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Impact of Input Support Schemes on Irrigated Maize in Gokwe South District, Zimbabwe

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Abstract- The study analyzed the existing input support schemes and their impact on maize productivity under irrigation in Zimbabwe taking Gokwe south district as a case study. In terms of the methodology, the study adopted case study, and targeted smallholder farmers in 33 wards of Gokwe South district. From 33 wards selected, only ward 5 (Sai ward) was used as a sample to represent the whole district with sub-villages. Sai ward comprise more than 20 villages with approximately 634 smallholder farmers in total and 40 farmers were used as a sample to provide primary data using a questionnaire. Government and non-governmental organizations also be interviewed and so are the service providers such as input suppliers and buyers. The results review that R value of 0, 825 ($p<0.05$) shown from correlation analysis between maize output and quantity of fertilizer. Furthermore, results revealed that based on the cost of production and input packages offered to small holder farmers in Gokwe South District farmers are realizing income ceteris paribus. Budget A. above showed cost of production under input support scheme while budget B is a comparative budget without input assistance. Smallholder farmers with input support scheme had lowest total variable cost of $339.03 compared to $411.77 without input assistance. In terms of revenue input support scheme had a 45% contributory compared to non-input assisted farmers. Overall in terms of profitability farmers with input support scheme realized a significant profit while those farming without assistance were realizing loss.

Keywords— Input Support Scheme, maize productivity, smallholder farmers, profit

I. INTRODUCTION

Agriculture is one of the most critical dimensions of Zimbabwe's economic recovery and is central to rebuilding food and livelihood security [1]. The structure and socio-economic conditions of agricultural sector in Zimbabwe today has been a function of deliberate discriminatory policies by the previous governments since 1893 till 1980. The new government in 1980 inherited a dual Agrarian structure and decided to pursue a policy of growth and equity attempting to address socio-economic factors affected the economy. In pursuit of the broad policy, objectives of growth and equity were formulated to do with the enhancing of agricultural maize output, increasing domestic food self-sufficiency, provision of access to inputs and redistribution of income to the formally disadvantaged rural smallholder farmers [2]. In an effort to address the pre-independence anomalies, the post-independence government took a different strategy. Agricultural support services were deliberately structured to address the circumstances of the smallholder farmers which imply that extension, research and credit institutions had to focus their attention on smallholder farmers. This was because the land was disproportionately shared between three farming sectors; about 6000 large-scale commercial farmers who controlled 47% of agricultural prime land and supported 1, 8 million people. 800 000 communal farm families controlling about 49% which supported a population exceeding 4,5 million people and lastly 8 500 small scale commercial farmers with 4% of total agricultural land supporting approximately 59 500 people [3].

Agricultural marketing infrastructure was expanded through expansion of more deports and collection points in terms of GMB. Marketing and pricing of most agricultural commodities i.e. strategic crops remained controlled since higher output levels and access of food are determinants of food security within an economy [4]. Food and Agricultural Organization (FAO) an international organizations has promoted consistency in the various areas of assistance by ensuring principled and coordinated programming, through the creation and strengthening of coordination and monitoring mechanisms. In order to coordinate these efforts and to maximize the benefits for the affected population, an Agriculture Coordination Working Group (ACWG) was established in 2002 under the Chairmanship of FAO [5]. This forum brings together representatives from Government, UN agencies, donors, international and local NGO's, private sector and other organizations and government parastatal i.e. GMB working in the agriculture and food security areas. However to further strengthen coordination efforts, FAO initiated the production of an atlas during the 2008-09 season indicating

average yields for most agricultural cash crops and strategic crops i.e. maize and other small grains. Although the efforts were done to promote maize production, still there is still low production, which is the reason why the researcher intents to analyse the impact of input support schemes on the maize productivity.

The paper is structured in the manner that it provides literature in Section II, material and methods adopted in Section III, Section IV provided results and discussion and Section V provided the conclusions.

