African Journal of Hospitality, Tourism and Leisure, Volume 8 (1) - (2019) ISSN: 2223-814X

Diversification in Production and Marketing Strategies for Higher Returns on Farmlands Located in a Coastal and Tourist District of Kenya: Lessons for South Africa's Land Reform Projects in Similar Locations

Prof. C.N. Mbatha
Professor of Economics -Unisa
School of Business Leadership
Midrand, South Africa
ORCID id: 000-0002-6990-6455
Email: nhlanhla.mbatha@gmail.com

Abstract

Failures in land reform projects in South Africa are linked to many factors including lack of skills, markets, etc. Hence, there has been growing interest to implement joint-ventures between established and new farmers. It is argued that the ventures would not only allow new farmers access to useful capital and skills but also to existing business networks of partners. Nevertheless, some projects continue to fail including some in joint-ventures, mainly due to management conflicts. This study argues that conflicts stem largely from limited information flows which raise transactional costs. An illustration of how diversifying production and marketing strategies in 2018 by smallholders in the Kilifi county, a coastal and tourist destination region of Kenya, limit these costs and lead to high income returns to farmers is presented. Lessons are drawn for general South Africa smallholders in similar tourist areas. Mixed research methods were used to gather data, first from semi-structured interviews with farmers who use online marketing platforms. The information was used to construct a questionnaire for a 2018 field survey conducted in Kilifi. Descriptive patterns and probabilities of farmer attributes were analysed using a multinomial logistic model on Stata. The variables explored included land sizes under cultivation and marketing strategies for buyers, including hotels and restaurants for tourists, against income returns per land size. It was found that farmers on land below 4 acres were more likely to diversify their products, and marketing strategies for different types of buyers than groups on bigger pieces of land. The relative income returns per acre to 'smaller' farmers were the highest of the sample. The income returns were also associated with clearly defined land ownership rights.

Keywords: Smallholder; Land-reform; Diversification; Production; Marketing

Introduction

Land reform projects in South Africa continue to face challenges at different levels. For example, the transfer of land to beneficiaries through the restitution and redistribution programmes has been missing its policy targets, including the 2005 target to transfer 30% of agricultural land to more than 800 000 new Black farmers by 2014. Lyne (2014) estimated that only 20% of the land transfer target had been achieved by 2014. In cases where transfers were successful many of the agricultural projects initiated on the land have failed. The CDE (2008) and Conversation (2016) reports estimated such failure rate to be as high as 90%. Mbatha and Muchara (2015) outline some of the administrative problems that have led to some of the challenges and they include slow reviews of land settlement cases and slow land valuation processes before land transfers as well as lack of skills, financial and technical support to new beneficiaries after inheriting farmlands.

Lahiff, Davis and Manenzhe (2012) report that joint-ventures between smallholders and established businesses have emerged in attempts to support farmers by giving them access to existing capital, skills and markets. However even these business models face many challenges as outlined by Lahiff et al. (2010) and van Koppen, Tapela and Mapezda, 2018). These challenges include lack of information-sharing among the partners, lack of transfer of production and marketing skills, little employment opportunities, lack of clarity on pooled land

ownership, etc. In the same narrative van Koppen et al. (2018) report that of the six projects they studied (which were initiated in 2001) three had collapsed in 2012, and two had changed strategic partners. The commercial partners would leave with their capital, equipment and marketing networks. Deep levels of mistrust and conflicts among partners (i.e. smallholders, businesses and government agencies) were rife in the reported cases. It is against this background that the current study looks at an agricultural business case in the Kilifi coastal tourist district of Kilifi in Kenya (see Map 1) to contribute to South Africa's land reform projects located in similar areas by presenting lessons on workable potential market structures and smallholder conduct that are associated with high income returns.

Map 1: Kilifi County along the east Coastal Land Source: Karte and Lizenz (2018)

From the review of theory and Kenyan data, this paper argues that many of the problems associated with current failures in South Africa's land reform projects stem primarily from information asymmetries in agricultural markets. The lack of transparency and information detail in contracts reported within joint-ventures, for example, and lack of skills on available products and buyers lead to high transactional costs that ultimately collapse smallholders. The Kenyan case illustrates that for whichever business model is in place to support small farmers, the re-organisation of farm businesses and the agricultural sector[1] should be aimed at reducing the risks associated with transactional costs. The study shows that innovative ideas aimed at limiting risks, starting from the production process to marketing initiatives ensure that high income returns, and business sustainability are achieved for farmers. Furthermore, farmers on smaller pieces of land outperform their peers when they diversify their production and use a varied number of marketing avenues to sell their goods. The marketing opportunities are increased for small farmers located in areas with a booming tourism industry, where many more direct buyers of a variety of fresh produce include local restaurants, hotels and visiting tourists buying at farm gates. Smallholders also have a higher incentive to employ innovative strategies when they own the land on which they farm.

Section two describes the methods used in collecting and analysing all data. An historical outline of prominent South African farming methods (from the early 1900s until currently) with

[1] Re-organisation of the business environment in which farms operate.

their political motivations is presented in Section three. The nature of value chains in agricultural products is discussed in Section four. Section five presents a theoretical framework of scale, scope and information asymmetry for looking at the study. A presentation of qualitative and quantitative data is made in Section six. A discussion of potential lessons for South Africa's land reform projects and concluding remarks are presented in Section seven.

Methods used for collecting and analysing data

Mixed methods were used to collect and analyse data on farm business structures and performances in Kenya. Desktop reviews of policy and case-study literature on selected African agricultural value chains[2], cases of Black South African smallholders and Kenyan agriculture in general were conducted prior to preliminary discussions with farmers themselves for an extensive field survey in Kenya.

Data collection

Semi-structured qualitative discussions as part of preliminary investigations were conducted with conveniently selected[3] Kenyan farmers who use the online platform (Digital Farmers, online[4]) for sharing production and marketing information. The information from the literature and discussions with farmers was used to conceptualise and develop the field survey-tool. The tool was shared with research peers at Unisa's School of Business Leadership and with the Kenyan farmers online for obvious improvements.

Institutional research methods for studying behavioural conduct and cultural norms and rules[5] in communities (e.g. Williamson, 2000 and Hodgson, 2006) were employed to understand the structure of agricultural farm businesses. For example, the roles and behaviours of stakeholders from farmers to brokers, vendors and retailers were studied through site visits and in-depth interviews on farms and at agricultural markets, including in Kongoea and Cheptiret markets in the Coastal region and the Rift valley in Kenya.

