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

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Table of Contents

1	Introduction.....	5
1.1	Problem statement and justification	7
1.2	Study objectives	8
1.2.1	Research hypotheses.....	9
1.2.2	Research questions	9
2	Methodology.....	10
2.1	Research Conceptual framework	10
2.2	Sampling, data collection and analysis.....	11
3	Results and discussions	14
3.1	Institutional review of the Warehouse Receipt System.....	14
3.1.1	Warehouse Receipt System: Justification, performance and coordination.....	14
3.1.2	Coordination challenges of WRS.....	17
3.1.3	Policy, rules, regulations and enforcement.....	22
3.1.3.1	<i>Setting of Cashew nut Indicative price</i>	22
3.1.3.2	<i>Bidding process</i>	24
3.1.3.3	<i>Enforcement</i>	25
3.2	Cost of production for cashew producers.....	26
3.2.1	Socio-economic characteristics of cashew farmers in the study area	26
3.2.2	Cashew Farmers Production costs in Tandahimba district.....	29
3.2.3	Cashew Farmers' Technical Efficiency (TE) Results in Tandahimba district	30
3.3	Competition assessment in the cashew industry.....	32
3.3.1	Market Concentration	32
3.3.2	Trade barriers to entry and exit (Natural barriers, Strategic barriers and Regulatory and Policy barriers)	33
3.3.3	Vested interest	34
3.3.4	Anti-competitive conduct.....	34
4	Conclusions.....	34
5	Bibliography.....	38
6	Appendices.....	Errore. Il segnalibro non è definito.

ABBREVIATIONS AND ACRONYMS

CBT	Cashew Board of Tanzania
UNIDO	United Nations Industrial Development Organizations
FAOSTAT	Food and Agriculture Organization Statistics
MITM	Ministry of Industry, Trade and Marketing
MAFSC	Ministry of Agriculture Food Security and Cooperatives
US\$	United States of America Dollar
WRS	Warehouse Receipt System
TWLA	Tanzania Warehouse Licensing Board
NIE	New Institutional Economics
TCA	Transaction Cost Economics Approach
NCE	Neo Classical Economics
DFID	Department of Foreign
AMCOs	Agricultural Marketing Cooperatives
DC	District Commissioner
DAICO	District Agriculture, Irrigation and Cooperatives
TANECU	Tandahimba and Newala Cooperative Union
SF	Stochastic Frontier
ANSAF	Agricultural Non State Actors Forum
CE	Commodity Exchange
CAF	Competition Assessment Framework
Kg	Kilogram
Ha	Hectares
WAKOTA	Wakulima wa Korosho Tandahimba
WAKONA	Wakulima wa korosho Nachingwea
CR4	Market concentration ratio for the 1 st top four buyers
CR3	Market Concentration ration for the 1 st top three buyers

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.

Key words: Cashew nut industry, Market failure, Institutional analysis, Production efficiency, competition assessment

1 Introduction

Cashew nut is a cash crop cultivated in Mtwara, Lindi, Coast, Tanga, Morogoro, Iringa, Mbeya, Ruvuma and Dodoma regions of mainland Tanzania (CBT, 2010). There are 734,144 households in the Southern Zone (Mtwara, Lindi, and Ruvuma) that grow cashew. The industry has about 2.1 million direct and more than 500,000 indirect individual beneficiaries in the Southern zone alone. The numbers are even higher when Northern and Coastal zones are factored in (UNIDO, 2011). The industry is thus a major player in ensuring household income and food security in the areas where cashew is cultivated.

Cashew is an important export crop in Tanzania, following only 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. Mtwara region produces 71% of the total raw cashew output in the country followed by Lindi (18%), Coast (8%) with the remaining 3% coming from the minor producer regions (mainly Ruvuma and Tanga) (Kilama, 2013). About 80-85% of the total output is exported raw and 15-20% is processed locally for both domestic and international markets (Fitzpatrick, 2012).

The current marketing challenges include price volatility for both raw cashew and kernels, 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). Cashew marketing gained a new impetus in the 2007/08 season following the launching of the WRS in Mtwara, and later in Lindi, Coast and Ruvuma regions. Despite the initiative(s), cashew marketing problems still linger and this study is among the efforts that seek to better understand the challenges in an attempt to provide alternative policy advice that will enhance sustainable cashew marketing in Tanzania.

1.1 Problem statement and justification

Many studies have been carried out in the cashew industry. Among the most notable of these include DaiPesa's (2004) on policy and taxes in the industry, UNIDO's (2011) on the cashew value chain diagnostic, Fitzpatrick's (2012) on regulations and Kilama's (2013) comparative study on the Tanzanian and Vietnamese cashew nut industries. According to the studies and Cashew Board of Tanzania (CBT) documents, the challenges in the industry are many and diverse and 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.

The Warehouse Receipt System (WRS) was viewed as a panacea to producers' problems, including undue low prices being offered by free-rider buyers. Its establishment was preceded by recurrent market failures in the industry during the late years of the 2000s. The anticipation was that group marketing through the cooperative system would curb the free rider problem and in turn, lead to higher producer prices.

Notwithstanding the WRS introduction, 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?

Market failure is a condition in which a market does not efficiently allocate resources to achieve the greatest possible consumer satisfaction and its manifestation 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. As such, 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 status in the industry have led to their inability to account for the recurring exchange failure in the sector. The institutional context analysis of the market was the least addressed factor in the two studies. Kilama (2013) wraps up the story by contending 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.

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. He thus reduced institutional context issues of the market to being an assessment and 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 as to whether a single buyer/seller or a small number of large buyers/suppliers, account for a substantial part of the market hence a need for ascertaining the level of market concentration of a particular market (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) as informed by the study's conceptual frame (Fig. 1). The study combines the NIE and NCE approaches to form a more rigorous methodology in an attempt to produce relevant and effective policy advice.

1.2 Study objectives

It is contended that exchange failure between buyers and sellers of raw cashew is a result of both structural and institutional problems/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, this study:

- (i) **Carried out institutional analysis of the raw cashew output market industry in order to identify institutional challenges that interfere with proper functioning of the WRS.**
This is premised on the fact that the key roles of institutions are to facilitate coordinated exchange (bringing willing buyers and sellers together), facilitating low cost exchange and providing incentives for exchange (Kirsten et al., 2009).
- (ii) **Quantified farmers' production costs and estimated their technical efficiency**
This underscores the fact that estimating farm gate indicative price from inefficient farmers' production costs may lead to buyer un-competitiveness in the market that they supply given

that the final produce price is likely to be overstated. In this case, disagreement between buyers and sellers on the produce price is imminent. On the other hand, the produce price that is not cost-effective is likely to drive farmers away from the respective market.

(iii) **Carried out competition scrutiny in the raw cashew market in a bid to determine anti-competitive practices that interfere with free entry and exit into and from the market.**

This is based on the understanding that a market with few buyers, as is the case with the raw cashew market (UNIDO, 2011), is likely to be inefficient given the possibility of collusion and other anti-competitive practices which could stifle competition and harm sellers.

1.2.1 Research hypotheses

In view of the above specific objectives, the study attempted to test the following hypotheses:

- (i) Farm gate price for raw cashew output is not cost effective.
- (ii) Input use in smallholder cashew production is efficient.
- (ii) Raw cashew output market is highly concentrated.

Explanation

Given that the root cause of exchange failure in the industry is complaints on low farm gate price, it was important to establish whether the offered price was cost effective i.e. did it cover production costs involved? It was also important to determine whether production was being carried out efficiently because buyers are not expected to compensate for producers' inefficiencies. A concentrated market is likely to be inefficient on pricing thus the need to seek for an understanding of the industry's position on this front if the root causes of the observed exchange failure were to be uncovered.

1.2.2 Research questions

The research questions in this study were uttered in respect of specific objective one. This emanated from the fact that the addressing of the objective entailed purely qualitative data analysis. The following questions were therefore answered:

- (i) What are the institutional snags hindering efficient market exchange in the raw cashew output market?
- (ii) What has been the proportion of producer price on export price for raw cashew over the years?
- (iii) To what extent do transaction costs in the raw cashew marketing system affect cashew producers' incomes in Tanzania?

