerable small-scale farmers with farming inputs through the food security pack programme which they previously lacked in Mpulungu district contributed to high maize crop productivity. The above finding is supported by the results of the assessment of the Integrated Food Security Programme introduced in 2011 in Malawi whose aim was to lessen food insecurity of the vulnerable households through the implementation of the diversified agricultural production of selected food crops. The assessment of the programme after two years of implementation revealed that it increased the availability of food and access to it by the family members of the benefiting households [32].

## CONCLUSION, AND RECOMMENDATIONS FOR DEVELOPMENT

One of the factors in increasing food crop production is farmers' access to agricultural inputs. The study demonstrates that the food security pack programme in Mpulungu district has a positive effect on land cultivation and maize crop productivity by vulnerable small-scale farmers. The programme beneficiaries performed better than non-beneficiaries in land cultivation and maize crop productivity because of the contribution of the programme. The study revealed that farming inputs were received late by most of the programme beneficiaries, mostly, outside the planting period due to the Zambian government's failure to release funds to farming inputs suppliers on time.

Despite challenges, the food security pack programme has been proven to be one of the social protection programmes that promote and protect vulnerable small-scale farmers due to its response to the sources of vulnerability and deprivation that small-scale farmers face in Mpulungu district. Through the programme, the vulnerable small-scale farmers in Mpulungu district can be helped to be productive in agriculture. The study concludes that the agricultural food security pack programme helped to increase the amount of land cultivated by the majority of the programme beneficiaries, which ultimately enhanced their maize crop productivity in Mpulungu district. It is recommended that the Zambian government should

increase the number of beneficiaries, contract local agro-dealers, and release funds to farming inputs suppliers on time.

### ACKNOWLEDGEMENTS

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**Table 1: Demographic variables for programme beneficiaries and non-beneficiaries**

Characteristic variables	Beneficiaries (%) n = 147	Non-beneficiaries (%) n = 152
<b><i>Gender</i></b>		
Males	51	53
Females	49	47
<b><i>Household family size (members)</i></b>		
1 to 5	26	11
6 to 10	33	23
Above 10	41	66
<b><i>Educational levels</i></b>		
No formal education	15	22
Primary education	59	53
Secondary education	17	19
Tertiary education	9	6

% = percentage      n = number of respondents



**Table 2: Group descriptive statistics on land cultivated for maize crop production**

Group		N	Mean	Std. Deviation	Std. Error Mean
Amount of land cultivated for maize crop production	Beneficiaries	147	2.00	.585	.048
	Non-beneficiaries	152	1.59	.848	.069

N = number of respondents

Std. = Standard

**Table 3: Group descriptive statistics on maize crop productivity**

Group		N	Mean	Std. Deviation	Std. Error Mean
Maize crop productivity	Beneficiaries	147	4.25	1.265	.104
	Non-beneficiaries	152	2.45	1.127	.091

N = number of respondents

Std. = Standard



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