POLICY IMPERATIVES FOR CONTROL OF MARKET EXCHANGE FAILURE IN THE CASHEW NUT INDUSTRY IN TANZANIA

Adam Meshack Akyoo, PhD
Zena T. Mpenda, PhD
Sokoine University of Agriculture, Tanzania

Abstract

This study examined the root causes of incessant market failure problem facing Tanzanian cashew nut industry. The overarching hypothesis was that the industry challenges are both structural and institutional. Competition status and economic coordination in the industry were thus duly scrutinized. Key informant and questionnaire interviews were carried out with key industry stakeholders and cashew farmers respectively. Data analysis entailed operationalizing the Institutional Analysis and Development framework, the DFID Competition Assessment Framework and estimating the Stochastic Frontier Production Model. Results showcased a systematic positive effect of the Warehouse Receipt System (WRS) on indicative and final producer prices over the years. Concentration ratio results professed the industry as being fairly concentrated and hence oligopolistic. Farmers' input use efficiency was calculated at 51% on average suggesting that majority could be high cost producers. The WRS was vindicated as an effective system for the industry though its high transaction costs due to hiked administrative costs, weak institutional arrangements along the value chain, cooperative monopoly and inadequate enforcement of underlying regulations counteract its strength. Fair competition in the industry is stifled by clandestine buyer collusion and predatory pricing at the expense of local processing. Production cost would overstate indicative price if used as a basis for its setting given inefficient farmers. For better results the industry needs to depoliticize, change warehouses' ergonomics, eliminate unnecessary WRS administrative costs, break cooperative monopoly to accommodate private buyers' participation, strengthen regulatory enforcement mechanisms, restore export parity pricing procedures and establish an advisory to sieve conflicting scholar recommendations.

Keywords: Cashew nut industry, market failure, institutional analysis, production efficiency, competition assessment

Introduction

Cashew is an important export crop in Tanzania after tobacco, coffee and cotton (FAOSTAT, 2011). The industry earned the country US$ 75 million in 2005 (TIC 2005), US$ 70 million in the 2008/09 season (UNIDO 2010, FAOSTAT, 2011) and US$ 140 million in the 2010/11 season (CBT, 2010). The 2011/12 season raw cashew output of 158,000 tons (CBT, 2012, pers. com.) has just beaten the long standing record of 145,000 tons for 1973/74 season. About 80-85% of the total output is exported raw and 15-20% is processed locally (Fitzpatrick, 2012). The industry has over 2.1 million direct and more than 500,000 indirect individual beneficiaries in the country (UNIDO, 2011) and a major contributor incomes and food security.

The current marketing challenges in the industry include price volatility for both raw and kernels cashew, low level of processing to meet critical volumes required in the

international markets, small domestic market for kernels, low farmers' knowledge of the Warehouse Receipt System (WRS), low level of diversification for cashew products, high borrowing interest rates, lack of brand label for Tanzanian cashew and high transaction costs that lower producers' profitability (CBT, 2010). Others include low output and productivity, weak institutional environment and arrangements, unfair taxation regime, unfair pricing and deductions, low prices, and insufficient government involvement in financing regulatory and research activities in the sector (DaiPesa, 2004; UNIDO, 2011; Fitzpatrick, 2012 and Kilama, 2013). Cashew marketing gained a new impetus in the 2007/08 season following the launching of the WRS in the country. However, the industry has continued to be affected by recurring market exchange failures that are always connected to price disagreements between buyers and producers. For instance, the 2011/2012 season initially witnessed one of the worst market failures. It prompted strong government intervention that went as far as issuance of a rescission threat to licenses of recalcitrant buyers. The major question is why does market exchange failure persist amid existence of the WRS? This study was thus carried out in an attempt to look for alternative policy advice that will enhance sustainable cashew marketing in Tanzania.

Market failure is a condition in which a market does not efficiently allocate resources to achieve the greatest possible consumer satisfaction and it manifestats in four forms; public good, market control, externality and imperfect information (Krishnamurthy, 2009; Fafchamps, 2004). According to Menard (2004), the institutional dimension of markets is much more important than what neo-classical economic theory suggests under the mechanics of supply and demand and price at its core. Kilama (2013) contends that existence of thin market (few buyers and sellers) in the Tanzanian cashew nut industry has since compelled interventionist approach (including WRS introduction) on the part of the Government in an attempt to control failure of the crop's market.

Market failure dynamics in agriculture can be well conceptualized within the New Institutional Economics (NIE) paradigm (Transaction Cost Economics Approach- TCA) (Kirsten et al., 2008). The dilemma with the marketing research on the cashew industry lies with the conventional approaches that have so far been adopted. Fitzpatrick (2002) and UNIDO (2011) are among the most recent and encompassing studies on the sector to touch on the issues of cashew value chain characterization, value chain upgrading and coordination/governance mechanisms. The studies' descriptive nature and non-coverage of competition issues led to their inability to account for the recurring exchange failure in the sector. The institutional context analysis of the market was also the least addressed factor in the two studies.