A walk through the Kongoea and Cheptiret markets and in-depth discussions with randomly selected small vendors, retailers, brokers and transport providers (two in each group) were carried out in 2018. The discussions enabled a construction of an understanding of the patterns of the *market, structure and conduct* of players in the agricultural markets of perishable vegetables including tomatoes and onions, citrus fruits and bananas. The market structure and conduct are presented in Section 7.

Thirty-seven farms were randomly[6] sampled for the survey in the easily accessible by road locations of Dirindi, Kikambala, Bomani and Mtwapa in Kilifi county. The farmers were asked to provide information on topics including, a) type of farm (e.g. land size, ownership, products under cultivation, etc.), b) marketing strategies, c) moral investments in agriculture d) external support structures, e) demographics, etc. The data from the survey that is relevant for this discussion are presented and discussed in Sections 7 and 8.

Data analysis

[2] E.g. Casava and Maize

[3] A call was placed on the farmers platforms for interested farmers to answer questions related to their production and marketing activities. Less than ten farmers responded and each answered questions to varying extent depending on their available time.

[4] A facebook platform with over 293 000 members

[5] The embedded norms, customs, mores and traditions that government markets especially where there are information asymmetries (Williamson, 2000:595-613).

[6] The random selection was for farms in villages accessible to the main road (B8) that could be easily reached travelling by a Tuk-Tuk, between Mtwapa and Takaungu.

Descriptive patterns from the data on demographics were analysed using STATA for data summaries on means, medians, frequencies, etc. on selected variables including size of land used, incomes, land access, etc. Tables with correlation coefficients were generated for variables including marketing strategies employed, land size and access (ownership versus rental) as well as on reported overall household incomes and incomes streaming directly from farming activities.

For categorical variables with more than two categories, a probability model (multinomial logistic model) was constructed for variables including land size and farm generated incomes. The marginal effects of incomes on predictions of the odds of farmers being found on smaller versus larger plots of land were explored, reported and discussed. This was in exploring the potential income returns to farm attributes including land size under cultivation and varied marketing strategies used to sell goods. The results are presented in Section 7.2 and Appendix and discussed within the context of other data collected and presented for the paper.

Historical modes of small scale farming

Besides dispossession of land from Black people, Apartheid policies also reconfigured the modes of farming and business management for Black farmers. Mbatha and Muchara (2015) reported on the case of a citrus business venture in the Eastern Cape's Kat River valley, where an *out-grower* mode led by *agri-business capital, technology and networks* was implemented. Many of such ventures were also adopted across the country after 1994 as reported by Lahiff et al. (2012) and Van Koppen et al. (2018) who outline a historical trajectory of how this mode of farming became gradually popular for smallholders when Apartheid collapsed. They report that before Apartheid was put in place, *smallholder family farms* were prevalent but then the Apartheid government set up *irrigation schemes* with *state led support and linkages* to agribusiness capital and technologies. After 1994 many of the schemes[7] collapsed and there have been many attempts to revive them as illustrated in numerous studies including in Denison and Manona (2007); van Averbeke (2008); Mnkeni, Chiduzi, Modi, Stevens, Monde, van der Stoep and Dladla (2010); etc. van Koppen et al. (2018) then identify smallholder farms, irrigating schemes, and out-grower (joint-ventures) as the predominant farming models adopted for Black farmers, respectively, in periods before, during and after Apartheid policies[8] were in place.

The emergence of the out-grower model, led by agri-business capital after 1994 was supported by various imperatives including policies aimed at Black economic empowerment, which would require capital injections into businesses. In addition, requirements for marketing networks, which came often with business partners of out-growers in the joint-ventures were required. The partners tended to be mostly White commercial farmers, who previously owned the land on which Black farmers were now resettled through the land reform project. In the Kat River basin's citrus case, the business partners were White farmers who identified among other benefits, the water abstraction opportunities in partnering with Black farmers pending the final implementation of water policies (Mbatha, 2007).

Hall, Scoones and Tsikata (2015 in van Koppen et al., 2018:2) outline what are believed to be the real potential business promises of agribusiness partners to out-growers as follows:

a) to bring in financial capital,
b) to introduce new technologies
c) to transfer skills for mechanisation required for large scale production

[7] The irrigation schemes were located in former homelands and many of them had links to former homeland government officials. "The reasons for failure are diverse.." (Denison and Manona, 2007:5) but they are mostly linked to the time of the political transition to democracy and collapse of former homeland governments, which subsidised them pre 1994 as well as withdrawal of the current government's financial support which was seen as not producing desired results (Maepa, Makombe and Kanjere, 2014:495).

[8] Which officially spanned from 1948 to 1994

d) large-scale agribusiness would bring in new national and foreign markets/buyers
e) large volumes would improve the standard of produce to satisfy demanding consumers

It is partly against the promises of marketing networks and buyers by agri-business that the joint-venture model of farming is promoted and piloted for Black smallholders in South Africa. Nevertheless, challenges in the model have emerged and have been documented. These include cases where Black farmers would hand over pooled land to business partners and wait as "'armchair farmers' for money to come or not". Skills have hardly been transferred in many projects. Employment opportunities of community members who benefited from land transfers are limited. In pilot cases that failed completely, smallholders lost alternative potential production opportunities with reduced lost in soil fertility, etc. (van Koppen et al., 2018). Lahiff et al. (2012) give similar accounts of failures on two cases in Limpopo province where the ventures have collapsed with huge losses experienced by land recipients.

The challenges mean that venture businesses need some reconfiguration to work more efficiently, even with some reported success cases in citrus farming in the Eastern Cape province (e.g. Mbatha, 2007) and in sugarcane farming in the KwaZulu-Natal province (Mbatha and Antrobus, 2012). In many cases it is apparent that other modes of business should be advocated alongside the joint-venture model.

It is also against the backdrop of the promise of markets and buyers from ventures and related challenges that the current study looks at complementary models for finding markets for smallholders in South Africa's land reform project. It is likely that for some crops with specific value chains that have export markets, ventures may be more appropriate, e.g. in citrus (Mbatha, 2007) or large-scale sugarcane farming (Mbatha and Antrobus, 2012). But for other agricultural products, for example quickly perishable cash crops, joint-ventures may not be the best model for success.

