Dynamics of institutional arrangements for small-scale vegetable farmers in Namibia: An analysis of the market, state and community institutions

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ABSTRACT

In developing countries, especially in Africa, the commercialisation of agriculture has proven to be a means of increasing the income of farm households and productivity, resulting in poverty reduction at the household level. The principal research question addressed by this study was why it would make sense for the government to invest in services for small-scale fruit or vegetable farmers if these farmers could not increase production because of a lack of market access unless they could make a profit, which would probably imply heavy subsidisation of marketing infrastructures by taxpayers.

A vegetable industry development case study was conducted in north-central Namibia. A Probit model was used to determine the factors that influence farmers to supply to the formal markets. The model results indicated that ownership of a vehicle and distance from farm to water source were statistically significant determinants of a farmer's decision to participate in the commercialisation of high-value crops at p=0.009 and p=0.073 respectively. In addition, the results indicate that water rights are not clearly defined, and there is no land market and limited access to credit for the farmers.

Moreover, a transaction cost analysis demonstrated that small-scale high-value crop production in the study area is experiencing high transaction costs that make the vegetable industry to be globally less competitive. The principal reason for high transaction costs is that the commercialisation of vegetables is constrained by information asymmetries or principal-agent problems among actors in the value chain, resulting in the failure of the market, state, and community institutional arrangements.

The study introduced a new approach incorporating insights from transaction cost economics in exploring the interrelationship of the market, state, and community institutions in agricultural development in developing countries to understand the influence of transaction costs on economic performance. The model introduces a public-private partnership as a policy instrument linking small-scale farmers to input and output markets through contract production. The model identifies and minimises transaction costs among value chain actors, to overcome the challenges of the market, state, and community institutions.

The study concluded that poor implementation of agricultural development initiatives as introduced by the state or the private sector (the market) and cultural embeddedness may

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limit agricultural development as community values, norms or beliefs take long to adjust to external ideas or technologies due to inadequate information in developing countries. The study recommends that there is a need for policy intervention that addresses water rights and improved access to credit as well as encouraging production and marketing cooperative to reduce costs of accessing input and output markets. An amendment of the Communal Land Reform Act No. 5 of 2002 would enable the introduction of land markets and rentals in communal areas of Namibia enable farmers to use their land as collateral to obtain credit from financial institutions. Amendments to the Communal Land Reform Act should also specify how to protect vulnerable and poor people such as women and the youth in communities and to ensure that land rights are available as a social safety net.

Keywords: Commercialisation; communal land reform, formal markets, public-private partnership, transaction costs

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OPSOMMING

In ontwikkelende lande, veral dié in Afrika, is daar bewys dat die kommersialisering van landbou ’n manier is om die inkomste van plaashuishoudings te verhoog en produktiwiteit te verhoog as gevolg van die vermindering van armoede op die huishoudelike vlak. Die oorhoofse navorsingsvraag wat hier aangespreek word, is hoekom die staat sou belê in ondersteuning aan kleinskaalse vrugte- of groenteprodusente in die geval waar hulle nie produksie kon verhoog as gevolg van ontoeganklike markte of die onvermoë om wins te maak nie, aangesien die staat in sulke gevalle waarskynlik boonop grootskaals sal moet investeer in bemarkingsinfrastruktuur. Hierdie studie stel ’n nuwe benadering voor wat insigte van ’n transaksiekoste-ekonomie inkorporeer in die verkenning van die verhoudings tussen mark-, staats- en gemeenskapsinstellings in landbou-ontwikkeling in ontwikkelende lande om die invloed van transaksiekostes op ekonomiese prestasie te verstaan.

’n Gevallestudie wat die ontwikkeling van ’n groentebedryf in noord-sentraal Namibië behels, is onderneem. Die resultate stel voor dat die kommersialisasie van landbou beperk word deur faktore soos ’n gebrek aan grondbesit, beperkte toegang tot infrastruktuur en markte (inset, uitset en krediet), ongereelde besoeke deur voorligtingsbeamptes, kulturele verandering, gebrekkige tegnologieë en onvolledige inligting onder akteurs in die waardeketting. Die resultate demonstreer ook dat kleinskaalse hoë-waarde gewasproduksie in die studiegebied hoë transaksiekostes ervaar, wat die groentebedryf globaal minder mededingend maak. Die vernaamste rede vir die hoë transaksiekostes is dat die kommersialisasie van groente beperk word deur inligtingsassimetrieë of hoof-agent probleme onder die akteurs in die waardeketting, wat ’n mislukking van institusionele reëlings in die mark-, staat en gemeenskap veroorsaak.

Gegewe die mislukking van die kommersialisasie van landbou in die studiegebied, is ’n model ontwikkel wat vir die verdere ontwikkeling van die groentebedryf gebruik kan word. Hierdie model stel ’n openbare-private vennootskap voor as ’n beleidsinstrument wat kleinskaalse produsente deur kontrakproduksie aan inset- en uitsetmarkte verbind. ’n Vername kenmerk van die model is die identifisering en minimalisering van transaksiekostes onder akteurs in die waardeketting as gevolg van die oorkoming van die mislukking van mark-, staats- en gemeenskapsinstellings.

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Die studie stel ook ’n strategiese beleidsopsie voor om die Gemeenskaplike Grondhervormingswet (*Communal Land Reform Act*) Nr. 5 van 2002 te wysig om dit moontlik te maak om grondmarkte en grondverhuring in die gemeenskaplike gebiede van Namibië in te voer. Dít sal verseker dat boere grondregte in die gebruiklike grondbesitstelsel kan bekom, wat hulle die vermoë sal bied om hulle grond as aanvullende sekuriteit te gebruik om krediet vanaf finansiële instellings te bekom. Wysigings tot bogenoemde wet moet ook spesifiseer hoe om kwesbare en arm mense, soos vrouens en die jeug in gemeenskappe, te beskerm, en om te verseker dat grondregte as ’n maatskaplike veiligheidsnet beskikbaar is vir hierdie mense in die gemeenskaplike gebiede. Die studie kom tot die slotsom dat swak implementering van landbou-ontwikkelingsinisiatiewe soos deur die staat of die privaatsektor (die mark) ingevoer word, asook kulturele inbedding, die ekonomiese aktiwiteit vir landbou-ontwikkeling kan beperk omdat gemeenskapswaardes, norme en gemeenskapsoortuigings lank neem om in ontwikkelende lande by eksterne ideës of tegnologieë aan te pas as gevolg van onvoldoende inligting. Hierdie faktore moet in toekomstige landboubesigheidstudies in ag geneem word.

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GLOSSARY OF ACRONYMS AND ABBREVIATIONS

AGRIBUSDEV	Agricultural Business Development Agency
AMTA	Agro-Marketing and Trade Agency
FAO	Food and Agriculture Organization
GAP	Good agricultural practice
GDP	Gross domestic product
GHM	Grossman-Hart-Moore
LDA	Linear discriminant analysis
NAB	Namibian Agronomic Board
NIE	New institutional economics
OHPA	Olushandja Horticultural Producers Association
SACU	Southern African Customs Union
SADC	Southern African Development Community
TCE	Transaction cost economics

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CHAPTER 1: INTRODUCTION

1.1 Background of the research

Globally, increasing agricultural productivity is critical to stimulating the rate of economic growth and development in developing countries, especially in Africa. Some studies on commercialisation in Africa have shown that it is a means of increasing farm households' incomes, and as a result reducing poverty (Kirsten *et al.*, 2012; Muriithi & Matz, 2014; Ochieng *et al.*, 2016). In African countries where agriculture is regarded as the backbone of the economy, excluding small-scale farmers from agri-food chains would pose a real threat to poverty alleviation and rural development (Kirsten, Dorward *et al.*, 2009; Mmbando *et al.*, 2015). Increasingly, agricultural expenditure is seen as one of the most important government instruments for agricultural development, which suggests a more active role for the state (Kirsten, Dorward *et al*., 2009; Kirsten *et al.*, 2012; Mogues *et al.*, 2012). As a result of poor market linkages and institutional failures, however, state-led agricultural development has not resulted in meaningful poverty reduction, especially in the rural areas, and consequently some physical infrastructure has become a 'white elephant' and money invested in these programmes has been wasted. These failures suggest that poverty alleviation could only be achieved through an integrated strategy addressing the most important factors that constrain access to physical, human, and financial resources (De Janvry & Sadoulet, 2005:82–83). Yujiro Hayami (1988), in his seminal work, discusses the interrelationship of market systems, rural community institutions, and government activities in the process of economic development in developing countries. He concludes that there can be a market failure, government failure, and, in some instances, community failure, either separately or jointly.

Market failure usually occurs because of four generally accepted reasons (Becker, 2008; Hill, 2013; Mogues *et al.*, 2012; Otsuka & Kalirajan, 2010; Parkin, 2012): The first problem is that the presence of externalities does not reflect the true cost or benefits of producing or consuming a good. The second problem is the supply of public goods because when they are provided for one, they are provided for everyone. Thirdly, organisations can gain inappropriate levels of market power, allowing them to block trade, resulting in imperfect market competition, which can lead to monopolistic, monopsonistic, or oligopolistic power and limited competition. Fourthly, information asymmetry[1] (imperfect knowledge) can result

[1] Information asymmetry' refers to when a party has different information to another. Note that ''information asymmetry leading to opportunism' refers to situations in which one set of agents in a transaction has more relevant information than another and uses the information to benefit itself at the expense of society.

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in adverse selection, moral hazard, and principal-agent problems, and ultimately institutional failures. For instance, asymmetric information will inevitably result in opportunism (hidden information known as adverse selection or hidden action known as moral hazard) (Mogues *et al.*, 2012; Ortmann & King, 2007a). Consequently, transactions in the market will result in a divergence between private costs and social costs and a failure to reach socially optimal levels in either the production or consumption of goods.

Moreover, inequality and thus poverty can simultaneously exist within both efficient and inefficient markets. Market failure tends to inhibit growth and deepen the incidence of poverty, especially amongst the rural poor in developing countries. Market failure thus provides a rationale for a variety of government interventions in the agricultural sector, with the government defining public policy in an attempt to correct market failure in order to improve the overall welfare of society (Chirwa & Kydd, 2009; Otsuka & Kalirajan, 2010). Dillon and Barrett (2016:13) contend that as African governments increasingly intervene to try to rectify perceived market failures, the onus now rests with researchers to precisely locate the sources and causes of market failures, especially those that impede productivity and income growth in agrarian communities in rural areas. De Gorter (2008:1) identified the following problems that are at the core of explaining inefficiency in government policy instruments: First, are the enforcement and commitment problems with regard to politicians' promises regarding policies and individuals who vote for them. Second, are the information and agency problems as a result of opportunistic behaviour among various participants in the political process.

The government also cannot solve market failure arising from the problem of asymmetric information as it does not have access to unobservable information (Otsuka & Kalirajan, 2010). Hayami has argued that community institutions can support market transactions by reducing information asymmetry (Hayami, 2009). This argument is not entirely correct because, in the real world, no community is perfect in eliminating opportunistic behaviour by individuals within that community. Hence, people within the community can benefit from free-riding and opportunistic behaviour, resulting in community failure due to information asymmetries and incentive compatibility structures as well as imperfect property rights, hence market failures (De Gorter, 2008).

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Hayami has also cautioned that any economic development system based on overreliance on state and community institutional arrangements would lead to inefficiency and increase inequality in the overall socio-economic welfare of the people. State-led agricultural development policies in Africa have not generally worked after African countries have gained their independence; neither have the market-liberalisation policies that followed. As a result, policies have been implemented poorly or not at all, or those that have been implemented well have not delivered sustainable benefits (Dorward *et al*., 2009:7).

Recently, a number of studies have focused on the interrelationship of community, market, and state institutions in economic development (Daftary, 2010; De Janvry *et al.*, 2010; Hayami, 2009; Mukherji, 2013). These studies indicate that there is a need for further exploration, especially of the role of the community in reducing transaction costs in economic development in developing countries. For instance, a study by Kalirajan *et al.* (2010) in India showed that community failure occurred as a result of some economically uninformed tribes within communities that did not participate effectively in capacity-building development programmes implemented by the state due to their traditional beliefs and norms. As acknowledged by Hayami, in this context, community failure can be associated with the long time that it takes communities to adjust to changing forms of culture, norms, taboos, and traditions with regard to the interaction of state and market. Undoubtedly, rural communities in developing economies have the potential to transform their norms in response to changes in economic environments (Hayami, 2009:114).

Globally, community failure may also be explained by existing shortcomings at the community level, such as a lack of knowledge or skills, disorganisation, stratification, conflicts of interest, inter-ethnic rivalry, and so on. Thus, community failure may be both the result and the cause of government initiatives (De Janvry *et al.*, 2010). Certainly, these concerns and the increasing prevalence of the failure of government interventions to ameliorate market failure in a developing country, especially in Africa, means that it is essential that robust studies be conducted to assess effective ways of bringing about agricultural development.

Moreover, in the provision of public goods, politicians act as patrons and provide services to their clients (voters) in order to get re-elected (Daftary, 2010; Mason *et al.*, 2013). By solidifying a support base of clients, politicians avoid being ousted from office despite poor

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performance. For example, many young democracies in southern Africa (for example Zambia and Malawi) may systematically direct subsidised farmer input support programmes, such as fertilisers bought with taxpayers' money, to areas where the government received strong community support in the previous election (Mason *et al.*, 2013:1–4). This process may result in inefficiencies that arise not because of political transaction costs but because of the political-economic interactions between politicians, voters, and interest groups (De Gorter, 2008; Keech & Munger, 2015).

In sub-Saharan Africa, especially in Namibia, small-scale farmers are facing various kinds of market challenges such as high risks, poor infrastructure, weak provision of finance, information asymmetries, economies of scale and weak systems of contract enforcement, market uncertainty, and markets that are often constrained by inadequate property rights and high transaction costs (Abdulai & Birachi, 2008; Haggblade *et al.*, 2010; Jordaan *et al.*, 2014; Masakure & Henson, 2005; Nothard *et al.*, 2005; Ortmann & King, 2010). Other key factors important for agricultural productivity are the distance from the market, adequate water, labour, crop choice, soil fertility, drought, diseases, pests, and so on (Fiebiger *et al.*, 2010; Kuvare *et al.*, 2008). The solutions to these challenges necessitate government interventions. Agricultural development in Namibia is also negatively influenced by both government and community institutions and organisations as discussed in the coming sections of this study.

1.2 Research problem

More than half of the Namibian population lives in northern communal areas and is directly or indirectly dependent on agriculture for their livelihoods. The country is a net importer of most food products. For example, domestic producers contribute about 44 percent of total domestic fruit and vegetable demand, while the remaining 56 percent is supplied by imports, mostly from South Africa (NAB, 2017). The commercialisation of agriculture in Namibia is considered central to employment creation, food self-sufficiency at the household level, rural development, and hence poverty alleviation.

The problem concerning Namibian agricultural development is rooted in a long historical system of transforming small-scale subsistence farmers into commercial enterprises to address skewed income distribution in the country. After the declaration of Namibia's independence from South Africa in 1990, the Namibian government started investing in infrastructure (physical and marketing) and human capital to develop the agricultural industry

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with the potential to improve the living standards of people. Despite government efforts to subsidise agricultural developmental activities, the outcome of public investment in agriculture is still characterised by low levels of productivity and high transaction costs in developing industries such as vegetable production in north-central Namibia. This has resulted in a slow pace of reducing poverty and addressing food insecurity.

The main constraints that hinder agricultural development in north-central Namibia and ultimately economic growth include land degradation, deforestation, marginal agricultural productivity, inadequate infrastructure support, recurring droughts, unpredictable rainfall, high temperatures, and poor soil fertility. In addition, land in communal areas in northern Namibia is owned by the state and the administration of access to land in these areas is handled by the traditional authority (Mendelsohn *et al.*, 2011:1–11). Thus, the state and traditional authorities may privatise land at their discretion and have been accused of allocating large tracks of communal land to themselves, while politicians, business, and wealthier people are accused of illegally fencing off land at the expense of small-scale poor households. Since land belongs to the state, farmers cannot use it as collateral to obtain credit from financial institutions due to the absence of property rights. This means that farmers have limited access to land as they have only user rights without title deeds.

Despite constraints to agricultural development in north-central Namibia the natural resources in the region are ideal for vegetable production under irrigation, but the area is remotely located to access both input and output markets. For the provision of inputs (seeds, fertilisers, and pesticides) farmers experience high transport and other transaction costs as these inputs are imported from South Africa. With the Namibian population estimated at 2.3 million (NSA, 2017), the domestic market for high-value crops is limited. The largest domestic market for horticultural produce is the capital, Windhoek (about 900 km south from the study area), which is not easily accessed by small-scale producers from the north-central regions due to high transport costs. Most of the supermarkets or retailers operating in the domestic market are owned by South Africans and procure food and fresh produce through their head offices that are based in South Africa.

As a result, these retailers often do not procure directly from Namibian producers, especially small-scale producers. Thus, the small-scale producers in Namibia are excluded and marginalised as supermarket chains (formal market) tend to source their fruit and vegetables

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through imports mainly from South Africa or favour larger farmers who can comply with their food quality standard requirements (Emongor & Kirsten, 2009). In addition, because of an increase in consumer demand and food safety concerns, the need to control for high perishability and safe handling involves specialised production, packaging techniques, and refrigerated transport, all of which require large capital investment, which small-scale producers are unable to make on their own (Kirsten & Sartorius, 2002:504).

The South African farmers have a comparative advantage over local farmers due to lower costs of production and higher transport costs to some extent are absorbed by a larger scale of production that lower unit costs. The local farmers also lack knowledge because they come from a community that does not prepare them for agricultural commercialisation. The constraints stated above obviously need government interventions to improve the competitiveness of small-scale farmers in Namibia.

However, many categories of government inefficiencies exist, for instance, inefficiencies stemming from government administration and inefficiencies stemming from democracy or government policy-making (De Gorter, 2008; Keech & Munger, 2015). A study by Vink (2012:2) raises two fundamental questions that agricultural economists in southern Africa must investigate, namely:

> First, what is the influence of public policy on the structure of agriculture? Here the structure of agriculture refers to the institutional organisation of the sector (in the public, private and voluntary/community spheres); its geographic organisation in terms of what is produced and then processed, distributed, and consumed, and where this takes place; and its business structure in terms of the modes of production practiced and the resulting mix of farm sizes. Second, what is the influence of the governance of farm businesses and agriculture businesses on their success from a financial, economic, social, and environmental point of view?

Furthermore, the problems associated with community institutions and organisations in agricultural development projects in Namibia need to be identified and assessed. Gonzalez (2014; refer also to Otsuka & Kalirajan, 2010) has identified three problems that can result in community failure: First, the poor within the community behave opportunistically due to information asymmetry or have limited information and as a result, their perceptions can jeopardise agricultural development projects. This is because the information is unequally

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distributed within communities, allowing some individuals to use it to control the benefits from the service more than others. Second, rural communities are poor and have very limited resources that can be very costly to obtain, sometimes resulting in conflicts and disagreements over available resources. In addition, the community is undermined by the costs of resisting the power of dominant interest groups and the temptation to free ride. Finally, the sustainability of managing agricultural development initiatives is constantly threatened by the conflicts of interest and the inequalities that exist amongst communities, such as the technical and entrepreneurial expertise required to manage new complex projects.

As discussed above, one can argue that the priority of the state (government) is not based on the reality of the market functions and is not aligned with the objectives of the community. As a result, little is understood about the impact of how the Namibian government deals with policy-inefficient instruments for the sustainable and equitable development of the agriculture sector.

For Namibia, only a handful of studies have addressed agricultural development based on linking development agendas to issues concerning the interrelationship of government, market, and community failure (Fiebiger *et al.*, 2010; Newsham & Thomas, 2009; Shapi & Likuwa, 2016). Detailed information on small-scale farmers in the commercialisation of agriculture schemes in Namibia is limited. This study aims to contribute to the literature. In southern Africa as a whole, some studies have addressed problems related to a lack of markets for both inputs and outputs (Louw *et al.*, 2008; Louw *et al.*, 2009; Mason *et al.*, 2013). Other problems cited by these studies include a lack of appropriate technologies and a lack of access to those technologies, inefficient extension services, insufficient physical and marketing infrastructure, a lack of credit as well as insufficient development of processing or manufacturing industries. Thus there is a need to design appropriate strategies for effective agricultural commercialisation policy implementation in Namibia and perhaps in other developing countries, especially in sub-Saharan Africa.

This study intends to contribute to and fill the gap found in the literature, as shown above, by identifying and assessing the main transaction costs (information, enforcement, monitoring, and searching costs) inhibiting agricultural development because of inefficient systems, combining the market, community and state institutions. The research question that this study tries to answer is why it would make sense for the government to invest in services to small-

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scale fruit or vegetable farmers if these farmers will not increase production, due to a lack of market access, unless they can make a profit, which probably implies heavy subsidisation of marketing infrastructures by taxpayers? In order to answer this question, the study uses a vegetable development case study in north-central Namibia. The researcher argues that successful agricultural development is directly related to effective government interventions to create and enforce institutional arrangements to deal with the transaction costs that are based on the reality of market and community institutions. The study explores the major role that insights from new institutional economics (NIE), especially transaction cost economics (TCE), play in the interrelationship of community, state and market institutions in agricultural development and is intended to develop a framework that should contribute to the development of agriculture where large amounts of public money are invested.

1.3 Objectives of the study

The main objective of this study is to determine the transaction costs between market, state, and community institutions in the small-scale production and marketing of high-value horticultural crops in the semiarid and isolated north-central region of Namibia. From this main, broad objective, the following five specific objectives were formulated with respect to the interrelationship between state, market, and community institutions in the development of small-scale enterprises:

1. To assess the role of different sources of inefficiency with regard to the interaction of market, government, and community in promoting agricultural development in developing countries (Chapter 3).
2. To determine socio-economic characteristics that influence small-scale vegetable farmers' participation in the production and marketing of high-value crops in north-central Namibia (Chapter 4).
3. To examine transaction characteristics that arise from the need to make investments in physical infrastructure by the state and on-farm activities by farmers that are specific to small-scale, high-value vegetable production and marketing activities (Chapter 5).
4. To develop an institutional framework based on the reality of the interrelationship of the market, community institutions, and government objectives in the development of the vegetable industry in north-central Namibia (Chapter 6).
5. To formulate relevant strategic policy options for further development of the vegetable industry that will enable the long-term survival of small-scale producers in

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the highly demanding globally competitive markets for high-value horticultural crops (Chapter 7).

1.4 Conceptual framework

The commercialisation of the agriculture sector in sub-Saharan Africa requires an understanding of the factors inhibiting the growth and development of this sector. As Hayami (2009) acknowledges, the nature and role of the community can best be understood through comparisons with the market and the state, which together comprise the economic system that coordinates economic activities in society. As can be seen from Figure 1.1, the first problem that leads to community failure, market failure and government failure in related transactions exchange amongst these economic systems is information asymmetry as a result of agency problems rooted in opportunistic behaviour. Second are the enforcement problems with regard to agricultural development initiatives by politicians who serve their interest in being re-elected, making policy implementation impossible. The third problem is associated with ill-defined property rights, which cannot be solved by market forces, resulting in social inequality or inefficiencies in resource distribution among citizens. From the conceptual framework in Figure 1.1 two thematic prepositions can be deduced that are described in the next subsection. Therefore, the presence of high transaction costs significantly contributes to the failure of agricultural development projects in most developing countries. As shown by a number of studies in rural areas, farmers are unable to overcome high transaction costs and as a result, are not able to enter into markets (Barrett, 2008; Haggblade *et al.*, 2010; Jordaan *et al.*, 2014; Mmbando *et al*., 2015). Similarly, the existence of significant transaction costs can pose an insurmountable barrier to collective solutions quite simply because such costs are likely to outweigh the potential gains resulting from cooperation (Blandford, 2007). In addition, rural farmers lack reliable market information as well as information on potential exchange partners (Ouma *et al.*, 2010).

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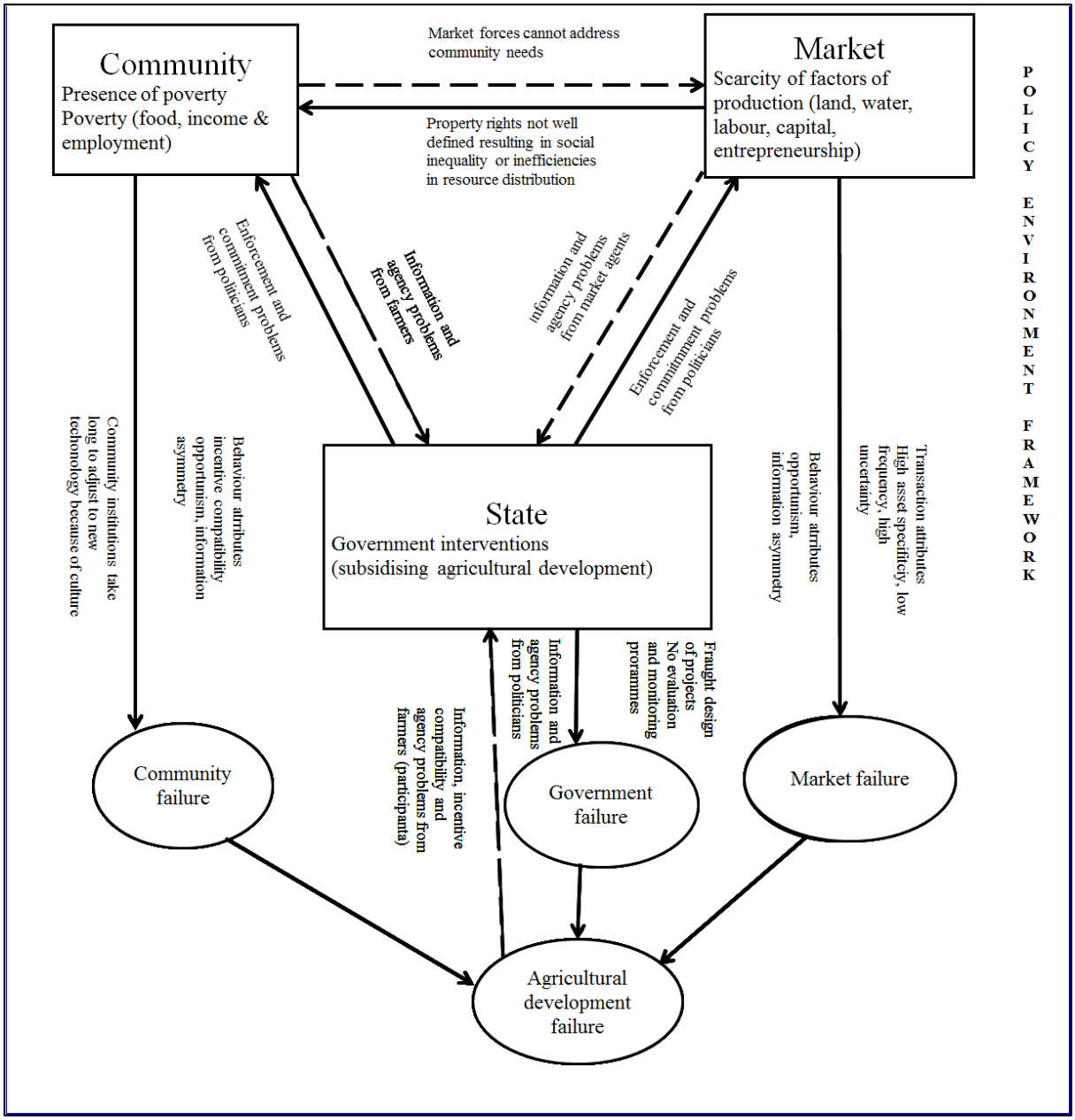

Figure 1.1: Conceptual framework of the interrelationship of community, market, and state

Information asymmetry is of growing importance in policy formation and evaluation in agriculture (Blandford, 2007). As agricultural policy evolves, the information required can be more complex and difficult to obtain. For instance, asymmetric information will inevitably result in opportunism (adverse selection or moral hazard) and high transaction costs (Mogues *et al.*, 2012; Ortmann & King, 2007a). Thus, the optimal completeness of a contract depends on the trade-off between marginal benefits and costs (Ortmann & King, 2007a).

Notably, agents often take advantage of the high cost of measuring their characteristics and performance and enforcing a contract and engage in shirking or opportunistic behaviour. The

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principal lacks the relevant competence to judge *ex-ante* incentives and *ex-post* governance aspects and often depends on the agent for such judgements (Mogues *et al.*, 2012). Thus, there is a need to further understand the principal-agent relationship by focusing on the incentive versus risk-sharing trade-off of contracts aimed at aligning the interests of the agent with those of the principal.

Technically demanding agricultural projects often have high transaction costs (negotiating, monitoring, or enforcing project responsibilities) and are more difficult to sustain as a community-driven process (Mukherji, 2013:1549). Of the transactional properties that have been examined empirically, asset specificity, or the redeployability of assets that support a given transaction to a different use or different user, is argued to be the most important and has subsequently been seen the most testing in the empirical literature (Macher & Richman, 2008:5). Transaction frequency has received far less treatment in the empirical literature in comparison with asset specificity and uncertainty; however, as Menard (2005:285) argues, all three are notoriously difficult to measure. Almost all the empirical literature avoids any attempts at measuring transaction costs directly, using instead a reduced-form model in which transaction costs are assumed to be minimised.

Transaction and related costs are the core of NIE. TCE is built on the important assumption that organising transactions involve costs (Parkin, 2012:115). In addition to the positive transaction costs, the allocation of resources and the development of new technologies depends on the prevailing governance structures such as the modes of governance to organise transactions and the characteristics of property rights (Menard, 2001:86).

There has been little systematic statistical analysis of agriculture or the organisation of agricultural transactions from a transaction cost perspective (Macher & Richman, 2008:36). Masten (2000) suggests that agricultural transactions display a broad range of governance structures, including the location-specific nature of the investments required and the temporal specificities associated with the perishability of agricultural products. As Masten (2000:190) argues, agricultural transactions provide a rich and largely unexplored area for application and refinement of transaction cost theory. Yet, the future of agricultural development in developing countries, especially in southern Africa, will depend on a successful model that combines the three pillars of economic organisation of community, market, and state and their complementary role in improving the welfare of society considering the influence of transaction costs on economic outcomes. In the next sub-section, the study embraces thematic

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propositions to be considered in understanding the triangular relationships of market systems, government interventions, and community institutions and how these constrain agricultural development and economic welfare in the fragile agro-ecological and socio-economic environment.

1.5 Key research themes

The government is supposed to set up and enforce institutional rules according to which markets operate and to mitigate market inefficiencies for the overall benefit of society. The first proposition in this study concerns the relationship between market and government failures, which could be attributed to the presence of a high level of transaction costs (Haggblade *et al.*, 2010; Jordaan *et al.*, 2014; Mmbando *et al*., 2015; Shiimi *et al.*, 2012) at both production and marketing stages along the supply chain for emerging small-scale vegetable producers in north-central Namibia. The first proposition is stated as follows:

> ***Proposition 1:*** *The design of agricultural development initiatives by the government is fraught with a poor understanding of community institutions and is not aligned with market reality, resulting in the failure of projects and the decline of economic welfare.*

The role of community institutions in many developing countries, being an important economic system affecting the development of agricultural initiatives, is being undermined (Hayami, 2009). For instance, community failure can stem from informal institutions including societal norms, customs, and traditions as their slow rate of change would require a longer period for communities to adjust to changing resource endowments and technologies as well as information asymmetry (Kalirajan *et al.*, 2010). In this context, the possibilities for implementing government interventions conducive to agricultural development and economic welfare are constrained by inefficient resource allocation stemming from government officials' administration and probably a lack of trust and incomplete information among project stakeholders. The question is what would happen when community institutions fail to manage resources when both market systems and government interventions have already failed to enhance agricultural development and economic welfare? The second proposition is stated as follows:

> ***Proposition 2:*** *The possibilities of the government implementing new agricultural development initiatives sustainably are constrained by the presence of information asymmetries and incentive compatibility problems and also agent problems that are the root cause of community institutions failing due to principal-agent relationships.*

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1.6 Methodology and data used

1.6.1 Small-scale vegetable producer case study

The study uses surveys, historical data, and in-depth interviews of key informants within north-central Namibia as a case study. Alston (2008) advocates the use of case studies because they allow the researcher to isolate the impact of theoretical concepts in a more detailed manner. Case studies mainly investigate a small number of units of interest purposefully selected out of a population of possible units such as countries, firms, households, groups, individuals, transactions, resources, regions, and political parties but also events such as revolutions, disasters, crises or wars, using mainly qualitative techniques (Beckmann & Padmanabhan, 2009:343). Although the number of units may be small, each unit may contain sufficient quantities of subunits that can be investigated using quantitative methods (Seawright & Gerring, 2008). Case studies rely on observable or recorded data and are capable of investigating historical as well as contemporary units or events. Information may be gathered in a variety of ways, such as documents, interviews, surveys, and participant observation. The main tool for verifying acquired data is triangulation, such as the simultaneous use of different sources of information (Beckmann & Padmanabhan, 2009:343).

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 (Menard, 2001, 2017). Case studies are especially important for NIE and TCE in particular because they enable us to analyse both the determinants and consequences of institutions and institutional change (Alston, 2008). According to Menard (2001:89), two types of case studies can be distinguished: One has to do with the construction of a stylised fact and is intended to provide an in-depth analysis of a specific question and related explanatory concepts. The other type of case study is developed by comparative case studies particularly relevant in NIE because of the need to deal with a limited number of discrete organising transaction modes that characterise society, both at the micro-level and at the institutional level. What is essential to the success of this approach is that a limited number of variables be isolated and kept under strict control by the researcher as the analysis proceeds (Menard 2001:90).

Although case studies are often criticised because of their lack of generality and possible *ex-post* rationalisation, they can be especially important to empirical TCE research when they focus on institutional and transactional details in an effort to understand unusual trade

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practices or the unique features of certain governance environments (as opposed to offering mere description) (Macher & Richman, 2008:8). Case studies are an important and necessary complement to econometric analysis (Masten & Saussier, 2000). Case studies provide a richer description and perspective than many statistical analyses offer and frequently represent the initial research steps that lead to subsequent refinements of transaction cost theory or future quantitative examinations (Macher & Richman, 2008:8). In this study, the case study technique is significant in understanding the historical dynamics of institutions and institutional arrangements that affect the efficiency of market systems, community institutions, and government activities.

The objectives of the study are achieved by using small-scale vegetable producer schemes as a case study in north-central Namibia. The case study includes producers directly supported by the Namibian government via the Green Scheme Project, (Etunda Irrigation Project) and the surrounding private vegetable producers (around Olushandja Dam) in the Omusati Region who do not receive direct government support for vegetable production. The Etunda Irrigation Project farmers are expected to commercialise given the resource availability and the support they receive from the government compared to private farmers around Olushandja Dam. Considering agro-ecological and socio-economic constraints, this case study was chosen because the Omusati Region is the most viable in north-central Namibia with the potential for irrigated small-scale vegetable production due to access to water from the Kunene River. In addition, small-scale vegetable producers have increased in recent years owing to government support in investing in physical, marketing, and processing infrastructure facilities, thus creating market access for domestic farmers. As a result, small-scale vegetable producers compete among themselves and with larger fresh produce producers as well as fresh produce imports from neighbouring countries such as South Africa for the same domestic market. Finally, the case study was chosen to assess the competitive advantage of small-scale vegetable producers given the existing policies, economic structures, and social, physical, and technological factors in the semiarid north-central regions of Namibia.

1.6.2 Research design and data collection

A mixed research approach, using qualitative and quantitative methods (Creswell, 2014) was adopted for this study. A qualitative design was used to collect in-depth information for understanding the dynamics of small-scale vegetable enterprises. The information gathered in

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this manner provides insights into the relationship and alignments between state, community, and market institutions which have resulted in the failure of some projects and the decline of the economic welfare of the farmers. Furthermore, information gathered with the qualitative approach provides insights into the information asymmetries, incentive compatibility problems, and also agent problems that are the root cause of the failure of community institutions. In addition, a quantitative approach was used to assess the relationships between socio-economic and agro-ecological variables in which small-scale vegetable enterprises operate.

The objectives of the study were achieved through methodological triangulation[2] such as the use of multiple methods to study a single problem (Wysocki *et al.*, 2003:119). This study relied on the following multiple data collection procedures: a household survey by face-to-face interviewing of individual farmers, direct observations, and interviewing of key informants. In order to address objective 1, secondary sources of data including the reviewing of existing literature associated with market systems, community institutions and state (government activities) as well as the theory of NIE and the development of the horticultural subsector in Namibia and elsewhere from both published and unpublished information were used. Specifically, the data that were collected for each case study included historical information concerning farmers' linkages with both input and credit suppliers, and with market and trading partners. Sources of data include historical records from producers, agricultural boards or marketing agencies, and grower associations. Historical data were also obtained by purposefully selecting farmers and experts in the study area, such as local traditional leaders, regional councillors, extension officials, and teachers for interviews. The aim was to gain insights into the factors influencing the interrelationship of the market, state, and community institutions in the commercialisation of the agriculture sector in northern Namibia.

In addition, a household survey with structured questions was conducted (APPENDIX A) to collect information that was used to address objective 2 of the study. The survey aimed to augment the qualitative information and to identify the characteristics of vegetable farmers

[2] Methodological triangulation is similar to what Bonoma (1985) called 'perceptual triangulation' as a method for providing a more complete picture of the business unit under study. Prime sources for perceptual triangulation include financial data, market performance data, market and competitive data, written archives, business plans and direct observations of management.

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(participants) in the study area. The 100 percent (census) farm household survey was conducted from May to July 2014. Because the vegetable industry in north-central Namibia is still in its infancy, only 78 farm households were selected purposefully and interviewed. Objectives 3, 4, and 5 were addressed using a combination of data sources that included observations, recorded data, key informant interviews, and household survey questionnaires.

1.6.3 Method of analysis

The research objectives were achieved by applying insights from TCE. The structural framework of analysis in this study was drawn from the arrangement of the market, state, and community institutions in agricultural development (Hayami, 1988) and TCE (Williamson, 1985, 2010). In order to address objective 2, nonparametric (descriptive) statistics and statistical analysis were applied to identify and analyse the factors (Fox, 2003; Gelman & Hill, 2007) constraining the sustainable production and marketing of vegetables in the case study. In order to examine transaction characteristics that arise from the need to make investments in physical infrastructure by the state and on-farm activities by farmers that are specific to small-scale, high-value vegetable production and marketing activities (objective 3), descriptive statistics (Gelman & Hill, 2007) was used together with thematic analysis (Braun & Clarke, 2006). Descriptive statistics (Gelman & Hill, 2007) and thematic analysis (Braun & Clarke, 2006) were also used to develop a framework based on the reality of the interrelationship of the market, community institutions, and government objectives in the development of the vegetable industry in north-central Namibia to address objectives 4 and 5.

1.7 Structure of the dissertation

This dissertation comprises three parts. The first part consists of chapters 2 and 3. These chapters provide a description of TCE and the arrangement of the market, the state, and the role of community institutions in the development of agriculture. Dealing with the theoretical issues of TCE was deemed important because it could be expected to facilitate the analysis of the development of the vegetable industry.

- In Chapter 2, a brief review of the theory of TCE is provided as insight into the theoretical underpinnings is important to establish inefficiencies in agricultural development in developing countries. Specific attention is paid to a discussion of property rights, principal-agent relationships, and collective action, and associated transaction costs used in the study. This is followed by a description of the arrangement of state and community institutions as employed in the study.

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- In Chapter 3, the assessment of the major challenges facing the development of agriculture in developing countries is discussed with special attention to market-led and state-led policies and community institutions in sub-Saharan Africa. The study aimed to investigate the market failure, state failure, and community failure and possible solutions for the commercialisation of agriculture in sub-Saharan Africa, specifically in Namibia.

The second part of the dissertation consists of empirical chapters 4, 5, 6, and 7. The chapters focus on a case study of small-scale vegetable farmers carried out in north-central Namibia in order to answer the central research question of the study.

- In Chapter 4, a description of types of farmers, socio-economic and agro-ecological characteristics that constrain the commercialisation of agriculture in the study area, and the farmers' decision to participate in the high-value crop (vegetable) industry is provided.
- In Chapter 5, transaction costs associated with governance structures in the study area are aligned with transaction attributes of asset specificity, frequency, and uncertainty based on TCE (Williamson, 1985). The chapter further discusses the influence of transaction costs or inefficiencies of the prevailing policy environment on the development of agriculture (vegetables) in Namibia.
- In Chapter 6, a model based on the interrelationship of the market, community institutions, and government objectives in the development of the vegetable industry is presented. The model aims to minimise transaction costs and enhance competitiveness in the development of the vegetable industry.
- In Chapter 7, strategic policy options for further development of the agricultural sector in particular agricultural commercialisation in communal areas such as north-central Namibia are discussed.

The final part of the dissertation is Chapter 8. In this chapter, a summary is given and the answers to the specific research objectives and some strategic policy options from the study are discussed in order to draw overall conclusions from the study. The chapter ends with recommendations for future research on this subject.

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CHAPTER 2: THE TRANSACTION COST ECONOMICS APPROACH IN ECONOMIC DEVELOPMENT: THEORY AND CONTEXT

2.1 Introduction

The objective of the chapter is to discuss thematic aspects from literature relevant to the development of the agricultural sector in developing countries, specifically the commercialisation of agriculture in sub-Saharan Africa. As a result, the TCE theory was reviewed. This helps to explain why it is necessary to consider the combination of market, state, and community institutions in the commercialisation of agriculture in developing countries, specifically in southern Africa where agro-ecological and socio-economic factors constraint the development of high-value crops. The focus in this chapter is based on the argument that there could be several institutional issues within the community and its organisation that could lead to the failure of agricultural development initiatives introduced by the state or the private sector (the market). It is also important to have a clear understanding of the literature on why market-led and state-led policies have failed in most developing countries after their independence.

