Journal of Economics and International Finance Vol. 3(3), pp. 187-194, March, 2011
Available online at http://www.academicjournals.org/JEIF
ISSN 2006-9812 ©2010 Academic Journals

Full Length Research Paper

Analysis of risk among agribusiness enterprises investment in Abia State, Nigeria

Nto P. O. O.*, Mbanasor J. A. and Nwaru J. C.

College of Agribusiness and Financial Management, Michael Okpara University of Agriculture, Umudike, Nigeria.

Accepted 10 February, 2011

The study analysed risk among agribusiness enterprises investment in Abia State of Nigeria. Specifically, it examined types of risk and the degree of influence on the agribusiness enterprises. The study also examined common risk reducing strategies among the agribusiness enterprises in the area. Primary data collected from 40 formal agribusiness firms were used in the study. The data were analysed with w-statistics and validated with Pearson criterion (χ^2). The result indicated a w-statistics of 0.79. The result was verified by Pearson criterion and this gave χ^2 calculated value of 4.81 which is lower than table value of 11.07 at 5% significant level. The result revealed that risk sources affecting agribusiness investment were financial, marketing, currency and production in that order. The common risk reducing strategies were diversification, integration, forward contracting, and insurance, among others. Based on this, it was recommended that government should make policies that will encourage investors adopt the highlighted risk reducing strategies in risk management.

Key word: Analysis, agribusiness, investment, Abia State, Nigeria.

INTRODUCTION

Risk analysis among agribusiness investments has become increasingly popular in recent years. This is obvious considering that agribusiness investment depends on vagaries of the environment and nature. Hence, there has been scepticism about the realisation of Millennium Development Goals (MDGs) most especially, cutting of people living under food insecurity by half in 2015 (Moss et al., 2003; Drollete, 2009; NIPC, 2006; Chaddad et al., 2010; Kuyrah et al., 2006).

Nigeria being prone to a lot of environmental inconsistencies requires high degree of risk aversion strategy to break the circle of poverty which engulfed over 70% of its population and also to achieve increased food production to meet 3.18% population growth (NIPC, 2007; Ojo, 2003; FRN, 2009; Alimi and Ayanwale, 2005; FOS, 1996).

Risk which investment economists describe as the variation from expected outcomes due to imperfect knowledge of investor in decision making is inherent in every form of enterprise but is more intensive in input-output relation among agribusiness productions (Kuyrah et al., 2006; Odii, 1998). Alimi and Ayanwale (2005) opined that a situation of imperfect knowledge is more common in agribusiness enterprises. Hence, investors in agribusiness enterprises face the danger that what they expect ex-ante may not be realised ex-post (Ndugbu, 2003). For instance, each time an investor borrows money for investment in agribusiness enterprise, there is the possibility that return on investment is less than cost of borrowed fund. Also, in this era of global climate change, an investor cannot predict with certainty the degree of fluctuation in prices of input and output.

According to Njavro (2009), NIPC (2006), CN (2008), Dercon (2002) and Mikhaylova (2005), risk sources to agribusiness enterprises can be grouped into social, market, political, financial, production and foreign exchange risk. Social risk is suggestive that the risks or hazards have their origin from man. The risk could be due to fire outbreak, burglary or theft, kidnapping of investors/workers for ransom, embezzlement, strike, civil commotion and changes in social structure e.g. divorce and dissolution of partnership which can lead to unexpected decline in efficient operation of enterprise.

Market risk arises due to fluctuation in input and output prices. Political risk is due to changes in government machineries and policies. The use of debt in financing agribusiness investment exposes the firm to financial risk. Foreign exchange risk is borne out of the firm's dependence on foreign currency. Production risk occurs

*Corresponding author. E-mail: nto2015@yahoo.com.

because agribusiness enterprise is affected by many uncontrollable events that are often related to weather, drought, physical hazard to the factory site and technological failure of the firm. This risk affects the efficient conversion of input to output (Barry and Frazer, 1984; Bauer and Bushe, 2003; Aneke, 2007). Thus, empirical studies have produced varieties of sources of risk. According to Alimi and Ayanwale (2005), in a study conducted on risk in onion production in Kebbi State, Nigeria, reported that the most important sources of risk are technical-drought, market and financial. Mikhaylova (2005) noted that the most important risk sources among agribusiness marketing firms in Central and Eastern Europe are currency and del credere in that order.

