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Impact of IFAD-Community Based Agriculture and Rural Development Programme on participants and non-participants farm production efficiency in Katsina State, Nigeria

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ABSTRACT

The study examined the impact of IFAD–Community Based Agriculture and Rural Development Programme (IFAD-CBARDP) participants and non-participations farm production efficiency in Katsina State, Nigeria. Multistage sampling technique was used in selecting 432 respondents for this study. Primary data were collected using a structured questionnaire and data collected was based on 2002 and 2015 cropping seasons, the year 2002 and 2015 was used as before and after respectively. The structured questionnaire was pre-tested before it was administered to the sampled farmers. The tools of analysis employed to analyze the data were stochastic frontier production model. The maximum likelihood estimate of the stochastic frontier Cobb-Douglas production function revealed that the participants and non-participants of the IFAD-CBARDP had mean technical efficiency of 95 and 47%, respectively. This is an indication that there is higher level of technical efficiency among the participants of the IFAD-CBARDP than non-participants. It was concluded that the IFAD-CBARDP has succeeded in targeting the marginalized and vulnerable participants in its farm technical efficiency; this is evident in their mean technical efficiency of 95%. Although, there is still room to increase the efficiency of their farming activities to 5% to close the efficiency gap from the optimum (100%).

Keywords: Farm production, efficiency, IFAD-CBARDP, farmers, Katsina.

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INTRODUCTION

In recognition of the economic challenges the rural poor face in Nigeria, the Federal Government of Nigeria approved International Fund for Agricultural Development (IFAD) loan of $29.9 million for establishment of Community-Based Agricultural and Rural Development Project (CBARDP) effective from January 31, 2003 and with completion date of September 2013 after an extension in 2010. The general objective of the programme was to improve the livelihoods and living conditions of the rural poor, with an emphasis on women and other vulnerable groups. The programme covered 69 Local Government Areas (LGAs) and 207 Village Areas (VAs) across the seven participating States of Borno, Jigawa, Katsina, Kebbi, Sokoto, Yobe and Zamfara States in the different agro-climatic zones in North-West and North East Nigeria (IFAD-CBARDP, 2013). From inception in 2003, IFAD-CBARDP became a landmark in addressing rural poor communities in these states. The direct target beneficiaries were 400,000 rural households and the programme was to impact on about 12 million people in the long run. With the buy in and expansion during its implementation, it is estimated that it will directly benefit 720,000 rural households and impact on about 18 million people in the long run (CBARDP, 2013).

The IFAD-CBARDP is the second phase of the IFAD-ACDP which commenced in Katsina State in 2003 and with completion date of September, 2013. The general aim of the programme is to improve the livelihoods, living conditions and reduce poverty of the rural poor. From inception of the programme in 2003 to date, it became landmark mandate in addressing rural poor communities in the state. This study was conducted to compare the farm production efficiency of the marginalized and vulnerable farmers between the IFAD – Community Based Agriculture and Rural Development Programme participants and non- participation in Katsina State, Nigeria.

MATERIALS AND METHODS

Study area

The study was conducted in Katsina State, Nigeria. The global location of the State is between longitude 6°52′, 9°20′ E and latitudes 11°8′, 13°22′ N, covering a land area of about twenty four thousand, one hundred and ninety four square kilometers (24,194 km^2), with an estimated population of five million, eight hundred thousand, six hundred and seventy two (5,800,672) people comprising of 2,947,639 males and 2,853,033 females (NPC, 2006).

There are two seasons in the State which includes wet and dry seasons. The wet season starts from the months of June to September and the dry season from October to May. The dry season is usually dominated by the north-east trade winds which are dry and dusty, popularly called the *"harmattan"*. The mean daily temperature ranges between 16 and 40°C while the annual rainfall ranges between 300 and 400 mm in the Sahel, 600 to 800 mm in the Sudan savannah and 900 to 1100 mm in the northern guinea savannah (KTARDA, 2014). There is an available farmland area of about one million, six hundred and forty thousand hectares (1,640,000 ha) with an identified *"Fadama"* land area of thirty six thousand, one hundred and thirty nine thousand hectares (36,139 ha) out of which twenty five thousand hectares (25,000 ha) are irrigatable "*Fadama*" areas. "*Fadama"* is the Hausa name for describing irrigatable lands that are underlined by shallow aquifer (Bello, 2006).