The starting point in this chapter is a brief discussion of the TCE theory in order to establish the relevance of institutions and organisations to economic development. This is followed by a discussion of transaction costs, governance structures (markets, hybrids, and hierarchies) and selected aspects of property rights, the principal-agent relationship, and collective action used in the empirical parts of the study. Attention is paid to a discussion of the arrangement of state and community institutions employed in the study. This provides a better understanding of the relevance of combining market, state, and community institutions in agricultural development in developing countries. The chapter ends with reflections on how TCE can broadly assist in a better understanding of the dynamics of the arrangement of the market, state, and community institutions in the economic performance of developing countries such as Namibia.

2.2 A transaction cost analysis approach

The term ‘transaction cost economics’ (TCE) was first introduced by Williamson (1975), but the concept of transaction cost was introduced by Coase in 1937 who established that market exchange was not costless. He associated transaction costs with searching, information, negotiation, bargaining, monitoring, coordination, policing, and enforcement of contracts.

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Arrow (1969), cited by Furubotn and Richter (2000:40), defined transaction costs as the costs of running the economy. As a result, a transaction may be said to occur when goods or services are traded across a technologically separable interface. By definition, the organisation of technologically separable activities is not technologically determined but is a matter to which the comparative analysis of alternative forms of governance may usefully be brought to bear (Williamson, 1993:16). A major challenge when using a comparative analysis relates to the variety of conditions behind the diversity of organisational solutions (Menard, 2017:3). For example, different types of soil might impose a specific organisation and the use of irrigation might require extremely good cooperation between stakeholders to minimise transaction costs.

Moreover, Coase (1960) contends that the neoclassical result of efficient markets is only obtained when it is without cost to transact, but when it is costly to transact, institutions matter. However, transaction costs need to be distinguished from production costs, which tend to be a preoccupation of neoclassical analysis. Neoclassical theory assumes *inter alia* that transaction costs are zero (in other words the costs of obtaining information about alternatives and the costs of negotiating, monitoring, and enforcing contracts are zero), adjustment costs are zero, all resources are fully allocated and privately held, and owners allocate resources to use purely in response to pecuniary incentives (Royer, 1999:45). In a review of NIE and development theory Bardhan, (1989) relates transaction costs of market exchange to market failure.

NIE analysis at the microeconomic level takes the transaction as the basic unit of study and focuses on transaction costs, using contractual arrangements or agreements to bring about a transaction cost minimisation outcome among trading parties. According to Williamson (2010), TCE assumes that an organisation has the rationale of economising on transaction costs. Thus, governance structures, according to NIE theory, are aligned with transactions as the basis of effecting minimisation of transaction costs (McCann, 2013). A firm should select the institutional arrangement that minimises the sum of its production and transaction costs (Milgrom & Roberts, 1990; Royer, 1999). Therefore, this study needed to review and understand the scope and nature of TCE which is essential in the assessment of the vegetable industry in the north-central part of Namibia. In this context, there is a need to explain market failures by employing TCE theory in analysing the development of government-supported agricultural projects in developing countries such as Namibia.

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2.2.1 Basic assumptions of transaction cost economics

NIE assumes that individuals have incomplete information and limited mental capacity. Because of this, they face uncertainty about unforeseen events and outcomes and as a result incur transaction costs to acquire information. Yet, NIE makes a better understanding of actual human behaviour, institutions, and resource outcomes possible.

TCE's first behavioural assumption is that individual human beings are limited in knowledge, foresight, skill, and time (Williamson, 1989:139). Thus, bounded rationality, which dates back to Simon's work (1957), has since come to be associated with TCE as a result proposes several categories that limit an individual's choices. These are (1) imperfect and/ or incomplete information, (2) the complexity of problems, (3) limited human information-processing capacity, (4) the time available for decision-making processes, and (5) the conflicting preferences decision-makers have for organisational goals (Gonzalez, 2014: 76).

TCE's second behavioural assumption refers to "self-interest seeking with guile" (Williamson, 1985:47). This opportunism includes deceit, theft, cheating by abusing trust or breaking an agreement between negotiating or trading parties whenever it is deemed beneficial to one's position. Imperfect information makes economic actors vulnerable to opportunistic behaviour (Poulton & Lyne, 2009:143). As a result, transaction costs include both the costs associated with the adverse consequences of opportunistic behaviour and the costs of trying to prevent them (Royer, 1999:46).

Royer (1999:47) describes the three causes of incomplete contracts, namely: (1) bounded rationality (i.e. limits on the capacity of individuals to process information, deal with complex issues, and consider all possible contingencies); (2) difficulties in specifying or measuring performance; and (3) asymmetric information (in other words 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 – and transaction costs.

According to Mogues *et al.*, 2012, adverse selection refers to information about the conditions of the contract held by one party that other parties do not hold or cannot learn. A moral hazard is an action taken by one party that affects contract performance but cannot be observed or verified by other parties. Thus, the optimal completeness of a contract depends

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on the trade-off between marginal benefits and costs (Ortmann & King, 2007a:53). The existence of a well-developed body of contract law can help prevent some of the problems of opportunism that can arise because of incomplete contracting by specifying a set of standard provisions applicable to broad classes of transactions and by eliminating the need for parties to specify these provisions in every transaction (Royer, 1999).

2.2.2 Dimensions of transactions

Because of bounded rationality and opportunism, three characteristics of a transaction that exert systematic influence on economic behaviour are critically important in determining the optimal institutional arrangement, namely (1) the frequency (F) with which transactions occur; (2) uncertainty (U); and (3) the degree of asset specificity (AS) or idiosyncrasy of the transaction (Williamson, 1985, 2010). Together, these three attributes determine the following relationship (the symbols show the predicted impact of a positive variation of each characteristic on transaction costs (TC) (Menard, 2005:285).

$$TC = f(AS(+), F(-), U(+)) \quad (1)$$

Williamson (1991) argues that transaction costs increase with a higher degree of asset specificity and a higher degree of uncertainty and decrease with the frequency of transactions. As Menard (2005:285) suggests, all three are notoriously difficult to measure. Almost all the empirical literature avoids any attempts at measuring transaction costs directly, using instead a reduced-form model in which transaction costs are assumed to be minimised. Therefore, the more complex[3] a transaction, the more difficult and costly it is to encapsulate all its dimensions (*ex-ante*) and predict all adaptations required (*ex-post*). A simple framework of contracts may be preferable or even the only possible solution.

In light of the above, it is important to understand the problem and complexity associated with the measurement and definition of asset specificity, uncertainty about a transaction, and the frequency of a transaction. These transaction characteristics or attributes are relevant in the analysis and assessment of agricultural commercialisation in developing countries such as Namibia.

[3] For instance transaction characteristic that involve privacy and technical change are increasingly complex with regards to the development and protection of new technology. In addition the higher the degree of programmability, the lower the level of supervision required and the higher the degree of non-separability the more difficult it is to determine the unit of output (Mahoney, 1992).

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2.2.2.1 Degree of asset specificity

Asset specificity refers to the degree to which an asset can be redeployed to alternative uses and by alternative users without sacrificing productive value (Williamson, 1991:281). Williamson (1991:281) distinguishes different types of asset specificity: (1) site-specificity; (2) physical asset specificity; (3) human asset specificity; (4) dedicated asset specificity; (v) intangible asset specificity (brand name capital); and (6) temporal specificity (Sykuta & Chaddad 1999).

Royer (1999:48) explains the first four asset specificities 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. Human asset specificity refers to acquired skills and knowledge of a group of workers that are more valuable within a particular relationship than outside it and that may interfere with conversion to another relationship. Dedicated assets are assets in which an investment is made based on a promise of a particular customer's business without which it would not be profitable. Brand name capital refers to the realisation of the future value of the brand name, which can only be ensured within a particular transaction (Groenewegen *et al.*, 2010). According to Sykuta and Chaddad (1999:73–74), temporal specificity results from the time-sensitive value of agricultural products and production processes that create another margin that may entice opportunistic behaviour by trading parties.

In the studies by Milagrosa (2007) and Jordaan & Grové (2013), the specific types of asset specificity are elicited using proxies (Table 2.1). This approach was used in this study to assess the attributes of the transaction that contribute to the transaction costs faced by vegetable farmers in the Omusati Region (north-central) Namibia.

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Table 2.1: The specific types of asset specificity and their proxies

Asset specificity	Proxies
Site assets	Agricultural production, Access to productive land, Availability of water, Climatic conditions (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,
Temporal assets	Availability of physical assets (cooling and packing facilities) 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	Number of times the fresh produce is sold during the previous season
Uncertainty	Information asymmetries (withholding important information on produce), Opportunistic behaviour, Delay payment from trading partners, The demand for fresh produce and consumer preferences

Source: Adapted from Jordaan & Grové 2013; Milagrosa 2007; Royer 1999; Williamson 1985

A strategic aspect relevant to many agricultural producers is the problem of asset specificity that may render them vulnerable to opportunistic behaviour by product-purchasing firms (Torgerson *et al.*, 1998:7). Thus, a problem of hold-up arises "when one party in a contractual relationship seeks to exploit the other party's vulnerability due to relationship-specific assets" (Royer, 1999:49). Once investments in relationship-specific assets have been made, the trading parties involved may have few or no alternative trading parties. This eliminates competitive trading; the asset's opportunity cost will fall because its value in its next-best use will be less than its value in its current use, creating quasi-rents[4] as a result.

2.2.2.2 Degree of uncertainty surrounding the transaction

Gödel's incompleteness theorems for the philosophy of the mind in 1951 argued that human intellectual capability is not representable by a Turing Machine: or, we can never know with mathematical certainty what such a machine is (Fano & Graziani, 2011). This argument enables us to understand in analytical depth the real implications of the philosophy of the mind. Thus it is important to distinguish between risk and uncertainty. Knight (1921) makes a crucial distinction between risk and uncertainty. He argues that situations with risk are those

[4] A quasi-rent is the portion of a relationship-specific asset's earnings in excess of the minimum required to keep the owner from exiting the relationship once the investment has been made. A quasi-rent is the difference between the revenue that the owner of the asset actually receives and the revenue that the owner must receive to be induced not to exit (Royer, 1999).

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in which decision making involves unknown outcomes but known *ex-ante* probability distributions. In uncertain situations, the exact set of all possible outcomes and/or the probability of a possible outcome are unknown (Groenewegen *et al.*, 2010:16). Thus, transactions often involve uncertainty with regard to both the behaviour of the contracting parties and market developments (Groenewegen *et al.*, 2010:121). Uncertainty surrounding the organisation of a transaction may involve significant costs, whether from agents' behaviour, organisational deficiencies, inadequate institutions, or the nature of the state (Menard, 2005:285).

2.2.2.3 Frequency of transaction

According to Williamson (1985, 2010), the frequency of transaction matters, because the more often a transaction takes place, the more widely spread are the fixed costs of establishing a nonmarket governance system. The frequency of transactions at which trading parties interact may result in implicit mutual understandings that reduce the need for formal contractual enforcement mechanisms. This may lead to substantial investments in transaction-specific resources, which make it more expensive to look for another trading partner and make it harder for rivals to take over the same position. Williamson (1989:144–145) refers to this process as a fundamental transformation.

2.2.3 Dimensions of governance

Governance can be defined as the body of rules, enforcement mechanisms, and corresponding interactive processes that coordinate the activities of the persons or network of organisations involved to allocate and monitor assets with regard to a certain outcome (Fischer *et al.*, 2007:123, Menard, 2017:2). Thus, governance may be defined as the institutional framework, broadly consisting of markets, hierarchies, and hybrids, through which a transaction is channelled (Menard, 2017:2). Williamson (1991) also argues that increases in asset specificity, the degree of uncertainty, and the frequency of transaction which are necessary to the results of this study are associated with shifts from spot markets to hybrids to hierarchical forms of governance.

2.2.3.1 Market governance

Markets represent a costly subset of the many institutional arrangements that have developed over time for transferring rights (Menard, 2005:303). Hence, markets specialise in the exchange of property rights through mechanisms that require the mutual consent of parties

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involved and coordinate the decentralised decisions made by agents using the information provided through the price system (Coase, 1937). One characteristic of markets from a transaction cost perspective is that they are organised (Furubotn & Richter, 2005); that is, markets are embedded in institutions that shape them. Thus, the neoclassical model serves as the benchmark for NIE when discussing market issues: supply, demand and the price mechanism form the hardcore of markets, as exemplified by spot markets (Menard 2005:302; Eaton *et al*., 2008: 20). The spot markets are preferred by small-scale horticultural farmers in north-central Namibia as formal markets will have quality requirements which they are not able to satisfy (Fiebiger *et al*., 2010). Thus, the market governance structure is relevant to the study of the high-value crop market in north-central Namibia.

Market transactions are supported by classical contract law, which means that more formal terms supersede less formal terms should a dispute arise (Williamson, 1991:271). Thus, according to Chaddad (2009:7), markets adapt autonomously to disturbances as partners react to changing relative prices and other market signals and reposition themselves. Williamson (1991) says that A-adaptation (autonomous adaptation) prevails. This is in line with the neoclassical price model in which consumers and producers respond independently to parametric price changes to maximise their utility and profits. Moreover, the market works on the basis of high-powered incentives, little administrative control, and a contract-law regime which is well suited to implementing autonomous adaptations but poorly suited to effecting cooperative adaptations (Williamson, 2005:7).

2.2.3.2 Hierarchical governance or vertical integration

Hierarchies bring all parties and activities into a single entity and use administrative rules to decide the allocation of rights (O'Malley, 2009:9). Firms rely most on the hierarchy for coordinating. Hierarchies, which use organisational command and control to allocate resources (Dorward *et al.*, 2009:26), are the basis of operations in government, parastatal agencies, most nongovernmental organisations, and anything other than the smallest private firms.

Hierarchy uses low-powered incentives and considerable administrative control and the courts are differential (Williamson, 2005:7). The courts do not usually intervene in disputes among branches of hierarchies (Williamson, 2005:9–10). The parties in a dispute resolve their differences internally by referring unresolved issues to a higher hierarchical level for

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settlement, drawing on fiat that is not possible in the market (Chaddad, 2009:8). The implicit contract law of internal organisation is grounded in the principle of forbearance (Williamson, 1991) as courts following the business judgment rule refuse to hear disputes among internal divisions. According to Williamson (1991:274), the hierarchical type of governance is its court of ultimate appeal a situation not experienced in the agricultural sector in north-central Namibia.

Therefore, hierarchies adapt to unanticipated disturbance of the distribution of rewards by administrative coordination. Adjustment to an unanticipated change in the distribution of rewards can be rapid, with high bureaucratic costs, but the stranding of specific assets can be avoided (O'Malley, 2009:9). However, to overcome the main costs of maladaptation during the bargaining interval, recourse to a different coordinating mechanism is needed. The adaptation of these kinds of coordination mechanisms' is referred to by Williamson (1991:279) as C-adaptation (coordinated adaptation).

2.2.3.3 Hybrid forms of governance, intermediate contract or partial ownership

Hybrids as an intermediate form of governance possess the combined characteristic advantage of the market and vertical integration (Milagrosa, 2007:26). In particular, hybrids are characterised by semi-strong incentives, an intermediate degree of administrative apparatus, semi-strong adaptations of both kinds, and a semi-legalistic contract law regime (Williamson, 1991:281). The viability of the hybrid depends on the efficacy of credible commitments (penalties for premature termination, information disclosure and verification mechanisms, specialised dispute settlement, and the like), the cost-effectiveness of which varies with the attributes of transactions (Williamson, 2005:7).

Hybrid forms of governance structure include various types of long-term contracts, joint ventures, dual sourcing (partial vertical integration), holding companies, and public enterprises (Joskow, 2005:302). Hybrid forms of the organisation include sharing arrangements such as franchising or agricultural sharecropping, groups of firms organised as networks, clusters or alliances, and reciprocal investments or reciprocal trading arrangements (Menard, 2004:21–22). Additionally, cooperatives are also conceptualised as a hybrid with a distinct governance model blending market-like attributes with hierarchy-like mechanisms (Chaddad, 2009; Makadok & Coff, 2009). Menard (2004) classifies the variety of hybrid arrangements into four generic configurations, namely trust, relational network, leadership,

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and formal government, which are defined as intermediate governance modes between markets and hierarchies. Thus, the hybrid models seem to be relevant to the study of the high-value crop market in north-central Namibia.

Menard (2017:12-15) discusses three problems related to hybrid governance arrangements. The first problem is how hybrids can secure cooperation in order to achieve coordination without losing the advantage of decentralised decisions. The second problem is the existence of relational contracting, which also plays a crucial role in other forms of organisations. But what distinguishes hybrids is that their contracts link activities and resources among partners who simultaneously operate unconnected transactions (Menard, 2005:296). A third problem is hybrids' relation to competition, which also exists among agents in a firm. The difference in the case of hybrids lies in the combination of interdependence and autonomy: partners remaining residual claimants in charge of their own decisions. Thus, partners compete against each other and hybrids usually compete with other arrangements, including other hybrids.

2.2.4 Transaction costs associated with property rights

The question of whether ownership should be private (individual) or social (collective) has been discussed widely in literature (Alston & Mueller, 2005:573–590; Furubotn & Richter, 2005:79–198). Property rights are defined as the claims, entitlements, and related obligations among people regarding the use and disposition of a scarce resource (Furubotn & Pejovich, 1972:1139). This definition is relevant to arrangements of the market, state, and community institutions in agricultural development which is the focus of this study. Three elements of property right ownership are outlined in the literature (Furubotn & Richter, 2005; Mwangi & Meinzen-Dick, 2009). The first is the right to make use of an asset (*usus*), such as the right to access the resource. Examples are to withdraw from or consume a resource (pick some wild plants) or to exploit a resource for economic benefit (graze cattle on common pastures). The second is the right to the income or appropriate returns from the asset (*usus fructus*). This includes the right to earn income from a resource even when using it indirectly can be separated from use and management of the resource, for example when government departments collect revenue from water users or when communities in parts of eastern and southern Africa collect a charge from tour operators in their common lands. The third is the right to change the form and substance of the asset, including the right to bear consequences in the value of the asset (*ubusus*). Examples are the rights to management (plant a crop),

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exclusion (prevent others from accessing the field), and alienation (rent out, sell, bequeath or give the rights).

Property rights include the right to benefit or harm oneself or others (Demsetz, 1967:347). Based on Coase's (1960) article "The problem of social cost" or Coase's theorem, externalities can be internalised if property rights are well established in a world with zero transaction costs. Although Coase's theorem was aimed at the legal and political treatment of economic and environmental externalities, the same principles apply in the context of the firm organisation (Sykuta & Chaddad, 1999:73). Coase's argument was used to counter Pigou's call for government taxes to curb negative externalities.

In the presence of transaction costs, different systems of property rights may produce different outcomes of efficiency as well as equity (Kherallah & Kirsten, 2002; Kirsten *et al.*, 2009). Establishing property rights to assets involves transaction costs. NIE links the minimisation of these transaction costs with the creation and design of different forms of organisation and contracting (Torgerson *et al.*, 1998:7). In a world of zero transaction costs, contracts would be fully complete (Sykuta & Chaddad, 1999:72).

Property rights theory regarding incomplete contracting of the firm was developed by Grossman and Hart (1986) and Hart and Moore (1990, 1999) and became known as the Grossman-Hart-Moore (GHM) model. The property rights theory is based on the idea that ownership of non-human assets is a source of bargaining power when contracts are incomplete (Hart, 2017:741). The incomplete contract theory has been useful for understanding topics such as the meaning of ownership and the nature and financial structure of the firm. The incomplete contracts refer to property rights and are concerned with why ownership of assets (human and physical) matters (Kirsten *et al.*, 2009:50). In general, ownership matters because it provides power when contracts are incomplete. Contracts are necessarily incomplete because information is presumed to be asymmetric between trading parties and/or because signals regarding at least one party's performance and/or the state of the world are not verifiable (Sykuta & Chaddad, 1999:72). According to Torgerson *et al.* (1998:6) many policy analysts, the economics of property rights can help explain and correct many kinds of market failures and provide alternative solutions to those of activist government.

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Thus, the private property system could imply that all resources are in the possession of private owners who receive all the benefits and bear all the costs associated with ownership (Groenewegen *et al.*, 2010:95). Note that goods are exclusive if other people can be prevented from effectively using those goods and that goods are said to be rival when consumption reduces the amount of the goods available to others. Thus, private goods (property) are both exclusive and rival, while purely public goods are nonexclusive and non-rival (collective consumption goods). According to Poulton and Lyne (2009:144), most agricultural goods and services are indeed private goods. However, some supporting services required by agricultural producers, for example, technical and market knowledge, exhibit characteristics of public goods. This relationship is relevant to understanding the development of the agriculture sector in northern Namibia.

Moreover, state (public) property or state governance means that the rights to the resource are vested exclusively in government, which in turn makes decisions concerning access to the resource and the nature of exploitation thereof (Feeny, 1990:5). Individuals and communities frequently have rights of access, use, and sometimes even decision making on communal land that is officially government (public) land (Mwangi & Meinzen-Dick, 2009:296). In the case of communal land in Namibia, which is the focus of this study, the land is governed by the Communal Land Reform Act, No. 5 of 2002. The problem of commons and common property started when Gordon (1954) used the term 'common property' to describe open access (nonproperty) of fisheries. The misunderstanding continued with papers such as "Toward a theory of property rights" (Demsetz, 1967) and "The tragedy of the commons" (Hardin, 1968). The key distinction here is between common property resources and open access.

Common property is a management regime that closely resembles private property for a group of co-owners (Bromley, 1991:94), while open access is what Demsetz (1967:356) refers to as communal property: this is prone to mismanagement by users. Open access refers to the absence of well-defined property rights; access to the resource is unregulated, and anyone is free to use the asset regardless of how their use affects the use of others (Alston & Mueller, 2005; Feeny, 1990). This means that in the absence of constraints on users such as those provided by informal community norms, more formal property rights, or other types of state regulation, individuals competitively exploit the resource rapidly and wastefully (Libecap, 2005:545). As a result, each user would have the incentive to overuse the resource

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eventually, resulting in its depletion and destruction a situation experienced in north-central Namibia.

Ostrom (1990:1, 2008:17–18) recommends that the 'state' control most natural resources to prevent their destruction; alternatively, privatising those resources will also solve the problem. This thesis will use insights from property right theory that may help in minimising transaction costs associated with the commercialisation of agriculture and how communities can operate collectively to facilitate the production and maintenance of public goods in agricultural development initiatives in developing countries as will be discussed in the coming chapters.

2.2.5 Transaction cost associated with collective action

In Olson's *The logic of collective action* (1965)[5], he explains the decisions involved in interest groups' use of collective goods. This theory of collective action includes the use of common-pool resources such as water, land, fisheries, wildlife, and forests by interest groups. The economic theory of collective action is concerned with the provision of public goods and other goods and services that are collectively consumed through the collaboration of two or more individuals and with the impact of externalities on group behaviour (Kirsten *et al.*, 2009:50). Unless a group has very specific characteristics, the provision of the collective goods is doomed to fail (Reuben, 2003:2). Collective action is not found everywhere, and even where it is found, it is not always inclusive, especially of the poor (Meinzen-Dick, 2009:328). Collective action problems are particularly acute in situations involving multiple governments across international boundaries, such as global warming (Alston & Mueller, 2005:582).

It is important to note that individuals cannot be excluded from consuming collective goods even though they might not contribute to their production. This may lead an incentive to free-riding, which tends to result in inefficient collective outcomes in that public goods are underprovided (Nabli & Nugent, 1989:1338). As a result, to overcome free-riding will therefore increase the transaction costs involved in joint ventures and this is very likely to produce collective action failures because it lowers the production of the public good. According to Gonzalez, (2014: 87) contracts that oblige individuals to monitor the activities

[5] See also the tragedy of the commons" by Hardin, (1968).

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of other parties are a critical strategy for minimising transaction costs by ensuring that they make sure that other parties do not fail to meet their obligations. However, the development of contracts and the coordination of interactions among individuals is always a costly process in the provision of a common good or service. Coordination of common resources is more commonly achieved by the state or collective action institutions than by the market (Meinzen-Dick, 2009:321). According to Meinzen-Dick (2009:321), much of the coordination that takes place is embedded in broader social institutions, such as people adhering to social rules and norms as well as social networks.

In addition, collective action is a useful tool for analysing how the free-rider problem can be overcome, according to Kherallah and Kirsten (2002:116), with cooperative solutions for the management of common resources or the provision of public goods. Similarly, studies (Kirsten *et al.*, 2009) have shown that special local institutional arrangements, including customs and social conventions designed to induce cooperative solutions, can overcome the difficulties of collective action and help to achieve efficiency in the use of such resources (Bernard & Spielman, 2009; Marcos-Matas *et al.*, 2013). As a result, small-scale farmers can use collective action through agricultural cooperatives to improve their access to markets. The use of farmer groups for technology dissemination and even for demanding technologies indicates the potential of collective action to improve access to information (De Janvry *et al.*, 2010; Place *et al.*, 2002).

It is easier to invoke collective action to manage resources when people live near one another and when they live close to the resource because such proximity increases the regular interaction of people with one another and with the resource (Meinzen-Dick, 2009; Ostrom, 2014). However, if people do not expect any benefit from the resource, they are less likely to contribute and cooperate. As a result, one can argue that collective action is successful when the total social benefits exceed the total social costs of a particular public good or institutional change. Collective action theory thus can significantly enhance our understanding of how participants maintain motivation and how incentives encourage them to cooperate or to behave opportunistically and the institutional arrangements that communities use to deal with these problems.

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2.2.6 Transaction costs associated with agent theory

The principal-agent theory originated with articles by Ross (1973) and Stiglitz (1974). According to Barry *et al.* (1992:1220), the agent relationship also referred to as the principal-agent relationship, is defined as an explicit or implicit contract in which one or more persons (the principal) engage another person (the agent) to take action on behalf of the principal. At the centre of the agent relationship lies the alignment of the objectives of each party and the distribution of information among parties. An agent is expected to follow the objectives of the principal so that these objectives can be achieved optimally.

Problems with regard to the principal-agent relationship arise because the objectives of the agent are usually not the same as those of the principal, and thus the agent may not always best represent the interests of the principal (Alchian & Demsetz, 1972; Ortmann & King, 2007b; Royer, 1999; Sykuta & Chaddad, 1999). The principal should have the power to discipline the agent and therefore to enforce agreements (North, 1990:33), but problems of policing and enforcement are not trivial for principals, as they do not have complete information on all the attributes or characteristics of the performance of an agent, and have to devote costly resources to measure and monitor them (North, 1990:32). The agent's self-interest causes informational asymmetry and uncertainties about future events, resulting in incomplete contracts. The terms of an agency relationship are usually defined in a contract that specifies the compensation to be paid by the principal to the agent conditional on the execution of specific actions by the agent and/or the observation of particular outcomes by the principal (Royer, 1999:50). Agency theory's primary focus is on incentive and measurement problems, and while the basic unit of analysis in TCE is the transaction, in agency theory it is the individual (Mahoney, 1992:567).

The theory is relevant for analysing issues related to share-cropping contracts, rural credit, incentive contracts in corporations and cooperatives, and insurance contracts based on the transactional contract between principals and agents (Sykuta & Chaddad, 1999:72). Agency theory is thus very relevant to the institutional structure of cooperatives because employed agents (managers) may not act in the best interests of cooperative owners/members (principals) (Ortmann & King, 2007a). Cooperatives experience greater principal-agent problems than proprietary firms because of the lack of capital market discipline and a clear profit motive, and the transitive nature of ownership (Bernard & Spielman, 2009; Marcos-Matas *et al.*, 2013; Richards *et al.*, 1998).

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Agency theory will enable us to understanding the funding or sponsorship relationship between actors in many agricultural development schemes in most developing countries that are relevant to this thesis. Agent theory will enable us to identify problems associated with politician captured of community leaders for self-interest and how to overcome these problems. In addition, the agent theory enables us to identify the costs and difficulties that principals incur in monitoring and sanctioning the activities of actors involved in running agricultural development schemes which are the focuses in this thesis as discussed in the coming chapters.

2.3 Transaction costs associated with the institutional arrangement of the state

The concept of a state as defined by Ellis (1996:8) includes the whole set of public institutions responsible for administration and enforcement of policy decisions. In this respect, economic concerns are about inefficiencies created by state intervention in the economy of a particular country, including its implementation of, for example, agricultural development programmes and projects. Furthermore, many inefficiencies and biases in resource allocations by the state are not merely the effect of bad decisions but are more fundamentally the consequences of the weakness or absence of mechanisms through which society can hold the state accountable for its actions on government policies and programmes that do not meet societal needs (Farrington *et al*., 1993:9). As a result, there is a need to better understand state interventions and, in turn, state failure, as will be discussed in the coming chapters.

The state has a legitimate role to intervene through enhanced capacity and new forms of governance, correct market failures, regulate competition and engage strategically in public-private partnerships to promote competitiveness in the agribusiness sector and to support the greater inclusion of small-scale farmers (World Bank, 2007:8). Unfortunately, the government can fail; for instance, the very nature of government can lead to systemic failures that prevent it from adequately and appropriately addressing the needs of citizens (Becker, 2008:17). The public choice theory assumes that government failure occurs mainly because of (1) misuse of budgets; (2) division of principal-agent interests; and (3) excessive regulation due to seeking 'institutional rents' (see, for example, Abers *et al.*, 2017; Becker, 2008; Otsuka & Kalirajan, 2010). This means that the main categories of government inefficiency stem from government administration and policy setting, both of which were necessary to meet the objectives of this study.

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Furthermore, state enforcement or implementation mechanisms of new agricultural initiatives are vulnerable to disinformation. As a result, they do not operate well unless a complementary mechanism ensures the accuracy and veracity of the shared information (Fafchamps, 2004: 25). The problems of commitment thus prevail, which according to De Gorter (2008:9) are twofold: First, politicians (incumbent or rival) cannot make binding commitments regarding their future actions. Second, voters cannot commit to politicians in the future because the latter no longer possess the political power to enforce such promises. Thus, there is a need to assess formal institutions such as constitutions or other legal institutions that can enhance the commitment to enforce contracts among economic agents. This is so because, most importantly, political promises are not formal legal contracts and as a result, contractual penalties between politicians and voters are not enforceable by third parties (De Gorter, 2008:9). Thus, politicians may renege on their policy promises while voters may renege on their promised votes. In view of this argument, political enforcement mechanisms such as elections are imperfect. The inefficiencies arise not because of political transaction costs but because of the political-economic interactions among politicians, voters, and interest groups (De Gorter, 2008:9). Thus, in Chapter 6 an investigation on the information, monitoring, and enforcement costs or transaction costs associated with state interventions in the commercialisation of agriculture or the development of the vegetable industry in north-central Namibia is presented.

Due to incomplete or asymmetric information, administrators (politicians) and farmers alike have the incentive to behave opportunistically for their benefit from government programmes or projects. For example, in the case of politicians, the fundamental principle is to deceive voters or withhold information from "rationally ignorant voters" (De Gorter, 2008:12). Incomplete information increases politicians' re-election chances by increasing the costs of the project or programme evaluation. One reason for this is that property rights, for instance to a particular agricultural project or programme and its benefits and costs are not well defined in the political marketplace. For agricultural products, whenever access to information about possible sources of demand or supply is limited, economic exchange involves high searching costs (transaction costs). In the case of farmers, De Gorter (2008:12) argues that farmers are assumed to have more information on agricultural policy effects, for example with regard to budgets and interests of different segments of the farming sector. In this way, farmers can behave opportunistically to benefit themselves because of hidden

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information that is not known by administrators of agricultural projects in many developing countries such as Namibia.

It is also important to understand the theoretical concepts of institutional issues within the community and its organisation that could lead to the failure of development initiatives introduced by the state or the private sector (market), which are discussed next.

2.4 Transaction costs associated with the arrangement of community institutions

A community is defined as a group of resource users at the local level that is formally or informally constituted with a common purpose. Members share the same culture, traditional norms, interests, values, and beliefs and cooperate, socialise, and network according to these (see Agrawal, 1996:6; McCay & Jentoft, 1998:22). In this regard, public choice theorists take a methodological individualist stance and tend to see communities as the aggregate outcomes of the strategies of individuals, influenced by incentive structures to which some of them may have contributed via collective action (McCay & Jentoft, 1998:22). Thus, with regard to the development of agriculture in most developing countries, which was the focus of this study, free riding and opportunistic behaviour can result in community failure due to information asymmetries and incentive structures as well as imperfect property rights, hence market failures. This means that in the absence of constraints on users such as those provided by informal community norms, more formal property rights, or other types of state regulation, individuals competitively exploit the resource rapidly and wastefully (Libecap, 2005:545). Each user would have the incentive to overuse the resource eventually, resulting in its depletion and destruction. Ostrom (1990:1, 2014: 17–18) recommends that the "state' control most natural resources such as land to prevent their destruction; alternatively, privatising those resources will also solve the problem.

It is therefore important to have a clear understanding of social embeddedness, which means the extent to which an entity is subject to its social environment (Karaan, 2009:203) and its influence on the development of agriculture in developing countries such as Namibia. Social embeddedness refers to the nature of interpersonal relations and social networks as well as personal contacts between managers and other actors who are important to the performance of the economic activity (Knutsen, 2003:560). One aspect of social embeddedness is that culture and tradition influence peoples' relationships and seem to play a particularly important role in contractual relations as they are concerned with trust (Hurrelmann,

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2002:10). Social embeddedness, which is located at Level 1, the highest level of Williamson's (2000) framework of social analysis, means that the rate of institutional change is very slow and changes take place over centuries or millennia. Informal institutions governing social embeddedness include societal norms, customs, traditions, and religion (Williamson, 2000:596). NIE suggests that institutions usually change as the result of a long and often painful process of competition and adaptation and that those changes are only sustained if beliefs and norms change as well (Shirley, 2005:632). It is important to note that social embeddedness does not strictly fall within the realm of economics but rather within that of social theory; however, its profound impact on the economic functioning of institutions necessitates that it be considered integral to a comprehensive understanding of the origins and roles of institutions (Kirsten *et al.*, 2009:58). In this study, social embeddedness was analysed from the perspective of trust and collective action shaping the development of the high-value crop industry in north-central Namibia.

Moreover, analysis of community institutions draws on social capital theory[6] (Milagrosa, 2007:22). Social capital is considered an important factor in explaining the economic success of countries (Beugelsdijk & Van Schaik, 2001; Durlauf & Fafchamps, 2004). Therefore, it was necessary for this study to review the institutional structure and organisation within the communal areas of north-central Namibia governed by traditional tribal village chiefs and their communities' contribution towards improving social capital and trust in reducing transaction costs. Thus, appropriate strategies to contribute to agricultural development in rural areas could be identified. Trust is a central component of social capital as it determines the strength of social ties (Durlauf & Fafchamps, 2004; Milagrosa, 2007; Murray, 2008). Thus, trust minimises transaction costs and contributes to flexibility.

Portes and Landolt (2000:532) highlight four negative consequences of social capital, namely (1) the exclusion of outsiders from networks; (2) excess claims on individuals who are network members (due to free riders); (3) restrictions on the individual freedom of those within the network; and (4) downward levelling norms (in networks that are considered undesirable or suboptimal). Milagrosa (2007:24) claims that this might occur especially in tribal communities strongly tied by their culture such as those in rural areas of Namibia.

[6] Putnam (1995:67) defines social capital as features of social organisation such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated actions.

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2.5 Summary

The objective of this chapter was to discuss thematic aspects from literature relevant to the development of the agricultural sector in developing countries, specifically the commercialisation of agriculture in sub-Saharan Africa. The analytical scheme considered two economic development models, namely Williamson's (1985, 2010) TCE and Hayami's (1988) economic development approach (combined market, state, and community institutions). These models were considered in the study because both consider the analysis of transaction costs in their structures. The Hayami model also considers the need to investigate institutional issues within the community and its organisation that could lead to the failure of development initiatives introduced by the state or the private sector (market). Despite the limitations associated with these theoretical approaches, the frameworks were found to be essential to achieve the objectives of this study. The theoretical frameworks will feature in the remainder of the chapters of the dissertation.

The chapter presented a general overview of TCE, which defines transaction characteristics that help in understanding inefficiencies in the development of agriculture in developing countries. TCE improves our understanding of why individual human beings are limited in knowledge, foresight, and skill, as a result of which their choices may constrain the development of agriculture. The three attributes of transactions that influence economic behaviour and are critically important in determining the optimal institutional arrangement are (1) the frequency with which transactions recur; (2) uncertainty regarding transactions; and (3) the degree of asset specificity. These are the principal dimensions relevant to a meaningful transaction analysis in this study. Asset specificity is the most important transaction attribute because a high degree of asset specificity may render the owner of the asset vulnerable to opportunistic behaviour by product-purchasing firms or individuals. A problem of hold-up arises when one party in a contractual relationship seeks to exploit the other party's vulnerability due to relationship-specific assets. For instance, in vegetable production, opportunity losses might arise when a trading partner depends on specialised processing or knowledge of products from another partner.

The transaction cost analysis in this study was also based on matching transaction attributes with the most appropriate generic forms of governance structure, namely market, hybrid, and hierarchy. This was done because of the increases in asset specificity, the degree of uncertainty, and the frequency of transactions that shift from spot markets to hybrids to

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hierarchical forms of governance. For instance, the market governance structure prevails in less efficient situations with low asset specificity and low uncertainty when compared to hierarchy and hybrid governance structures. The hierarchy governance structure prevails in most efficient situations with high asset specificity and high uncertainty where transactions are governed by administrative rules (authority). The hybrid governance structure is more efficient in a situation where an intermediate form of governance prevails with moderate levels of both asset specificity and uncertainty. The governance structures that seem to be relevant to the study of the vegetable industry are the market and hybrid models. These are governance structures that can exist between farmers and traders or agents in the high-value crop market.

Insights from TCE also improve our understanding of transaction cost analysis associated with property rights, collective action theory, agency theory, and institutional analysis in the development of agriculture in developing countries. Thus, in this study, it was important to examine transaction costs and problems associated with theories on property rights, collective action, and principal agents, especially when using common-pool resources or public goods, as well as the resultant kinds of market failures that may result into missing input, output and credit markets, especially for small-scale farmers. Understanding transaction costs would give insight into how people (community) shape their choices on the utilisation of public goods and their opportunistic behaviour as well as the costs involved in accessing and using the information in the commercialisation of agriculture. It was also deemed necessary to investigate problems of asymmetrical information, incentive compatibility, and politicians' self-interest in the development of the vegetable industry.

TCE may also provide us with insight into the arrangement of the market, state and community institutions in the development of agriculture and as a result allow us to focus on issues such as competition for resources, how they are allocated and how benefits and costs are distributed. It will enable us to understand why markets, states, and communities fail in the development of agriculture in developing countries. Policy-makers need to promote institutional innovations that adjust to both the cultural and the institutional environment to be reliable within competitive market systems and to promote the country's welfare. It is then essential to have a better understanding of market-led and state-led policies as well as the role of community institutions in the development of agriculture in developing countries, as discussed in the next chapter.

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CHAPTER 3: CHALLENGES OF AGRICULTURAL COMMERCIALISATION IN DEVELOPING COUNTRIES OF SUB-SAHARAN AFRICA

3.1 Introduction

The objective of this chapter is to investigate the major challenges facing the commercialisation of agriculture because market-led and state-led policies as well as community institutions have failed in fulfilling their role in the development of agriculture in most developing countries after these countries had gained their independence. The chapter focuses on the arrangement of the market, state, and community institutions for two reasons: The first is to understand constraining factors in the interrelationship among the community, the market, and the state in agricultural development. The second is to understand why investments in agricultural development increase while most projects have failed, especially in developing countries of sub-Saharan Africa. These arguments require a sound application of economics and other social sciences to understand the economic implications and economic performance of poor agrarian economies. The chapter thus mainly provides answers to Objective 1 of this study.

The chapter commences with a discussion of agricultural development in developing countries with an emphasis on transaction costs and market failures relevant to market-led and state-led policies. The second section briefly discusses the opportunities and challenges of agricultural commercialisation that are relevant to the evaluation of the economic performance of the vegetable industry, which was the focus of this study. The third section briefly outlines the implications for agricultural development in Namibia, which can be used as a basis of transaction cost and market failure analysis in the vegetable industry. A reflection on the chapter is presented in the summary and conclusion section.

3.2 Agricultural development in Africa: An overview

There is extensive literature on the role of agricultural development in broader development processes, including the work of Johnston and Mellor (1961) and Timmer (1988), supported by the more recent empirical work of among others Barrett *et al.* (2010), Carr (2001), Christiaensen *et al.* (2011), and Collier and Dercon (2014). Millions of people in Africa live in rural areas, and directly or indirectly depend on a large part of their livelihoods on agriculture. Although increasing agricultural growth has been a critical driver of poverty reduction in some parts of the world, its performance in most parts of Africa has been

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disappointing, with continual low per capita growth over the years. For example in sub-Saharan Africa excluding Nigeria, per capita income rose by just 1.1 percent in 2017 (African Development Bank, 2018:6). Yet agriculture is seen to play a key role in the economies of most developing countries in Africa, like Namibia, as the sector (1) contributes to gross domestic product (GDP), (2) contributes to foreign exchange earnings, (3) contributes to the employment of a number of people as farmers or farm workers, and (4) contributes to the household food security of poor people (FAO, 2002a:7). As a result, large amounts of public money have been invested in agricultural development projects and programmes that have been implemented across African countries for many years since the 1960s (see, for example, Carr, 2001). However, in most circumstances, public investment in agriculture is usually low and sometimes declining (Mogues *et al.*, 2012:17). In other circumstances, it is sufficient for agricultural development but, as Troskie (2013:6) argued, the main constraints are a lack of well-defined interventions for the sector.