2 Methodology

2.1 Research Conceptual framework

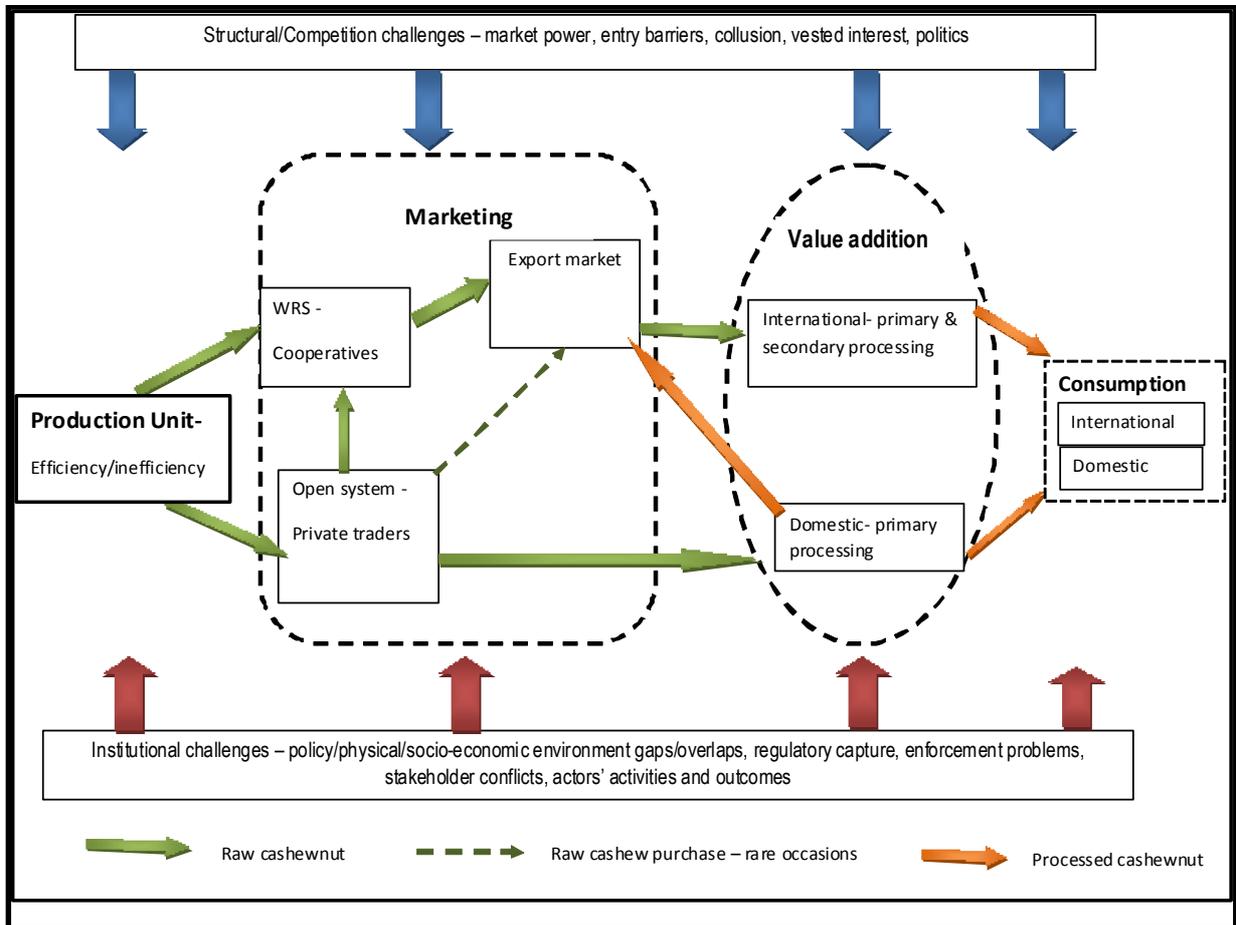


Figure 1: Conceptual framework for market exchange study in the cashew industry

Source: Derived from literature details and authors' observations

The study's conceptual framework (Fig. 1) depicts market exchange in the Tanzania's cashew industry. It traces the movement of cashew nut from the farm to the table, including production, marketing, value addition, and consumption. The framework enhances understanding of the way the produce exchanges hands along this path. Tanzanian cashew nut is mostly sold raw, with most (more than 80%) destined for the Indian export market. Domestic marketing efforts are thus geared towards facilitating the exchange between producers and buyers in supplying the Indian market for both raw (in-shell) cashew and kernels.

Currently, the Warehouse Receipt System is the vehicle that oversees this exchange, and it is founded on the mainstream cooperative system. Private buyers can only participate in the system via the cooperative system if they are lucky enough to be accepted. In other words, they are not entitled by law to participate. Private buyers are only accepted into if they will export the produce; otherwise they are forced to operate in the open market that serves the thin/small domestic market. International buyers access Agricultural

Marketing Cooperatives' (AMCOs)' cashew from registered warehouses under the supervision of the Cooperative Unions and CBT. The exported produce will then be processed in India whereas the produce that goes through the open market will end up at the local processors' premises. The latter may either sell processed cashew to domestic consumers or export it to international processors for further processing before the product reaches the international end user. The exchange of raw cashew is thus relatively complex to justifiably require coordination through the WRS in order to stop market exchange failure and the likely 'race to the bottom'¹ if the crop were to be traded on the open market. In the course of its operation, the WRS is however faced with a variety of institutional and structural/competition challenges from all directions. The system has thus to be perpetually improved over time if it is to be sustainably effective in the face of the frequently changing international trade environment for cashew.

2.2 Sampling, data collection and analysis

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 therefore mainly obtained from the actors in Mtwara region. 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), AMCOs, banks offering crop finance loans to AMCOs, and one small scale processor in Tandahimba. Each specific objective was addressed using relevant data and approach. In addressing objective one, a desk review of cashew nut policy documents was conducted 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.

Objective two, the quantification of producers' production costs was accomplished through a structured questionnaire. Data on output levels, farming practices, factor endowments and socio-economic characteristics were among the variable for data collection in the questionnaire. Tandahimba district was selected into the study being the leading producer (45% of total production) in the cashew producing regions. Five wards were randomly selected from the district from which a total of 210 randomly sampled households were interviewed.

In testing the hypothesis that farm gate price for raw cashew is not cost effective; an analysis of the cost of production was done in two stages. Initially, total per unit production cost (fixed + variable costs) was calculated and compared with the producer price (indicative price) for the 2012/13 season². Technical

¹ In this case, the likelihood of farm gate produce prices that are far below farmers production costs under open market arrangement i.e. the extreme consequences of agricultural marketing deregulation

² In terms of cross sectional data, the 2012/2013 season was the most appropriate in a situation where farmers do not keep farm records. It is also unlikely that farmers' production costs would differ significantly between seasons given the nature of the existing farming system.

efficiency of the farmers was estimated using the Stochastic Frontier (SF) model. In this case, the relationship between inputs and output (technical efficiency) using cashew nut production function was analyzed. The dependent variable for the model was the *output (kg)* and independent variables were *cashew area planted (ha)*, *plant population per hectare*, *labour (person-days)* and *amount of pesticide used*. Other independent variables were *years of education*, *gender of household head* and *household size*. Three of the dependent variables were dummies which included access to *extension services*, *weeding* and *pruning activities*.