The main occupation of the people in Katsina State is farming, cattle rearing and crafts. Apart from crop farming, livestock are also reared such as cattle, sheep, goats, camels, poultry, etc. It is worthy of note that there are other income earning activities carried out by the people in the state such as government work, trading, crafts work (blacksmithing, basket and mat weaving, wood carving etc.) trading, hunting and fishing. The state is currently made up of thirty four Local Government areas out of which twelve (12) Local Government Areas participated in the IFAD-CBARDP. The participating LGAs are Danja, Bakori, Musawa, Kusada, Dutsin-ma, Dutsi, Bindawa, Baure, Kurfi, Batsari, Jibia and Kaita. According to IFAD-CBARDP (2012), the marginalized and vulnerable groups identified in the study area are women, widows, elderly, youth, hunters, pastoralists and people living with HIV/AIDS. Population of this study is made up of the crop farmers in the IFAD –CBARDP participating Local Government Areas in Katsina State.

Sampling technique and sample

This study was carried out in all the three agro-ecological zones of Katsina State namely: Southern (Northern guinea), Central (Sudan Savannah) and northern (Sahel) zones. Two sample groups were drawn from the marginalized and vulnerable crop farmer population; a sample of participants and non-participants. Multistage sampling technique was used in selecting 432 respondents for this study. The first stage involves the purposive selection of six LGAs out of the 12 participating LGAs in the State. This study took into consideration the difference in the agro-ecological zones in the State. The State has three distinct agro-ecological zones with marked differences in rainfall and crops grown. As such the State was stratified into three according to the agro-ecological zones. Two LGAs with high concentration of Community Development Associations (CDAs) and farmers' associations were then purposively selected in each agro-ecological zone with the help of IFAD desk officers in the State programme, making a total of six LGAs. The LGAs selected for the study were; Jibia and Batsari in the northern zone (Sahel), Dutsin-ma and Musawa in the central zone and Bakori and Danja in the Southern zone.

The second stage included the random selection of two villages from each of the sampled LGAs making a total of twelve villages respectively. The twelve (12) villages were: Farfaru, Daga, Ruma, Kasai, Shema, Sanawa, Garu, Sako, Kakumi, Jargaba, Kahuta and Tandama. The third stage involves the random selection of 216 marginalized and vulnerable farmers for the participants and non-participants groups. The non-participants were selected to serve as the control group. Thus, a total of 432 farms were sampled for the study which represents 10% of the population of the study.

Data collection

Primary data was used for this study and were collected for the 2002 and 2015 cropping seasons through the use of structured questionnaire and oral interview schedule administered on both programme participants and non-participants.

Analytical techniques

Stochastic frontier model

This model was employed to determine the technical efficiencies of the marginalized and vulnerable groups. The measurement of firm level technical efficiency has become common place with the development of frontier production functions. The approach can be deterministic, where all deviations from the frontier are attributed to inefficiency, or stochastic, which is a considerable improvement, since it is possible to discriminate between random errors and differences in inefficiency (Piesse and Thirtle, 2000). This study used stochastic frontier model of the type originally proposed by Aigner et al. (1977), extended to include characteristics of the firm that explain the inefficiency, following the work of (Battese and Coelli, 1995). A general form of stochastic frontier model can be given by:

$$\ln q_i = f(1n\ x) + V_i - N_i \quad (1)$$

Where q_i is the output (sum of Kg grains equivalent to all crops produced by the farmer *i*), X is vector of factor inputs, V_i is the stochastic (white noise) error term and μ_I is a one-sided error representing the technical efficiency of respondent *i.* Both V_i and μ_i are assumed to be independently and identically distributed (iid) with variance δ^2_V and δ^2_μ respectively. Given that the production of each firm *j* can be estimated as:

$$\ln q_i = f(1nX) - \mu_i \quad (2)$$

While the efficient level of production (that is, no. of efficiency) is defined as:

$$\text{In } q_i = f(\text{1n}x) - \mu_i \quad (3)$$

Then technical efficiency (TE) can be given by:

$$\text{In } TE_i = \text{I}n q_i - \text{I}n\, q' = \mu_i \quad (4)$$

Hence, $TE_i = e^{-\mu i}$ and is constrained to be between zero and one in value, if μ_i equals zero then TE equals one, and production is said to be technically efficient. Technical efficiency of the i^{th} respondent is therefore a relative measure of its output as a proportion of the corresponding frontier output. A respondent is technically efficiency if his output level is on the frontier, which implies that $\frac{q}{q_i}$ equals one in value. The ratio of actual output *q* to frontier output q' is equal to one.