Public spending was a success story in yielding sizeable marginal benefits in terms of poverty alleviation and income generation in rural areas in the south, east, and southeast Asia, in countries such as India and China (Mogues *et al.*, 2012). Thus public investments have led to sustainable and impressive agricultural productivity that was called the Green Revolution. This included public investments in technology and services, as well as infrastructures such as roads, agricultural research and development, and education. In Africa, for example, the deleterious impact of the decades-long downward spiral of public investments in agriculture has led to the initiation of a concerted, continent-wide effort since the early 2000s to increase agricultural investments in the form of the Comprehensive Africa Agriculture Development Programme (CAADP) (Mogues *et al.*, 2012). Thus this programme was proposed to support African governments in establishing public investment priorities and strategies for promoting rural economic growth and poverty alleviation.

There have, however, been some important agricultural development successes in most African countries in both the pre-colonial and postcolonial periods. Examples are the use of ox ploughs in Uganda; the cultivation of such new cash crops as cocoa, coffee, cotton, and groundnuts across the continent; the release and adoption of improved high-yielding maize varieties in east and southern Africa; and horticultural enterprises (Carr, 2001; Dorward *et al*., 2009; Eaton *et al*., 2008; Gabre-Madhin & Haggblade, 2003; Tiffen, 2003). In addition, major research successes for agricultural development include the development of new rice

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varieties (New Rice for Africa [NERICA]) and the control of cassava mosaic virus and cassava mealybug in a pan-African action that benefited millions of farmers and consumers (Gabre-Madhin & Haggblade, 2003).

The increase in demand for high-value fresh and processed food products was driven by rising disposable income, population growth, rapid urbanisation, liberalised trade, advancing technology as well as consumer taste and preferences, and access to information (Kapoor & Kumar, 2015; Weatherspoon & Reardon, 2003; Wiggins, 2005). However, these successes have, with a few exceptions, been too limited in scope to significantly increase overall agricultural productivity and improve the welfare of farmers and consumers in Africa – especially in sub-Saharan countries (Dorward *et al.*, 2009). As a result, there is a need for a better understanding of market failures with respect to market access to credit, input, and output as will be discussed in subsequent sections. The next subsection is about agricultural intensification and its roles in agricultural development.

3.2.1 Intensification

One of the objectives of agricultural development in Africa is to achieve sustainable intensification with the adoption of new technologies that use, for instance, integrating soil fertility strategies (combining organic and inorganic fertilisers) and intensifying production in combination with the preservation of functional biodiversity (Marongwe *et al.*, 2012; Phalan *et al.*, 2011; Tscharntke *et al.*, 2012). The aim is to increase land and labour productivity. There is, however, a growing concern that the expansion and intensification of agriculture may lead to degradation of the natural resource base such as soil, water, vegetation, and biodiversity, resulting in a decrease in agricultural production. For instance, conventional agricultural intensification often results in contamination by pesticides and fertilisers, which can affect human health and create non-target effects on wildlife and functional agro-biodiversity (Tscharntke *et al.*, 2012:56). However, FAO (2002a:20) argued that the lack of sound management practices and access to appropriate technology and inputs for agriculture, rather than intensification, is the most serious cause of environmental degradation. Sustainable intensification is made difficult in the production of staple food (e.g. maize, millet, and wheat) crops which are meant for household food security and with low productivity. This is because the presence of large numbers of producers, small-scale traders, and consumers make coordination difficult and, with variable and often small margins,

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investment in technology and in coordinating institutions is discouraged (Dorward *et al*., 2009:12).

Intensification is also associated with problems, including poor roads and telecommunications; poor human health; lack of a well-developed and diversified monetary economy; and inadequate markets for agricultural inputs, outputs, and finance, despite significant direct and indirect dependence of the local economy on agriculture (Dorward *et al.*, 2009; Marongwe *et al.*, 2012). Other general problems unique to small-scale agricultural circumstances in Africa include limited insurance (Binswanger & Rosenzweig, 1986; Shapi & Likuwa, 2016), the prevalent HIV/AIDS epidemic (which can affect the productive labour force); relative scarcity of water (both for human basic needs and for direct production in irrigation agriculture); and low levels of soil fertility (see, for example, Carr, 2001; Newsham & Thomas, 2009; Sartorius *et al.*, 2014). Furthermore, Fafchamps (2004:11–12) noted challenges with high transaction costs in Africa, which make market exchanges more costly, cumbersome, time-consuming, and unpredictable than elsewhere in the world.

3.2.2 State-led agricultural development

State-led agricultural commercialisation is a result of government intervention in the presence of market failure when there is a divergence between private costs and social costs, and socially optimal levels in the production or consumption of goods cannot be reached as a result of market failures. Hence, state intervention was considered an effective instrument for agricultural development. For example, state intervention enables access to public sector financial resources to invest in organisational and human resource development; infrastructure; and the coordinated delivery of research, extension, financial, and input and output marketing services. Thus, Hill (2013:96) has argued that policy initiatives ostensibly developed to deal with the market failure need to take into account corresponding state failure.

In general, the state-led agricultural development policies in poor rural economies of most developing countries in Africa did not work after these countries gained independence, despite large government expenditure on agricultural development. This is so because many policies have not been implemented or have been implemented only in part or very poorly; those that have been implemented well have often not delivered sustainable benefits (Dorward *et al*., 2009:7).

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Moreover, policies to address poverty in rural and agricultural areas take many forms (De Gorter, 2008; Mogues *et al*., 2012; OECD, 2010; Rausser & Swinnen, 2010; Russo *et al.*, 2011). The first prominent policy that is intended to have the most direct and immediate effect is the provision of direct transfers in the form of cash, food, or other in-kind goods to lowest-income households. These transfers either are without additional requirements or are conditional on household investments in human capital or labour contributions for agricultural or other investments. The second widely used expenditure measure as a poverty-alleviation tool is the subsidisation of poor small-scale farmers' costs (mainly costs of production), such as the provision of price subsidies on agricultural inputs. However, these policy instruments typically have perverse distributional effects, with larger farmers benefiting more than small-scale farmers (OECD, 2010:14).

In addition, one group of theories (Cox & McCubbins, 1986; De Janvry *et al.*, 2010; Dixit & Londregan, 1996) put emphasis on the supporter model that suggests that politicians act as patrons and provide services to their clients (voters) in the form of provision of public goods to the communities where they have received the strongest electoral support as rewards for loyalty to be re-elected. In other cases, the emphasis is put on the swing-voter model that predicts that politicians target communities with more swing voters whose political behaviour could be influenced by public goods provision. As a result, reaching small-scale farmers, most of whom are poor, is thus overshadowed by evidence that subsidy programmes have promoted political patronage and the interests of rural elites (Mason & Ricker-Gilbert, 2013; Smale *et al.*, 2014; Xu *et al.*, 2009).

There are many complementary determinants of agricultural productivity, but the most important ones emphasised in the literature are fertiliser and improved seed (Chibwana *et al.*, 2012; Holden & Lunduka, 2010; Mason & Jayne, 2013; Minde *et al.*, 2008). Fertiliser market development is a strategy to improve farmers' access to fertiliser; that is to say, improving the policy environment, strengthening and expanding the network of private agri-input dealers with training and credit, and providing farmers with information about fertiliser use through advisory services and demonstration plots (Minot & Benson, 2009:4). Thus, many governments throughout sub-Saharan Africa devote a large share of their public budgets to implement subsidy programmes (Mason & Jayne, 2013:55). However, many African small-scale farmers seem to use much less commercial fertilisers than is economically optimal because they lack information on how to use fertilisers effectively and profitably. Small-scale

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farmers are also risk-averse in the face of uncertain rainfall and lack the cash to pay for fertiliser because of low income and poorly functioning credit markets (Minot & Benson, 2009:2).

Equally, price support and input subsidies are inefficient, and governments, therefore, use infra-marginal support policies such as quotas, hectare restrictions, farm payment limits and so on that are at the same time more efficient and prevent dilution by reducing the number of farms receiving support (Acemoglu & Robinson, 2001:649). Thus, the inefficient redistribution policies in agriculture, such as price supports and input subsidies, are enacted to encourage newcomers in order that farmers uphold future political power (Acemoglu & Robinson, 2001:650). In this case, the inefficient policy instruments do not arise because of political transaction costs, but because of the political-economic interactions between politicians, voters, and interest groups (De Gorter, 2008:9). Furthermore, Rausser and Swinnen (2010:312) have identified three agricultural policy instruments on the role of governance structures in the implementation of public policy in developing countries such as Namibia. The first set is quantitative public goods policies, such as agricultural research and development. The second set is quantitative redistributive policies, which would include direct farmer support, such as dryland crop subsidy programmes. In contrast to quantitative policies, the third set is structural policies that seek to modify economic institutions, such as laws, property rights, and contractual arrangements. As a result, structural policies involve changing transaction costs.

Government interventions also involve organisational interventions, such as parastatals, state-sponsored cooperatives, and agricultural finance organisations (Dorward *et al.*, 2004). Farmers' organisations, for example, can function as an important catalyst for innovation adoption and upgrading of production systems through promoting efficient information flows (Fischer & Qaim, 2012:1267). Despite many successes, producer organisation effectiveness is frequently constrained by legal restrictions, low managerial capacity, elite capture, exclusion of the poor, and the failure to be recognised as full partners by the state (World Bank, 2007).

According to Dorward *et al.*, (2009:14), government intervention in most developing countries was thus seen as causing distortions in the economy via, for instance, protecting inefficient local industries and, as a result, limiting local competition and private sector

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development. Consequently, government intervention was considered to be a corrupt and expensive drain on already overspent government budgets and hence leading to difficulties in macroeconomic stability (FAO, 2002a:25).

Furthermore, government interventions in African countries, especially in southern Africa, are also needed to ensure good access to markets, especially for small-scale farmers, for two reasons which are becoming increasingly important, as was noted by Carr (2001). The first derives from the growing prosperity of developed countries and their demand for luxury products and for organically grown produce. This is not an easy market, but it is one that African countries such as Namibia should not ignore. The second is the expanding urban population within Africa itself, which offers real opportunities for farmers.

3.2.3 Market liberalisation and agricultural development

In many developing countries, especially in Africa, governments have undertaken to privatise inefficient state-owned enterprises and to eliminate marketing boards and other inefficient regulatory agencies in recent decades (FAO, 2002a). In addition, nongovernmental organisations (NGOs) have promoted the privatisation or dismantling of agricultural marketing parastatals and deregulation of these markets; and, as a result, eliminated credit, input, and output subsidies (Dorward *et al.*, 2009:15). However, Namibia still follows the model concept of agricultural marketing boards, such as the Namibian Agricultural Board (NAB), but the role of this board in agricultural commercialisation is not well defined.

The outcome of the market liberalisation and structural adjustment (or market-led) policies was, however, mixed (Dorward *et al.*, 2009). For example, these policies appear to have successfully stimulated growth in poor countries with dense populations, good infrastructure, and diversified agriculture and rural economy, such as Bangladesh. Similarly, these policies appear to have benefited lower- to middle-income countries, where staples production is no longer the basis of the livelihoods of most of the poor. On the other hand, for most African countries in sub-Saharan such as Namibia, the record has not been so bright. These policies have not generally succeeded in enhancing agricultural development in poor rural economies owing to the lack of transformation of the agricultural sector. The state has failed to implement market liberalisation policies. Thus, it is fair to ask why both state- and market-led approaches to development generally appear to have failed in Africa, whereas both have worked in parts of the world such as Asia. As a result, there is growing interest in the

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development of new institutional frameworks involving the state, the private sector, and stakeholder groups in agricultural development (Kirsten, Dorward *et al*., 2009:xxii).

3.2.4 Public-private partnership

The private sector in Namibia has a role to play, not only by being a catalyst for economic growth and development but also by working with the government to implement developmental policies through public-private partnerships (NDP4, 2012:53). Governments are increasingly turning to public-private partnerships to build and operate public infrastructures such as roads, schools, prisons, hospitals, and water facilities (Valero, 2015:111–112). In this case, the contractual relationships will depend heavily on the following assumptions (Valero, 2015:113). First, consider a strong institutional framework that allows the private sector to enter into long-term contracts knowing that the government commits itself not to engage in opportunistic behaviour. Second, consider a weak institutional framework in which the government cannot commit to long-term contractual agreements. In this case, the long-term nature of contracts leads the government to behave opportunistically. On the other hand, strict guidelines should be in place for the implementation and monitoring of private firms (public-private partnerships) by governments to prevent opportunistic behaviour because of incentives associated with principal-agent relationships. Recently, the OECD (2015) developed a policy framework for investment that addresses the issue of sustainable and inclusive development through the lens of private sector-led development.

There is a need for private sector involvement in agricultural development (OECD, 2015). However, the government's diminished ability to engage the private sector cooperatively may be related to issues of limited efficiency. However, the reasons may also be financial. The government and private sector alike can help small-scale farmers to expand and upgrade their range of assets and practices to meet the new requirements of supermarkets and other coordinated supply chains (World Bank, 2007:127). The options include public good investments to increase farmers' productivity and connectivity to markets; policy changes to facilitate trade and market development; and public-private efforts to promote collective action and build the technical capacity of farmers to meet the new standards (World Bank, 2007:128). Investors will need to work with local communities to engage small-scale farmers, and a variety of institutional arrangements (land rental, contract farming, and out-grower schemes) can be used to combine the assets of investors (capital, technology, and markets) with those of local communities and small-scale farmers (land, labour, and local knowledge)

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(Deininger *et al*., 2011:34). In addition, the role of community as an important economic system, as introduced by Hayami (1988), is significant for sustainable agricultural development and is discussed next.

3.2.5 Role of community in agricultural development

Yujiro Hayami's (1988) work suggested a triangular model to conceptualise the role of the rural community in development, as it specified jointly the roles of the state, the market, and community institutions in economic performance. His model was based on how the community could play an important role in making both the markets and government work better. There were high expectations that the community could assume functions that markets and states could not perform so well (Platteau & Abraham, 2002:105). Understanding this interrelationship is important for developing countries, such as Namibia, where governments are investing in agricultural commercialisation of high-value crops to improve small-scale living standards.

A number of studies have shown how the Hayami model works (De Janvry *et al.*, 2010; Feder *et al.*, 2010; Hayami, 2009; Kalirajan *et al.*, 2010). First, there are distinctive features of the community such as local information, trust and norms, and social capital, and interlinked transactions that can help reduce transaction costs, adverse selection, and moral hazard, overcoming many market failures. Second is that the community can assume functions on behalf of or instead of the state, such as the delivery of public goods and, as a result, regulating externalities across community members. The state reciprocally works with the community in helping it more effectively to assume these functions. This includes reinforcing local administrative capacities, promoting inter-community cooperation when there are economies of scale beyond the community, and changing community institutions for instance on property rights or towards more participatory decision-making processes (De Janvry *et al.*, 2010).

Hayami (1988) pointed out that agricultural production activities by nature are strongly interdependent because of the agro-ecological interdependence of biological processes. Thus, an example of a major source of market failures in an agrarian community in a developing country is pervasive externalities. For instance, diversion of irrigation water upstream may result in a water shortage for downstream farms along a river basin. In this case, individual small-scale farmers are too small to internalise such a production externality. Thus

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community relations are sometimes relied upon to reduce conflicts over the use of such a resource and to correct such market failures. Thus, the institutions that govern the use of resources efficiently in the villages are customary rules such as norms, rather than formal laws and explicit contracts (Hayami, 2009).

Hayami (2009) furthermore noted that the community can also become an obstacle to growth. As a result, the community can oppose new agricultural development initiatives. For instance, it is difficult for market-oriented producer organisations, which are the potential source of net social benefits, to be established in community structures with high social homogeneity (as a result having a strong capacity to enforce sharing norms) and high exposure to natural risks (as a result of the need for sharing mechanisms) (Bernard & Spielman, 2009; De Janvry *et al.*, 2010). In this case, institutional richness under formalised rural community organisations does not always translate into substantial economic benefits. Consequently, the community remains an under-used opportunity to support the competitiveness of small-scale farmers and rural development (Bernard *et al*., 2008:2203) in developing countries, including Namibia.

Moreover, sustainable community development employs a community assets (capital) framework that suggests communities comprise six assets or capital: natural, physical, economic, human, social, and cultural (Hendrickson *et al*., 2011:54). As a result, community-driven development projects have attracted a lot of interest as an alternative to top-down, centralised mechanisms for managing local public goods (Mukherji, 2013:1549). However, strong participation is only possible for a limited range of services, as problems associated with participation can only be avoided by finding effective ways of balancing the need for bottom-up control with top-down authority (Brett, 2003:18). In this case, asymmetrical information is expected to make top-down approaches less effective in agricultural development, while asymmetrical power relations at the local level and weak accountability mechanisms in the use of public funds can open the door to politician capture (De Janvry *et al.*, 2010). In this study, it is important to assess how rural projects are managed in Namibia and how the decentralisation policy is implemented. For example, in Namibia, the interests and influence of traditional authorities and elites (politicians) are that management of and rights over communal land remain unregulated, and it is due to these influences that no action has been taken against people who have appropriated large farms, even though the practice is prohibited by the Communal Land Reform Act (Werner, 2011:1, 45).

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Wealthier members of the community often become transformed into greedy individuals who show less and less restraint in enriching themselves at the expense of their community, as they are legitimated by politicians (De Janvry *et al.*, 2010). For example, in sub-Saharan Africa, it is a frequent practice for chiefs to co-opt new elites in their village 'associations', such as by creating neo-traditional titles that are then sold to the new rich eager to acquire a political base in the rural areas (Platteau & Gaspard, 2003:1688). On the other hand, in order to curb the unbearable influence of the vested interests of local power holders, a strong and effective central government must exist that is determined to confront the clientelism of rural areas in an environment rife with rent-seeking opportunities (Platteau & Gaspard, 2003:1697). There are also examples of communities that fail even when projects were identified by the community through community-based organisations because the implementation is dictated by the central government (De Janvry *et al.*, 2010).

Moreover, the state is not singularly responsible for community failure, as communities are pressured by internal and external forces such as markets. For example, in some cases, the state and/or market forces have played a critical role in eroding the capacity of collective action of communities (Otsuka & Kalirajan, 2010). In other cases, the failure may be explained by already prevailing shortcomings at the community level, such as lack of knowledge, disorganisation, stratification, conflicts of interest, inter-ethnic rivalry, and so on. Equally, lack of capacity building, especially the building of organisational skills at the community level, and lack of 'ownership' of the projects by the beneficiary groups have been recognised to be among the main limitations of agricultural development projects in developing countries (De Janvry *et al*., 2010; Platteau & Gaspard, 2003).

3.3 The role of agricultural commercialisation in the high-value crops sector

Agricultural commercialisation refers to the process by which farmers increase their productivity (efficiency) by producing greater output per unit of input (land and labour) and produce greater farm surpluses, which can be sold in the market, thereby increasing farmers' market participation and, as a result, raising their income and improving their standard of living (Jayne *et al.*, 2011:1). The goal of the process is to achieve greater output and agricultural growth, which implies a process that links a large proportion of the rural farming population to commercial high-value chains (Jayne & Muyanga, 2011). As a result, agricultural commercialisation can help to lift subsistence farmers out of poverty (Kirsten *et*

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al., 2012; Maertens *et al*., 2012; Meemken & Qaim, 2018; Muriithi & Matz, 2014; Tapela, 2008).

Kirsten *et al*. (2012:2) argue that agricultural commercialisation can occur on either the output or input side. First, on the output side, a farming household can become commercialised by increasing its marketed produce. However, most small-scale farmers fail to participate in markets as sellers because they sometimes have no or inadequate surpluses to sell (Barrett, 2008; Jayne *et al*., 2010). The lack of marketable surplus results from no or inadequate use of improved techniques of production owing to lack of investment, which eventually leads to low yields – a situation referred to as a low equilibrium poverty trap (Barrett, 2008). Second, on the input side, a farming household can become more commercial by increasing its usage of purchased agricultural inputs. In essence, many subsistence farmers use very few purchased inputs, but as they gradually shift from subsistence farming towards market orientation, they start to increase their investment in farming (Kirsten *et al*., 2012:2).

In the past two decades, horticulture has been identified as one of the fastest-growing agricultural subsectors in sub-Saharan Africa (Henson & Jaffee, 2008). For example, McCulloch and Ota (2002) show that contract farming in Kenyan horticulture export chains significantly increases farmers' incomes. These authors found that small-scale farmers' access to horticulture export chains in Kenya is determined by farm size and access to irrigation. Some studies indicate that the sex of farmers also matters, and that female farmers are largely excluded from supplying high-value export chains (see, for example, Kirsten *et al*., 2012; Maertens & Swinnen, 2009). Jayne *et al*. (2002), Masakure and Henson (2005), and Ortmann and King (2010) indicate various kinds of market failure such as high risks, poor infrastructure, weak provision of finance, information asymmetries, inadequate economies of scale, and weak systems of contract enforcement, market uncertainty and markets that are often constrained by inadequate property rights and high transaction costs. Other key factors which affect agricultural productivity are the distance from the market; water and labour availability; crop choice; declining soil fertility; drought; disease and pest outbreaks; and land fragmentation (Fiebiger *et al*., 2010; Kirsten *et al*., 2012). In addition, other studies mention increasingly stringent requirements for product quality and food safety as demanded by supermarkets and wholesalers, consistent quantity (volume), high quality, timeous deliveries, a certain size and type of product, and so on, posing special challenges for

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small-scale farmers wishing to compete in international markets (Emongor & Kirsten, 2009; Louw *et al*., 2008; Weatherspoon & Reardon, 2003).

The debate on agricultural development, and hence commercialisation, follows different arguments, with some scholars arguing for the efficiency of small-scale agriculture (Delgado, 1999), while others argue for large-scale, modernised commercial farming (Collier & Dercon, 2014; Hazell *et al*., 2010) and for large estates and state farms (White *et al*., 2012). Some scholars furthermore point to emerging patterns of commercial farming on so-called "medium-scale farms" (Jayne *et al*., 2014; Sitko & Jayne, 2014), while others argue for integration arrangements between estates and out-growers through contract farming (Von Braun & Meinzen-Dick, 2009). Moreover, Tipraqsa and Schreinemachers (2009:45) grouped the origins of the different types of agricultural commercialisation as follows:

- In some cases, commercialisation involves contract farming.
- In some cases, the commercialisation is initiated externally by companies or governments.
- In some cases, commercialisation is more gradual and driven by farmers supplementing their subsistence production by various cash crops, in order to augment their incomes.

The last two types of commercialisation are taking place in north-central Namibia, where this study is focused. On one hand, commercialisation is initiated by the government where farm households are selected to participate in high-value crops with direct support from the government in terms of both physical and marketing infrastructures, as well as input subsidies. On the other hand, individual farm households participate through self-selection by participating in cash crop production to meet their households' needs and sell the surplus. In both, the contractual relationship is limited, with most farm households deciding individually what crops to grow and where to sell them (mainly local informal markets).

The risk of investing in, for example, high-value crops in Namibia is high where various issues and concerns include poor agricultural organisation and lack of knowledge in vegetable production, as well as difficulties influenced by socio-economic and agro-climatic conditions (Fiebiger *et al*., 2010; Newsham & Thomas, 2009). Yet on-going agricultural commercialisation in Namibia continues to favour small-scale farms rather than large-scale farms. Potential small-scale farmers found it difficult to join this sector. Experience

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elsewhere in Africa can be found in Maertens and Swinnen (2009) for a case in Senegal; in Maertens *et al*. (2012) for a case in Madagascar; and in McCulloch and Ota (2002) for a case in Kenya. These studies indicate the need for further research into agribusiness value chains, especially relating to high-value crops with the potential for export to global markets and as such contributing to the alleviation of poverty among rural households. Noteworthy is the work of Kirsten *et al*. (2012:11), who provide evidence from studies in sub-Saharan Africa that demonstrate that the socio-economic characteristics of small-scale producers are an important determinant of the success of commercialisation. For instance, household characteristics such as the size of a household, educational and literacy levels, age, and gender of the household head are found to determine a household's decision to participate in commercial markets as well as in determining the type of crops that households commercialise (Kirsten *et al*., 2012:11). The factors that constrain agricultural commercialisation in north-central Namibia will be discussed in the coming chapters.

3.4 Summary

In many developing countries, especially in Africa, agriculture contributes to foreign exchange earnings, income generation, and employment, and the household food security of poor people; hence, the sector contributes significantly to the GDP. Increasing agricultural growth has been a critical driver of poverty reduction in some parts of the world; however, in most parts of Africa, specifically in sub-Saharan countries such as Namibia, performance in agriculture has been disappointing, with continual low per capita growth over the years due to socio-economic and agro-ecological constraints such as changes in climatic conditions and the global financial crisis. Consequently, tax payers' money invested in agricultural development programmes has been wasted, which necessitated an investigation into market failure, state failure, and community failure. In the subsequent chapters, the results of this investigation, which was based on the development of the vegetable industry in north-central Namibia, will be presented.

One of the objectives of agricultural development in Africa has been to achieve sustainable intensification with the adoption of new technologies that use integrating soil fertility strategies (combining organic and inorganic fertilisers) and intensifying production in combination with the preservation of functional biodiversity. There is, however, a growing concern that the expansion and intensification of agriculture may lead to degradation of the natural resource base such as soil, water, vegetation, and biodiversity, which in turn will lead

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to a decrease in agricultural production. Intensification is also associated with problems including poor roads and telecommunications, poor human health, lack of a well-developed and diversified monetary economy, and thin markets for agricultural inputs, outputs, and finance despite significant direct and indirect dependence of the local economy on agriculture. Understanding these market failures and transaction costs, as discussed in the previous chapter, is essential for the study of the development of the vegetable industry.

Moreover, small-scale farmers are facing challenges as participants in the commercialisation process in Namibia and other developing countries, including agro-ecological and socio-economic constraints, which were examined in this study. The risk of investing in, for example, high-value crops in Namibia is high because various market failures, poor agricultural organisation, and lack of knowledge of vegetable production among farmers hamper the development of agriculture. The obstacles include low and uncertain rainfall or limited access to water, poor soils, and limited access to markets for output, input, and credit owing to high transaction costs. Thus, government interventions are required to correct these market failures and to improve social welfare and the economic development and performance of the country. Yet, state-led agricultural development policies in Africa have not generally worked after independence; neither have the market-liberalisation policies that followed.

The subsequent chapters will discuss the results of the case study of the vegetable industry in north-central Namibia. The objective of the next chapter 4 is to determine farmers' socio-economic characteristics and evaluate the performance of small-scale farmers who produce vegetables with access to government support (project farmers) and those with limited government support (non-project farmers).

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CHAPTER 4: DETERMINANTS OF SMALL-SCALE VEGETABLE PRODUCERS' PARTICIPATION IN AGRICULTURAL COMMERCIALISATION IN NORTH-CENTRAL NAMIBIA

4.1 Introduction

The description of a conceptual framework for the interrelation among market, state, and community institutions in Chapter 1 shows that the development of the vegetable industry in north-central Namibia is influenced by socio-economic and agro-ecological characteristics. In Namibia, the main objective of horticulture development is to increase the local production and supply of fruit and vegetables to both local and international markets. The objective of this chapter is to describe farmers' socio-economic characteristics, to present the influence of small-scale vegetable farmers with access to government support (project farmers) and those with limited government support (non-project farmers), and to demonstrate the differences found between them during the case study. Because the vegetable industry in the study area is in its infancy, the data presented in this chapter come mainly from the farm household survey that was conducted during the period from May to July 2014. Only households specialising in high-value crop production were surveyed. The information and factors presented in this chapter will be used in the coming chapters to discuss the efficiency and competitiveness of the vegetable industry in north-central Namibia.

The results of the survey were used to verify and test whether there were significant differences between project and non-project farmers and to provide an answer to Objective 2 as presented in Chapter 1. The various elements of the commercialisation of agriculture (vegetable enterprises) were evaluated based on survey results. Although the factors related to the propositions of this study are interrelated, this chapter is more relevant to Proposition 1 of this study as presented in Chapter 1. The chapter starts with a brief background on vegetable production and marketing, followed by a description of the study area and the results of the survey, and ends with a summary.

4.2 The Namibian vegetable industry

4.2.1 Status of production and consumption

The Namibian horticultural (fruit and vegetable) industry is still in its infancy, and the development of the sector relies on irrigation. The main objective of horticulture development is to increase the local production and supply of fresh produce to both local and

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international markets. The most suitable areas for fruit and vegetable production in the country are the Orange River at 52 percent, Karst at 25 percent, the Kavango regions at 5 percent, southern Namibia at 5 percent, north-central Namibia (the focus of this study) at 4 percent and Zambezi at 1 percent (NAB, 2017) (Figure 4.1). It is estimated that potentially about 43 500 ha of underdeveloped agricultural land could be irrigated by water obtained from the perennial rivers (Orange, Kunene, Okavango, and Zambezi) that border the country as well as from excess underground water that is available countrywide (Iita, 2012).

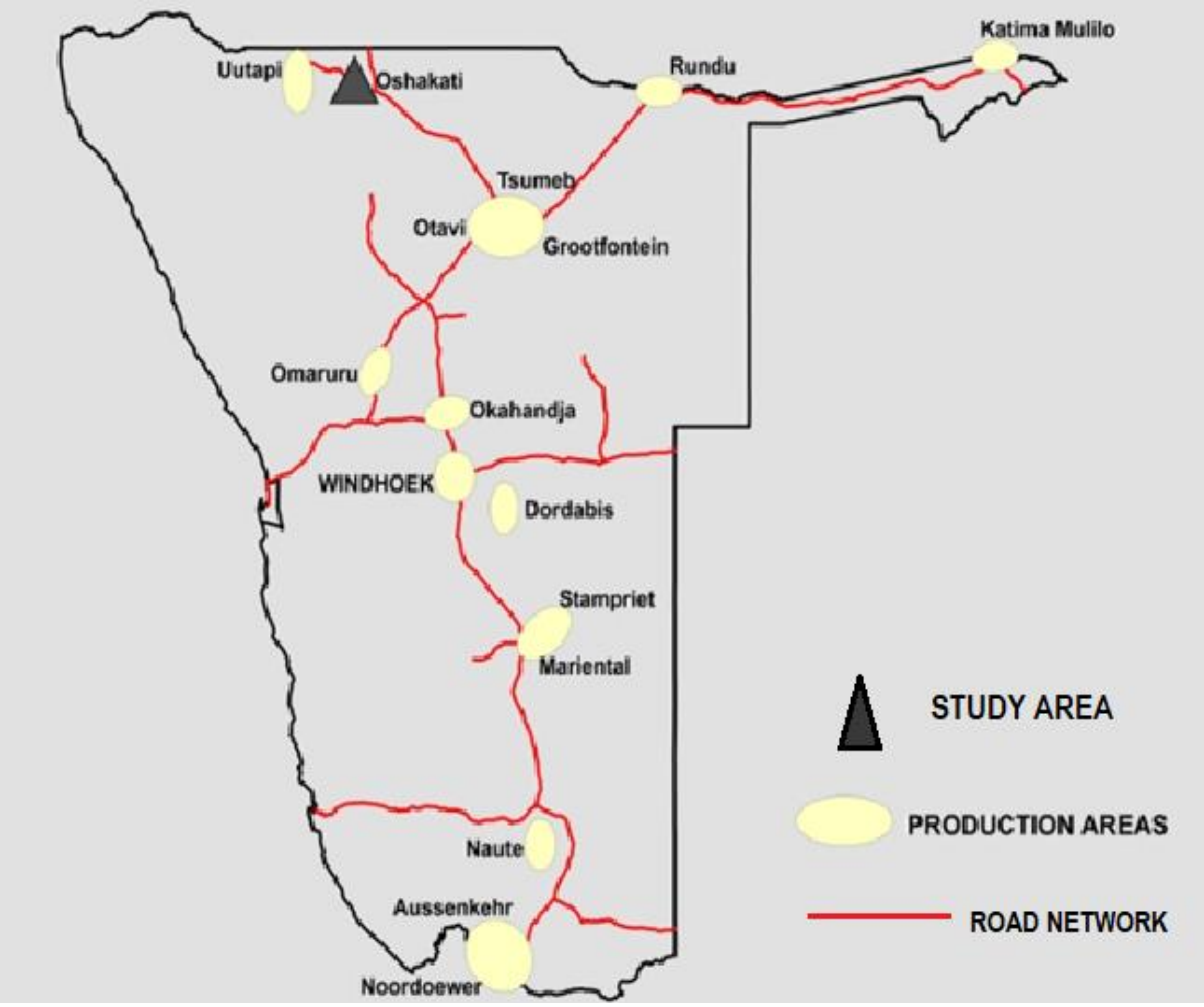

Figure 4.1: Map of vegetable production areas in Namibia

The horticultural industry contributes about 10 percent of the GDP (NAB, 2017). Notably, local production of horticultural products is recorded only for those products that are traded formally to retailers and supermarkets and thus there is no record for the products that are traded informally to consumers. Table 4.1 indicates some of the horticultural products that Namibia produces and imports. During the 2017/2018 fiscal year, Namibia consumed 81 452

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tonnes of horticulture fresh produce in the formal market, estimated at a value of N$643 million with 28 599 tonnes (34 percent) marketed locally whereas 52 854 tonnes (66 percent) were imports. The total value of imports was N$504 in 2015/2016, N$415 million in 2016/2017, and N$421 million in 2017/2018. This probably implies a need for local farmers to increase production. Table 4.1 also indicates that the five most important vegetables produced and imported by Namibia are potatoes, onions, tomatoes, carrots, and lettuce.

Table 4.1: Local production and imports for 2017/2018

Product	**Local production**		**Imports**		**Total (local production plus imports)**	
	Tonnage	**Percent**	**Tonnage**	**Percent**	**Tonnage**	**Percent**
Potatoes	7 843	27	23 655	45	31 498	39
Apples	0	0	6 772	13	6 772	8
Onions	3 184	11	1 898	4	5 081.94	6
Bananas	0	0	5 016	9	5 015.56	6
Tomatoes	2 914	10	1 356	3	4 269.83	5
Oranges	404	1	3 126	6	3 530.12	4
Carrots	2 505	9	562	1	3 067.18	4
Lettuce	885	3	1 294	2	2 178.62	3
English cucumbers	1 772	6	402	1	2 173.49	3
Cabbage	1 747	6	38	0	1 784.95	2
Butternuts	1 364	5	136	0	1 499.58	2
Peppers	821	3	449	1	1 270.60	2
Sweet potatoes	650	2	357	1	1 007.75	1
Grapes	268	1	710	1	977.27	1
Pumpkins	657	2	133	0	789.82	1
Avocados	0	0	721	1	720.79	1
Mushrooms	553	2	127	0	680.28	1
Watermelons	311	1	275	1	586.68	1
Broccoli	160	1	427	1	586.65	1
Pears	0	0	556	1	556.37	1
Total other	**2 561**	**9**	**4 844**	**9**	**7 405**	**9**
Grand total	**28 598.56**	**100**	**52 853.92**	**100**	**81 452.48**	**100**

Source: Agro-Marketing and Trade Agency (AMTA), 2018

The horticultural industry production initiatives in Namibia currently are being developed and promoted under the Green Scheme[7] and the National Horticulture Development Initiative

[7] The strategy of the Green Scheme is to attract and enable large commercial farming enterprises to establish commercially viable organisations in remote and undeveloped rural areas by acting as service providers to

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that were established in 2002 (Government Republic of Namibia, 2008). These strategic interventions in the development of the country's horticultural industry ultimately led to fresh fruit and vegetables to be gazetted as controlled products during 2002, under Section 2 of the Agronomic Industry Act No. 20 of 1992. The NAB is a statutory body instituted by the government of the Republic of Namibia in terms of the Agronomic Industry Act. The main objective of the NAB is to facilitate border control, including issuing of permits and checking and controlling the cross-border flow of agronomic and horticultural products.

The Green Scheme is a national programme[8] that aims to encourage the development of irrigation-based agronomic production. The Agricultural Business Development Agency (AGRIBUSDEV) is responsible for crop production and was created in 2011 by the Namibian government to oversee the management of government Green Scheme projects (irrigation projects) through monitoring and creation of an ideal environment in order to achieve the Green Scheme Policy objective of the commercialisation of agriculture. One of the problems with AGRIBUSDEV is the lack of financial resources to run the Green Scheme projects sustainably as most of the allocated funds end up as salaries of agency staff. Another problem is that the production activities are not linked to any marketing system, making it difficult for small-scale farmers in these projects to access markets.

From a total of 9 429 ha of agricultural land, 3 435 ha are under production in Green Scheme projects in the //Kharas, Kavango, Zambezi, and Omusati regions (Iita, 2012). The small-scale farms found in Green Scheme projects occupy a total of 825 ha (Iita, 2012) that are directly supported by inputs (e.g. fertilisers, seeds, and pesticides) and services (e.g. water, ploughing, and electricity) as well as training in fruit and vegetable production in order to commercialise. In northern Namibia, scattered small-scale vegetable farmers are also found with limited support from the government with regard to inputs. These farmers find it difficult to sell their produce to supermarkets and other retailers, as they cannot meet the food safety, quantity, and quality standards set by them.

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small-scale producers (Mushendami *et al.*, 2006:31). The service providers therefore ensure effective production on a cost recovery basis and facilitate the transfer of skills to small-scale horticulture farmers.

[8] The national Green Scheme projects are Orange River (300 ha) and Tantjieskoppe(1 000 ha) in the //Kharas Region; Hardap (130 ha) in the Hardap Region; Etunda (1 200 ha) in the Omusati Region; Shadikongoro (1 000 ha), Ndonga Linena (800 ha), Mashare (200 ha), Uhvungu Vhungu (600 ha), Shitemo (1 000 ha), Musese (1 000 ha) and Sikondo (800 ha) in the Kavango regions; and Kalimbeza Rice (229 ha) in the Zambezi Region (Iita, 2012).

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4.2.2 The vegetable markets

Namibia is a net importer of most fruit and vegetable products. The Market Share Promotion (MSP) policy that aims to reduce imports and to increase horticulture production was established by the NAB in 2005. The estimated maximum import substitution through local production of high-value crops under the domestic MSP is 60 percent of domestic demand (NAB, 2017). The initial MSP started at 5 percent of local production in 2005 but increased to 44 percent in 2017 (NAB, 2017).

The Agro-Marketing and Trade Agency (AMTA) is the implementing agent of the NAB. AMTA is responsible for marketing and trade and was created in 2013 by the Namibian government as a specialised agency with the mandate to manage the fresh produce business hubs and the national strategic food reserve infrastructure towards the attainment of food safety and food security in the country. AMTA currently operates fresh produce business hubs in Windhoek, the capital of Namibia, Ongwediva in north-central Namibia, and Rundu in Kavango East. The fresh produce hubs are very important as they create market access for local fresh produce farmers and are also where local retailers can source their produce for distribution to the domestic and international markets. Thus, local farmers need to comply with accreditation and certification that are in line with stringent international food safety and agricultural standards such as Hazard Analysis Critical Control Point, International Standards Organisation 9001, and global good agricultural practice (GAP). One of the main challenges facing AMTA is to organise farmers appropriately into a self-help scheme and to make financial resources available timeously to ensure that the fresh produce infrastructure is utilised to avoid it becoming a 'white elephant'. The agency's marketing activities are also not linked to the production activities of farmers, making it difficult for farmers to meet the required standards. In addition, most of the financial resources allocated to AMTA by the government end up as salaries of staff, especially top managers (Immanuel, 2019).

The Namibian vegetable industry is still an infant industry and is, therefore, less competitive globally. Domestic vegetable producers thus compete with imports, mainly from South Africa. With regard to exports, a small amount of Namibian fruits and vegetables are traded to larger markets such as the European Union, the United States of America, China, the Southern African Customs Union (SACU) (principally South Africa), and the Southern African Development Community (SADC) (principally Angola). The total value of exports for horticultural products was N$674 million during 2016/2017 and N$817 million in

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2017/2018. Figure 4.2 shows the export quantities of selected vegetables during the 2017/2018 fiscal year. Tomatoes (9 475 tonnes), onions (7 537 tonnes), peppers (2 368), sweet melons (839), and butternuts (757) are the most important vegetables produced for export in Namibia. These vegetables are mainly exported to South Africa and Angola. Due to favourable climatic conditions, Namibian vegetable growers have a regional comparative advantage as they can harvest watermelons earlier and export them to South Africa (Cape Town), which has a different growing season. Similarly, Namibian farmers can produce tomatoes throughout the year, thus satisfying demand in neighbouring Angola during its off-season (October and November) (Togarepi *et al*., 2018).