UNIDO's study attempted to analyze governance structures in the industry, but discussion on vertical integration completely missed out on the basic meaning of the concept (see UNIDO, 2011, pp. 36). James Fitzpatrick concerned himself with structure of roles in the cashew value chain. Institutional context issues of the market are reduced to discussion of organizations charged with various responsibilities in the chain and the level of implementation of those roles (see Fitzpatrick, 2012). Technically, market structure analysis call for an understanding of the proportion of buyers/suppliers accounting for a substantial part of the market i.e. market concentration determination (DFID, 2008). Market structure is thus a reflection of competition status in an industry.

On the other hand, institutions are concerned with the 'ground rules of the game' (at the macro-level) and institutions of governance (institutional arrangements) at the micro level (Kirsten et al., 2008). A comprehensive analysis of governance/coordination mechanisms in the cashew industry should have thus addressed these two trajectories. The scope of this study is however more focused on the arrangement between participants in the WRS that governs the ways in which they cooperate and/or compete (i.e. institutional arrangements).

The study combines the NIE and NCE approaches to form a more rigorous methodology for the research.

The study contended that exchange failure between buyers and sellers of raw cashew is a result of both structural and institutional deficiencies in the industry's output market. The two challenges need in-depth analysis of the value chain and the Warehouse receipt system which governs the market exchange, so as to determine the root causes of the problem and thus suggest appropriate and sustainable remedial measures. Specifically, the study carried out institutional analysis of the raw cashew output market in order to identify institutional challenges that interfere with proper functioning of the WR; quantified farmers' production costs and estimated their technical efficiency and also carried out competition scrutiny in the raw cashew market to identify anti-competitive practices that interfere with free entry and exit into and from the market. The study attempted to test three hypotheses which include: (i) Farm gate price for raw cashew output is not cost effective, (ii) Input use in smallholder cashew production is efficient and (iii) Raw cashew output market is highly concentrated. Given that the root cause of exchange failure in the industry are price-related, it was important to establish the cost effectiveness of offered producer price and also level of farmers' production efficiency as buyers may not be willing to compensate for inefficiency effects.

Methodology

The principal area for the study was Mtwara region, where the entire spectrum of value chain actors, including the Cashew nut Board of Tanzania (CBT) headquarters, is located. Primary data was obtained from the actors in Mtwara region, specifically in Tandahimba district. Secondary data was sourced from CBT headquarters in Mtwara and from Ministry of Agriculture, Food Security and Cooperatives (MAFSC), Ministry of Industry, Trade and Marketing MITM, , and CBT branch office in Dar-es-Salaam. Key informant interviews were carried out with relevant officials in the ministries mentioned above, CBT, Tandahimba district council, Cooperative unions (TANECU), Agricultural Marketing Cooperatives (AMCOS), banks offering crop finance loans to AMCOs, and small scale processor in Tandahimba.

A desk review of cashew nut policy and WRS documents was conducted using Institutional Analysis and Development (IAD) framework (Ostrom et al., 1994) to identify institutional challenges that hinder smooth market operation. Key informant interviews using a checklist were carried out to obtain WRS-specific information for assessing its modus operandi, performance, and its success and failure factors so far. The quantification of producers' production costs was accomplished through a structured questionnaire in which a total of 210 randomly sampled households were interviewed. Technical efficiency of the farmers was estimated using the Stochastic Frontier (SF) model. Market concentration ratio was used to address the hypothesis that raw cashew market is highly concentrated.

Warehouse Receipt System: Justification, performance and coordination

Marketing of raw cashew in Tanzania is well understood through articulating the *modus operandi* of The WRS. This is a legally established system by Act of parliament No. 10 of 2005 that came into being in the 2007/08 season. The system was established to control the then flourishing free-riding in the industry in order to improve producer prices and prevent the 'race to the bottom'. The views as to the justification and achievement of the WRS so far vary between scholars, value chain actors, stakeholders and organizations. The CBT, producers and cooperative movement support the system and appreciate its achievement so far. On the other hand, cashew buyers and most NGOs denounce the justification and achievement of the WRS. Scholars' views are divided. For instance UNIDO

(2011) acknowledges the positive effects of the system on the cashew value chain whereas Fitzpatrick (2012) decries it outright on all fronts.

Fitzpatrick's (2012) study on the WRS finds that the system is worthless and akin to a closed tender system (rather than an auction) which is corrupt and ineffectual in all of its objectives. Contrary to his findings, the available statistical evidence suggests that the WRS has had a systematic positive effect on producer/farm gate prices, cashew output and exports since its inception to date (figs. 2 and 3). Correlation coefficients for final price to production and final price to export were calculated at 0.772 and 0.811 respectively. These are undoubtedly strong indications to the fact that WRS had positive effect on these two variables.