Estimation of the stochastic production function requires a particular functional form of the production function to be imposed. A range of functional forms for the production function frontier are available, with the most frequently used being the translog and (Cobb) Douglass functions. In general terms, the cob Douglass function can be expressed as:

$$\text{In } Q_{it} = \beta_0 + \Sigma\beta_L \text{ I}n\, X_{it} + V_t + \mu_t \quad (5)$$

Where Qit is the output (sum of Kg grains equivalent of all crops harvested by the respondent) in period of *t* and $\text{In}X_{it}$ is the variable inputs used in the production process. As noted above, the error term is separated into two components, where V_i the stochastic error is term and μ_i is an estimate of technical efficiency.

The efficiency of production μ_i was model in terms of the factors that are assumed to affect the efficiency of production of the farmers. Such factors are related to the socio-economic variables of the farmers. The determinant of technical inefficiency is defined by:

$$\mu = \delta_0 + \beta_1 Z_1 + \beta_2 Z_2 + \beta_3 Z_3 \quad (6)$$

Where
μ = Technical efficiency
Z_1= Age of farmers (Years)
Z_2= Educational level (Years of schooling)
Z_3= Household size (Numbers)

RESULTS AND DISCUSSION

Farm production efficiency of the participants and non-participants before and after IFAD-CBARDP in the study area

Stochastic frontier production function for the farmers before IFAD-CBARDP

The stochastic frontier model specified was estimated by the maximum likelihood (ML) method using Frontier software developed by Coelli et al. (1998). The stochastic frontier production function estimates before IFAD-CBARDP is presented in Table 1. The maximum likelihood estimate of the stochastic frontier Cobb-Douglas production function revealed that (seed, family and hired labour) were significant**,** while the remaining two variables (fertilizer and chemicals) were not significant for participants. However, non-participants (seed, fertilizer and chemicals) were significant, while the remaining two variables (chemicals and hired labour) were not significant. The implication is that the positive ones exert positive effect equal to their coefficient values on the individual farmers' income and profit, while the negative ones have negative effect on the mentioned variables.

Within the participants of the IFAD-CBARDP, seed was significant at 1% probability level and negatively related to the output of the farmers. This implies that a unit increase in the quantity of seeds will decrease the output of the farmers by 0.0090. This could be due to over utilization of seed. Family and hired labour were positively related to the output of the farmers but fertilizer was significant at 5 and 1% probability levels, respectively. This implies that a unit increase in the quantity of family and hired labour will increase the output of the farmers by 0.0050 and 0.0014 respectively and this could be attributed to good utilization of these resources. The positive relationship between labour and output disagrees with the finding of Baruwa and Oke (2012) who reported that labour was negative and significant at 5% probability level in a study on Technical Efficiency of Small-holder Cocoyam Farms in Ondo State, Nigeria.

Within the non-participants of the IFAD-CBARDP**,** only fertilizer and chemicals were significant at the chosen level of significance and positively related to the output of the farmers. A unit increase in the quantity of fertilizer and chemicals would increase the output of the farmers by 0.0039 and 0.0016 respectively, this could be attributed to good utilization of these resources. Thus, embracing the use of fertilizer and chemical alone may not be the key to increasing participants' production efficiency in area, it could be due to the advice and enlighten by the extension agents in the area about the optimum fertilizer and chemical usage rate. This finding agrees with that of Omonona et al. (2010) who reported that agrochemicals had a positive relationship with the output. This implies that, the higher the quantity of agrochemicals used, the higher the level of production.

Technical inefficiency of participants and non-participants before IFAD-CBARDP

The inefficiency determinants of the specified frontier of participants and non-participants before IFAD-CBARDP are presented in Table 2. The study revealed that the generalized log likelihood function was -65.62 and -60.54

Table 1. Estimates of stochastic frontier production function for the farmers before IFAD-CBARDP.

Variables	Parameters	Participants			Non-participants		
		Coeff.	Std. error	T-ratio	Coeff.	Std. error	T-ratio
Efficiency model							
Constant	β_0	3.2267	0.4230	7.290	4.9252	0.5604	8.789
Seed	β_1	-0.0090***	0.0014	-6.6130	-0.0075*	0.0038	-1.958
Fertilizer	β_2	-0.0001	0.0007	-0.116	0.0039***	0.0011	3.579
Chemical	β_3	-0.0006	0.0004	-1.672	0.0016***	0.0004	3.740
Family labour	β_4	0.0050**	0.0002	2.117	0.0004	0.0003	1.190
Hired labour	β_5	0.0014***	0.0002	6.715	0.0003	0.0003	1.160

***P < 0.01, **P < 0.05 and *P < 0.10.

Table 2. Estimates of technical inefficiency of farmers in the study area before IFAD-CBARDP.