II. RELATED WORK

Maize productivity

Maize productivity can be defined as the total yield per hectare produced for commercial purpose. Higher maize productivity as the overall output of maize with higher calorific value produced in a given area per given season [6]. This definition provides a link between maize productivity and food security if we incorporate the aspect of access into FAO's definition for maize productivity. However for this study shall refer to maize productivity as output per hectare.

Input Support Schemes (ISS)

These are projects being carried out by both private and governmental organizations as to meet specific objectives. Some of the objectives are macro objectives such as price stabilization, full employment of resources, food security and economic growth and recovery. These projects support different farmers with different services and products within the agricultural sector [9].

Effect of Input supply and credit schemes to smallholder maize growers

According to literature [10] input credit scheme plays a significant role among smallholder farmers as they reduce financial challenges, and constraints to factors of production such as fertilizers, labour and seeds required as means of production. Research has shown that input support schemes are engines of prosperity and social advancement as they play a critical role in capacitating smallholder with resources necessary for maize production. Furthermore, shortage of credit facilities is translated to lack of working capital which limits farmers to finance farm operations and this reduces the ability to purchase required inputs in time to meet expected yields per hectare [11]. Generally input credit schemes increase maize production due to the increase in area under maize cultivation by an individual beneficiary farmer. Non-beneficiary farmers would be having challenges of money to purchase inputs therefore leading to inputs shortages and reduced area under maize cultivation. Also input support schemes increase the number of players in the industry for maize production thus boosting overall maize production in the country. The improvement in maize production results in an improvement in food security country which is one of the objectives of agricultural policy.

Constraints to input support schemes in the production of maize in Zimbabwe

The previous section discussed importance of maize in Zimbabwe. However this section discusses various constraints faced by smallholder farmers producing maize as well as input support schemes distributing various inputs to these farmers. Maize production can be affected by economic and political environment as well as climatic factors. Poor communication and road networks affected most of the projects carried out in communal areas by various Input Supply Schemes. According to literature [7] FAO fertilizer project carried out in 2008 failed to reach farmers in isolated area due to poor roads and communication networks. The problems of poor roads have a negative implication on maize productivity because inputs will not be able to reach the targeted group of farmers in time to meet targeted output/Ha. Some of the Input Support Schemes had inadequate quality control capacity to the extent that substandard inputs get to farmers which can be attributable to government policies and political environment affecting projects implemented by several non-organizations [8].

Benefits derived from input support schemes

Input Support Schemes enhances promotion of agricultural production, exports and food reliance in most developing countries. This can be in the form of price support. Price give farmers signals, incentives to produce, hence they serve as an instrument of allocating resources and income. If there is no promotion the farmers produce less, swing to other crops, venture into illegal trading, produce for own consumption and finally leave land and seek employment in other sectors of the economy [12]. Literature [13] states that," the subsidization of basic food such as mealie meal has also been used in order to increase effective demand for these commodities". In general the above quote shows that farmers respond to subsidies in a positive way as people respond to incentives. Creation of employment as well as indigenization is a benefit derived from expansion of input support schemes [14]. The substantial contribution of smallholder farmers increases GDP and formal sector employment. It has been noted that several governments have focused on the technical and technological advancement in supporting advancement of the small scale maize production. Process and product innovations such as hybrid seeds and fertilizers among several innovations have been noted as major key drivers towards productivity and the gross domestic product of the developing nations [15].

Review of empirical studies on input support schemes in the production of maize.

Studies [16] documented that input trade fairs and input distribution programme led to spinoff benefits in Zimbabwe since independence. Expansion of input support schemes across the country was fundamental in the improvement of maize production as well as other parallel socio-economic activities such as that aim to raise awareness of HIV and AIDS. Moreover it was noted that some spontaneous cultural activities such as traditional

ceremonies took place in several villages during input distributions

Another author [17] also studied roles and effectiveness of input support schemes in the production of maize as a staple crop of Zimbabwe in Masvingo and Bikita area and discovered that input support schemes are associated with provision of inputs either in the form of vouchers or direct inputs such as fertilizers and seeds. He further noted that vouchers were an effective method of input distribution in Bikita during Zimbabwean dollar era due to inflation.

