NIGERIAN AGRICULTURAL JOURNAL
ISSN: 0300-368X
Volume 49 Number 1, April 2018. Pp. 231-239
Available online at: http://www.ajol.info/index.php/naj

ANALYSES OF RESOURCE USE, PRODUCTIVITY AND TECHNICAL EFFICIENCY AMONG LOCAL RICE FARMERS IN BAYELSA STATE, NIGERIA

[1]Onyegbulam, L.A., [2]Alleluyanatha, E., [1]Mbanasor, J.A. and [1]Gabolu, E.
[1]Department of Agribusiness and Management, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria
[2]National Root Crops Research Institute Umudike, Abia State
oa.lilian@gmail.com

ABSTRACT
This study analyzed the effect of resource use on productivity and technical efficiency of rice farmers in Bayelsa State, Nigeria. Primary data were collected using well-structured questionnaire from 40 rice farmers randomly selected. Descriptive statistics such as frequencies, means and percentages and econometric models such as regression, stochastic frontier and instrumental variable estimator were adopted for data analyses using STATA 13.0. Rice production in this study area is commercialized with about 50% of farmers cultivating 2.2hectares of land. The ordinary least squares regression (OLS) estimates found household size to be significant and negatively related to yield of rice at 1% and training and mandays used for planting at 5% level each. Conversely, number of times trained in rice production and use of fertilizer in production were all significant and positively related to the yield of rice in the study area at l%, level each and land ownership at 5% level. MLE result further revealed that while farmers are 65% technically efficient in use of input resources, the estimated value of γ is 0.796934 which clearly indicates that 79.69% of total variation rice yield is due to technical inefficiency. Government need to discover the synergies between credit/fertilizer supply and farmers and develop an efficient and on-time distribution channels for farm inputs to allow farmers attain their productive potential in rice farming and in addition, identify the potentials of farmer clusters for market development for their produce to generate increased income for their production. Training is a critical factor influencing output and thus calls for increased capacity building among farmers in rice production to help them cope with exogenous elements such as changing weather conditions.

Keywords: Technical efficiency, Stochastic frontier, Output and Rice farmers

Introduction

Rice remains the staple crop consumed in Nigeria in a large volume per annum and the estimated consumption stands at 5 million metric tons of milled rice while annual consumption per capita stands at 29kg and this has continued to rise at 11% per annum due to population and income growth (USAID, 2012). Out of this figure, about 2.8 million tons are produced locally leaving a deficit of 2.2 million metric tons which is imported from other countries including Thailand and India. Nigeria therefore, spends over NGN365 billion (10 .5 million dollars) annually to import rice into the country, thereby placing the country as the highest importer of rice in the world (FMARD, 2013). The bulk of the rice production in the country still remains in the hands of small holder farmers who are limited by funds, poor commodity market development and farm management skills to give higher yield despite the potentials of the available varieties to exceed the present average national yield of

1.7mtha. In the area of processing, the country was in the past dominated by small scale millers whose capacities were small and could not compete favorably with imported rice in terms of quality of grains and value addition. No doubt of the potentials of agriculture to reduce poverty particularly in Africa where net income of the major population comes from agriculture. Subsequently, the Nigeria government initiated the Agricultural Transformation Agenda (ATA) to promote growth in the production, processing, marketing and local consumption of rice and thus, boost national food security and reduce poverty (FMARD, 2012).

However, the agricultural policy launched in 2001, recognized the roles and potentials of small-scale farmers as the major producers of food in Nigeria. Nigeria prior to this time spends an unsustainable import bill on rice importation draining the country of its foreign exchange reserves. To promote its national food security and food self-sufficiency, the presidential initiative on Agricultural Transformation agenda 2011 drove a government enabled and private sector-led schemes for promotion of food value chains including rice. Considering the fact that the average typical farmer anywhere in the sub – Saharan Africa has limited level of resources and he is faced with the problem of myriad of choices for allocating farm resources between various crops to be able to optimize production objective by making profit. These farmers are forced to make do with available resources.

