Investigating Agricultural Risks in Maize Value Chain under the Anchor Borrowers' Programme in Cross River State, Nigeria

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Abstract: **Maize value chain as agribusiness is susceptible to the changes of nature and exposed to arrays of hazards, risks and uncertainty -pest infestation, diseases infection, yields variability and price fluctuation. Several risks mitigation strategies have been incorporated into the Anchor Borrowers' Programme as to induce investors' appetites. The objective of study is to examine the adopted risk mitigation strategies under the Anchor Borrowers' Programme in Cross River State. Qualitative research design which focused on interview and in-depth focussed group discussion used in collecting information from the committed participants purposively drawn from the stakeholders. The results showed that the risks identified in maize value chain in State included production, market price, environmental/climate change and government policy. Risks mitigation strategies adopted by stakeholders included loan process monitoring, confirmation of prepaid insurance premium, equity contributions by farmers, adoption of best agricultural practices and irrigation facilities, certification of inputs supplied and financial capacity of anchors. Results also showed that adopted risk mitigation strategies incorporated risks transfer and coping remediation activities which provide an efficient economic option for increased return on investment. The study recommends improvement in loan officer ratio to loan beneficiary in order to ensure efficient monitoring of the loan process, confirming prepaid insurance premium coupled with appropriate agro-entrepreneurs' identity management as well as timely cash disbursements. These would not only minimize credit risk but also stimulate increased bank participation in financing investments in maize value chain in the State.**

Keywords: **Risks, Mitigation, Maize, Value chain, Strategies**

I. INTRODUCTION

In emerging nations such as Pakistan, Mexico, Iran, Kenya, Ghana and Nigeria, agriculture plays pivotal functions in their economies (Umoren, Akpan and Ebong, 2016). These functions include provision of food, income, employment, raw materials for industries, foreign earnings that support the nation's external reserves and many others (Izuchukwu, 2011). Prior to the discovery of crude oil in Nigeria, agriculture was the mainstay of the economy. (Olayide, Akinlade and Tijani 2012). However, from 1970 to 2000, contributions gradually declined. The major reason is ascribed to shift in emphasis from agriculture to crude oil sub-sector (Izuchukwu, 2011; Mordi, Englama and Adebusuyi 2010 and

Ukeje 2003). In Nigeria, the recent decline in inflows from crude oil products due to drastic decline in prices of these commodities necessitates urgent diversification of the economy. Nigerian agriculture calls for huge investments in massive production with value addition across the sub-sectors of the sector. Maize, as a major component of the sector is one of the major staple foods as well as agro-industrial crops in most sub-Saharan African countries. In Nigeria, the major food and agro-industrial crops are rice, maize, guinea corn, millet, wheat, cassava and yam. Cross River State is one of the important maize production belts in Nigeria. Maize production system is dominated by the micro-small-scale holders who cultivate most of the land and produce most of the maize. The production method is characterized with small land holdings of 0.5–5.0 hectares with low productivity

The Anchor Borrowers' Programme (ABP)

Despite the pivotal roles that agriculture played in the Nigerian economy in the past period, the sector was neglected by the Government. Arrays of financial interventions were introduced to spur growth in agricultural sector. However, with inadequate credit purveyance to the smallholders who constitutes the dominant of the production base of the agricultural economy, improvement in output of maize was not much. In an effort to deepen credit access and improve production techniques of the maize producers, the CBN introduced targeted interventions (Umoren, Akpan and Udoh, 2014). These include: Agricultural Credit Guarantee Scheme Fund (ACGSF) in 1977, Commercial Agricultural Credit Scheme (CACS) in 2009, Micro-Small Medium Enterprise Development Fund (MSMEDF) in 2013, Nigeria Incentive for Risk Sharing in Agricultural Lending (NIRSAL), Agriculture, Small Medium Enterprise Investment Scheme (AGSMEIS) and Anchor Borrowers' Programme (ABP).

Prior to the introduction of ABP by the Central Bank of Nigeria (CBN) in 2015, Nigerian maize import was quite alarming because of huge amount that was used in financing importation of the commodity. The trend had devastating effects on employment of youths who would have been engaged in the production of these commodities. In addition, there was depletion of foreign reserves due to significant

allocation of foreign exchange used in importation of imported maize (ABP, 2015). The introduction of ABP by the CBN stimulated the production of maize locally. The desired outcome is evidenced by the significant reduction in import bills for maize, a major household foodstuff and agro-industrial material in the economy.