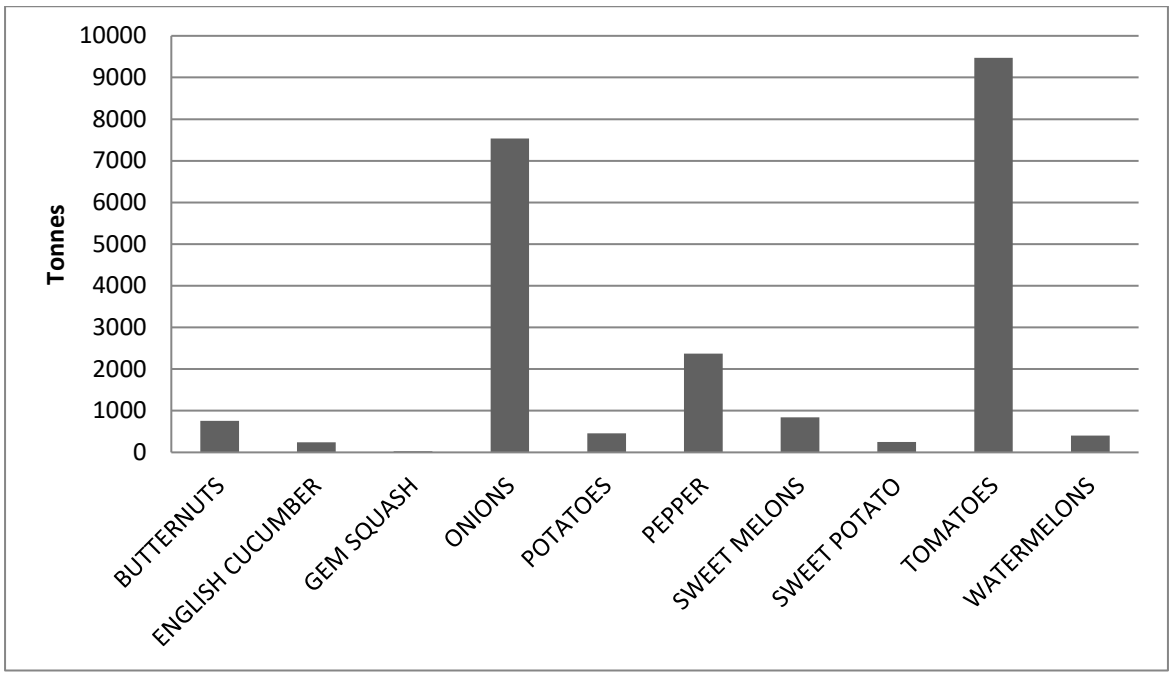

Figure 4.2: Selected vegetable export quantities (tonnes) 2017/2018

Source: AMTA, 2018

4.2.3 Leasehold versus freehold land tenure in the Namibian agricultural sector

This subsection briefly discusses the difference between the leasehold and freehold land tenure systems in Namibia in order to clarify the subsequent sections in this chapter. The details of the land tenure systems and suggested policies for enhanced investment in agricultural development in communal areas of Namibia are discussed in Chapter 7.

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In Namibia, the land is divided into 44 percent freehold (commercial), 36 percent communal, and 20 percent state land (Mendelsohn *et al.*, 2011). The redistribution of freehold agricultural land is addressed by the Agricultural (Commercial) Land Reform Act No. 6 of 1995, whereby the government buys freehold farms and resettles landless Namibians on those farms under state leasehold tenure. Land redistribution is aimed at redressing land access imbalances created by the past political system while empowering the majority economically by equalising income distribution. In order to do this, the Namibian government has introduced a variety of land reform instruments to promote economic development and land ownership, including the Affirmative Action Loan Scheme, communal land registration, and the National Resettlement Policy.

Under the Agricultural (Commercial) Land Reform Act No. 6 of 1995 and the National Resettlement Policy, the state purchases freehold commercial farms on a willing-seller willing-buyer basis, subdivides these into smaller parcels, and allocates the parcels to selected potential farmers. Under this land redistribution process, it is expected that leasehold rights will enable small-scale farmers to be economically productive and to enter the mainstream economy by using the lease agreements to access capital and investments to support agricultural production (Werner & Bayer, 2017). Notably, the right of leasehold would grant the holders the opportunity to access financial capital to invest in their properties and as a result to improve their living standard.

The Communal Land Reform Act No. 5 of 2002 and the Traditional Authorities Act No. 25 of 2000 constitute the most important policies for land management in communal areas in Namibia (Meijs & Kapitango, 2009:6). The Communal Land Reform Act stipulates that any land used for commercial activity has to be registered as a leasehold.[9] This means that holders of customary land rights, who make up the great majority of residents, are prevented from using their land for income-generating enterprises unless they go through lengthy processes of converting their land rights into leaseholds (Mendelsohn *et al.*, 2011). At present, the tenure regulation in communal areas has created conditions that (a) are not conducive to economic development and (b) cause residents to lose their commonage resources[10]

[9] The customary land right is for the natural life of a holder and can be inherited by the surviving spouse and the children. The leasehold is for a maximum of 99 years and is also transferable.

[10] The former largely concerns the rights of individuals to use and invest in their properties to create wealth, while the latter focuses on the rights of groups of local residents to the commonage resources that they share.

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(Mendelsohn *et al*., 2011). Namibia's commercial financial institutions such as banks do not accept registered leaseholds over state land as collateral as they are not allowed to sell leaseholds in the event of a borrower's defaulting (Werner & Bayer, 2017), a problem experienced by small-scale vegetable farmers in north-central Namibia, as will be presented in subsequent sections and chapters. Notably, the problem of commons is described by Hardin (1968) as the 'tragedy of commons'. Ostrom (2008:17–18) identified the following fundamental requirements when designing governing systems for diverse commons that are relevant for improving communal land in developing countries:

- Accurate and relevant information: The system as well as the individual's experience changes over time. As a result, regular updates and the latest accurate information are essential.
- Dealing with conflict: Those involved in the commonage system should have rapid access to low-cost local arenas to resolve conflict among participants.
- Clearly defined boundaries: The boundaries of the system should be clearly defined, as should be the rules specifying the resource entitlements and materials or labour or cash inputs.
- Collective choice arrangements: All those affected by the rules governing the use of resources should be involved in any modification of these rules.
- Graduated sanctions: Participants who violate rules are to receive graduated sanctions (depending on the seriousness and context of the offence) from the designated authority.

4.3 Description of the study area

The study was conducted in north-central Namibia in the Omusati Region, which was purposefully selected from the four regions in the area due to its potential for small-scale irrigated vegetable production (Fiebiger *et al*., 2010). The region is composed of 6 percent urban dwellers and 94 percent rural households, of whom 70 percent depend directly or indirectly on agriculture (NSA, 2011). The Omusati Region has a total population of 243 166, of whom 109 545 (45 percent) are men and 133 621 (55 percent) are women.[11] The total area of the Omusati Region is estimated to be 26 551 km^2. In this region, economic, social and natural resource constraints hinder agricultural development and, ultimately, economic growth. These constraints include limited market access, land degradation, deforestation,

[11] The total population of Namibia is estimated at 2.1 million (NSA, 2011).

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marginal agricultural productivity, and inadequate infrastructure support. In this area, the incidence of organic matter in the topsoil is low, about 1–5 percent (Newsham & Thomas, 2009) with nutrient deficiency, low soil fertility, and susceptibility to salinity. The climate in the region is described as semiarid with an erratic average annual rainfall ranging from 350 mm to 500 mm. Summers are hot with maximum temperatures between 30 °C and 35 °C during the hottest months, and the coldest winter temperatures are around 2 °C to 6 °C (DEA, 2002). Whereas the adverse effects of drought could result in crop failure (Kuvare *et al.*, 2008), heavy rains during the rainy season cause environmental damage such as soil erosion.

In the Omusati Region, farmers depend primarily on livestock farming and rain-fed subsistence crop production, mainly pearl millet and small quantities of sorghum and maize, of which any surplus is sold for income. The small-scale irrigation schemes produce maize and vegetables such as cabbage, tomatoes, butternuts, sweet potatoes, and watermelons. In the Omusati Region, irrigated crop and horticultural production takes place mainly at the government-owned Etunda Green Scheme Irrigation Project and around the Olushandja Dam in the same vicinity.

The Etunda Irrigation Project covers an area of 1 200 ha of which 900 ha are under cultivation; half of this area is divided into equal small-scale units of production, totalling 450 ha. Each small-scale farmer, about 80 in total, occupies an area fixed at 3 ha, 6 ha, and 12 ha and uses the sprinkler irrigation method. The remaining 450 ha, using a centre pivot irrigation system, is managed by a service provider who is also responsible for training farmers in the project. The land in the Etunda Irrigation Project is state land that is leased to farmers on a five-year contract renewal basis for them to commercialise. However, due to a lack of collective action and principal-agent problems between farmers and AGRIBUSDEV managers as a result of incomplete information, these farmers find it difficult to commercialise despite governmental support.

The Olushandja Dam is an artificial permanent dam with a capacity of 42 331 mm^3 (millions of cubic metres) and a surface area of 29 km^2 when full (NamWater, 2015). In the area surrounding the dam, about 35 independent vegetable producers with limited government support (non-project farmers) were found during the period 2014/2015. The land around the Olushandja Dam that is occupied by non-project farmers is communal (state land) that is allocated by traditional leaders to farmers to generate income and support their families.

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However, communal land is also free for people who are not poor, and many wealthy people have used their influence to acquire large farms, mainly through allocation by traditional authorities and by unilateral fencing off of land by private individuals (Mendelsohn *et al*., 2011:9). The land owned by the non-project farmers is sufficient for small-scale crop production but cannot be used as collateral to access credit facilities offered by financial institutions. The source of water for irrigated agriculture is the Calueque Dam, fed by the Kunene River, which is situated across the border in Angola, and water is pumped into the Olushandja Dam and also discharged into the 150-km-long concrete Calueque-Oshakati[12] Canal. The water from the canal is used for both human consumption and horticultural production without clearly defined property rights. Fiebiger *et al.* (2010:31) argue that conflict may arise with increased demand for water in Namibia for irrigation as a lack of cooperation is being experienced with some Angolan officials. The small-scale farmers around Olushandja try to commercialise specialising in vegetable production with limited governmental support. It is against this background that this study attempted to assess whether these farmers (project and non-project) were efficient in the production of vegetables given the political, socio-economic, and agro-ecological constraints associated with the development of the horticultural sector in Namibia.

4.4 Analysis of variables affecting the participation of vegetable industry in north-central Namibia

This section presents the testing of several variables to determine the significance of the difference between a project and non-project commercial vegetable farmers in north-central Namibia. Although the factors related to the propositions of this study are interrelated, this section is more related to Proposition 1 of this study as presented in Chapter 1. Table 4.2 presents the explanatory variables and their hypothesised effect. These explanatory variables are also explained in other literature (Bester *et al.*1999; Hayes *et al*., 1997; Lishman & Nieuwoudt, 2003; Turner *et al.*, 2000).

[12] Oshakati is the largest town in north-central Namibia.

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Table 4.2: Summary of independent variables and hypothesis

Variable	Variable type	Variable measurement	Sign/effect
Gender of head of household	Dummy	1=male, 0=otherwise	+
Age of head of household	Continuous	Years	+
Household size	Continuous	Number	+/-
Total number of years spent on education	Continuous	Number	+
Type of employment (full time)	Dummy	1=Full time, 0=otherwise	+/-
Farming experience in horticultural production	Continuous	Number	+
Farm income per month	Continuous	Namibian Dollar	+/-
Farm size	Continuous	Hectares	+
Land ownership	Dummy	1=Communal, 0=otherwise	-
Source of irrigation	Dummy	1=Canal, 0=otherwise	+/-
Distance from farm to the water source	Continuous	Kilometres	+/-
Distance to major urban market from farm	Continuous	Kilometres	-
Ownership of vehicle	Dummy	1=Own vehicle, 0=Otherwise	+
Source of Capital	Dummy	1=Agribank, 0=Otherwise	+/-
The amount borrowed from Agribank	Continuous	Namibian Dollar	+/-
Total labour (family, permanent, hired)	Continuous	Number	+
Distance to Extension services	Continuous	Kilometres	+/-
Member of any community-based Association	Dummy	1=Yes, 0=otherwise	+/-

The explanatory variables in Table 4.2 are defined as follows:

Gender of head of household was presented as a dummy variable assuming the value of 1 if a household was female and 0 if male-headed. Generally, male-headed households have more access to resources as a result this increases the chance of owning land and practicing horticulture due to traditional expectations. Gender of head of household is positive and is thus expected to increase the chance of farmer participation in commercialisation.

The age of the head of the household was measured in years and is taken as a good proxy for the experience of the farmer in the production of vegetables and older farmers are expected to farm better than younger ones. In addition, older household heads may have more experience in the production of vegetables and may have access to loyal customers. According to Brown (2012), throughout the African continent, many young people are avoiding pursuing livelihoods within the agricultural sector, particularly as farmers. Age is positive and is expected to increase the chance of a farmer to participate in commercialisation.

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The total number of years spent in education and agricultural training by a farmer is likely to achieve higher yields and incomes as it is expected that the farmer is better equipped with the technical skills necessary to produce vegetables. This is likely to increase participation in commercialisation.

The type of employment (full-time farmer) is presented as a dummy, assuming a value of 1 if a farmer is employed full-time and 0 if not. A full-time farmer is likely to be involved in the management of the farm which is likely to lead to high output compared to a part-time farmer. Therefore, this variable is expected to have either a positive or negative impact on commercialisation.

Farming experience in horticultural production is positive and is likely to lead to production efficiency which will likely increase production and participation in commercialisation. Moreover, the longer a farmer has been on the farm, the better the understanding of the agro-ecological and socio-economic constraints.

Farm income per month was presented in Namibia Dollar and is expected to have a positive or negative influence towards commercialisation as a farmer with high income may be able to access other services as well as invest in production. Lower farm incomes will have a negative impact on commercialisation.

The variable farm size measured in hectares is expected to have a positive influence on the farmer to commercialise as a farmer with a bigger farm will benefit from economies of size that spread fixed costs related to information, management, machinery investment, and services over a larger area (Lugemwa & Darroch, 1995). However, in communal areas, farms are expected to be smaller. Van Zyl *et al.* (1995) argue that there is an inverse relationship between farm size and efficiency in commercial farming; as a result, efficiency gains could be significant if commercial farms became smaller.

Land ownership with secure tenure is presented as a dummy variable in which a lack of ownership rights is expected to discourage investments on the farm that may improve productivity and lead to commercialisation. Thus security of tenure has a positive influence on the farmer to commercialise.

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The source of irrigation was a dummy, assuming a value of 1 if a farmer used the Calueque-Oshakati Canal as a source of irrigation and 0 if not. The main source of irrigation water is the canal and the Olushandja Dam which is expected to have either a positive or a negative impact on commercialisation. A farmer located closer to the canal is more likely to be successful as he or she can produce continuously compared to a farmer who uses the dam for irrigation as the dam level recedes in dry seasons, making irrigation difficult and increasing the cost of production.

Distance from farm to the water source was measured in kilometres. A farmer who is located closer to the water source has a higher chance of producing continuously. Therefore, this variable is expected to have either a positive or negative impact on commercialisation.

Distance to major urban markets from the farm was measured in kilometres. Farmers near towns are more likely to participate in vegetable markets due to lower transaction costs because of lower transport costs and easier access to sources of information about market conditions. Thus distance to a major urban market is likely to have a negative impact on commercialisation.

Ownership of a vehicle is presented as a dummy variable, assuming a value of 1 if a farmer-owned a vehicle and 0 if not. Ownership of a vehicle may help farmers to access distant vegetable markets. This could imply reducing transaction costs, especially transport costs, making it easier for farmers to access vegetable markets. Thus vehicle ownership is expected to have a positive impact on commercialisation.

Source of capital (Agribank) is presented as a dummy, assuming a value of 1 if a farmer's source of capital is Agribank and 0 if not. A farmer that has access to credit facilities is likely to invest in infrastructure and production leading to high output and this is likely to have a positive impact on commercialisation.

The amount borrowed from Agribank was presented in Namibia Dollar. When a farmer can borrow an amount that they can pay back then their production will increase but if the amount is too much that may affect production and lead to failure. Therefore, this variable is expected to have either a positive or negative impact on commercialisation.

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The total number of farm labourers (family, permanent, and hired) was measured in total number of workers per season. The more labourers a farmer has, the less mechanised he or she is. However, a bigger number of farm labourers may increase production leading to higher incomes that may be invested on the farm to improve efficiency like mechanisation. This is likely lead to expansion and positively influencing the farmer to commercialise.

Distance from farm to extension services was measured in kilometres. Farmers near extension services are more likely to have access to production and marketing information due to regular advice from extension officials. This could reduce the transaction costs of searching for production and marketing information. However, extension officials should be knowledgeable and have practical experience and skills in horticultural production and management. The most important contribution of extension officials is to share information that increases the production and marketing of vegetables (Jona & Terblanché, 2015). Therefore, this variable is expected to have either a positive or negative impact on commercialisation.

Membership of farmers' organisation was a dummy, assuming a value of 1 if a farmer is a member of an association and 0 if not. A farmer's membership in an organisation or cooperative does not necessarily mean that the probability of successful vegetable production and marketing will be increased. A farmer still needs to be able to produce consistently and to meet the quality standards as demanded by the markets, which in most instances small-scale farmers are unable to do. Therefore, this variable is expected to have either a positive or negative impact on commercialisation.

4.4.1 Comparison of the means of non-project and project farmers

This subsection presents a comparison of the means of the two groups of farmers that was performed to determine whether there were any statistical differences between the two groups.

Group 1: Non-project farmers

Group 2: Project farmers

The test for significant difference between the means of two independent and unequal groups is based on the t-distribution (Fox, 2003:179).

Let μ_1 and μ_2 be the means of the two populations with variance δ^2 and a random sample selected from each population under the assumption that

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$\sigma_1^2 = \sigma_2^2$ or $\sigma_1^2 \neq \sigma_2^2$ with

$N_1 \square N(\mu_1; \sigma_1^2)$ and $N_2 \square N(\mu_2; \sigma_2^2)$ where N_1 and N_2 respectively refer to the populations from which samples n_1 and n_2 were randomly selected.

The hypothesis thus is as follows:

$H_0 : \mu_1 = \mu_2$ versus $H_1 : \mu_1 \neq \mu_2$

The level of significance α is pre-specified.

The decision criterion is to reject H_0 if $|T_{cal}| > t_{crit}$ where

$$T_{cal} = \frac{\bar{X}_1 - \bar{X}_2 - D_0}{\sqrt{S_p^2\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \tag{1}$$

D_0 is the hypothesised difference, S_p^2 is the common variance or pooled variance for populations N_1 and N_2 ; $S_p^2 = \dfrac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}$ (2)

which is a weighted average of the variance using the two-sample variances and the degrees of freedom of each variance as the weights.

$$t_{crit} = t_{n_1+n_2-2}^{\alpha/2}$$

The standard error for the difference between the two mean is given by

$$S.E_{(\bar{X}_1 - \bar{X}_2)} = \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}} \tag{3}$$

The results of this analysis are presented in Table 4.3, which shows that distance from farm to extension services, and the amount borrowed from Agribank are significant at 1 percent significance level. The age of the head of the household and farm income per month is significant at 5 percent significance level. Household size and distance to a major urban market from the farm are significant at a 10 percent significance level. There is no significant difference in mean for the remaining variables. The details of each variable are discussed in the subsections below.

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Table 4.3: Comparison of the means of non-project and project farmers

Variables	Least squares mean				t-value	P-value
	Olushandja (n = 22)	Std dev	Etunda (n = 56)	Std dev		
Household size	5.77	5.191	6.68	3.433	-0.9	0.069*
Age of head of household	43.64	20.259	42.79	13.54	0.216	0.038**
Total number of years spent on education	10.5	4.351	10.05	3.193	0.5	0.13
Years of experience in horticultural production	7.8	5.115	11.21	5.49	-2.522	0.584
Farm size (ha)	6.48	8.158	6.04	5.614	0.268	0.184
Distance from farm to water source (km)	0.54	0.624	1.56	2.838	-1.664	0.117
Distance to major urban market from farm (km)	84.55	155.41	66.23	73.44	0.708	0.058*
Distance from farm to extension services (km)	14.77	16.613	6.27	10.35	2.725	0.004***
Amount borrowed from Agribank	11818.18	43930.3	68903.59	105729	-2.44	0.005***
Farm income per month	3.32	2.514	4.11	5.614	-1.42	0.040**

Note: ***Significant at $P \leq 0.01$, **significant at $P \leq 0.05$, *significant at $P \leq 0.1$

4.4.1.1 Household characteristics

A descriptive analysis of the household demographics of the Etunda (project) and Olushandja (non-project) farmers interviewed during the survey is given below.

a) Age of the head of household

Table 4.4 shows that most of the farmers are over 40 years old while the youth (up to 40 years) makes up 36 percent of those who are involved in vegetable farming. The majority of respondents fall within the 41–50 years bracket (33.3 percent) with 27.3 percent and 35.7 percent found in Olushandja and Etunda respectively. This indicates that there is still a need to encourage the youth in the study area to become involved in vegetable farming. A total of 6.4 percent of respondents are pensioners; 18.1 percent at Olushandja and only 1.8 percent at Etunda. This bodes well for the future of the industry since the farming population in the study area is still young and productive.

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Table 4.4: Age of head of household

	Non-project (n = 22)		Project (n = 56)		Total (n = 78)	
Age in years	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Under 31	4	18.2	8	14.3	12	15.4
31–40	5	22.7	11	19.6	16	20.5
41–50	6	27.3	20	35.7	26	33.3
51–60	3	13.6	16	28.6	19	24.4
Over 60	4	18.1	1	1.8	5	6.4

The age of the head of households of non-project farmers on average is higher than that of project farmers (Table 4.4). This difference is significant at 5 percent significance level. This implies that older farmers may be more likely to start their vegetable fields with limited government support.

b) Educational level of head of household

Just over 50 percent of the heads of households who were interviewed had secondary education as their highest level of education, with non-project farmers at 55 percent and project farmers at 64 percent (Table 4.5). Further, 10.7 percent of the project and 22.7 percent of non-project heads of households interviewed had tertiary education. This probably suggests that some of the farmers with tertiary education see farming as a business with higher returns.

Table 4.5: Educational level of head of household

Type of farmer	Level of education	Frequency	Percent
Non-project (n = 22)	None	2	9.1
	Primary	3	13.6
	Secondary	12	54.5
	Tertiary	5	22.7
	Total	**22**	**100.0**
Project (n = 56)	None	3	5.4
	Primary	11	19.6
	Secondary	36	64.3
	Tertiary	6	10.7
	Total	**56**	**100**

The total number of years spent on education on average is 10 (Table 4.3). This implies that most farmers have a formal education up to Grade 10, which makes it easy to enhance capacity in GAP. The difference in the total number of years spent on education is not significant.

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c) Years of experience in horticultural production

The Etunda Project farmers have on average 11.21 years of experience compared to the 7.80 years of non-project farmers around the Olushandja Dam (Table 4.3). This implies that small-scale farmers in the horticultural industry in north-central Namibia are relatively inexperienced in horticultural production, which confirms the infancy status of the industry in this area. The difference in years of experience in horticultural production is not significant.

d) Household size

The households interviewed that were producing vegetables consisted on average of six persons for project farmers and five persons for non-project farmers (Table 4.3). The data in Table 4.3 show that most families in the community are extended rather than nuclear families. This probably explains why most farmers use family labour or relatives who are willing to work on the farm for free or for lower pay rather than nonrelatives who are hired at a greater cost. The study also found that the number of permanent workers in the vegetable industry in north-central Namibia was minimal (ranging from one to three per farmer) with average wages of N$480 per month, which was about half of the approved national minimum wage for farm workers of N$860 per month during 2014/2015. Most of the workers are employed as temporary workers during peak times such as harvesting and are paid a daily rate ranging from N$25 to N$50 while some workers accept payment in kind (in vegetables). However, most labourers are relatively unskilled[13] in vegetable production, which constrains productivity.

e) Mean distance from farm to major urban markets

The nearest town supplied by farmers from both schemes is Outapi, which is about 50 km from the schemes. The furthest distance supplied by Olushandja farmers is Windhoek, the capital city of Namibia, which is 900 km from the scheme (Table 4.3). Non-project farmers on average travel longer distances to sell their vegetables to major urban markets compared to Etunda Project farmers (Table 4.3). This variable is significant at a 10 percent significance level. This may imply that non-project farmers are faced with high transaction costs due to a high degree of searching for trading partners, the high cost of price information, and high transport costs.

[13] It is important to note that knowledge remains a key element of human capital development in farming; farmers need to know how to apply various production technologies in vegetable enterprises.

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f) Distance to extension services from the farm

The non-project farmers cover on average a distance of 14.77 km to access extension services compared to project farmers who cover on average 6.27 km (Table 4.3). This implies that the role of extension officials with respect to the training of farmers in vegetable production is limited for non-project farmers. The difference in distance from farms to extension services between the two farmer groups is significant at 1 percent significance level. During the study, it was observed that specific extension officials were responsible for farmers in the two schemes. The extension officials for the Etunda Irrigation Project were located at the project site, while the extension officials for the Olushandja area were located at a maximum distance of around 40 km from the site and in most cases were without transport for fieldwork. Lack of transport by extension officials, especially for non-project farmers, was therefore one of the constraints in field-level extension services. In general, with limited resources, extension officials in communal areas found themselves not being able to deliver services to their expectations. It was also observed that the extension officials were not trained specialists in horticultural production but were rather general agronomists who lacked practical farming expertise and skills, making it difficult to provide farmers with appropriate information.

Table 4.6 shows access to information by non-project and project farmers in the case study area. The results indicate a significant difference in access to training on pricing (P = 0.013) and on-farm planning and financial management (P = 0.092) between project and non-project farmers. This is probably because training at the Etunda Project is offered to the farmers by the service providers as well as by the extension officials who are based at the project.

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Table 4.6: Access to information

Variable		Non-project Frequency (%)	Project Frequency (%)	Total (%)	Chi-square	P-value
Do you keep production records?	No	3 (3.8)	4 (5.1)	7 (9)	0.815	0.308
	Yes	19 (24.4)	52 (66.7)	71 (91)		
Have you received training on vegetable production?	No	5 (6.40	14 (17.9)	19 (24.4)	0.044	0.542
	Yes	22 (21.8)	42 (53.8)	59 (75.6)		
Do you keep financial records?	No	3 (3.8)	8 (10.3)	11 (14.1)	0.005	0.626
	Yes	19 (24.40)	48 (61.5)	67 (85.9)		
Have you received training on pricing?	No	13 (16.7)	16 (20.5)	29 (37.2)	6.2999	0.013**
	Yes	9 (11.5)	40 (51.3)	49 (62.8)		
Have you received training on farm planning and financial management?	No	13 (16.7)	22 (20.5)	35 (44.9)	2.505	0.092*
	Yes	9 (11.5)	34 (43.6)	43 (55.1)		
Have you received training on fertiliser application?	No	7 (9)	26 (33.3)	33 (42.3)	1.331	0.179
	Yes	15 (19.5)	30 (38.5)	45 (57.7)		
Have you received training on pesticide application?	No	13 (16.7)	27 (34.6)	40 (51.3)	0.748	0.27
	Yes	9 (11.5)	29 (37.2)	38 (48.7)		
Have you received training on financial record keeping?	No	9 (11.5)	21 (26.9)	30 (38.5)	0.078	0.489
	Yes	13 (16.7)	35 (44.9)	48 (61.5)		

*** Significant at $P \leq 0.01$, **$P \leq 0.05$, *$P \leq 0.1$

g) Inputs

In principle, non-project farmers (around Olushandja) experience high transport costs when procuring inputs such as seeds, fertilisers, and pesticides, which in many cases are not available locally or are available only at high prices. For the project farmers (in Etunda), the procurement of inputs is done on their behalf by a service provider(s) based at the project from South African suppliers such as Aqualand; however, this arrangement is associated with high transport costs and delays in consignment delivery and hence production delays. High transaction costs still prevail despite the government's providing subsidised inputs such as fertilisers and pesticides and investing in physical farm infrastructures for Green Scheme Project farmers at Etunda. This is caused by limited skills and knowledge among farmers in the project to use the inputs optimally as well as not managing the crops following GAP. Farmers also source their inputs (seeds, pesticides, or fertilisers) from domestic suppliers (legal market) in Oshakati, Outapi, Tsumeb, Grootfontein, and Epalela, obviously entailing high transport and searching costs. The majority of farmers lack the funds to purchase their production inputs. As a result, the majority of vegetable farmers in the target areas, specifically those around the Olushandja Dam, purchased few inputs due to a lack of access to government input subsidies for high-value crop production. The study found that farmers

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did not keep accurate physical and financial records of their farm produce, making it difficult to estimate the total costs of inputs and yield. Table 4.7 shows the estimated costs of tomatoes and cabbage as the most produced crops in the study areas. These costs are considered to be high by the farmers, which constrains the production of high-value crops.

Table 4.7: Input costs of project farmers

Item	Tomatoes (N$)	Cabbage (N$)
Seeds/ha	9 600	5 000
Fertilisers/ha	10 537	7 000
Chemicals/ha	32 748.74	5 000

Source: Etunda, 2015; Field data

The yield estimates of the two most important crops in the study area for the season 2014/2015 are provided in Table 4.8. The results in Table 4.8 imply that farmers need to improve their production techniques to meet the target yields and in turn increase their gross income.

Table 4.8: Tomato and cabbage yields

	Crop	Average target yield/ha	Average actual yield/ha
Project	Cabbage	20 000 head/ha (60 t)	16 000 head/ha (48 t)
	Tomatoes	50 t/ha	-
Non-project	Cabbage	20 000 head/ha (60 t)	16 000 head/ha (48 t)
	Tomatoes	50 t/ha	20 t/ha

Source: Etunda, 2015; Field data

h) Credit

Unlike project beneficiaries who have access to credit backed by the government for collateral, non-project farmers have limited access to credit, which leads to a shortage of capital that affects productivity. This limits input sourcing, compounded by the socio-cultural background of the community that causes them to be risk-averse; they thus are limited in borrowing for farming purposes. The community culture does not prepare the non-project farmers for taking a risk by borrowing for commercial farming to improve productivity. The study found that the nearest credit facility[14] that offered agricultural loans to farmers,

[14] Individually, farmers can also apply for production loans from commercial banks, the nearest of which are situated 40 km from the study area.

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Agribank, was situated 130 km away from the study area and that approval of loans took up to four weeks. It was found that all project farmers qualified for 100 percent production loans, which consisted of a voucher with a value of N$19 000/ha during the 2014/2015 season, from Agribank. Security was covered by the government, and private collateral was not needed.

The repayment period of the loan was one year at an interest rate of 4 percent. The study found that no accurate monitoring of the loan repayment system was in place and that some producers believed that the period in which to repay the loan was too short. As a result, at least 40 percent of producers with farming units at the Etunda Irrigation Project had failed to repay their loans on time. In the event of loan default, producers were supposed to be evicted from the project and the government would take over the debt; however, at the time of the study, no defaulters had been evicted from the project yet. This probably served to maintain strong political support as most farmers in the project were supporters of the ruling party. The non-project farmers also did not have adequate collateral, which is critical for obtaining credit from leading financial institutions such as Agribank, resulting in their investing poorly in improved seeds, pesticides, fertilisers, irrigation equipment, and tools. Adverse selection by financial institutions has thus caused these farmers not to engage successfully in commercial farming.

Table 4.9 indicates the main sources of finance of farmers in the study area. The farmers in Etunda (35) revealed that they had borrowed from Agribank at a value of N$80 000 to N$87 000 while only 2 farmers from Olushandja had borrowed N$60 000 and N$200 000 during the 2014/2015 season. The remaining Etunda Project farmers did not share how they financed their production, but from observations, it was noticed that they took inputs on credit from the service provider at the project and paid back after harvesting.

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Table 4.9: Sources of finance

Source of finance	Non-project (n = 22)		Project (n = 56)	
	Frequency	**Percent**	**Frequency**	**Percent**
Own capital	22 (collateral: own savings)	100	1 (collateral: own savings)	1.8
Agribank	2 (collateral: own savings)	9	35 (collateral: government, 5 indicated life cover)	63
The amount borrowed from Agribank: Significance tests of means t-value P-value				-2.44 0.005***

*** Significant at $P \leq 0.01$

i) Gender of head of household

It was found that more men (46 out of 78 or 59 percent) than women (32 out of 78 or 41 percent) participated in commercialised agriculture in the study area. More female (54 percent) than male (46 percent) heads of households were involved in the Etunda Irrigation Project (Table 4.10). This is most likely the result of how farmers were selected for the project, considering both married couples and the gender balance policy of the government. In the case of Olushandja (non-project farmers), men constituted 91 percent and women 9 percent of the heads of households. Traditionally, men are the ones who apply for customary land rights and start clearing the land for both homesteads and fields for crop cultivation. In addition, most of the farms around Olushandja are family farms, which are traditionally inherited by men and by women only under exceptional circumstances.

Table 4.10: Gender of head of household

Type of farmer	Gender	Frequency	Percent	Cumulative %
Non-project (n = 56)	Male	20	90.9	90.9
	Female	2	9.1	100.0
	Total	**22**	**100.0**	
Project (n = 22)	Male	26	46.4	46.4
	Female	30	53.6	100.0
	Total	**56**	**100.0**	

j) Employment status

Forty-five percent of the project and non-project farmers were farming on a full-time basis of which 41 percent were non-project and 48 percent project (Table 4.11). Forty-eight percent of project farmers confirmed that most farmers in the project were well-connected to politicians and their relatives who had full-time employment but were corruptly selected for the project

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at the expense of poor farmers. This implies that the wealthier and politicians have more access to land in rural areas as they can afford, for example, to buy the land allocated by traditional chiefs illegally and thus only farm on a part-time basis with the farm managed by supervisors or farm managers.

Table 4.11: Employment status of respondents

Employment status	Non-project n = 22		Project n = 56		Total (n = 78)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
No off-farm employment	18	81.8	45	80.4	63	81.1
Own nonfarm business	5	22.7	5	8.9	10	15.8
Fulltime employment	9	40.9	27	48.2	36	44.6
Pension	5	22.7	5	8.9	10	15.8

k) Membership of farmers' organisations

The study found that no viable or disciplined cooperatives had been established based on sound principles that could ensure their sustainability in orderly production and marketing arrangements of vegetable farmers. For instance, the farmers in the Etunda Irrigation Project were not organised under any producers' organisation. This lack of organisation most probably means a lack of cooperation among farmers; as a result, farmers cannot sell and purchase inputs together, resulting in poor input and output market access. The non-project farmers (91 percent) indicated during the interviews that they were organised under the Olushandja Horticultural Producers Association (OHPA). The OHPA benefits members mainly in storing and sorting their vegetables and sometimes arranges training sessions and transportation of vegetables to the AMTA fresh produce hub in Ongwediva. It was found that the OHPA could not organise farmers into production schedules and was not involved in the purchase and marketing of fresh vegetables of members or the arrangement of viable marketing channels. Lack of cooperation among farmers is thus a factor constraining the development of the vegetable industry in the study area.

4.4.1.2 Household resource endowment

a) Ownership of land

The farmers interviewed confirmed that the land in the Etunda Irrigation Project was state land that was leased to farmers by the state while the land around the Olushandja Dam was state land that was allocated to farmers by traditional chiefs (Table 4.12). This implies that

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farmers have the right to use the land and may not sell it or use it as collateral to negotiate a loan with financial institutions.

Table 4.12: Type of land ownership

Type of farmer	Type of land ownership	Frequency	Percent
Non-project	Leasing of customary land	22	100
Project	Leasing of state land	56	100

*** Significant at $P \leq 0.01$

Farms in the study area are generally small with a minimum farm size equal to 1 ha for non-project farmers compared to 3 ha for project farmers (Table 4.3). There is no significant difference between the mean farm size of non-project farmers (6.48 ha) compared to that of project farmers (6.04 ha). This may imply that crop farming in the study area can only be promoted in the form of small-scale enterprises.

b) Farm income

Only 36 percent of non-project and 45 percent of project farmers indicated that they earned at least N$5 000 per month (Table 4.13). This implies that a significant number of farmers do not make a profit from their sales of fresh vegetables.

Table 4.13: Farm income per month

	Farm income per month grouped			
Type of farmer	**Less than 1000(frequency and percent)**	**1000-5000 (frequency and percent)**	**More than 5000 (frequency and percent)**	**Total (frequency and percent)**
Non-project	8 (36.4)	6(27.3)	8(36.4)	22(100)
Project	9(16.1)	22(39.3)	25(44.6)	56(100)
Total	17(21.8)	28(35.9)	33(42.3)	78(100)
Significance tests of means t-value P-value				-1.42 0.040**

**Significant at $P \leq 0.05$

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c) Ownership of a vehicle

The study found that 59 percent of non-project farmers owned vehicles while only 32 percent of project farmers owned vehicles (Table 4.14). For farmers to participate successfully in horticultural production, they need to own a vehicle that can be used to access input and output markets.

Table 4.14: Ownership of a vehicle

Type of farmer		Own vehicle	
		Frequency	Percent
Non-project (n = 22)	None	9	40.9
	Own	13	59.1
	Total	22	100
Project (n = 56)	None	38	67.9
	Own	18	32.1
	Total	56	100

Interviews with the farmers also revealed that in the absence of their vehicle, farmers opted to use, although, to a limited extent, public transport (taxis), which was unreliable with much negotiation/bargaining regarding transport cost, and that producers experienced regular delays in reaching local markets. Etunda Irrigation Project producers were dependent on a truck hired from a service provider at the project to reach the large regional urban market of Oshakati (130 km from the project). Transport was considered by farmers to be expensive at a minimum cost of about N$12.50 per km during the 2014/2015 season. Farmers also lacked access to refrigerator trucks to transport their fresh produce from the farm directly to the supermarkets or retailers. As a result, they experienced barriers of high transaction costs from the farm to the final buyers and were thus in many instances excluded from opportunities in formal or lucrative markets.

d) Ownership of tractor

The study found that owning or having access to a tractor was among the most significant determinants of farmers' participation in vegetable production. In the Etunda Irrigation Project, farmers used tractors that they had to hire from the service provider at the project at an average price of N$400/ha while Olushandja farmers could hire tractors from private operators at between N$400/ha and N$550/ha during the 2014/2015 season. While subsidised government tractors could be hired at N$180/ha, it was associated with free-rider problems, thus benefiting mainly relatives and friends of government administrators as well as the wealthier members of the community at the expense of the majority of rural poor households.

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e) Ownership of irrigation systems

The survey results revealed that the non-project farmers used different methods to irrigate their crops, namely drip (77 percent), sprinkler (45 percent), and flood-furrow (27 percent) irrigation whereas farmers in the Etunda Irrigation Project only used sprinkler irrigation (100 percent) (Table 4.15). It was also observed during the study that non-project farmers used multiple irrigation systems at the same time in the same field to irrigate their crops. Access to water for irrigation was found to be a major problem for non-project farmers along the Olushandja Dam during the dry season (drought years) when the level of water in the dam dropped, resulting in increased investment in buying extra pipes and in high fuel costs to pump water up the slope. It was found that non-project farmers around the Olushandja Dam were not paying for water at the time of conducting this study; however, they indicated during the interviews that the high fuel cost of pumping water from the dam reduced their profitability and discouraged potential farmers from participating in vegetable production. With respect to the Etunda Irrigation Project, farmers paid N$0.46/m^3 for irrigation water[15] during the 2014/2015 season, including electricity prices. This price was considered by farmers to be high, which created unhappiness among them.

Table 4.15: Type of irrigation system

Type of farmer	Type of irrigation system	Frequency	Percent
Non-project (n = 22)	Drip	17	77
	Sprinkler	10	45
	Flood-furrow	6	27
	Drip, flood-furrow, and sprinkler	17	77
Project (n = 56)	Sprinkler	56	100

f) Ownership of nurseries and greenhouses

It was observed that all farmers visited during the study owned a nursery where seedlings were prepared before being transplanted into the field. No greenhouses were found in the study area at the time of the study. Farmers thus produced their vegetables depending on natural conditions with minimal modification of the crop environment.

[15] With regard to farmers around the Olushandja Dam, an average watering of three times per week is estimated at about 29.15 m^3/ha per day.

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4.5 Testing the difference between a project and non-project farmers in the study area

4.5.1 Discriminant analysis

From the descriptive analysis and characteristics of farmers presented in earlier sections of this chapter, it is clear that not all farmers were able to participate successfully in the production of vegetables in the case study area. This section presents the results of the linear discriminant analysis (LDA) that was used to determine the variables that discriminated between project and non-project farmers because the government mainly supports project farmers to be included in commercialisation. Although the factors related to the propositions of this study are interrelated, this section is more related to Proposition 1 of this study as presented in Chapter 1. Discriminant analysis was conducted to determine which variable discriminated between the small-scale vegetable farmers within the government scheme (Etunda Irrigation Project) and private producers (Olushandja Dam). Explanatory variables that distinguished between non-project and project farmers were analysed using a discriminant analysis statistical technique. LDA can be used to determine (a) multivariate differences between groups; (b) which variables are the most useful for discriminating between groups; (c) whether one subclass of variables works as well as another; and (d) which groups are similar and which are different (Klecka, 1980; Norusis, 1994; Wysocki *et al.*, 2003).

4.5.1.1 Computing discriminant analysis

In order to determine the variables that discriminated between the project and non-project farmers, a linear combination of the independent variables was formed and served as the basis for grouping cases. This means that the LDA distinguished between the two farmer groups using discriminating variables to investigate differences between the groups and to discard variables that were only slightly related to group distinction. The equation for LDA is as follows:

$$D = a + W_1X_1 + W_2X_2 + \ldots W_iX_i \qquad (4.5.1)$$

Where D, the discriminate function, was estimated for each farmer and compared to the mean score for each farmer group, and the farmer was then classified into the group with the score most similar to his or her own. W, the discriminant coefficient or weight for that variable, is especially important for policy analysis since each shows the relative contribution of its

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associated respondents' score for the variable X while a is a constant and i is the number of predictor variables.

Hypothesis

The LDA was intended to contribute to the answer to Proposition 1 and Objective 2 of this study as presented in sections 1.3 and 1.5. The model presented in Section 4.5.1 aimed to test the hypothesis that discriminated between the two groups of non-project and project vegetable farmers. The hypothesised variables that discriminated between the decisions to participate as a project or non-project farmers are described below:

Dependent variables

The dependent variables consisted of two variables (types of farmers) in the model description, namely project, and non-project farmers.

Independent variables

The expected signs and hypothesised effect of the independent (explanatory) variables (Lishman & Nieuwoudt, 2003; Turner *et al.*, 2000) that discriminated between the two groups of non-project and project vegetable farmers are described in section 4.4 and will not be repeated in this section.