The literature on risk cannot be complete without a brief discussion on the issues of risk measurement. According to Macaver and Ehimare (2010), risk measurement has been a challenging issue among sectors and industries. Risk being the probability of adverse outcomes associated with an action or decision according to Njavro (2009), Akinsuhre (2006), Chandra (2006), Macaver and Ehimare (2010) and Ndugbu (2003) is measurable in empirical and quantitative manner using three major statistical tools such as expected value, variance/standard deviation and coefficient of variation. Expected value (EV) is the sum of the probabilities that different outcomes will occur multiplied by resulting payoffs (Martin and Markus, 2000; Hardaker, 2000). For instance, if the possible outcomes of the investment decision are X_1, X_2...Xn and the corresponding probabilities of the investment decision are P_1, P_2...P_n then the expected value is stated as

$$EV = P_1 X_1 + P_2 X_2 + \ldots + P_n X_n \quad \ldots\ldots\ldots\ldots\ldots (1)$$

Where; the sum of $P_s = 1$

Despite the simplicity in the use of expected value method in risk measurement, it collapses information about the likelihood of different outcomes into a single statistic. This is a very convenient way of economizing on the amount of information needed to make decision; therefore there is need for caution (Macaver and Ehimare, 2010). Also, the expected value only provides information about the average value of a random variable but does not indicate the degree of risk associated with the random variable, hence the need for standard deviation (Hardaker, 2000).

Standard deviation is a statistical measure of absolute dispersion from the mean value. It measures variability around an expected value (Akinsulire, 2006). Following Chaddad et al. (2010) and Macaver and Ehimare (2010) standard deviation is computed thus:

$$\delta = P_1 (X_1 - EV)^2 + P_2 (X_2 - EV)^2 + \ldots + P_n (X_n - EV)^2 \quad \ldots\ldots\ldots (2)$$

where δ is the standard deviation.

Akinsulire (2006) held that the higher the standard deviation of a project, the riskier it is. The weakness of standard deviation as a measure of risk arises when choice has to be made between enterprises having the same standard deviation but different expected value .Hardaker (2000) added that neither variance nor standard deviation tells anything about the location of the distribution of outcomes on the x-axis. Pandey (2006), Chandra (2006), Alimi and Anyawale (2005) opined that coefficient of variation becomes a better tool for handling the issue of difference in size or scale among agribusiness enterprise. Coefficient of variation is defined as the standard deviation of the probability distribution divided by its expected value.

$$\text{Coefficient of variation (CV)} = \delta / EV \ldots\ldots\ldots (3)$$

Hence it is a useful statistics for comparing the degree of variation from one set of outcome to another, even if the expected values are drastically different from each other. The decision rule is that, the lower the ratio of standard deviation and expected value, the better the risk-return trade off. The flaw with coefficient of variation is that it may give unreliable result when the expected value is negative or zero. For instance, an investment with a zero expected value will also have a zero standard deviation, implying non-risky investment. The ratio will make no sense hence limits the usefulness of coefficient of variation in risk measurement. Besides, it cannot be used to construct confidence intervals (Hardaker 2000 and Chaddad et al., 2010).

However, there is need for an econometric model which will take care of the limiting factors associated with the discussed models. This becomes necessary now that Abia State and Nigeria in general is brainstorming on the possibility of achieving economic growth and food security in line with vision 20, 2020 projects and MDGs blueprint. Though, similar studies may have been conducted in other areas, the findings of which may not be relevant for policy formulation in Abia State. Therefore, the need for the study with the following specific objectives: (1) Examine sources of risk and the degree of influence on agribusiness enterprise investment, and (2) Examine risk reducing strategies in the agribusiness investment.