According to CBN-ABP (2015), in reducing the nation's huge import bills and conserving external reserves, various engagements between the key stakeholders in maize value chain actors were conducted. Commitments in executing the programme were obtained through collaboration, sharing and roles. The key objectives of ABP included: to: create ecosystem to link out-growers to local processors; increase banks' funding to the agricultural sector; increase capacity utilisation of agricultural anchor companies engaged in the production of maize, productivity and incomes of the out-growers; reduce importation; encourage the emergence of new generation of agro-entrepreneurs and reduce level of poverty among small holders' maize cultivators (CBN-ABP, 2015). ABP was introduced to facilitate massive maize production, add value and export thus conserving the nation's external reserve. Though many criticisms have painted the ABP model of credit purveyance as a political tool with less sustainability, yet the impact which the programme has created with plethora of innovations has made the ABP model a veritable tool in inclusive growth strategic approach in the Nigerian economy with emphasis on economic diversification.

Risks in Maize Value Chain Enterprise

The concept of value chain was introduced by Michael Porter in 1985. He used the term to indicate the extent in which organizations could achieve what he referred to as competitive advantage through adding value within the organization (Porter 1998). The concept became popularised for agricultural development purposes. The United Nations Industrial Development Organisation (2009) describes a value chain as the entire range of activities that are undertaken to bring a product from the initial input-supply stage, through the various phases of processing, to its final market destination, including its disposal after use. For instance, agro-food value chains encompass activities that take place at the farm or rural level, including input supply, and continue through handling, processing, storage, packaging and distribution. As products move successively through the various stages, transactions take place between multiple chain stakeholders, money changes hands, information is exchanged, and value is progressively added. Hence a value chain is a system of interdependent activities.

Ambarawati, Wijaya and Budiasa (2018) observed that risks were chances of failure or loss that the actual return from holding an asset or investment would change from expected return over time. They maintained that maize value chain was susceptible to failure due to inherent risks associated with biological and natural phenomenon. They noted risks as uncertain events or phenomena which could have the probability of causing losses and this assertion was upheld by Khan (2008). In a study on unravelling risk structures in Nigerian rice supply chains by Adeosun and Opata (2016), their findings confirmed that agricultural production was exposed to many risks which affected the farmers and other actors in the given commodity value chain. The study also unravelled the various risks faced by farmers in agribusiness and outlined the mitigation strategies adopted in order to control these risks. They concluded that production, processing and storage risks were vital risks at various stages in maize value chain. Furthermore, Siegel and Jaffe (2007) identified all possible sources of risk potentials affecting agricultural value chains. These included weather, market policy and institution, production risks caused by flood, scarcity of water for irrigation or excess water at harvest, paddy bug, blast infestation, market risks caused by volatility in output prices, increase in prices of inputs, increase in transport cost, delayed payments, market accesses preferred by suppliers (Bach, Phum and Vo, 2016). Johl and Kapoor (2015) maintained that biological nature of farm enterprises portend some uncertainties in their production and prices in addition to uncertainties of inputs availability. They concluded that the measurable degree of uncertainty was classified as agricultural business risks which could be adjustable. Agribusiness risks in the maize value chain could be adjusted through the production process, resources combination, price fluctuation and yield variability of farm inputs and outputs over time. Product and price uncertainty, price fluctuation could directly affect the return from maize enterprises as out growers might have no control over price and yield's uncertainty which depend on their nature.

The concept of value chain has spread beyond individual firms to the whole industry such as agriculture (Bach, Phum and Vo, 2016). Maize value chain activities are made up of input suppliers, farmers/out-growers/cooperatives/associations, millers, traders, shops/store- owners and final consumers. Value chain may be seen as sequential linkages through input or raw materials which are transformed into finished outputs for markets and final household consumption (Ambarawati, Wijaya and Budiasa, 2018). The emergence of agriculture value chain has provided catalyst for enhanced transformation in the landscape of arrays of investments and trade with significant results on Government as well as enterprises (Gurria 2012). Notable arrays of value chain studies were conducted for Malawi and Mozambique to understand production cost structure and competitiveness based on data collected from smallholder farmer market outlets, farmer–buyers linkages, gains and losses along the value chain (Mango et al., 2015; Chagomoko, Afari-Sefa, & Pitoro, 2014; Tchale & Keyser, 2010). These studies showed that agricultural value chains link urban consumption with rural production. Recently, value chain analysis has gained remarkable significance due to the need to assess the key sources of cost efficiency or the lack of it along the value-chain of the given commodity. The purpose of these studies was to come up with acceptable policy