4.5.1.2 Discriminant function distinguishing between project and non-project farmers

This section covers the results of discriminating between project farmers that are directly supported by the government and non-project farmers with limited governmental support in vegetable production in north-central Namibia. Table 4.16 shows the results of significance tests, standardised coefficients, and classification of the model distinguishing between farmers who participated in the government-supported project and those with limited government support (non-project farmers). The overall chi-square value of 37.8198 (significant at 1 percent of probability [$p < 0.000$]) means that explanatory variables can be distinguished significantly between project farmers and non-project farmers. Wilks' lambda (λ) examines the ratio of the within-group sum of squares to total sum squares (Wysocki *et al.*, 2003). Here $\lambda = 0.598$ indicates a high level of discriminating power. The Eigenvalue, which is the ratio of between-group to within-group sum squares of 0.673, and the canonical correlation, which is the degree of association between discriminant scores and group membership of 0.634, indicates a good predictive model. The overall percentage of the

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known cases that were correctly classified is 87.20 percent. The estimated model classified about 63.6 percent of non-project farmers and 96.4 percent of project farmers correctly.

Table 4.16: Discriminant function distinguishing between project and non-project farmers

Explanatory variable			**Discriminant model (n = 78) Standardised coefficient**		
Years of experience in horticultural production			0.481***		
Total number of farm labourers (family, permanent and hired)			-0.56***		
Source of irrigation			0.763***		
Discriminant function statistics					
Chi-square				37.8198***	
Wilks' lambda				0.598	
Canonical correlation				0.634	
Eigenvalue				0.673	
Predicted group membership (percentage in brackets)					
Actual group	Number of cases			1	2
Non-project	1	22		**14 (63.6)**	8 (36.4)
Project	2	56		2 (3.6)	**54 (96.4)**
Overall percentage classified					87.20

***Significant at $P \leq 0.01$

Three of the coefficients estimated that the predictor variables were statically significant at the 1 percent level. The discriminating variables that strongly account for most of the variability between project and non-project farmers, thus making them different, are years of experience in horticultural production, the total number of farm labourers (family, permanent and hired), and source of irrigation.

From the discriminant analysis above, it is clear that the years of experience in the horticultural production variable is important when selecting farmers to participate in agricultural projects. This means that years of experience in horticultural production is a key variable as the more experienced a farmer is, the more likely the farmer is to succeed in agricultural production. When farmers are selected to be part of the Green Scheme developmental projects, the aim is to train them to gain skills towards commercialisation;

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hence, the majority do not have farming experience that may increase the probability of successfully commercialising.

The next most important discriminating variable between project and non-project farmers is the presence of alternative farm labour (family, permanent, or hired) systems. Thus, farmers with alternative labour systems are unlikely to be project farmers.

Source of irrigation is also an important variable; despite the fact that all farmers have access to water, those who obtain irrigation water from the Olushandja Dam have the disadvantage of receding water levels in dry months, which affects production.

4.6 The decision of a farmer to participate in agricultural commercialisation: The probit model

Various statistical models to deal with the problem of self-selection are discussed in the literature, including those by Tobin (1958) and Heckman (1979). In this study, the decision of farmers to participate as a project or non-project farmers was modelled by the probit model. The model was used to determine the factors that influenced the probability of farmers' selling and supplying their vegetables to the formal market or not. This model is discussed extensively by Finney (1971) and Gill *et al.* (1986). Although the factors related to the propositions of this study are interrelated, this section is more related to Proposition 1 of this study as presented in Chapter 1.

The probit regression model is generalised linear regression model of the following form (Sweet & Grace-Martin, 2011):

$$f(\mu_Y) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_n X_n \qquad (4.6.1)$$

The major drawback of the linear probability model is the assumption that the conditional probability function is linear. Consequently, $P(Y = 1 / X_1, ..., X_n)$ is not restricted to lying between 0 and 1 as per the definition of probability. The probability can even be above 1 or negative, resulting in the model's having no meaningful interpretation. To overcome this

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problem of equation 4.6.1, instead of using $f(\mu_Y) = Y$ as the outcome, a function of the mean of Y is used. This function is called the link function.

The logit link function is as follows:

$$f(\mu_y) = \ln\left(\frac{P}{1-P}\right) = \beta_0 X_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots \beta_n X_n \qquad (4.6.2)$$

A probit regression uses an inverse normal link function as follows:

$$f(\mu_y) = \Phi^{-1}(P) \qquad (4.6.3)$$

The cumulative normal distribution function $\Phi\ (.)$ is used in probit regression to model the regression function when the dependent variable is binary. We assume that

$$E(Y/X) = P(Y = 1/X) = \Phi\ (\beta_0 + \beta_1 X_1) \qquad (4.6.4)$$

$\beta_0 + \beta_1 X_1$ in (4.6.2) acts as quantile $_z$ where

$\Phi\ (z) = P(Z \le z),\ Z \sim N(0,1)$

The probit coefficient β_1 in equation 4.6.2 is the change in $_z$ associated with a unit change in X. The effect of the change in X on $_z$ is linear and the link between $_z$ and the dependent variable Y is nonlinear since Φ is a nonlinear function of X; in fact, the relationship is sigmoidal (S-shaped) or has a logistic function (Sweet and Grace-Martin, 2011), that is

$$Y = \frac{1}{1+e^{-X}} \qquad (4.6.5)$$

Y` for Y in 4.6.5. is given by

$$Y' = \frac{e^X}{(1+e^X)^2} \qquad (4.6.6)$$

4.6.1 Variables in the model and working hypothesis

In this section, the explanatory variables that are included in the model to estimate the decision of a farmer to participate in agricultural commercialisation are discussed.

Dependent variables

The probit model was used to estimate data collected from 78 small-scale farmers (22 from Olushandja and 56 from Etunda irrigation project). Of these farmers, some supply the informal markets (local open markets, at roadside stalls, within the community and urban

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settlements), and other supply the formal markets (retailers, supermarkets, institutional buyers (catering and restaurants). The dependent variable consists of a variable that the probability that a farmer participates in the formal market supply chain for vegetables by selling to formal markets. This variable assumes 1 for those who participate in the formal market supply chain and 0 for those who supply informal markets. Fresh fruit and vegetables are high-value crops that are being promoted by the Namibian government with the aim to contribute to the incomes of households involved in these activities. These products also can be sold directly to formal markets and informal markets.

Independent variables

The independent (explanatory variables) used in the model are explained below while other variables that were explained under section 4.4 will not be repeated in this section. The variables explained in section 4.4 are household size, age of head of household, the total number of years spent on education, farming experience in horticultural production, the total number of farm labourers, source of irrigation, type of employment (full-time farmer), farm income per month, farm size, land ownership, distance from farm to the water source, distance to major urban market from farm and ownership of a vehicle. These variables were also explained in the literature (Bester *et al.*1999; Hayes *et al*., 1997; Lishman & Nieuwoudt, 2003; Turner *et al.*, 2000).

The type of scheme was presented as a dummy variable, which assumed the value of 1 if a farmer is in the project or 0 for non-project. This variable's impact on commercialisation is positive.

Professional training in agriculture was a dummy, assuming a value of 1 if a farmer received professional training in agriculture and 0 if not. A farmer that received professional training in agriculture is more likely to achieve higher yields and incomes and able to adjust to new technologies as they have skills and knowledge in production. Thus professional training is likely to influence farmers to commercialise.

The land type was presented as a dummy variable assuming the value of 1 if a household was the leasing of customary land and 0 if leasing of state land. The farmers cannot use customary land to obtain credit because of a lack of property right to land. The land market is not

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available. Thus having customary ownership has a negative impact on access to formal markets as farmers cannot invest in the land to improve production.

The type of irrigation was a dummy, assuming a value of 1 if a farmer used drip irrigation and 0 if not. Therefore, the type of irrigation is expected to have either a positive or a negative impact on commercialisation as the type of irrigation can influence the level of production.

Hypothesis

The model was intended to contribute to the answer of Proposition 1 and Objective 2 of the study as presented in sections 1.3 and 1.5. Table 4.17 shows the variables hypothesised to show the probability of the farmers to supply to the formal or informal markets. A positive or negative sign in the model indicates the relationship between dependent and independent variables (Akankwasa *et al*., 2013; Maziya *et al*., 2017).

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Table 4.17: Hypothesised relationships between farmers participating in agricultural commercialisation

Variables	Model description	Variable description	Participation decision
Dependent variables			
Marketing channel for vegetables	Supplying to Formal market =1, informal market=0	MRKTCHNEL	
Independent variables			
Type of farm or scheme	Type of farm or scheme (project = 1, non-project = 0)	SCHEME	+
Gender of head of household	Gender of head of household (female = 1, male = 0)	GENDER	+
Age of head of household	Age of head of household (years)	AGEHOH	+
Household Size	Number of household members	HHSZE	+/-
Total number of years spent on education	Total number of years spent on education (years)	EDUYR	+
Professional training in agriculture	Professional training in agriculture (yes = 1, no = 0)	TRAININGP	+
Farming experience in horticultural production	Farming experience in horticultural production (years)	FARMINEXR	+
Farm income per month	Amount of income per month (Namibian dollar)	FARRMINC	+/-
Farm size	Farm size (hectares)	FARMSZ	+
Land type	land type (leasing of customary land = 1, leasing of state land = 0)	LNDSIZE	+
Land Ownership	Secure tenure for land (yes = 1, no = 0)	TENRLND	-
Total labourer (family, permanent, hired)	Total number of farm labourers (total workforce on the farm)	TOTFARMLABR	+
Source of irrigation	Irrigation source (canal = 1, other = 0)	IRRIGSOUR	-/+
Type of irrigation	Type of irrigation (drip 1, other = 0)	IRRTYPE	-/+
Distance from farm to the water source	Distance to the water source (km)	DISTWS	+/-
Distance to major urban market from farm	Distance to market (km)	DISTM	-
Ownership of vehicle	Ownership of vehicle (yes = 1, no = 0)	OWNVEHCL	+
Membership of any community-based association	Membership of association (yes = 1, no = 0)	ASSOCM	-/+
Distance from farm to extension services	Distance from farm to extension services (km)	KMEXTN	-/+
Type of employment (full-time farmer)	Type of employment (fulltime farmer yes = 1, other = 0)	EMPFULTM	-/+

4.6.1 Probit results

The probit regression model was specified as follows:

Pr (MRKTCHNEL) = f (SCHEME GENDER AGEHOH HHSZE EDUYR TRAININGP FARMINEXR FARRMINC FARMSZ LNDSIZE TENRLND TOTFARMLABR IRRIGSOUR IRRTYPE DISTWS DISTM OWNVEHCL ASSOCM KMEXTN EMPFULTM)

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Probit analysis as shown in Table 4.18 was used to determine the factors that influenced the probability of farmers' to supply to the formal market. The results show that the chi-square value (LR-statistics) for the model is significant at 10 percent level. The McFadden's R^2 indicates that 39.3 percent of the variance is explained by the independent variables. The signs indicate the direction of change in the probability to supply to the formal market with a positive sign showing an increase in probability to supply to the formal market while a negative sign indicates a decrease in probability.

The ownership of a vehicle was significant at 1 percent probability level while the distance from farm to the water source was significant at 10 percent. The type of farm or scheme is not statistically significant therefore it can be concluded that whether a farm belongs to the project or not, it does not influence their decision as to which market it will supply to. This would suggest that the project farms have no greater inclination to produce for formal markets than non-project farms. The type of farm or scheme, the gender of head of household, type of employment (full-time farmer), farm income per month, farm size, land type, land ownership, distance from farm to the water source, distance to major urban market from farm and ownership of vehicle had a positive sign, implying that they would increase the likelihood for farmers to supply vegetables to the formal market, however, they were not statistically significant. Household size, age of head of household, the total number of years spent on education, farming experience in horticultural production, professional training in agriculture, the total number of farm labourers, source of irrigation and type of irrigation had a negative sign, implying that they were likely to decrease the probability of farmers supplying vegetables to a formal market, however, they were not statistically significant.

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Table 4.18: Probit model summary for estimating likelihood to supply to the formal market

Variable	Coefficient	Standard error	Z-value	Pr(>|z|)	95% confidence interval	
Constant	-11.87762	353.7363	-0.03	0.973	-705.188	681.4328
Type of farm or scheme	2.200727	2.370812	0.93	0.353	-2.44598	6.847434
Gender of head of household	0.314821	0.6809204	0.46	0.644	-1.019758	1.6494
Age of head of household	-0.0005726	0.0191583	-0.03	0.976	-0.0381223	0.036977
Household Size	-0.1149061	0.0713464	-1.61	0.107	-0.2547425	0.0249304
Total number of years spent on education	-0.1235265	0.0774677	-1.59	0.111	-0.2753605	0.0283075
Professional training in agriculture	-0.009419	0.2192323	-0.04	0.966	-0.4391065	0.4202685
Type of employment (fulltime farmer)	0.5197518	0.7066095	0.74	0.462	-0.8651773	1.904681
Farming experience in horticultural production	-0.1495457	0.2231114	-0.67	0.502	-3.067357	1.502196
Farm income per month	0.7698178	1.04494	0.74	0.461	-1.278228	2.817863
Farm size	0.0299158	0.0415134	0.72	0.471	-0.0514489	0.1112806
Land type	0.6782835	1.135164	0.6	0.55	-1.546597	2.903164
Land Ownership	0.7604906	0.998209	0.76	0.446	-1.195963	2.716944
Total number of farm labourers	-0.0006831	0.0274319	-0.02	0.98	-0.0544486	0.0530824
Source of irrigation	-7.226425	353.7026	-0.02	0.984	-700.4709	686.018
Type of irrigation	-0.4194831	0.8038863	-0.52	0.602	-1.995071	1.156105
Distance from farm to water source	0.3768445	0.2100507	1.79	0.073*	-0.0348472	0.7885363
Distance to major urban market from farm	0.003723	0.0029881	1.25	0.213	-0.0021335	0.0095795
Ownership of vehicle	1.339249	0.5110994	2.62	0.009***	0.3375128	2.340986
Number of observations	78					
LR (model) X^2 (23)	34.93					
Prob> X^2	0.0529					
McFadden's (Pseudo) R^2	0.3933					
Log-likelihood	-26.939289					

*Significant at $P \leq 0.1$; **significant at $P \leq 0.05$; ***significant at $P \leq 0.01$

4.7 Summary

In this chapter, an analysis of the results of the determinants for small-scale vegetable producers' participation in agricultural commercialisation that were relevant to the market, state, and community institutions was presented. Household size, age of head of household, distance to major urban market from the farm, distance from farm to extension services, amount borrowed from Agribank, and farm income per month were found to be statistically significant determinants of a farmer's decision to participate in the commercialisation of high-value crops in north-central Namibia. The results showed that farmers participating in agricultural commercialisation were moderately educated and had access to production resources such as land, water, and irrigation systems. The results revealed that vegetable

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farmers were facing the following constraints that discouraged them from participating in the high-value crop (vegetable) industry:

- Lack of land ownership, meaning that land cannot be used as collateral to obtain credit from financial institutions.
- High input costs due to high transport costs associated with the procurement of seeds, fertilisers, and pesticides with resulting in high production costs.
- Limited access to credit facilities. For example, the cropland in the areas is customary-owned or state-owned land that cannot be used as collateral to obtain a loan from financial institutions.
- Limited access to supermarkets or retailers due to the poor quality of fresh produce and inconsistent demand by supermarkets or retailers.
- Limited technical production (such as application of fertilisers and pesticides) and marketing (such as pricing, cold chain, and processing) information.
- No viable farmers' organisation within the community based on international principles was found. This resulted in poor cooperation among farmers and confirmed that state and market institutions were not aligned with community institutions.

The presence of these factors means that the vegetable industry is less efficient and less competitive in the study area because of the high cost of production and high transaction costs as well as negative impacts of climatic change on crop production. These results show a need for policy intervention on landownership and improving access to credit for farmers as well as encouraging cooperative marketing to reduce the costs of accessing output markets.

The discriminant analysis carried out with respect to the two groups identified three explanatory variables that differentiated between these groups: years of experience in horticultural production, the total number of farm labourers (family, permanent and hired), and source of irrigation. These variables should be considered when selecting farmers in high-value commercial activities in north-central Namibia.

In addition, the probit model was also used to estimate the factors that influenced small-scale vegetable producers' participation in agricultural commercialisation. The McFadden's R^2 indicated that 39 percent of the variance was explained by the independent variables. Household size, age of head of household, the total number of years spent on education, farming experience in horticultural production, professional training in agriculture, the total

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number of farm labourers, source of irrigation and type of irrigation had a negative sign, implying that they were likely to decrease the probability of farmers to supply to the formal market. The variables ownership of a vehicle (p=0.009) and distance from farm to the water source (p=0.073) were statistically significant. The results with respect to distance from farm to water source imply that there is a need to provide water infrastructure such as piped water or canal to the farmers to reduce the distance to the water sources to improve the reliability and availability of water. This would reduce the cost of pumping water for irrigation and improve production efficiency. The type of farm or scheme is not statistically significant therefore it can be concluded that whether a farm belongs to the project or not, it does not influence their decision as to which market it will supply to. This suggests that the project farms have no greater inclination to produce for formal markets than non-project farms. Thus production for the formal market as the target of the government support has failed.

Farmers in the study area should consider effective agricultural practices and quality standards when producing high-value crops to be globally competitive. Understanding the arrangements of market transactions and the role of the government and the community in the prevailing policy environment with respect to the commercialisation of the vegetable production system in north-central Namibia is important, which will be discussed in Chapter 5.

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CHAPTER 5: THE DEVELOPMENT OF VEGETABLE ENTERPRISES IN THE PRESENCE OF HIGH TRANSACTION COSTS AMONG FARMERS IN NORTH-CENTRAL NAMIBIA

5.1 Introduction

The government of the Republic of Namibia is responsible for all citizens in the country; thus, the support of agricultural development is intended to benefit both commercial and communal farmers. The political challenges of alleviating poverty via agricultural activities are therefore to increase household food security, create employment and enhance income generation of previously disadvantaged communities, meaning that economic empowerment favours small-scale farming rather than large-scale farming. Chapter 4, evaluate the performance of small-scale vegetable farmers with and without access to government support (project farmers) and those with limited government support (non-project farmers). Thus, this chapter presents an assessment of the transaction costs associated with the prevailing policy environment, including political, economic, and social factors that are relevant to the arrangements of the market, state, and community institutions in the development of small-scale agriculture. The chapter presents a theoretical discussion, household survey results, and information provided during interviews with experts familiar with the horticultural industry in Namibia as outlined in Chapter 1.

The study results presented in this chapter provide answers mainly to Objective 3 as presented in Chapter 1 and thus can assist in public policy and business strategy formation. The results also show whether the vegetable industry is globally competitive or not, considering the transaction costs associated with the need for farmers and the government to make investments in production and marketing infrastructures as well as social embeddedness within the community, which constrain agricultural development. Although the factors related to the propositions of this study are interrelated, this chapter focuses more on Proposition 2 as presented in Chapter 1. The chapter starts with an assessment of the prevailing policy environment and social interaction and cooperation of the community and their associated transaction cost characteristics. This is followed by an assessment of market transactions and forms of governance structure in the development of the vegetable industry in the study area. The chapter ends with a summary.

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5.2 Transaction in the prevailing policy environment

This section discusses the historical and social factors, macroeconomic forces, and natural resources and related policies that have a significant impact on the development of the vegetable industry of north-central Namibia with respect to the market, state, and community institutions. The section presents multiple approaches to assess the factors that contribute to transaction costs associated with the prevailing institutional environment, including theoretical discussion, household survey results, and interviews with key informants. For key informants, interviews took place in the form of multiple office visits or by means of telephone and the internet (e-mails). Respondents included farmers, managers, traders, agronomic boards, or government agencies officials.

5.2.1 Prevailing political factors

Historically, the institutional framework for the development of the Namibian horticultural industry with specific reference to vegetable production has been influenced by the country's colonial history from German rule (1884–1915) to South African rule (1915–1990).[16] This history, together with the country's natural resources in a fragile environment has overwhelmingly influenced the institutional framework and property rights such as agricultural land ownership of the Namibian society. For instance, the South African colonial administration did everything in its power to support white farmers settling in Namibia and paid little attention to the needs of the native black farmers living in native reserves, even in areas that were rich in natural resources suitable for crop diversification.

This study found that an increase in investment in the horticultural industry in Namibia with the objective to alleviate poverty among poor rural communities was only established after

[16] According to Mendelsohn *et al.* (2006:8), the German administration from 1892 to 1915 focused on attracting and establishing German settlers who would be productive and develop the country into being as self-sufficient regarding its food needs as possible. As a result, much effort was put into the production of diverse foods (vegetables, fruit, butter, milk and meat), experimentation and support for white farmers. German colonial rule came to an end in 1915, and South-West Africa became a protectorate of Great Britain, from 1915 to 1920; no legislation existed under which land settlement could be carried out during this period (Odendaal, 2005:1). According to Mendelsohn *et al*. (2006:8), South African influences from 1920 to 1990 changed the complexion of Namibian agriculture. The country became like a fifth province of South Africa, with its agricultural policies tailored to the needs of South Africa. Farmland was used for the resettlement of landless white people from South Africa. Diversity of production was replaced mainly by livestock production.

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1990 when Namibia gained independence from the South African colonial administration. Through the Green Scheme Policy (2008), the government has invested in infrastructure (for example marketing, communication, and irrigation facilities) and services in support of agricultural commercialisation to improve the conditions of mainly black farmers in communal areas. The commercialisation of agriculture (e.g. vegetables) in north-central Namibia was negatively influenced by poor implementation of the agricultural policy (2015) and the Green Scheme Policy (2008). For example, the government spent at least N$110 million and N$115 million on the construction of the Ongwediva Fresh Produce Hub during the period 2011/2012–2013/2014 and the Rundu Fresh Produce Hub during the period 2011/2012–2013/2015 respectively (Government of the Republic Namibia, 2016). It was observed that government services and funding of agricultural activities were inadequately decentralised to local or regional authorities and were in many instances costly and ineffective. The result is inefficiency due to high bureaucracy costs and in some cases no authorisation of funding for the development of the small-scale vegetable industry.

Namibia is a member country of the SACU. As a result, the domestic prices of fresh produce are influenced by especially the South African pricing system plus high transport costs of inputs. Therefore, in many cases, the prices of fresh produce that are charged by local farmers are higher than the prices of imports. However, the infant industry status as provided for under SACU arrangements has created a competitive advantage for the vegetable industry to grow crops that have potential in the fragile environment of Namibia.

5.2.2 Prevailing economic factors

Most of the production inputs (such as seeds, fertilisers, and pesticides) are imported from South Africa, resulting in high transport costs. Table 5.1 shows that 76 percent of farmers travel to a source of production inputs (fertilisers, chemicals, and seeds) about 10 times per production season. The table also indicates that 70 percent of project farmers suffer from delays in the arrival of inputs that are imported from South Africa, causing production delays.

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Table 5.1: Farmers' perceptions of economic factors leading to high transaction costs in the vegetable industry

Factors	Non-project n = 22		Project n = 56		Total farmers n = 78		Presence of transaction costs
	Number of respondents	Percent	Number of respondents	Percent	Number of respondents	Percent	
Times that you visit input sources per production season							
-From 0 to 10	20	91	39	70	59	76	Moderate
-More than 10	2	9	17	30	19	24	
Any delays in input/material supply (yes)	13	59	39	70	52	67	High
Land ownership: Leasing (communal land)	22	100	0	0	22	28	Unknown
Land ownership: Leasing (Green Scheme)	0	0	56	100	56	72	Unknown
Number of farmers without insurance against theft or loss	21	96	46	82	67	86	Moderate
Payment for irrigation water (yes)	0	0	56	100	56	72	Low
Level of skills of labourers							Moderate
Very good	2	9	8	14	10	13	
Good/have adequate knowledge or skills	10	45.5	26	47	36	46	
Satisfactory/know a little bit	10	45.5	22	39	32	41	

Barriers experienced by new entrants are especially that the vegetable industry is prone to high input costs and lack of knowledge of how and when to apply these inputs. It is further constrained by factors such as lack of access to land for agricultural activities, lack of access to water for irrigation, lack of availability of skilled labour, and lack of subsidies (Table 5.1).

Specifically, it was observed that the scarcity of productive agricultural land as a result of the high cost of acquisition of agricultural land in Namibia made it difficult for potential small-scale farmers to have ownership of the land that they cultivate. In addition, the cost of leasing is high and the high risk of being removed from state property, in many cases to pave the way for development initiatives, makes it difficult for many farmers to invest in the land that they occupy for agricultural activities. Table 5.1 shows that the land occupied by farmers in the study area is state land that is leased to farmers. As a result, this land cannot be used by farmers as collateral to obtain crop production loans from financial institutions. It was also

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observed that due to limited agricultural production land, the farmers found it difficult to expand their crop fields. For example, for the project farmers at Etunda, many of whom farm on 3 ha, it is difficult to expand their agricultural land. For non-project producers who farm on communal land (Olushandja), many of whom own limited productive agricultural land (average 6 ha), expansion of the farms in many cases is impossible because the relatively productive land is currently occupied by subsistence farming households who are not active in vegetable production.

Moreover, it was observed that the key macroeconomic factors that acted as constraints in the development of the Namibian vegetable industry included the low exchange rate of the Namibian dollar when compared to other currencies such as the United States of America dollar (Figure 5.1), the global financial crisis, the increase in the oil price and the high inflation rate of commodity prices. For instance, the average annual inflation rate of about 7 percent has resulted in high prices for food products when compared to neighbouring countries such as South Africa. In addition, Namibia became part of the Common Monetary Area in 1992 and issued its currency (Namibian dollar) in 1993, which is pegged to the South African Rand. Thus, South Africa has a decisive influence on the exchange rate and both the monetary and fiscal policies of Namibia.

This study found that only a handful of research and development projects had been carried out by consultants sponsored mainly by the government and to an extent by donor agencies with respect to fresh vegetables and fruit (Decosa, 2001; Togarepi *et al*., 2018). The incidence of HIV/AIDS and the associated medical costs among employees also have a serious impact on productivity and labour costs in the development of the vegetable industry.

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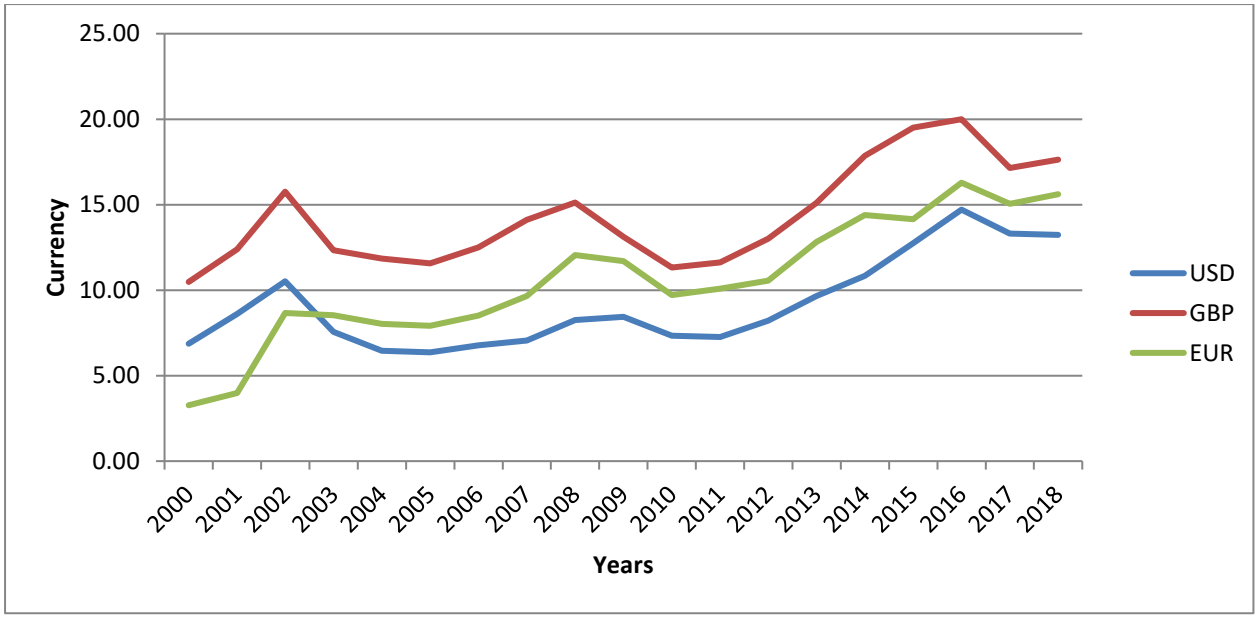

Figure 5.1: Namibian dollar against GBP, USD, and EUR

GBP = Great Britain pound, USD = United States of America dollar, and EUR = Euro.

Source: Bank of Namibia, 2018

5.2.3 Prevailing social factors

The non-project farmers around the Olushandja Dam and the Calueque-Oshakati Canal were made up of Aawambo (Owambo)-speaking farmers who are indigenous to north-central Namibia. The farmers selected to participate in the Etunda Irrigation Project were mainly from the north-central (Ohangwena, Oshikoto, Oshana, and Omusati) and north-eastern (Kavango and Zambezi) regions of Namibia. These farmers' traditional farming methods were similar in many cases; traditionally, they produce under the subsistence farming system.

Table 5.2 shows the perceptions of farmers on the most important factors in selecting them for agricultural commercialisation initiatives and the associated level of transaction costs in the development of the vegetable industry in north-central Namibia.

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Table 5.2: Ranking of factors affecting vegetable development initiatives by project and non-project farmers

Factors	Non-project n = 22		Project n = 56		Total number of farmers n = 78		Presence of transaction costs
	Response	Ranking	Response	Ranking	Response	Ranking	
Strong ties to local community	13 (59%)	2	17 (30%)	3	30 (38%)	3	High
Close political connections	14 (64%)	3	15 (27%)	3	29 (37%)	3	High
Membership of a business association	9 (41%)	2	17 (30%)	2	26 (33%)	2	Moderate
Past experience of starting a farm	11 (50%)	2	21 (38%)	2	32 (41%)	2	Moderate
Information or advice from other farmers	11 (50%)	2	17 (30%)	2	28 (36%)	2	Moderate
Help from government agency	8 (36%)	2	28 (50)	1	36 (46%)	2	Moderate
Being a woman	9 (41%)	3	21 (38%)	3	30 (38%)	3	High
Being a native-born citizen	10 (45%)	3	14 (25%)	3	24 (31%)	3	High
Specific ethnic or language group	10 (45%)	3	30 (54%)	3	40 (51%)	3	High
Specific religious affiliation	13 (59%)	3	31 (55%)	2	44 (56%)	3	High

Note: 1 = helps a little, 2 = helps very much, 3 = makes much more difficult, 4 = makes a little more difficult and 5 = do not know. Low (1), moderate (2), and high (3) stand for strength of the presence of transaction costs.

A strong tie to the local community is an important factor because culture may set limits to an agricultural development economic activity as community values, norms and beliefs take long to adjust to external ideas or technologies due to inadequate information and lack of trust. This implies that inadequate information about agricultural development initiatives that are shared among community members (farmers) results in high transaction costs. High transaction costs due to incomplete information are also associated with being a native-born citizen, belonging to a specific ethnic or language group, and having a specific religious affiliation (it was observed that at least 90 percent of the farmers in the study area were Christians).

With respect to close political connections, it was observed that most farmers selected for government commercialisation projects were relatives or friends of politicians and war

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veterans. This took place because of opportunistic behaviours due to incomplete information among government officials that was shared with the public. Specifically, information costs are high because it is difficult to monitor the hidden agendas of politicians and administrators.

Being a woman is important for aligning with the gender equality policies of the government. Women suffer from high transaction costs due to inadequate information on the production of vegetables and as a result, do not comply with accepted GAP as demanded by retailers and supermarkets.

The other factors associated with moderate transaction costs include assistance from a government agency and other farmers, the experience of farming, and being a member of a business association, which implies that information is shared with farmers to some extent although not satisfactorily.

It was also observed that the traditional system of farming for subsistence purposes was not conducive to the commercialisation of agriculture in the study area. This is because subsistence farming mainly focuses on providing household food security and selling surpluses, if any, and as a result does not promote commercial farming and income-generating activities. Income is rather spent on buying basics such as food and clothes and paying school fees and medical expenses.

In many cases, the extended family including grandparents, siblings, adopted children, cousins, and so on is the centre of local social organisation. This means that trust is placed first in the family and then in community members; those outside the community are trusted less or distrusted. Trust is core to new technology transfer and production and marketing information dissemination in the commercialisation of agriculture. The lack of trust in outsiders who are not part of the community is a big constraint on the development of the vegetable industry.

Moreover, an obligation to take care of or whenever possible to employ family members irrespective of their background and skills is a big factor undermining the commercialisation of agriculture (vegetables) in the study area.

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Table 5.3 shows that the most trusted stakeholders in the study area are other traders in informal markets. This implies low transaction costs because the farmers meet the food standard as demanded by informal markets and farmers also determine the prices of produce (not price takers).

Table 5.3: Ranking of farmers' trust of vegetable industry stakeholders

Factors	Non-project n = 22		Project n = 56		Total number of farmers n = 78		Presence of transaction costs
	Response	Ranking	Response	Ranking	Response	Ranking	
Trust of people from the same ethnic or language group	10 (45%)	5	15 (27%)	5	25 (32%)	5	High
Trust of people from other ethnic or language groups	5 (23%)	2	16 (29%)	1	21 (27%)	2	Moderate
Trust of other farmers	8 (36%)	5	23 (41%)	5	31 (39%)	5	High
Trust of traders (informal)	7 (32%)	1	17 (30%)	1	24 (31%)	1	Low
Trust of government officials	8 (36%)	1	21 (38%)	5	29 (37%)	3	Moderate
Trust of police	11 (50%)	5	21 (38%)	5	32 (41%)	5	High
Trust of own labourers	-	Unknown	-	Unknown	-	Unknown	High

Note: 1 = very great extent, 5 = very small extent. Low (1), moderate (2 and 3), and high (4 and 5) stand for strength of presence of transaction costs.

The second most trusted stakeholders by farmers in the study area are people from other ethnic or language groups and government officials, associated with moderate transaction costs. With respect to other ethnic or language groups, farmers may share information with regard to vegetable production and marketing moderately because they believe that these people are less serious competitors. With respect to government officials, they are trusted more by non-project than project farmers. The lack of trust by project farmers implies that farmers, politicians, and administrators behave opportunistically due to information asymmetries and principal-agent problems in the development of the vegetable industry in north-central Namibia.

The groups of stakeholders that are least trusted are people from the same ethnic or language group, other farmers, police or law enforcement officials, and farm labourers. People from the same ethnic or linguistic group and other farmers are distrusted because they are viewed

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as competitors in vegetable developmental initiatives, and as a result, incomplete information is shared among community members. In addition, it might also imply that there is poor social cohesion and networking among farmers because individual farmers want to benefit more from government support at the expense of other farmers. With respect to labourers (farm workers), transaction costs are expected to be high because it was observed that labourers were paid an average wage of N$480 per month, which was about half of the approved national minimum wage for farm workers of N$860 per month during the 2014/2015, and that temporary workers were paid less than N$50 per day. Notably, labourers often take advantage of the high cost of measuring their characteristics and performance and enforcing a contract and engage in shirking or opportunistic behaviour (Mogues *et al.*, 2012). Police are distrusted because, in some cases, during interviews, it was indicated that theft of produce was common.

One of the questions that need to be addressed is whether cultural embeddedness can enhance the development of agriculture, specifically vegetable production, in north-central Namibia. Relationships with neighbouring countries such as Angola show how political, cultural, and economic activities are interrelated. For instance, the cultural and political link with Angola is important for trading agricultural produce across the border. A similar culture exists in northern Namibia and southern Angola, and Angola also supported the ruling party, the South West Africa People's Organisation, in the struggle for Namibian independence. As a result, the Namibian government has targeted Angola as the main trading partner (Knutsen, 2003:575). It was observed in the study that a small quantity of vegetables such as potatoes, tomatoes, and onions was traded across the border to relatively large markets in Angola. Exports to Angola during 2014/2015 were, however, hindered by customs formalities and lack of trust from Angolan traders or agents. As a result, payment for produce is made only in cash. Trust among trading partners is important in order to reduce opportunistic behaviour and the need to monitor and control the trading partner.

5.2.4 Prevailing consumer concerns

It is also important to note that the literature reviewed (Fiebiger *et al.*, 2010; Kirsten, Dorward *et al.*, 2009; Ortmann & King, 2010) and interviews conducted with experts in the horticultural industry have revealed that globally consumers are concerned about the environment in which vegetables have been grown and are ready to pay high prices for organic fresh produce. Specifically, international consumers are concerned with food safety

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issues, such as environment-friendly products, absence of residue from pesticides, non-genetically modified products, and organic products, all of which are difficult to measure due to moral hazard problems (information asymmetry) at the level of the product itself (see Table 5.4).

Table 5.4: Major global consumer concerns

Consumer concerns	The main effect of transaction characteristics
Food safety (non-genetically modified products)	High searching costs
Organic products	High monitoring and searching costs
Environment-friendly products (no pesticide residuals)	High searching and enforcement costs
Social accountability (fair trade)	High searching and enforcement costs
Traceability	High searching costs
Price of produce	High negotiation costs

5.3 Market transaction and forms of governance structures in the development of the vegetable industry

As discussed in Chapter 2, the institutional arrangements depend on the type of governance structure (market, hybrid, and hierarchy) through which a transaction is channelled (Menard, 2017). The four forms of coordination mechanisms identified in the study area are spot markets, contractors, wholesalers (hybrids), and commission agents (hybrids). The results of the survey with respect to the most used coordination mechanism are presented in Table 5.5. However, there is no regulation or policy that obliges farmers to select a specific governance structure when selling their produce. It is important to note that farmers in the study area use the type of governance structure depending on the level of transaction costs.

Table 5.5: Forms of coordination in north-central Namibia vegetable markets, 2014/2015

Type of governance structures	Non-project n = 22		Project n = 56		Total n = 78		Ranking
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Spot markets (informal)	13	59	44	79	57	73	1
Contractors	7	32	14	25	21	27	2
Commission agents	0	0	5	9	5	6	3
Wholesalers	0	0	0	0	0	0	Not applicable

Note: Farmers use multiple trade types.

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5.3.1 Spot market-based transactions

As can be seen from Table 5.5, the spot market arrangement is the most used by farmers to sell their vegetables. The spot market-based coordination mechanism is described by Eaton *et al*. (2008:20) as the 'default' marketing option for small-scale farmers in rural areas. It was found that vegetable farmers in the study area preferred to sell their horticultural produce through informal markets, for example on the local open markets, at roadside stalls, within the community (local trade), and in urban settlements. The vegetables are mainly sold by women, children, or young men to customers. Farmers sell directly to the buyers or informal traders such as hawkers and vendors, who are important actors in the trading of fresh produce. In informal markets, the prices obtained are generally low when compared to formal markets (supermarkets, shops, and petrol station outlets). Nonetheless, small-scale farmers prefer the informal marketing channel because they cannot meet the stringent international quality standards and, consistently, the quantity demands set by modern supermarkets and retailers (Ortmann & King, 2010). In many cases, however, high transaction costs are caused by high transport costs experienced by both farmers and traders.

5.3.2 Contractor-based transactions

Contractor-based transactions in this study referred to marketing arrangements between farmers and retailers or supermarkets or institutional buyers such as catering companies and restaurants. However, farmers from the study area in many cases do not meet the quality and quantity standards of the retailers or supermarkets and 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 percent of domestic consumption [NAB, 2017]). Locally, supermarkets also source their vegetables from commercial farmers around the country (mainly from the Tsumeb and Mariental districts).

5.3.3 Commission agent-centred transactions

Commission agent-centred transactions in this study referred to marketing arrangements between farmers and commission agents. The commission agents rent the marketing facilities of the AMTA trading centre in Ongwediva where the trading parties meet. It is much more efficient for traders (agents) to purchase from the farmers at a central locale than to visit individual farmers. The farmers must arrange their transport to the marketing hub. The commission agent-centred transactions begin in the trading posts in the marketing hub when

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the farmers arrive with their vegetables in search of trading partners on the market floor. Alternatively, agents search for farmers and negotiate the price of fresh produce and the commission for the agents for their efforts in looking for buyers for the farmers' crops. At the time of the study, farmers were limited to only two commission agents at the AMTA trading centre in Ongwediva, making it difficult to negotiate and search for trading partners.

Although market agents sell fresh produce on behalf of farmers and charge a mutually negotiated commission[17] fee based on the gross sale (gross income) of the consignment, the farmer still retains full property rights of the vegetables until they are sold. Once the fresh produce (fruit or vegetables) is sold, ownership is transferred from producer to buyer. The buyers include individual buyers, supermarkets and retailers, and institutional buyers such as catering companies. The price formation or discoveries are the main coordinating mechanism that guides the actions between farmers and commission agents. In some cases, the price is high on the first day and decreases on the second day and so forth, as a result reducing the initial agreed-upon total gross income on the fresh produce between the farmers and commission agents. In other cases, payment for vegetables from the commission agents to the farmers is delayed. This situation has created distrust among small-scale farmers about the effective functioning of the commission agent-centred system, especially the Olushandja (non-project) farmers as they lack the ability to monitor the agents until payment for their vegetables are received.

5.3.4 Wholesale-centred transactions

The wholesale-centred marketing arrangement in this study referred to the transactions between farmers and wholesale agents. In this system, the wholesale agent gains full property right of the fresh produce once exchange with the farmers has taken place and retains this right until the vegetables are sold. The wholesale agent then sells in bulk or large quantities to retailers, supermarkets, and institutional buyers such as catering companies and restaurants. The result is less negotiation and lower bargaining transaction costs. However, the farmers from the study area did not meet the quality and quantity standards of the wholesale agents and as a result, no vegetables were supplied from the study area. The wholesale agents,

[17] Currently, all agents using AMTA floor space deduct a total of 12 percent from the value of fresh produce sold. Breakdown is as follows: 7 percent goes to the agent(s), 3.6 percent must be paid to AMTA and 1.4 percent must go to the NAB.