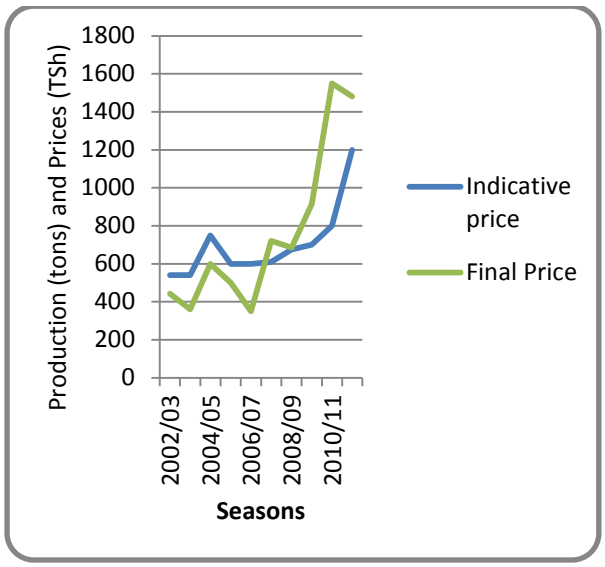

Fig. 2: Indicative price against final producer rice over the last ten years

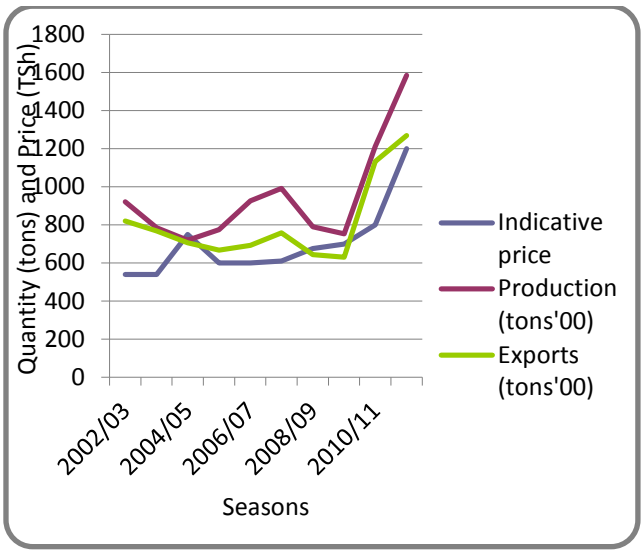

Fig. 3: Trend of indicative price, cashew output, and exports in the period 2002/03 – 2011/12.

Fig.4 further attests to the facts of Fig. 2 and shows an even rosier picture of cashew exports trend over the past decade when exports of processed produce are converted into their in-shell cashew equivalents. Assuming that these effects happened spontaneously following a general rise of cashew price in the world market (Fitzpatrick, 2012) defies economics principles. Economists have always grappled with the challenge of effecting price transmission from the world market to the grass-root producers. In view of results in fig. 2-4 and correlation analysis above, it can safely be argued that the WRS has been the appropriate mechanism to effect positive price and output changes in the cashew industry.

Fitzpatrick (2012) argues that WRS is just a distortion in the industry and suggests for an open market in its place. This is surprising as the same study has elucidated the very factors that are technically known to call for coordinated exchange in a market. Such factors include asset specificity, degree of uncertainty surrounding a transaction, need for quality verification and circumstances where equilibrating supply and demand is important (Poulton and Lyne, 2008). Fitzpatrick (2012) contends tha cashew is grown where other crops cannot be planted (i.e. asset specific investment), its market depends on the global forces of supply and demand making the timing of supply into the market important and that cashew nut industry worldwide suffers from a lack of quality information and is typically driven by myth, rumor and adversarial relationships (i.e. high degree of uncertainty). These characteristics may prevent equilibrium in an open market situation; hence the need for coordinated exchange. The WRS is thus technically justified as a mechanism to coordinate exchange in the cashew sector.