interventions and was targeted at raising overall value-chain efficiency. The United Nations Industrial Development Organisation (2009) describes a value chain as the entire range of activities that are undertaken to bring a product from the initial input-supply stage, through the various phases of processing, to its final market destination, including its disposal after use. For instance, agro-food value chains encompass activities that take place at the farm or rural level, including input supply, and continue through handling, processing, storage, packaging and distribution. As products move successively through the various stages, transactions take place between multiple chain stakeholders, money changes hands, information is exchanged, and value is progressively added. Hence a value chain is a system of interdependent activities (this is a repetition of part of what had been reflected under the paragraph above on 'Risks in Maize Value Chain Enterprise' and as such could be deleted) Agricultural value chain is a concept that identifies a set of actors either private or public, service providers and other set of activities that bring agriculture output from the production in the farms to the families for final consumption (Gurria, 2012). At each stage of the node or linkage, each segment has backward and forward linkages. Thus, agricultural value chain is an integrated framework with various segments comprising production, financing, processing, service provision, marketing and consumption (Rani and Roy 2018; Tinsley 2012). At each segment, value addition is enhanced. From specific enterprise level, maize value chain is filled with arrays of activities needed in bringing products or services from initial point through stages such as production, financing, processing, packaging, marketing, transportation and consumption through various actors. Through the maize value chain, producers/farmers have access to the buyers and vice versa. Therefore, an efficient functioning of maize value chain facilitates effective linkages of activities thereby minimizing market risks and increasing farmers' incomes, creating more employment opportunities and sustainable wealth in agricultural sector of the economy. Maize value chains actors/players consist of farmers, village buyers, traders/transporters, processors, transporters, wholesale markets, retail markets stores keepers and consumers (Tinsley 2012).

Cross River State is an important maize production hub in Nigeria as result of its geographical location in the tropical rain forest zone. Maize cultivation depends on biological processes which are vulnerable to natural phenomena such as weather, pests and diseases. Consequent upon these, maize production is risky and investors/actors in the maize value chain are susceptible to risks and uncertainty in making agribusiness decision on daily basis (Johl and Kapoor, 2015). These include hedging and forward contracts. How the risks are mitigated in maize value chain is the main focus of this study. Various strategies have been put in many of the credit schemes to manage these risks. Their impacts have not been qualitatively studied. More so, the issue of risks mitigation strategies has been raised and debated at several stakeholders'

engagements. At many of these fora, several operational questions have always been raised such as: To what extent has the adopted risk mitigation strategies assist in minimizing stakeholders' risks in their investments in maize value chain under the Anchor Borrowers' Programme in Cross River State, Nigeria. The purpose of this study is therefore to identify and examine the risk mitigation strategies adopted by the key stakeholders in maize value chain of in Cross River State during the 2018/2019 farming year.

II. METHODOLOGY

The Study area

Cross River State has a land area of 20,156 square kilometres with total population of 3,866,269 (NPC, 2016). The State has a population density of 191.8 people per square kilometre (NBS, 2018). Cross River State is one of the important. States producing maize in Nigeria. The State is made up of 18 local government areas. There are two seasons in the State namely, dry and wet with a temperature range of 24 to 37 degree Celsius.

Sampling Methods and Data Collection

The multi-stage sampling technique was used to select respondents needed for the study. The first stage was the purposive selection of participants who are stakeholders in ABP in the study area. The list of the stakeholders was obtained from ABP records in Development Finance Office in Calabar. The second stage involved the random selection of fifty (50) beneficiaries in ABP maize value chain activities in 2018/019 farming period. Data collected from the study were from primary and secondary sources. Primary (qualitative) data were obtained from the beneficiaries by means of interview and focused group discussion.

III. RESULTS AND DISCUSSION

Identified Risks in Maize Value Chain and their Mitigation Strategies in Cross River State, Nigeria

The results of the personal and in-depth interviews as well as focussed group discussion on the risks management which incorporate mitigation tools by the selected major stakeholders in maize value chain in Cross River State are presented below.

Table 1 presents the identified major risks in maize value chain and their corresponding mitigation strategies in Cross River State, Nigeria. The identified risks are: loan defaults, flood, drought, disease, pest, production risk, poor yield, theft/spoilage transport cost, poor road networks, , poor quality of inputs, late input supplies, side-selling, vagaries of price of output. The risks mitigation strategies adopted by each stakeholder are designed to minimize the expected risk.

The level of mitigation strategies adopted by the stakeholders may encourage other investors to continue to leverage on the minimal risks profile so as to expand their maize value chain activities in the State in order to reap from the business

opportunities in the maize sub-sector. CBN-ABP risks mitigation templates provide that the expected risk of maize variation be mitigated by the provision of guaranteed minimum price by Federal Ministry of Agriculture and Rural Development while the risk of poor farm techniques with ensuing low yield and technical assistances were remedied by the provision of best agricultural practices. Feed mill processing facilities has been established by the State Government to create enabling environment for investors in the maize value chain.