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therefore, depend more on the vegetable supply from commercial farmers around the country (mainly from the Tsumeb and Mariental districts) and imports from South Africa.

Figure 5.2 shows the produce and information flow from farms to markets.

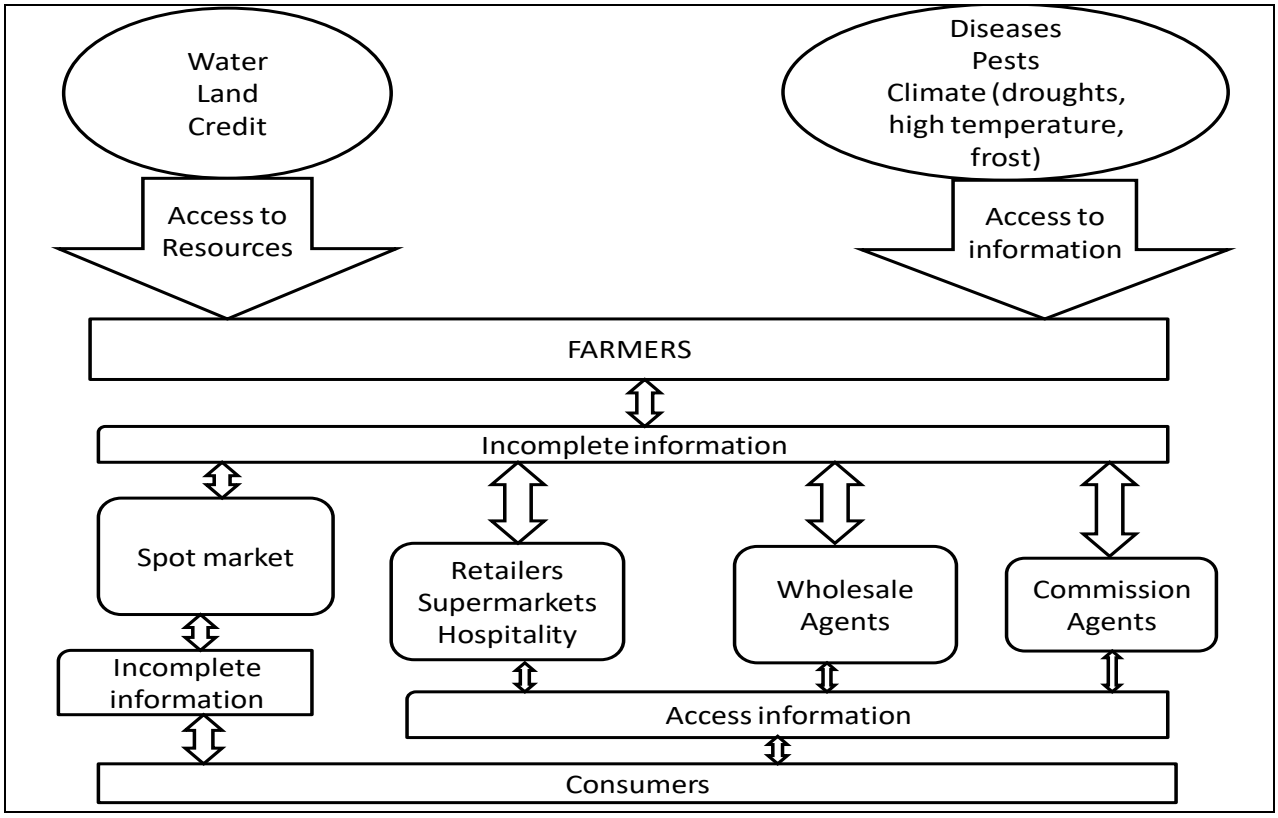

Figure 5.2: Farmers, governance structures and information flow for the vegetable industry in north-central Namibia

5.4 Transaction attributes and governance structures in the vegetable industry

As mentioned in Chapter 2, the three attributes of a transaction that exert a systematic influence on economic behaviour in determining the optimal institutional arrangement are the frequency with which transactions recur, uncertainty, and the degree of asset specificity (Williamson, 1985). The details of the methods of data collection were discussed in chapters 1 and 2 and will not be repeated here. As transaction costs are difficult to measure, this study used the empirical results of the survey and directly observable data to describe and estimate transaction costs as well as the theoretical discussion. This section presents the matching of governance structures with transaction attributes to analyse transaction costs as a result of

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investment or lack thereof by farmers and the government. The transaction characteristics were assessed following the specific types of asset specificity that were elicited using proxies as discussed in Chapter 2. Due to difficulties in measuring transaction costs, several transaction attributes of governance structures were not included in Table 5.6 but are rather discussed in the succeeding subsections.

Table 5.6 presents the transaction attributes and associated governance structures as reported by the project and non-project farmers during the survey. The last column presents the presence or strength of transaction attributes in each governance structure as gleaned from interviews with several key role players in the vegetable industry. Respondents included farmers, managers, traders, agronomic boards and government agencies officials (namely from the NAB, AGRIBUSDEV, and AMTA), farmers' union officials (namely from the Namibia National Farmers Union and the Namibia Agricultural Union), OHPA officials, Agribank officials, extension officials and other public service officials (especially from the Ministry of Land Reform, the Ministry of Trade and the Ministry of Agriculture), traditional leaders, local government officials, and academicians. Interviews took place in the form of multiple office visits or by means of telephone and the internet (e-mails). In addition, the strength or presence of transaction costs in the last column follows Williamsons' (1991) model whereby low (+), moderate (++), and high (+++) indicate the transaction cost strength relative to each governance structure. Notably, the final strength or presence of transaction costs was measured from Table 5.6 and the succeeding discussion of other transaction attributes.

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Table 5.6: Matching transaction characteristics and governance structures in the vegetable industry

Asset specificity and governance structure	Number of respondents				Presence of transaction costs
	Non-project n = 22	Project n = 56	Total n = 78	Total (%)	
Physical assets:					
Own a vehicle					
Wholesalers	0	0	0	0	Not applicable
Contractors	6	7	13	17	Moderate
Spot markets	8	7	15	19	Low
Commission agents	0	2	2	3	High
Invest in storage facilities					
Wholesalers	0	0	0	0	Not applicable
Contractors	5	4	9	12	Moderate
Spot markets	10	38	48	62	Low
Commission agents	0	3	3	4	High
Invest in packing material					
Wholesalers	0	0	0	0	
Contractors	2	2	4	5	Moderate
Spot markets	8	20	28	36	Low
Commission agents	0	2	2	3	High
Site assets:					
Secure land tenure					
Wholesalers	0	0	0	0	Not applicable
Contractors	3	3	6	8	Moderate
Spot markets	8	35	43	55	Low
Commission agents	0	0	0	0	High
Delays in inputs supply					
Wholesalers	0	0	0	0	Not applicable
Contractors	2	2	4	5	Moderate
Spot markets	9	27	36	46	Low
Commission agents	0	4	4	5	High
Limited access to water					
Wholesalers	0	0	0	0	Not applicable
Contractors	4	1	5	6	Moderate
Spot markets	8	6	14	18	Low
Commission agents	0	0	0	0	High
Human assets:					
Horticultural experience of less than five years					
Wholesalers	0	0	0	0	Not applicable
Contractors	1	2	3	4	Moderate
Spot markets	1	8	9	12	Low
Commission agents	0	1	1	1	High

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Horticultural experience of more than five years					
Wholesalers	0	0	0	0	Not applicable
Contractors	4	6	10	13	Moderate
Spot markets	14	42	56	72	Low
Commission agents	0	4	4	5	High
Uncertainty:					
Contract or agreement with the buyer (endogenous)					
Wholesalers	0	0	0	0	Not applicable
Contractors	2	2	4	5	Moderate
Spot markets	3	5	8	10	Low
Commission agents	0	1	1	1	High
Knowledge of price before selling (exogenous)					
Wholesalers	0	0	0	0	Not applicable
Contractors	1	8	9	12	Moderate
Spot markets	6	41	47	60	Low
Commission agents	0	4	4	5	High

Note: Temporary asset specificity was not measured in Table 5.6, but the assessment was done by looking at physical assets invested in by farmers or traders and the government. Whether the investments in assets affected the timing of delivery and the value of vegetables was also assessed.

5.4.1 Presence of transaction costs in spot market-based governance

Overall, the transaction attributes and transaction costs of the 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. 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.

With respect to physical asset specificity, most of the respondents (62 percent) indicated that they invested more in storage facilities at a farm level while only 36 percent invested in packing materials. Only 19 percent of farmers who used the spot market governance structure owned vehicles that were used to transport crops to urban centres. Thus, in many cases, high transaction costs are characterised by high transport costs experienced by both farmers and traders.

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With respect to site-specificity, the farmers indicated that they believed that their occupancy of land was secure. They also indicated that they experienced delays in input supply such as fertilisers and seeds, which are mainly imported from South Africa. This 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 percent of farmers using the spot market coordination mechanism indicated that they had at least five years' experience in vegetable production and marketing, this amounts to an average of less than 10 years, confirming that horticultural production in north-central Namibia is still in its infancy.

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 exogenous factors, manipulation of prices by buyers was a big problem according to the farmers, except in cases of lower quality fresh produce when buyers negotiated for lower prices.

5.4.2 Presence of transaction costs in contractor-based governance

The contractor-based market arrangement is the second most used governance structure. However, farmers in north-central Namibia struggle to meet the quality and quantity standards of retailers and supermarkets; as a result, limited vegetables from the study area were supplied through this type of market arrangement. Retailers and supermarkets in Namibia depend more on vegetable imports from South Africa.[18] Retailers and supermarkets also source their vegetables from commercial farmers around the country (mainly from the Tsumeb and Mariental districts). Overall, the transaction attributes and transaction costs of the governance structures of vegetable markets in the study area are characterised by moderate asset specificity, frequency, and uncertainty between farmers and contractors when compared to the other three modes of organisation. The details of asset specificity are summarised in Table 5.6. Contractor-based transactions overall seem to be characterised by

[18]In 2017 vegetable imports stood at 66 percent of domestic consumption (NAB, 2017).

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moderate frequency as farmers do not supply contractors consistently. It was observed that trading took 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 the government forcing contractors to buy crops locally before they import. 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.

5.4.3 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 commission agents when compared to the other three modes of organisation. However, it was found that transactions within a particular season could 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 was suitable for vegetable production due to access to irrigation water. It was also observed that the climatic conditions allowed the production of vegetables that were 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 produce hub in Ongwediva in order to create market access for small-scale 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, complained 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)

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are highly specific and have a low prospect of being used for non-fresh produce outside the fresh produce industry. The details of human asset specificity are summarised in Table 5.6.

High exogenous uncertainty exists between commission agents and farmers because there is a risk of not sourcing vegetables from the study area and farmers are not producing based on an agreed cropping programme or based on GAP. A high level of endogenous uncertainty also exists between commission agents 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 compared to their initial agreement with the agents, an example of opportunistic behaviour by the agents. According to the agents, however, this was a result of their not finding buyers in time for the farmers' vegetables, resulting in price reduction every day until the product was sold. In some instances, farmers were called after several days when their produce had reached substandard quality levels to collect their products as agents could not find buyers. Thus, the commission agent-centred governance structure transactions are associated with high levels of withholding important information from the producer by the agent. This relationship has resulted in high levels of risk for the farmers and less trust in the commission agent-centred 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.

5.4.4 Presence of transaction attributes and wholesale-centred governance

Wholesale-centred transactions did not take place at the time of this study for targeted farmers. However, at the time of the study, a single wholesale agent was identified at the AMTA marketing hub in Ongwediva. It was observed that the wholesale agent governance structure was associated with a lower level of uncertainty as ownership and the associated risk of fresh produce (vegetables) were transferred at the trading post. In cases where producers of fresh produce did not meet the required quality standards, they were rejected. The wholesale agent prefers to source vegetables from commercial farmers in Namibia or imports from South Africa who meet the set quality standards. With the wholesale agent at

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the trading post, the prices offered for fresh produce were certain, but the prices were also affected by fluctuations between the market forces of supply and demand.

5.5 Estimation of type of transaction costs associated with the governance structure

The focus in this section is on the type of transaction costs incurred by each type of coordination mechanism or governance mode of organisation. Generally, transaction costs can be divided into different types.[19] These costs are classified by Hobbs (1997) and Staal *et al*., (1997) as follows: search, screening and information costs, negotiation, bargaining and transferring costs, and monitoring and enforcement costs.

In Table 5.7, the same methodological approach as in Table 5.6 is illustrated. Since transaction costs are difficult to measure, this section presents the presence or strength of transaction costs based on a combination of survey data and discussions with experts.

[19] Hobbs (1997:1083) classifies the components of transaction costs in relation to the transaction: information costs as arising before the transaction, negotiation costs as the costs of physically carrying out the transactions and monitoring costs as the costs of ensuring that the terms of the transactions are adhered to. Building on Coase's (1937) definition, Staal *et al.* (1997:782) suggest that transaction costs include the following, among others: the costs of searching for partners with whom to exchange, screening potential partners to ascertain their trustworthiness, bargaining with potential trading partners (and in some cases officials who can hold up trade) to reach an agreement, transferring the product (this typically involves transportation, processing, packaging and securing title if necessary), monitoring the agreement to see that its conditions are fulfilled and enforcing (or seeking damages for any violation of) the exchange agreement.

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Table 5.7: Searching, screening and information costs, negotiation, bargaining and transferring costs, and monitoring and enforcement costs and associated governance structure

Transaction costs	Number of respondents				Presence of transaction costs
	Non-project n = 22	Project n = 56	Total n = 78	Total (%)	
Negotiation, bargaining, and transferring costs					
Before selling did you know the buyer?					
Wholesalers	0	0	0	0	Not applicable
Contractors	0	2	2	3	Moderate
Spot markets	9	9	18	23	Low
Commission agents	0	0	0	0	High
Searching, screening, and information costs					
Do you search for trading partners?					
Wholesalers	0	0	0	0	Not applicable
Contractors	2	2	4	5	High
Spot markets	3	23	26	33	Low
Commission agents	0	0	0	0	Moderate
Do you experience problems with price determination?					
Wholesalers	0	0	0	0	Not applicable
Contractors	2	3	5	6	Moderate
Spot markets	11	25	36	46	Low
Commission agents	0	2	2	3	High
Monitoring and enforcement costs					
Do you keep records?					
Wholesalers	0	0	0	0	Not applicable
Contractors	4	7	11	14	Moderate
Spot markets	13	47	60	77	Low
Commission agents	0	5	5	6	High
Have you received training on vegetable production?					
Wholesalers	0	0	0	0	Not applicable
Contractors	4	7	11	14	Moderate
Spot markets	12	42	54	69	Low
Commission agents	0	3	3	4	High

5.5.1 Negotiation, bargaining, and transferring costs

Negotiation and bargaining costs were measured in terms of knowledge of the selling price by farmers when selling products through each governance mode of organisation (Table 5.7). Only 23 percent indicated that they knew the price when using the spot market and 3 percent when using the contractor-based governance structure. This probably implies that farmers are

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price takers with less negotiation and bargaining by them. Moreover, it is possible that the traders, particularly the contractor-based organisation, do not trust the farmers as they are not acquainted with the farmers and the farmers possibly cannot meet the required standards and supply produce consistently. Overall, the commission agent-based organisation incurred the highest transaction costs based on the assessment of three transaction attributes among the market coordination mechanisms in north-central Namibia.

5.5.2 Searching, information, and screening costs

Searching and information costs were measured in terms of searching for trading partners and price-setting (Table 5.7). With respect to searching for trading partners, 33 percent of those using the spot market indicated they searched for trading partners while only 5 percent of those using contractors searched for trading partners. With respect to price setting, 55 percent of farmers indicated that they experienced problems with price setting across all governance structures. Those involved in spot market organisation travelled most to the market in search of price information. Overall, the contractor-based organisation entailed the highest transaction costs as a result of searching and information costs.

5.5.3 Monitoring and enforcement costs

Monitoring and enforcement costs were measured in terms of whether farmers kept both physical and financial records of vegetable enterprises (Table 5.7). Of those who used spot market organisation, 77 percent indicated that they kept records. Of those farmers who used contractor-based transactions and commission agent-based transactions, only 14 percent and 5 percent indicated that they kept records of crop production. It was observed that monitoring difficulties associated with product quality were a reality as buyers relied on safety information provided by farmers, which could not be verified scientifically. This means that the contractor-based organisation must rely on farmers for information regarding their produce, such as the origin of the produce, how it was produced, whether there was any incidence of disease at the time or the use of genetically modified plant materials or seeds. This information and other food safety requirements are needed in order to maintain consumer confidence. For instance, customers may require assurances from retailers, who will require these assurances from farmers. Thus, the traceability of produce along the vegetable supply chain is extremely important. More detailed records may be necessary, for example physically inspecting the production practices of farms or requiring them to adopt certain production practices such as global GAP.

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The second indicator to measure monitoring and enforcement costs was whether farmers were trained in vegetable production (Table 5.7). Of those farmers who used contractor-based transactions and commission agent-based transactions, only 14 percent and 5 percent indicated that they were trained in vegetable production. This probably implies a lack of a crop programme and poor implementation of GAP. For instance, it was observed that no proper guidelines were in place to monitor the progress of project farmers and the achievements of a service provider (i.e. a contracted commercial farmer who provided services to small-scale project farmers). In this respect, the Green Scheme Project is poorly implemented, without proper monitoring, evaluation, enforcement, and commitment from the state. This leads to delays in services provided to project farmers, such as ploughing and input supply (e.g. fertilisers and seeds), as a result of declining gross income and profits as well as making it difficult to sign contracts with retailers or supermarkets where consistent supply is demanded.

5.6 Summary

In Namibia, the political challenge of alleviating poverty via agricultural activities is to increase household food security, create employment, and enhance income generation of previously disadvantaged communities by addressing inequality among citizens. This requires a political will that supports and promotes agricultural policies through small-scale agriculture. The development of the vegetable industry in north-central Namibia is influenced by poor implementation of government regulation with respect to the Green Scheme Policy. It is further influenced by factors such as land ownership, access to water, availability of skilled labour, access to power (energy), availability of government subsidies, payment of taxes, and market failures associated with input and output markets. It was observed that the barriers experienced by new entrants were especially that the vegetable industry is prone to high input costs, a lack of knowledge, and a low level of support by the government, especially of non-project farmers.

Moreover, the study found that vegetable farmers in the study area were not well coordinated through, for instance, cropping programmes or planting or contract production and harvesting schedules to meet the food safety quality standards of the global market. As a result, vegetable farmers are not trained in global GAP and most do not have adequate skills to produce certain vegetables of their choice; this makes it hard for them to produce optimally to meet demands and standards.

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In addition, key macroeconomic factors that cause the Namibian vegetable industry to be less competitive include the exchange rate of the Namibian dollar, the effects of inflation on commodity prices, changes in the oil price, the influence of the South African economy on the Namibian economy and the global financial crisis. It is also important to note that cultural embeddedness may set limits to an agricultural development economic activity as community values, norms and beliefs take long to adjust to external ideas or technologies due to inadequate information and lack of trust of outsiders. Investing in social capital as a resource would make it possible to form farmers' organisations or groups that would enable government and other stakeholders to raise awareness, provide training (such as global GAP) and implement cropping programmes, which are conditions necessary for the commercialisation of the vegetable industry in north-central Namibia.

From the brief overview of the theoretical context given in Chapter 2, one sees that asset specificity, uncertainty, and frequency are important parameters for the definition of efficient institutional arrangements that aim at minimising transaction costs. The institutional arrangements depend on the type of governance structure (market, hybrid, and hierarchy) and their associated transaction characteristics.

The main governance structures found in the study area are spot markets, contractors, and commission agents. The transaction attributes and transaction costs of the governance structures of vegetable markets in the study area are characterised by (1) low asset specificity, frequency, and uncertainty between farmers and buyers in spot (informal) markets; (2) moderate asset specificity, frequency and uncertainty between farmers and contractors; and (3) high asset specificity, frequency and uncertainty between farmers and commission agents (hybrid organisation). The results of this study thus stress that farmers in the study area experience high transaction costs due to information asymmetries and principal-agent problems between farmers and buyers, which result in the vegetable industry's being less efficient or less competitive for both domestic and export markets. As a result, there is a need to promote institutional change or innovation that would sustainably improve the linking of the small-scale producers to agribusiness supply chains, which will be discussed in Chapter 6.

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CHAPTER 6: A MODEL FRAMEWORK FOR THE DEVELOPMENT OF THE VEGETABLE INDUSTRY IN NORTH-CENTRAL NAMIBIA

6.1 Introduction

The previous chapters contribute to empirical studies by showing that several institutional issues within the community and its organisation could lead to the failure of agricultural development initiatives introduced by the state or the private sector (the market). The problem is that most government interventions in the vegetable industry in north-central Namibia are not aligned with community institutions, agro-climatic conditions, and market realities, resulting in failure of agricultural projects and wasting of taxpayers' money invested, for example, in physical infrastructure. This chapter aims to describe the main proposed interrelationship interventions among market, state, and community institutions that would promote the development of the vegetable production system in north-central Namibia. The chapter relates to Objective 4 of this study as presented in Chapter 1.

The primary concern is with the opportunistic behaviour of individuals or the community as collective, government officials, or politicians in the commercialisation of agriculture in developing high-value crops. The discussion also focuses on the findings of the study with respect to propositions 1 and 2 as presented in Chapter 1, with emphasis on information asymmetries and principal-agent problems among actors in the north-central Namibia vegetable industry. The chapter aims to contribute to the analysis of the transaction costs of market, state, and community institutions in the development of agriculture. The chapter describes the model that was designed for the further development of the vegetable industry. The chapter ends with a summary.

6.2 Data and information used

The thematic analysis presented in this section draws on information from discussions with farmers and selected key informants and succeeding discussion of the market, state, and community institutions in the development of agriculture presented in previous chapters. The main proposed interrelationship interventions that would promote the development of the vegetable production system with respect to minimising transaction costs in the value chain are presented. For example, the sources of information asymmetries from the community are traditional leaders and farmers, from market actors are traders and agents, and from the state are project administrators and politicians. These information asymmetries may lead to market

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failure, community failure, and state failure and as a result of agricultural development failure. The chapter is related to both propositions 1 and 2 of this study as presented in Chapter 1.

6.3 Proposed framework for the development of the vegetable industry

It is important to choose the appropriate coordination mechanisms to minimise transaction costs to fully integrate farmers with the market. The approach of assessing the transaction costs involved in the interrelationship of the market, state, and community institutions in agricultural development shows that there is a need to introduce a vertically integrated (backward and forward) firm. A vertically integrated firm minimises transaction costs in a crop value chain (Karaan, 1999; McCann, 2013), but this type of coordination mechanism was found to be lacking in the vegetable value chain in Namibia. These interventions and the introduction of a private company in the vegetable production system are summarised in Figure 6.1 below. The challenges and solutions with respect to the model framework in improving agricultural development in north-central Namibia's high-value crop (vegetables) value chain are discussed. Understanding the constraining factors in the vegetable production system would allow planners and policy-makers to review and implement agricultural programmes and projects that would improve the living standards of people and contribute to GDP. The focus is on agricultural projects and their contribution to agricultural commercialisation, the role of public-private partnerships in agricultural commercialisation, and obstacles associated with information asymmetries and principal-agent problems among market, state, and community institutions in agricultural development.

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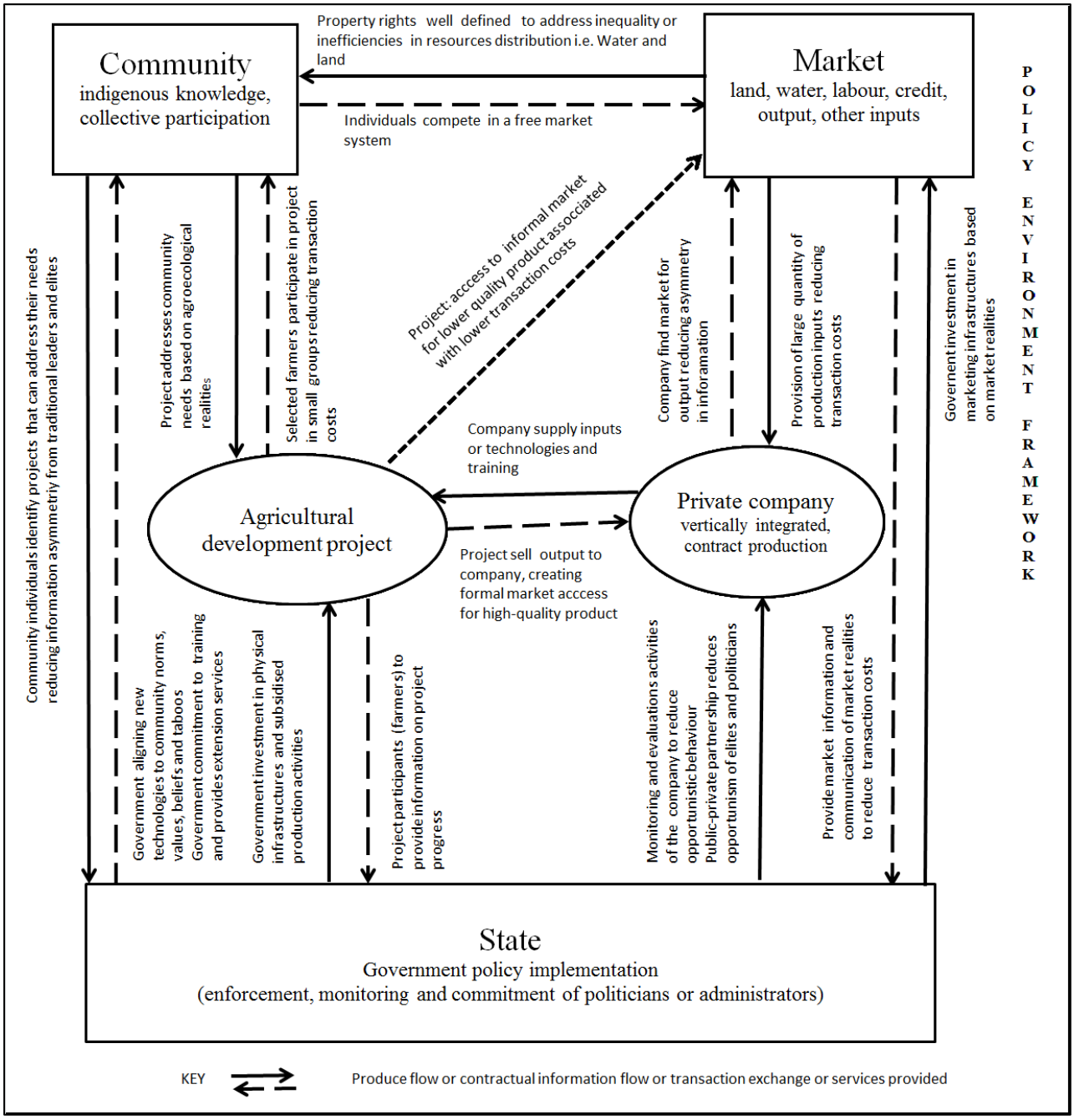

Figure 6.1: A model of the proposed solutions to relationships in the state, market and community institutions network

The model in figure 6.1 shows how transaction costs are reduced in the vegetable industry in north-central Namibia (see also section 6.4). From the model, it can be deduced that the solutions to the relationship between community, market, and state institutions in north-central Namibia can be discussed as follows:

- Between the market and community institutions, there are no clearly defined property rights for natural resources such as land and water which are key to vegetable

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production. Thus, to ensure that a solution that is sustainable for water resources, clear property rights including pricing and distribution to the farmers have to be clearly defined from the current status where there is no pricing system for water from the canal and the dam. Another problem is that the land belongs to the state (communal land) and is governed by the customary laws which restrict property rights. The solution to this problem is that property rights for land have to be clearly defined to allow for a land market which will create land ownership that can be used for collateral to allow farmers to access credit for investment and production. The government will need to create institutions that will support registration, transfer, and administration of property rights to enable farmers to invest in high-value crop production. The detail on solutions to customary land in north-central Namibia is given in chapter 7.

- Between the state and the community institutions, there is a problem of norms, values, and beliefs which have been developed over time which makes transformation and adaptation to new ideas and innovations to take long. This can be ameliorated through the introduction of innovations and technologies by the state (e.g. high yielding varieties, appropriate and locally produced fertilisers, and mechanisation) that are compatible and align with the farmers' norms and values. These innovations and technologies should incentivise as well as attract farmers to be willing to transform and adapt their practices through employment creation and income generation. The government needs to continue building the capacity of farmers so that they are able to adjust and adapt to new and changing innovations and technology. More detail on the relationship between community and state and agricultural projects are discussed in subsection 6.3.1.

- Between the market and the state, the government has and continues to invest in physical and marketing infrastructure. However, there is a continued problem of access to input and output markets for small-scale farmers. Inputs are mostly imported from South Africa, as a result, local small-scale farmers experience high transport costs and other high transaction costs as a result of incomplete information among agents. The main local output market is Windhoek, the capital city which is located about 900 km south of the production area and is supplied by large quantity vegetable

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imports of high-quality standards from South Africa. The local small-scale farmers produced a small quantity of vegetables and experienced high transport costs when accessing domestic markets which make them less competitive in the local market. The solution to this problem is to introduce a vertically integrated company that will operate on contract production. The company will be able to source inputs in large quantities and benefit from discounts on volume and reduced transportation costs. This will allow local farmers to have access to the output market through the company which will have the capacity to supply to both domestic and export markets in large quantities as well as meet the required food standards as demanded by retailers and supermarkets. However, the government has to play a monitoring role in this partnership. The detail on the public-private-farmer partnership is discussed in subsection 6.3.4.

6.3.1 Agricultural development projects

One of the key challenges has been that agricultural projects are identified by politicians and traditional leaders and outsiders without aligning them with the agro-ecological realities of planting specific crops and considering indigenous knowledge and community institutions such as norms, taboos, beliefs, and the organisations that collectively serve the community. The communities identify the needs constraining their production, which, however, is not done by means of a participatory approach and is dominated by politicians who have their interests and political expedience at heart. Thus, some of the solutions proposed for the development of agricultural needs are not fit for purpose and often do not consider market and agro-ecological realities as well as community institutions.

For instance, the state provides agricultural development projects such as high-value crop production (vegetables) to meet farmers' needs, which sometimes bring with them technologies that are not aligned with communities' prevailing practices. This causes the projects to be inaccessible and impossible to use as communities would have to abandon their current practices for the new technologies despite not being equipped to use those technologies. It was found that at the farm level and in the community at large, information was imperfect when obtaining data on crucial environmental, production, and marketing issues, such as technical requirements and specifications, and in respect of registration of land rights, buying and application of the right inputs (seeds, fertilisers, and chemicals), designing and installing appropriate irrigation systems, pricing and other marketing-related information

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and awareness of the community. Only 14 percent of the farmers interviewed indicated that they had acquired adequate information on vegetable production. Thus, decisions on project implementation and management were made based on incomplete information from politicians and powerful social groups and traditional leaders) as well as voters (farmers).

Due to incomplete information, politicians or administrators, traditional leaders, and farmers have been behaving opportunistically to accrue benefits for themselves from government projects with little or no financial outlay. The agenda of politicians in the projects is to become re-elected and to enrich themselves and their families. For example, during the period 2013/2018, AMTA senior managers were overpaid with a 27 percent variance above the 90th percentile of gazetted remuneration (Immanuel, 2019). In addition, the total salary bill of AMTA during 2017 was 61 percent (total expenditure was N$63 million per annum) of total expenditure, which is not sustainable for community development initiatives (Immanuel, 2019). Owing to information asymmetry and politicians' self-interest and hidden agendas, they continue promising re-evaluation of inefficient projects, such as vegetable production, in order to maintain their support base of voters in the area for re-election. In this way, politicians promote agricultural initiatives that are not sustainable but that are relevant to food security and employment creation. This means that when the politicians and a selected few (traditional leaders) in the community identify the participants in rural projects, the interventions will not be sustainable as there will be a lack of ownership of these projects.

The perceptions of community members, as gleaned from the interviews with the small-scale farmers, were that agricultural projects should be led by the state as the community collectively and individual members have no property rights. For example, the farming units in the Etunda Irrigation Project are state land that is leased to farmers on a contract basis and the contract has to be renewed after five years. This means that farmers do not have any property rights with respect to the agricultural land and thus invest less in their farming operations. The use and management of resources related to Green Scheme projects are entrusted to the government agency (AGRIBUSDEV). As a result, one can conclude that these projects lack collective interest, which results in inefficiency of projects. This implies that graduating farmers should have access to land with property rights in order to be able to invest in production. Therefore there is a need to have a policy that enables farmers to have property rights to land in communal areas. The details on customary land rights are discussed in chapter 7.

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Table 6.1 shows how projects are currently identified in north-central Namibia and their main challenges and proposed solutions. It is important to note that when the community's agricultural needs are identified, the process should be inclusive and participatory in order to come up with interventions that are fit for purpose and serve everyone. In the event of a new intervention being decided on, the community should receive training to capacitate it and the intervention should be aligned with the traditional practices that are being used and the agro-ecological realities of the area.

Table 6.1: Agricultural project identification, concerns, and possible solutions

Agricultural project identification issues	**Concerns**	**Proposed solutions**	**Confirmation of inadequate information n = 78**
The project identified by politicians and traditional leaders	The project not aligned with markets, agro-ecological realities, and community institutions	Project to be identified by communities and their organisation in a participatory manner	Unknown
Government project with new technologies not aligned with farmers' indigenous knowledge	Farmers forced to abandon their existing farming practices and cannot use new technologies	Information to and training of farmers should allow a combination of new technologies and existing practices	Inadequate information on vegetable production n = 67 (86%) in 2014/2015
Farmers perceive the agricultural project as government projects	Farmers do not have property rights to agricultural projects	Community or farmers should own the project	Leasing in Etunda project n = 80 (100%) in 2014/2015

Moreover, a lack of collective action means that there is reduced community participation and that project management and leadership are left to project leaders. The project leaders are also inexperienced in vegetable production and therefore invest major resources such as time and energy in order to oversee the success of the project. Project leaders are also captured by politicians and work in the best interest of politicians who wish to maintain support. Thus, the role of community members in managing agricultural projects in north-central Namibia is almost non-existent, as a result constraining the commercialisation of agriculture in rural areas. There is a need to remove bureaucracy in the management of agricultural projects. The project management will need to invest in corporate social responsibility such as training of the farmers in the surroundings to build trust.

The successful implementation of agricultural projects such as the development of the vegetable industry would also depend on aligning community institutions (norms, values, beliefs, and taboos) with agricultural initiatives and associated new technologies to minimise high transaction costs and project failure. The community at large and farmers, in particular,

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should perceive the project as their own in order to avoid public resource wastage and physical and marketing infrastructures' being white elephants. Thus, the successful implementation of agricultural projects depends on effective evaluation (Figure 6.2) and monitoring systems (Section 6.3.2). Currently, the process of evaluation is lacking in agricultural commercialisation initiatives in north-central Namibia. An extensive literature on evaluation processes in agricultural development exists, including the works of Jacobs (1988) and Rodriguez-Campos (2020). Figure 6.2 presents a general evaluation of the Etunda Irrigation Project for the periods 2014/2015 and 2016/2017. The background of this project was discussed in Chapter 4, Section 4.3.

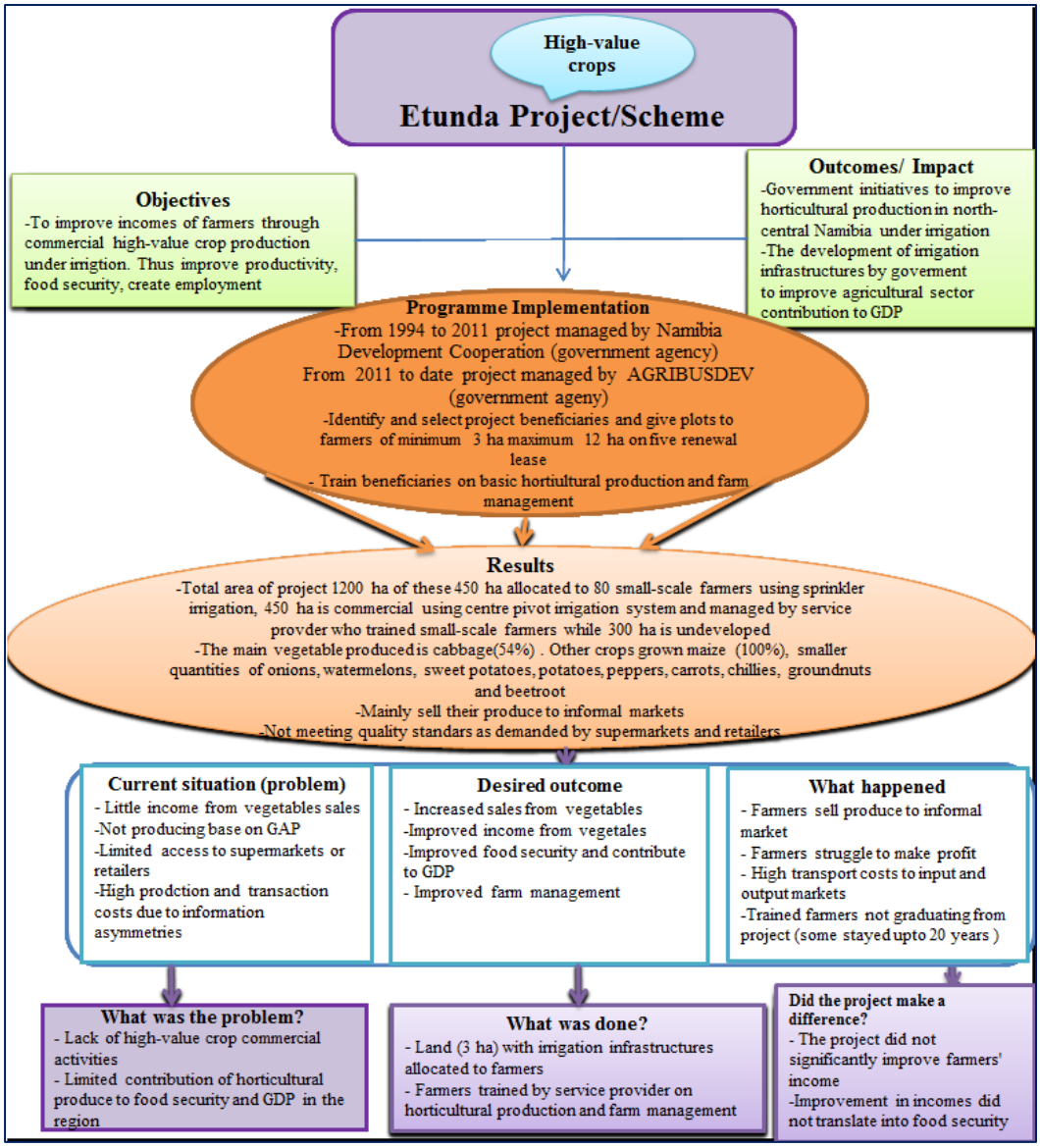

Figure 6.2: Application of evaluation process to Etunda Irrigation Project

Source: Adapted from field data

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6.3.2 Monitoring and incentive compatibility problems of agricultural projects

Notably, incentive compatibility problems are prevalent between the farmers and the government agency (AGRIBUSDEV) entrusted with overseeing the management of the Etunda Irrigation Project. For example, because of adverse selection by government officials or project administrators, the selection of beneficiaries into the project is reported to be skewed towards politically well-connected individuals, family members and friends, and war veterans. As a result, the monitoring processes of the project are compromised and it is difficult to impose penalties for non-performance of farmers in the project. The selection process of the farmers to be part of the project has to be done in a transparent manner in which an independent body oversees the process.

It was found that 86 percent of farmers from the Etunda Project blamed their crop failure on the high cost of production. While some farmers had a genuine case to argue, others had hidden agendas because of incentives for participating in the project as they wanted to continue to benefit from subsidies offered by the government. For instance, during the study, it was observed that irretrievable investment in physical infrastructure, such as irrigation systems, tractors and houses, and inputs were covered by the government for project farmers. These were incentives enjoyed by project farmers that discouraged them from graduating into private farmers. Opportunistic behaviour takes place because of moral hazard by farmers that cannot be proved by government officials or project administrators. Shirking and free-riding problems result in high transaction costs due to information asymmetry, which is a big constraint on the development of the vegetable industry. The government subsidies for the project beneficiaries have to be gradually reduced after the first production so that farmers prepare to stand on their own.

It was found that there were no proper guidelines in place to monitor the progress of project farmers and the achievements of a service provider[20] (i.e. a contracted commercial farmer who provides services to small-scale project farmers). In this respect, the Green Scheme Project is poorly implemented, without proper monitoring, evaluation, enforcement, and commitment from the state. This leads to delays in services provided to project farmers, such as ploughing and input supply (e.g. fertilisers and seeds), as a result of declining gross

[20] This means that a more information-rich commercial farmer shares his or her insights into farming business transactions on a continuing basis with a less well-off small-scale farmer who is only partly integrated into the market (Mushendami *et al.*, 2006).

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income and profits as well as making it difficult to sign contracts with retailers or supermarkets where consistent supply is demanded.