One of the cardinal objectives of the government of Nigeria is attainment of self-sufficiency in food production. The government view agricultural production as the main hope for the country's survival, growth and development. Over 70% of people in Nigeria live in the rural areas relying on agriculture for their income (Onumadu, 2014). This informed the desperation with which various governments in Nigeria has enunciated agricultural development programs and projects focused at the sub-sector of the economy to improve their livelihood, yet the per capita of food production has remained low in Nigeria. This situation has been compounded by grave scarcity and high cost of agricultural production inputs. According to Scarborough (1996) population density has continued to increase in Nigeria and land resources for the expansion of agriculture are becoming increasingly scarce. Moreover labour productivity to the use of unimproved technology and the difficulties associated with the transfer and adoption of the available improved technology in subsistence agriculture. The goals of small scale crop farmers sparring through efficient allocation of resources through optimum enterprise combination, year round provision of food for the household, monetary income accumulation and minimizing expenditure on hired labour have not been fully achieved in sub-Saharan Africa (Adejobi et. al., 2003). Recent report by Ohajianya (2005) revealed that food supply, particularly rice in Nigeria had not kept pace with demand. The food deficit situation results from insufficient production techniques; leading to technical, allocative and economic inefficiencies (Ohajianya, 2006) worsened by declining crop productivity. Achieving increased productivity in food production is therefore, imperative to achieve the goals of food self-sufficiency. To ensure substantial improvement rice production, there is need for effective input resource combination aimed at increasing the level of farm resource optimization and efficient use of the limited resources available to farmers (Tanko et al., 2006, Adejobi et al., 2003). According to Nimoh, et. al., (2012); land, fertilizer and seeds are highly positively correlated with output at over 70%. Mahoukede, Aliou, and Gauthier (2015) also affirmed from his findings that increase in input use such as fertilizer and credit led to an increased output in rice production.

In estimating farms efficiency, Farrell (1957), decomposed economic efficiency into its technical and allocated components. Technical efficiency refers to the ability of a producing unit to obtain maximum (optimal) output from a given amount of inputs. Formally, the level of technical efficiency is measured by the distance of farm production from the optimal production frontier. Parametric and non-parametric methods been utilized to measure economic efficiency. The most common specifications are the stochastic frontier models, which have been extensively specified in Nigeria for a wide variety of crops (Ajibefun 1998; Fasoranti 2006; Adejoh 2009; Ojo et al. 2009). Parametric methods assume that the functional form of the production function is known while non-parametric methods do away with the restrictive functional form assumptions,

instead relying on the data to specify the production frontier. Data envelope analysis models are the most commonly used forms of non-parametric models (Ajibefun 1998; 2008). Using either methodology (parametric or non-parametric), it is possible to estimate technical efficiency and allocative efficiency for each observation in the dataset. Most studies report mean levels of technical and allocative efficiency for the sample under observation. Studies that have applied both methodologies report no substantive differences in estimates of efficiency (Ajibefun, 1998; 2008). It is against this background that this research seeks to investigate the resource use and technical efficiency among rice farmers in Bayelsa State.

Methodology

The study was carried out in Bayelsa state comprising nine local government areas, they are: Yenegoa, Sagbama, Ekeremor, Southern Ijaw, Ogbia, Brass, Nemebe, Kolokuma/Opokuma and Kembe; Bayelsa has a population of 1,998,349 (National Population Commission 2013; population.gov.ng). There are two main seasons in the zone- dry and rainy seasons. Bayelsa State has the highest rainfall in Nigeria, with an annual average of approximately 140 centimeters per year (and up to 400 centimeters in some areas). The zone is richly endowed with fertile land suitable for the growth of arable crops. Farmers in the zone are mainly commercial farmers Bayelsa ADP. All these necessitated the choice of the zone study area. Purposively, two rice producing local government areas from a list of rice farmers in Agricultural Development Programme (ADP) Bayelsa State. Two communities each were selected from the randomly selected rice producing LGAs identified in the State. Ten (10) farmers were randomly selected from each of the communities to include both registered cooperative members and non cooperative member farmers using a list of registered rice farmers' cooperative from the selected communities to generate giving a total of forty (40) respondents for this study. Primary data were used in the study and information was generated using a structured questionnaire. Data was analyzed using descriptive statistics such as means and percentages as well as ordinary least square regression and frontier tools. A log-linear regression following Ukoha (2000) and Okoye et al, (2008) in cassava and cocoyam production respectively. This functional form is the most popular in applied research because it is easiest to handle mathematically (Koutsiyiannis, 1979). The regression model using the semilog functional form is specified as follows:

$$Yi = \beta0 + \beta1LnX1 + \beta2LnX2 + \beta3LnX3 + \beta4LnX4 + \beta5LnX5 + \beta6LnX6 + \beta7LnX7 + \beta8LnX8 + \beta9LnX9 + \beta10LnX10 + \beta11LnX11 + \beta12LnX12 + \beta13LnX13 + Ui \quad \ldots\ldots (1)$$