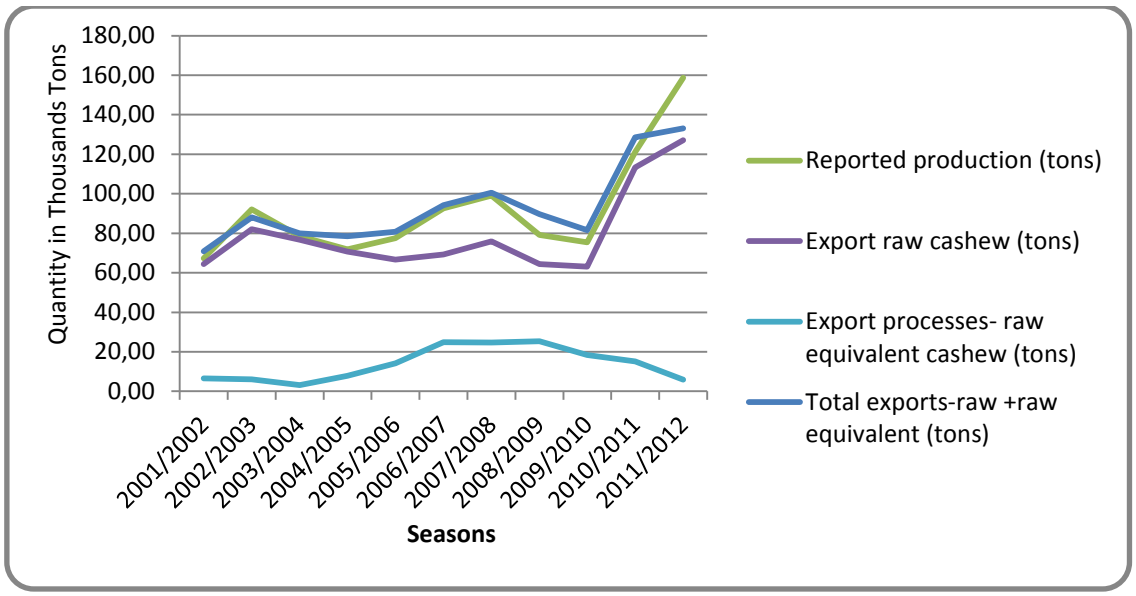

Fig. 4: Production and total exports over the past ten year period ending 2012
Source: Grey data from CBT headquarters' Mtwara and MITM Dar es Salaam, (Feb-Mar 2013)

Coordination challenges of the WRS

The cashew nut marketing in Tanzania is coordinated under the legally mandated Warehouse Receipt System. Contrary to coffee industry, the system in cashew nut has been made mandatory to all cashew farmers (Fig. 6). In coffee industry, private buyers are allowed to purchase the crops and therefore create competitive price for farmers. According to Tanzania Warehouse Licensing Board (TWLB), the current situation in the cashew industry creates a monopoly by cooperatives, thus making the market less competitive. The system could, however, accommodate other players (e.g. private buyers) if not denied by political pronouncements. TWLB is planning to introduce Commodity Exchange (CE) in the industry to enhance buyer competition. Some authors (Fitzpatrick, 2012), without concrete evidence, have already dismissed the effectiveness of CE in the industry on account of its being susceptible to corruption.

Misconceptions about WRS among stakeholders also contribute to the existing conflicts in cashew nut industry. Key informants raised poor understanding of the system as one major challenge. During a discussion with a TWLA officer, it was noted that almost all of the stakeholders in the cashew nut industry have varying understanding of the Warehouse Receipt System. Politicians and CBT consider the system as mandatory through the Unions only, farmers take it as a final market and traders conceive it as a deliberate move to eradicate them from the chain. A common understanding is an urgent requirement for the WRS's smooth and sustainable operation. Those few awareness trainings conducted so far have not been adequate, and dependency on TWLA alone for future training is insufficient given their low manpower and budgetary constraints.

Economic coordination of the WRS in the cashew industry is a bit cumbersome as it entails bringing together three line ministries [MAFC, MITM and Local Government Authority (LGA)], Cooperative Unions, Primary Cooperative Societies i.e. AMCOs, warehouse operators and port authority (Fig.5). The three ministries have thus far been unable to work in unison. In addition, financing of the system brings in the Central Government through the Central Bank (guarantors), commercial banks (lenders) and cooperatives (borrowers) all adding up to a complex exchange which is difficult to coordinate. The relationships between actors in Fig. 5 and their individual actions are

important as they translate into the transaction cost of carrying out the raw (in-shell) cashew exchange.