RESEARCH METHODOLOGY

Study area

The study was conducted in Abia State of Nigeria. The state is approximately within Latitudes 4°, 41/ and 6°, 14/ North of the Equator and Longitudes 7°, 10/ and 8° East of the Greenwich median. It has seventeen local government areas that are divided along three agricultural zones namely Ohafia, Umuahia, and Aba (ABSEEDS, 2005; Balogun, 2008).

The state is selected for this study from many others because of numerous agribusiness enterprises, some of which have either formal or informal status. The formal agribusiness enterprises are

predominantly found in the urban areas of the state (Marchet et al., 2001).

Sample selection and data collection

The following sampling technique was adopted in the selection of the agribusiness firms that were used for the study. The first stage was a fact finding visit to the Ministry of Commerce and Industry as well as Aba Chamber of Commerce, Industry, Mines and Agriculture from where a list of all the companies and factories (registered with the above agencies) in the State was obtained. The second stage involved a purposive sampling technique to select the agribusiness firms in the list and the population guided in knowing the number that was selected. The population of the agribusiness firms in the list was 300 which formed the sampling frame for the study.

The third stage was a preliminary visit to some of the agribusiness firms by the researcher and an enumerator appointed from the Ministry of Commerce and Industry. The reasons for the visit were to validate the list of agribusiness firms from the Ministry of Commerce and Industry and eliminate moribund enterprises. Another visit was conducted on three agribusiness firms purposively selected from each of the agricultural zones. The visit paved way for the pretesting of validity and reliability of the research instruments that were used so as to enhance successful data collection.

Data for this study were generated through cross sectional method using survey instruments administered on the management team of each of the agribusiness firms. The survey instruments were responded to by the investors or their representatives in the firms who are in positions to provide the necessary data. The services of enumerators were used to obtain the data. To ensure reliability of data, the enumerators were drawn from the members of staff of Abia State Ministry of Commerce and Industry. The Ministry was also chosen because of the existing statutory relationship (that is, as Supervisory Ministry) with the agribusiness firms. The enumerators were given little training to enable them carryout effective data collection through the use of the survey instrument. After which, random sampling technique was used to select forty viable agribusiness firms which were functional for a period not less than ten years . The distributions of the firms were as follows: Twenty firms were selected from Aba zone while fifteen were selected from Umuahia zone and five from Ohafia zone. The inequality in the sampling spread was due to clusters of most of the agribusiness firms in Aba and Umuahia zones (Marchet et al., 2001).

Objective (1) was realized through simple descriptive statistics while objective (2) was analyzed through ranking risk factors by experts (staff that are well informed on risk management) as well as verification of concordance and probability of judgments with econometric model namely W- statistics and Pearson criterion. This involved ranking the degree of risk by the way of “experts’ judgment”. The following procedures were taken. In the first place, expert judgment method means to collect as many as possible experts evaluations of each risk factor influence upon the production economic indicator (which are the firms selected). Each risk factor would be put in order of descending influence. As a rule, the most important risk factor is given the rank one, the rest are given ranks two, three, four etc., in order of descending influence. Expert appraisal from each of the 40 agribusiness firms was carried out following Mikhaylova (2005).

1. Selection of experts among 40 firms who are competent to know issues regarding the various risk factors
2. Ranking factors by the experts
3. Information (expert judgments) processing
4. Verification of concordance and probability of expert judgments
5. Use of estimation results for working out the econometric model.

It is important to state that during ranking, some kinds of risks were given the same rank. Experts were requested to specify the positions given to such kind of risks in the process of general ranking; the risk factors in order of ranks decrease. We assumed that weight of position varies from 1 to 6. The factors which were given the same risk weight were equal to arithmetic middling of corresponding positions. Position and weights given to risks and the result of experts’ judgments processing were presented in Tables 2 and 3. The next was the determination of the coefficient of concordance to verify concordance of expert judgments

$$W = \frac{S}{\frac{1}{2}m^2(n^3-n) - \frac{m}{12n}\sum_{j=i}^{M} Tj} \quad (4)$$

