



The development of vegetable enterprises in the presence of transaction costs among farmers in Omusati Region of Namibia: An assessment

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ABSTRACT

The paper investigates how transaction characteristics influence the development of vegetable enterprises among smallholder farmers in north-central Namibia. As transaction costs are difficult to measure the theoretical framework of analysis is based on transaction costs economics of new institutional economics. The results revealed that the spot market-based governance structure was the most preferred market arrangements by smallholders farmers in north-central Namibia because vegetable farmers struggle to meet the quality and quantity standards as required by the contractors market-based and commission market-based arrangements. The results also suggest that due to incomplete information, farmers and market agents suffer from high transaction costs. Skewed information distribution between farmers and marketing agents leads to slow development of vegetable enterprises. The study recommends that information shared to farmers must be packaged in an adequate manner to minimise transaction costs in the vegetable value chain.

1. Introduction

Smallholder farmers in developing countries, specifically in Africa, are considered important in terms of increasing household income, providing employment, human welfare and political stability [1–4] and steady export earnings [5,6]. Empirical evidence suggests that linking smallholder farmers to agri-food chains is hindered by limiting factors of production, poor conditions of physical infrastructure, lack of access to credit, insecure property rights, and lack of market information, which results in high transaction costs [4,7–10]. High transaction costs are detrimental to the efficient operation of markets for inputs and outputs [9]. Furthermore, access to productive agricultural land, skilled labour and the ability to mitigate risk are important factors in correcting marketing constraints [11]. Given Africa's limited irrigation potential, weak institutions, poor performance and insufficient policies as a result of low agricultural productivity, coupled with high transport costs and growing global market liberalisation, farmers find it difficult to compete in global markets [8,12]. Improving the livelihood of rural smallholder farmers requires linking them to markets through contract farming [13] and creation of or integration into marketing cooperatives [14–16] gaining ownership in marketing or processing companies, or complete vertical integration [4,17]. These studies also highlighted challenges relating to

linking smallholder farmers to agribusiness chains.

Various studies on high-value crops have applied insights from transaction cost economics (TCE) to understand why farmers choose a specific governance structure (spot market, hybrids or hierarchy) when selling their produce. Some of these studies are cited by Jordaan et al. [7] pp. 3–4): they highlight the potential contribution of collective action and vertical coordination to minimise high transaction costs. Governance structures are therefore aligned with transaction elements in order to minimise transaction costs [18–20]. The three forms of governance structure as defined in the literature through which a transaction is channelled are markets, hierarchies and hybrids [21–23]. However, the study by Milagrosa [24] on vegetable production and marketing in Northern Philippines identified spot market centred, commission centred and wholesale centred coordination mechanisms and these form the focus of this study. Thus farmers base their selection of a channel on the cost and returns of engaging in specific marketing arrangements [25]. Challenges relating to these different forms of governance structure are highlighted in the literature [6,24,26–28].

The TCE approach was applied to a case study of agricultural development in north-central Namibia. About 70% of the population depends directly or indirectly on agriculture for its livelihood [29]. The sustainable commercialisation of agriculture in Namibia is promoted by the

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Government Green Scheme Policy (2008). As Namibia is a semi-arid country (average annual erratic rainfall is 270 mm ranging from less than 20 mm in the Namib Desert to more 700 mm in Katima Mulilo in the Zambezi Region) this policy focuses on developing agricultural value chains in areas with potential for irrigated crops. The farmers are sometimes constrained by many challenges such as access to input, credit and output markets [30]. The major challenge among these is access to the output market. To address this problem the government has invested in physical infrastructures and marketing facilities such as the Agro-Marketing and Trade Agency (AMTA) to create market access for poor farmers. However, farmers and other market actors behave opportunistically due to information asymmetries and incentive compatibility structures to benefit from government projects. Farmers have different expectations on the price of products and want to benefit from government programmes at no cost. Conversely, formal marketing agents' expectations are for farmers to meet international quality standards for their products; however, when they share information with farmers, the packaging is not conducive to the farmers. Since both sides have different expectations this creates an impression that there is no market access, despite the availability of market infrastructure due to mismatch of expectations.

