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ECONOMIC METHODOLOGY, PHILOSOPHY & HISTORY | RESEARCH ARTICLE

Cross border trade in grain between Nigeria and neighbouring Niger: Risk management assessment along Sokoto Illela-Konni border land

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Abstract: Grain is an important marketable commodity that is hampered by risk of interrelated dimensions, particularly in borderlands of West Africa. Assessing the extent of risk in borderlands can be valuable for policy-makers and likely to contribute to increased regional trade through effective management. Risk management along the grain supply chain was investigated. The methodology was qualitative using desk review of literature and field survey and interviews. While the survey revealed evidence of substantial volume of grain exchange, most of the traders indicated transportation, high taxes and low production of grain as the most important risk factors limiting trade. Production was found to be limited by low access to agricultural insurance, fertilizer, irrigation and credit. Although farmers had access to production information, market information was inadequate. While public grain reserve exists to manage price risk; the capacity was insignificant compared to the magnitude of grain trade in the region. The guaranteed minimum grain price was not collectively determined but by government and their contractors.

Subjects: Africa—Regional Development; Development Economics; Development Policy; Employment & Unemployment; International Trade (incl. trade agreements & tariffs); Sustainable Development

Keywords: regional trade; food security; risk; value chain; borderland; grain production

ABOUT THE AUTHOR

John Chiwuzulum Odozi holds a PhD in agricultural economics and a fellow at the French institute for research in Africa, University of Ibadan. His research activity includes risk, vulnerability, migrant remittances, income inequality, environment and governance. His research explores how the environment, socio-economic factors and policy interact with income growth and food security in Africa. This paper emerged from the collaborative study of risk assessment in the border region between Nigeria and Niger. The project was divided into three sub-themes: (1) assessment of faith-related risk; (2) assessment of risks related to the fragile state of the public sector at the level of infrastructures, border control and food security; and (3) assessment of risks in the context of migrations and extreme poverty. This paper looks at the effectiveness of institutions in the management risk related to grain production and cross-border trade in the region.

PUBLIC INTEREST STATEMENT

Grain staple is an important marketable commodity within and between member countries of the Economic Community of West Africa States (ECOWAS). It constitutes a large share of farmers' incomes and poor consumers' expenditure. Despite long standing efforts of the Economic Community of West African States for increased regional trade, small farmers and traders are faced with uncertainty and risk in the region that includes sudden changes in output and input prices, production short fall from natural hazards, asset risk from death in livestock and institutional risk from changes in programmes and personal characteristics. Regional trade is an important channel for food security and should be promoted in the phase of international food price volatility and global climate change.

1. Introduction

Grain is an important marketable commodity within and between member countries of the Economic Community of West Africa States (ECOWAS). Among many factors, ecological variation and differences in consumption give rise to extensive trade in agricultural products such as sorghum, millet, rice, cowpea and maize. Existing studies have identified the leading role of Nigeria in West African food security (Babatunde, 2012) and in regional trade (Bach, 2010; Eboh, Oji, Oji, Amakom, & Ujah, 2004; Sempere, 2010; Soulé & Obi, 2001). In Nigeria sorghum, millet and maize are widely consumed by most households particularly in Northern Nigeria and by industries. In neighbouring Niger, Millet and sorghum are basic staples while rice and maize are mostly imported (Afrique Verte International, 2010). The consumption rate of grain per habitant is the highest among Sahelian countries (CILSS/FEWS NET/OCHA/SWAC/UNICEF/WAMIS-NET/WFP, 2006). Illéla border town in Sokoto Nigeria and Konni in Niger belong to the Sahel ecology with large expanse of grain belt and markets for the physical exchange of grains. The fragility of the area in the dimension of drought and poor land quality heightens the risk of severe short fall in grain production. Climate-induced production short fall is further aggravated by institutional risk factors that often correlate with price volatility.

Consequently, from Table 1, average cereal yield for both countries is lower than for South Africa. This is more particular in Niger where the average cereal yield falls below the average for the whole of West Africa. Average fertilizer use in Nigeria estimated at 121.76 kg/ha over the period 1993–2002 is disproportionately lower than that for South Africa estimated at 1,541.43 kg/ha while in Niger, fertilizer use is extremely below the average for West Africa and far below that for Nigeria.

While trade brings about stabilization of food supply by moving food from surplus to deficit areas, barriers to trade appear to limit agribusiness participation and the volume of grain trade. Documented in Brenton, Portugal-Perez, and Régolo (2013), such barriers include regulatory constraints that raise the price and limit access to key inputs such as seeds and fertilizers, high transport costs reflecting limited competition among providers of transport and logistics services, the costs of getting goods across borders and opaque and unpredictable trade policies, including export bans. The implication on the welfare of producers and urban consumers is well known in literature. In 2011, more than 5,458,000 people (34.9% of the population) were food insecure in Niger (ACF, FAO, OCHA, UNICEF, & WFP, 2012).