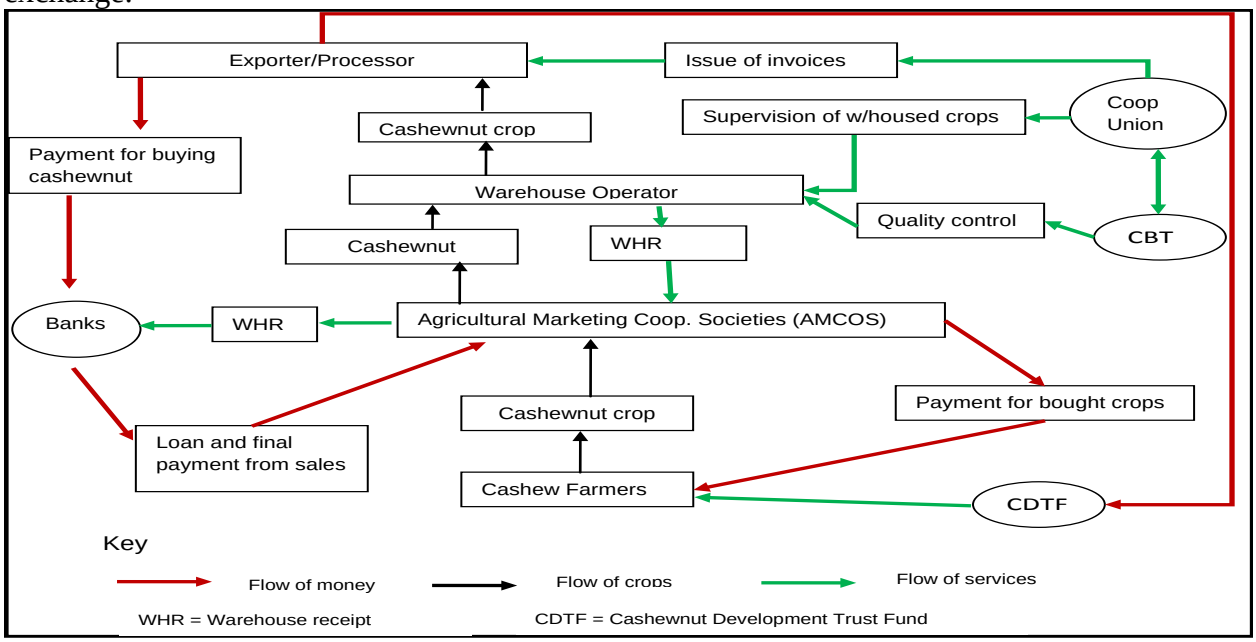

Fig. 5: WRS in the Cashew nut value chain

(i) Cashew Traders and processors

Cashew trading comprises both licensed domestic and international traders operating through local and multi-national companies. A general assessment indicates that the number of buyers per season has been fluctuating with only 22 buyers being regular in the market. The seasonal inconsistency of buyers' participation in the market may indicate existence of some anti-competitive practices in the market thus low prices. This could not however be empirically substantiated in this study because of lack of long time series data on export figures by buyers in which a trend and movement of concentration ratios would have been computed/shown.

On the other hand cashew processing in the country is minimal with only 15% of total production (this does not include local unregistered processing) being processed and exported. Even after the privatization of the 11 processing plants in the 2000s, the country has only 5 privately owned plants which are currently operating with a total capacity of 40,000 tons. Many stakeholders interviewed agreed that processing the cashew is the way to go now for Tanzania. However, some challenges were cited that stand in the way of the much awaited processing, which include requirement of large investment to purchase machinery and the attempt of incumbent cashew buyers to frustrate any attempt to process cashew nut domestically. Furthermore, the incumbent traders' government supports raw cashew export to the Indian market given the importance of the crop in its labour market (Ashimogo *et al.*, 2008). For example, in the season 2010/11 the incumbent buyers left the market after meeting their planned purchase of 90,000 tons of raw cashew leaving behind unsold 60,000 tons in the warehouses. Their plan was to have the produce carried over to the following season, which would mean buying the stock at a throw away price. However, a prospective American buyer emerged and offered to buy the remaining stock under an agreement with Unions that included a promise to be a sustainable buyer thereafter. Just before the sale was completed, however, the entire stock was strangely and unexpectedly bought by the incumbent buyers. The life of the American buyer was also threatened. Indeed, cashew business is full of adversarial relationships, but the question is, who is the perpetrator? Surely, the incumbent buyers are not the victims here as held by Fitzpatrick (2012) study. The surprising thing again

in this development was the realization that though the FOB price for raw cashew in 2010/11 ranged between US$ 750 – 900 (equivalent to Tshs 1,200 – 1,440 per kilogram[129]) (Kilama, 2013), the final average auction price in Tanzania closed at Tshs. 1,440 per kilogram (see Table 1). This could only be possible where incumbent buyers were instituting exclusionary measures to ward off competitors or were being subsidized (Indian Government has since been claimed to subsidize these buyers). Other challenges to processors include unreliable power and water supply and dilemma on the use of automatic machines (which produce broken nuts) while depending solely on India market that consumes whole-nuts.

(ii) Cooperatives and Cashew nut Development Trust Fund (CDTF)

Mistrust between members and leaders of primary societies and between leaders of primary societies and Unions originate from inadequate flow of cashew nut market information among them, little understanding of the warehouse receipt system and laxity of members on taking bold actions when they are unsatisfied with society/union decisions. Contradictory information provided by members during the field survey exhibit inadequate information flow between society's members and their leaders.

Research findings indicate some elements of weak management on the part of the Unions. For instance, it was observed that at Tandahimba, TANECU dissociates itself from the responsibility of counter-checking delivery and release of cashew nut owned by AMCOs under its jurisdiction from bonded warehouses. An incident was reported also on the Union failing to prosecute warehouse operator claimed to be responsible for a loss of 600 tons[130] of cashew under its custodianship. It was learnt that the Union out of mere complacency issue produce release warrants to cashew buyers after being informed by warehouse operators of the amount to be released without crosschecking.