Where:

Yi = Rice yield (t/ha)

X_1 = Age (years)

X_2 = House hold size

X_3 = Level of education (years)

X_4 = Farm experience (years)

X_5 = Land ownership(yes=1 otherwise 0)

X_6 = Access to credit (yes=1 otherwise 0)

X_7 = Training on rice production (yes=1 otherwise 0)

X_8 = Number of times trained on rice production

X_9 = Use of Fertilizer (yes=1 otherwise 0)

X_{10} = Use of improved variety (yes=1 otherwise 0)

X_{11} = Labour on clearing (manday)

X_{12} = Labour on weeding (manday)

X_{13} = Labour on planting (manday)

Ui = error term

Ln = Natural logarithm

β_0 = Intercept/constant

Stochastic frontier was used to analyse the technical efficiency of the farmers. The stochastic production frontier for rice farmers is assumed to be of the Cobb-Douglas. The explicit form of the model is specified as follows:

$$LnYi = \beta0 + \beta1LnX1 + \beta2LnX2 + \beta3LnX3 + \beta4LnX4 + \beta5LnX5 + Vi - Ui \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Yij = output of rice (kg/ha)

X_1 = Amount spent on labour (N/ha)

X_2 = quantity of fertilizer used (kg//ha)

X_3 = Farm size (hectares)

X_4 = Capital (Naira)

βs = Unknown scalar parameters to be estimated

Ln = logarithm to base e

ij = jth observation of the ith farmer

Vi-Ui= error term (ε)

βo = constant term to be estimated

The inefficiency model (Ui) is specified as follows:

$-Ui = \delta 0 + \delta 1X1i + \delta 2X2i + \delta 3X3i + \delta 4X4i + \delta 5X5i + \delta 6X6i + ei$ …… (3)

Where:

δs = Unknown scalar parameters to be estimated
δ1= Age (Years)
δ2= House hold size
δ3= Level of education (Years)
δ4= Farm experience (years)
δ5= Number of times trained on rice production
δ6 = Interest rate (%)
ei = error term

Results and Discussion

The results in Table 1 show the socio-economic characteristics of the respondents in the study area. The results indicate that majority (52.5%) of rice farmers are males with a mean age of 39years which indicates a paradigm shift towards youth participation in rice farming. This could be because of the recent reform and incentives that the government has placed on rice production. Many (45.00%) of these farmers are married with an average household size of nine (9) persons indicating appreciable level of dependence on household heads. The years of farming experience was 11yrs on the average and farmers are members of local and cooperative societies. Most of the farmers grow their rice on 2ha farm land sufficient for small to medium farm enterprise.

The results in Table 2 show the regression estimates of effect of resource use on productivity of rice farmers in the study area. The coefficient of household size was significant at 1% and a negatively signed, which implies increase in number of people in the house will lead to corresponding decrease in yield, which might be because the farmers have more financial responsibility in the family but this does not conform to Kinkingninhoun-Medagbe *et al.* (2015). Being a landowner is positive and significant at 5%, implying that owning farm land increases yield of rice in the study area. The tendency of having your own land will positively influence farmers attitude towards proper soil management which in turn results to high spoil fertility, thus increasing yield. Training is significant and negative at 5% level meaning that being trained had no significant effect on their productivity. However, the number of times trained on rice production positive and significant at 1% level. This implies that additional follow up training received by farmer increase yield by 8%; implying that increase in technical know-how which comes from continuous training in rice production has a direct relationship with increase in yield.

Fertilizer use in production is positive and significant at 1%, implying that use of fertilizer is positively associated with increase in rice yield. This agrees with the findings of Nimoh *et. al.*, (2012) that land, fertilizer and seeds are highly positively correlated with output at over 70%. Kinkingninhoun-Medagbe *et al.* (2015) also found that increase in input use such as fertilizer led to an increased output. Prior to these findings, Boansi (2014) estimated the elasticities with respect to real producer price of rice, aggregate output of paddy rice, real producer price of maize, and total quantity of fertilizer used and found that in the short-run, observed yield is dependent on the quantity of fertilizer used among other factors.