In fitting the model, the independent variables were split into efficient and inefficient effects variables as required by the model. The efficient variables for the model were area cultivated (ha), plant population (number of trees per hectare), total labour (person-days) per annum per hectare; amount of pesticide used (kg) and V_i as a random error variable. U_i was used to denote technical inefficiency effects of a farmer measured mostly by social characteristic variables namely; age of household heads (years), level of education (years), gender of household head (dummy: Male = 1, Female = 0), extension services (dummy: Access=1, No access=0), weeding (dummy: weeding = 1, No weeding = 0) and pruning (dummy: pruning = 1, No pruning = 0). For efficient effects the estimated translog model was specified as;

$$\ln Y_i = \ln \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + (\beta_1 \ln X_1)^2 + (\beta_2 \ln X_2)^2 + (\beta_3 \ln X_3)^2 + (\beta_4 \ln X_4)^2 + \beta_1 \ln X_1 \beta_2 \ln X_2 + \beta_1 \ln X_1 \beta_3 \ln X_3 + \beta_1 \ln X_1 \beta_4 \ln X_4 + \beta_2 \ln X_2 \beta_3 \ln X_3 + \beta_2 \ln X_2 \beta_4 \ln X_4 + \beta_3 \ln X_3 \beta_4 \ln X_4 + (v_i - u_i)$$

Where;

\ln = denotes natural logarithm

Y = output of cashew harvested (kg)

X_1 = area cultivated (in ha)

X_2 = Plant population/ha

X_3 = Person days/ha/annum

X_4 = Amount of pesticide used (kg)

V_i = Random error, captures measurement errors and other random factors outside the control of the farmer

U_i = Technical inefficiency effects and are connected with technical inefficiency of a farmer

In analyzing technical inefficiency effects, socio-economic characteristics of the farm were regressed against the U_i as shown below;

$$U_i = \rho_0 + \rho_1 Z_1 + \rho_2 Z_2 + \rho_3 Z_3 + \rho_4 Z_4 + \rho_5 Z_5 + \rho_6 Z_6 + \rho_7 Z_7$$

Where;

Z_1 = Age of household heads

Z_2 = Level of education (years)

Z_3 = Gender of household head (Male = 1, Female = 0)

Z_4 = Access to extension services (Access=1, No access=0)

Z_5 = Weeding activity which is dummy variable (Weeding = 1, No weeding = 0)

Z_6 = Pruning activity also a dummy variable (Pruning = 1, No pruning = 0)

Z_7 = Household size

$\rho_0, \rho_1, \rho_2 \dots \rho_7$ = Parameter estimates

In addressing the hypothesis that raw cashew market is highly concentrated and the study's third objective in general, competition scrutiny of the industry was carried out using the DFID's Competition Assessment Framework (CAF). The study essentially analyzed a number of parameters from time series data collected from relevant institutions including the Tanzania Warehouse Licensing Board (TWLB), Cashew Board of Tanzania (CBT), Tandahimba and Newala Cooperative Union (TANECU), Masasi and Mtwara Cooperative Union (MAMCU) and Primary Cooperative Societies in Tandahimba district and the Ministry of Industries and Trade. The ten year period series data obtained were in respect of raw and processed cashew output, farm gate indicative price, indicative auction price, bonus payments to farmers and raw cashew export figures. The time series data for individual buyers' volume purchases were important in calculating Market Concentration ratio (CR4 and CR3). However, despite many efforts it was not possible to get the time series data for the sought 10 year period but only for the 2007/08 season. Thus the CR4 and CR3 were computed using the single season data above. Key informants were used to gather additional information in relation to market structure (trends of market shares), anticompetitive practices by firms, vested interest and political interference issues in the industry.

Market shares and concentration ratios were calculated as percentage of turnover accounted for by a small number of the relatively largest firms. The following formulae were used:

$$\text{Market Share} = \frac{\text{Individual firm's annual sales}}{\text{Total annual sales}} \%$$

$$CR_i = \frac{\text{annual sales turnover of the } i\text{th largest number of firms}}{\text{Total annual sales turnover of all firms}}$$

Institutional review of the WRS was carried out along the lines of the Institutional Analysis and Development (IAD) framework (Ostrom et al., 1994). Using the IAD framework, the study attempted to understand the dynamics of the WRS by looking at the interplay between its environment (policy and governance, physical, and socio-economic factors) and its action domain (institutions, actors, activities and outcomes). The main focus was to investigate the institutional context of the cashew market by scrutinizing its economic coordination and outcomes of its actors' activities.

3 Results and discussions

3.1 Institutional review of the Warehouse Receipt System

3.1.1 Warehouse Receipt System: Justification, performance and coordination

Cashew nut marketing in Tanzania has come of age. Several studies have covered its historical perspective including Fitzpatrick (2012), UNIDO (2011) and CBT (2010) to mention but a few. Marketing exchange of raw cashew in Tanzania is well understood through articulating the *modus operandi* of The WRS. This is a legally established system that came into being in the 2007/08 season. It was established by Act of parliament No. 10 of 2005. The need to control the then flourishing free-riding in the industry in order to improve producer prices and prevent the 'race to the bottom' was the prime objective of the system's establishment. 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 (justification and effect).Reportedly, the worst enemies of the WRS are those beneficiaries of the open market system that existed prior to it.

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. This conclusion can only be comprehended in the underlying understanding that he is writing for an activist organization – ANSAF (Agricultural Non State Actors Forum).Contrary to his findings, the available statistical evidence suggests that the WRS has had a systematic positive effect on producer/farm gate prices and output since its inception to date (figs. 2, 3, and 4). 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.

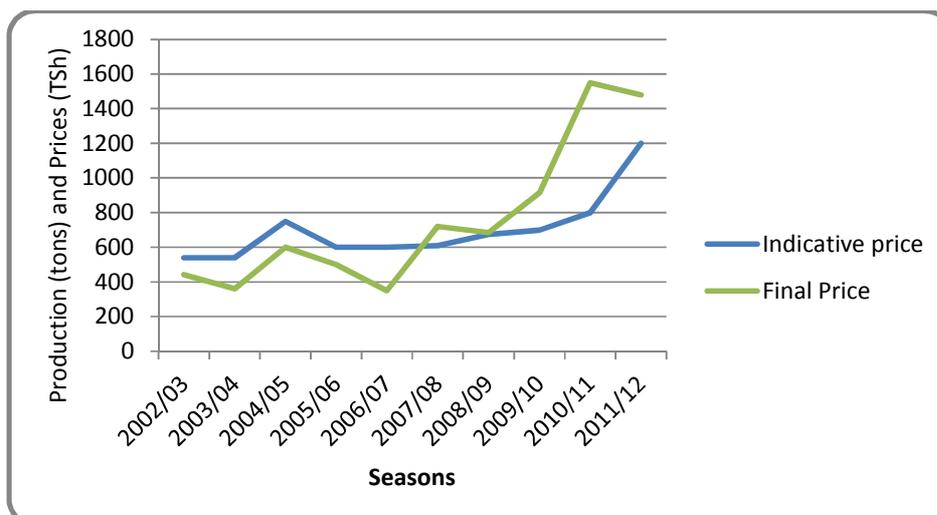


Fig. 2: Indicative price against final producer price over the last ten years

Source: Grey data from CBT headquarters' Mtwara (March 2013)

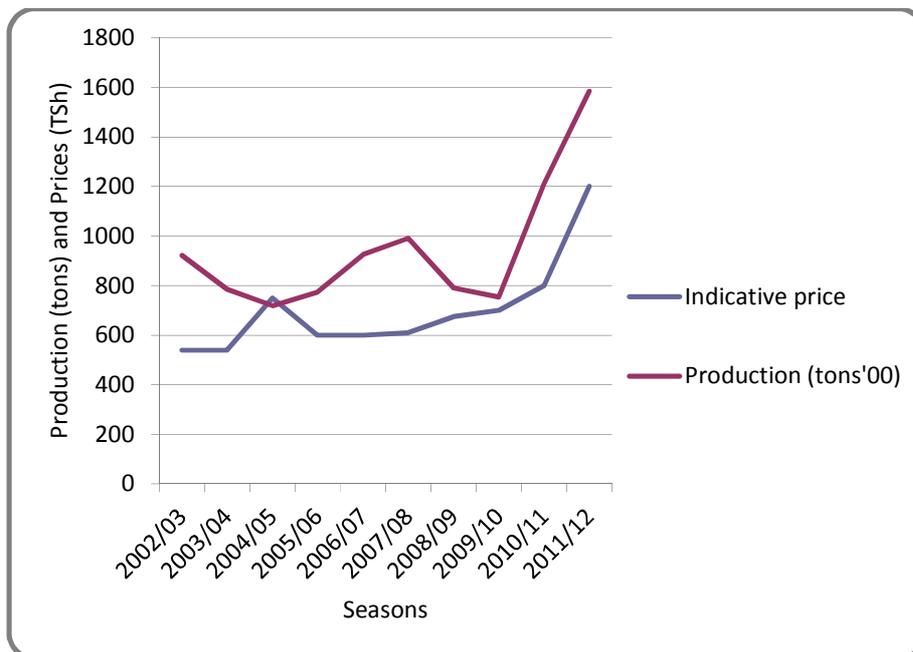


Fig. 3: Cashew output and indicative price trends over the years

Source: Grey data from CBT headquarters' Mtwara and MITM Dar es Salaam, (Feb-March 2013)