Table 1. Cereal yield in Nigeria, neighbouring Niger and rest of Africa, 2000–2010

Year	Nigeria	Neighbouring Niger	West Africa	Southern Africa
Yield (ton/hectare)				
2000	1.11	0.29	0.91	2.76
2001	1.18	0.40	0.95	2.42
2002	1.20	0.41	0.95	2.77
2003	1.25	0.44	1.01	2.54
2004	1.31	0.34	1.01	2.78
2005	1.36	0.43	1.09	3.31
2006	1.44	0.45	1.12	3.16
2007	1.35	0.42	1.04	2.79
2008	1.52	0.49	1.17	4.06
2009	1.45	0.38	1.10	4.41
2010	1.34	0.49	1.08	4.16
2011	N/a	N/a	N/a	N/a
2012	N/a	N/a	N/a	N/a
Average	1.32	0.41	1.04	3.20
Growth (%)	1.88	6.27	1.70	4.21
Fertilizer (kg/ha) 1993–2002	121.76	6.35	123.93	1,541.43

Source: FAO (2012).

Understanding the nature, consequences and the management of risk in the region is valuable for policy-makers and likely to contribute to economic development through effective management. Various policies within and between countries have evolved over time in the management of risk in the region. For Nigeria, the instruments are both interventionist and market within the broader frame of the New Agricultural Policy Thrust, vision 20:20 and the on-going agricultural transformation agenda. Niger also uses the combined Partnership Commission of State and donors since 1998 for the prevention and management of food crises. ECOWAS[1] has been at the forefront since 1975, in the promotion of trade from surplus to deficit countries in the region. In 2005, ECOWAP was initiated to promote common agricultural policy for increased food production in the region. Also, farmers and traders have also developed methods of managing risk on their own. This paper argues that policy and institutions have major direct and indirect impacts on shaping incentives and decision-making in agribusiness activity (Jaffee, Siegel, & Andrews, 2008) and therefore an important risk factor when ineffective. In light of this, the paper examined three objectives: (1) assessment of farmers' ability to manage risk; (2) assessment of traders' ability to manage risk, the volume of grain that is exchange and the constraints; and (3) assessment of the effectiveness of the public grain reserve in Sokoto state. The paper is structured as follows: the literature review/conceptual framework in Section 2 comes up immediately after the introduction in Section 1. Section 3 presents the methodology while Sections 4 and 5 present field results and conclusion.

2. Literature review/conceptual framework

Trade is a veritable instrument for organizing economic activities and moving food efficiently from surplus regions to deficit regions. It can in fact smooth out the fluctuations and uncertainties inherent in local food production (Runge, Senauer, Pardey, & Rosegrant, 2003). **C**oncern about informal trade has gained precedence in the literature. According to Soulé and Obi (2001), informal trade highlights the gap between actors' real needs and the needs of public authorities caught up in an international environment that is ever harder to manage. Cross-border trade can be formal or informal, legal or illegal exchange of goods. It can be illegal because it avoids official procedures and channels, but it does not mean that the traded products themselves are illegal. It can involve small amounts of food products moved over short distance or large volumes moved over vast distance (Little, 2007).

The concept of risk is probabilistic in nature, relating either to (1) the probability of occurrence of an event that results to an undesirable outcome, or (2) the probability of an outcome, combining the probability of the event and the consequences of the event (Brooks, 2003; Downing et al., 2001; Jones & Boer, 2003; Smith, 1996; Stenchion, 1997). Risk affecting trade and agricultural production are multifaceted and therefore a vague concept. However, risk can be typified as price risk, arising from sudden unanticipated changes in input and/or output prices; production or yield risks, mostly arising from natural hazards which affect crops quantity and/or quality; asset risks, arising from theft, fire or other loss and damage of equipment, buildings and other productive assets for agriculture, processing or trading; and financial risk arising from unexpected changes in the cost of capital, exchange rate fluctuations or disruptions in the ability to access credit and/or equity losses and human or personal risk, due to death, illness or injury of the labour force (Angelucci & Conforti, 2010).

The central issue in this paper is whether economic agents such as individuals, communities and government and non-government organizations are effective in the management of risk in the region. The notion of control underlies risk management (Kostov & Lingard, 2003). "Control means shaping the problem and transforming it so that its characteristics are altered in favourable directions. The control operators offset some unfavourable possibilities and in this way extract some risk from the problem" (Kostov & Lingard, 2003). In other words aims to reduce the incidence of damages, mitigate the effects of damages suffered by those that are vulnerable and also to increase the risk management ability of those at risk (see Cafiero, Capitanio, Cioffi, & Coppola, 2007). There are various ways institutional risk management can be evaluated empirically. There is the hard core quantitative approach using the gravity model to assess institutional performance with policy prescriptions that advocate for reduction of trade barriers and increasing coordination of macroeconomic policies. It also includes studies that have investigated the transmission of price signals