Where; S = Sum of deviation squares (derived from processing of expert judgements); M = number of experts (40); n = number of risk, and Tj = Indicator that allows taking into consideration coincidence of ranks and was estimated by the formula;

$$Tj = \sum_{K=1}^{n} (t_k^3 - t_k) \quad (5)$$

Where; tK = number of rank K coincidences while ranking factor by expert j. Thus, coefficient of concordance varied within the range o ≤ w ≤ 1. The decision rules were that if w ≥ 0.5 then the concordance may be regarded as satisfactory, if w ≥ 0.7, then concordance is considered as good. W = 1 means entire coincidence of expert judgments. (that is, execellent and more reliable result). The probability of concordance coefficient was verified by Pearson criterion. This criterion was calculated thus:

$$\chi^2 = \frac{S}{\frac{1}{12} * m * n * (n+1) - \frac{1}{n-1} * \frac{1}{12} * \sum_{j=i}^{M} Tj} \quad (6)$$

Calculated value χ2Calc was compared with table value χ 2 Table. If χ2Calc exceeds χ2table, then the null hypothesis about concordance of 40 experts judgments on the risk factors ranking may be rejected, that is, we may assert that concordance of experts judgments is non-random. So in accordance with expert’s judgments, we determined the factors which have extreme influence upon the profitability of agribusiness operation. Following Alimi and Ayanwale (2005) and Mikhaylova, (2005), the risk factors for consideration were:

X1 = Currency risk
X2 = Political risk
X3 = Production risk
X4 = Market (price) risk
X5 = Financial risk
X6 = Social risk

Table 1. Distribution of risk sources affecting agribusiness enterprises.

Risk source	Frequency	Percentage
Currency (X_1)	40	100
Political (X_2)	40	100
Production (X_3)	40	100
Market (price) (X_4)	40	100
Financial (X_5)	40	100
Social (X_6)	40	100

Source: field survey data 2010;*Multiple responses were recorded.

RESULTS AND DISCUSSION

Here, the various sources of risk and their degree of influence on the agribusiness enterprises were discussed. This was done with the use of simple descriptive statistics, w- statistics and Pearson's criterion (x^2).

Sources of risks

As presented in Table 1, the risk sources identified to be affecting agribusiness enterprises in the study area were currency risk, political risk, production risk, market risk, financial risk, and social risk. Though 100% of the sampled firms identified the six risk sources but their degree of influence may not be the same on the productivity or profitability of the enterprises. The result is in line with the findings of Mbanasor and Nwankwo (2001), Nwaru et al. (2007) Alimi and Ayanwade (2005) as well as Mikhaylova (2005) who reported that the identified risks were the major sources of risk in agribusiness operations.

The six risk sources were also split into their various components as to determine the ones that are important to the investors.

Ranking of risk sources and their components

The identified risk sources and the ranking by staff (who were well informed on risk management) in their order of importance are presented in Table 2.

The table indicated that none of the firms considered such risk components as government instability, government interference and repatriation of earning, physical hazards in the factory, war and civil commotion/disturbances, changes in social structure, death and sickness as components of risk sources in the area. The risk components are considered inconsequential as NIPC (2007) noted that since 1999, a lot of policies have been put in place to encourage foreign investors to come to Nigeria.

Table 2 further indicated that the firms stated that meteorological, technological failure, input and output prices, high interest rate, and accessibility to credit as important risk components. Sixty (60) percent of the firms considered kidnapping of workers important while 50 and 42.5% of the sampled firms viewed poor management, theft and burglary, respectively, as other important risk components. More so, 27.5% ranked translation as a major risk component in currency risk source. Akinsulire (2006) opined that translation exposure has effect on the translation of multinational firms' financial statements.

The table also indicated that 22.5% of firms recognised transaction, policy shock, and technological success of competitors respectively as important risk components of agribusiness firms in the area. The result on policy shock is good especially when related to that obtained by Dercon (2002) which reported that policy shock such as changes in taxation, and ban on migrants, are sources of risk to agribusiness operation.

The risk sources identified cause adversity in return to investment. Each or any combination of the outcomes, of the risk sources leads to low productivity and income to the firms.