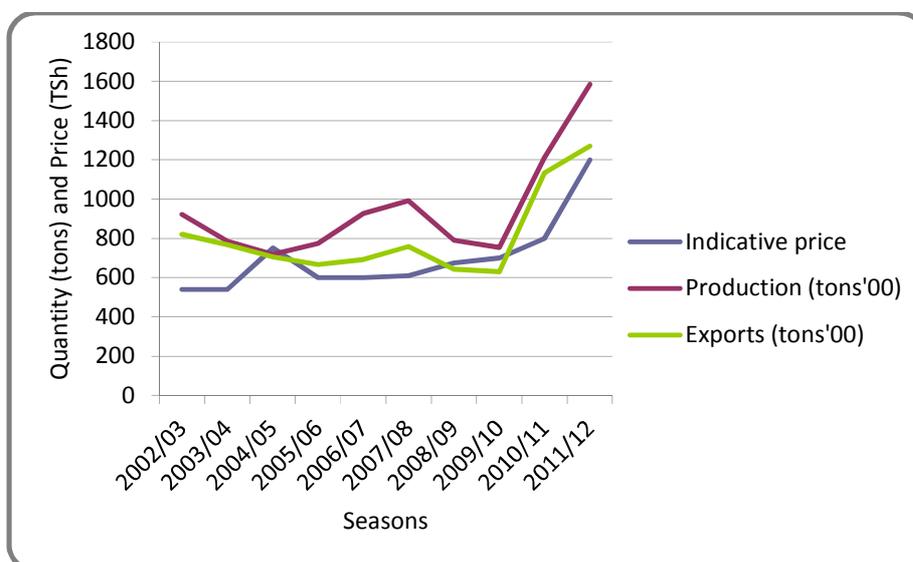


Fig. 4: Movement of indicative price, cashew output, and exports in the period 2002/03 – 2011/12

Source: Grey data from CBT headquarters' Mtwara and MITM Dar es Salaam, (Feb-March 2013)

It is evident from Fig. 2 that final producer price started to surpass indicative price right after establishment of the WRS in 2007/08 season. This has been a real gain hence the observed response on output increase (Fig.3) over the years following 2008. Cashew exports (fig. 4) have also lately started to increase after a sharp decrease following the system's introduction. The introduction of a formal marketing system for raw

cashew was shocking to traders hence the initial decrease in exports. Following increased buyer confidence on the system recovery of exports ensued. Fig.5 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.

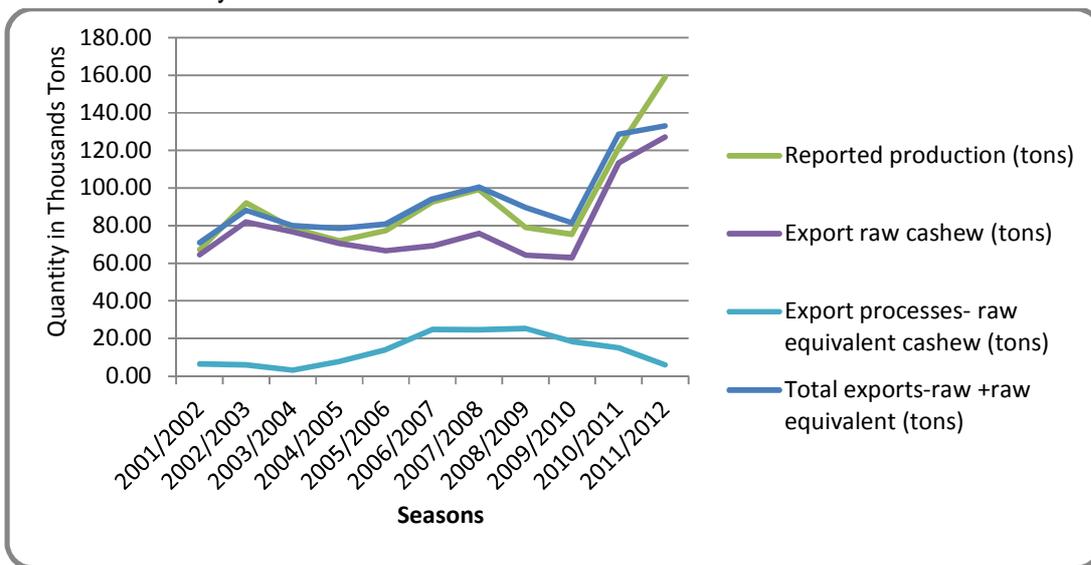


Fig. 5: Production and total exports over the past ten year period ending 2012

Source: Grey data from CBT headquarters' Mtwara and MITM Dar es Salaam, (Feb-March 2013)

Fitzpatrick (2012) argues that WRS is just a distortion in the industry and suggests for an open market in its place. This is a very surprising suggestion given that the same study has elucidated the very factors that are technically known to call for coordinated exchange in a market. According to Poulton and Lyne., (2008), such factors include asset specificity, degree of uncertainty surrounding a transaction, need for quality verification and circumstances where equilibrating supply and demand is important. According to Fitzpatrick (2012), 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. Finally, the 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, and its achievements as discussed above attest to this assertion.

3.1.2 Coordination challenges of the WRS

The cashew nut marketing in Tanzania is coordinated under the legally mandated Warehouse Receipt System. The crop is among the six crops that were nationally identified to be used in piloting the system in the country. Other crops include cotton, sunflower, paddy, coffee and sesame. The system in cashew nut industry has been made mandatory to all cashew farmers (Fig. 6). Farmers are legally required to sell their produce through primary cooperative societies. Primary cooperative societies collect cashew nut from farmers, transport and store it in licensed privately operated bonded warehouses. Finally, the cashew nuts are sold by cooperative Unions through CBT-controlled competitive bidding auctions. In the coffee industry, farmers are free to sell their produce either through the cooperatives or to private buyers. In this way, private buyers (other than cooperatives) 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 they were not outlawed. The board is planning to introduce Commodity Exchange (CE) in the industry to enhance buyer competition. Some authors (Fitzpatrick, 2012) have already dismissed the effectiveness of CE in the industry on account of its being susceptible to corruption. However, it is difficult at this point in time to figure out how the would-be on-line bidding system will be prone to corruption malpractices unless concrete evidence is provided.

Misconceptions about WRS among stakeholders contribute to the existing conflicts in cashew nut industry. The misconceptions are twofold;

(a) The system is conceived as final market

In this case, politicians are making farmers believe that once they have collected their produce through primary societies to the bonded warehouses then they should be paid instantly and in full amount. The truth is that WRS is a collective action that strives to ensure that cashew farmers participate directly in the export market notwithstanding their meager resources individually. Empirical evidence shows that WRS has significantly and consistently improved producer prices and cashew output over the years of its operation (section 3.1.1).

(b) The system can only be operated through the cooperative system

In the current arrangement, all non-cooperative and other private dealers/buyers are illegally denied the right to participate in cashew marketing. A previous attempt to include other private buyers failed because of unfounded disqualification of the system's ability to accommodate them and political interference in cashew marketing. Examples on this can be cited from Mkuranga district in the 2011/12 season, where private buyers were invited by the regional office to buy cashew nut. They out-competed the cooperatives to the extent that the latter failed to repay their bank loans. A similar case is cited of private buyers in Tandahimba, namely WAKOTA (Wakulima wa Korosho Tandahimba) and WAKONA (Wakulima wa Korosho Nachingwea), who were to be banned by a presidential decree after outcompeting the mainstream cooperatives. The Cashew nut Industry Act 2009, clause 15 has however affirmed the legal right of the private dealers to participate in WRS rather than just the

cooperatives but the latter are the only *de facto* participants by virtue of government and political pronouncements.