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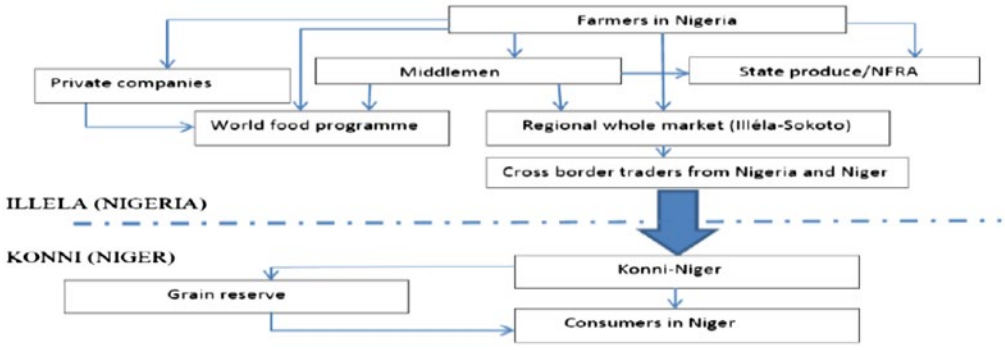

Figure 1. Grain market chain in the borderland.

Source: Adapted from Gerken et al. (2009) and Author.

between spatially separated markets in the borderland in explaining market performance, their degree of integration and the role of borders (see Aker, Klein, O'Connell, & Yang, 2010; Amikuzuno, 2011). The second approach is qualitative that require survey data, in-depth interviews and focus group discussions with farmers and other farms experts. It consists of methods that seek to map out actual and potential actors, their interaction and level of involvement in risk management. Risk management can also be evaluated by examining the appropriateness and innovativeness of measures used. There is also the approach that employs subjective appraisal of the performance of interventions by those that the interventions are meant to serve. This study adopts the qualitative approach for its flexibility in understanding local reality that is often difficult to capture using complex models.

The study is limited by consideration of the Nigerian side of the border. Figure 1 shows the management of risk along the grain market chain in the borderland. At the production block of the supply chain, access to agricultural insurance or use of irrigation will buffer farmers' ability of controlling weather-induced production risk. Grain exchange in the borderland is a veritable instrument for domestic food stabilization. Farmers can supply grain directly to the market, private companies and World Food Program (WFP). This can be limited by high transport costs and costs of getting goods across borders. Lack of access to market information would reduce farmers' capacity to sell at good prices, where and when to sell.

While arbitrage can control for price fluctuations, this is often not in the favour of small farmers. Adejumo and Raji (2007) find that grains kept in farmer's structures are mainly for household consumption; any surplus over consumption requirement may be sold within two or three months of harvest. In contrast, Balami, Ogboru, and Talba (2011) find that big time cereal traders in Nigeria give cash to their partners in Niger, at the time of harvest, to purchase cereals at cheaper rates for storage in Nigeria. Also employs boys who move to various village markets and buy cereals on the village market days. Portion of the cereals bought is also stocked in Niger in anticipation of speculative gains during the lean period.

Public storage facility is interventional in terms of stabilizing prices and cushioning production shocks. Effective public stock operation can reduce the expected profitability of speculation of middle men by setting appropriate limits to the range of fluctuation in market price and allowing price to behave in a more predictable way. Public grain reserve institution can affect markets negatively through lack of transparency and credibility of operation. That is, public reserves can create government failures when not properly managed. This paper aims to evaluate risk management performance along the chains of grain production, trade and public storage operation.

3. Methodology

The survey instrument used to generate data for this study followed a number of steps as presented in Gerken et al. (2009). The flexibility of the instrument to specific context allowed some adaptation in this study. It consists of a desk review of relevant literature, field work and synthesis of ideas. The

desk review synthesizes facts on grain production and evolution in both countries using secondary data sourced from FAOSTAT, NBS, NAERLES/NFRA and other secondary information from the internet. The field survey employed quantitative and qualitative data gathered from structured questionnaire, interviews of relevant stakeholders and observation.

The study space is Sokoto state located at the North West geopolitical zone of Nigeria with a population of 3,696,999 million (2006 census). There are 23 local administrative zones in the state including Gawabawa, Illéla, and Kware which are the obvious administrative centres along the road linking Sokoto state and Konni town in Niger. The dry seasons starts from October and lasts up to April while the wet season begins in May and lasts up to September or October. The state accommodates two belts of dominant staple millet and sorghum. Other crops that further distinguish the local economy are cowpeas, which are grown in surplus; groundnuts; cotton; and sesame. It is bordered by the Niger republic to the north; Kebbi State to the south west; and Zamfara state to the east. The regional market is located in Illéla local government area council.

The first field survey was carried out to elicit responses on the nature of crop production in selected local government council areas in the state. Towards this end, 120 farmers were randomly selected from eight local administrative areas purposively selected from 23 local administrative areas in the state. The second survey was carried out on the nature of grain trade in Illéla regional market. This consists of two parts. In the first part, 60 traders were selected randomly from the market and administered with a structured questionnaire on the nature of trade in the market. Six enumerators who understood Hausa and English were hired from the state and trained for this purpose. In the second part, one enumerator was stationed at a strategic place at the border market from 10 am to 5 pm each regional market day to observe the flow of grain across the border towards Niger and Nigeria.