In this sense, different modes of farming, business management arrangements, values chains, geo-politics, economics, etc. are variables to be considered, with different implications, for what models would lead to successful farming and marketing cases for small farmers. The Kenyan Kiliki county study provides some lessons of possible factors for marketing successes as well as failures for smallholders operating in a different geo-political environment some of whose lessons could be emulated by South African Black smallholders. Some of the lessons are presented in this paper.

Smallholders, value chains and markets

Different crops, different farming methods, different economies, etc., mean that different value chains and marketing strategies would face smallholders. A distinction is made between a commodity and a final product to indicate a process through which value is added on a product before its final use or consumption. In principle some value should be added along the value chain process as defined explicitly by Porter (1985). He defined a collection of activities *within* a firm or production system that are performed on a product for value creation leading to a firm's competitive advantage. In agricultural production, the 'value adding' activities do not necessarily have to be within a single firm. Some activities that increase price do not even add intrinsic value to the product. The transportation process and associated costs contribute to price increases, for example. On the other hand, a commodity could result in a production of different final products. This is especially true with respect to flex crops such as soy, sorghum, barley, etc. Therefore, value chains are neither predictable nor set. They can be modified or created as when required.

The value chains of perishable agricultural goods targeted at local buyers are normally short, while those targeted at international markets are longer (Meridian Institute, 2018). Cassava and maize are two of many products that are most cultivated in sub-Sahara Africa and with longer chains. This is partially because they require minimal attention and treatment while in

the soil. Once dried, chipped and converted into flour they have a longer shelf-lives and can be highly commercialised and transported to faraway destinations (Meridian Institute, 2018).

Longer value chains are also associated with larger profit margins and bigger businesses, mainly because big producers can afford mass production, storage and transportation costs associated with their products. Smallholders can participate in longer value chains through government support or by participating in joint-ventures or cooperatives to benefit from economies of scale.

The political aspiration to empower Black South Africa farmers has led to efforts to integrate smallholders into more lucrative value chains, for example through the implementation of joint-venture businesses reported by Lahiff et al. (2012), IDC (2016) and van Koppen et al. (2018). In economic terms the political efforts have the following aims:

a) to assist smallholders to benefit from longer value chains by becoming feeders (out-growers) to bigger companies through joint-ventures, and

b) to reduce technological and informational barriers faced by smallholders in the production, processing, transportation and final marketing of products otherwise what would be unaffordable technological means.

Nonetheless, while these appear to be important interventions, it would not be possible for all new small farmers in land reform projects to be partners in joint-business ventures. Therefore, different value chains for various products, modes of doing business, methods of farming, geo-political considerations etc., mean that other approaches or business models besides joint-ventures need policy attention.

The Kenyan experience *inter alia* provides some lessons on how to support smallholders who operate outside the joint-venture model. The efforts to assist and develop farmers should therefore focus on all segments of the business spectrum and activities in the sector. These would be support on value chain and market analysis, production, storage, transportation, commercialisation, market access (including online platforms), partnership formation, business and financial management, etc., and irrespective of where farmers are located along the many value chains.

Scale, scope and information challenges

The benefits from economies of scale and scope come essentially from better information flows within, a) growing firms and, b) bigger networks of smaller firms involved in the production of complementary goods or services. Beyond a certain point of growth, however, the flow of information becomes less efficient and the benefits of scale and scope diminish. For this reason, it is important to discuss concepts of scale and scope alongside the costs of a lack of information transparency that are required to run and manage large-scale operations and network of collaborating firms.

Economies of scale and scope in joint-ventures

Until some turning-point, when output is increased on a given scale, the average total costs of production decrease. This stems partly from fixed costs, such as rent, which do not change irrespective of whether or not a firm is in production mode. With growing output, fixed costs per unit of output declines[9]. Therefore, average total costs would decline when firms grow, but that is also if, a) workers specialise in areas where they are most efficient, b) managers vary input combinations, c) large firms negotiate inputs at lower prices, etc., (Pindyck and Rubinfeld, 2005:237-240). Costs do not drop indefinitely, however, as with more production space machinery can be overloaded and managerial capacity can become less effective. When these factors set in, large firms or joint ventures would begin experiencing negative

[9] Average Total Cost = Total Cost / Output, where Total Cost = Fixed Cost + Variable Cost

returns to scale. In some instances, the benefits of increased scale may not be experienced at all, for example where there are skills shortages and managerial challenges from the start. These challenges would be similar to those experienced in failed agricultural joint-ventures as reported by Lahiff et al. (2012) and van Koppen et al.(2018) for South Africa.

It is not only the benefits that come from being large that motivate going into joint-ventures in agriculture. Some joint-venture benefits come from entering into networks where complementary goods or services are provided. Van Koppen et al. (2018) say joint-venture would provide smallholders access to capital, equipment, skills and existing markets. These are the economies of *scope*, where "[the] joint output of a single firm is greater than the output that could be achieved by two different firms each producing a single product…" (Pindyck and Rubinfeld, 2005). In game theory this is a 'win-win' outcome from cooperative efforts of individuals working as a group. But when members of a group do not act collaboratively, but against one another, negative returns to scope set in. Those are zero-sum game outcomes, where players cheat against each other.[10] For these reasons, the efforts of management of joint-venture businesses are important as is the cooperation of out-growers with management. Without this the joint-venture business model cannot succeed.

The bigger and more complex a business system becomes, without being complemented by improved managerial skill, the more susceptible it is to instability. At the core of managerial success is transparent information flow among all parties for a morally binding decision-making process. Information sharing is therefore crucial for the success of any business system, including joint-ventures.

Asymmetric information and transaction costs

In a business transaction, when one party knows more about the product that is being sold than other parties, there would be information asymmetry problems, where one party possesses more market information than the other party during a business negotiation, leading to unequal and inefficient market outcomes. These problems are found in almost all sectors (e.g. second-hand car markets, labour negotiations, stock markets) and they have a direct effect on efficiency and the whole economy (Pindyck and Rubinfeld, 2005). The problems often result in bloated prices that favour the more informed parties at the expense of the rest in cases where agreements are reached. Otherwise they drag negotiation processes. In worst case scenarios they collapses business negotiations leading to huge transactional costs. Reuer and Koza (2000) presented strong arguments on the effects of transactional costs on multinational joint-ventures versus acquisitions. Hobbs (1996) presented the negative effects of the same costs on supply chain management decisions within firms.

