The Farm Support Policy Debate in Nigeria: Evidence from Small-scale Rice Production in selected villages of Kaduna State, Nigeria

A.A. Ammani[1], Z. Abdulsalam[2], M.A Damisa[2] and T.K. Atala[2]
[1]National Agricultural Extension and Research Liaison Services
Ahmadu Bello University, Zaria, Nigeria

[2]Department of Agricultural Economics and Rural Sociology
Ahmadu Bello University, Zaria, Nigeria

Abstract: The study was aimed at finding answer to the question: should the government subsidize farm inputs or support farm producer prices? A multistage random procedure was employed to draw a sample of 241 rice farmers in Kaduna state. Primary data was collected and analyzed using the Policy Analysis Matrix (PAM). Sensitivity analyses were conducted to test the likely effects of changes on the costs of fertilizers and pesticides as well as price of output on farmers' profit. Farmer profit was estimated at ₦93, 498.93 per hectare. Results indicated that a 25% and 50% increase in fertilizer costs will reduce farmers' profit to ₦87, 661.00 and ₦81,825.80 respectively; a 25% and 50% increase in the costs of protection chemicals will respectively reduce farmers' profit to ₦92, 295.00 and ₦91, 091.14. A 100% increase in the costs of rice seeds is expected to reduce farmers' profit to ₦80, 161.07 i.e. by just 14%! However, a 25% and 50% increase output price will raise farmers' profit to ₦143, 259.81 and ₦193,020.69 respectively. It is concluded that changes in inputs costs have much smaller effects on profits than changes in the prices of outputs; therefore government policies should be more towards producer price support than the provision of farm input subsidy.

Key words: Agricultural policy, price support, input subsidy, policy analysis matrix (PAM)

INTRODUCTION
Lester and Stewart (2000), agricultural policy defined as a process or a series or pattern of governmental activities or decisions designed to remedy real or imagined agricultural problems.According to Monke and Pearson (1989), the rationale for government intervention through the imposition of policies on the agricultural sector are principally to accelerate the rate of income growth, correct market failures, address income distribution concerns, stabilize prices and ensure food security and self-reliance on staple food supplies.

e-mail: aaammani@yahoo.co.uk

The input subsidy strategy, especially fertilizer, has been popular with the agricultural policies and programmes of the federal governmentof Nigeria since the 1970s.In fact the current government's Agricultural Promotion Policy 2016-2020 (FMARD, 2016) has retained the Growth Enhancement Support Scheme (GESS), the input subsidy strategy of the Agricultural Transformation Agenda (FMARD, 2011) of the previous administration.

The motive for government involvement in inputs subsidy, especially fertilizer, is that fertilizer is seen as vital commodity that should not be left in the hands of the private sector which is regarded asexploitative

andunreliable (World Bank, 1981). Ogunfowora (1996) identified 2 justifications for government involvement in fertilizer subsidy: (i) to ensure availability of fertilizer on time and at fair prices throughout the country, and (ii) to promote increased consumption through intensive extension activities by government agencies. A third justification was on the grounds that small-scale resource poor farmers cannot afford to pay high cost of fertilizer (Mwangi, 1997).

There has been rapid growth in fertilizer usage in Nigeria; rising from 186,000 MT in 1977 to over one million metric tons in 1994 (Ogunfowora, 1996). However, as the use of fertilizer in Nigeria increases, the inadequacies of the subsidy strategy became manifest in leakages and transit losses, cross border trade, late and non-deliveries of fertilizer to designated depots, artificial scarcity, and unsustainable subsidy burden on the government (Isokrari, 1995; Ogunfowora, 1996; Nagy and Edun, 2002). Experts pointed to liberalization as the only panacea to the then problems of the fertilizer sector (World Bank, 1979; World Bank, 1981; Ogunfowora; 1996). The Federal Government of Nigeria (FGN) discontinued the fertilizer subsidy and adopted a complete liberalization of the fertilizer procurement and distribution process in Nigeria in 1997. With the return to democratic rule in May 1999, as reported by Nagy and Edun (2002), the FGN reintroduced fertilizer subsidy. To date, the Federal Government and the various states and local governments are involved in some form of subsidy for fertilizer.Yet, the problem of havingsubsidised fertilizer delivered to farmers at the right time, at the right place, and in the right amounts still persist.