Variable	Parameter	Participants			Non-participants		
		Coeff.	Std. error	T-ratio	Coeff.	Std. error	T-ratio
Inefficiency model							
Constant	Z_0	0.29771	0.08337	3.571	-36.67325	21.17112	-1.7322
Age	Z_1	0.07735***	0.02807	2.756	-4.31408	8.50489	-0.507
Education	Z_2	0.00487	0.01774	0.275	9.83264**	4.19506	2.344
Household size	Z_3	0.00956	0.02533	0.377	-8.39319	7.67548	-1.094
Sigma-squared	(σ^2)	0.10750***	0.01051	10.228	6.14060**	2.56854	2.3907
Gamma	(γ)	0.3502***	0.1000	3.502	0.199996***	0.053837	3.714
Log likelihood	L/f	-65.62			-60.54		
LR test		9.86			7.41		

***P < 0.01 and **P < 0.05.

for participants and non-participants, respectively. The log likelihood function implies that inefficiency exist in the data set. The log likelihood ratio value represents the value that maximizes the joint densities in the estimated model. Thus, the functional form that is, Cobb-Douglas used in this estimation is an adequate representation of the data. The value of gamma (γ) is estimated to be 0.3502 and 0.19996 for participants and non-participants, respectively, and highly significant at ($p < 0.01$) level of probability. This is consistent with the theory that true γ-value should be greater than zero. This implies that 35 and 20% of random variation in the yield of the farmers was due to the participants and non-participants inefficiency in their respective sites and not as a result of random variability. Since these factors are under the control of the farmer, reducing the influence of the effect of γ will greatly enhance the technical efficiency of the farmers and improve their yield. The value of sigma squared (σ^2) was significantly different from zero level of probability. This indicates a good fit and correctness of the specified distributional assumptions of the composite error terms while the gamma γ indicates the systematic influences that are unexplained by the production function and the dominant sources of random error. This means that the inefficiency effects make significant contribution to the technical inefficiencies of farmers.

For the associated inefficiency effects, the estimated coefficients with negative signs attached indicate that they reduce technical inefficiency among the farmers, while positive signs indicate that the coefficients increase technical inefficiency or reduce technical efficiency.

The coefficient for age was found to be positively related with the output and significant at 1% level of probability for participants, it implies that the older a farmer is, the higher will be the level of technical inefficiency or the lower will be his technical efficiency in farming. This finding agrees with the findings of Kolawole and Ojo (2007) who in their study of small scale farmers in Nigeria found age to be positively related to inefficiency.

Within the non-participants, only the coefficient for education was found to be significant at 5% level of probability and positively related with the output. This indicates that education impacts positively on the technical efficiency of farmers. That is to say, the more educated a maize farmer is, the higher is likely to be his technical efficiency. Education enhances farmer's ability to derive, decode and evaluate useful information as well as improving labour quality. This result concur with that of Onyenweaku et al. (2005) that showed a positive

Table 3. Estimates of stochastic frontier production function for the farmers after IFAD-CBARDP.

Variable	Parameter	Participants			Non-participants		
		Coeff.	Std. error	T-ratio	Coeff.	Std. error	T-ratio
Efficiency model							
Constant	β_0	11.0080	1.7586	6.260	7.9504	0.7132	11.148
Seed	β_1	0.3037***	0.0423	7.185	0.4044***	0.0630	6.422
Fertilizer	β_2	0.2919***	0.0421	6.932	0.5489***	0.0776	7.076
Chemical	β_3	0.0871***	0.0266	3.279	-0.0209	0.0481	-0.435
Family labour	β_4	0.0637***	0.0148	4.310	0.0156***	0.0041	3.769
Hired labour	β_5	0.0086	0.0128	0.670	0.0019	0.0039	0.483

***P < 0.01 and **P < 0.05 levels of probability.

relationship between education and technical efficiency in yam production in Nasarawa State, Nigeria.