It is based on this theory that this paper proposes that information asymmetries with its associated costs contribute negatively to the management and success of South Africa's land reform projects, including joint-ventures. These transactional costs problems are also found in business networks of buyers and sellers along different agricultural value chains.

Many of the innovative ideas aimed at maximising farmer performances in different value chains across Africa are aimed partly at reducing transactional costs. These include the development of platforms to provide information on the processing of goods as well as selling of products via online platforms. The Kilifi case illustrates different ways in which players in farming businesses navigate with varied success the benefits and challenges of scale, scope and transactional costs to sustain their work.

Diverse tastes for tourism businesses

The Kilifi County (see Map 1), specifically, is located on the eastern coast of Kenya and has a population of over 1 million, covering more than 12 000 square kilometres (Map 1). With good

[10] See Ostrom's (1990) discussion of collective action

climate and fertile soil, dairy and crop farming are practiced in the county also with the support of government though KALRO's research programmes. The county's location along the coast, one of the biggest tourist destinations in East Africa near the city of Mombasa, provides even more business opportunities for smallholders. Farmers in the region have greater marketing opportunities to sell directly to restaurants and hotels who cater for a successful tourism industry. It would be expected for the tourist centred establishments to make it that much easier for local small farmers to diversify fresh products for more diverse markets of varied international tastes and at relatively good prices. In this setting farmers would not only sell to restaurants and hotels but also directly as vendors to tourists staying self-catering homes.

Overview of Kenya's agricultural sector

Kenya has a big agricultural sector. Almost 75% of the workforce is involved in farming and agriculture contributes 26% to GDP. Tea and coffee are the biggest agricultural exports growing in high rainfall areas, but other products include maize, wheat, sorghum, millets, cassava, potatoes, bananas, fruits, vegetables, dairy products, beef, poultry, etc. Most agricultural production for exports like tea and coffee takes place in the central and western highland regions. The average annual rainfall is 630 mm across the country. Agricultural productivity is for local consumption, and for export markets in most parts of the country. The exceptions are desert areas in the northern regions, which experience average annual rainfalls of less than 200mm and there is hardly any cultivation in those areas. The highest rainfalls of over 1800 mm per annum are experienced around the slopes of Mount Kenya in the central parts of the country. Nevertheless, irrigation accounts for almost 80% of water withdrawals from a national reserve of almost 3000 cubic km (FAO, 2005).

The Kenya Agricultural & Livestock Research Organisation (KALRO[11]) through various research institutes is tasked with supporting the production of strategic products, including coffee, beef, dairy, etc., in the six major agro-ecological zones of the country. The Industrial Crop Research Institute (ICRI) located in the Kilifi county of the Coastal Region is tasked with supporting the production of industrial crops[12] including cotton, sunflower, barley, tobacco, sisal, coconut (palm), cashew, and bixa, etc. (Lewa[13], 2018 and KALRO, 2018).

Kilifi County is located on the eastern coast of Kenya and has a population of over 1 million, covering more than 12 000 square kilometres (Map 1). With good climate and fertile soil, dairy and crop farming are practiced in the county also with the support of government though KALRO's research programmes.

An overview of agricultural markets

Visits to the Kongoea and Eldoret West markets, two of the biggest agricultural fresh produce markets in coastal and highlands regions, respectively, showed that the buying and selling of goods and services in agriculture are not simple linear processes. Most sellers at markets are themselves not farmers. Many are retailers along different value chains who either buy directly from farmers and/or brokers in bulk and sell goods in smaller quantities to other sellers or final consumers at differently marked-up prices. Depending on the exact location and size of the stall, retailers would pay different rental prices to the relevant municipality offices. At Kongoea market, closest to Kilifi County, the rental prices would range from a daily rate of 50 KES for smaller stalls located about 100 metres outside the market premises to 1500 KES per month for bigger stalls inside the market premises.

[11] Formerly the Kenyan Agricultural Research Institute (KARI).

[12] With exception of tea, coffee and sugar, which get support under different research institutes

[13] Agricultural sociologist at KALRO

Some retailers diversified their stall businesses and sold a combination of agricultural goods (tomatoes, onions, bananas, etc.) plus clothing (t-shirts, shoes, pants, etc) at stalls outside the designated market areas (e.g. Wambuwa, 2018)[14]. A customer with a limited amount of time to walk around, having come with an intention to buy only clothing items might end up also buying vegetables or fruits because the goods were conveniently found at the same stall. The retailers just outside the market premises would buy agricultural goods in medium sized bulk quantities inside the market premises and resell those in much smaller quantities than wholesalers inside the market itself. For example, a 110kg container of tomatoes was selling at around 6 500 KES in July 2018, while a similar sized bag of onions sold at 10 000 KES. For marginal profits to be made, the smaller retailers would then resell about half a kilogram of tomatoes above 30 KES and about 500g of onions around 50 KES. The prices would vary around these ranges daily depending on the season and level of the freshness of the goods. For example, 500g of onions sold at around 40 KES a few months before in May 2018.

The high transaction costs of searching for goods, negotiating for prices and transporting them to the market meant that many other players would be involved in providing services along the different value chains for goods to be fetched from farm gates and delivered at market stalls. Innovatively some retailers, with the help of personal assistants, would interchangeably provide the services of brokers, transporters and final sellers for a diverse type of agricultural goods, depending on the distances covered from the farm gates to the market (e.g. Juma, 2018)[15]. Nevertheless, because of the time intensiveness and price negotiating skills required in finding the right quality and type of goods at reasonable prices, brokering services had become a specialist service provided on a fulltime basis by some who could either hire (or already owned) the transportation and could communicate with both farmers and retailers at the same time. Juma (2018) with her business assistants sold tomatoes and onions in bulk inside the Kongoea market. She also had direct relationships with specific farmers along the coastal region and did not rely on brokers to negotiate prices on her behalf. She also owned her own transportation means to fetch and deliver the goods. Trust in the relationship between herself and farmers was key to the success of her business. She would not give the researcher the contact details of her suppliers, partly to maintain the trust, but also to maintain her competitive advantage by not sharing the information with possible competitors.