Regional market is held once a week on a Sunday and the days were spread, two consecutive market days in the month of June and two in July 2012. Thus, data collection was carried out from June to July 2012. The months coincided with the planting season. I complemented the above method with key informant interviews of some relevant stakeholders such as the chairman and secretary of the Illéla regional market grain association, officers of customs, quarantine and grain produce board stationed at the border and one transporter. Interview was also conducted with the director of the Sokoto state agricultural produce department charged with buffer stock management. I also conducted focus group discussion with selected members of Fadama, farmers association in Sokoto state.

The focus group discussion was conducted to triangulate the farm survey study. The Fadama group selected carried out their farm operation in Shinaka village in Goronyo local government area of Sokoto state. The village is about 10 km from the local government headquarters office. Farmers group visited included rice processors, groundnut processors and general farmers upon which the focused group discussion was conducted. Twenty-four individuals were present with 16 women and 8 men. Questions were asked on various farming activities in English but translated in Hausa by the translator hired for this purpose. The second interview was with the director of the grain produce of the ministry of agriculture Sokoto state. I spent close to one hour with him. Other interviews were carried out with key informants such as the president and secretary of the Illéla market grain sellers association, officers at the border post and one transporter.

4. Results

4.1. Assessment of farmers' ability to manage risk

Table 2 shows the various inputs used by farmers. Fertilizer constitutes the predominant input used by 31.2% of farm households. The least used input was agricultural insurance 0.1% of households. Use of irrigation, draught animal, tractor and remittances represented 3.8, 12.1, 0.7 and 1.4%, respectively. Use of formal credit unions and cooperatives represented 0.9% while informal credit institutions such as esusu, represented 4.1%. The commonest method of storage is the Rhombus. A mud rhombus is a specially built structure made from a mixture of dry grass and clay. It consists of a bin resting on large

Table 2. Distribution of farmers by input use, storage methods and causes of storage loses in Illéla border land, Sokoto state

Input use	***Mean distribution (%)***
Fertilizer	31.2
Agricultural insurance	0.1
Irrigation	3.8
Draught animal	12.1
Tractor	0.7
Remittances	1.4
Formal credit unions/cooperatives	0.9
Informal credit unions (esusu)	4.1
Storage methods	***Mean distribution (%)***
Rhumbus	96.2
Others	3.5
Causes of storage spoilage	***Mean distribution (%)***
Insects	54.9
Rodents/pests	37.4
Flood	6.2
Transportation mode to input market	***Mean distribution (%)***
On foot	29.2
Commercial bicycle	4.1
Own bicycle/animal cart	25
Motorcycle	5.7
Truck/bus	27.6
Others	8.3
Transportation mode to output market	***Mean distribution (%)***
On foot	2.5
Commercial bicycle	1.6
Own bicycle/animal cart	4.9
Motorcycle	75.4
Truck/bus	15.6
Others	0

Source: Author's estimate.

stones and covered with a thatched roof plate. While only 33.5% of grains produced are stored, 54.9% of farmers attributed losses to insects (54.9%), rodents/pest (37.4%) and flood (6.2%). Table 2 also shows the most important means of transportation to input market is by foot (29.2%) and truck/bus (27.6%). 75.4% of farm households use motorcycle to transport food grains to output market.

4.2. Assessment of traders' ability to manage risk, volume of trade and constraints

At the heart of grain trade in the Illéla-Sokoto borderland is the regional market located close to the border post in the Nigerian side. The "market activity starts from Saturday through Sunday night and held once a week. Figure 2 shows trading activity in a typical market day. About 75% of grains brought into the market are taken to Konni market" (Local government grain produce department official). As shown in Table 3, 69% of the sampled traders identified themselves as grain whole sellers. There are also retailers and those who combine retailing and whole sale activity. 66.6% of the traders belong to traders association and the benefits provided by the association are loans to traders (23.3%), information on prices (33.3%), cooperative buying (6.7%), transportation (10%) and price fixing (26.7%). 57.7% of the traders have access to credit mostly sourced from traders

Figure 2. Open air grain trade activity in Illéla regional market, Sokoto state, Nigeria.

Source: Author.

association. Other sources are cooperative society (22.2%), money lenders (5.6%) and commercial banks (5.6%). 66.7% of traders borrow an amount greater than N200,000 and payment is made between 1 and 2 years (44.4%).

The most important grains stocked in the markets are maize (46.7%), followed by millet (28.9%), sorghum (guinea corn) (20%) and rice (4.4%). The grain stocked in the market come from trader's own cultivation (18.6%), farmer's field (22.1%), cooperative groups (21.2%), fellow traders (31.8) and government stocks (0.06%). From the table, the commonest means through which traders negotiated business was through their boys (agents) representing about 34.1% of the traders. These agents go to farmers and other traders to buy grain. Twenty-five percent of traders used their transporters while 11.3% through commission agents. Information was also sourced through this means. For example, 2.2% of traders got price information from their boys, 17.8% from fellow traders, 40% from transporters, 4.4% from radio or newspaper and 28.9% from GSM.