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.6 below depicts schematically how the system operates in the cashew industry *market structure and points to potential institutional challenges thereof*.

WRS operates in an environment where there are overlapping mandates between the three line ministries mentioned above. For instance, the law provides that the crop is owned and controlled by the MAFSC while MITM controls and operates the WRS (and district councils oversee the system in their respective areas. 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. 6 and their individual actions are important as they translate into the costs (transaction costs) of carrying out the raw (in-shell) cashew transaction. The discussion below covers these relationships and actions in some detail.

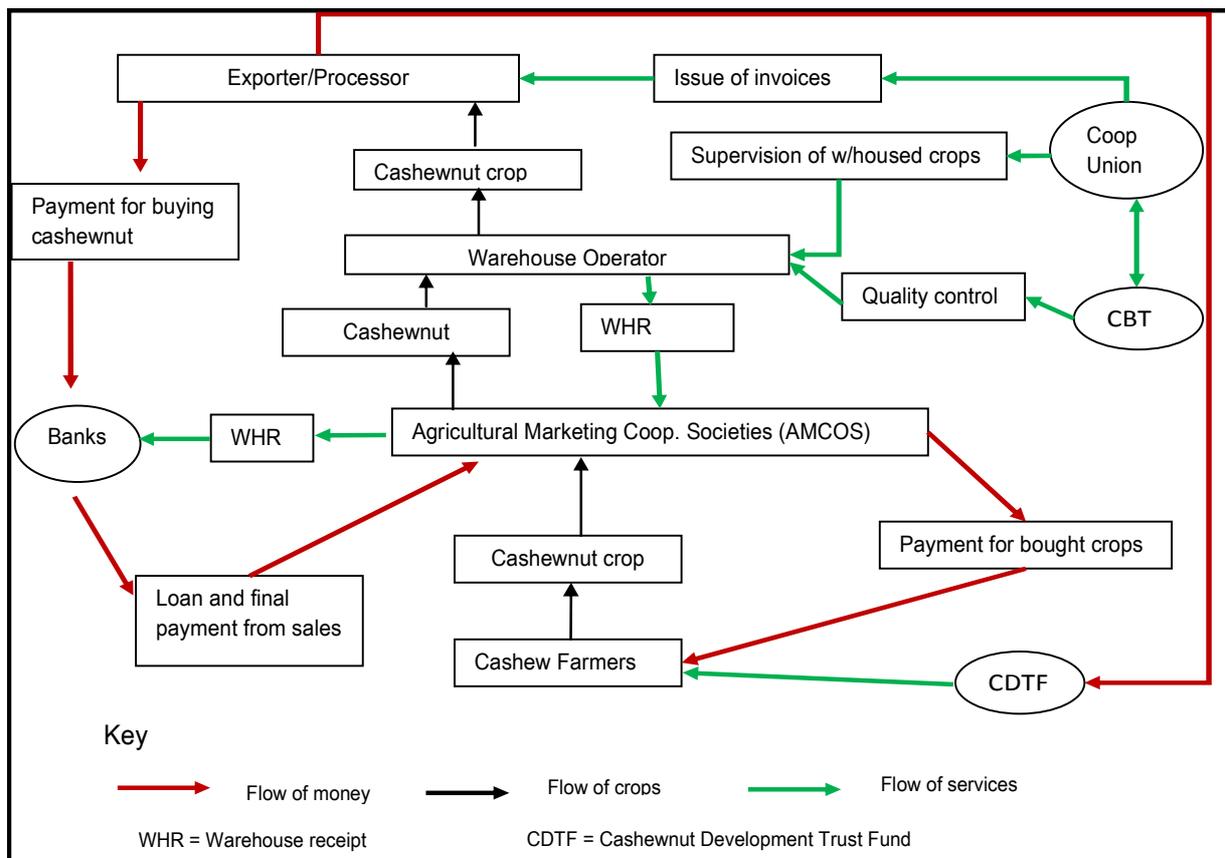


Fig. 6: WRS in the Cashew nut value chain

Cashew Traders

Cashew trading comprises both domestic and international traders operating through local and multi-national companies (Appendix 4). These traders are licensed for purchase and export of cashew. A general assessment indicates that the number of buyers per season has been fluctuating with only 22 buyers being regular in the market. For example when comparing two seasons, 2011/12 and 2012/13, a total of 89 buyers were licensed in the two seasons of which 67 were in 2011/12 season and 44 were in season 2012/13. It can be observed that 45 buyers that were in season 2011/12 did not register in season 2012/13 instead there were 22 new comers. The seasonal inconsistency of buyers' participation in the market can contribute to low price competition and may indicate existence of some anti-competitive practices in the market. The latter 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.

Cashew Processors

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. These include two plants in Newala district, one in Masasi and two in Mtwara district 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 the following:

- (a) Processing requires large investment to purchase machinery, especially automated machinery. For example, a small scale processing plant at Kitama ward in Tandahimba (Kitama Farmers' Group company Ltd), which is a manual processing plant with a capacity of one ton per week, cost more than one billion Tanzanian shillings in investment money (600 million in machinery and more than 400 million in buildings). The related investment cost has been co-financed by UNIDO and equity funding from Kitama group.
- (b) Incumbent cashew buyers frustrate any attempt to process cashew nut domestically and their 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 kilogram³) (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).
- (c) Unreliable power and water supply increases processing costs by making the use of automatic machines impractical. An example was cited in Tunduru district, where an installed processing plant is yet to take off due to unreliable and inadequate water and power supply.
- (d) Dilemma on the use of automatic machines while depending solely on India market that consumes whole-nuts. The disadvantage of automation is broken nuts which means a need for market search outside India that has its own complications as discussed in (b) above.

Primary Societies and Cooperatives (AMCOs)

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

³ 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.

with society/union decisions. Contradictory information provided by members during the field survey exhibit inadequate information flow between society's members and their leaders. For instance, while societies claimed that the shrinkage compensation funds are retained by unions, the union claimed to pass over the funds to the societies. Other examples include members' unawareness of recent changes in the shrinkage allowable rate of 2% to 1% per annum which is again charged on half yearly basis.

A lack of member participation in decision making was observed during the field survey. During the discussion with union members and society leaders it was clear that the individuals who were responsible for societies' funds mismanagement were known, but no one was ready to point a finger at them. For example, in Tandahimba primary society, there is enmity between the primary society's leaders and members. It is claimed that the selection of the management was imposed by one rich farmer and that, despite management weaknesses including mismanagement of funds, members are afraid to demand change. The same applies to the management of cooperative unions who are elected by primary societies. In this case, primary societies' leaders are afraid to take any disciplinary action against the Unions because there are strong farmers behind the union leaders.

Research findings indicate some elements of weak management on the part of the Unions. Understandably, AMCOs pay fees to Unions for management services including, but not limited to, bulk supply of gunny bags, cash distribution, overseeing marketing of AMCOs cashew and recovery of lost produce cargo while in the designated warehouses. For instance, it was also 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 tons⁴ 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. TANECU defended the practice claiming that their inaction reduces the chances of conflict between the Union management and the private warehouse operators in case of any produce loss from the warehouse. The inaction by the Union shows inadequate business management skills and a blatant compromise of their agency terms with the AMCOs.

The structure of primary societies in the cashew nut industry was also assessed. Membership of these societies includes mainly cashew farmers and a few traders. The majority of cashew traders are not members but still sell their produce through the societies. The interesting part is that there is no tangible benefit difference between members and non-members. This diminishes the value of society membership and cooperative ownership, which causes conflicts with bona fide members.

Cashew nut Development Trust Fund (CDTF)

⁴ 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.

CDTF is a new comer into the cashew value chain and was established by the Stakeholders General Meeting in the 2010/11 season. The fund was meant to help farmers obtain input supplies, alleviating the problems they faced with the incumbent private dealers, such as hiked prices, untimely supply of inputs, counterfeit chemicals, etc. Sixty-five percent of the export levy collected from cashew exports goes into the fund, which amounts to more than 4 billion Tanzanian shillings each year. However, the fund operations were 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 Chairperson came to realize the potential that the industry was about to waste in favour of promoting *dukawalas* cashew input businesses. The Chair's realization came over following its full involvement in CBT activities soon after the appointment which had been past due for more than three years.