Lastly, another author [18] in his study for cereal production noted that after the Bangladesh Government adopted the Innovation adoption models on input distributions to sustain the economy food security status. New seed maize hybrids and fertilizers were introduced and positive results in terms of productivity of maize were noted. This was noticed in 1977 when the government also supported the small scale farmers with herbicides and fertilizers with the intention to promote income distribution and alleviate poverty. The results of such an intervention were significant as 2501kg/Ha were realized in Myanmar around since 1980.

III. METHODOLOGY

The Study Area

This study was conducted in Gokwe District which comprises 33 wards and each ward is subdivided into several villages which comprise many smallholder maize growers.

Research Design

The study adopted a case study research design, in conceptualizing the research idea which sought to analyze the impact of input support schemes on maize productivity in Zimbabwe. The study narrowed on a particular case which were selected irrigation schemes under Gokwe South District. The research generalized the key findings based on the data which was gathered from the case study of Gokwe south district. The researcher had to adopt a case study as the design was effective enough in generalizing findings at lower cost and within a shortest stipulated timelines. In order to implement the case study approach effectively, the researcher adopted interviews and questionnaire survey methods and a mixture of qualitative and quantitative data analysis was adopted.

Population and Sampling Procedures

The targeted population of Study

The population of this study involved 6300 smallholder farmers who are under irrigation schemes in Gokwe South which was estimated based on the records gathered through the Department of Irrigation Registers in the Midlands province of Zimbabwe [11]. For 33 Wards in Gokwe South area only one ward was used for this study due to the limited resources available to the researcher.

Sample of Study

Gokwe South district comprises of 33-wards in total. From 33 wards selected, only ward 5 (Sai ward) was used as a sample to represent the whole district. Sai ward comprise more than 20 villages with approximately 634 smallholder farmers in total. The sampling technique employed in Sai ward was a proportional random sampling method which involved selection of 8 households per village out of 5 villages with irrigations to represent the whole population of study. The following table 1 shows the sample frame:

Table 1: Sample Size

Villages in Ward 12	Estimated smallholder farmers	Households Sampled
Manata	42	8
Nyamayedenga	22	8
Tazvarirwei	25	8
Mukoka	31	8
Muperekwa	23	8
Total Sample Size		**40**

However a sample of 40 households from Gokwe South district answered questionnaire of this current study. This sample as shown on table above represents the targeted population of this study.

Data collection methods

Research instruments: Questionnaires were used in this study to collect information from smallholder farmers growing maize. Interview schedule was used for gathering data from various economists and agronomists.

Questionnaire: These are structured interview schedules which can be filled by respondent in selected area of study. The questionnaires were answered by 40 respondents in Gokwe South district. These questionnaires was delivered to the selected farmers through the Zimbabwe Farmers Union (ZFU) District offices during researcher's attachment at ZFU headquarters to cut costs and to ensure proper flow of information.

Interview: Key informant interview was conducted with various economists and agronomists from GMB, Ministry of Agriculture, FAO and IFAD to gather information for analyzing effects of fertilizer subsidies on maize productivity in Zimbabwe. Fully structured interviews had predetermined set of questions and responses to answer objectives of the study.

Data Sources and Presentation

Sources and Type of Data Collection: In order to gather primary data the researcher considered smallholder farmers as source of primary data. Government and non-governmental organizations also be interviewed and so are the service providers such as input suppliers and buyers. Secondary data was collected from published magazines, reports and other relevant books from organizations such as ZIMSTATS, and the Swedish Cooperative Centre (SCC), European Union (EU), Government of Zimbabwe, Zimbabwe Farmers Union and Food and Agricultural Organization (FAO).