From the foregoing it is clear that the adoption of the input subsidy strategy in Nigeria has been bedeviled by myriads of problems prominent among which are high subsidy burden of the federal budget and the inability of the strategy to ensure the delivery of subsidized farm inputs to farmers at the right time, at the right place, and in the right amounts. The problem that thus arises for this study is to attempt an answer to the following question: should the government continue with the policy on farm inputs subsidy or should it rather support farm output (producer) prices? In the process of finding answer to the aforementioned question, the study was aimed at the following objectives:

(i)   Assess the profitability of small-scale rice production in the study area, and

(ii) Examine the effects of changes in both inputs costs and output prices on farmers' profitability with a view towards identifying the best of the 2 farm policy strategies, input subsidy or producer price support, that will maximize farmers' profit.

This study is expected to modestly contribute to the literature on our understanding of the effects ofgovernment farm support policies on agricultural production in Nigeria which would hopefully provide insights for policy-makers that could lead to the formulation of better agricultural policies in Nigeria.Though the study is based on evidence from rice production in Kaduna state of Nigeria, its observations and conclusions are expected to be of use to other sub-sectors of the Nigerian Agricultural sector and beyond.

The Conceptual Framework: The conceptual framework for this study is based on the following arguments: (i) that for Nigerian agriculture to be developed, it has to be practiced as a business (ii) that profit makes all businesses, including agriculture, attractive (iii) that farm profit can be enhanced through the formulation of good farm policies(iv) that farm policies can enhance farmers' profit through either of the following two strategies: reducing costs of inputs (input subsidy) or guaranteeing a fair price for farmers' produce (price support) (v)

that the preferred farm policy strategy is one that lead to more profit for the farmers.

METHODOLOGY

The Study Area: The study was conducted in Kaduna State which is located between Latitudes 9 08 and 11 07 N and Longitudes 6 10' and 8 48 E, with a land mass of about 45,567 square kilometres. Kaduna State has a population of 6,066,562 inhabitants (National Population Commission, NPC, 2006), which is estimated at 8,106,284 for the year 2016 at an annual growth rate of 2.67%.It occupies a major position in the Agricultural economy of Northern Nigeria (Ado, *et al.,* 1999). The annual rainfall in the area varies generally between 942mm and 1000mm and last for about six months (May to October) of the year (National Agricultural Extension and Research Liaison Services, NAERLS, 2002). The area has a suitable climate and environmental conditions favourable for cereal crop production. The major crops grown in the State include maize, sorghum, rice, millet, yams, potatoes, ginger, groundnut, chillies, sheanuts, beniseed and soyabeans. Small-scale farmers whose labour force, capital and management originate mostly from the households predominantly carry out the bulk of agricultural production. According to Cadoni and Angelucci (2013), Kaduna state, with an average annual production of more than 650,000MT, is the leading producer of rice in Nigeria. Rain-fed upland is the predominant rice production system in the State (USAID, 2009).

Sampling Procedure
The study employed a multistage selection procedure. The procedure comprised, first, the purposive selection of 3 out of the 4 zones of the Kaduna Agricultural Development Programme (KADP) known for their importance in paddy production. The second stage was the purposive selection of two prominent rice producing Local Government Areas (LGAs) from each of the 3 ADP zones. This gave a total of 6 LGAs in the study area. In the third stage, two important rice producing communities were purposively selected from each LGA based on the concentration of paddy producers. This gave a total of 12 rice producing communities in the study area. The fourth stage was the random selection of 10% of rice farmers using simple random sampling technique whereby numbers were assigned to each potential respondent in the sampling frame developed for each of the selected rice producing community in the study area as shown in Table 1. Using electronically generated random numbers the sample for each community was drawn. This gave a total of 241 rice farmers.The number of questionnaires returned and analyzed in this study was 226.