3.1.3 Policy, rules, regulations and enforcement

3.1.3.1 Setting of Cashew nut Indicative price

The indicative price for cashew nut is set by a stakeholders' committee under the Cashew nut Board of Tanzania (CBT). In the past, the price was set at the calculated export parity price for raw cashew which was subject to approval 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. Thus 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 the price structure, enabling buyers to bid just enough to meet the indicative price and avoid price competition⁵. The current approach is to base the indicative price at farmers' production costs. Reportedly, however, indicative price has always been below production cost when compared with Naliendeke standard figures. Experts in the MITM are strongly opposed to the current approach, which is associated with the following challenges:

(i) Overestimation of production costs

While most cashew farmers are peasants, the approach calculates production costs based on farmers who apply fertilizer, pesticides and follow a standard required weeding regime (twice in a season). This study, however, finds that only 27% of cashew farmers weed their farms twice in a season. Most farmers do not apply chemical fertilizer and pesticide spraying is under-performed. Thus including the

⁵Intense 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).

full cost of recommended weeding, spraying and fertilizer is not realistic as it overstates farmers' production costs.

(ii) Indicative price perceived as season-long floor price

Once the indicative price is set, many stakeholders (especially politicians) would take it as a season-long floor price and therefore force AMCOs to pay the amount to farmers over the entire season. However, while the indicative price is maintained over the entire season, cashew world market prices are highly volatile. The inability therefore to recognize the dynamism of these world market prices can cause exchange failure in the cashew value chain given that the produce could not be sold in case of world market price slump.

(iii) Districts and Unions overcharge for services

Overloading the indicative price with over-charged administrative services was also pointed out during the survey. The cost structure (Table 2) shows that the district levy is charged at the highest allowable rate of 5% instead of an average rate between 3-5% or the minimum allowable low rate of 3%. Unions are charging TSh 20/kg as their levy on primary societies while again charging separately for their services to the societies (i.e. for cash distribution and delivery of gunny bags). 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. Changing rules/institutional arrangements (e.g. scrapping off unnecessary cost items and downsizing others accordingly) will make WRS a low cost exchange system which is efficient and competitive.

The WRS has been accused of being inward looking (Fitzpatrick, 2012). Essentially however, this is only the result of the cost of production being used to set the indicative price. The old approach, which used export parity price to set the indicative price, was not only outward looking but also an effective method of taking stock of global price fluctuations on the world market. Two things are worth noting from Table 1. Firstly, that administrative costs are not deducted from the indicative price but rather added onto it in coming up with the final indicative price. The converse was true in the Fitzpatrick's study, which resulted in incorrect inferences. Secondly, the setting of indicative price has not stopped the market from responding favourably to the actual prices in the world market. With exception of 2008/09 season, farmers managed to fetch price above the indicative price for their produce in respective seasons⁶ (see Table 1).

⁶This means that farmers were eligible for bonuses during the entire period. However, receiving the bonus and the amounts applicable have always been contentious issues as Unions and primary cooperative societies have failed to establish trust with the farmers.

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

3.1.3.2 Bidding process

Cashew nut bidding process is under CBT and Cooperative Unions. Bidders deposit their bids to a tender locked box placed at CBT. In the past, the bidders were given five days to deposit their bids. But because of some forging encounters, bidders are now given half a day to deposit their bids before bids are opened on the same day. Before bidding, CBT provides catalogs that contain information on type, quality, quantity and location of the cashew nut. Contrary to what the case was 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.

A notable change in the bidding process has been the making of the indicative auction price transparent even to buyers. The price is now announced in the stakeholders' general meeting in the presence of buyers unlike in the past when this was never divulged to them. This has clamped down on the previous corruption

practices by some unscrupulous bid committee members but not without consequences as explained in section 3.1.3.

3.1.3.3 Enforcement

The study found out that enforcement of regulation in the WRS is challenged in many ways. 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.

Inadequate management capacity within both primary societies and unions was also mentioned during discussions. Key informants said that many members fail to fully participate in decision making, especially in general meetings and in appointed committees, mainly because of low understanding of issues. For example, in every Cashew nut stakeholders' general meeting, Cooperative Audit and Supervision (COASCO) presents audit reports showing some mismanagement of funds, but no one presses the unions for an explanation. In addition, indicative prices are always endorsed in general meetings despite many complaints about its structure by various stakeholders. Furthermore, sensitive documents are routinely mishandled. For example, *certificates of title* are issued by unions as proof of ownership of cashew nut in a warehouse, and they are supposed to be held by the owner. Sometimes, however, they are left with the bank, making it possible for any unscrupulous bank officer to release cashew nut from the warehouse without a consent or knowledge of the owner (in this case, the primary society). In an interview with a NMB bank officer on reasons to retain the certificate, the banker defended the issue as an easier way for societies to sell because if a buyer failed to get the certificate on time he might forfeit the purchase.

Another area where enforcement of regulations is lacking is the observance of payment and evacuation time limits. Regulations state that bid winners must pay for their consignments within 7 days and evacuate them from the warehouses within 14 days. However, CBT officer(s) and warehouse operator(s) often collude to delay settlement and evacuation, which prevents producers from being paid in a timely manner. Delayed second payments have been linked to recent skirmishes in the industry such as producer remonstrations and adversarial relationships between primary cooperative leaders and their members and between producers and warehouse operators. The 2012/13 season has witnessed houses belonging to primary cooperative leaders in Tandahimba being set ablaze on similar reason.

3.2 Cost of production for cashew producers

3.2.1 Socio-economic characteristics of cashew farmers in the study area

(i) Farm size, plant population and input use

According to FAO categorization of farmers, the majority of farmers in Tandahimba district are still smallholders as they have farm plots ranging from 1 to 10 hectares on which cashew is intercropped with annual food crops such as maize, cassava, groundnuts, millet and a variety of legumes and pulses. Only a handful of the interviewed farmers (8.1%) had more than 10 hectare farms. The larger farmers plant cashew in pure stands in total seclusion of other crops.

Most of the existing cashew trees in the study area during the survey were old, aged between 30 and 60 years. The farms had been inherited from farmers' parents and grandparents. The survey established that the average plant population per hectare was 71 trees, which close to the recommended rate of 70 trees per hectare (UNIDO, 2011). The survey discerned some positive changes (though low-key) among farmers towards adopting improved cashew varieties. For example, some respondent farmers had already started to plant new trees to replace the old ones using either the *top-working*⁷ method or direct transplanting of new improved seedlings. Reportedly, the latter is rarely used because it is tedious, not well adapted and takes a long time before the resultant crop matures compared to top-worked grafts. It is difficult also in the former case (i.e. top-working) to guarantee varietal improvements because farmers source scions either from own farms or from their fellows. Top-working and transplanting are normally done from January through March and are sometimes combined with tree pruning.

Key informants claim that farming practices, in general, do not adhere to the recommended practices advocated by Naliendele Research Institute. The result is low productivity. For example, main inputs applied in cashew farming are fungicides and insecticides for prevention of powdery mildew, blight diseases and insect pest infestation, especially *Helopeltis* stalk borer. The single most important fungicide in use over the entire Makonde plateau and in all other cashew producing areas is elemental sulphur. This comes in two formulations – dust and water-based. The general view from CBT is that farmers prefer dust sulphur to water-based sulphur for its effectiveness and ease of spraying, especially in dry areas. It is claimed that blowers and sprayers for water-based sulphur are ineffective at spraying higher canopies, cause blower fatigue and are heavier than those used for sulphur dust application. They are thus claimed to result into higher production costs notwithstanding the fact that use of water-based sulphur has proven benefits. First, it reduces seasonal recommended fungicide application rate to 3 times instead of the 5 times required for the dust formulation. Second, the dust formulation acidifies the soil. Third, the dust formulation is comparatively less effective than the water-based formulation, which sticks onto the leaves and provide longer lasting protection to the crop. Tandahimba farmers were found to prefer water-based sulphur to dust formulation claiming it to be more effective and cheaper. This preference underscores adequate supply of water in Tandahimba. They also reported that fertilizers are not applied to cashew in the study area. However, farmers apply a little manure, especially farm yard manure, when intercropping food crops like maize.