Data Presentation and Analysis Procedures

Tables, bar and line graphs were used to present data

Table 2: The summary of the analytical framework

Objectives	Analysis Procedures
Characterization of farmers and input support schemes available for the production of maize	Descriptive statistics was used as analytical tools for testing H_0.
Determine relationship between input packages and maize productivity	Multiple regression analysis, Descriptive statistics and t-test.
Determine the overall impact of input subsidies on income levels of beneficiary smallholder maize growers.	Gross margin analysis and t-test.

Econometric Modelling

Data obtained was used to analyze the effect of input packages on maize output were maize output is the dependent variable against X_1 to X_6 as independent variables. Below is a multiple regression model to estimate and analyze the effect of inputs subsidies offered as a package, on maize productivity. The following is the model:

$$Y = \beta_0 + B_1X_1 + B_2X_3 + B_4X_4 + B_5X_5 + B_6X_6 + \mu$$

Given that Y = Maize Output

X_1 =fertilizer quantity used (AN and D)

X_2 =seed quantity used

X_3 =area under cereal

X_4 =dummy variables for beneficiary status

X_5 =education status

X_6 =number of children in a household

μ =error term

Assumptions of the Model

Maize output is a function of seed quantity, fertilizer quantity, beneficiary status and area under cereal, education status and assets held by a farmer ceteris paribus. For this model to be valid climatic factors and political environment are held constant.

Gross Margin Analysis [GMA]

Gross margins are calculated on per hectare basis.

A period of 3 production years was used for the analysis. According to literature gross margin is derived as the difference between total variable costs and total income realized in the maize production enterprise [10].The gross margin is the best tool for comparative analysis of the overall how input support schemes affect gross income levels of smallholder farmers who benefited against those who did not, since all the return are expressed on per unit basis [e.g., $/ha]. In this project GMA assesses the following:

- Changes in fertilizer prices, seed maize and labor costs as variable production costs per season:
- Changes in annual maize average yield per hectare per
- Gross Margin = Total Income realized – Total Costs

Principle of GM:

- Given that GM is greater than 0[benefit] and if GM is less than 0[loss]

Therefore in this study H_0 was only accepted as true if GM>0 implying an improvement in smallholder income. To analyze the extent to which input subsidies affect level of income an analysis was carried out at different levels of input prices.

Limitation of the GMA

- It is a partial measure of profitability since fixed costs are excluded during gross margin analysis.

Strength of the GMA

- GMA Provides actual values of production of maize in seasonal trends for analysis of the impact of input subsidies on income levels of small holder farmers.
- GMA reveals the production values on per hectare basis, thus rendering a proper analysis of input packages on maize productivity given different area under cereal.

IV. RESULTS AND DISCUSSION

Characterization of Smallholder Farmer

The respondents were asked to provide their demographics by indicating their gender, highest level of education, marital status and type of crops grown in Gokwe district as shown in the findings below:

Gender of the Beneficiaries

Information on gender was collected and the results were presented as follows:

Table 3: Gender

Gender	Frequency	Percent
Female	25	60%
Male	15	40%
Total	**40**	**100%**

Pearson Chi^2 = 1.321 Pr = 0.395

Composition of Farmers according to categories

The following were the composition of farmers.

Table 4: Descriptive Statistics of Composition of Farmers

Composition of Farmers	Frequency	Percent
A1	6	10%
Small scale Commercials	12	70%
Small scale Communal	12	20%
Total	**40**	**100%**

Pearson Chi^2 = 1.2227 Pr = 0.328

Level of Education Attained

The data on level of education were as follows:

Table 5: Level of Education Attained

Education Attained	Frequency	Percentage
Tertiary	2	8
Secondary	20	50
Primary	18	42
None	0	0
Total	**40**	**100**

