



Prospects of forward contracting of inputs among Nigerian crop farmers and agricultural input marketers

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ABSTRACT

Forward contracting can help reduce the problem of inputs supply risk which is inherent in Nigeria's agriculture. This research work concentrated on the prospect of the strategy among crop farmers and agricultural input marketers. 'The results of the study revealed that majority of the respondents' supported forward contracting of inputs and were willing to engage in the strategy. However, low capital base of enterprise, possible default by farmers and late payments are possible reasons why Agricultural input marketers may not be willing to go into a forward contract with crop farmers. The age of farmer, number of crop enterprises, years of experience, capital base of farmer and extension visits were significant factors influencing farmers' willingness to engage in forward contracting of inputs. There is need to create more awareness about 'forward contracts' among agricultural input marketers and farmers in the country. Agricultural credit should be made affordable, available and accessible to input marketers by Micro Finance Banks and the Nigeria Agricultural Bank to improve their capital base. State and Local Government Authorities in collaboration with farmers' cooperative societies should stand as guarantors for Farmers who are willing to engage in forward contracting.

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Introduction

Almost every farm business must stock goods that are inputs to the production process. Having inputs in stock ensures smooth and efficient running of the business operation (Taha, 1976). The manager must consider the appropriate lot size, quality, and purchase price as well as setup or preparation costs. Purchase price is of special interest when quantity discount price breaks can be secured. Decision regarding the quantity and time at which the inputs are ordered are based on the minimization of an appropriate cost function which balances total cost resulting from over or under stocking of the inputs (Mishra and Godwin, 1997). The biological nature of agriculture makes timing of inputs supplies paramount. Forward contracting of inputs is an agreement between farmers and agricultural input marketers whereby inputs will be given to the farmers on credit and the farmers will pay back after selling their farm produce.

Farmers chose to forward contract their factors of production for two basic reasons. First, they are seeking to obtain price discounts and "Lock in" a certain price for the input. This reduces the input price risk. Second, contracting of inputs ensures quality and timeliness of input deliveries (Perry and Johnson, 1979). In addition to input quality, contracting may also assure quantity of inputs and facilitate co ordination among individuals (Sonka and Patrick, 1984). The farmer can arrange for supply of inputs when they are needed, rather than having to overstock to ensure supply. For example, crop producers may forward price of fertilizer and other chemicals to reduce price variability for both parties. Acquiring assets through contracting offers the farmer a number of advantages, including possible supplier provided financing to purchase the inputs. In addition to financial assistance, the farmer may receive production or managerial assistance such as fertilizer recommendation, feed,

high quality seed varieties and other services not available without contract.

Forward contracting of inputs in production agriculture is becoming increasingly important in developed nation like USA, UK, etc, as more farmers attempt to manage risk (Perry and Mishra, 1999). Forward contracting also guarantees farmers an assured supply of inputs at a specified price. Forward contracting of inputs could also aid planning and allows farmers diversify purchase over time (Haydu *et al.*, 1992). However, Mishra and Perry (1999) stated that, farmers choose to forward contract their factors of production for two basic reasons first, getting price discounts and locking in a certain price for the inputs. This reduces the inputs price risk. Second, contracting of inputs ensures quality and timeliness of inputs deliveries. Forward contracting of input also allows for reduction of risk and enable farmers speculate on favourable price moves (Haydu *et al.*, 1992). Past researches on agriculture production risks has focused on the output side when considering future markets and forward contracts (McKinnon, 1967; Chavas and Pope 1982; Anderson and Danthine 1983). Only limited attention has been given to input price risk. Batra and Ullah (1974) showed that output price uncertainty, assuming all inputs are chosen before the output price is observed, leads to changes in the output level, but leaves relative input quantities unchanged. Hartman (1975) concluded that reducing output due to uncertainty reduces factors demand. However, Robinson and Barry (1971) noted that even though risk modifies the output level, leaving relative input rations unaltered, production still occurs in the line of least -cost combination.

Background

Access to agricultural production inputs is a necessary impetus for agricultural development in Nigeria. Orebiyi *et al.* (2005) reported that availability of production credit and farm

inputs will sufficiently improve farmers' level of empowerment to adopt innovations. This in real sense can translate into greater level of adoption with a multiplier effect on increased farm income. Rahman (2008) in his study on women accessibility to productive resources reported that women's poor financial status and poor access to credit facilities did not enable them to acquire farm inputs, thus limiting the scale of their farm production. Sanusi and Salimonu (2006) in their studies on yam production economics in Oyo State, Nigeria, reported that the most critical problem facing farmers is inadequate capital to invest in farm production especially in inputs procurement. Farmers in Abuja Municipal Area Council (AMAC) are also not immune to this problem. However, the problem needs to be relaxed and one way of doing this is by forward contracting of inputs. This practice is not common in Nigeria. The importance of forward contracting of inputs in agricultural production can never be over emphasized. As a means of fostering production by farmers and promoting their welfare on the long run, it becomes absolutely relevant to; (i) determine the perception of Nigerian farmers and agricultural input marketers on forward contracting of inputs, (iii) determine the factors that influence the willingness of farmers to engage in forward contracting of inputs and (v) identify the factors that may likely inhibit agricultural input marketers in Nigeria from engaging in forward contracting of inputs.