Table 1: Sampling Frame and Sample Size for the respondents in this study

ADP Zone	LGAs	Farmers	
		Sampling Frame*	Sample Size
Maigana	Soba	379	38
	Ikara	437	44
Lere	Lere	378	38
	Kauru	397	40
B/Gwari	B/Gwari	456	46
	Kajuru	346	35
Total		2393	241

*A list of potential respondents drawn during the reconnaissance survey

Data Source and Collection

Primary data such as input costs and output pricewere collected and utilized in the construction of farmbudgets. These data were collected from the respondents using the semi-structured questionnaires designed for this study.The details of the type of data collected are presented in Appendix A.

Appendix Table A1: Private Prices Budget for Small-scale Rice Production and Processing in Kaduna State (Average per Hectare)

P-Budget	Item	Quantity	Unit of Price (₦)	Amount (₦)
Tradables	Fertilizers (kg)	237.50	98.30	23,346.25
	Pesticides (ltr)	5.23	920.75	4,815.52
	Seeds (kg)	80.64	165.40	13,337.86
Factors	Land Preparation (Mandays equivalent)	17.65	850.00	15,002.50
	Crop care (Mandays equivalent)	11.53	850.00	9,800.50
	Harvesting (Mandays equivalent)	2.48	850.00	2,108.00
	Threshing & winnowing (Mandays equivalent)	3.23	850.00	2,745.50
	Wood			5,713.66
	Water			1,910.65
	Milling			9,141.85
	Drying			1,645.53
	Destoning			3,047.89
	Polishing			1,523.03
	Size & Grading			4,570.93
	Packaging			2,559.72
	Working capital			4,275.20
	Land	1.00	10000	10,000.00
Output	Total Revenue (N/Ha)	1279.20	155.6	199,043.52
	Total Cost N/Ha			115,544.59
	Profit N/Ha			83,498.93

Source: Field Survey 2014

Analytical Technique

The Policy Analysis Matrix (PAM)was employed to achieve the objectives of the study. For a description of the PAM methodology and its applications see: Monke and Pearson (1989); Gotsch *et al.,*(2003) and Pearson *et al,*(2003). An overview of the PAM is presented in Table 2.The first row of the PAM was constructed based on the data collected from the farmersand other relevant respondents along the rice value chain (see Appendix table A for computations).The PAM first row adopted for this study is presented in Table 3 and was used to achieve objective (i). Through the constructed PAM's first row, sensitivity analyses were conducted to simulate the effect of changes in costs of inputs and prices of output on farmers' profit in the study area by changing one parameter at a time and observing what happens. This was used to achieve objective (ii).

Table 2: An Overview of the Policy Analysis Matrix

	Revenues	Costs		Profit
		Tradable Inputs	**Domestic Factors**	
Private Prices	A	B	C	D
Social Prices	E	F	G	H
Divergences	I	J	K	L

Table Notes: Private profits (D) equals A minus B minus C. Social profits (H) equals E minus F minus G. 'Output transfers (I) equals A minus E. Input transfers (J) equals B minus F. Factor transfers (K) equals C minus G. Net transfers (L) equals D minus H; they also equal I minus J minus K. (Source: Monke and Pearson, 1989).

Table 3: The Policy Analysis Matrix adopted for this study

	Revenues	Costs		Profit
		Tradable Inputs	**Domestic Factors**	
Private Prices	A	B	C	D
Social Prices	-	-	-	-
Divergences	-	-	-	-

Table Notes: Private profits (D) equals A minus B minus C. (Source:Monke and Pearson, 1989).