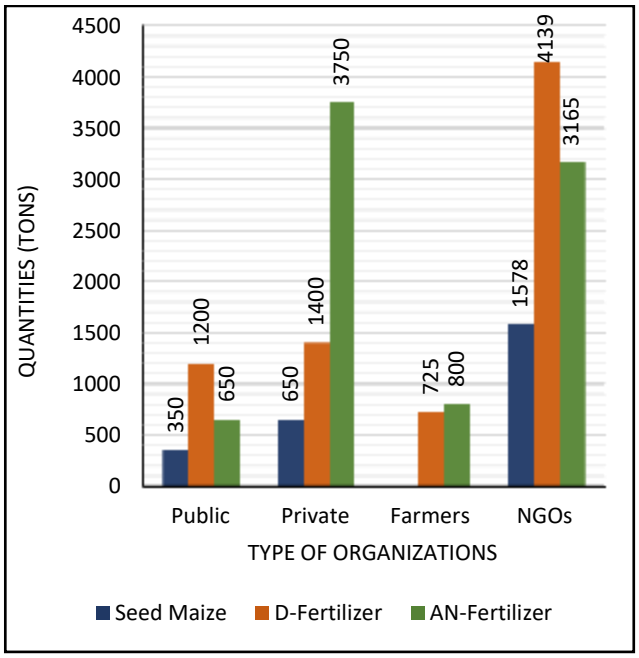
Person Chi^2 = 1.2227 Pr = 0.328

Descriptive Statistics on Input Support Schemes in Zimbabwe for the 2005-2020 seasons

Table 5: Results and analysis of input support schemes studied.

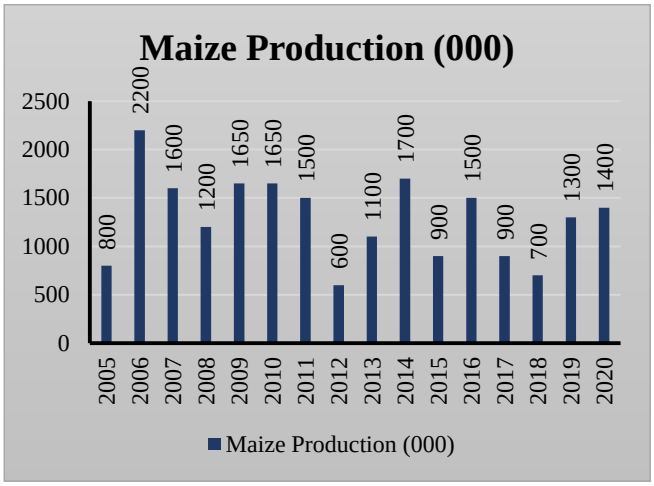
	Input distributors/Facilitating companies	Form of Aid given to smallholder farmers
N	58	
Mode	4	4
Mean	3.69	2.66
Standard Deviation	0.730	1.264
Variance	0.534	1.598
Maximum	4	4
Minimum	1	1

Below is a chart which describes forms of input support schemes which were available in the production of maize in Gokwe South District in Zimbabwe.



Source: Chinsinga (2019)

Figure 1: Forms of Input support schemes available in the production of maize in Zimbabwe



Source: DFID (2019)

Figure 2: Maize Production Trend 2005-2020

Regression model to determine how input packages offered in the form of a subsidy affect maize productivity was as follows:

$$Y = \beta_0 + B_1X_1 + B_2X_3 + B_4X_4 + B_5X_5 + B_6X_6 + \mu$$

Given that Y = Maize Output

X_1 =Fertilizer Quantity Used (AN and D)

X_2 =Seed Quantity Used

X_3 =Area under Cereal

X_4 =Dummy Variables for Beneficiary Status

X_5 =Education Status

X_6 =Number of Children in a Household

μ =Error Term

This section analyses the multiple regression model which determine the relative impact of each independent variable on maize productivity. The major aim is to address the relationship between maize productivity, beneficiary status and factors of production specified in the model. Maize productivity depends on access to cheap inputs, climatic factors, hectarage under cereal, assets held by farmers which are directly linked to maize production.