The objective of this study was to assess transaction costs and related governance structures using insights from TCE theory. The study took place among smallholder vegetable farmers in Omusati Region in north-central Namibia in 2014. In this area, the risk of investing in high-value crops is high, where various issues and concerns include poor agricultural organisation, lack of knowledge in vegetable production, and difficulties influenced by socioeconomic and agro-climatic conditions. The site was selected for the study based on access to water for crop irrigation from the Kunene River. Crops grown in these schemes include; maize, wheat, cabbage, tomatoes, groundnuts, butternuts, sweet potatoes, green peppers, watermelons and carrots. The study adds to the existing literature on the analysis of transaction costs and governance structures in smallholder value chains.

2. Transaction costs insights

The term TCE was first introduced by Williamson in 1975 [23]; however, the concept of transaction cost itself was introduced by Coase in 1937 [31]. He associated transaction costs with searching, information, negotiation, bargaining, monitoring, coordination, policing and enforcement of contracts. TCE subscribes to the idea that the transaction is the basic unit of analysis and much of the contract management and dispute settlement action is dealt with directly by the parties [22]. In this case, trading parties might suffer from information asymmetry (that is when the parties do not have equal access to all information relevant to the contract) which will inevitably result in opportunism (hidden information known as adverse selection or hidden action known as moral hazard) [32].

Three characteristics of a transaction are critically important in determining the optimal institutional arrangement: frequency of transaction, degree of uncertainty and asset specificity [18,20,23]. Williamson [23] distinguishes asset specificity as site specificity, physical specificity, human specificity, and dedicated specificity as well as temporal specificity [33]. These assets specificities are explained as follows:

- site specificity involves assets that are located nearby to economise on transportation or inventory costs or to achieve processing efficiencies;
- physical asset specificity is associated with assets with physical properties specifically tailored to a particular transaction;
- dedicated assets are assets in which an investment is made on the basis of a promise of a particular customer's business without which it would not be profitable;
- human asset specificity refers to acquired skills and knowledge of a group of workers that are more valuable within a relationship than

outside it and that may interfere with conversion to another relationship; and

- temporal specificity results from the time-sensitive value of agricultural products and production processes which create another margin which may entice opportunistic behaviour by trading parties [33].

3. Methods

Data were collected in 2014 in Omusati Region of north-central Namibia along the Caluegue-Oshakati Canal. The region is sparsely populated with a population density of 9.2 inhabitants per km². This site was chosen because vegetable production is still in its infancy despite water availability from the Kunene River across the border in Angola. The study used surveys, historical data and in-depth interviews of key informants within north-central Namibia as a case study. Alston [34] advocates the use of case studies because they allow the researcher to isolate the impact of theoretical concepts in a more detailed manner. One problem with specific case studies is that detailed facts can always be found to question the prevailing explanation, hence the necessity of a robust theory to direct the interpretation of these facts [21]. Case studies are especially important for TCE analyses in particular because they enable us to analyse both the determinants and consequences of institutions and institutional change [34].

The study used a mixed research design approach using qualitative and quantitative approaches [35]. Qualitative design was used to collect in-depth information for understanding the dynamics of the small-scale vegetable enterprises from key informants such as Ministry of Agriculture officials (n = 6) and agricultural boards or marketing agency officials (n = 5), as well as members of producer associations (n = 12), local traditional leaders (n = 4) and a regional councillor (n = 1). Consultations took place in the form of multiple office visits; in some cases, interviews were conducted with different experts by means of telephone and the internet (e-mails). Interviews with key informants were necessary to gain additional insight into the study area, review historical data, the development of the vegetable industry and to assess previously conducted research.

In addition, a quantitative approach (descriptive characteristics) was used to determine transaction characteristics within governance structures in which small-scale vegetable enterprises operate. Using questionnaires, information was collected from farmers (n = 78). With respect to farmers' interviews, only 78 out of 115 (68%) households were interviewed. Data were collected at the household level where heads of households or another permanent resident adult (≥ 18 years) were interviewed. Participants were identified through a purposive sampling method. This method was useful to identify cases of interest from persons who know respondents that are information-rich and good study subjects and interview examples [36]. The purposive sampling method was deemed appropriate given the remoteness of the study area and the lack of a farmer database system for the study units.

Data were analysed using the Statistical Package for social sciences (SPSS) version 21. Descriptive statistics were generated including frequencies, cross-tabulations, means and %ages. The research objective was also achieved by applying insights from TCE. The approach of Milagrosa [24] and Jordaan and Grové [37] were used to assess the attributes of the transaction that contribute to the transaction costs faced by farmers. In this approach, the specific types of asset specificity are elicited using proxies within a specific governance structure (Table 1).