During harvest times starting from January to April grains are bought from farmers for storage and from June upwards during planting time, the intensity of grain exchange through the border increases. "Transportation of grain across border is specialized. Transporters who take grains from the regional market to Niger come from Niger while transporters bringing grains to Nigeria are Nigerians" (transporter informant). "An average of three trips per transporter on a Sunday market day and one trip on a non-market day. Transporters take grain through the legal route during the rains but during the dry season through the illegal route to reduce the amount given to border officials" (transporter informant). Although different modes of transportation are used in the border area to supply food between countries, pick-van and big Lorries are used to carry large consignment of grains. The average transportation vehicle to Konni is a pick-up van. Fully loaded van contains about 40 bags of 100 kg grain. The big Lorries can contain between 80 and 120 bags of grain (100 kg/bag). About 4–5 big Lorries pass through the border per market day. The pickup van popularly called "canter" contains 50–60 bags and about 8–10 of that pass through the border per market day.

The flow of grains through the border is presented in Table 4. The table shows the number of pick-up Lorries crossing the border at both sides. Four hundred and forty-nine pick-up Lorries left Nigeria for Niger during the four market days observed between June and July 2012. The highest number was observed in week three, while the lowest was observed in week one. Lorries entering Nigeria from Niger amounted to 74. The highest was observed in week three while the lowest in week four.

Table 3. Percentage distribution of traders by their characteristics

Traders age group	**%**	**Markets were grain is purchased**	**%**	**Purchasing arrangement**	**%**
35–50	61.4	Illéla regional market	31.1	Trader to seller	4.5
> 50	39.6	Farmer's field	4.4	Seller to trader	9.1
Mean age	50 years	Rural markets	37.8	Trader's employee to seller	34.1
Trading experience		Urban markets	26.7	Traders' transporter to seller	25.0
10–21	62.2	**Villages were grains come from**		Buying agent to seller	4.5
> 21 years	37.7	Bajoga	4.05	Traders and sellers meet in the market	15.9
Mean years of trading	21	Darazau	8.2	Commission agent	6.8
Educational level		Dawanu	10.22	**Sources of grain price information**	
< Primary	40	Dukku	4.05	Send employee to markets	2.2
Primary	40	Illéla	28.64	From fellow traders	17.8
> Primary	20	Kebbi	2.0	From transporters	40.0
Type of trader		Mafara	16.4	From radio or news paper	4.4
Wholesale	68.9	Potiskum	14.3	From GSM	28.9
Retail	17.8	Gussau	2.0	**Use of credit**	
Wholesale/retailer	11.1	Paiko	2.0	Yes	57.7
Wholesale/retail/agent	2.2	Bida	2.0	No	42.3
Sources of grain stock		Sokoto	2.0	**Belong to association**	
Own production	18.6	Konni	4.05	Yes	100
Farmers	22.1			**Benefits provided by association**	
Cooperative groups	21.2	**Amount borrowed**		Loans	23.3
Traders	31.8	< N200,000	33.6	Information on prices	33.3
Government stock	0.06	> N200,000	66.7	Cooperative buying	6.7
Most important grain stocked		**Duration of loan**		Transportation	10.0
Guinea corn(sorghum)	20	2 months	16.7	Agreement on selling price	26.7
Millet	28.9	3–6 months	38.9		
Maize	46.7	1–2 years	44.4		
Rice	4.4	**Sources of credit**			
Second most important grain stocked		Bank	5.6		
Guinea corn	26.7	Cooperative society	22.2		
Millet	26.7	Traders association	66.7		
Maize	35.6	Money lender	5.6		
Rice	6.7				
Sorghum	2.2				

Source: Author's estimates.

Table 4. Number of pick-up lorries crossing the border over four market operations between June and July 2012

	Week 1	**Week 2**	**Week 3**	**Week 4**	**June/July**
Pick-up lorries leaving	41	113	147	148	449
Pick-up lorries entering	19	23	19	13	74
Prices in Nigeria (N/kg)	71	78	72	71	73
Prices in Niger (N/kg)	79	83	79	77	79

Source: Author's computation.

The prices per kilogram of total grains are also reported and reflect variation in prices over the short period. Table 5 presents a rough estimate of the volume traded during the period surveyed. Traders from all over Niger and Nigeria come to the regional market to trade. Buyers come, especially from Niger and then from Burkina Faso and Mali. Traders from Niger often buy sorghum, millet and maize while traders from Nigeria buy cowpeas, wheat and soybean from Konni market and bring them to Illéla market. Based on some assumptions, cross-border trade in grain amounted to 0.8 million–1.3 million dollars during the four days market survey between June and July 2012. The corresponding cost is estimated at between 0.1 million dollar and 0.2 million dollars. This implies a favourable trade balance of between 0.7 million dollars and 1 million dollars for Nigeria. However, caution is required since the observational approach is limited in accuracy.