CDTF is a new comer into the cashew value chain and was established by the Stakeholders General Meeting in the 2010/11 season and was meant to help farmers obtain input supplies, alleviating the problems of price hiking, untimely supply of inputs, and counterfeit chemicals. It is funded by 65% (over 4 billion Tanzanian shillings annually) of the cashew export levy. However, the fund operations were initially highly sabotaged by the incumbent private dealers and politicians in a bid to disqualify the fund's ability to deliver the goods. Nonetheless the fund has managed to showcase its effectiveness, delivering input supplies on time at competitive prices in the 2013/14 season. In short, the cashew value chain is clandestinely consolidated and protected in many respects. The CDTF has been able to successfully break through the protection of private interests' wall because the CBT Board new Chairperson came to realize the potential that the industry was about to waste in favour of promoting *dukawalas* cashew input businesses.

Policy, rules, regulations and enforcement

The industry is plagued with three main challenges related to indicative price setting, bidding process and enforcement of the WRS regulations. The indicative price for cashew is set by a stakeholders' committee. In the past, under CBT, it was se on the basis export parity price calculations for raw cashew and was approved by the cashew nut stakeholders' meeting. The price was kept secret and shared between committee members only. The method was, however, misused during the bidding process. Consequently, stakeholders pressed for more transparency. This called for changes in the composition of the committee to include councilors, buyers and representatives from primary societies. The new composition exposed

[129] Equivalence calculated by using the current exchange rate of Tshs 1,600 per US$ which is higher than the ruling rate in 2010/11 season.

[130] Surprisingly and to everyone's dismay, the loss was paid-off without affecting farmers expected dues. This could insinuate that administrative costs in the cost structure are highly overstated.

the price structure, enabling buyers to bid just enough to meet the indicative price and avoid price competition[131]. The current approach is to base the indicative price on farmers' production costs. Reportedly, however, indicative price has always been below production cost when compared with Naliendele Research Institute (Goverment) standard figures. Experts in the MITM are strongly opposed to the current approach, which is associated with overestimation of production costs and overcharge for services through district levy and unions fee (Table 1). The districts' and Unions' over and double charges could result in an unrealistic and overstated indicative price and lead to uncompetitive pricing in the market.

Table 1: Cost price structure for raw cashew nut in the WRS

NO.	ITEM	Cashewnut indicative farm gate price structure (Tsh/kg)						
		2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/2013
1	Gunny bags and Twine		31.0	31.5	31.5	38.5	44.0	46.3
2	Crop Insurance		1.0	1.0	1.0	1.0	1.0	1.0
3	Cash Insurance		1.0	1.0	1.0	1.0	1.0	1.0
4	Cash Distribution		5.0	5.0	-	-	5.0	5.0
5	District Council Produce Cess 5%		30.5	33.5	35.0	40.0	60.0	60.0
6	Primary Co - op. Societies Levy		20.0	50.0	50.0	50.0	50.0	50.0
8	Union Levy		14.0	20.0	20.0	20.0	20.0	20.0
9	Task force		1.0	1.0	1.0	1.0	1.0	1.0
10	Storage Warehouse Commission		8.0	17.0	17.0	15.0	14.0	14.0
11	Transportation		50.0	65.0	65.0	50.0	65.0	50.0
12	Fumigation and weighing scale		-	-	-	-	1.0	0.5
13	Shrinkage 1% or 0.5 % (2013)		12.2	13.4	13.4	13.5	12.0	6.0
14	Bank charges						3.0	3.0
15	Loan interest		10.0	10.0	18.0	18.0	9.0	9.0
16	Farmers contribution - CDTF							25.3
	TOTAL COSTS Admin costs (A)		183.7	248.4	252.9	248.0	286.0	292.3
	Farm gate Price (B)	600.0	610.0	670.0	700.0	800.0	1,200.0	1,200.0
	Auction indicative price (A+B)		793.7	918.4	952.9	1,048.0	1,486.0	1,492.3
	Average actual auction price		925.0	845.0	1,164.0	1,842.5	1,715.0	1,572.0
	Average final price to farmers	600.0	690.0	670.0	885.0	1,440.0	1,340.0	
	% incremental change in the estimated auction price	0.0%	16.5%	-8.0%	22.2%	75.8%	15.4%	5.3%

Source: CBT headquarters, Mtwara

Forgery cases in recent past compelled a change in the cashew bidding process under CBT and Cooperative Unions. Now bidders are given half a day (instead of five days in the past) to deposit their bids in a tender box and tenders are opened on the same day. CBT provides sales catalogs before bidding. However, contrary to the practice in the past, cashew auctions are not gazetted nowadays instead phone calls are used to alert prospective buyers. The system is questionable as to its ability to ensure equitable dissemination of the alerts to all buyers and worse still, its ability to attract new buyers.