4. Results and discussion

4.1. Type of governance structures in north-central Namibia

The four forms of governance structures identified in the study area are spot markets, contractor-centred agents, wholesale-centred agents (hybrids) and commission-centred agents (hybrids). The results of the survey with respect to the most used coordination mechanism are

Table 1
Types of asset specificity and their transaction characteristics.

Asset specificity	Proxies
Site assets	Access to productive land (Farm size), Access to the source of production inputs (fertilisers, seeds and chemicals), Access to water for irrigation, Climatic conditions (incidence of droughts), Incidence of pests and diseases
Physical assets	Own vehicles used for farming activities, Access to equipment and inputs (fertilisers, seeds, chemicals), Availability of cold storage facilities, packing materials, Availability of physical assets (cooling and packing facilities)
Temporal assets	Timing of delivery, Quality and value of the product that is sold
Human assets	Number of years of formal education, Years of experience in horticultural production, Frequency
Uncertainty	Number of times the fresh produce is sold during the previous season Information asymmetries (withholding important information on produce), Inadequate of market information and price setting, Delay payment from trading partners

Source: Adapted from Jordaan and Grové [37], Milagrosa [24], Royer [20], Williamson [23].

Table 2
Forms of coordination in north-central Namibia vegetable markets.

Type of governance structures	Number of respondents n = 78	%	Ranking
Spot market (Informal)	57	73	1
Contractors	21	27	2
Commissioners	5	6	3
Wholesalers	0	0	N/A

Note: farmers use multiple trade types; N/A stands for Not Applicable.

presented in Table 2. It is important to repeat that farmers in the study area select the type of governance structure depending on the level of transaction costs.

As can be seen from Table 2 the spot market arrangement is most frequently used by farmers to sell the vegetables. The spot transactions in this study referred to marketing arrangements that include local open markets, roadside stalls, within the community (local trade) and in nearby urban settlements. The spot market-based coordination mechanism is described by Eaton et al. [39] as the 'default' marketing option for small-scale farmers in rural areas. In spot (informal) markets, the prices obtained are generally low when compared to retailers and supermarkets.

The second most favoured channel contractor based transactions which can be described as marketing arrangements between farmers and retailers or supermarkets or institutional buyers such as catering companies and restaurants. This was followed by the commission agent-centred transactions which referred to marketing arrangements between farmers and commission agents. The commission agents rent the marketing facilities of AMTA trading centre in Ongwediva where the trading parties meet. The farmers have to arrange their own transport to the fresh produce marketing hub where it is much more efficient for traders (agents) to purchase from farmers at one place than to visit individual farmers. The commission agent-centred transactions begin in the trading posts in the marketing hub when farmers arrive with their vegetables in search of trading partners on the market floor. The information in Table 2 also indicates that farmers in the study area do not sell to wholesale agents.

4.2. Transaction attributes and related governance structures in the vegetable production system

Table 3 summarises the transaction attributes that are found in the

Table 3
Summary of transaction characteristics found in the vegetable value chain.

Transaction attributes	Transaction characteristics	Number of respondents (n = 78)
Site assets	Farm size (average ha)	6
	Inaccessibility to sources of production inputs	48 (62)
	Inadequate information about climate, diseases and pests	All
Physical assets	Inaccessibility of irrigation water	16 (73)
	Inaccessibility of irrigation water	16 (73)
	Owning a vehicle for farming activities	53 (68)
	Access to a cold storage facility near the farm	22 (28)
Temporal assets	Quality of produce deteriorating in informal markets due to lack of cooling facilities	69 (88)
	Quality of produce deteriorating in the trading centre	25 (32)
Human assets	Age group (years)	
	Less than 30	12 (16)
	31–40	16 (21)
	41–50	26 (33)
	51–60	19 (24)
	More than 60	5 (6)
	Education level achieved	
	None	5 (6)
	Primary	14 (18)
	Junior secondary school completed	25 (32)
	Secondary school graduates	23 (30)
	Tertiary/university studies	11 (14)
	Professional training	23 (30)
	Farming experience (average years)	9.5
	Number of workers (range)	1–3
	Minimum wage	N\$1500 (US\$ 111.68)
Frequency	Selling immediately after harvesting to informal markets	69 (88)
	Selling sometimes through commission agents	25 (32)
Uncertainty	Lack of market information	All
	Inadequate produce information for traceability	All
	Price change of produce due to perishability	All
	Poor quality of produce as assessed by agents	All
	Delayed payment from trading partners	25 (32)
	Food safety and environmental concerns	unknown