Mandays spent on planting of rice was negatively related to yield at 5% significant level respectively. This implies that applying proper planting method increases output and vice versa

Table 1: Socio-economic characteristics of rice farmers in Bayelsa State

Socioeconomic Factors	Frequency	Percentage
Sex		
Female	19	47.5
Male	21	52.5
Age (years)		
20-30	18	46.4
31-40	4	9.6
41-50	4	9.7
51-60	12	29.2
61-70	2	4.9
Mean Age	39.0	
Marital status		
Single	11	26.8
Married	18	45.0
Divorced	6	14.6
Widowed	5	12.2
Household Size		
1-9	26	63.4
10-18	11	26.9
19-26	3	9.7
Level of Education		
FSLC	11	26.8
WAEC	17	42.5
HND/BSc	8	19.5
MSc	4	9.8
Years of Rice farming Experience		
1-10	25	61
11-20	8	20.2
21-30	7	17
Mean	11.0	
Membership of cooperative Society		
Members	20	50
Non-members	20	50
Land size (Ha)		
0.1- 1.0	12	29.3
1.1- 2.0	15	36.6
2.1- 3.0	5	12.2
3.1- 4.0	1	2.1
4.1- 5.0	7	17.5

(N=40)

Table 2: Log-linear regression estimates of the Effects of Resource use on productivity

Log-yield (Output)	Coefficient	Standard error	t-test
Age	.001101	.0026729	0.41
House hold size	-.0229053	.0044739	-4.83***
Level of education	-.0283081	.0161518	-1.75
Farm experience	.0058552	.0035009	1.67
Landowner	.0990554	.0374819	2.64**
Access to credit	.115665	.0570431	2.03*
Training on rice production	-.1325133	.0526549	-2.52**
Number of times trained on rice production	.0814674	.0234979	3.47***
Use of Fertilizer	.2133242	.0395729	5.39***
Use of improved variety	-.0307867	.0299421	-1.03
Labour on clearing	-.0316929	.0181368	-1.75
Labour on weeding	-.0135032	.0102898	-1.31
Labour on planting	-.0110786	.0042421	-2.61**
Constant	9.037	.183	49.32***
R^2	0.600		
Adjusted R^2	0.400		
F-value	3.002***		

***1% significant, **5% significant, *10% significant.

The inefficiency result presented in Table 3 shows that the coefficient of education is statistically significant at 5% level of significance, implying that farmers with formal education tend to be more efficient in rice production, which could be attributed to their enhanced ability to acquire technical knowledge that makes them move closer to the frontier output. This finding is in conformity with the finding of Tanko and Jirgi (2008) and Ortega et al. (2005) who reported a positive relationship between education and technical efficiency. This shows that education is an important factor that reduces inefficiency among rice farmers in the study area. The coefficient of household size is negative and statistically significant at 5% level implying that household size is an important factor that contributes negatively to technical efficiency in the study area. The estimated coefficient with respect to interest rate is negative and statistically significant at 10% level of significance. This implies that interest rate is an important factor that influences inefficiency among rice farmers in the study area. This finding is in consonance with the work of Eno (2004) who reported a significant relationship between interest rate and technical efficiency of the farmers. The estimated value of γ is 0.796934 that indicates 79.69% of total variation in farm output is due to technical inefficiency. Furthermore, from the MLE result above, the farmers are 65% technically efficient .This implies that the farmers are slightly above average in the use of their input resources, however but are technically inefficient because they are not at the frontier (1.00 or 100%).

The technical efficiency of rice production in the study area is presented in Table 3. The result showed that farm size and quantity of fertilizer were statistically significant at 10% and 1% level of significance respectively. This means that a 1% increase in the hectare of land and fertilizer used in the production of rice will lead to a 0.045% and 0.02% increase in yield respectively. This shows that farm size and use of fertilizer are the major inputs which improve productivity in the study area. The result agrees with the findings by Ogundari (2006) who reported that inorganic fertilize increase crop output.