Table 6: Regression results and inference to test the significance of the relationship

Variables in maize production	Coefficients	T-Stat	Sig.
Constant	0.694	-0.536	0.596
Area under maize	0.139	1.080	0.288
Dummy (beneficiary)	0.234	1.883	0.069
Number of children	0.060	-0.615	0.543
Quantity of seed used	0.014	-0.772	0.446
Quantity of fertilizer	0.002	6.362	0.00
Education status	0.152	-0.663	0.512
R-squared	0.681		
R-adjusted	0.623		
F-statistic	11.736		
Pearson Coefficient	0.825		
Durbin-Watson test	1.870		

Variable correlation analysis

The results below shows Pearson correlation coefficients which were used to identify the relationship between variables specified in the model.

Table 7: Results on Correlation Analysis

	Maize Output					
Maize output	1.000					
Beneficiary status	0.282	1.000				
Quantity of fertilizer used	0.797	0.155	1.000			
Quantity of seed maize used	0.317	-0.142	0.407	1.000		
Number of children in a household	0.063	0.141	0.110	0.250	1.000	
Education status	-0.204	-0.031	-0.185	-0.203	-0.335	1.000
Area under maize	0.373	-0.155	0.431	0.909	0.172	-0.204

In terms of the overall impact of input subsidies on income levels of beneficiary smallholder maize growers

A general form of the regression model used in this study:

$$Y = \beta_0 + B_1X_1 + B_2X_3 + B_4X_4 + B_5X_5 + B_6X_6 + \mu$$

Given that Y = Smallholder Income
X_1 =Land Preparation Cost
X_2 =Cost of Weeding
X_3 =Cost of Harvesting
X_4 =Price for Input Package
X_5 =Maize output
μ =Error Term

The regression results for the model above are as follows:

Table 8: Regression results from SPSS

Gross Margin Analysis – Profitability Analysis

Table 9: Gross Margin Analysis

	A	**B**
Yield (T/HA)	1.5	0.78
Selling price ($/T)	$275	$275
Gross income ($/HA)	$412	$214.5
Total variable costs ($/HA)	$339.03	$411.77
Gross margin ($/HA)	$73.47	-$197.27
Gross margin ($/$100 VC)	$21.67	-$47.91
No of labour hours/ha	269	269
VARIABLE COSTS	$/ha	$/ha
Seed	$45.00	$62.50
Ploughing, Costs	$80.00	$80.00
a. Maize fertilizer (D)	$66.00	$87.00
b. Ammonium nitrate	$48.00	$81.00
d. Transport 40 Km	$5.58	$6.82
Labour cost/OC	$10.00	$10.00
a. Dipterex 2.5%	$10.00	$10.00
b. Dual Magnum 2 Litre	$30.00	$30.00
SUBTOTAL	$294.58	$367.32
HARVESTING COSTS		
a. Empty Bags	$14.00	$14.00
b. Twine 0.09kg/ton	$0.45	$0.45
2. Transport off farm	$30.00	$30.00
SUBTOTAL	$44.45	$44.45
TVC	**$339.03**	**$411.77**

The discussions of the findings above is provided below:

Discussion of Findings

Characterization of Smallholder Farmer

The respondents were asked to provide their demographics by indicating their gender, highest level of education and marital status. The findings as presented in Table 3 shows that, the modal gender group were female with 60% and male constituting 40% of the Smallholder farmers. The results imply that more female are into maize production than males in Gokwe district. The findings has shown that the composition of smallholder farmers in Gokwe South shows that there are diversified types of farmers in Gokwe South District. According to the results obtained in this current study there are 3 categories of farmers in Gokwe South who are into maize production.

Table 4 shows that they are 3 farmer categories namely A1, Small scale commercial and small scale communal farmers. This means that 10% of farmers in Gokwe South are A1, 70% in small scale commercial farmers and another 20% small scale communal farmers. The results are showing that more farmers in Gokwe South form small scale commercial farmers. The results imply that farmers produce at a smaller scale for sale maize produce. Findings on education attained in table 5 revealed that about 42 % completed primary school, 50% completed secondary school and 8% completed tertiary education.