Note: Number in brackets show average percentage (%).

north-central Namibia vegetable industry. With respect to site specificity, the results show that the land (average of 6 ha) owned by the farmers is enough for small-scale crop production, however; it is associated with poor soils. It thus needs to be improved through the appropriate application of organic fertilisers that are available locally and inorganic fertilisers that are imported mainly from South Africa and available locally. In addition, most farmers do not have adequate knowledge of fertiliser application. The land is also communal (state land) and cannot be used as collateral to access credit facilities offered by financial institutions as it is difficult to identify, locate and access information, and to monitor and enforce contracts. Thus, access to credit constrains the productivity of smallholder farmers due to lack of collateral, high-interest rates, the inability to repay loans and delays in the approval and processing of loans [40]. The majority (68%) of farmers indicated that they lack funds to purchase pesticides to control pests. Most farmers who might have access to pesticides also lack adequate knowledge on application and use of these pesticides. Some of them are also not able to identify the diseases and pests for application of appropriate pesticides.

In respect of physical assets, farmers revealed that they experience high transport costs when procuring inputs such as seeds and fertilisers, which in many cases are not available locally and are imported from

South Africa at high prices. This problem of input costs was identified by other studies as affecting production in most parts of Southern Africa [41, 42]. In addition, most farmers (68%) do not own vehicles used for farming activities due to lack of affordability and as a result, they must hire transport at exorbitant prices. As a result, most farmers cannot afford the high prices of procurement of inputs and thus invest less in inputs, equipment, and packaging materials which leads to low productivity. They also lacked access to refrigerated trucks to transport their fresh produce from the farm directly to the supermarkets or retailers, which is consistent with findings of Fiebigler et al. [30]. Most smallholder farmers (88%) in the study area prefer to sell their horticultural produce through informal markets where transaction costs are significantly lower, as formal markets will have quality requirements which they are not able to satisfy. These include Hazard analysis critical control point (HACCP) and International standards organisation (ISO) certification [6].

With respect to human assets, the results indicate that only 29% of youth (21–40 years) participated in vegetable farming. This implies that the younger generation is not interested in agricultural activities, mainly due to the low profit margins associated with farming [38]. In addition, most (32%) of the vegetable producers have Grade 10 (junior secondary) as their highest level of formal education, which implies that the majority will not be able to get jobs in cities and towns as the minimum requirement for most of the formal jobs is at least a grade 12 certificate.

Moreover, when the produce stays for long periods without being bought, post-harvest losses will increase due to lack of cold storage facilities. Farmers may also lack market information on product availability in the market affecting decision making on what quantities to produce and supply in the market. Lack of market information will constrain productivity [7]. Smallholder farmers are, therefore, 'price takers', which implies that the product prices depend on the market power and bargaining behaviour of the traders.

In Table 4 transaction attributes and associated governance structures as reported by the farmers during the study are presented. The last column presents the presence or strength of transaction attributes in each governance structure. The presence of transaction costs in different governance structures is described in subsequent sections.

4.2.1. Presence of transaction costs in spot market-based governance

Overall the transaction attributes and transaction costs of governance structures of vegetable markets in the study area are characterised by low asset specificity, frequency and uncertainty between farmers and buyers in spot (informal) markets when compared to the other three modes of organisation (Table 4). The low frequency implies that farmers have limited access to cold storage facilities, making it difficult for transactions to be repeated on consecutive days between the trading parties.

However, smallholder farmers still prefer the spot marketing channel because they cannot meet the stringent international quality standards and, on a consistent basis, the quantity demands set by modern supermarkets and retailers [21]. With respect to physical asset specificity most of the respondents (62%) indicated that they invest more in storage facilities at a farm level while only 36% invest in packing materials. Only 19% of farmers who use the spot market governance structure owned vehicles that were used to transport crops to urban centres (Table 4). Thus in many cases high transaction costs are characterised by high transport costs experienced by both farmers and traders. With respect to site specificity, the farmers indicated that they believe that their occupancy of land is secure. They also indicated that they experience delays in input supply such as fertilisers and seeds which are mainly imported from South Africa. This obviously implies high transaction costs due to high transport costs. In addition access to water for irrigation was also found to be a major problem for farmers along the Olushandja Dam during the dry season (drought years) when the level of water in the dam drops significantly, resulting in increased investment in extra pipes and increased fuel costs to pump water up the slope.