Methodology and Data

Farmers who participated in the study were selected from Nasarawa State and Abuja, the capital city of Nigeria. A three stage sampling technique was used for the selection. The first stage involved a random selection of 6 Local Area Councils from each of the two areas. The second stage involved the selection of 2 villages from each of the Councils. In the third stage, 20 farmers were randomly selected from each village making a total of 480 farmers. A total of 40 Agricultural input marketers were also interviewed to give a total of 520 respondents for the study.

Primary data was utilized and were collected with the aid of an interview schedule which was administered on the farmers and agricultural input marketers by trained enumerators. Data was collected on the number of farm enterprises, annual income, source of inputs, educational levels, farmers' perception on forward contracting and the agricultural input marketers' perception on forward contracting. Data collection lasted for a period of 4 weeks.

Descriptive statistics and Logistic regression (Logit) model were used to analyze the data. This (Pindyck and Rubinfeld, 1991). The dependent variable (Y_i) assumes the value of one '1' if a farmer is willing to use in future, the strategy "forward contracting of inputs" and assumes a value of zero '0' if otherwise. Explicitly, the logit is defined as the natural logarithmic value of the odd in favour of the positive response (in this case, forward contracting of inputs). That is;

$Y_i = (1 \text{ if the farmers are willing to engage in forward contracting of inputs, } 0 \text{ if otherwise})$

Empirical representation of forward contracting of inputs model is given by:

$Y_i = X_i\beta + \mu_i$, Where X_i is a vector of explanatory variables useful to the farmers willingness to engage in forward contracting of inputs. β is a vector of unknown parameters while μ_i is a residual error assumed to be distributed with a zero mean and constant variance. The factors hypothetically found to influence farmers' willingness to engage in forward contracting

of inputs following the works of Edelman *et al.* (1990), Turner *et al.* (1983), Shapiro and Broorsen (1988), Hill and Kau (1973), Fu *et al.* (1988) Calvin (1992), Asplund *et al.* (1989) and Makus *et al.* (1990) are:

X_1 = Age of respondents (Years)

X_2 = Education level (no of years)

X_3 = Years of experience in farming (years)

X_4 = Numbers of crop enterprises (Actual number)

X_5 = Land tenure system (secured 1, unsecured 0)

X_6 = Distance from major source of input (km)

X_7 = Total farm income in the previous session (N)

X_8 = Total farm size (hectare)

X_9 = Frequency of extension visit (1 if yes, 0 if otherwise)

X_{10} = Attendance of farm organization meetings (Actual number of meetings attended)

Results and Discussion

Perception of Farmers on Forward Contracting of Inputs

The perception of farmers on forward contracting of inputs is presented on Table 1. The Table showed that majority of the farmers (72%) supported the strategy of forward contracting of inputs while about 26% did not support the strategy.

Willingness of Selected Farmers to Engage in Forward Contracting of Inputs

The willingness of selected farmers to engage in forward contracting of inputs is presented on Table 2. The result revealed that 82% of farmers were willing to engage in forward contracting of inputs, while 18% were not willing to do so.

Maximum-likelihood estimates for the Logit model of forward Contracting of Inputs by Farmers

Estimated model parameters are presented on Table 3. Summary statistics showed that the hypothesized forward inputs contracting model provided acceptable "fit" to the data. From the result, age, farming experience, farm size and frequency of extension visits had positive coefficients and were significant at 5% level. Education, land tenure system and total farm income from crop enterprises also had positive coefficients and were significant at 1% level. Turner *et al.* (1983) had earlier reported that the age of the farmer is a significant factor influencing the willingness of farmers to engage in forward contracting of agricultural inputs. The significant coefficient for age as observed from the study indicated that the older the farmer the more his tendency to engage in forward contracting of inputs. An explanation for this result is that the farmers will have the idea to use inputs contracting to lower their cost and maximize their profits (Perry and Mishra, 1999). Education is intended to decrease agricultural producers' risks, the significant coefficient for education indicated that educated farmers are more likely to use forward contracting of inputs. The significant coefficient for farm income implies a probability of inputs contracting among farmers with higher income from crop enterprises relative to those with lower farm income. The significant coefficient for land tenure system implies that farmers who have secured land are more likely to engage in forward contracting of inputs compared to those who do not. The coefficient of total farm size was positive and significant at 5% level this implies that farmers with larger farm sizes are more likely to increase the use of forward contracting of inputs than farmers with smaller farm sizes. The coefficient for extension visit was positive and significant at 5% level; thus confirming the importance of this source of information. Farmers who seek information from agricultural extension agents are more likely to use forward contracting of inputs than others. Farmers who regard extension