As noted in Table 1, loan default being a the major expected risk faced by the participating financial institutions   was minimized by effectively monitoring of the loan process, provision of adequate and realisable collateral or guarantee, adherence to ABP Guidelines, conducting know your customer and business (KYCB), certification of inputs supplies, anchor capacity certification, and monitoring of field performance and harvest.

Table1: Identified risks in Maize Value Chain and their Mitigation Strategies in Cross River State, Nigeria

S/No	Stakeholders	Identified Risks	Risk Mitigation strategies
1	PFIs	Loan Defaults	Monitor loan process always, collateral or guarantee, adhere to ABP Guidelines, KYCB, Certification of inputs supplies, anchor capacity certification, monitor performance and harvest
2	NAIC	Flood, drought, Disease, Pest	Visit project site for suitability, timely planting, monitor performance, insure project
3	RIFAN	Production risk, Poor yield,	Equity contribution, supply of correct data by farmers, BVN, price of output, off-taker assured, certification of inputs supplies
4	INPUT SUPPLIERS	Theft/spoilage transport cost, poor road networks	Well secured stores, proximity to project sites
5	ABP/HDFO	Farmers' identity	Bank verification number (BVN) creation
6	Farmers	Production risk, Poor quality; poor yield, late input supply	Assured guaranteed minimum price, timely supply of inputs, use of certified inputs, keep off rodents/birds, adopt best agricultural practices-and modern technologies
7	ANCHOR	Side-selling, vagaries of price of output. poor yield	Insist on the adoption of the best Agricultural practices by farmers

Source: Authors' compilation, May 2020. Note: PFIs, NAIC, RIFAN, HDFO PFIs= participating financial institutions, NAIC= Nigerian agricultural insurance corporation, RIFAN= rice farmers' association of nigeri, HDFO= Head development finance

Risk Severity Impact in Maize Value Chain in Cross River State,

The potential severity of risks impact on maize value chain was assessed during the in-depth interviews and focussed group discussion and the results are presented in Table 2. The table shows the risks severity and probability in maize value chain in Cross River State, Nigeria. In the table, the potential severity of the risks impact on the maize value chain/enterprise is rated as low, moderate, considerable and critical.

Table: 2 Risk Severity and Probability in Maize value chain in Cross River State, Nigeria.

		Potential severity of Impact			
		Low	Moderate	Considerable	Critical
Probability Of Event	Highly Probable		Price of inputs, delayed cash disbursed	grass-cutter attack, weaver birds	Flood and climate change
	Probable		Market price risk and access roads		
	Occasional		Increase of transport cost, heavy rainfall		
	Remote			Government policy taxes/levy Rice blast and bugs,	
	Improbable				

Source: Authors' Compilation, May 2020

 Table 2 attempts to summarise the risk severity and probability of occurrence in the State during the period under review. The highly probable risky events with moderate potential of severe impacts were price of inputs and output

coupled with delayed cash disbursements to beneficiaries in the maize value chain in the State. Market price risks and access to road network were probable in occurrence and the potential severity of impact was moderate. However, climate change as indicated by excessive rainfall that caused flood in maize farmland was critical during the study period. Though the Nigerian Agricultural Insurance Corporation (NAIC) remediated the impacts of the occurrence yet it seemed as the benefits were not enough to fully plough maize farmers back. Timely distribution of farm planting inputs as well as planting maize during dry season using irrigation facilities have been created by the State Agency to mitigate excessive impacts of climate change. There was a remote probability of risk occurrence for Cross River State Government policy/regulation on imposing taxes or levy on maize value activities.

Risks Mitigation Strategies for Stakeholders in Maize Value Chain in Cross River State

The risks mitigation strategies adopted by the stakeholders in maize value chain in the State were assessed during the in-depth and focussed group discussion. The results are presented in Table 3. The various risks mitigation tools or strategies adopted by the stakeholders are specific for the type of identified risks. The Participating Financial Institutions (PFIs) adopted timely loan monitoring till repayment so as to minimize increasing credit risks which could crystalize to non-performing loans which might lead to systemic crisis in the banking sub-sector of the economy. Risks transfer strategy as adopted by the CBN provides 50% guarantee cover to every loan exposure granted under the CBN-ABP in event of loan defaults by the beneficiaries. In mitigating the occurrence of flood, drought, weather forecast, and confirmation of prepaid insurance premium were insured by Nigerian Agricultural Insurance Corporation. National emergency management agency was engaged in risks coping strategy in the State during the period of the study.