RESULTS AND DISCUSSIONS

The profitability of small-scale rice production is presented in the top row of the Policy Analysis Matrix estimated for rice in the study area as shown in Table 4.It reveals that rice farmers in the study area made a positive private profit of ₦93, 498.93 per hectare under prevailing technologies, costs of inputs, prevailing output prices, and existing policy environment for the study period. This finding is in agreement with three other separate rice PAM studies (Liverpool *et al.,* 2009; Oguntade, 2011; Ugochukwu and Ezedinma, 2011; Ogbe *et al.,* 2011) where it was reported that rice farmers in Kano, Niger, Ekiti and the South eastern states of Nigeria had positive private profitability. Profitability of rice production from non-PAM studies were reported by Onoja and Herbert (2012) in Kogi state. Thus, it can be concluded that small scale rice production is profitable in the study area.

Table 4: Constructed first row of the rice PAM for the Study area

	Revenue (₦)	Costs (₦)		Profits (₦)
		Tradable Inputs	**Domestic Factors**	
Private	199,043.52	41,499.63	64,044.97	93,498.93
Social	-	-	-	-
Divergence	-	-	-	-

Sensitivity analyses were conducted to test the likely effects of changes on the costs of fertilizers, pesticides and price of output farmers' profit. The results are presented in Table 5. Results of the sensitivity analyses indicate that a 25% and 50% increase in fertilizer costs will reduce farmers' profit to ₦87, 661.00 and 81,825.80 respectively. Likewise, a 25% and 50% increase in the costs of protection chemicals is estimated to respectively reduce farmers' profit to ₦92, 295.00 and ₦91, 091.14. A 100% increase in the costs of rice seeds is expected to reduce farmers' profit to ₦80, 161.07 i.e. by just 14%!

Results of the sensitivity analysis on a 25% and 50% increase in rice price indicate an increase in profit to ₦143, 259.81 and 193,020.69 respectively. These findings supports that of Gotsch *et al.,* (2003) that changes in inputs costs have much smaller
.

effects on profits than changes in the prices of outputs. Thus it can be concluded that the government policies that support output prices will increase farmers' profit much more than policies on inputs subsidies.

From the foregoing it can be argued that modern inputs such as fertilizer are technologies that requires government subsidies at the introductory stage to create awareness and encourage adoption; once the importance and benefits of these technologies have become well known to the farmers, and the potential structures of a viable competitive market are available, the government need not subsidize such inputs anymore because farmers, as rational beings, will purposefully seek out such inputs to maximize their productions, within the limit of available information, resources, and budgets; so long as the prices for their produce are good

Table 5: Sensitivity Analysis on Farmers' Profit

Parameter	Profit at 25% increase (₦/ha)	Profit at 50% increase (₦ /ha)
Fertilizer Costs	87,661.00	81,825.80
Pesticide Costs	92,295.00	91,091.14
Rice Price	143,259.81	193,020.69
Seeds Costs (100% increase)		80,161.07

CONCLUSION
Based on the findings of this study and its conclusion that changes in inputs costs have much smaller effects on profits than changes in the prices of outputs, this study therefore recommends that government policies should be more towards producer price support than farm input subsidy provision.

REFERENCE
Ado, S. G., Abubakar, I. U. and Mani, H. (1999).Prospects of Extra Early Maize Varieties in Nigerian Savanna Zones.In J. A. Valencia, A. M. Falaki, S. Miko and S. G. Ado (eds). *Sustainable Maize Production in Nigeria: Challenges in the Coming Millennium*. Proceedings of National Maize Workshop.

Cadoni P. and Angelucci F., (2013).Analysis of incentives and disincentives for Rice in Nigeria.*Technical notes series*. MAFAP, FAO: Rome

Federal Ministry of Agriculture and Rural Development FMARD (2011).*AgriculturalTransformation*

Agenda: We Will Grow Nigeria's Agricultural Sector (Draft). Abuja: FMARD.