Mwabini (2018) was one of the bigger retailers in the market. He sold fruits (soursop and a variety of citrus) but also worked as a broker for other retailers or farmers when opportunities arose. Respondents at both the Kongoea and Eldoret West markets reported that brokering was a very lucrative business especially during times of low supplies (e.g. shortages because of rain drought) or times of over supplies (e.g. bumper crop seasons). During the times of low supplies, brokers would hold market power over retailers and other brokers because of the high transaction costs involved in searching for goods, price negotiation, and transporting of goods from farmers to markets. They would deliberately keep away information on the locations of good quality supplies and prices; inflating transaction costs to make monopolistic profits from retailers. During the times of bumper crops, they would make profits from farmers desperate to find buyers.

A linear value chain at these markets could have at most about six easily identifiable players from the farm gate, via two different types of retailers, to a final consumer as illustrated in Diagram 1 – broken line.

[14] Retailer of agricultural goods and clothing outside the designated agricultural goods areas at Kongoea market

[15] Retailer and broker inside the Kongoea market

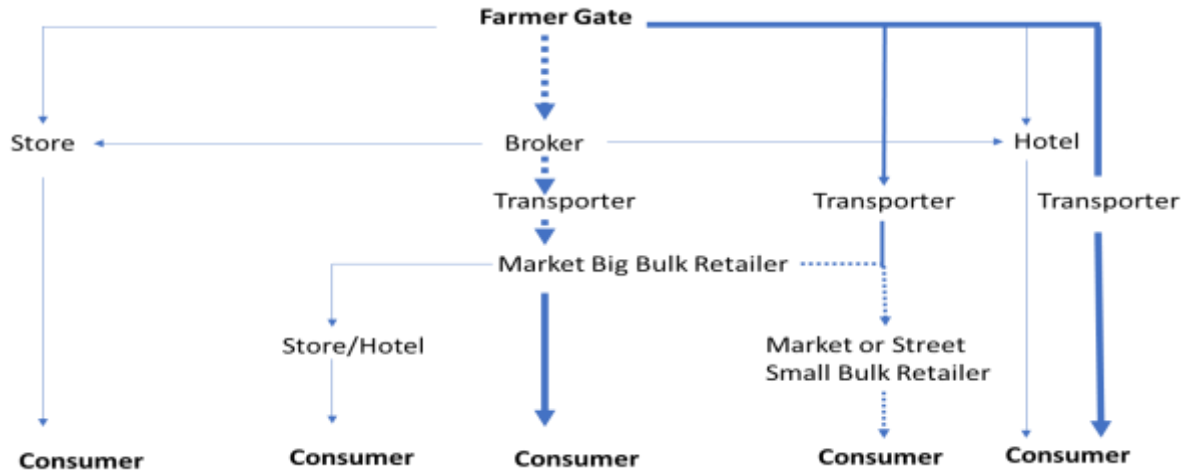

Diagram 1: Farm gate to consumer value chains

The shortest chain would involve only two players. The thicker lines (solid and broken) represent what seemed to be the most dominant chains, one at the market and another outside the market, from the farm gate to the final consumer.[16] The scarcity of a particular good made its value chain longer, because more effort was required to identify, buy and transport the product over longer distances. With scarce goods and more players involved in the chains, prices quickly became inflated. The potential surplus profits would over time attract more players who would sense and the use all the potential money-making opportunities available, if they had the means. As already indicated, when goods were scarce the brokering businesses made more money at the expense of retailers and consumers. Because of the potential profits more people, including some farmers and retailers, would get themselves into brokering businesses. Under these circumstances, it was typical to find retailers keeping their suppliers a secret. To make extra money, retailers or farmers could also double up as brokers for other retailers and buyers who did not have suppliers. It is for these reasons that the longer chains were characterised by information asymmetries and monopolistic profits for the more-informed players. The longer chains had a higher number of transactions and associated costs which resulted in higher final prices. For beneficiaries of these non-competitive prices, it was important to ensure that information asymmetries were kept going for as long as possible. To enable this, trust in the formal or informal relationships among those profiting was an important glue.

Brokering services were also important and lucrative because brokers are generally highly involved. Among other roles, in this study, brokers searched for farmers with good quality products, hired pickers and packers and managed the process to have the goods packed and ready for transportation. To ensure that these roles were performed satisfactorily, many buyers or retailers hired independent transporters who reported back to them when products had been collected from the farms. It was only then that buyers could pay brokers for services rendered. Transporters were paid on delivery of goods at markets. Hence, trust was key to all relationships formed along the value chains. In the relationships, brokers and transporters always held more information about what products had been picked and packed and about the progress on transporting goods to the buyer.

This information asymmetry rendered retailers and farmers open to abuse from brokers and transporters. It is mainly because of these factors that since 2014 online market places like ‘Twiga’ had emerged and were finding traction with the mission to ‘link farmers and vendors to fair, trusted, modern markets’ (Twiga, 2018 online). Through similar programmes many

[16] This chain was discovered through the survey of farmers themselves.

farmers in Kenya and elsewhere were encouraged to join digital platforms to share information about production techniques among themselves, product prices and also to reach buyers who offered much higher prices than brokers as illustrated by AgriFinAccelerate:[17]

> In order to improve his (Cornelius Kiptoo) gross revenue, he recently started advertising his farm produce on an online market place called OLX. "I took photos of my oats and posted them in the online market place and to my surprise I got a buyer from the nearby town of Eldoret. This buyer gave me USD7.8 per bag of oats, which is a much better price than the USD6.0 that I used to get on my farm gate. Even with the cost of transport factored in, I still made a good profit, "adds Kiptoo (MercyCorps, 2016).

Although online platforms provide some of the solutions to the challenges of information asymmetries and high transaction costs and there is a growing uptake in the use of such platforms, many more farmers were still excluded. For example, a nationally representative Farmer Benchmark Study for Kenya established that of the "39% of farmers interviewed in Central and Western regions owned or had access to an internet enabled phone. *13% of all farmers with phones (including basic phones) used their phones to access the internet.* [Although] 34% of all farmers interviewed reported that they considered their phones as a tool they could use to access agricultural information through various channels" (MercyCorps, 2016). Thirteen percent with internet to access online platforms across a country, where 75% (33 million) of the population of above 44 million was involved in agriculture was still a low number of people. In August 2018, around 8000 farmers were registered with www.twiga.ke. Digital Farmers Kenya on Facebook had more than 293 000 members. But not all members of this e-platform were farmers, including the author of the current study.