Monitoring difficulties associated with produce quality are a reality as buyers rely on safety information provided by farmers, which cannot be verified scientifically. This means that supermarkets, retailers, and traders must rely on farmers for information regarding the produce, such as the origin of the produce, how it was produced, whether there was any incidence of disease at the time or use of genetically modified plant materials or seeds. This information and other food safety requirements are needed in order to maintain consumer confidence. For instance, when selling formally, retailers may require assurances from wholesalers, who will require these assurances from farmers. Thus, the traceability of produce along the vegetable supply chain is extremely important. More detailed records may be necessary, for example physically inspecting the production practices of farms or requiring farmers to adopt certain production practices such as global GAP.

The transaction costs associated with monitoring activities in the vegetable supply chain are significantly high. These costs include the costs of auditing, produce inspection, and investment in monitoring devices. Therefore, the high cost of monitoring government activities and individual farmers is a factor that constrains the production and marketing of vegetables. Institutional arrangements to monitor government activities and farmers' progress regarding agricultural projects should thus be put in place. An example would be creating internal motivation through competition among farmers and rewarding the best farmers. This would force individuals to practice and enhance self-monitoring and monitoring of others on what they are doing. However, this might involve significant monitoring costs. The alternative would be to employ a monitor for the project, which would also be expensive.

6.3.3 Enforcement and commitment problems in the study area

In north-central Namibia, like in many other rural communities, traditional institutions (such as norms, taboos, and beliefs) have been known to regulate individuals' behaviour and the provision of public goods by allowing individuals within a community to work together in solidarity. Yet, from the community perspective, incomplete information is associated with problems of cooperation and commitment, causing free-riding and shirking, which undermine collective efforts of providing public goods. For example, government (extension) officials in many cases end up allocating subsidised services to well-to-do farmers at the expense of poor

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ones who were targeted for the programme. This happens because of free-riding as no one is excluded from benefiting from the use of public resources such as subsidised tractor services for independent farmers around the Olushandja Dam. There is a need to categorise the beneficiaries into smaller groups that are easy to manage in the distribution of public goods such as subsidised tractor services.

Owing to the high transaction cost associated with enforcement of rules at formal government institutions such as courts, most disputes or criminal cases are handled at the community level as no serious cases were reported during the interviews with the farmers. In addition, formal government institutions, such as courts to resolve disputes, are located far away from the project area, the nearest one being about 40 km away in Outapi, the administrative town in the region. With regard to farmers in the Etunda Irrigation Project, the enforcement of rules against transgressors is vested in AGRIBUSDEV as a leader in decision-making processes and individual cases such as theft of property are normally reported and handled by law enforcement (police).

Moreover, ownership of projects by the government increases the incentive to cheat and steal state property from farmers and community members. In the case of the management of the Etunda Irrigation Project, a security company was appointed to guard the government property in the project. Because this was found to be costly, the security guards were mainly deployed in strategic places such as the main entrance to the project. The possibility of bribing individual guards is high since most security guards are paid low salaries (on average N$2 500 per month during the period 2016/2017).

The interviews with the farmers revealed that the theft of vegetables while still on the field was more common with farmers around the Olushandja Dam. Communities can use community networking to report rule-breakers, who will be punished by traditional courts if found guilty. Since it is difficult to monitor the amount of effort and care that community members will exercise, even with effective institutional arrangements within the community, the costs of monitoring cannot be avoided completely, unless individuals regard the farming units of others as theirs. In this case, the community can also fail to reduce theft completely when farming units are considered as privately owned, such as with the experience of Olushandja farmers.

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It was found that for the non-project farmers around the Olushandja Dam, enforcement against transgressors was sometimes handled by traditional authorities, for example in the case of land disputes, and sometimes by law enforcement (police), for example when the theft was reported. However, it is important to note that private individuals might opt to approach government institutions, such as a court, for dispute resolution. Enforcement costs are expected to be high when formal judicial processes are followed, such as courts to try transgressors. It is natural to expect government institutions to be more costly than collective procedures at the community level to try transgressors. The problem with solving disputes at the community level is that bodies at the village level may settle disputes in favour of the traditional leaders, or politicians or the communal body itself may be composed of more powerful members of the community who promote their interest (De Janvry *et al*., 2010), a situation that demands a monitoring and evaluation programme for agricultural projects in rural areas.

6.3.4 Proposed public-private-farmer partnership

The public-private partnership is a long-term strategic intervention that will be implemented over a period of 10 years. It is expected that an independent vertically integrated (backward and forward) firm will manage the production, marketing, and processing of fresh vegetables in the study area (Figure 6.3). The government is expected to continue to provide the company with production and marketing infrastructure and policy guidelines. The constructed physical and marketing infrastructure will remain government property. A memorandum of understanding should spell out the conditions for how the public-private-farmer partnership would function, including precautions against business and physical risks as well as the allocation of shares among partners. For instance, the farmers, the government, and the company that runs the operations on a contractual basis should all share in the profit made. The proposed distribution of shares is 50 percent to the private company, 35 percent to farmers, and 15 percent to the government.

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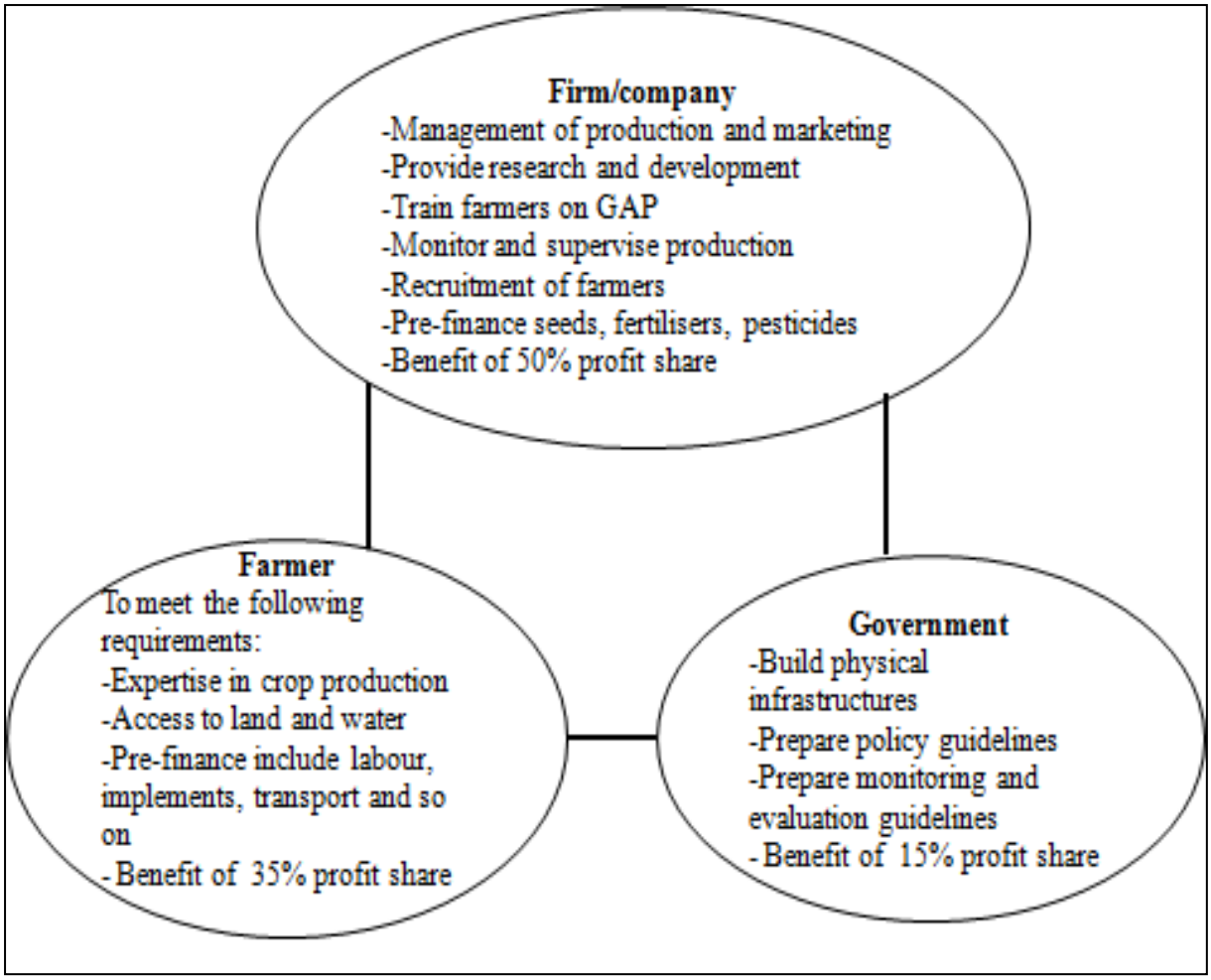

Figure 6.3: A model of the firm-government-farmer relationship

Source: Adapted by the author from Figure 6.1

The vertically integrated (backward and forward) firm to be introduced will coordinate small-scale vegetable farmers with regard to input and output markets through contract[21] production, as a result correcting the market failures experienced by high-value crop farmers. The contract will be renewed at least yearly, and a memorandum of understanding will be signed by all parties as the code of practice (agreement). The company is expected to provide expertise in vegetable production and marketing that would minimise the high transaction costs in the supply chain as well as reduce the costs associated with research and product development. Such expertise in turn is expected to be transferred to local farmers, as a result enhancing the development of the vegetable industry. The criteria to select farmers for the commercialisation of agriculture programmes should include performance (experience with

[21] It is proposed that payment for fresh vegetables be made by bank transfer to each farmer.

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crop production), availability of productive land, availability of irrigation water, and availability of experienced/skilled labour (growing, scouting, grading, and so on).

The vertically integrated firm (a public-private partnership) will also design cropping programmes (crop calendar) and train farmers in global GAP. Awareness of the importance of global GAP among farmers will be a key factor in enhancing the competitiveness of the vegetable industry. The cropping programme will involve identifying the vegetables to be produced and scheduling or staggering production to avoid a glut on the market. Training will be provided free of charge by the company to farmers[22] and some of their labourers. During training, proper planting techniques, spraying methods, fertiliser applications, and so on should be demonstrated, especially to new entrants.

The company, among others, will pre-finance production inputs (seeds, fertilisers, and pesticides [the latter only when needed]) and supply marked crates for traceability purposes. The farmers will be responsible for other input costs, including labour, fuel, ploughing implements, and transport costs. The contract with respect to the cropping programme (crop calendar) should be crop-specific, taking into consideration the time from planting to harvesting. The high-quality fresh produce will be sold through the company to retailers or supermarkets. The farmers will pay for pre-financed inputs only after they have sold their high-value crops. During the rainy season, some farmers might fear planting – as they should – because there is a risk of heavy rains (floods) washing the seeds or seedlings away. In such cases, the farmers will have to inform the company immediately so that alternatives (for example imports) can be considered as the company would already have secured domestic or foreign buyers. The company field officers will also be responsible for monitoring and supervising the entire production process. The company field officers who inspect the crops and supervise the application of fertilisers and chemical spraying should also be entrusted with the recruitment of new farmers and extension of contracts with existing farmers.

In the case of natural calamities, the company field staff will assess the extent to which loss has been incurred by each farmer. In this case, the government will be responsible for assisting farmers through social welfare programmes such as the disaster management programme. As a result, the risk will be shared between the farmers and the company and no

[22] If possible, farmers who can read and write, preferably with an education level of Grade 10, and have at least 10 years of experience can be considered for training.

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refund will be required for pre-financed inputs from the farmers. However, in cases where a farmer did not break even owing to the neglect of the crop, such as not irrigating as required, the farmer should bear all the costs and the company will not be held responsible. In the case of an outbreak of epidemics or pests, which requires emergency spraying or fertilisers, the company should cover the additional costs incurred. The reason for this is that before signing the contract, the farmers will be given estimates about inputs and outputs and will thus be able to determine their approximate gross income and profits.

6.3.5 Information asymmetries and principal-agent problems among market, state, and community institutions

The arrangement of the market, state, and community institutions is especially influenced by information asymmetries and principal-agent problems in the development of the vegetable industry in north-central Namibia. Figure 6.4 shows the background information exchange on arrangements of the market, state, and community institutions as gleaned from the vegetable production system in north-central Namibia. Figure 6.4 was adapted from the framework in Figure 6.1.

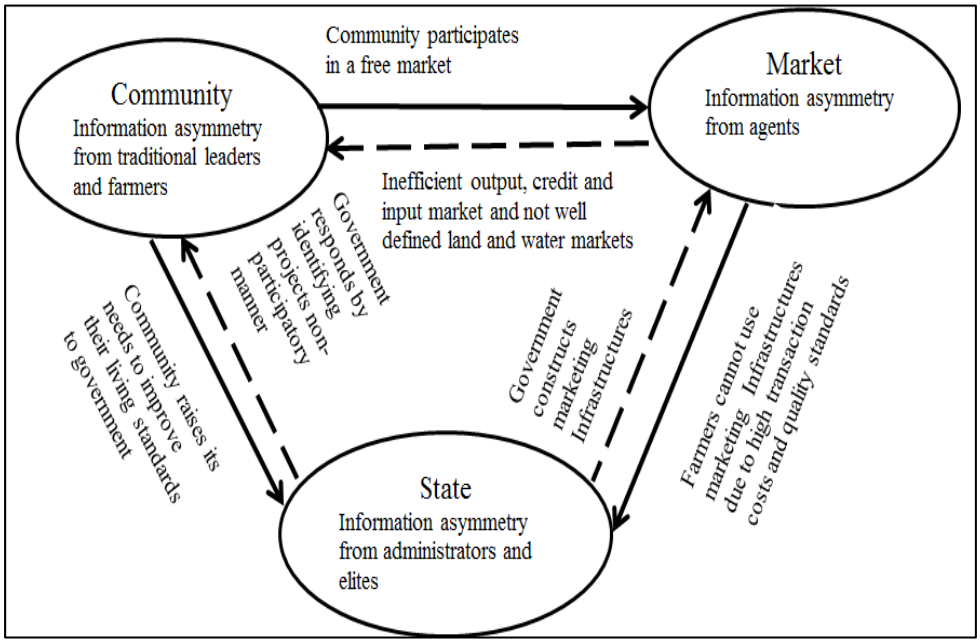

Figure 6.4: A model of the key relationships in the state, market and community institutions network

Interventions for the development of the vegetable production system should include how information should be shared among state, community, and market institutions.

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- Between community and state: It is important to note that tacit knowledge matters in the process of agricultural commercialisation because farmers possess indigenous knowledge with regard to environmental and historical trends as well as social and institutional factors. Important information about local conditions such as climate (temperature, rainfall, floods, and droughts), poor soil fertility, culture, and community needs that are constraining the commercialisation of agriculture should be shared among the actors in agricultural development. For instance, the study found that rain-fed vegetable production was impossible in the study area because of erratic rainfall, with an average ranging from 350 mm to 500 mm in the region (DEA, 2002). Climate change is inevitable; droughts have been frequent, and intensity has increased in the study area, impacting water availability. Successive drought years have been reported to lower the water level of the Olushandja Dam, thereby affecting farmers who rely on irrigation water from the dam. This leads to high pumping costs (fuel) and high installation costs of extra pipes that as a result forced about 25 percent of farmers out of production during the 2014 drought spell. One, therefore, has to take into consideration that climate change (which causes droughts and extreme temperatures) constrains vegetable production. Therefore, there is a need to provide piped water or canal water closer to the farmers' fields to ensure continuous and sustainable crop production.

- Between community and market institutions: Farmers bring with them their socio-cultural beliefs and norms, which make it difficult for them to accept certain practices that would improve their productivity. Their socio-cultural background, for example, is not linked to the formalised input market. It is suggested that farmers be trained and capacitated in the use of GAP and that the use of organic fertilisers is encouraged rather than being regarded as inferior. Information shared with farmers should enable them to access input, output, and credit markets. In addition, the development of agriculture and hence commercialisation, in this case in north-central Namibia, is constrained by poorly defined property rights and the high transaction costs associated with small-scale crop production and marketing. Thus, agricultural land and water rights or markets should be well defined in order to enhance commercial production. There is also a need to enforce the buying of local products by retailers or supermarkets (a market share scheme).

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- Between state and market institutions: In Namibia, most developmental agricultural projects, such as vegetable production, have failed to achieve the desired results. This problem has been exacerbated by inefficient agricultural policy, which has failed to respond to information asymmetries and agency problems from actors (farmers and politicians) and administrators of the projects. The Namibian government also intervened by establishing market access for small-scale farmers in the country, but these interventions are not aligned with community norms and values and the organisation that collectively serves the community (the OHPA). For instance, the inadequate information shared with farmers does not enable them to meet the stringent requirements for fresh and processed food products as set by retailers and supermarkets who demand consistent quantity, high quality, food safety, timely deliveries, a certain size, and type of product and so on. The result is that farmers end up not using marketing hubs such as that of AMTA, thereby creating the impression that there is no market for the farmers despite the availability of market infrastructure. Thus, farmers could be organised into cooperatives in order to reduce the transport cost to output markets.

6.4 Summary

In order to enhance the commercialisation of agriculture in north-central Namibia, a model was developed. This model was designed considering that several institutional issues within the community and its organisation could lead to the failure of agricultural development initiatives introduced by the state and market institutions. The model introduced public-private partnerships as a policy instrument linking small-scale farmers to input and output markets through contract production. The aim is to implement a vertically integrated system that minimises transaction costs in the vegetable supply chain as discussed in Chapter 2.

This chapter also discussed the main problems of not aligning community institutions and their organisation with market realities and agro-ecological factors as these constrain the development of agricultural projects (vegetable production) in the rural areas of Namibia. The research results revealed that information asymmetries and principal-agent problems inhibited the development of agricultural projects in north-central Namibia, mainly because of the opportunistic behaviour of administrators (politicians), traditional leaders, farmers, and other market actors who want to benefit from government programmes at a limited cost. In addition, agricultural development projects should include a monitoring and evaluation

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programme to monitor the extent to which these projects have succeeded or failed. This is necessary to reduce the wastage of taxpayers' money on unsuccessful agricultural projects.

From the results of this study, one can conclude that lack of land ownership among small-scale potential commercial farmers is one of the key factors that inhibit agricultural commercialisation in north-central Namibia. Thus, it is important to understand and propose strategic policy reforms of the customary land tenure system in Namibia that will promote the commercialisation of agriculture in communal areas, which will be discussed in Chapter 7.

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CHAPTER 7: THE IMPLICATIONS OF THE CUSTOMARY LAND TENURE SYSTEM ON THE SMALL-SCALE VEGETABLE COMMERCIAL ENTERPRISES IN NORTH-CENTRAL NAMIBIA

7.1 Introduction

The prevailing customary land tenure system in north-central Namibia was found in the previous chapters to impede the development of small-scale high-value crop production. The land tenure system in Namibia is divided according to three different categories of land, namely freehold title whereby land is privately owned, leasehold[23] whereby land is allocated by the government through the resettlement programme to previously disadvantaged communities, and the customary land tenure system whereby all land used by the indigenous Namibian communities falls under the authority of traditional chiefs in communal areas. However, the ultimate customary land tenure authority is vested in the government, which holds all communal land in trust for the indigenous people. In practice, commercial markets are allowed in freehold land and not allowed in customary tenure systems. This chapter focuses on the customary tenure system and associated agricultural development, especially how it impedes the commercialisation of agriculture in north-central Namibia.

Land reform in Namibia has been devoted to redistributing commercial land mainly from white farmers to previously disadvantaged Namibians (mainly black farmers) since independence in 1990 for disadvantaged individuals to be resettled as farmers. In contrast, the land reform in communal areas under customary land tenure has received little attention during colonialism and post-colonialism in terms of commercialising agriculture under the customary tenure system. As a result, small-scale crop farmers in communal areas of Namibia are farming with limited investments to enhance agricultural commercialisation. Customary tenure in Namibia is therefore over-reliant on state and community institutional arrangements with limited roles of market institutions. This situation according to Hayami (1988) would lead to inefficiency and increase inequality in the overall socio-economic welfare of the people. Thus, Namibia needs a land policy that provides a clear position on the customary tenure system to promote the economic opportunities and social reform of rural farmers.

[23] Leasehold rights are defined as individual rights that are in effect for a defined period of time and that are considered virtually indistinguishable from property rights (Werner & Bayer, 2017).

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The chapter relates to Objective 5 of this study as presented in Chapter 1. The chapter reviews the process of land reform in communal areas and suggests amendments to the Communal Land Reform Act No. 5 of 2002 to include articles that promote economic opportunities for small-scale farmers such as those specialising in vegetable production. It is also important to point out deficiencies in the approaches of government policy-makers and other development practitioners to land reform in communal areas of Namibia. The discussion also focuses on the findings of the study with respect to Proposition 2 as presented in Chapter 1, with emphasis on information asymmetries and principal-agent problems, especially among traditional leaders and politicians, in the allocation of land under the customary land tenure system in sub-Saharan Africa and north-central Namibia in particular.

Certainly, this chapter is relevant to alleviating poverty and improving household food security through agricultural income-generating activities. The starting point is a brief discussion of customary land tenure in sub-Saharan Africa. This is followed by an overview of land tenure systems in Namibia with an emphasis on the customary tenure system. A discussion of the suggested improvements in customary tenure in Namibia to promote agricultural commercialisation activities in communal areas will follow.

7.2 Data and information used

In chapters 4, 5, and 6, land ownership in communal areas of north-central Namibia was identified as one of the key factors impeding the commercialisation of agriculture. This is mainly because agricultural land in rural areas is allocated, registered, and administered under customary tenure systems that prohibit land sales and limit land rentals. As a result, farmers cannot use their land as collateral to obtain credit from financial institutions. To explain the implications of and to suggest policy options for the customary tenure system in Namibia, this chapter reviews the customary tenure systems in sub-Saharan Africa. Both published and unpublished sources are considered in this chapter. Other methodological procedures were described in Chapter 1 and will not be repeated here.

7.3 Customary land tenure systems in sub-Saharan Africa

One of the most important factors in sustainable economic development is a supportive institutional environment, which is at Level 2 of Williamson's (2000) social analysis. Most parts of sub-Saharan Africa are characterised by abundant land; however, scarcity of farmland is becoming an issue as the population grows (Cotula, 2007; Deininger *et al.*, 2014;

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Heady & Jayne, 2014; Holden & Otsuka, 2014). However, a new study by Jayne *et al*., (2016) highlights the increasing prevalence of medium-sized farms, as the regional population grows and demand for land increases. The region is vulnerable to land scarcity problems because of its heavy dependence on agriculture for livelihood for most of its population (Tione & Holden, 2019:1). The global land issues relate to the alleviation of poverty, social inclusion, stability, investments, economic development, environmental protection, and natural resources management (Enemark *et al.*, 2015: 7).

Land tenure reform is defined in different ways in the literature. Adams *et al*. (1999) refer to land tenure reform as a planned change in terms and conditions, for example, the adjustment of the terms of contracts between land-owners and tenants or the conversion of more informal tenancy into formal property rights. Land tenure reform is also defined as the allocation and security of land rights through legal cadastral surveying, land transfers, and the management of boundary disputes (Enemark, 2005). Traditionally, in Africa, customary institutions are relevant in providing tenure security high enough to encourage investment (Deininger *et al.*, 2017:78). However, in recent years, both land rental and sales markets have been emerging in sub-Saharan Africa in response to population pressure, which in principle leads to reallocation of land from land-rich to land-poor households (Holden & Otsuka, 2014:91). Thus, there is a need for explicit policy actions to address the unique agricultural development challenges in densely populated rural areas (Jayne *et al*., 2014).

It is estimated that approximately two-thirds of about 2.2 billion hectares of all cultivated land in sub-Saharan Africa is under customary tenure (Wily, 2011:468). The terms ‘customary tenure’ or ‘community-based tenure’ means collectively owned land under the authority of traditional leadership (Chimhowu, 2019; Hull *et al.*, 2019; Wily, 2011). Customary tenure is a set of traditional rights, rules, and norms that governs community allocation, use, access, and transfer of land and other natural resources (Freudenberger, 2013). Given these definitions, customary tenure is embedded in social relationships (Cousins, 2007; Lavigne Delville, 2007). For instance, in most sub-Saharan African countries, customary land is governed under different forms of customary tenure systems by well-intentioned social and cultural rules or norms meant to grant equal access to families within groups with a common interest in land (Yaro, 2010:119). In practice, the customary tenure approach is defined based on the *de facto* (informal, extra-legal) situation, constituting

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the communally accepted rules that define access to land and land use rights and interests (FAO, 2002b).

Customary tenure is not exclusively communal, but the communal paradigm remains in land policies and legislation of customary land tenure systems in most African countries (Banda, 2011; Cotula, 2007). The communal land system is more associated with colonial influences while emphasising that landholding is regulated by traditional leaders using local institutions, based on customary norms and practices (Chitonge *et al.*, 2017: 83). As a result, customary tenure systems draw their legitimacy from traditional practices and they are also affected by colonial and postcolonial influences (Cotula, 2007; Hull *et al.*, 2019). Possibly, this means a dilution of the power and authority of traditional authorities and an extension of state power by statutory laws into a realm that has largely remained governed via local institutions including rules and norms (Chimhowu, 2019:900). Regrettably, customary authorities can be as corrupt, unfair, and partial as any other authority. For example, rural communities often do not protect the rights of minorities, women and the underprivileged, and powerful traditional leaders (chiefs) and politicians with vested interests may dominate the decision-making processes (Freudenberger, 2013).

Customary tenure can be divided into the holding and the commons (Adams *et al.*, 1999; Hull *et al.*, 2019). The former refers to land occupied and used exclusively by individuals or households for residential, farming, or other activities while the latter is land shared by multiple users for grazing and gathering. Customary tenure systems are not only powerful forces in resource management but they can also be highly responsive to political, economic, social, technological, legal, and environmental changes in the world around them. For instance, adaptations take place in response to an increase in population growth, market forces of demand and supply, conflicts as well as political and climate changes (Freudenberger, 2013; Holden & Otsuka, 2014). Notably, the basis for the rejection of customary tenure systems is the idea that common property leads to unsound economic and environmental practices (Yaro, 2010:201-202). However, customary or communal tenure is the only check against landlessness among the poor households in the African rural areas; a pro-poor land policy should, therefore, strengthen customary rights to land (Chimhowu & Woodhouse, 2006: 346).

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It is important to differentiate between customary law and statutory law. The former refers to the rules about land made by communities while the latter refers to laws made at the national level to protect private properties by the government through parliaments (Wily, 2011). As a result of modern (colonial and postcolonial) administrations, especially sub-Saharan Africa has found it appropriate to rule that only land that is used for housing and farming can be eligible for being designated as property. The primary objective was to enable governments to declare land that was neither cleared nor farmed as unowned and therefore by default the property of the state and to enable governments to dispose of such land at will. As a result, governments, especially in sub-Saharan Africa, consider themselves as the *de jure* or *de facto* owner of the customary lands (Chimhowu, 2019; Hull *et al*., 2019).

The losses in customary lands occur through the state's reallocation of land for other purposes or to private persons (normally rich people) seeking large areas of land of their own, often for industrial agriculture or private commercial agriculture (Chimhowu, 2019; Chitonge *et al*., 2017). Under legal pluralism, people frequently observe customary and/or statutory law as the need commands (Cotula, 2007), giving rise to a continuum of various combinations of customary and statutory laws (Hull *et al*., 2019). As a result, modifications of the customary land tenure systems are viewed through various lenses by different stakeholders, with capitalists welcoming the positive aspects with respect to production and communitarianism very much, pointing to the negative concerns of inequality and landlessness (Atwood, 1990; Yaro, 2010).

Under true reform in a customary tenure-rich region such as sub-Saharan Africa, rights that are derived both from customary systems and from statutory land tenure should be considered. This means that customary systems may allocate land rights among different users, but the state may at the same time allocate land rights and responsibilities to resources in the world around the users (Freudenberger, 2013). For example, in Malawi, the government instituted a legal framework that allowed households to trade their private or customary land following proper guidelines for land-use changes compared to most other Africa countries that completely prohibit land market activities (Tione & Holden, 2019). Inevitably, land market transactions, both rentals, and sales have become more active in most African countries (Holden & Otsuka, 2014).

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The process of land registration in communal areas ensures secure land rights and land administration (Chimhowu, 2019; Sanga, 2009; Yaro, 2010). It is reasonable to assume that when individuals are given formal recognition through land titling and access to investment, their living conditions can improve (Jayne *et al*., 2016). Having tenure rights is a necessary condition for accessing credit from financial institutions by using land as collateral (Deininger, *et al.*, 2017; Sanga, 2009). The ability to use the land as collateral in formal credit markets is a benefit that is more relevant where the formal title exists and land transactions are feasible (Kaakunga & Ndalikokule, 2006). For land to serve as collateral, the lender must be assured that the borrower is certainly the owner and thus a secure title is registered (Feder & Feeny, 1991). If the borrower is unable to repay the loan from a particular financial institution, the property (land) will be transferred to the lender (Sanga, 2009:12).

However, secure land rights and land administration are associated with high transaction costs (Blochert, 2006), and significant real costs are associated with land titling, documenting, and/or codifying complex local systems in remote and inaccessible areas in most developing countries (Freudenberger, 2013). Transaction costs include measurement costs, information costs, monitoring costs, and enforcement costs (Coase, 1937; Hobbs, 1997; Furubotn & Richter, 2000) as well as legal costs, searching costs, administrative costs, and uncertainty costs (Zevenbergen *et al*., 2007). In sub-Saharan Africa, the related transaction costs in rural factor markets partly depend on policies and institutions that facilitate local access to incomplete information, which is costly to collect, verify and disseminate (Fafchamps, 2004; Tione & Holden, 2019). This information is primarily used to build trust and reputation among potential partners when searching, screening, negotiating, or monitoring and enforcing contracts (Tione & Holden, 2019:2). Certainly, low-cost new technologies and rapid approaches to registration and formalisation have reduced the costs of registration and certification (Holden & Otsuka, 2014).

Reviewing the legal status of customary land rights and land laws in 35 countries in Africa, Wily (2011:3-13) managed to categorise these countries, based on their statutory system of customary land rights and the specific effect thereof on common properties, as having land laws with positive, negative or mixed impacts. In terms of land law, the most positive countries include Uganda, Tanzania, Burkina Faso, and Southern Sudan. In terms of land law, the most negative countries include Cameroon, Mali, Sudan, Zimbabwe, and Lesotho. In terms of land law, Namibia falls in the category of mixed countries; this means that the

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country's land law is neither all bad nor all good. According to Wily (2011:13), uncertainty regarding land rights has three main sources:

- Protection of customary rights may be provided but is legally applicable only to lands that are occupied and used, for example, family properties. This leaves most of the customary land resources involving forests, rangelands, wetlands, and other traditionally collectively owned lands without protection.
- Customary rights may be protected but only if they are made subject to formal survey, registration, and titling.
- New policies are in the process of being formulated with indications that positive improvements might be made.

From a theoretical perspective, there appear to be three schools of thought, namely the replacement, adaptation, and conservative theories. The details of these theories are discussed by Hull *et al*. (2019: 6-11). The replacement theory supports the substitution of customary land rights (living, uncodified customary law) with titles (official, codified customary law, possibly including collective freehold titles or records, or individual freehold or limited real rights titles or records) to ensure tenure security. The conservative theory maintains that uncodified, living customary tenure systems provide sufficient tenure security and that titling reduces tenure security; the theory advocates conservation of much of the customary status quo. The adaptation theory lies between replacement and conservative theories. This theory advocates incremental changes to the land tenure system or the adoption of hybrid tenure systems in order to accommodate local and changing needs. Understanding these theories is relevant when governments make amendments to land rights under customary tenure systems in sub-Saharan Africa.

Chimhowu (2019) introduced the concept 'new-African customary tenure regime' when referring to the more legible local land markets that are characterised by processes of economic globalisation. These reforms to customary tenure have been involved to varying extents five specific processes depending on country contexts, namely privatisation, marketisation, deregulation, re-regulation, and creation or emergence (Chimhowu, 2019). These processes entail the following:

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- Privatisation of ownership involves reform of state land through specific actions such as documenting and registering customary land users, adjudicating and assigning land rights to individuals or collectives, and physically surveying boundaries and other processes that make customary tenure more legible (Chimhowu, 2019). This means secure land title or rights under the customary tenure system. This type of land reform is found in African countries such as Ghana, Burkina Faso, Kenya, Namibia, South Africa, South Sudan, Uganda, Tanzania, and Zambia (Wily, 2011).
- Marketisation involves the introduction of a formal system of land valuation that facilitates transactions. However, in sub-Saharan African countries, many of the land reforms have not set up extensive standard pricing systems for rural land valuations (Chimhowu, 2019).
- Deregulation is the neo-liberalisation of customary land, which simply means removing legal barriers to trade in the land as a commodity (Chimhowu, 2019). For example, in Rwanda land reforms have created a more formal land market (Schreiber, 2017), while in Mozambique private investors have found it relatively easy to secure vast areas under 50-year leaseholds (Wily, 2011).
- Re-regulation is a core process of neo-liberalisation of customary land that involves recognising, standardising, and incorporating customary land tenure practices within statutory law and reforming rights on customary land (Chimhowu, 2019). For example, some of the reforming rights on land include the Land Act of 1995 in Zambia, the Land Law of 1997 in Mozambique, the Rural Land Law of 1998 in Ivory Coast, the Land-use Planning Act of 2004 in Tanzania, the Organic Land Law of 2005 in Rwanda and the Land Law of 2009 in Burkina Faso (Wily, 2011).
- Creation or emergence is also described by Jessop (2002) as the flanking and supporting mechanisms that involve stabilising some of the contradictions as shaped by the neo-liberalisation of customary tenure. A good example of this type of reform is Mozambique's *Terras Comunitarias* whereby this organisation works with communities to ensure that they register their land rights under a land lease known as *Direito do Uso e Aproveitamento da Terra*. In most countries in Africa, formal long-term leases have been the common way of providing land to international and national investors in large land acquisitions or land grabs (Deininger & Byerlee, 2011; Holden & Otsuka, 2014).

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If individuals, families, and communities in the customary sector are recognised as lawful owners of their land, they run the continuing and worsening risk of losing their land to others (Wily, 2011). The potential contradiction here lies in the fact that making land a formally tradable commodity means that many of the rural poor households can find themselves landless after all (Chimhowu, 2019; Chitonge *et al*., 2017; Collins & Mitchell, 2017; Holden & Otsuka, 2014). In particular, vulnerable groups (such as divorced women, widows, youth, tenants, and people living with HIV/AIDS) are at a disadvantage when it comes to registration of their right to occupy customary lands (Chimhowu, 2019; Freudenberger, 2013; Mwangi & Meinzen-Dick, 2009; Whitehead & Tsikata, 2003). These vulnerable groups may lose their land or their property rights to land-grabbing relatives, to distress sales to neighbours, to politically well-connected persons, or outsiders. For example, increasing population pressure and lack of access to land as a safety net for the youth have led to many of them migrating from rural areas to urban areas (Holden & Otsuka, 2014). The lack of a more comprehensive understanding of land issues in sub-Saharan African may have caused well-intended land reform laws to fail as these are subject to capture by politicians who serve their interests at the expense of poor households and other vulnerable groups among rural communities (Deininger & Byerlee, 2011; Holden & Otsuka, 2014; Mendelsohn *et al*., 2011; Sitko & Jayne, 2014). With this understanding of the customary land tenure system in sub-Saharan Africa, it is important to understand the agricultural policy environment and customary land tenure system in Namibia. This is discussed next.

7.4 Agricultural policy environment and customary land tenure systems in Namibia

In Namibia, the acquisition of land is governed by Article 16 of the Namibian Constitution[24] as the primary protector of private property rights. The country's land is classified into three categories, namely state, communal, and commercial land. State land constitutes around 20 percent, communal land constitutes around 36 percent and commercial land constitutes around 44 percent of Namibia's total area (Mendelsohn *et al.*, 2011). State land is the property of the state, and all land that is not otherwise lawfully owned belongs to the state. This land is used for nature conversation, game parks, agricultural research farms, and military bases and also includes urban land owned by local authorities (LAC, 2005).

[24] Article 16(1) of the Namibian Constitution states that all persons have the right to acquire, own and dispose of all forms of property. In addition, Subsection (2) of the article grants the power to the state (government) to expropriate private property in the public interest, provided that just compensation is paid to the affected subjects.

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7.4.1 Agricultural commercial land in Namibia

Commercial land includes privately-owned urban land within proclaimed boundaries, rural commercial farmland, or freehold agricultural land (LAC, 2005). The title and administration of land in commercial farming areas are vested in the registered owner of each farm (Kaakunga & Ndalikokule, 2006). Commercial or freehold land is surveyed and registered in the Deed Registry. This allows for the development of agricultural commercial land because it is privately owned. Thus, owners develop the land to ensure a high market value for their property. The Agricultural (Commercial[25]) Land Reform Act No. 6 of 1995 provides for the acquisition of commercial farmland according to a 'willing seller-willing buyer' land redistribution policy to address land reform.

The Agricultural (Commercial) Land Reform Act No 6 of 1995 aimed at the redistribution of freehold agricultural land whereby the government would buy freehold farms and resettle landless Namibians on those farms under state leasehold tenure. The main aim of land redistribution is to redress the past imbalances in land access among Namibians while empowering the majority economically by equalising income distribution (LAC, 2005). In this way, land market transactions play a significant role in transferring land rights from land-abundant to labour-rich households, which may contribute greatly to both efficiency and equity (Deininger *et al.*, 2017; Holden & Otsuka, 2014). Since independence in 1990, land reform in Namibia has been devoted to redistributing commercial land mainly from white farmers to previously disadvantaged Namibians (mainly black farmers) to be resettled as farmers. Resettlement is defined as the movement of people from an area with insufficient resources to one that is more likely to provide a satisfactory standard of living (National Resettlement Policy, 2001). The Resettlement Policy states that land acquired for resettlement purposes is provided to the beneficiaries on a long-term leasehold of 99 years and can be inherited by their relatives and family members. The challenge, in this case, is that currently, the leasehold right for 99 years cannot be used as collateral, thus making it difficult for financial institutions (commercial banks) to lend money to these resettled farmers (Kaakunga & Ndalikokule, 2006). There is thus a need to review the Resettlement Policy to accommodate the land market so that leases can be used as collateral to obtain credit from financial institutions.

[25] In Namibia commercial land has been and continues to be used as collateral for ensuring access to credit.

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7.4.2 Agricultural communal land

Communal land, which is the focus of this study, includes all land used by indigenous Namibian communities but is owned by the state, who holds it in trust for these communities (LAC, 2003). It is estimated that at least 60 percent of Namibia`s population lives in communal areas (Bank of Namibia, 2012). The Communal Land Reform Act No. 5 of 2002[26] and the Traditional Authorities Act No. 25 of 2000 constitute the most important policies for land management in communal areas in Namibia (Meijs & Kapitango, 2009). The Ministry of Lands and Resettlement continues administering communal land through the regional land boards and traditional authorities. Currently, the communal land boards are responsible for the registration of customary land rights and transfers, cancellations, and allocations, which is a continuous process. According to the Communal Land Reform Act, traditional leaders (chiefs) still have the responsibility of allocating and cancelling customary land rights, after which the land board must ratify the decision before it has legal effect.

The Communal Land Reform Act No. 5 of 2002 recognises the land rights in communal areas of Namibia to be either customary land rights or rights of leasehold. The act declares that customary land tenure includes arable and residential land rights as well as provision for grazing, forests, and other natural resources. The customary land right is valid for the natural life of a holder and can be inherited by the surviving spouse and the children. The challenge is that residents (farmers) in communal areas do not have the same agricultural commercial opportunities as their counterparts in freehold areas. As a result, residents are forced to continue abiding by a customary system of land governance designed for subsistence and that serves the interests of senior traditional leaders and their allies. Thus, it is no longer practical for residents to develop or maintain their properties according to their wishes (Mendelsohn *et al*., 2011).

In communal areas, leasehold rights can be used for specific commercial activities such as agricultural, tourism, or other purposes that the board approves, and rights are valid for more than 10 years and should be registered in the Deeds Registration System (Section 33 of the Communal Land Reform Act No. 5 of 2002). According to the Communal Land Reform Act, the Communal Land Boards have the power to grant rights of leasehold to any portion of

[26] In order to eliminate tenure insecurity in the communal areas, the government of Namibia introduced the registration of land rights in communal areas through the Communal Land Reform Act No. 5 of 2002. The act also provides for equal rights for women to apply for and be granted land rights in communal areas.

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communal land but this right of leasehold may only be granted if the traditional authority of a particular traditional community in whose communal area the land is situated consents to the right of leasehold. For example, the Communal Land Reform Act states that if the right of leasehold is granted for a community campsite and the area is larger than 50 hectares, the Minister of Lands must approve the application in writing before the right to leasehold is granted. The leasehold is for a maximum of 99 years and is also transferable as per Section 38 (2) of the Communal Land Reform Act according to which the Communal Land Board must give written consent.

According to the Communal Land Reform Act No. 5 of 2002 Section 40, in general, no person has a claim against the chief, the traditional authority, the Communal Land Board, or the state for improvements on land held under a customary land right or a right of leasehold. Moreover, ownership of land is not permitted; this means that no private ownership exists in communal areas. Communal land cannot be bought or sold and is kept in trust by the government. Communal land cannot be used as collateral for ensuring access to credit due to the customary land ownership structure. Notably, collateral itself may only be valuable where there is an active land market that permits easy land markets (Atwood, 1990). To enhance agricultural commercial activities and alleviate poverty, some sections in the Communal Land Reform Act need to be amended to improve communal farmers' living conditions and to enhance commercialisation of agriculture, as discussed in the next section.