Enforcement of regulation in the WRS is challenged in many ways as already discussed above. Cooperative members, for instance, are unable to hold their leaders accountable for financial mismanagement vices depite the Cooperative Audit and Supervision's (COASCO) vindictive reports. In addition, indicative prices are always

[131]Intense calls for improved transparency in the WRS have finally led to over-exposure which has eroded the incentive for buyers to bid competitively. Normally, every business must have its own classified information to maintain its competitive edge which seems not to be the case here. There are claims that that the advantages of keeping the indicative price open to buyers are higher than the associated disadvantages of hiding it. Opponents argue that the period when the price was kept from buyers was marred with corruption and unfair competition. Deep down however such eventualities were just a result of ineffective bidding/sale committees and at best failed enforcement of the system's regulations. Gains in producer price improvement were more pronounced during the price hiding period (see table 2).

endorsed in general meetings despite disproval by various stakeholders. Sensitive documents are also routinely mishandled and give way to undue theft and smuggling of the crop. Enforcement of regulations is further compromised in the observance of payment and evacuation time limits. Though 7and 14 days are set limits for payment and evacuation of bid winners, CBT officer(s) and warehouse operator(s) often collude to delay settlement and evacuation, which prevents producers from being paid in a timely manner.

Cashew Farmers' Technical Efficiency Results

Stochastic Frontier (SF) model results showed that cashew farmers were not efficient enough, as the overall computed TE was only 51% (Tables 2 and 3). The analysis showed that only about 6% of the farmers had efficiency levels above 80% (Table 4). This means that the efficient use of available resources could increase output by 49% at the same input use level. According to Table 3, two of the efficient variables (land area and plant population) are statistically significant at $p \leq 0.05$ level. Land area however is unexpectedly affecting output in the opposite direction, a situation which likely indicates poor farm management practices.

Results in tables 2 and 3 show that level of education of the household head, gender of household head, extension services, weeding and family are all significant inefficiency factors for cashew producers in Tandahimba district. The major concern however is the estimated overall efficiency of 51% (Table 2).

Given the TE results, Tandahimba cashew farmers are likely to be high-cost producers. If production cost is used to determine the indicative price for the produce, the market exchange is likely to fail since the price would be overstated.

Table 2: Maximum likelihood estimates for trans-log stochastic frontier production function

Variable	**Parameter**	**Coefficient**	**Standard error**	**t-ratio**
Constant	beta 0	-2.89	3.69	-0.78
Ln Area	beta 1	-2.63**	1.26	-2.08
Ln Plant popn	beta 2	3.89**	1.29	3.02
Ln Mandays	beta 3	0.26	1.27	0.21
Ln Pesticides	beta 4	-0.17	0.65	-0.26
Ln Area2	beta 5	- 0.35	0.17	-2.05
Ln Plant^2	beta 6	-0.48	0.17	-2.95
Ln Mandays2	beta 7	-0.04	0.15	-0.24
Ln Pesticides2	beta 8	0.04	0.03	1.35
Ln Area* Ln Plant	beta 9	0.74	0.29	2.54
Ln Area* Ln Mandays	beta10	0.06	0.24	0.22
Ln Area* Ln Pesticides	beta11	-0.103	0.09	-1.14
Ln Trees* Ln Mandays	beta12	0.06	0.25	0.23
Ln Trees* Ln Pesticides	beta13	0.102	0.09	1.13
Ln Mandays* Ln Pesticides	beta14	-0.05	0.102	-0.53
sigma-squared		24.95	6.39	3.9
Gamma		**0.99**	**0.002**	**388.5**
log likelihood		-294.15		
LR test		168.86		
Mean/overall efficiency		**51%**		

Table 3: Parameter estimates of the Inefficiency model

Inefficiency variable	Parameter	Coefficient	Standard error	t-ratio
Constant	delta 0	18.003	6.61	2.72
Age	delta 1	-0.06	0.04	-1.65
Level of Education	delta 2	-1.27 **	0.39	-3.19
Gender	delta 3	-4.99 **	2.15	-2.32
Extension services	delta 4	-7.86 **	2.56	-3.07
Weeding	delta 5	-19.201 **	6.65	-2.89
Pruning	delta 6	3.003	1.54	1.95
Family size	delta 7	-1.025 **	0.39	-2.59

Table 4: Technical efficiency results

Technical efficiency	Frequency	Percentage
0 – 20	24	11%
20 – 40	37	18%
40 – 60	58	28%
60 – 80	79	38%
80 – 100	12	6%
Total	**210**	**100**

Market Concentration

It has not been possible to obtain data for the entire prior ten year period. Nonetheless, calculations made from the available 2007/08 season data produced CR4 and CR3 values of 44% and 38% respectively. A market with CR4 of 40 normally insinuates an oligopolistic market (DFID, 2008). These results comport well with information from the study's key informants and Fitzpatrick's (2012) study. Key informants highlighted the presence of participating buyers masquerading as independent while they are actually falling under a common ownership. Comprehensive inference on the current concentration status of the Tanzanian cashew market cannot however be made using this single set and five-year-old data.

Trade barriers to entry and exit

High initial capital investment cost, especially for automated machines, might be related to the lack of new entrants into cashew nut processing. The actual investment cost for such a plant was not established, but a simple manual processing plant, like the one in Kitama village, costs over one billion TSh to establish..