The results from a random sample of smallholders in Kilifi County also reiterated the fact that digital markets in 2018 still had relatively low levels of use by farmers[18]. The survey nevertheless revealed many other avenues farmers still used successfully to sell their products. Hence, the lessons and challenges facing Kenyan farmers overall were not only useful to younger generations of farmers with internet access and technological skill, but the lessons were applicable also to the type of small farmers found in South Africa. These were normally older and rural based smallholders working alone or in schemes.

Descriptive analysis

In the Kilifi county most farmers were male (84.2%; n=37). Only 13.2% reported to be non-African and those identified mostly as Hindu. 86.8% of the respondents were also heads of households, with 13.2% reporting to be the children of the heads. The average land size used for farming by smallholders was *3.2 acres*[19]. The reported average income per cultivated acre was *500* USD (median) per month[20]. Many of the farmers cultivated more than one type of vegetables and fruits. The vegetables included African spinach (65.8%), tomatoes (23.7%), potatoes, cassava, okra, etc. Sixty two percent of the respondents cultivated fruits such as bananas (19.0%), papaya (13.5%), citrus, water melons, etc. More than 46% of farmers kept livestock, mostly chickens (45.9%), cattle (31.5%), goats/sheep (21.1%), etc.

These patterns show that most farmers diversified their farming across vegetables to fruits and livestock. It was also notable how many of the farms, although small in land size, were also equipped with irrigation systems (83.8%). 54.1% of the respondents derived their income

[17] Is one of the programmes by MercyCorps supported by the MasterCard Foundation to promote the use of digital platforms, including Whatsup, OLX, Youtube, Facebook (Digital Farmers Kenya group had over 293 000 members in 2018), Twitter, etc., for farmers.

[18] One out of 37 farmers in Kilifi County reported using an online platform

[19] The sizes are in line with those reported globally for low and middle income countries (Lowder, Skoet and Raney (2016) and for East African countries (FAO, 2015) at between 1 and 2 hectares (2.47 to 4.94 acres).

[20] At 2018 exchange rate (1 USAD = 100 KES) 500 USD = 50 000 KES. This was equivalent to the salary of a junior public official (e.g. teachers) (The Daily Nation, 2017 online).

solely from farming activities. The average total household income per month of smallholders was USD 853,00. One plausible extrapolation from the patterns is that farming businesses were considered quite important income generators by those involved in them. Hence almost half (48.6%) reported not being able to meet their current market demands and many reported that they used more than one marketing avenue to sell their produce.

Marketing avenues for farmers

Among different avenues, smallholders were able to market and sell their produce at their farm gates to ad hoc buyers (92.0%). These buyers included brokers, big and small retailers as well as final consumers. Those interested in selling beyond the farm gates had formal or informal agreements with buyers including cooperatives, individuals (mostly brokers), local businesses (e.g. stores and hotels) as illustrated in Diagram 2.

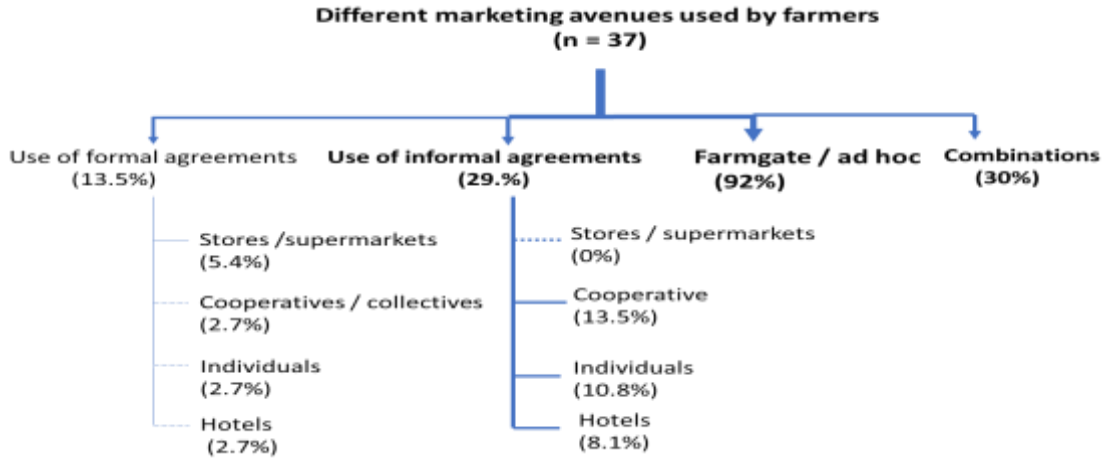

Diagram 2: Marketing avenue distributions in Kilifi county STATE THE SOURCE OF THIS DIAGRAM

In addition to ad hoc marketing strategies, farmers formed mostly informal arrangements with buyers (cooperatives, brokers and local businesses). The data show that a high number of sellers also used more than one avenue to sell (30.0%) goods. Again, the data indicate that online platforms are yet to take off and replace the traditional means of marketing in the country, especially the brokering system. In this discussion it is therefore useful to understand what influenced (and to what extent) the different selling avenues and with what effect especially on farming incomes. Hence the following section explores several postulations on variables including marketing arrangements, types of goods cultivated, size of land use, land ownership and farming incomes.

The relationships among these variables are explored through descriptive tables and a multinomial logistical model. The statistical tools are used to explore the magnitudes and reliabilities of patterns found in the data.

The correlation coefficient table explored, for example relationships of marketing avenues such as formal arrangements against other farmer attributes such land sizes under cultivation, land ownership patterns, etc. The multinomial logistic model explored the odds[21] of farming incomes determining the sizes of land under cultivation for different farmers.

Patterns on marketing avenues, cultivated goods, land size and ownership

For small datasets of few observations, statistical results are often not reliable in terms the t tests or z-scores and p-values (see Mbatha and Gustafsson, 2013). The patterns presented

[21] The odds of something are P/(1 – P), where P = Probability of something happening

in this section are therefore partly *indicative of comparative directions and extents* of the relationships among the variables under observation.

The correlation Table 1 indicates a negative relationship (corr. = -0.217) between land size under cultivation and use of diverse marketing strategies[22] per acre of farmed land. This means that smaller farmers, as opposed to bigger farmers, in terms of land under cultivation, were more likely to use a combination of diverse marketing avenues in selling goods. Farmers who cultivated vegetables or fruits and kept livestock (i.e. the most diverse cultivation strategy) were more likely than other groups to use the most diverse marketing avenues (corr. = 0.115) as well. In fact, a higher percentage of farmers who cultivating smaller sizes of land were also more likely to diversify their output than 'bigger' farmers (corr. = - 0.096). The same 'small' farmers were also more likely to own the land on which they farmed, personally or through a family title deed, compared to farmers who worked on bigger areas of land (-0.399). Out of 37 farmers, three farmers who worked on big pieces of land (above 20 acres) were renting (either formally or informally).