While trade is favourable to Nigeria, there is the problem of high transaction cost in the flow of grains to Niger. As revealed in Figure 3, 44.4% of the traders indicated transportation followed by high taxes (8.8%), too many traders (6.7%), lack of credit (4.4%) and limited supply of grains (2.2%).

Table 5. Estimate of grain traded over the period

	Naira	$
At 40 bags/pick-up lorry		
Export to Niger	131,108,000	874,053.3
Import to Nigeria	21,608,000	144,053.3
Total trade	152,716,000	1,018,107
Trade balance	109,500,000	730,000
At 60 bags/pick-up lorry scenario		
Export to Niger	196,662,000	1,311,080
Import to Nigeria	32,412,000	216,080
Total trade	229,074,000	1,527,160
Trade balance	164,250,000	1,095,000

Source: Author's computation, exchange rate at N150/$ caution is required since the observational approach is limited in accuracy.

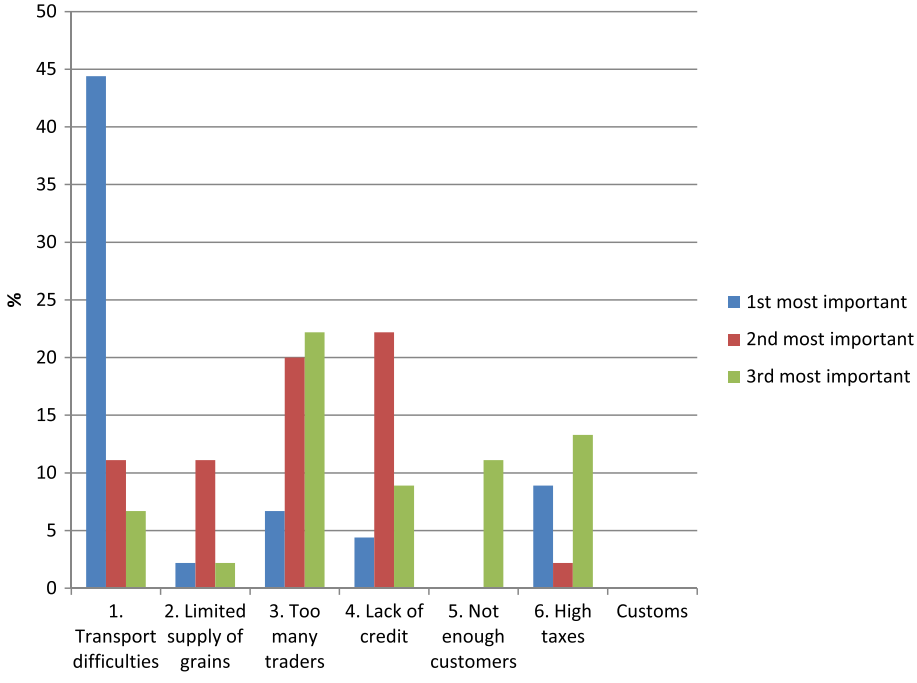

Figure 3. Risk factors as perceived by traders.

Note: Field survey 2012.
Source: Author.

From the survey questionnaire, majority of the traders indicated transportation problem as the most important risk factor. This is followed by high taxes and limited supply of grains. It cost about 200 per 100 kg bag to transport grains from Illéla market to Konni market, and about 400 per 100 kg bag to transport grains from Potiskum villages to Illéla market. Substantial amount of money made goes to security officials at the border. Although grains are cheaper in Nigeria, it cost a lot to take goods from Nigeria to Konni in Niger. Customs officials in Nigeria and Niger charge some money. Customs and migration officials are paid about 200 per 100 kg bag of grain. The amount paid to officials at the border varies. During market peak, like Sunday market day, N500 per bag; but during week days, N300 per bag. N300 is paid to grain produce officials, N100 to quarantine and N100 to customs officials. Customs in Niger charge about N300 per 100 kg bag. This money is paid to transporters who in turn pay the money to customs and other officials at the border. Thus, the cost is reflected in the transport fare charged by transporters loading grains across border. Taxes are also paid to state producers' board. The only challenge is the difficulty to pay taxes. Whether grains are taken through the right channel or through smuggling, taxes must be paid (key informant interview).

To verify some of these facts, some border officials were interviewed on their operation at the border. According to the quarantine official met at the border, checks on grain vehicles crossing the border are normally done on market days. The aim is to verify whether there is any veterinary or plant disease that might be imported into the country or exported from the country. It is expected that phytosynatary certificates must be verified for bulk crossing of grain through the border. This is often obtained from Abuja or Ibadan. Also import certificate from the import of origin is also required. Although ECOWAS allows free movement of goods and persons, checks on agricultural goods being imported or exported from Nigeria are carried out. The quarantine official interviewed also pointed out that half of the people in Illéla-Nigeria are from Niger while half of the people in Konni-Niger are from Illéla-Nigeria making routine checks difficult.