There is a strategic barrier which is rather difficult to discern. This emanates from over- dependency on one cashew market that prefers either raw cashew or whole processed nuts. India is considered the only export market for Tanzania cashew nuts, whether raw or processed. The latter forced many processing plants to use manual/rudimentary technology to ensure absence or minimal broken pieces of cashew nuts –a position that hindered large-scale operations and made processing the cashew uncompetitive given the low volumes. Rumours have it also that efforts of prospective large scale processors (from Brazil and England) to enter the Tanzania market are being frustrated by the incumbent raw cashew buyers through some clandestine predatory/exclusionary measures as partly explained in previos sections above.

The sidelining of private dealers from WRS is not only a regulatory barrier but has also created a monopoly of cooperatives in the cashew nut market. Forcing cashew farmers to sell through the cooperative system alone and prohibiting private sector participation create uncompetitive pricing for raw cashew nuts. High export levies have also failed to curb export of raw cashew to further detriment of the crop's local processing.

Anti-competitive conduct and Vested interest

Contradictory arguments in relation to cartels and abusive conduct in the cashew nut market were observed during interviews with key stakeholders. Some argued that cashew buyer companies are mostly individual Indians masquerading as independent buyers, but others disagreed. The latter substantiated the claim on the observed high buyer turnover rate as discussed in the previous sections above. The former case is supported by the existence of the 22 buying companies and the calculated concentration ratio above 40%, which suggest that the raw cashew market is oligopolistic and thus likely collusive. Moreover, rumour has it that there are only two buyer companies/families for the raw cashew destined for the Indian market.

WRS is a legally established institution which is supposed to run according to the underlying law/regulations. However, it is puzzling that the system is run through frequent political pronouncements from government leaders. For example, in the 2011/12 season, Mtwara's regional authority ordered farmers to refuse any payment below TSh 2.000/kg, which was far above the market price. Political interference in the industry has led to decreased morale on the part of CBT's technical personnel, who are now weary of any innovative action for fear of backlash from producers, politicians and activists (all these are now cashew experts in their own rights!).

Conclusions

There is enough evidence to conclude that the WRS has been successful in improving producer prices over the entire period of its existence. WRS is, however, plagued with a myriad of challenges, including negative publicity from internal and external forces; high transaction costs due to hiked administrative costs; poor enforcement of regulations due to political interference and intentional malpractice; out-selling due to smuggling; over transparency/overexposure on price structure formulation; overdependence on a single Indian market; poor flow of information leading to poor transparency; poor utilization of the market window following belated season start due to untimely bank loan funds' disbursement; and monopolization by cooperatives and exclusion of private dealers from raw cashew export trade. The suggestion to replace WRS with the open market (Fitzpatrick, 2012) that existed before 2007/08 season has not been empirically supported. The immediate action could be to eliminate the hiked administrative costs as they are responsible for high transaction costs in the WRS.

Most cashew farmers are inefficient and hence high cost producers. The current practice of determining the indicative price in the WRS on the basis of production costs is thus detrimental to the industyr as it is likely to overstate the price and ignore the dynamics of the world market price movements. This situation will only enhance disagreements between buyers and sellers as buyers may not be willing to compensate producers for their inefficiency. There is a need to restore the determination of indicative price on the basis of export price valuation.

Competition assessment of the WRS has found the cashew market to be oligopolistic. This is in the backdrop of conflicting views from CBT and TWLA on the existence of buyer collusion in the market. In either case however, oligopolies are usually collusive though a coordinated market (e.g. under WRS) which strictly observes its operational regulations is still likely to be efficient under the same circumstance. There is need to diversify the market to break overdependence on the Indian raw cashew export market by building internal processing capacity and exploring alternative markets globally.

Institutional review of the WRS has revealed a number of instances where the system's rules and regulations are violated. The effect has been delayed payments to farmers, which is the major cause of the skirmishes and producer demonstrations that have become rampant in Mtwara region. These outcomes are detrimental to the system's reputation. However, there has not been evidence to suggest that perpetrators (unscrupulous buyers, Union staff, warehouse operators, CBT staff etc) are made to bear the consequences of their action as stipulated in the WRS regulations. The problem is exacerbated by the complex nature of entities involved in administering the system in a situation where CBT has turned into an onlooker interested in dancing to the tune of politicians' interests. Thus depoliticizing CBT management through abolition of the presidential appointee chairperson position and eliminating regional and district political leaders' influence on the WRS would ensure effective operation and enforcement of the WRS. If the chair is retained it should be turned into an executive position, competitively contested on merit.

The Cashew industry is currently a play ground for many researchers, scholars, civil rights groups, media houses etc. The industry is thus bombarded with several interventions and/or policy advices that could be conflicting at times. There ought to be a well thought way (e.g. an advisory committee) by all cashew stakeholders to sieve these advices in order to identify the pertinent ones in terms of their reliability, compatibility and effectiveness. The industry should be keen not to fall into *the fallacy of false authority trap*.

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