However, ranking by simple descriptive statistics may be misleading as the tool cannot be tested econometrically. So the analysis of ranking of the degree of influence was further conducted using W – statistics and Pearson criterion (x^2). This starts with the processing of ranking by the experts. The experts who formed the assessment team were of the same rank across the different agribusiness firms that is, managing directors of the 40 sampled firms) so they all have equal weight of 1. Each expert's judgement was multiplied by 1 to give the weight of the risk variable. The weights given to risk and the results of the expert's judgement were calculated and presented in Table 3.

Table 3 indicated that the central tendency is 191, that is, total weight divided by the number of risk sources (1146/6) while the sum of deviation square is 664. The table also indicated that the sum of mean of rank is 28.645. It was based on this that coefficient of concordance was determined to verify concordance of experts judgements.

Coefficient of concordance using W – statistic was calculated to be 0.792. Hence, Mikhalova (2005) held that if W > 0.50, then concordance may be regarded as satisfactory, but if W > 0.7 then concordance is considered as good. W = 1 means entire concordance of experts judgements. Since the result is 0.792, it means that the concordance should be regarded as good. The probability of concordance coefficient of expert judgments was verified by Pearson criterion, following, Mikhalova (2005) and this gave x^2 (Pearson criterion calculated) 4.81. At a degree of freedom of 5 (that is $y = 6 - 1 = 5$, where 6 is the number of risk sources) and 5% significance level (that is, probability P = 0.95), the table value of Pearson criterion is $x^2_{table} = 11.07$. The decision

Table 2. Firms' ranking of risk sources and components in Abia State.

Risk sources and component	Rank						Frequency	Percentage
	1	2	3	4	5	6		
Currency								
Transaction	2	1	3	1	1	1	9	22.50
Translation	1	2	5	1	1	1	11	27.50
Economic	3	4	1	-	-	-	8	20.00
Political								
Policy shock	4	3	2	-	-	-	9	22.50
Government instability	-	-	-	-	-	-	-	-
Government interference	-	-	-	-	-	-	-	-
Repatriation of earning	-	-	-	-	-	-	-	-
Production								
Meteorological	6	8	10	6	5	5	40	100.00
Technological failure	40	-	-	-	-	-	40	100.00
Technological success of competitor	1	2	3	-	-	-	9	22.50
Physical hazard in factory	-	-	-	-	-	-	-	-
Market								
Input price	2	2	7	9	5	15	40	100.00
Output price	1	4	6	8	6	15	40	100.00
Financial								
High interest rate	40	-	-	-	-	-	40	100.00
Accessibility of credit	15	3	2	4	3	13	40	100.00
Social								
Theft and burglary	-	-	-	-	-	-	-	-
Poor management	3	5	4	-	8	-	20	50.00
Strike	-	-	-	-	-	-	-	-
War/civil commotion	-	-	-	-	-	-	-	-
Kidnapping of workers	12	1	3	6	1	1	24	60.00
Death and sickness	-	-	-	-	-	-	-	-

Calculated from field survey data, 2010.

Table 3. Result of experts' judgement processing of agribusiness firms in Abia State.

Sources	Total weight	Deviation of sum from the central tendency	Deviation squared	Mean of rank
Currency	192	1	1	4.80
Political	200	9	81	5.00
Production	195	4	16	4.88
Market	180	-9	81	4.50
Financial	174	-17	289	4.40
Social	205	14	196	5.12
Total	1146	2	664	28.65

Calculated from field survey data, 2010.

rule is that if calculated ^{2} exceed the x^2_{table}, then the null hypothesis about concordance of 40 experts' judgements which ranked 6 risk factors may be rejected as non-random. So in accordance with experts' judgements, we