Stochastic frontier production function of the participants and non-participants after IFAD-CBARDP

The stochastic frontier production function estimates of participants and non-participants after the IFAD-CBARDP are presented in Table 3. The maximum likelihood estimate of the stochastic frontier Cobb-Douglas production function revealed that (seed, fertilizer, chemicals and family labour) were significant for participants. However, non-participants (seed, fertilizer and family labour) were significant. There is a slight difference between the participants and the non-participants after the IFAD-CBARDP in terms of more coefficient that are significant related to the output and also there is a great improvement for the participants after than before participating in the IFAD-CBARDP in terms more coefficient that are significantly related to the output. There is also improvement for the participants after the programme in terms of more coefficients that are significantly relayed to the output.

Within the participants, the coefficient for seed was significant at 1% probability level and positively related to the output of the farmers. This implies that a unit increase in the quantity of seeds will increase the output of the farmers by 0.3037. This could be attributed to good utilization of seed. The coefficient for fertilizer and chemicals were significant at 1% probability level and positively related to the output of the farmers. This implies that a unit increase in the quantity of fertilizer and chemicals would increase the output of the farmers by 0.2919 and 0.0871, respectively. Finally, the coefficient for family labour was significant at 1% probability level and positively related to the output of the farmers. This implies that a unit increase in the quantity of family labour would increase the output of the farmers by 0.0637. This is attributed to the fact that family labour was well utilized. The positive relationship between family labour and output disagrees with the finding of Baruwa and Oke (2012) who reported that labour was negative and significant at 5% probability level in a study on Technical Efficiency of Small-holder Cocoyam Farms in Ondo State, Nigeria. Within the non-participants, the coefficient for seed was significant at 1% probability level and positively related to the output of the farmers. This implies that a unit increase in the quantity of seeds would increase the output of the farmers by 0.4044. This could be attributed to good utilization of seed.

The coefficient for fertilizer and family labour were significant at 1% probability level and positively related to the output of the farmers. This implies that a unit increase in the quantity of fertilizer and family labour would increase the output of the farmers by 0.5489 and 0.0156, respectively. This means that fertilizer and labour were well utilized.

Technical inefficiency of the participants and non-participants after IFAD-CBARDP

The inefficiency determinants of the specified frontier after IFAD-CBARDP are presented in Table 4. The study revealed that the generalized log likelihood function was -188.81 and -82.17 for participants and non-participants, respectively. The log likelihood function implies that inefficiency exist in the data set. The log likelihood ratio value represents the value that maximizes the joint densities in the estimated model. Thus, the functional form that is, Cobb-Douglas, used in this estimation is an adequate representation of the data. The value of gamma (γ) is estimated to be 0.8279 and 0.9379 for participants and non-participants, respectively and highly significant at ($p < 0.01$) level of probability. This is consistent with the theory that true γ-value should be greater than zero. This implies that 83% and 94% of random variation in the yield of the farmers was due to the participants and non-participants inefficiency in their respective sites and not as a result of random variability. Since these factors are under the control of the farmer, reducing the influence of the effect of γ will greatly enhance the technical efficiency of the farmers and improve their yield. The value of sigma

Table 4. Estimates of technical inefficiency of farmers in the study area after IFAD-CBARDP.

Variable	Parameter	Participants			Non-participants		
		Coeff.	Std. error	T-ratio	Coeff.	Std. error	T-ratio
Inefficiency model							
Constant	Z_0	44.2221	9.2929	4.759	-6.8922	1.2275	-5.615
Age	Z_1	24.7781***	5.5434	4.470	-1.9234	1.9459	-0.988
Education	Z_2	2.2198	6.2215	0.357	-9.9908***	1.8070	-5.5288
Household size	Z_3	-99.6579***	4.8200	-20.676	-26.6746***	3.1087	-8.581
Sigma-squared	(σ^2)	65.1363***	1.3846	47.043	18.5488***	1.0032	18.395
Gamma	(γ)	0.8279***	0.0222	37.241	0.9379***	0.0786	11.932
Log likelihood	L/f	-188.81			-82.17		
LR test		28.80			16.34		

***P < 0.01.

squared (σ^2) was significantly different from zero level of probability. This indicates a good fit and correctness of the specified distributional assumptions of the composite error terms while the gamma γ indicates the systematic influences that are unexplained by the production function and the dominant sources of random error. This means that the inefficiency effects make significant contribution to the technical inefficiencies of farmers.

For the associated inefficiency effects, the estimated coefficients with negative signs attached indicate that they reduce technical inefficiency among the farmers, while positive signs indicate that the coefficients increase technical inefficiency or reduce technical efficiency.

The coefficient for age was found to be positively related with the output and significant at 1% level of probability for participants, it implies that the older farmers are more technically inefficient than the younger ones. Older farmers tend to be more conservative and less receptive to modern and newly introduced agricultural technology.