Table 3: Maximum likelihood estimates of the Stochastic Frontier production function

Variables	Parameters	Coefficient	Standard Errors	T-ratio
Constant	β_0	8.78381	.125318	70.09***
Amount spent on labour (N/ha)	β_1	.0033898	.0038141	0.89
Farm size (ha)	β_3	.0459841	.0268648	1.71*
Fertilizer (kg/ha)	β_2	.0269872	.0074264	3.63***
Amount of credit (N)	β_4	.0036125	.0032631	1.11
Inefficiency model				
Constant	δ_0	8.69837	.1471806	59.10***
Age	δ_1	.002277	.0043355	0.53
House hold size	δ_2	-.0040622	.0015664	-2.59**
Level of education	δ_3	.0210524	.078699	2.67**
Farm experience	δ_4	-.0005098	.0044257	-0.12
Number of times trained on rice production	δ_5	.0447579	.0342074	1.31
Interest rate	δ_6	-.0071644	.0030857	-2.32*
sigma_v	σv	.1027242	.011514	0.24
sigma_u	σu	.2015712	.1457913	2.00*
Sigma square	σ^2	.1105547	.1023779	0.07
Lambda	λ	1.962256	1.1470437	1.29***
Log likelihood	Lif	34.269168		

Source: Field Survey, 2016. ******* 1% significant, **5% significant *10% significant
Total number of observation=40
Mean Efficiency=0.64938806E+00

Conclusion

This study assessed the effect of resources use on the productivity of rice and technical efficiency among rice farmers in Bayelsa State, Nigeria. Findings of the study revealed that the farmers are not efficient rice producers. Production is carried out by both male and females but mostly by males who are experienced, educated but not very literate with a relatively average household size and who engage in commercial rice production as a means of livelihood. Results further shows that the farmers have prospects in rice production to help Nigeria attain food self-sufficiency, particularly rice production and save the trillions spent on importation of rice to meet domestic needs. The results call for policies aimed at developing synergies between credit/fertilizer supply and farmers to develop an efficient distribution channel to enhance impact on farm households as well as identify the potentials of farmer clusters for off-takers and processors towards establishing a full continuum of production and processing towards market development.

References

Adejobi, A. O., Kormawa, P. M., Manyong, V. M., & Olayemi, J. K. (2003). Optimal Crop Combinations under Limited Resource Conditions: Application of Linear Goal Programming (LGP) Model to Smallholder Farmers in the Drier Savannah Zone of Nigeria. *Deutscher Tropentag, Gottingen*, 8-10.

Adejoh, S. D. (2009). "Analysis of Production Efficiency and Profitability Of Yam-Based Production Systems In Ijunmu LGA Of Kogi State." MSc thesis Department of Agricultural Economics And Extension, Ahmadu-Bello University, Zaria

Ajibefun, I. A. (1998). "Efficiency of Small Scale Food Crop Farms InOndo State, Nigeria. An Application of Parametric And Non-Parametric Frontier Production Functions." Phd Thesis, Department of Agricultural Economics and Extension, FUTA, Akure.

Ajibefun, I. A. (2008). An evaluation of parametric and non-parametric methods of technical efficiency measurement: application to small scale food crop production in Nigeria. *Journal of Agriculture and Social Sciences (Pakistan)*

Amos, T. T., Chikwendu, D. O., & Nmadu, J. N. (2004). Productivity, technical efficiency and cropping patterns in the savanna zone of Nigeria. *Journal of Food Agriculture and Environment*, *2*, 173-176

Adejobi, A. O., Komawa, P. M., Manyang, V. M., & Olayemi, J. K. (2003). Optimal Crop Combinations under Limited Resources Use:

Application of Linear Goal Programming Model to Small holder farmers in the Drier Savannah Zone of Nigeria. Deutscher Tropentag, Cottingen. *J. Technol. Inst. Inno. Sust. Rur. Developt*, *17*(1), 8-10.

Boansi, D. (2014). Yield response of rice in Nigeria: A co-integration analysis. *American Journal of Agriculture and Forestry*, *2*(2):15-24.

Bravo-Ureta, B. and Pinheiro, E. (1997). "Technical, Economic, and Allocative Efficiency In Peasant Farming: Evidence From The Dominican Republic." *The Developing Economies*, XXXV-1: 48–67.

Eno, H. (2004). Seven Billion Naira to be Tapped Wealth of Opportunities in the Cassava Processing Industry. Success Digest, October, 2004, Lagos pp 14-16 and 46-49.