services as an important source of market information are considered active in seeking information to increase relative return to farm inputs, including their time spent in farming. Likewise, they are expected to have favorable attitudes towards forward contracting of inputs as a means to reduce both production and inputs risks. The above findings are consistent with the findings from previous studies (Fu *et al.*, 1988 and Asplund *et al.*, 1989). Perry and Mishra (1999) in their study on forward contracting of inputs also reported that farm size and extension visits are among the important factors affecting the choice to forward contract inputs.

Perception of Agricultural Inputs Marketers on Forward Contracting of Inputs

The results on Table 4 revealed that 90% of the agricultural inputs marketers support the arrangement. This is a positive indication that the strategy of forward contracting of inputs can be introduced in the study areas.

Willingness of Agricultural Inputs Marketers to Engage in Forward Contracting of Inputs

The willingness of agricultural inputs marketers to engage in forward contracting of inputs is presented on Table 5. The results revealed that majority (65%) of the inputs marketers were willing to engage in the strategy while 35% were not willing to do so. This further supports the high prospect of forward contracting of inputs in the study areas and possibly Nigeria at large.

The Factors that will likely inhibit Agricultural inputs marketers from engaging in forward contracting of Inputs

The factors that will likely inhibit agricultural inputs marketers from engaging in forward contracting are presented in Table 6. The table revealed that low capital base of the marketers' enterprise, default by farmers and late payment were the major factors that can inhibit marketers from engaging in forward contracting. This implies that agricultural inputs marketers will be encouraged to engage in forward contracting of inputs if these factors are mitigated. Further discussions with agricultural inputs marketers revealed that provision of credit facilities by government and collaterals or guarantors by the farmers will encourage them to engage in forward contracting of inputs.

Conclusion

Based on the findings of the study, the following conclusions are drawn;

1. The prospects for forward contracting of inputs are high among agricultural input marketers and farmers in Nigeria.
2. A number of factors may inhibit input marketers from engaging in forward contracts.
3. The socio-economic characteristics of Farmers can significantly influence their willingness to engage in forward contracting.

Recommendations

1. There is need to create more awareness about 'forward contracts' among agricultural input marketers and farmers in the study area and the country (Nigeria) at large. This can go a long way to guide against inputs supply risk and at the same time create market outlets for the agricultural input marketers. The extension agencies can play a big role in this regard.
2. Agricultural credit should be made affordable, available and accessible to input marketers by Micro Finance Banks and the Nigeria Agricultural Bank to improve their capital base. Such an action will enable marketers procure adequate quantities of farm inputs for sale to farmers.

3. State and Local Government Authorities should be mandated to stand as guarantors for Farmers who are willing to engage in forward contracting. This can be done in collaboration with farmers' cooperative societies in order to guide against default.

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Table 1: The Distribution of Farmers Based on their Perception of Forward Contracting of Inputs

Perception	Frequency	Percentage
Support	347	72.3
Do not support	128	26.7
Undecided	5	1.0
Total	480	100

Table 2: Distribution of farmers Based on their willingness to engage in Forward Contracting of Inputs

Opinion	Frequency	Percentage
Yes	394	82
No	86	18
Total	480	100

Table 3: Maximum-Likelihood Estimate for the Logit Model of Forward Contracting of Inputs by Farmers

Variable	Parameter Estimate	Standard Error
Intercept	0.532	0.625
Age	0.571**	0.209
Education	0.470***	0.107
Farming experience	0.643**	0.324
No of crop Enterprises	0.259	0.026
Land tenure	0.637***	0.199
Distance	0.250	0.019
Total farm income	0.876***	0.318
Farm size	0.181**	0.089
Extension visit	0.536**	0.188
Attendance at meetings	0.049	0.610

Log likelihood function = 12.155, ***, ** denote Significance at 1% and 5% respectively.

Table 4: The Distribution of Agriculture Inputs Marketers Based on their Perception of Forward Contracting of Inputs

Perception	Frequency	Percentage (%)
Support	36	90
Do not support	0	0
Undecided	4	10
Total	40	100

Table 5: The Distribution of Agricultural Inputs Marketers Based on their Willingness to Engage in Forward Contracting of Inputs.

Opinion	Frequency	Percentage (%)
Yes	26	65
No	14	35
Total	40	100

Table 6: Distribution of Agricultural Inputs Marketers Based on the Factors that will likely inhibit them from engaging in Forward contracting of Inputs

Factors	Frequency	Percentage
Default by Farmers	28	70
Late payment	6	15
Low capital base of enterprise	6	15
Total	40	100