⁷ Chopping-off of the upper part of an old cashew tree and use using its trunk as a root stock for an improved graft scion



Plate 1: Cashew farm populated with a mature improved variety in Nanyhanga ward, Tandahimba district (note the terraces in the foreground, which are used as water inlets and also seedbeds for some annual crops like cassava).

(ii) Farming activities and labour availability

Cashew farming involves six main seasonally-cyclical activities: planting, pruning, weeding, pesticide application, harvesting and final selling on the market. Table 2 summarizes the annual/seasonal farming calendar for farmers in the study area. Most of the smallholder farmers carry out these activities using family labour.

Hiring-in of labour is only done when the family has money or is ready to part with some of their harvest as payment to casual labourers. Casual labourers are paid based on the number of trees they work, a system known as *Kipande system*. For instance, in pruning casual labour is compensated TSh 2.000 for a big tree pruned and TSh1.000 for a small tree. In-kind compensation is also accepted, such as casual labourers receiving raw cashew nuts or food (like cassava) as payment.

It is common for farmers to hire-in the services of professional pesticide sprayers because of the special skills required to perform the activity. In recent years, access to hired labor has been limited compared to five years ago, when labourers were hired from neighboring Mozambique. These labourers locally known as *Mabwana*, have since left Tanzania following the return of stability in their country.

Table 2: Cashew farmers' farming calendar

Activity	Month carried out
Planting/top working	January – February
Pruning	January – March
Weeding	April – June
Spraying of pesticides	June – August
Harvesting	September – November
Selling	October – December/January

Cashew harvesting in Mtwara starts in early September and ends late November, while selling ends in December or mid-January. According to UNIDO (2011), 60% of the cashew output is sorted and exported raw through primary societies while the remaining is processed domestically and sold as whole nut to both export and domestic markets. The findings of this study, however dispute highly the possibility of 40% of Tanzanian cashew output being processed in-country. Information from key informants puts the processing level at 10-15%. Calculation from available series data suggests even lower level of cashew processing (i.e. $\leq 10\%$) (See fig. 5). While the series data did not capture small-scale informal processing activities, the volume of informal processing is essentially insignificant. Therefore, we maintain that the reported 40% would be a significant overstatement.

The harvesting time (especially September – November months) provides a special market window for Tanzanian cashew. This is the period when Tanzania stands as the only significant seller in the market because harvesting seasons for the other major competitors are yet to start (only 20% of entire global crop is in the market at this particular time) (Fitzpatrick, 2012; Kilama, 2013). The harvesting season for Mozambique, India and Vietnam, who are amongst the major players in the market, commences in December. Available evidence shows that the window has not been fully utilized as peak sales of cashew in Tanzania are recorded in December (Fig. 7). According to CBT, this is a result of failing to synchronize bank loan funds' availability with the early season start in September. However, the price differential does not seem to be significant unless subsequent years after the 2007/08 season (data unavailable for analysis) depicted a different trend.

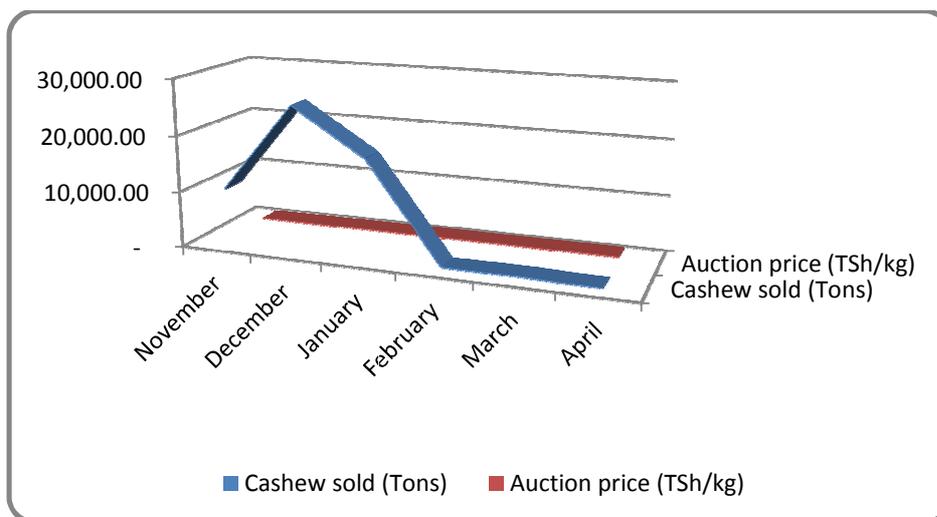


Fig. 7: Summary sales for MAMCU and TANECU in the 2007/08 season (December recording the highest sales)

3.2.2 Cashew Farmers Production costs in Tandahimba district

Cashew farmers incurred costs on farming activities and equipment. The study computed unit costs for both variable and fixed costs as shown in Table 3 and 4 respectively. Labour cost was used to compute the costs for pruning, weeding and land clearing.

Table 3: Average cashew farm variable costs

Costs	Per tree (Tsh)	Per Kg (Tsh)
Land clearing	1443.28	180.41
Pruning	369.5	46.19
Weeding	449.8	56.23
Harvesting	501.1	62.64
Transportation	108.6	13.56
Dust sulphur*	432.75	270.46
Water sulphur*	426	266.25
Herbicides	290	36.00
Pesticide application	200	25.00
Fuel	50	6.25
Total variable costs	4271.03	962.99

*NB: Dust and water-based sulphur cannot be used on cashew trees at the same time

Table 4: Average cashew farm fixed costs

Depreciation costs/ year	Value (Tshs)
Machete	58.56
Axe	109.96
Hoe	87.17
Sprayer	7102.28
Rake	62.19
Sieve	69.99
Spade	109.16
Knife	30.15
Total fixed costs	7629.46
Per unit fixed cost	13.43

From tables 3 and 4 above, the total per-tree cost of production for Tandahimba farmers in the 2012/2013 season was TSh. 976.42. The indicative price of TSh 1,200 per kg would thus recover farmers' entire direct (as opposed to indirect administrative) production costs and leave a margin of about 23%. If a bonus was to

be paid, then the margin would be even higher. The costs however vary depending on whether the farmer decides to use hired labour and how frequently he performs each activity (e.g. instead of two weedings the farmer may decide to weed only once per season).

These input decisions are made by household heads, who are mostly men (98.0%) in this case. Another factor that influences the decision to hire labour is the amount of money the family has and their willingness to part with a certain amount of cashew nut harvest as in-kind payment to the hired labour. However, the study found that the majority of farmers hire-in labour during harvesting and spraying time only. The labour cost for spraying at the time of survey was TSh 200 per tree. This is in addition to the cost of fuel (petrol) for the sprayer and the fungicide/pesticide itself. It is claimed that subsidized pesticides are not available to all farmers, and most of the few farmers who access it re-sell it to other farmers at the prevailing market price. The under-use of pesticides, especially dust sulphur, originates from farmers' belief that it is toxic to land compared to the water-based sulphur. Dust sulphur is however associated with soil acidification.

3.2.3 Cashew Farmers' Technical Efficiency (TE) Results in Tandahimba district

Stochastic Frontier (SF) model results showed that cashew farmers were not efficient enough, as the overall computed TE was only 51% (Tables 5 and 6). The analysis also showed that only about 6% of the farmers had efficiency levels above 80% (Table 7). This means that the efficient use of available resources could increase output by 49% at the same input use level. In other words, farmers have a chance to increase output by 49% using only the available technology and resources, including number of trees planted per acre (plant population), area under cultivation, pesticides/insecticides in use and all other inputs currently in use. According to Table 6, 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 5 and 6 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 5).