The coefficient for household size was found to be negatively related with the output and significant at 1% level of probability for participants, This implies as household size increases, the technical inefficiency decreases thereby increasing technical efficiency of farmers. This finding disagrees with the findings of Musa (2011) who reported that as household size increases the technical efficiency decreases. This could be due to the fact that large household size makes sufficient availability of labour for farm production.

Within the non-participants, the coefficient for education was found to be significant at 1% level of probability and negatively related with the output. Education showed a negative relationship with technical inefficiency. This could be due to the fact that educated farmers are able to understand and use information from research and extension more easily than illiterate farmers which reduce technical inefficiency. Moreover, educated farmers are likely to be less risk-averse and therefore more willing to use modern technologies. Khalirajan and Shard (1985) observed that education sharpens managerial input and leads to a better assessment of the importance and complexities of good decisions in farming.

The coefficient for household size was negative and significant at 1% probability level indicating that a unit increase of this variable has the tendency of increasing the technical efficiency of the farmers. This finding is similar with the finding of Rahman and Umar (2008) who reported that household size was negatively related to the technical inefficiency of crop production in Nasarawa State and was significant at 5% probability level.

Farm specific technical efficiency level for participants and non-participants before and after IFAD-CBARDP in the study area

The estimation of technical efficiency for participants and non-participants before and after IFAD-CBARDP are shown in Table 5. Results revealed that the majority (91 and 95%) of the participants of IFAD-CBARDP record technical efficiency between 0.61 to 0.80 before and after IFAD-CBARDP respectively, while only 9 and 5% of the participants record technical efficiency between 0.41 and 0.60 and less than 0.20 before and after IFAD-CBARDP, respectively.

Within the non-participants, majority (95 and 59%) of the non-participants of the IFAD-CBARDP record technical efficiency of less than 20 before and after the IFAD-CBARDP respectively, while 4 and 36% of the non-participants record technical efficiency between 0.61 and 0.80 before and after IFAD-CBARDP, respectively. The participants of the IFAD-CBARDP had mean technical efficiency of 0.89 and 0.95 before and after the IFAD-CBARDP, respectively. The non-participants of the IFAD-CBARDP had mean technical efficiency of 0.22 and 0.47 before and after IFAD-CBARDP, respectively. The difference in technical efficiency between participants and non-participants of the IFAD-CBARDP could be attributed

Table 5. Distribution of farmers based on technical efficiency before and after IFAD-CBARDP in the study area.

Technical efficiencies	Participants				Non-participants			
	Before		After		Before		After	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
<0.20	0	0	11	5	203	94	127	59
0.21 - 0.40	0	0	0	0	3	1	8	4
0.41 - 0.60	19	9	0	0	2	1	3	1
0.61 - 0.80	197	91	205	95	8	4	78	36
0.81 - 1.00	0	0	0	0	0	0	0	0
Total	216	100	216	100	216	100	216	100
Mean	0.89		0.95		0.22		0.47	

to distortion in inputs and credit market. Furthermore, technical efficiency values of the participants indicate that this category of farmers can have their efficiency increased, unlike the non-participants, if inputs and credit market imperfections are adjusted, and improved upon. This finding is in variances with the findings of Zeller et al. (2001) statement that, access to credit is not a guarantee for higher technical efficiency, except it goes with complementary factors as access to agricultural land, well-functioning markets for both input and output, and concluded that rather, access to credit will only enable (farming) households to adopt new technology, intensify agricultural production and invest in farm, all of which will eventually lead to increase income levels. From the results obtained, although farmers among the participants were generally relatively efficient, they still have room to increase the efficiency of their farming activities to 11 and 5% before and after the IFAD-CBARDP respectively to close the efficiency gap from the optimum (100%) which are yet to be attained by both the participants and non-participants in various scales of operations in the study area. The non-participants on the other hand still have a long way to go in terms of increasing the efficiency of their farming activities to 78 and 53% before and after the IFAD-CBARDP respectively to close the efficiency gap from the optimum (100%).

CONCLUSION AND RECOMMENDATION

Based on the empirical evidence emanating from the findings of this study, it was concluded that the IFAD-CBARDP has succeeded in targeting the marginalized and vulnerable participants in its farm technical efficiency; this is evident in their mean technical efficiency of 95%. Although, there is still room to increase the efficiency of their farming activities to 5% to close the efficiency gap from the optimum (100%).

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