Table 1: Correlation patterns of farmer attributes

Variable corr.	Strategies per acre	Land size	Land ownership	Cultivated goods	Mean	Std. Dev.	Min-Max
Strategies per acre	1.000				0.491	0.795	0 - 2
Land size	**-0.217**	1.000			1.541	0.960	1 - 4
Land ownership	**0.2055**	**-0.399**	-1.000		2.108	1.173	1 - 4
Cultivated goods	**0.115**	**-0.0957**	**-0.051**	1.000	2.432	0.801	1 - 3

In many ways, it appears that farmers who worked on smaller pieces of land were more entrepreneurial. They were more likely to a) produce a more diverse mix of goods, b) own their land, c) use more than one marketing avenue, etc.

During in-depth discussions with farmers who cultivated on bigger plots of land[23] it transpired that they were farm managers or caretakers who either formally or informally rented the land from absent landlords who lived outside the county (e.g. in Nairobi). Some of the owners were reported to be high-ranking public officials. This could be one explanation why farmers on bigger plots of land seemed less innovative given that they did not own the land they farmed.

Levels of success in terms of farming incomes

Following the patterns in Table 1, it was then postulated that in relative terms the 'small' innovative farmers who also owned their land (personally or as a family) would outperform (in income terms) farmers on bigger plots who were mainly renting. The proxy indicator for the performance would include total monthly incomes received per unit of land under cultivation. In this sense, we would expect the odds to be higher for finding smaller farmers in high income categories.

To explore these odds, a multinomial logistic model is appropriate when the dependent variable has more than two categories and the independent variable/s are also categorical or continuous. The dependent variable (ls = land size) has four categories[24]. The independent variable (income from own farming) ranges from USD 62.50 to USD 2000 per month. The biggest category of land (20 to 50 acres) of the dependent variable (land size) was used as the base against which the probabilities of being found in other categories were compared.

[22] Having no agreement with any type of buyer was interpreted as a low diversity strategy and having more than one type of agreement with different types of buyers (e.g. vendors, retailers, hotels, restaurants, etc) constituted a highly diverse strategy.

[23] Above 20 acres

[24] Under 4 acres; from 4 to under 10 acres; from 10 to 20 acres; from 20 to 50 acres

This meant that the model had three components. The independent variable (income per farmed area) was explored for its effects in determining the odds of finding a farmer in any of the three other categories versus finding them in the fourth category of plot sizes ranging from 20 to less than 50 acres).

Formally, the model is specified as follows:

1. **Ln (P (below 4 acres)) / (P (20 to 50 acres))** = b1 + b2 (income_acre) + μ

2. **Ln (P (4 to below 10 acres)) / (P (20 to 50 acres)) =** b11 + b12 (income_acre)+ μ

3. **Ln (P(10 to below 20 acres)) / (P (20 to 50 acres))** = b21 + b22 (income_acre) + μ

Where: Ln = natural log

ls = land size (Under 4 acres; from 4 to under 10 acres; from 10 to 20 acres; from 20 to 50 acres)

income_acre = income per acre of farming

P = probability

The logistical estimates of the log odds changes in the equation are presented in Table 2.

Table 2: Multinomial logistic model results (5 iterations)

				Number of obs = 38 LR chi2(3) = 26.38 Prob > chi2 = 0.0000 Pseudo R2 = 0.3600	
Land size	**Variable**	**Coefficient**	**SE**	**z**	**P value (* > 90 %; ** > 95%; *** >99%)**
20 to 50 acres	(base outcomes)				
Below 4 acres	Income_acre	16.41338	8.218593	2.00	0.046**
	constant	-13.76611	6.690452	-2.06	0.040**
4 to 10 acres	Income_acre	16.12625	8.227279	1.96	0.050
	constant	-14.77353	6.750688	-2.19	0.029
10 to acres	Income_acre	12.08116	8.005181	1.51	0.131
	constant	-9.54806	6.354693	-1.50	0.133

For the number of observations (n=38), the model could still provide several statistically significant outcomes. This came from strong associations between incomes and the sizes of farmers in terms of land under cultivation. The likelihood chi-square of 26.38 and an overall p-value > 0.000 tells us the model as a whole fits better than an empty one (i.e. without any predictors).

i) A unit increase in the variable income_acre was associated with a 16.413 point increase in the relative log odds of being on the confidence e farm area below four (4) acres versus being found on a farm area from 20 to 50 acres. The nature of the data also ensured a statistically significant pattern at more than 95% level of confidence (z score=2.00 and p value = 0.046) for this income effect.

ii) A unit increase in the variable income_acre was associated with a 16.126 point increase in the relative log odds of being on the farm area from four (4) to ten (10) acres versus being found on a farm area from 20 to 50 acres. The nature of the data also ensured a statistically significant pattern at 95% level of confidence for this effect (z score=1.96 and p value = 0.05)

iii) A unit increase in the variable income_acre was associated with a 12.081 point increase in the relative log odds of being on the farm area from ten (10) to twenty (20) acres versus being found on a farm area from 20 to 50 acres. However, the patterns of odds of a move from the biggest plots to these medium sized plots were

smaller and not statistically significant at normally accepted 95% level of confidence (z=1.51 and p value = 0.131)

A high level of income per cultivated acre increased the odds of farmers being found on the smaller farms. These results on income effects were congruent with expectations from the correlation coefficients (Table 1), where farmers on smaller plots seemed to be more innovative and to outperform others in terms of diversified production and marketing strategies.

Looking at the effects of income at the margins and within each of the three different outcomes, it appears that the strongest effects of increased incomes in predicting the sizes of plots farmers used came in the first outcome. The highest income effects were observed when moving from the biggest to the smallest plots (see predicted outcome (1). The probability of being found in the smallest plots (below 4 acres) as opposed to being found in the biggest plots (above 20 acres) was highest when the farmers' income was highest (at interval 3 (92.0 percentage points) compared to interval 1 (44.7 percentage points) and interval 2 (88.6 percentage points)) in Part 1 of Appendix. More generally, higher incomes had their highest marginal impacts on predicting farmers being found in the smallest plots versus the biggest plots (Part 1 to Part 3 of Appendix).