Model	R	R^2	Adjusted R^2	F-Stat	Watson
1*	.922[a]	.850	.814	23.7.8	1.434

1. Description of ISS available in the production of maize in Gokwe South District in Zimbabwe for the 2005-2020 seasons

The first objective sought to describe the ISS. The study consisted of 58 input and credit providers who supported smallholder maize growers in Gokwe South District in Zimbabwe. The input and credit supply system for maize production in Gokwe South District in Zimbabwe comprises many funding companies and organisations

which offered different services and products to smallholder farmers as a way to improve productivity. Table 5 in the appendix section shows different credit and input distributors which were available in the production of maize in Gokwe South District in Zimbabwe. The quantification of input and credit schemes available in the production of maize is shown as a descriptive statistics from table 5 which was categorized according characteristics of the implementing/facilitating company being private, public company/governmental companies, Farmer Unions, International organizations and other NGOs against form of assistance offered to small holder maize growers.

Results in Table 6 shows that from 58 input and credit schemes studied with a mode and a maximum value of 4 which shows that most of the input support schemes are funded by International organizations and other NGOs compared to all other input service providers such as private, public companies and Farmer Organizations. Moreover maximum value under form of aid implies that most of International Organizations and other NGOs offer voucher for procurement of fertilizers to smallholder maize growers. However the minimum value of 1 is an indication that private sector contributes lesser to maize production during the 2005-2020 seasons.

The bar chart in figure 1, shows that seed maize which was offered in the form of a subsidy was mostly distributed through International organisations and other NGOs i.e. FAO, CARE International, etc. as compared to all other sectors. Much of AN, was distributed through the ministry via Operation Maguta as shown on the chat with a highest tonnage of 3750. Farmer Unions such as ZFU, ZCFU and CFU only distributed fertilizers through the Input Support Scheme for fertilizer only during the 2005-2020 season. However from the bar chart above international organisations contributed a greater proportion of compound D for production of maize which had an overall impact on maize output at national level. Results in figure 2 has highlighted that recovery in cereal production, including maize during the 2005-2020 agricultural seasons benefited from improved support, timely availability of subsidised inputs through donor support assisting smallholder farmers with credit facilities, extension and training services, fertilizers and input schemes. Some of the inputs where offered directly on the open market but none in the form of a subsidy. The ZFU annual report [15] states that the combined impact of government of Gokwe South District in Zimbabwe and cooperating partner supporting including Gokwe South District in Zimbabwe Farmers Union's Input Support Scheme '16 fertilizer program for smallholder farmers boosted communal farmers' maize output from 90215 tonnes to 96675 tonnes in 2009/10. Roles of input and credit schemes are discussed in the section below.

2. Determine how input packages offered in the form of a subsidy affect maize productivity for small holder farmers in Gokwe South District in Zimbabwe

The second objective sought to determine how input packages offered in the form of a subsidy affect maize productivity for small holder farmers.

Findings in table 7 describes the expected impact of variables in the model used in this study to analyze the relationship between fertilizer subsidy and maize output. Education status was expected to have a strong positive relationship with maize output because the more one increases knowledge base concerning agriculture the more he/she improves productivity. Beneficiary status is a dummy variable and was expected also to have a positive effect on maize productivity since the more farmers benefit from various input and credit schemes the higher the chances of increasing maize production.

Number of children per household was also likely to have a positive impact because according to [14] when he was describing functions of a family he stated that a family. Seed quantity was expected to have no significant effect on productivity since specific quantity of seed is required per hectare, however exceeding the level is not economic. Area under cereal was also expected to have a positive effect on maize output since the more one increases production area the higher the output gained compared to a small piece of land.

From the table 7, a higher Pearson correlation coefficient indicated by 0.825 shows overly that there is a positive relationship between maize production and all six models estimated in this study. R-squared 0,681 shows the strength for the relationship between all variable specified in the model. Education status was insignificant 95% but significant at 10 % level with a positive effect on maize production, implying that as farmers acquire knowledge and new skills concerning maize production higher yields will be attained. From the results it shows that Quantity of fertilizer used was significant and it had a positive impact towards maize productivity under irrigations in Gokwe South. The law of diminishing returns is applicable in this scenario which states that if you increase a variable input like fertilizer, production of maize will increase up to a certain point that a marginal increase in variable input will result in the decline of output ceteris paribus. From the results it shows that an increase in quantity of fertilizer (D & AN) can increase maize output by 6.362 holding constant all other factors such as climatic factors, socio-economic environment, etc.