Interview with customs official was very difficult to achieve. The most senior customs official at the border at the time was not cooperative. He requested I should get permission from the headquarters in Lagos before he can discuss with me. However, on a general discussion, one important point noted is that large consignment of grain from Nigeria to Niger or from Niger to Nigeria requires meeting customs regulation of import and export. They really don't disturb small grains import or export through the border meant for household survival. Since most of these people belong to both sides of the country through marriages and other affiliation, it is difficult to stop somebody who is carrying a bag of grain to feed his family.

4.3. Assessment of risk management effectiveness of the public grain reserve in Sokoto state

4.3.1. Nature and operation of Sokoto state grain reserve agency

The agency is a department under the Ministry of agriculture and responsible for managing the state buffer stock. It was instituted since 1968 at the creation of Sokoto state. The organizational structure is as follows: the director, the deputy director, assistant director, zonal officer and store personnel. The department functions as follows:

- To procure and store grains as state buffer stock policy.
- To encourage farmers to produce more.
- To buy surplus from farmers during harvest period.
- To recommend to the state government the buffer stock requirement.
- To sell to the people at subsidized price during critical periods of the year.
- To distribute to individuals at periods of disaster such as flood and draughts.

The capacity of the reserve is 8,398 MT of grains such as millet, sorghum, maize, beans and rice (local). Grains are stored in conventional ware houses and there are eight of such buildings. There

are buildings that can store up to 1,000 MT (about 10,000 bags (100 kg/bag)), and those that can store only 500 MT (5,000 bags). These ware houses are located in Kasarawa in Wamakko local government area. The federal government silos are located in the same area and of 25,000 MT capacity but not in use at the time of the study. The agency has extension agents, organize meetings with farmers, farmers groups and association. The department is linked to the National Grain Reserve Agency (NFRA). Every year NFRA releases grains to states at subsidized rate. Two years prior to the survey, NFRA, requested the agency under the minimum guaranteed price to nominate three dealers that will be buying grains from farmers. Contractors go directly to farmers to buy but who the contractors should be is determined by government. The agency distributes grain to beneficiaries during flood crisis. It is usually free as a relief. Also when prices are high and grains are scarce, government allocate at a subsidized rate. Usually it is given to the following, organizations, hospitals, prisons, local government council, individuals, civil servants and the general public. The flow of grain into and out from the grain stores depends on the budget. However, there was increased storage in 2011 relative to 2012. The year 2009 had the lowest storage. In terms of outflow, 2011 had the highest outflow because of the flood crisis. The agency also works with the Sokoto state emergency relief agency (SERA), the state arm of the National Emergency Management Agency. The problems of the agency include lack of modern storage facility (silos).

This section evaluates the performance of the agency based on views and opinions of farmers and traders. The Principal Component Analysis (PCA) was used to generate weights that summarize the opinion of farmers and traders regarding the effectiveness of the agency. The survey asked respondents to judge agency effectiveness based on selected questions that seek to elicit responses grouped into three categories (agree, undecided and disagree). Table 6 presents the weighting results of the five retained principal component denoted as PC1–PC5. The Five factors retained captured 70% of total variation in the indicators included. To facilitate the readings of the results, weights smaller than 0.14 were omitted from the table. Table 6 shows the average ranking of Agency effectiveness across the five principal components. The weighting matrix suggests a consensus of poor effectiveness of the agency.

Corroborating PCA findings, the focused grouped discussion revealed that farmer's seldom sell their produce to state grain reserve board because of low awareness of the existence and functionality of the state grain reserve agency. For farmers that were aware, the guaranteed minimum price was not applied but rather government applied the market price. This was below what farmers expected. Farmers claimed that during difficult times like flooding, government used to distribute grains to them but was insufficient. Farmers and traders were not consulted in the setting of prices and were not aware when and how the prices are set. If the objective of the guaranteed minimum price is to prevent prices from falling too low and to prevent prices from soaring too high, such institutional behaviour would increase market risk. However, the capacity of the reserve is insignificant compared to the magnitude of grain trade in the region.

Focused group discussion with Fadama users group in Sokoto state revealed that traders go to farms and houses to buy grains. This reflects the fact that the activities of grain wholesalers or middle men are prevalent in the region. The risk here is that, given ineffective state public grain reserve operation, merchant wholesalers may be enjoying oligopolistic position and market dominance. The study finds that merchants fix grain prices and the price established at a regional market becomes the basis for pricing both for farmers and consumers.

5. Conclusion

Trade and economic development is at the heart of ECOWAS.[2] The objectives since 1975 include creation of free trade zones, common market and customs union[3]; elimination of tariffs and non-tariffs barriers, harmonization of economic and financial policies and establishment of a CETs. In addition to policies that help to facilitate regional trade, ECOWAP was adopted in 2005 to facilitate common agricultural productivity and food security in the region. In light of this, risk management along the chains of grain production, trade and public storage operation was evaluated from the