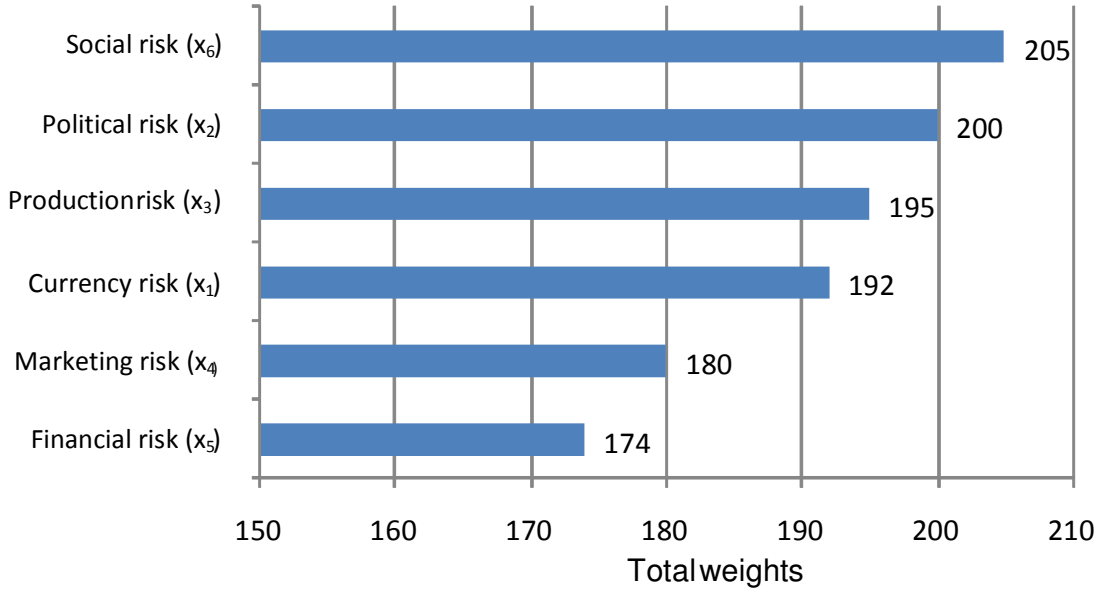

Figure 1. Decreasing influence of risk factors.

Table 4. Firms optimal risk reducing strategies in Abia State.

Risk aversion strategy	Frequency	Percentage
Diversification	34	85.00
Integration	32	80.00
Insurance	20	50.00
Forward contracting	22	55.00
Sequential marketing	10	25.00
Cooperation marketing	8	20.00
Foreign exchange hedging	13	32.50
Borrowing	6	15.00
Savings	6	15.00

Source: Field survey, 2010 *Multiple responses were recorded.

may determine and isolate the risk factors which have extreme influence on investments and productivity in the selected agribusiness enterprises. After ranking the factors, that is, placing factors in order of decreasing impact upon the agribusiness operations, experts' judgements on the risk could be positioned as shown in Figure 1.

Figure 1 show that the four most important risk factors selected were financial, marketing, currency and production risks. They appeared in order of decreasing influence. Since the weights assigned to the variables ranged from 1 to 6 with 1 being the highest, it means that the higher the total weight assigned, the lower the influence of the variable. Hence in selecting the most significant risk factors in order of decreasing influence a target of four most important risk factors was set. Using the aforementioned criterion therefore (order of decreasing influence), as shown by the bar charts based on the total weights of the risk variables previously mentioned, it could be inferred that, among the risk factors considered, financial risk had the highest influence, followed by marketing risk, currency risk (exchange rate) and production risk in that order. This result is satisfactory, especially when compared with that obtained through ranking of risk factors in Table 2. This result is in conformity with a 'priori' expectation considering the difficulty involved in securing credit, fluctuation in price of inputs and outputs as well as that of exchange rate.

However, Alimi and Ayanwale (2005) reported that financial risk was not a source of risk in agribusiness operation. This could be due to the fact that investors in their study area never employed debt financing.

Risk reducing strategies

A number of the optimal risk reducing strategies adopted by the sampled firms are summarized and presented in Table 4.

A majority (85%) of the firms adopted diversification strategy as a way of reducing risks. This involves investment in more than one portfolio. Some of the agribusiness operators also engaged in non agribusiness activities. Engagement in and earning of non agribusiness income lowered the variants of incomes from agribusiness operation. Some of the agribusiness investors engaged in diversification of products produced, that is, they are involved in the production of two or more agribusiness products or output simultaneously. Alimi and Ayanwale (2005), Akinsulire (2006), Pandey (2004) and Van Horne (2004) noted that diversification served the

best by spreading risk across a number of enterprises. Diversification acts as a strategy to stabilise firms' incomes.