With respect to human asset specificity, while 72% of farmers using the spot market coordination mechanism indicated that they have at least

Table 4

Matching transaction characteristics and governance structure in the vegetable industry.

Asset specificity and governance structure	Number of respondents Frequency n = 78	Presence of %	transaction costs
Physical assets:			
Own a vehicle			
Wholesalers	0	0	N/A
Contractors	13	17	Moderate
Spot markets	15	19	Low
Commissioners	2	3	High
Invest in storage facilities			
Wholesalers	0	0	N/A
Contractors	9	12	Moderate
Spot markets	48	62	Low
Commissioners	3	4	High
Invest in packing material			
Wholesalers	0	0	N/A
Contractors	4	5	Moderate
Spot markets	28	36	Low
Commissioners	2	3	High
Site assets:			
Secure land tenure			
Wholesalers	0	0	N/A
Contractors	6	8	Moderate
Spot markets	43	55	Low
Commissioners	0	0	High
Delays inputs supply			
Wholesalers	0	0	N/A
Contractors	4	5	Moderate
Spot markets	36	46	Low
Commissioners	4	5	High
Limited access to water			
Wholesalers	0	0	N/A
Contractors	5	6	Moderate
Spot markets	14	18	Low
Commissioners	0	0	High
Human assets:			
Horticultural experience less than 5 years			
Wholesalers	0	0	N/A
Contractors	3	4	Moderate
Spot markets	9	12	Low
Commissioners	1	1	High

Asset specificity and governance structure	Number of respondents Frequency n = 78%		Presence of transaction costs
Human assets:			
Horticultural experience more than 5 years			
Wholesalers	0	0	N/A
Contractors	10	13	Moderate
Spot markets	56	72	Low
Commissioners	4	5	High
Uncertainty:			
Contract or agreement with buyer (endogenous)			
Wholesalers	0	0	N/A
Contractors	4	5	Moderate
Spot markets	8	10	Low
Commissioners	1	1	High
Before selling did you know the price (exogenous)			
Wholesalers	0	0	N/A
Contractors	9	12	Moderate
Spot markets	47	60	Low
Commissioners	4	5	High

Note: Temporary asset specificity is not measured in Table 4, but the assessment was done by looking at physical assets invested by farmers or traders and government and assess whether the investments in assets have an effect on the timing of delivery and the value of vegetables.

five years experience in vegetable production and marketing but this comes to an average of less than 10 years in horticultural production. Thus confirming that horticultural production in north-central Namibia is still in its infancy.

Moreover, uncertainty was difficult to measure during the study. Nevertheless, observations and interviews with producers and traders

revealed key factors highlighting high levels of uncertainty with respect to endogenous (behavioural) and exogenous (environmental) factors. With respect to endogenous factors, farmers did not sign any contract with buyers so no delayed payment was expected. With respect to the exogenous transaction in spot market governance structure, manipulation of prices by buyers was very difficult according to the farmers, except in cases of lower quality fresh produce, when buyers negotiated for lower prices.

4.2.2. Presence of transaction costs in contractors based governance

The contractor-based market arrangement is the second most used governance structure by farmers. However, farmers in north-central Namibia struggle to meet the quality and quantity standards as required by the retailers or supermarkets as a result limited vegetables from the study area were supplied through this type of market arrangement. The retailers or supermarkets in Namibia depend more on vegetable imports from South Africa (in 2017 vegetable imports stood at 66% of domestic consumption [43]). Locally retailers or supermarkets also source their vegetables from commercial farmers around the country (mainly from Tsumeb and Mariental districts). Overall the transaction attributes and transaction costs of governance structures of vegetable markets in the study area are characterised by moderate asset specificity, frequency and uncertainty between farmers and contractor-centred agents when compared to the other three modes of organisation. The details of asset specificity are summarised in Table 4. However, the contractor based transaction in this study overall seems to be characterised by moderate frequency as farmers do not supply contractors on a consistent basis. It was observed that trading takes place more because of personal relationships and trust between contractors and farmers than because of market forces. The level of exogenous uncertainty of transactions between contractors and farmers is moderate, possibly because there is a risk of government forcing contractors to buy crops locally before they import. At the same time the level of endogenous uncertainty is also moderate, possibly because of a lack of trust between contractors and farmers especially with respect to quality standards, consistent supply and lower prices offered to farmers.