Table 6. Weighting results of the five retained principal component

Farmers and traders	PC1	PC2	PC3	PC4	PC5
Does the agency buy grain at a good price	0.41	0.15			0.24
Does Agency cushion shocks	0.15	0.17	0.37		0.22
Does Agency provide extension services and price information	0.32		0.29		
Does Agency buy more grain from women than men		0.26	0.43		
Does Agency sets price without consulting farmers			0.37		0.19
Is Agency well known to farmers		0.19		0.25	0.42
Does agency buys grains during harvest		0.29		0.31	0.20
Does Agency offers price higher than market price	0.23			0.27	
Is price setting transparent		0.28		0.24	
Is price setting politicized and influenced by big farmers		0.17		0.44	
Does Agency give good quality service to farmers	0.29			0.21	
Does Agency informs farmers of when to buy	0.36	0.18	0.20	0.15	
Is grain silo adequate			0.29		
Does Agency meet farmers expectation	0.24		0.27		
Does Agency acts in the best interest of farmers	0.39			0.20	
Does Agency stabilizes prices			0.19		0.25
Does Agency takes farmers expectation into consideration		0.31		0.24	0.24
Is the Agency reliable and trustworthy					0.48
Does the Agency Operate under strict supervision				0.19	
Do you envisage problem with agency		0.18	0.25		
Are you satisfied with the services of the agency		0.20			0.17
Satisfied with delivery payment	0.23	0.15	0.22		
Satisfied with agency in keeping promises	0.15	0.34		0.20	0.16
Satisfied with staff conduct		0.37			
Satisfied with the way payments are made	0.24				0.22
Satisfied with the way grain are distributed to the public		0.26		0.36	0.17
Satisfied with the price the agency buys					0.34

Source: Author's computation.

perspective of farmers and traders. Field survey was employed. Findings showed traded grain is constrained by high transaction cost, post-harvest losses, and low access to agricultural insurance and marketing information.

High transport costs, poor information channels, inefficient communication systems and post-harvest losses isolate markets and prevent poor farmers from participating in the gains of the region. Successful arbitrage is only undertaken by grain whole sellers. Although such arrangement helps to reduce the distance between markets, gains accruable to the region might exclude poor farmers and traders. While public grain reserve exists in Sokoto state, it is ineffective as perceived by farmers and traders. Though cross-border trade in grain s succeeding in bringing about stronger regional trade integration, the counteracting losses raise the debate of alternative programme innovations on risk management.

6. Further research

The survey did not cover all the border stations in Northern Nigeria as well as ungazetted routes near the monitored border post. The survey for trade flow observed only the Sunday market day and only four Sundays in the period instead of the eight Sundays. The observed period is June and July, the

lean period when there is substantial grain flow. Therefore, the dynamics during two seasons is not considered. Thus, the observation might not accurately estimate the quantities of traded items. Further extension to this limitation is proposed.

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Notes

1. Ever since the ECOWAS treaty, a number of development and negotiations have followed in the last 3–4 decades. First is the revision of the treaty drawn up by an ECOWAS Committee of Eminent Persons in 1991/1992, and signed at an ECOWAS summit conference in Cotonou, Benin Republic, in July 1993. Thus giving rise to a reinvigorated advancement of a common market and a single currency, establishment of a West African Parliament, an Economic and Social Council and an ECOWAS Court of Justice. In 1994, a monetary union of the Francophone member countries in the region known as the Union Economique et Monetaire Quest-Africaine was formed. This meant a common convertible currency in (CFA) for the member states in UEMOA of ECOWAS. The countries are Benin, Burkina, Ivory Coast, Guinea Bissau, Mali, Niger, Senegal and Togo. Other notable achievements include the adoption of ECOWAS passport/travelling documents, a Free Trade Area for unprocessed agricultural products was taken in 1980, and the signing of the Protocol on Non-Aggression and Mutual Defence Assistance took effect in 1981 and a common traveller's cheque entered into circulation, a veritable asset for intra-regional trade promotion and, at the same time, a major step towards the realization of a single monetary zone (Eboh et al., 2004). Other progress includes the Common External Tariff (CET), regional agricultural policy alignment (ECOWAP) and the EPA negotiation with the European Union. ECOWAP was adopted in 2005 in Accra by the Heads of State and governments of the region. The aim is to have a common agricultural policy for the region that will enhance agricultural productivity and food security. ECOWAP is the regional version of NEPAD's Comprehensive Africa Agriculture Development programme endorsed by the African Heads of State at the Maputo Summit in 2003. There is also the cross-border trade initiative programme (CIP) officially launched in 2004. CIP is a tool to facilitate the implementation of locally driven cross-border cooperation initiatives in all of the West African cross-border zones. That is an initiative, whereby states and local communities are directly involved in cross-border cooperation operations by relying on their expertise within the limits of the internal laws of each member state. One of such initiative is the cross-border corridor Kano-Katsina-Maradi in Nigeria launched in 2007.
2. ECOWAS comprises 15 countries of the West African sub region that include Cape Verde, Gambia, Ghana, Guinea, Liberia, Nigeria, the Sierra Leone, Benin, Burkina, Ivory Coast, Guinea Bissau, Mali, Niger, Senegal and Togo.
3. By article 12 of the ECOWAS treaty a customs union of the member-states will emerge within 15 years from the definitive entry into force of the treaty.

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