Table 4 also revealed that significant proportions (80%) of the firms used integration to reduce agribusiness risks. Integration is a contracting agreement between different actors in agribusiness chain. Integration helps to overcome the disruption of the supply of inputs or evacuation of output in the agribusiness chain. This result is consistent with several studies (Ndugbu, 2003; Akinsulire, 2006). Hence, integration is used to reduce risk associated with fluctuation in input and output supply through the encouragement of backward and forward integration.

Fifty five percent of the agribusiness firms adopted forward contracting as a strategy to reduce risks. In this case, the firms reduce price risk by allowing agribusiness firms to agree and be sure of the price they want to sell their commodities in future before they are ready for disposal. The essence of such arrangement being a commitment to provide agribusiness commodity of a type, at a time and a price and in quality required by a known buyer. Alimi and Ayanwale (2005) and Varangis et al. (2002) added that forward contracting also involves entering into forward contract for the exchange of one currency for another at a specific future date and at a specific exchange rate by multinational firms. Hence, forward contracting is used to reduce foreign exchange related risk by multinational agribusiness companies. Though the result is contrary to the report of Nwaru et al. (2007) that forward contracting is virtually non-existent for most agribusiness firms except brewery and flour mill industries, because of weak legal system to enforce contract. Furthermore, the results (Table 4) indicate that 50% of the firms used insurance strategy to reduce their risk. This involves payment of premium to an insurance company which indemnifies the insured investor against losses recorded in the business. However, this result is not in consonance with Alimi and Ayanwale (2005) who reported that investors never used insurance as a means of reducing risk because of their unavailability. The table also revealed that 32.5, 25, 20 and 15% used foreign exchange hedging, sequential marketing and borrowing/ saving, respectively, as optimal risk reducing strategies. The result is however, satisfactory when compared with that obtained by Alimi and Ayanwale (2005) and Varangis et al. (2002).

Conclusion

This study makes a significant contribution to the existing literature on risk analysis among agribusiness enterprises. It provides a new practical perspective on the issue of ranking the degree of risk on agribusiness investments and how there could be managed. The study revealed that the major risk sources in the area are financial followed by marketing, currency,and production in that order while the risk aversion strategies are diversification, integration, forward contracting and insurance. Drawing from the findings of the study, efforts should be geared towards the development of agencies and institutions that would reduce financial and market risks that have been found to be critical among agribusiness enterprises. This is fundamentals to the growth and development of agribusiness enterprises in Nigeria.

REFERENCES

Abia State Economic Empowerment Development Strategy ABSEEDS (2005). Abia State Planning Commission Blue Print, Mbeyi and Associate Nig. Ltd, Lagos

Akinsulire O (2006). Financial management (4th edition) Ceemol Nigeria Ltd, Lagos.

Alimi T, Ayanwale AB (2005). "Risk and Risk Management Strategies in onion Production in Kebbi State of Nigeria" J. Soc. Sci. 10(1).

Aneke JI (2007). "Agricultural Insurance" In Reading in Agricultural Economics and Extension, Akubuilo CJC, Umebali EE, Mgbada JU, Ugwu DS, Egwu WE, Awoke MU (eds). Computer Edge Puplishers. Enugu. pp. 221-244.

Balogun O (2008). Nigeria Atlas of Electoral Constituencies Independent National Electoral Commission (INEC) Abuja.

Barry PJ, Baker CB (1984). "Financial Response to Risk in Agriculture", In Barry PJ (eds), Risk Mgt Agric., IOWA State University Press, Ames. pp. 183-198.

Bauer L, Bushe D (2003). Designing Risk Management Strate, Managing the Modern Farm Business, third edition, university of Alberta.