Beneficiary status was also significant with a positive respond towards production of maize. From the results is showed that as the number of beneficiary farmers increase production of maize increase by a 0.234 ceteris paribus. This however is supported by literature were an increase in input and credit schemes to support smallholder maize growers increases maize production [17-18]. However being part of input and credit schemes proved to be an effective way of boosting smallholder maize production in Gokwe South District in Zimbabwe.

Area under maize was insignificant at 95% significant level although significant at 99% SL. This variable showed a positive effect on maize production, in this case number of children per household was insignificant and quantity of seed used was insignificant. In addition, the results in Table 9 shows Pearson correlation coefficients which were used to identify the relationship between variables specified in the model. Holding all other things constant there is a positive relationship between maize output and quantity of fertilizer as indicated by 0.797. This implied that as fertilizer quantity increases maize output increases till optimum point. The results shows that area under maize and maize output is positively correlated implying that as area under maize increases.

3. Determine the overall impact of input subsidies on income levels of beneficiary smallholder maize growers

The third objective sought to determine the overall impact of input subsidies on income levels of beneficiary smallholder maize growers. To summarize Table 4.9 shows regression results which show relationship between input packages and income levels of a smallholder farmer. The results confirmed a positive relationship between variables under consideration ($R= 0.922$, $p<0.05$). Coefficient of Determination (R2 value) shows that 85% of variation in income levels of a smallholder farmer was explained by input packages. The adjusted R2 shows that 81.4% of the variance in in income levels of a smallholder farmer was explained by input packages.

Gross Margin Analysis – Profitability Analysis

This section describes gross margin analysis used to analyze the effect of input package on income levels of smallholder farmer. The results in table 11, revealed that based on the cost of production and input packages offered to small holder farmers in Gokwe South District farmers are realizing income ceteris paribus. Budget A above showed cost of production under input support scheme while budget B is a comparative budget without input assistance. Smallholder farmers with ISS had lowest TVC of $339.03 compared to $411.77 without input assistance. In terms of revenue input support scheme had a 45% contributory compared to non-input assisted farmers. Overall in terms of profitability farmers with ISS realized a significant profit while those farming without assistance were realizing loses.

V. CONCLUSION AND FUTURE SCOPE

Gokwe South District in Zimbabwe is still facing higher levels of chronic food insecurity and unemployment which is due to several socio-economic factors affecting smallholder maize production in Gokwe South District in Zimbabwe. The main constraint to increased maize production of food stuffs in the country is the limited access of smallholder farmers to credit facilities, agricultural inputs and farmer knowledge on maize production. The study conclude that 82.5% increase in maize output is explained by fertilizers offered through input support schemes. Furthermore, study also concluded that based on the cost of production and input packages offered to small holder farmers in Gokwe South District farmers are realizing income ceteris paribus. Smallholder farmers with input support scheme had lowest total variable cost of $339.03 compared to $411.77 without input assistance. In terms of revenue input support scheme had a 45% contributory compared to non-input assisted farmers. Overall in terms of profitability farmers with input support scheme realized a significant profit while those farming without assistance were realizing loss.

In terms of policy recommendations the study recommended that member states should take immediate action to increase access to credit facilities, extension services and input such as fertilizers, seed maize and chemicals i.e. herbicides and insecticides. In addition, the government and all humanitarian concerned organizations should change their policy direction and focus on issues of improving food security at household level through credit and input assistant. Input support scheme offer such benefit and can improve food self-sufficiency for the country. Furthermore, companies and organizations which facilitate input distribution should also offer knowledge through training to smallholder farmers to improve farmer knowledge base and level of income.

In future there is need to look into the management and administration of inputs on economic development.

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