4.2.3. Presence of transaction costs in commission agent-centred governance

Overall the transaction attributes and transaction costs of the governance structures of vegetable markets in the study area are characterised by high asset specificity, frequency and uncertainty between farmers and buyers for commission market-based arrangements when compared to other three modes of organisation. The transaction costs occurrence between commissioners and farmers in the study area overall seem to be characterised by low frequency with high transaction costs (Table 4). However, it was found that transactions within a particular season can be repeated between the trading parties.

With respect to site asset specificity, the land in the area is communal and can be used for multiple farming activities. Farmers who acquire land (demarcated crop farmland) in this area are investing in an asset that is generally specific to the production of crops. It was observed that in the Omusati Region, the area along the Calueque-Oshakati Canal and specifically the area around the Olushandja Dam are suitable for vegetable production due to access to irrigation water. It was also observed that the climatic conditions allow the production of vegetables that are relatively free from serious crop diseases, pests and frost found in other vegetable-producing areas of Namibia.

With respect to physical assets, the government has invested in physical infrastructure and marketing facilities such as the AMTA fresh hub in Ongwediva in order to create market access for smallholder farmers. The physical marketing infrastructure includes storage facilities, and packing and floor space, enabling producers to transact with either commission or wholesale agents who are renting the facilities. The farmers from the study area however, complain about the high transport cost to the fresh marketing hub, the cost of these facilities and the low prices paid for their fresh produce. As a result, they were hesitant to

supply the hub. It was also observed that the assets of fresh produce marketing hubs (AMTA) are highly specific and have a low opportunity to be used for other non-fresh produce outside the fresh produce industry. The details of human asset specificity are summarised in Table 4.

There is high exogenous uncertainty between commissioners and farmers because there is a risk of not sourcing vegetables from the study area, farmers are not producing based on an agreed cropping programme or based on good agricultural practices (GAP). There is also a high level of endogenous uncertainty between commissioners and farmers because farmers believe that prices are being manipulated even when fluctuations are the result of normal changes in demand and supply. This governance structure was also associated with high levels of delayed payments to producers by commission agents. In some cases, producers revealed that they received lower gross income as compared to their initial agreement with the agents, an example of opportunistic behaviour by the agents. This according to agents was a result of their not finding buyers in time for the farmers' vegetables, resulting in price reduction every day until the produce was sold. In some instances, farmers were called after several days when their produce had reached substandard quality levels to come and collect their produce, as agents could not find buyers. Thus, the commission agent governance structure transaction is associated with high levels of withholding important information from the producer by the agent. Obviously, this relationship has resulted in high levels of risk for the farmers and less trust in the commission agent governance mechanism. At the time of this study, AMTA officials revealed that to reduce risk and encourage farmers to use government fresh produce facilities, they bought the vegetables from the farmers and ownership was transferred to AMTA (government). The risk of the product not reaching the buyers is, however, still high as this risk is not transferred to the commission agents.

5. Conclusions and policy considerations

The study applied TCE to explain transaction level costs in the vegetable industry in north-central Namibia. The insights from TCE helped identify the transaction costs related to the vegetable industry. Although the government has tried to provide access to input, credit and output markets in the vegetable industry, inadequate information distribution between farmers and marketing agents leads to the slow development of vegetable enterprises. The spot market-based governance structure including local open markets, roadside stalls, within the community (local trade) and in nearby urban settlements was the most preferred market arrangement by smallholder farmers in north-central Namibia. The vegetable farmers in north-central Namibia struggle to meet the quality and quantity standards as required by the contractors' market-based and commission market-based arrangements. These market arrangements depend more on imports mainly from South Africa. This implies that smallholders in north-central Namibia are excluded from agri-food chains due to high transaction costs. Thus both the marketing agents and farmers do not make necessary production and marketing information available that can help develop the value chain of the vegetable industry in Namibia. As a result of incomplete information among value chain actors, the study stresses the presence of high transaction costs. The study recommends that information provided to farmers must be packaged in such a way that is adequate and meets farmers' expectations and needs and minimise transaction costs. In addition, farmers should be trained on how to establish cooperatives based on international principles that could ensure sustainability in production and marketing arrangements as most seem not to understand how cooperatives should operate, and the benefits that could accrue from them. This is particularly relevant for the Namibian agricultural development policy for transforming subsistence farming to commercial enterprises. Furthermore, there is a need for farmers to be trained in sustainable agricultural practices to meet market quality requirements.

Declaration of competing interest

The author declares that there is no conflict of interests regarding this research paper.

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