Chaddad I, Al-Husni M, Chen BF (2010). "Risk Analysis in Agricultural Enterprises", Revne Des economies nord Africaines. p.16

Chandra O (2006). Project Planning, Analyaia, Selection, Financing and Implementation and Review (6th edition), Tata Mcgraw – Hill publishing Company Ltd. New Delhi

Corporate Nigeria (CN) (2008). The Business, Trade and Investment Guide. Corporate Guides International Ltd. www.corporate –Nigeria net

Dercon S (2002). "Income Risk; Coping Strategies and Safety Nets" The World Bank Research Observer, 17(2): 141-166

Drollete SA (2009). "Management Production Risk in Agriculture" AG/AGCO/RMA

Federal Office of Statistics (FOS) (1996). Population Figures FOS publication.

Federal Republic of Nigeria official Gazette (FRN) (2009) "Legal Notice on Publication of 2006 Census final result" 2nd February, 96(2).

Hardaker JB (2000). "Some Issues in Dealing with Risk in Agriculture." Working paper series in Agricultural and Resources Economics, Austr.

Kuyrah JN, Obare G, Herrero M, Waishaka M (2006). "Agricultural Income Risk and Rural Poverty Dynamics Strategies of smallholder producers in Kenya" Contributed paper, presented at the international Association of Agricultural Economics Conference; Gold Coast, Australia, August., pp. 12-16.

Marchet JM, Nasir J, Ramachandra V, Shah MK, Tyler G, Zhao l (2001). "Results of the Nigerian Firm Survey; Regional Program on Enterprise Development, African Region", The World Bank, Draft for Review.

Martin P, Markus D (2000). "Risk in Agriculture As Impediment To Rural Lending- The Case of North-Western Kazakhstan." Discussion paper, Institute of Agricultural Development in Central and Eastern Europe.

Mbanasor JA, Nwankwo OO (2001). "An Economic study of Palm Oil Marketing in Akwa Ibom State," J. Applied Chem. Agric. Res. JACAR., 7: 120-126.

Mikhaylova LI (2005). "Risk Management in International Agricultural Markets" IAMO-Forum, Agricultural and Food Markets in Central and Eastern Europe, Seminar Paper 16-18 June, Halle (Saale).

Moss C, Schonkwiler J, Schmitz A (2003). "The Certainty Equivalence of farm land value: 1910 – 2000". In Moss, C.B and A. Schmitz

(editors).Goverment Policy and farmland markets: The maintenance of farm wealth, IOWA State University press: Ames.
Ndugbu MO (2003). Foundation of Project and Investment Analysis, Barloz publishers Ltd, Owerri.
Njavro M (2009). “Risk Management in Agribusiness.” Paper presented at Zagreb School of Economics and Management, June 5.
Nigerian Investment Promotion Commission (2007). Newsletter. The Nigerian Investment Promotion Commission (NIPC) Publication October.
Nigerian Investment Promotion Commission (NIPC) (2008). Newsletter; A Quarterly Publication, 6th Edition, July- September.
Nigeria Investment Promotion Commission (2006). Consolidated Annual Report (2004-2006), Nigerian Investment Promotion Commission, Billy Comms and Co Ltd, Abuja
Nwaru JC, Onyenweaku CE, Njoku SC (2007). Rural Risk management Strategies in Imo State of Nigeria: The case of Insured and uninsured Arable Crop Farmers. Int. J. Agric. Rural Dev., 10(2): 18-24.
Odii MACA (1998). Modern Farm Management; Techniques; Alphabeth Nigeria Publishers, Owerri.
Ojo SO (2003). “Productivity and Technical Efficiency of Poultry Egg Production in Nigeria”, Int. J. Poult. Sci. 29(6): 459-464.
Pandey IM (2004). Financial Management (9th ed). Vikas Publishing House PVT Ltd New delhi.
Van-Horne JC (2004). Financial Management and Policy (12th edition). Pearson Education (Singapore Pte Ltd.) Delhi.
Varangis P, Larson D, Anderson JR (2002). Agricultural Markets and Risk: Management of the Latter, not the Farmer,” Paper Presented in a Seminar Held to Honour Ronald C. Duncan on the Occasion of his Retirement as Executive Director of the National Centre for Development Studies and Director, Asia Pacific School of Economics and Management, Australian National University, Caribbean in July 2001.