FAOSTAT (2012). Searchable online database from food and agriculture division of the United Nations. Rome, Italy Retrieved 22 November 2012 from http:fostat.fao.org/site/567/DesktopDefault.aspx?pageID=567#ancor./

Farrell, M. (1957). "The Measurement of Productive Efficiency." Journal of The Royal Statistical Society, 120(3): 253–290.

Fasoranti, M. M. (2006). "A Stochastic Frontier Analysis of Effectiveness Of Rice-Based Cropping Systems In Ondo State, Nigeria." PhD Thesis, Department of Agricultural Economics and Extension, FUTA, Akure.

FMARD (2012). Agricultural Transformation Agenda. Policy document.

Mahoukede, K. M., Aliou, D., & Gauthier, B. (2015). Impact of Use of Credit in rice farming on rice Productivity and Income in Benin. In *2015 Conference, August 9-14, 2015, Milan, Italy*(No. 211635). International Association of Agricultural Economists

Nimoh F., Kwame, E., Tham-Agyekum P. and Nyarko, K. (2012). Resource Use Efficiency in Rice Production: the Case of Kpong Irrigation Project in the Dangme West District of Ghana. *International Journal of Agriculture and Forestry*, 2(1): 35-40.

Ogundari, K.; Ojo, S,O. and Ajibefun, I.A. (2006). An Examination of Technical, Economic and Allocative Efficiency of Small Farms: The Case Study of Cassava Farmers in Osun State of Nigeria, Journal Central European Agriculture Vol. 7 (3), 423-432..

Ohajianya, D. O. (2005). Econometric analysis of aggregate demand for meat in Imo State, Nigeria. *Journal of Agriculture and Social Research (JASR)*, *5*(1), 62-66.

Ohajianya, D. O., and Onyenweaku, C. E. (2003). Analysis of costs and returns in rice farming by farm size in Ebonyi State. *Journal of Agriculture and Social Research (JASR)*, *3*(1), 29-39

Ohajianya, D.O., Oguoma, N.N and S.U. Onyeagocha. (2006). "Stochastic translog profit frontier approach to measurement of profit inefficiency in Yam production in Imo State, Nigeria". *J. of Agric. &Soc, Research (JASR),* 6(1). 50-58

Ojo, M. A., U. S. Mohamed, A. O. Ojo, and R. S. Olaleye. (2009). "Return To Scale And Determinants Of Farm Level Technical Inefficiency Among Small Scale Yam Based Farmers In Niger State Nigeria: Implications For Food Security." *International Journal of Agricultural Economics and Rural Development*. Available online at: http://dspace.futminna.edu.ng/jspui/handle/1/4499

Onumadu, F.N., Ekwugha, G.N. and Osahon, E.E. (2014). Resource Use Efficiency In Arable Crop Production In Oyi Local Government Area, Anambra State, Nigeria. *International Journal Of Scientific & Technology Research Volume 3, Issue 1,* JANUARY 2014. ISSN 2277-8616. Pp 230-235.

Okoye, B.C., Onyenweaku, C.E., Ukoha, O.O., Asumugha, G.N and Aniedu, O.C (2008). Determinants of Labour Productivity on Small-Holder Cocoyam farms in Anambra State, Nigeria. Academic Journals Scientific Research and Essay. 3(11):559-561

Ortega, L., Ward, R and Andrew, C. (2005). Measuring Technical Efficiency in Venezuela: The Dual-Purpose Cattle System (DPCS) in University of Florida IFAS Extension, 10(5), 22-27

Scarborough, V. (1996). "Farmer led Approaches to Extension Papers presented at a Workshop in the Philippine Agricultural Research Extension Network No: 59 P1

Tanko,L. and Jirgi, A.J. (2008). Economic Efficiency Among Small holder Arable Crop Farmers in Kebbi State, Nigeria. Continental Journal of Agricultural Economics, 2: 14-22

Ukoha, O.O. (2000). Determinants of Labour Productivity on Small-Holder Sole Crop Farms: A Case of Waterleaf Enterprise (talinum triangulare). Nigeria Journal of Agribusiness and Rural Development Vol. 1, No. 3, Sept.2000

USAID (2015).Maximizing Agricultural Revenue and Key Enterprises in Targeted Sites MARKETS, Mid-Term Update April 2012 – March 2015. Available online at https://www.chemonics.com/wp-content/uploads/2017/10/MARKETS2_MidTermUpdate_PrintVersion_Dollars.pdf