Table 3: Risks Mitigation Profile for the Stakeholders in Maize Value Chain in Cross River State

Identified risks	Risks mitigation adopted	Risk transfer strategy adopted	Risk coping strategy adopted
Loan defaults	Monitor loan process till repayment	50% guarantee by CBN	
Floods/climate change	Weather forecast	Confirmed Insurance premium prepaid	National emergency/Flood management
Weeds, diseases, pests, and Rodents/ weaver birds	Adopt best agric. practices. Extension services employed		Adopt improved technologies, effective use of extension services
Scarcity of water during dry season	Invest in irrigation facility	Maize insurance premium prepaid	

Source: Authors' compilation, May 2020

As observed from table 3, managing risks in maize value chain could be through risk transfer activities, depending on the nature and their forms. Therefore, risk mitigation which incorporates transfer and coping remediation activities may provide an efficient economic option for increased return on investment. Monitoring the loan process and confirming prepaid insurance will minimize credit risk thereby encouraging more bank participation in financing investment in maize value chain in the State.

IV. CONCLUSION AND RECOMMENDATIONS

Risks identified in maize value chain in Cross River State include production, market price, environmental/climate change and government policy while the risks mitigation strategies adopted by stakeholders include loan process monitoring, confirmation of prepaid insurance premium, equity contributions by farmers, adoption of best agricultural practices and irrigation facilities, certification of inputs supplied and financial capacity of anchors. The results of the study showed that risks mitigation which incorporates transfer and coping remediation activities may provide an efficient economic option for increased return on investment. The study concludes that increased adoption of appropriate risk mitigation strategies has minimized vulnerability of the risks

in the maize value chain in the State. This will spur core investors to increase their portfolio of investment in Cross River State. It would also enhance value addition to the capacity of the State in maize production.

Based on the findings, the study recommends improvement in the ratio of loan officer to loan beneficiary in order to ensure efficient monitoring of the loan process and confirming prepaid insurance. Furthermore, appropriate farmers' identity management and timely cash disbursement to loan beneficiaries should be adhered to in order to minimize credit risk thereby encouraging more bank participation in financing investments and increasing outreach of beneficiaries in maize value chain in the State.

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Maize import to Nigeria in metric tonnes

Year

1971 2 (1000 MT) -80.00 %
1972 2 (1000 MT) 0.00 %
1973 2 (1000 MT) 0.00 %
1974 3 (1000 MT) 50.00 %
1975 1 (1000 MT) -66.67 %
1976 25 (1000 MT) 2,400.00 %
1977 75 (1000 MT) 200.00 %
1978 40 (1000 MT) -46.67 %
1979 175 (1000 MT) 337.50 %
1980 300 (1000 MT) 71.43 %
1981 400 (1000 MT) 33.33 %
1982 375 (1000 MT) -6.25 %
1983 100 (1000 MT) -73.33 %
1984 120 (1000 MT) 20.00 %
1985 50 (1000 MT) -58.33 %
1986 0 (1000 MT) -100.00 %
1987 0 (1000 MT) NA
1988 0 (1000 MT) NA
1989 0 (1000 MT) NA
1990 0 (1000 MT) NA
1991 0 (1000 MT) NA
1992 15 (1000 MT) NA
1993 0 (1000 MT) -100.00 %
1994 0 (1000 MT) NA
1995 0 (1000 MT) NA
1996 16 (1000 MT) NA
1997 4 (1000 MT) -75.00 %
1998 0 (1000 MT) -100.00 %
1999 0 (1000 MT) NA
2000 0 (1000 MT) NA
2001 41 (1000 MT) NA
2002 8 (1000 MT) -80.49 %

2003 0 (1000 MT) -100.00 %
2004 18 (1000 MT) NA
2005 9 (1000 MT) -50.00 %
2006 0 (1000 MT) -100.00 %
2007 0 (1000 MT) NA
2008 50 (1000 MT) NA
2009 100 (1000 MT) 100.00 %
2010 100 (1000 MT) 0.00 %
2011 100 (1000 MT) 0.00 %
2012 200 (1000 MT) 100.00 %
2013 200 (1000 MT) 0.00 %
2014 150 (1000 MT) -25.00 %
2015 200 (1000 MT) 33.33 %
2016 650 (1000 MT) 225.00 %
2017 200 (1000 MT) -69.23 %
2018 400 (1000 MT) 100.00 %
2019 400 (1000 MT) 0.00 %
2020 500 (1000 MT) 25.00