Table 5: Maximum likelihood estimates for the parameters of the 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 6: Parameter estimates of the Inefficiency model

Variable (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 7: 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

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. It is worth noting here that buyers can only remain competitive in the destination market if they buy from efficient farmers. The use of production cost as a basis for pricing the produce is tantamount to transferring producers' inefficiency onto the buyers. The concern of MITM, CBT, and TWLA about indicative price determination is thus justified by these results.

3.3 Competition assessment in the cashew industry

3.3.1 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 (Table8) 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. The latter went even further to claiming that referring to the market as monopsony fails to recognize the diversity of Indian buyers participating in it. Key informants highlighted the presence of participating buyers masquerading as independent while they are actually falling under a common ownership. They did affirm the fact that the buyers are not as many as they may appear on face value but not a monopsony either. Comprehensive inference on the current concentration status of the Tanzanian cashew market cannot be made using this single set and five-year-old data. Even though the study data is incomplete, however, the evidence pointing to an oligopoly is useful because we know oligopolies are rife with collusion tendencies. This industry may not be an exception.

Table 8: Market share and concentration ratio for cashew buyers in 2007/08 season

buyer	Descriptive											
	Total weight (tons)					Auction Price (TSh/kg)				Buyer share (%)	CR 4	CR 3
	N	Minimum	Maximum	Sum	Std. Deviation	Minimum	Maximum	Mean	Std. Deviation			
Unanimous (various)	735	0.05	9,386.01	20,531.27	346.00	-	1,076	935	107	0.35		
ABBAS EXPOR	395	1.74	148.25	9,399.77	23.71	875	2,709	928	100	0.16	0.44	0.38
AGROFOCUS C	12	10.03	102.11	393.25	26.29	1,050	1,050	1,050	-	0.01		
AGRONUT(T)	3	70.22	97.40	242.54	14.53	996	996	996	-	0.00		
ANNAR CASHE	12	7.94	102.11	467.15	26.81	964	1,007	1,000	16	0.01		
COSTANZA TR	75	1.11	30.00	801.57	4.45	965	980	974	6	0.01		
DASHOOD COR	149	4.13	69.16	2,938.43	13.58	915	985	932	21	0.05		
EXPORT TRAD	56	6.57	179.69	2,591.96	28.45	920	1,001	993	16	0.04		
KULATHOOR L	140	1.00	99.04	1,860.13	9.32	931	1,030	1,023	12	0.03		
OLAM (T) LT	390	0.03	182.79	8,984.89	25.41	936	991	970	20	0.15		
RAIS (T) LT	204	0.32	180.22	3,403.69	19.30	927	995	975	21	0.06		
Ste BPS (Co	310	0.10	73.34	4,292.24	9.94	900	1,035	991	42	0.07		
TREE NUT EX	154	0.07	116.49	3,147.34	19.44	880	993	966	31	0.05		
UNSOLD	11	1.25	15.98	55.40	4.74	-	-	-	-	0.00		
Total				59,109.62						1.00		

Source: Data from TWLA

3.3.2 Trade barriers to entry and exit (Natural barriers, Strategic barriers and Regulatory and Policy barriers)

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. Even this cost is more than most cashew farmers can bear.

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. Processing challenges were also emphasized by the claim from key informant that India gives monetary incentive to buyers of raw cashew because they contribute to employment for people in India. The informants claim this has forced many local processing plants to either shut down or operate under capacity. This claim is boldly highlighted in the existing literature (UNIDO, 2011). 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 section 3.1.2.

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 by the government intended to curb exportation of raw cashew did not succeed, and cashew buyers refused to relinquish their market and continued to buy.

3.3.3 Vested interest

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. Political interference is considered one of the major sources of conflicts in the cashew nut industry and the Warehouse Receipt System. Political interference has been cited in several districts in the cashew nut production areas. For example, in the 2011/12 season, the Coast Regional Commissioner allowed direct purchase of cashew nut by private buyers in direct contravention to the underlying WRS regulations. In the same season, Mtwara's regional Commissioner ordered farmers to refuse any payment below TSh 2.000/kg, which was far above the market price. Most recently, in the 2011/12 season, the Minister of the MAFSC threatened to rescind the licenses of all buyers who would not buy at the government recommended 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!).

3.3.4 Anti-competitive conduct

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 section 3.1.2 (i). 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. In furtherance to that, rumour has it that there are only two buyer companies/families for the raw cashew destined for the Indian market. Another anti-competitive practice is in relation to frustrating prospective cashew buyers as explained in section 3.1.2 (ii). These results suggest that the industry is prone to anti-competitive practices which are not explicit but potentially harmful.

4 Conclusions

The foregoing discussion has highlighted some important issues for making evidence-based conclusions on the study's main themes as contained in the specific objectives. There is enough evidence to conclude that the WRS has been successful in improving producer prices over the entire period of its existence. The system has also been flexible for local processors who are sourcing raw cashew from their own farms.

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.

Smallholder cashew farmers in Tandahimba, as many other producers within Tanzania, have been found to be inefficient in their farming activities. Inefficient farmers generally fall into two groups. They are either high-cost serious producers, who may be inefficient due to poor ability to comply with recommended practices given poor extension services, or low-cost negligent producers, who could even be termed 'nut collectors'. Both extremes are not good subjects on whom produce price negotiation with buyers should be based, and much less in an open market. The current practice of determining the indicative price in the WRS on the basis of production costs is thus detrimental to the industry. 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 lest they become uncompetitive in the market they supply – leading to exchange failure. Absence of subject matter specialists in the field (contrary to what used to be the case in the 1970's) speaks volumes for the observed farmers' production inefficiency.

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.

Institutional review of the WRS has revealed a number of instances where the system's rules and regulations are violated, especially on paying for consignments by winning bidders and evacuation time for consignments from the warehouses as per regulation (i.e. 7 and 14 days respectively). 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 (bodies and ministries) involved in administering the system in a situation where CBT has turned into an onlooker interested in dancing to the tune of politicians' interests.

Policy implications

The study is keen to give a short list of hands-on recommendations that are likely to make a difference in enhancing smooth exchange between buyers and sellers of cashew through the WRS. The study recommends the following:

- (i) Indicative price has shown to be cost effective when marketing/administrative costs are excluded. The hiked marketing/administrative costs are responsible for high transaction costs in the WRS. There is thus a need to change relevant institutional arrangements between some participants in the WRS as a step to reducing the costs of transacting in the system. The following levies/costs should be reduced or eliminated:
 - (a) Eliminate the TSh 5 per kg paid to Unions for cash distribution as the cost could be covered through Union levy of TSh 20 per kg
 - (b) Eliminate TSh 0.5 per kg to Warehouse operators on fumigation and weighing scales as this should be covered within the warehouse commission of TSh 14 per kg.
 - (c) Reduce the recommended charge on district levy to the minimum level of 3% in a bid to improve producer price following lessened transaction costs
- (ii) Improve internal warehouse ergonomics to enable smooth operation of First- In- First- Out (FIFO) stock issuance procedures and use of digital scales in replacement of the currently in use 'calibrated' weighing scales. This will reduce contentious shrinkage costs complications. In the second stage of this restructuring, warehouses should maintain quality grades in their stacking arrangements as opposed to the current arrangement whereby ownership of cashew is maintained. This will enable farmers to realize the fair value of their produce, which is one of the basic objectives of launching the WRS in the industry.
- (iii) Depoliticize CBT management through abolition of the presidential appointee chairperson position and eliminating regional and district political leaders' influence on the WRS. If the chair is retained it should be turned into an executive position, competitively contested on merit.
- (iv) Diversify the market to break overdependence on the Indian raw cashew export market by building internal processing capacity and exploring alternative markets. The major global kernel markets are in USA and many European countries like Netherlands and Germany (Kilama, 2013) and have to be pursued accordingly when considering building internal processing capacity. The diversification move should, however, proceed gradually in consideration of the low existing processing capacity in the country. A three tier processing model (small→ medium→ large) may prove effective i.e. recognizing stage-wise processing of raw cashew by processors of different scales. Some large scale processors in Mtwara have indicated their support in this model.
- (v) CBT must fully enforce WRS regulations to ensure there are consequences for transgressions. Only a depoliticized CBT can deliver this.
- (vi) 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 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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