Federal Ministry of Agriculture and Rural Development FMARD (2016).The Agriculture Promotion Policy (2016 – 2020) *Building on the Successes of the ATA, Closing Key Gaps.* Policy and Strategy Document. Abuja: FMARD.

Gotsch, C.H. Pearson, S.R, and Bahri, S. (2003). *Computer Tutorial for Policy Analysis Matrix (PAM) In Indonesian Agriculture*.http://stanford.edu/group/ FRI/indonesia/newregional/newbook .htm

Isokrari, O. F., (1995). *Achievements and Constraints of the Local Fertilizer Manufacturers in 1993 and 1994.* An invited paper presented at the 27th Meeting of the National Council on Agriculture (NCA). Abuja-July 1995.

Lester, J. P. and Stewart, J. (2000).*Public Policy: An Evolutionary Approach.* 2nd Edn.Wadsworth Thomson Publishing.

Liverpool, L.S.O, Ayoola, G.B and Oyeleke, R.O. (2009) Enhancing the Competitiveness of Agricultural CommodityChains in Nigeria: Identifying Opportunities with Cassava,Rice, and Maize using a Policy Analysis Matrix (PAM)Framework.*Background Paper No.NSSP 013.* IFPRI: Abuja.

Monke, E. A. and Pearson, S.R.(1989). *The Policy Analysis Matrix for AgriculturalDevelopment*.Cornell University Press.

Mwangi, W. M. (1997). Low Use of Fertilizer and Low Productivity in Sub-Saharan Africa.*Agro-Ecosystems*47:135-147.

Nagy, J. G. and Edun O (2002).*Assessment of Nigerian Government Fertilizer Policy and Suggested Alternative Market-Friendly Policies*.IFDC-Africa, Lome, Togo.

National Agricultural Extension and Research Liaison Services, NAERLS (2002).*Field Situation Assessment of 2002 Wet Season Agricultural Production inNigeria*. Zaria: NAERLS Press.

National Population Commission, NPC (2006).*Human Population Figures of the 2006 Nigerian National Census*. Abuja: NPC.

Ogbe, A. O, Okoruwa, V. O and Saka, O. J. (2011). Competitiveness of Nigerian Rice and Maize Production Ecologies: A Policy Analysis Approach. *Tropical and Subtropical Agro-ecosystems*.14 : 493- 500 493.

Ogunfowora, O. (1996). *Input Supply and Distribution for Crop Production in Nigeria: Problems and Prospects.* A Keynote address presented at the first ISNAR/NAERLS/FDA joint seminar, Zaria: NAERLS Press.

Oguntade, A. E. (2011). Assessment of Protection and Comparative Advantage in Rice Processing in Nigeria.*African Journal of Food, Agriculture, Nutrition and Development.* 11(2): 4632-4646.

Onoja, A. O. and Herbert B. C. (2012).Econometric evaluation of rice profitabilitydeterminants in Kogi State, Nigeria.*Journal of Agricultural Extension and Rural Development* 4 (5): 107-114.

Pearson, S.; Gotsch, C., and Bahri, S. (2003): *Applications of the Policy Analysis Matrix in Indonesian agriculture*. Accessed by Internet, through

http://stanford.edu/group/FRI/ indonesia/newregional/newbook.htm.

Ugochukwu, A.I and Ezedinma C.I (2011).Intensification of Rice Production Systems in Southeastern Nigeria: A Policy Analysis Matrix Approach. *International Journal of Agricultural Management & Development*, 1(2): 89-100.

United States Agency for International Development, USAID (2009).Global Food Security Response Nigeria Rice Study Microreport #159.Attachement IV to the Global Food Security Response West Africa Rice Value Chain Analysis. Washington DC.

World Bank (1981).*Problems of Marketing and Input Supply in Accelerated Development in Sub-Saharan Africa*. World Bank Report, Washington.

World Bank (1979).*Nigeria: Agricultural Sector Review*. World Bank, Washington.