Lessons for South Africa and closing remarks

The historical evolution of modes of farming of smallholders in South Africa is essentially about the distribution of market power among the different elements of various value chains, from organisation, production, marketing to final consumption. Such power is constituted by information that dis/empowers various role players including farmers. It was mentioned that when relevant data were missing or shared unevenly, monopolistic markets emerge with high transactional costs borne by those lacking of such information. Farmers, brokers, retailers, etc., wrestle one another in different ways to lower their own transactional costs in these markets. In the Kilifi county a great number of instances where farmers acted with relative success in mitigating against personal risk stemming from information asymmetries and associated costs were displayed. By diversifying produce and mixing marketing strategies smallholders showed they could mitigate against risks stemming from markets dominated by brokers. As a result, the average level of self-reported incomes of smallholders were relatively high and equivalent to those of public servants at 500USD. For the same reason, one would expect even higher incomes for farmers using digital platforms.[25]

Hence, there are important lessons from the Kilifi county study on how farmers and policy can navigate or modify the current production and marketing modes in favour of smallholders, especially with many reports of failed schemes and joint-venture projects.

The first lesson from the Kilifi County is that small farmers can succeed outside the modes of irrigation schemes or joint ventures with bigger commercial players that are typical in South Africa. With innovative ideas in environments that support entrepreneurship, the smallest farmers can run successful businesses. What is key for them is to find or have buyers at good prices through diverse avenues.It can be argued that within the joint-venture models, commercial farmers play similar roles to those played by brokers in Kilifi County and in Kenyan agriculture in general. Some of the common roles include connecting smallholders to new networks including buyers that otherwise would not be available to smallholders. Like with brokers, big commercial partners can enter into agreements with different small farmers to supply them with products. Therefore, as is the case between a broker and a farmer, trust between partners in a joint venture is required.

[25] From the limited data, the farmer who reported using digital platforms also reported a monthly income above 1750 USD. The limited responses (n=3) from farmers approached directly online reported monthly incomes above 2000 USD.

The content details of the agreements entered into in joint-ventures should, however, go a long way in mitigating against the transactional cost (i.e. risks) that were typically reported agricultural markets in Kongoea. The degree to which agreements are clear enough on the responsibilities of each partner reduces transactional costs. This also supports one of the findings by von Koppen et al. (2018) on what needs to change for venture models to succeed. In any case as illustrated by the Kenyan data, when the responsibilities of each party are not clearly outlined or are not legally binding farmers can also find other innovative ways outside existing agreements with 'brokers' to limit their exposure to abuse and to maximise profits. Diversifying products and marketing avenues including the use of online platforms would be synonymous to having well defined contract agreements in joint-ventures. But as reported for South African cases, having good or bad contracts in place is only part of the solution. Smallholders should still work on meeting the required quality and quantity of production.

It can also be argued that when smallholders are not protected by venture contracts with big business they are more proactive at acquiring production and marketing skills. Perhaps the lesson for South Africa is to outline clearly in the contracts what skills need to be transferred at the end of the contract and how the transfer can be monitored and measured throughout the duration of the contract. Ultimately the end of the contract should ensure that smallholders can operate on their own with similar successes as those observed with small farmers in Kilifi county. One of the ways to ensure this happens is for agreement contracts to allow smallholders to engage in other business models alongside the out-grower model. This would more likely contribute towards diversifying market avenues.

Like the big commercial partners [e.g. sugarcane farmers reported on by Mbatha and Antrobus (2012)], it is argued that smallholders themselves do not only have to work with just one partner in a joint-venture. They can diversify their produce to have more partners for different products. This would mean entering into more than one agreement to reduce potential business risks. Production and marketing skills acquisition are important for farmers to practice diversification throughout their value chains. Government and donor agencies have a role to play in developing these skills.

It was land ownership and not big plots under cultivation that had positive correlations with product and marketing diversification. For the land restitution programme in South Africa this is positive given the often-high number of land beneficiaries in resettled communities. In the Kilifi county, the most innovative and successful famers worked on land size below four acres and the average farmland size was 3.2 acres. In a similar environment, for example where many farms use water irrigation and a similar list of goods is produced, average Kenyan farm sizes for smallholders could be used for benchmarking by Community Property Associations (CPAs) dealing with many land beneficiaries.

The Kilifi case also illustrates that the biggest challenge to farming market structure and conduct are transactional costs coming from a skewed distribution of information among players. To reduce the risks associated with market information, farmers also produced a variety of goods. Product diversification does not always require big plots of land. It is also possible - if not required - for small farmers to diversify for high level performance. Therefore, the revision of the South African legislation on subdivision of agricultural land needs to be prioritised to support the creation of smaller farmers under the restitution and redistribution programmes (Mbatha, 2017: 6). Finally, land ownership by Black farmers with title deeds needs to be attended by policy. The implications are beyond the legislation on subdivision of agricultural land but also on individual land ownership in rural traditional areas. The study illustrated that personal and family land ownership were positively associated with the best farming business results, where diverse goods were produced and diverse marketing avenues were used with higher income r returns.

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Appendix: Marginal probability predictions for the three outcomes

		Margin	**Std. Error**	**z - score**	**P> \z\ (* > 90 %; ** > 95%; *** >99%)**
Base outcome 0 = Land Size = 20 to 50 acres					
Outcome 1 = Land Size: Below 4 acres					
	Farming income groups				
	1. Mean 100 USD	.4470342	.1496892	2.99	0.003 ***
	2. Mean 750 USD	.8662078	.0778982	11.12	0.000 ***
	3. Mean 1750 USD	.9200562	.1177937	7.81	0.000 ***
Outcome 2 = land size 4 to 10 acres					
	Farming income groups				
	1. Mean 100 USD	.1224958	.0827986	1.48	0.139
	2. Mean 750 USD	.1336588	.077892	1.72	0.086 *
	3. Mean 1750 USD	.0799438	.1177936	0.68	0.497
Outcome 3 = land size 10 to 20 acres					
	Farming income groups				
	1. Mean 100 USD	.3988003	.16299	2.45	0.014**
	2. Mean 750 USD	.0001334	.000603	0.22	0.825
	3. Mean 1750 USD	2.45e-08	2.23e-07	0.11	0.913