7.5 Suggested improvements on customary land tenure to allow agricultural commercialisation activities in communal areas in Namibia

7.5.1 Land tenure rights

Article 16 of the Constitution of the Republic of Namibia states, "All persons shall have the right in any part of Namibia to acquire, own and dispose of all forms of immovable and movable property individually or in association with others and to beneath their property to their heirs or legatees" (Constitution the Republic of Namibia, 2000: 11). Thus, it suggested that customary land in communal areas of Namibia be formally surveyed, registered, and titled under the non-customary system or freehold land tenure. However, the transaction costs of legal change can threaten the success of the land reform process (Blochert, 2006:171). In agreement with Freudenberger (2013), land titling should not be imposed where it is not needed but governments should prevent events that are likely to lead, for example, to tenure

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insecurity, intervening before disruptive conflicts take place or poor people are deprived of their livelihoods.

Secure land in the form of land titles is a required condition for economic development (Werner & Bayer, 2017). In addition, land security confers value on land and provides incentives for landholders (farmers) to invest time, effort, and money in developing and managing their land (Mendelsohn *et al.*, 2011). However, it is important to avoid modifications to the customary tenure system that creates incentives for corruption, favouritism, nepotism, or other negative outcomes that undermine the credibility of the system. As Namibia is a signatory to international conventions, the land rights of indigenous communities should also be respected based on international convention guidelines. Thus, it is important to design a plan on how to deal with conflicts on customary land tenure (Freudenberger, 2013) before changes are made to this system.

From observations, it was clear that land rights were sold illegally in communal areas. This happened frequently to owners of communal properties that had recently been included in declared towns or urban areas (Mendelsohn *et al*., 2011:8). Thus, it is suggested that the Communal Land Reform Act No. 5 of 2002 Section 40[27] be amended to allow customary land rights to be registered as legal deeds. This will allow land rights to be assigned as collateral security to financial institutions to secure capital to enhance commercial agricultural development among rural farmers. However, amendments to the Communal Land Reform Act should also stipulate how to protect poor or vulnerable community members, such as women, and to ensure that land rights are available as a social safety net. This is important because the continued availability of commonage is fundamental if communal land is to provide a safety net for people unable to acquire land elsewhere (Mendelsohn *et al*., 2011).

7.5.2 Leasing of land

In Namibia, the Communal Land Reform Act No. of 2002 recognises the provision and allocation of land under leasehold rights to beneficiaries. The act stipulates that any land used for commercial activity has to be registered as a leasehold. Nevertheless, holders of customary land rights, who make up by far the great majority of residents, are deterred from

[27] It is also important for local communities to participate in delineating territorial boundaries before the process of a legal framework is established and thus recognise community rights.

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using their land for income-generating activities unless they go through lengthy processes of converting their land to leaseholds (Mendelsohn *et al*., 2011). In addition, Namibian commercial financial institutions currently are not accepting registered leaseholds over state lands as collateral as they are not allowed to sell leaseholds in the event of a borrower's defaulting (Werner & Bayer, 2017). According to Holden & Otsuka (2014), restricting land rentals may contribute to enhancing poverty and food insecurity among rural people. The land market should thus be gradually brought into the customary tenure system in line with community institutions.

It is suggested that the Communal Land Reform Act No. of 2002 add a section that allows residents to apply for non-customary land use such as residential use, commercial farming, and industrial use and that these types of utilisation should be limited in time and be subject to consultations with the community. It is suggested that customary land under leasehold rights should be registered and valued to serve as collateral when farmers apply for credit from financial institutions. The leasehold rights should conform to the basic characteristics of leasehold agreements in the national context and must be transferable. Leasehold rights in communal areas should be granted for the same period as under the resettlement programme, namely between 10 and 99 years. It is suggested that leased land under the customary land tenure system be registered at the Deeds Registry Office according to the Deeds Registries Act No. 14 of 2015.

It is expected that leasehold rights will enable small-scale farmers to be economically productive and to enter the mainstream economy using the lease agreements to access credit to support agricultural development (Werner & Bayer, 2017). This is in line with the National Resettlement Policy (2001: 6) that states that "the leasehold tenure system will be arranged so that the settlers can use the lease agreement as collateral agreements to get a loan from lending institutions for agricultural purposes". The development of the land market in the small-scale farming sector in Namibia in both resettlement and non-freehold (communal) areas is a necessary condition for lessees of state land to use their land as collateral (Werner & Bayer, 2017).

The registration of lease agreements is expected to generate significant transaction costs that may impede the full implementation of government policy and its legal framework (Werner & Bayer, 2017). Lack of registration of leasehold rights in Namibia is caused by inadequate

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information among beneficiaries about the process and the financial requirements for registration from implementing agencies. This incomplete information relates to the following issues, namely the value of land, the potential range of economic activities, and the lease process itself, including information about essential statutory requirements by institutions. As a result transaction costs associated with registration of lease agreements should be minimised for effective implementation of land markets in Namibia.

7.5.3 Land markets

Land markets and land regulations influence the distribution of wealth, real income, residential segregation, and economic efficiency significantly (Cheshire & Sheppard, 2004). Customary land sales markets are prohibited in most countries including Namibia because fear exists that such markets can lead to landlessness and concentration of land in fewer hands of politically well-connected individuals (Chitonge *et al.*, 2017; Holden & Otsuka, 2014; Mendelsohn *et al*., 2011; Sjaastad, 2003). However, land rental markets were found to be pro-poor in Malawi, Kenya, and Uganda; they helped to improve access to land for poor households and provided income-generating opportunities for landed households with limited non-land resources such as agricultural labour and farm management knowledge and skills (Holden & Otsuka, 2014). In Namibia, redistribution and land markets are currently only applicable to freehold farmers, but it is suggested that the same commercial land activities also be applied to non-freehold land in communal areas. This is especially relevant to small-scale high-value farmers in north-central Namibia who are struggling to commercialise their fresh produce due to a lack of collateral as demanded by financial institutions.

Historical experience with land markets has been associated with growing export markets for agricultural output, for instance, tree crops such as cocoa in West Africa, and a growth in demand for horticultural produce in rapidly urbanising parts of Africa (Chimhowu & Woodhouse, 2006:353). Thus, investment incentives in land improvements, especially tree planting, tend to enhance land tenure security in customary land areas in sub-Saharan Africa (Holden & Otsuka, 2014:93). Hence, it is important to develop land reform programmes and land policies that allow land markets that play a role in and promote efficiency, equity, and sustainability (Holden & Otsuka, 2014). Therefore, it is suggested that the government legalise the land market and the associated rental market to improve agricultural commercialisation in the communal areas of north-central Namibia to improve small-scale farmers' living standards, increase income opportunities and improve productivity. This will

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also be a means to prevent illegal land sales under the customary tenure system that currently take place mainly near urban areas in communal areas in Namibia. However, tenure security and the future livelihood of marginalised groups and vulnerable members of the community such as women and youth should be sorted out before land markets in customary tenure are considered.

7.6 Summary

In most sub-Saharan countries, the majority of the rural population has access to land under customary tenure systems. Customary land is governed under different community institutions, including traditional rights and cultural rules or norms meant to grant equal access to families within groups with a common interest in land. Customary land tenure systems draw their legitimacy from traditional practices and are also affected by colonial and postcolonial influences. The customary land tenure authority is vested in the government that holds all communal land in trust for the indigenous people. Customary tenure systems are not only powerful forces in resource management, but they can be highly responsive to political, economic, social, technological, legal, and environmental changes in the same space. Adaptations may take place in response to an increase in population growth, market forces of demand and supply, conflicts, and political and climate changes.

Under true reform in a customary system-rich region such as sub-Saharan Africa, both rights that are derived from customary systems and statutory land tenure should be considered. The process of land registration in communal areas ensures secure land rights and land administration. As a result, land market transactions, both rentals, and sales have become more frequent in most African countries. However, making land a formally tradable commodity means that many poor rural households may find themselves landless. This includes especially vulnerable groups that may lose their land or their property rights to land-grabbing relatives, to distress sales to neighbours, to politically well-connected persons or outsiders. Land policies should protect these vulnerable groups when the land market is introduced under customary tenure systems.

Customary land tenure in Namibia and elsewhere in sub-Saharan Africa is over-reliant on state and community institutional arrangements with limited roles of market institutions. The limited role played by market institutions, as indicated in previous chapters, would lead to inefficiency and increase inequality in the overall socio-economic welfare of the people.

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Thus, there is a need to amend some sections of the Communal Land Reform Act No. 5 of 2002 to enhance economic development and agricultural commercialisation.

In light of this argument, it is proposed that the Communal Land Reform Act No. 5 of 2002, sections 33 and 40 especially, be amended to allow customary land rights to be registered as legal deeds. Amending the act will also allow land rights to be assigned as collateral security to financial institutions to secure capital in order to enhance commercial agricultural development among rural farmers. In practice, restricting land rentals may continue to enhance poverty and food insecurity among rural people, especially for small-scale high-value crop farmers. Amendments to the Communal Land Reform Act should also specify how to protect vulnerable or poor people such as women and youth and to ensure that land rights are available as a social safety net. Land markets should be gradually implemented under the customary tenure system in line with community institutions.

In Chapter 8, the overall conclusions of the study are presented.

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CHAPTER 8: CONCLUSION

8.1 Conclusion

In developing countries, especially in southern Africa excluding small-scale farmers from agri-food chains would pose a real threat to farm households' incomes, poverty alleviation, and rural development. Using an example of small-scale vegetable production enterprises in north-central Namibia, this study attempted to provide a better understanding of how several institutional issues within the community and its organisation led to the failure of agricultural development initiatives introduced by the state or the private sector (the market). This study intended to contribute to and fill the gap found in the literature by identifying and assessing the main transaction costs (information, enforcement, monitoring, and searching costs) inhibiting agricultural development because of inefficient systems – combining market, community, and state institutions. The research question that this study tried to answer was why it would make sense for the government to invest in services for small-scale fruit or vegetable farmers if these farmers would not increase production due to a lack of market access unless they could make a profit, which would probably imply heavy subsidisation of marketing infrastructures by taxpayers.

A case study of vegetable production in north-central Namibia was conducted for this study. The data were collected from historical records from farmers, agricultural boards and marketing agencies, government officials, and farmers' associations. Historical data were also obtained by selecting farmers for interviews and conducting in-depth interviews with experts (key informants) such as local traditional leaders, regional councillors, scheme officials, extension officials, and other researchers as well as by conducting a farm household survey. Field observations were made to collect first-hand information on the operation and impact of irrigation schemes on the welfare of the community.

The analytical scheme considered two economic development models, namely Williamson's (1985, 2010) TCE and Hayami's (1988) economic development approach (combined market, state, and community institutions). These models were considered because both include the analysis of transaction costs in their structures. The Hayami model also considers the need to investigate institutional issues within the community and its organisation that could lead to the failure of development initiatives introduced by the state or the private sector (market). The choice of TCE was deemed important because transaction costs, especially information asymmetries and principal-agent problems influence economic performance. Moreover, a

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detailed conceptual framework was described in Chapter 1. The conceptual framework itself was specifically applied in chapters 5 and 6 to present the most important information on the commercialisation of agriculture (vegetable production) in north-central Namibia.

Chapter 2 commenced with a brief review of the theory of TCE that was followed by a discussion of transaction costs and selected aspects of property rights, principal-agent relationships, and collective action relevant to the empirical parts of the study. This chapter discussed economic inefficiencies as a result of high transaction costs for the arrangement of the market, state, and community institutions. The chapter developed a series of lessons based on factors constraining the commercialisation of agriculture in developing countries. In Chapter 3, the discussion was based on the major challenges and opportunities facing the commercialisation of agriculture and policy analysis because market-led and state-led policies as well as community institutions failed in the development of agriculture in most developing countries in sub-Saharan Africa after these countries had gained their independence. Thus there is a need to involve the private sector in agricultural development in developing countries such as Namibia.

Chapter 4 provided a description of the types of farmers and the socio-economic and agro-ecological characteristics that constrained the development of vegetable production in the study area. Chapter 5 provided a discussion of the prevailing policy environment and social interaction as well as transaction characteristics and associated governance structures regarding the development of agriculture (particularly vegetables) in north-central Namibia. In Chapter 6, a model based on the interrelationship of the market, community institutions, and government objectives in the development of the vegetable industry is presented. The model aims to minimise transaction costs and enhance competitiveness in the development of the vegetable industry. In Chapter 7, the strategic policy option for further development of the agricultural sector in particular agricultural commercialisation in communal areas such as north-central Namibia was discussed. It is proposed that the Communal Land Reform Act (No. 5 of 2002) sections 33 and 40 should, especially, be amended to allow customary land rights to be registered as legal deeds with market value. This will allow land in communal areas to be used by small-scale commercial farmers as collateral when applying for finances from financial institutions meant for agricultural production.

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Because the theory and the local variables influencing the specific study objectives were interrelated, it was not possible to assess or analyse each objective successively; they were investigated as a combination. It is now appropriate to discuss each of the specific objectives and the key findings with respect to the development of the vegetable industry in north-central Namibia.

The results of the study with regard to the first objective suggest that it is important to arrive at an optimal combination of the roles of community, market, and state in promoting the welfare of a country. The results support the conclusion presented in Chapter 3 that small-scale farmers are facing challenges as actors in the commercialisation of agriculture in developing countries such as Namibia. Constraining factors include agro-ecological and socio-economic constraints, including limited access to markets for output, input, and credit owing to high transaction costs, poor agricultural organisation, and a lack of knowledge of vegetable production among farmers, which hamper the development of agriculture. In addition, state-led agricultural development and the market-liberalisation policies in sub-Saharan Africa have been implemented poorly or not at all or those that have been implemented well have not delivered sustainable benefits. Hayami (1988) argues that market systems, rural community institutions, and government activities in economic development should be combined to achieve sustainable agricultural development in developing countries such as Namibia. Understanding the arrangement of the market, state, and community institutions is essential for describing the conceptual framework that was presented in Chapter 1. The usefulness of this approach can be applied in further studies of transaction costs in agricultural commercialisation in developing countries, especially in southern Africa. For instance, transaction characteristics leading to high transaction costs were identified in the supply chain of the vegetable industry in the study area. The forms of governance structures (market, hybrid, and hierarchy) were identified and matched with governance structures in the study area for small-scale vegetable farmers with limited government support (non-project) and those with government support (project). The community institutions and organisations in agricultural development were assessed. The behavioural attributes such as principal-agent relationship problems, information asymmetry, or opportunistic behaviour among actors in the study area were investigated. The lesson that can be gleaned from this objective is that transaction costs analysis can help to understand the influence on access to input and output markets as well as the sharing of information among actors in the supply chain.

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The results of the study with regard to the second objective are related more to Preposition 1 of this study as was presented in chapter 1 and suggest that the commercialisation of agriculture in north-central Namibia is influenced by both agro-ecological and socio-economic constraints. These include poor soils, lack of land ownership, small farm size, low income, limited access to infrastructure and markets (input, output, and credit), irregular visits by extension officials and a lack of vehicle ownership, as well as cultural change, inadequate technologies and information asymmetries among value chain actors. In addition, the ownership of a vehicle (p=0.009) and distance from farm to the water source (p=0.073) were statistically significant in influencing the farmers' decision to participate in the commercialisation of high-value crops in north-central Namibia. The results show that there is a need for policy intervention that addresses water rights and improved access to credit as well as encouraging production and marketing cooperative to reduce costs of accessing input and output markets. The type of farm or scheme is not statistically significant therefore it can be concluded that whether a farm belongs to the project or not, it does not influence their decision as to which market it will supply to. This suggests that the project farms have no greater inclination to produce for formal markets than non-project farms. Thus production for the formal market as the target of the government support has failed.

The results of the study with regard to the third objective suggest that the transaction attributes and transaction costs of the governance structures of vegetable markets in the study area are characterised by (1) low asset specificity, frequency, and uncertainty between farmers and buyers in spot (informal) markets; (2) moderate asset specificity, frequency and uncertainty between farmers and contractors-centred agents; and (3) high asset specificity, frequency and uncertainty between farmers and commission-centred agents (hybrid organisation). The wholesale-centred transaction was not taking place at the time of this study for targeted farmers. The results thus stress the fact that farmers in the study area experience high transaction costs due to information asymmetries and principal-agent problems between farmers and buyers, which in turn result in the vegetable industry being less efficient or less competitive for both domestic and export markets. As a result, there is a need to strengthen the extension services as well as training farmers in the global GAP to be able to meet the quality standards as required by the retailers and supermarkets.

The results of this study also suggest that the Green Scheme policy is poorly implemented. There is thus a need to revise this policy to include the monitoring and evaluation of

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programmes components. In addition, there is a need to reform water policy with regard to irrigation and land policy to include a programme on how to resettle small-scale farmers graduating from government Green Scheme projects. Therefore, there is a need to create up-to-date policies that facilitate the adjustment of small-scale farmers to the latest production technologies and agri-food systems in line with globalisation, agro-industrialisation, foreign direct investment, free trade agreements, and consumer preferences, and that comply with international food safety and quality standards, such as global GAP, for fruit and vegetables.

Furthermore, key macroeconomic factors that cause the development of the Namibian vegetable industry to be less competitive include the exchange rate of the Namibian dollar, the effects of inflation on commodity prices, changes in the oil price, the influence of the South African economy on the Namibian economy and the global financial crisis. Both the monetary and fiscal policies of Namibia are dependent on what is happening in South Africa. The results also suggest that cultural embeddedness may limit agricultural development economic activity as community values, norms or beliefs take long to adjust to external ideas or technologies due to inadequate information. This implies that training is needed for farmers to be able to adjust to new and changing innovations and technologies that are relevant to agricultural development.

The results of the study as regards the fourth objective suggest the need to develop a model for further developing the commercialisation of agriculture in north-central Namibia. The model was designed considering the agro-ecological and market realities as well as the role of the community. The model suggests public-private partnerships as a policy instrument linking small-scale farmers to input and output markets through contract production and minimising transaction costs, thereby overcoming the failure of the market, state, and community institutions.

The results of the study also suggest that government interventions are not aligned with community needs for poverty reduction, the agro-climatic conditions of the study area, and the market realities of inputs and outputs, making the development of the vegetable industry less efficient due to high transaction costs. These problems are exacerbated by inefficient agricultural policy, which failed to respond to information asymmetries and principal-agent problems from actors (farmers, project administrators, or politicians). In this case, the results support Proposition 1 of the study: “The design of agricultural development initiatives by the

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government is fraught with a poor understanding of community institutions and is not aligned with market reality, resulting in failure of projects and decline of economic welfare." The inefficiencies in the vegetable (high-value crops) value chain are mainly associated with high information, monitoring and enforcement costs as projects are designed externally with little involvement of the community. A lack of ownership by the community thus resulted in the failure of agriculture projects, especially vegetable production in northern Namibia. Community organisations, norms, and values should be considered when the government is developing agricultural projects which will ensure ownership and sustainability of the projects.

The results of objectives 3 and 4 also support Proposition 2 of the study: "The possibilities of government's implementation of new agricultural development initiatives sustainably are constrained by the presence of information asymmetries and incentive compatibility problems and also agency problems that are the root cause of community institutions' failing due to principal-agent relationships." For instance, owing to information asymmetry and politicians' self-interest and hidden incentives, politicians continue promising re-evaluation of inefficient projects, such as vegetable production, in order to maintain their support base from their voters in the area for re-election. High transaction costs in this case are associated with the reason why the property rights of beneficiaries of the project are poorly defined. Therefore, there is a need for policy intervention that addresses property rights for water and land ownership in the study area.

Moreover, incentive compatibility problems are also prevalent between the farmers and the government agency (the AGRIBUSDEV) entrusted with overseeing the management of the project. For example, because of adverse selection by government officials or project administrators, the selection of beneficiaries into the project is reported to be skewed towards politically well-connected individuals, family members and friends, and war veterans. Farmers also have hidden agendas because of incentives for being in the project as they want to continue to benefit from subsidies offered by the government. Shirking and free-riding problems result in high transaction costs due to information asymmetries, which are a big constraint on the development of the vegetable industry. The selection of the project beneficiaries has to be done in a transparent manner in which an independent body oversees the process. These beneficiaries need to be categorised into smaller groups that are easy to manage for the provision of public goods such as subsidised tractor services. To ensure trust

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from the farmers in the community, the project management needs to invest in corporate social responsibility activities such as capacity building. In addition, the government subsidies for the project beneficiaries have to be gradually reduced after the first production so that farmers prepare to stand on their own.

The results of the study as regards the fifth objective suggests the need to formulate relevant strategic policy options for further development of the vegetable industry in north-central Namibia to enable the long-term survival of small-scale farmers in the highly demanding globally competitive markets for high-value horticultural crops. It is suggested that the Communal Land Reform Act (No. 5 of 2002) sections 33 and 40 should, especially, be amended to allow customary land rights to be registered as legal deeds with market value. This will allow the land rights to be assigned as collateral security to financial institutions to secure capital in order to enhance commercial agricultural development among rural farmers. However, amendments to the Communal Land Reform Act (No. 5 of 2002) should also specify how to protect vulnerable or poor people such as women and youth among community members and to ensure that land rights are available as a social safety net.

8.2 Recommendations

The study suggests that further research is required in order to accommodate a wider range of commodity diversity to apply the proposed model in an agricultural development context. Firstly, considering the limitations set for this research, it is recommended that a case study be conducted in other geographical areas with potential for vegetable production in Namibia, especially in the northern areas of the Kavango and Zambezi regions where access to water is ensured. The results are then to be compared with the current results, in which transaction costs are the basic unit of analysis, to determine inefficiencies in the commercialisation of agriculture in less favoured areas. Secondly, there is a need for an improved understanding of the contribution of small-scale farmers, given inadequate access to water, land, credit, and markets. Thirdly, there is a need to understand the structural functions, culture, norms, and values of community organisations regarding how they encourage the commercialisation of agriculture. Finally, there is a need for a better understanding of information asymmetries and principal-agent problems associated with actors in agricultural development initiatives in developing countries and how to integrate small-scale farmers into the commercialisation of agriculture as proposed in this study.

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APPENDIX A: Farmers' questionnaire

TITTLE: Dynamics of institutional arrangements for small-scale vegetable farmers in Namibia: An analysis of market, state and community institutions

A. INTRODUCTION

The following questions have been set to understand Opportunities and Challenges of small scale horticultural production and marketing in the north central part of Namibia. The answers are confidential and will assist in formulation of policies, research and extension programmes that are appropriate to your area. In this interview schedule there is no wrong or correct answer. Your cooperation is therefore highly appreciated.

B. GENERAL INFORMATION

1.1 Date of interview_____
1.2 Name of enumerator_____
1.3 Respondent's name (OPTIONAL) _____ V1
1.4 Are you farm owner or farm manager _____
1.5 Name of scheme
1. Olushandja or canal (Independent producer)_____ V2
2. Etunda (government green scheme producer)_____

What made you participate in the Green Scheme?
1st ……
2nd ……
3rd ……

C. FARMERS CHARACTERISTICS

1.6 Gender of the respondent
1. Male ☐ V3
2. Female

1.7 Head of household
1. Male ☐ V4
2. Female

1.8 Age of head of household……..years ☐ V5
1.9 Age of respondent…….. years ☐ V6
1.10 How many people live in the house?…… V7
1. Adult Male (more 18 years) …… V8
2. Adult Female (more 18 years)…… V9
3. Boys less than 18 but more than 2 years…… V10
4. Girls less than 18 but more than 2 years …… V11
5. Babies (less than 2) …… V12

1.11 Marital status
1. Single (unmarried)
2. Married ☐ V13
3. Divorced/ separated
4. Widowed

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1.12 Highest educational level of the respondent: *In each category also indicate the total number of years attained*

1. None
2. Primary school (grade 1- 9)
3. Grade 10
4. Grade 12
5. Tertiary (Certificate, Diploma, Degree) CIRCLE HIGHEST
6. Non-formal (adult education) ……

Total no. of years [ ] V14

Category [ ] V15

1.13 Employment status 1=Yes 2= No

Variable	Yes 2=No	
1. Full time farming		V16
2. Own business		V17
3. Private/ state:		V18
4. Pensioner		V19
5. Others(specify)		

a) What is your occupation……

D. FARMING EXPERIENCE

1.14 How long have you practiced production of horticultural products? …… V20

1.15 How many years have you lived on your current farm?..... V21

1.16 How many years have you managed your current farm?..... V22

1.17 How many years have you managed any previous farm/s?..... V23

1.18 How many years have you worked on a farm/s before becoming a manager? V24

1.19 Apart from the horticultural produce that you grow, what other things do you do on the farm to get extra money?..... V25

1.20 What is your income from your farming activity per month

1. 0-999	2. 1000-1999	3. 2000-2999	4. 3000-3999	5. 4000-4999	6. 5000+

1.21 As a farmer indicate your arithmetic ability. V26-29

	Adding	Subtracting	Multiplying	Dividing
1. None				
2. Little				
3. Average				
4. Good				

E. LAND AND CLIMATE INFORMATION

2.1 What is your farm size? V30

2.2 What type of land ownership are you using on the land:

1. Private land (commercial farm)
2. Private land (communal land)
3. Leasing (communal land)
4. Leasing (Green scheme)
5. Others (specify)…….

[ ] V31

2.3 Do you have secure tenure for your land? 1=Yes or 2=No [ ] V32

(a) If No, state the reasons

……

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2.4 Is the agro-climatic condition favourable for farming vegetables? 1=Yes 2=No
(a) If No, what do you do to improve farming conditions? V33
.....

2.5 Considering your experience with access to land in your opinion is it possible to facilitate the process of registering as a horticulture farmer by paying a bribe: 1=Yes 2=No V34

If yes, From who	How much is the typical payment (N$)	
1. Traditional chiefs		V35
2. Government offices		V36
3. Others (Specify)		

2.6 Are there any steps in registration process as a horticulture farmer where payment of bribe is essential or else the process cannot be completed 1=Yes or 2=No V37

If yes, which Steps	How much is the typical payment (N$)

2.7 Are there any other types of costs associated with registering as a horticulture farmer we have not asked about? 1=Yes or 2=No V38
If Yes, specify.....

2.8 From your experience, when someone is registering or applying as a horticulture farmer, which factors help the process and which make it more difficult? How large is each effect? (TICK ONE)

Factor affecting the registration or applying process	1.Helps very much	2.Helps a little	3.Makes no difference	4.Makes a little more Difficult	5.Makes much more difficult	6.Don't Know	
1.Strong ties to local community							V39
2.Close political connections							V40
3.Membership in a business association							V41
4.Past experience starting a farm							V42
5.information or advice from others							V43
6.Help from government agency							V45
7.being a female							V46
8.Being a native born citizen							V47
9. Specific ethnic or language (specific)…..							V48
10. Specific religious affiliation Specify…….							V49
Other factor (specify)							

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F. CROP PRODUCTION

3.1 Indicate average crop YIELD in GOOD YEARS during past 3 seasons (2010-13)

Crop type	Cultivated land (Area-Hectare)	Yield (Bags) Or other units	How many times you cultivate these crops?	
Maize				V50-52
Cabbage				V53-55
Tomato				V56-58
Butternut				V59-61
Water melons				V62-64
Sweet potatoes				V65-67
Other (specify)				

*1 =most important, 2 =intermediate and 3 = Least important

(a) From the TABLE above what are your top most important 3 crops, give reasons?

……

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3.2 Inputs of crop produced per year

Crop type	Labour (man-day or man-hour)	Seed (kg)		DAP (yes/no) (hours)	Tractor (yes/no) (hours)	Hand hoe (yes/no) (hours)	Urea (g)	Pesticide specify Lt/kg	Compost (yes/no)* SEE BELOW)	Manure (yes/no)* SEE BELOW)	
		Local	Improved								
Maize											V68-77
Cabbage											V78-87
Tomato											V88-97
Butternut											V98-107
Water melons											V108-117
Sweet potatoes											V118-127
Other (specify)											

*Give local unit

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3.3 What is the source of inputs for vegetable production?

inputs	Source							
Labour	1.Number of Family labour ……..	2. Number of Hired labour ……	3. Number of Other (specify) ……					V128-129
Fertilizer	1.Agriculture office	2.Service provider	3.Other farmers	4.Market	5.Cooperative	6.Other specify		V130-134
Pesticide	1.Agriculture office	2.Service provider	3.Other farmers	4. Legal market/ known source	5.Cooperative	6.Illegal market/ unknown source	7. Other specify	V135-140
Improved seeds	1.Agriculture office	2.Service provider	3.Other farmers	4. Legal market/ known source	5.Cooperative	6.Illegal market/ unknown source	7. Other specify	V141-145

3.4 How many times do you visits inputs sources per whole production season?..... V146

3.5 Do you experience disruptions (delays) in input/material supply? 1=Yes or 2=No V147

(a) If Yes what are the main reasons …… …….

3.6 How do you describe the level of skills of your labours?.....

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3.7 How much do you spend on each input per year?

Inputs	Cost/ unit (SPECIFY)	
Labour (casual)		V148
Labour (contract)		V149
Fertilizer		V150
Pesticide		V151
Seeds		V152
Fuel		V153
Electricity		V154
Other inputs? (Please specify)		

3.8 What kind of farming tools do you have?.....

3.9 Do you think getting higher yields might in any way cause problems or concerns to you?

1=Yes 2=No [ ] V155

If Yes what could be the problems or concerns?

1st.....

2nd …….

3rd……...

3.10 How is the trend of volume of horticultural crops production during the past 5 years?

1. Increase
2. Decrease [ ] V156
3. same

(a) If the production increases, what are the reasons? ……..

(b) If the production decreases, what are the reasons? ……..

3.11 Do you use crop rotation system? 1=Yes 2= No [ ] V157

(a) If your answer to question 3.11 above is Yes, mention the sequence of crop rotation?

3.12 In your opinion what opportunities exist in expanding vegetable production in this area?

.....

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3.13 What are the crop production constraints on your farm? Rank horizontally e.g. 1=most severe, 2=second severe etc.

Crop type	Birds	Insects	Diseases	Drought	Weeds	Flood	Frost	Seed shortage	Fertilizer shortage	Lack of pesticide	Others (specify)	
Maize												V158-168
Cabbage												V169-179
Tomato												V180-190
Butternut												V191-201
Water melons												V202-212
Sweet potatoes												V213-223
Other (specify)												

3.14 Do you sow your crops in time (according to sowing date)? 1=Yes 2=No [ ] V224

(a) If the answer to question 3.14 above is No, why? 1=Yes 2=No

Variable	Yes 2=No	
1. Water shortage		V225
2. Hired labour shortage		V226
3. Inability to get input on time (seed and fertilizer)		V227
4. Others(specify		

3.15 Do you have any form of insurance against theft, loss of income etc? 1=Yes 2=No [ ] V228

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G. IRRIGATION, ENVIRONMENTAL IMPACTS AND INSTITUTIONAL ARRANGEMENTS

4.1 What is your source, method, frequency of use and cost of irrigation for your vegetable production? 1=Yes 2=No

Source:	1.Dam	2. Canal	3.Pond	Other specify	V229-
Method:	1.Flooding	2.Furrow	3.Sprinkler	4.Drip	V232-235
st of using irrigation per year(N$)	Own Pump* (SEE BELOW)	.....			V236
	nted pump	.....			

**Annual use cost includes fuel cost, wage (if employed labour is used)* V237

4.2 How many times do you irrigate your crop? (Indicate per week) V238

4.3 How far is your farm (land) from the water source?……Km

4.4 Who gives permission on water usage? V239

1. Namwater
2. Government (ministry of agriculture) V240
3. Traditional authority
4. Other (specify)

4.5 Does your access to water limit the area that you cultivate in any season of the year? 1= Yes and 2= No V24

(a) If your answer to question 4.5 above is Yes, indicate the reason based on the magnitude of the problem.

1st ……
2nd……
3rd ……

4.6 Does irrigation water availability affect your decision on the type of crop you grow? 1=Yes 2=No

(a) If Yes, which crop will you give the priority? V242

1st…….
2nd…….
3rd…….

4.7 Do you make any payment for using water on irrigation? 1=Yes and 2=No V243

(a) If Yes how much……. V244

4.8 Have you ever faced any conflict with neighbouring farmers because of using irrigation water? 1=Yes 2= No V245

(a) If Yes what were the problems or sources of the conflict? Rank

1st ……..
2nd……..
3rd……..

(b) What measures were taken to resolve the conflict?

1. ……..
2. ……..
3. ……

4.9 Is there a land use change associated with the expansion of irrigated crop production? 1=Yes 2= No V246

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(a) If your answer is Yes, do you think the change had negative effects on the local environment (deforestation, erosion, water of the dam, water pollution) 1=Yes 2 =No ☐ V247

(b) If your answer is Yes, mention the impacts according to their severity

1st……

2nd ……

3rd……

4.10 If there was a water supply problem in this community, how likely is it that people will cooperate to try to solve the problem?

1. Very likely ☐ V248
2. Somewhat likely
3. Neither likely or unlikely
4. Somewhat unlikely
5. Very unlikely

4.11 How did you judge the fertility level of your land after you started using irrigation water? ☐ V249

1. increased
2. decreased
3. No change

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H. MARKETING AND GOVERNANCE

5.1 Where do you sell your horticultural products/produce? Please respond to the following questions

Crop type	Market place (CHOOSE BELOW)	Distance to market	Means of transport** CHOOSE BELOW	Transport fee per trip (N$)	How many times do you sell this product per week	What is the price you charged at your Farm	What is the price you charged at other Markets	Number of months you may sell your products?	To whom do you sell?*** CHOOSE BELOW	
Maize										V250-
Cabbage										V259-
Tomato										V268-
Butternut										V277-
Water melons										V286-
Sweet potatoes										V295-
Other (specify)										

*1=Farmgate 2=Outapi 3=Oshakati 4=Oshikango 5=Windhoek 6=Other specify

**1=On donkey/ ox cart, 2=own vehicle 3=hired vehicle 4=on foot (being carried) 5=others (specify)

***1=Wholesale 2=Retailers, 3=Fellow farmers 4=institutions/organization such as schools, hospitals, hostels 5=Ongwediva hub 6=Village market 7=Town open market 8=Others (specify)

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5.2 If you do sell in the market place below complete the table with respects to your vegetables products?

Type of markets (place)	Time to reach market (hours)	Time it take to sell in market (hours)	Before selling did you know a buyer in the market? 1=Yes 2=No	Before selling did find a buyer and fixed price ahead? 1=Yes 2=No	Before selling did you knew the price 1=Yes 2=No	Do buyers lives in the same as farm area 1=Yes 2=No	What are you reasons for selling in markets *(SEE BELOW)	
1. Farmgate								V304-
2. Outapi								V311-317
3. Oshakati								V318-
4. Oshikango								V325-
5. Windhoek								V332-
6. Other specify								

*1. Higher prices, 2. Lower prices 3. Same price 4. More buyers 5. More trust in buyers 6. Only option 7. Other (specify)

5.3 Do you search for trading partner before selling you horticultural produce? 1=Yes 2=No V339

(a) If Yes what were your total hours for negotiations before the selling of vegetable..... V340

5.4 Do you experience problems with price determination? 1=Yes 2=No

5.5 What are your sources of vegetable price information? V341

1. Other farmers only
2. Traders only
3. Radio only
4. Bulletin board (in trading posts) only
5. Other people in trading posts only
6. Via mobile phone short messaging system
7. Other farmers and radio, combined
8. Other farmers, traders and radio combined
9. Anybody who comes from the trading posts
10. None
11. Other specify……

V342

5.6 How is the trend of price per unit of sales of horticultural product during the past 5 years?

1. Increase
2. Decrease
3. Same

V343

(a) If the price increases, what are the reasons? …….

(b) If the price decreases, what are the reasons? ……

5.7 Do you sell on contracts? 1=Yes 2=No V344

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(a) Is Yes (complete the Table below)

Type of markets (place)	Number of times to get paid (days)	Number of times to ask for payment	Trust in buyers (1lowest, 10highest	contract terms or agreement	
1. Farmgate					V345-347
2. Outapi					V348-350
3. Oshakati					V351-353
4. Oshikango					V354-356
5. Windhoek					V357-359
6. Other specify					

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5.8 What are the horticultural marketing constraints? Rank horizontally e.g. 1=most severe, 2=second severe etc.

Crop type	Lack of market	Low price of product	Lack of storage	Lack of processing facility	Lack of transport	Lack of market information	Brokers (hinder fair sales)	Competitors lower prices	Others (specify)	
Maize										V360-368
Cabbage										V369-377
Tomato										V378-386
Butternut										V387-395
Water melons										V396-404
Sweet potatoes										V405-413
Other (specify)										

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5.9 Is storage of vegetable a problem for you? 1=Yes or 2=No [ ] V414

(a) If Yes, how much of the production of all the vegetable products are damaged in the field and after?

1. %of loss before harvest…… V415
2. % loss after harvest…… V416

5.10 How do you store your vegetables?……..……

5.11 Are you making use of the available cold storage facility, if so is there any payment involved?..... V417

5.12 Is there any processing involved in your vegetable products? 1=Yes or 2=No [ ] V418

(a) If Yes explain your processing processes……

5.13 Do you invest in packing materials for vegetables products 1=Yes or 2=No [ ] V419

(a) If Yes how much do spend per year……

5.14 Do you find buyers for all horticultural products you take to markets? 1=Yes 2=No [ ] V488

(a) If No, (you do not find buyers for your product), what do you do?.....

5.15 What do customers expect from you as a producer? 1=Yes 2=No V420

Variable	Yes 2=No	
1. Quality products		V421
2. lower price		V422
3. Continuously supply		V423
4. Deliver product at their places		V424
5. Others(specify)		

5.16 Who are your main competitors in selling of vegetables? 1=Yes 2=No

Variable	Yes 2=No	
1. Farmers in the same region		V425
2. Farmers from other region		V426
3. Imported products		V427
4. Others(specify)		

5.17 What do you do to cope with competition? 1=Yes 2=No

Variable	Yes 2=No	
1. Produce enough for the target market		V428
2. Produce high quality products		V429
3. Produce off-seasons vegetables		V430
4. Store & sell when there are no similar products in the market		V431
5. Sell at low price		V432
6. Contract production		V433
7. Others specify		

5.18 Could you please place the following characteristics in ranked order of importance from lowest 1 and highest 5?

Variable	Rank	
1. Yield		V435
2. Taste		V436
3. Produce quality		V437

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4. storability		V438
5. Early maturity		V439

5.19 Do you advertise your vegetable products? 1=Yes 2=No

Source	1=Yes 2=No	
1. Radio		V440
2. Newspaper		V441
3. Television (TV)		V442
4. Other specify		V443

(a) If Yes what are the challenges do you experience from advertising your products?
……..

I. FINANCE OR CREDIT

6.1 Do you borrow money for your farming activities 1=Yes 2=No [ ] V444
If Yes indicate source, amount borrowed, purpose and terms of contract.

Source	Amount borrowed	Purpose* (SEE BELOW)	Who borrowed? Wife/ husband	Loan period in months/years	Terms of contract/ agreement	
Own capital						V445-449
AgriBank of Namibia						V450-454
Commercial Banks (name……)						V456-460
Family &friends						V461-465
Other specify						

* 1.Payment for hired labour 2.Purchase of fertilizer & seeds 3. Purchase of farm implements 4.To start off farm business 5. Pay transport

6.2 If you borrow money do you find it easy to paying back the loan? 1=Yes 2=No [ ] V466
(a) If No what are your reasons?.....
6.3 What type of collateral have you put up to obtain the loan? 1=Yes 2=No

Source	1=Yes 2=No	
1. House		V467
2. livestock		V468
3. Insurance		V469
4. life cover		V470
5. Other specify		

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6.4 How do you prefer to save your money? 1=Yes 2=No

Source	1=Yes 2=No	
		V471
1. Keeping it with you		
2. Hiding it at home		V472
3. Savings account at the bank		V473
4. Post office savings at the bank		
5. Other specify		V474

I. PARTICIPATION IN GROUPS AND SOCIAL ACCEPTABILITY

V475

7.1 Are you a member to any Community-Based Association e.g. women group, cooperative, league? 1=Yes or 2=No

(a) If Yes of all the groups to which you belong, which two are the most important to your household?

Group 1……

Group 2……

V476

7.2 How much money or goods did you or your household contribute to this group in the past 12 months?

Group 1 V477 Group 2 V478

7.3 What is the main benefit from joining this group?

1. Improves my household's current livelihood or access to services
2. Important in times of emergency/in future
3. Benefits the community
4. Enjoyment/Recreation
5. Spiritual, social status, self-esteem
6. Other (specify) .....

V479

7.4 How far is your farm or settlement from the following services

Facility	Distance in Km	
		V480
1. Schools		
2. Water supply or sanitation		V481
3. Credit or Savings		V482
4. Health facilities		V484
5. Recreation facilities		V485
6. Extension services		V486
7. Main roads		V487
8. Other (specify)		

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7.5 On a scale of 1 to 5, where 1 means a very small extent and 5 means a very great extent, how much do you trust the people in this category? (CHOOSE BELOW)

Variable	Scale	
1. People from your ethnic or linguistic group/race/caste/tribe		V488
2. People from other ethnic or linguistic groups/race/caste/tribe		V489
3. Other farmers		V490
4. Shopkeepers (Traders)		V491
5. Government officials		V492
6. Police		V494
7 Others (specify)		

*1.To a very small extent 2. To a small extent 3. Neither small nor great extent 4. To a great extent 5.To a very great extent

7.6 How well do people in your village/neighbourhood help each other out these days? Use a five point scale, where 1 means always helping and 5 means never helping.

Variable	Scale	
1. Always helping		V495
2. Helping most of the time		V496
3. Helping sometimes		V497
4. Rarely helping		V498
5. Never helping		V499

7.7 Choose from the list the two differences most often cause problems in your village or neighbourhood?

1. Differences in education
2. Differences in landholding
3. Differences in wealth/material possessions
4. Differences in social status
5. Differences between men and women
6. Differences between younger and older generations
7. Differences between long-term and recent residents
8. Differences in political party affiliations
9. Differences in religious beliefs
10. Differences in ethnic background/ race/caste/tribe
11. Other differences (specify)…….

	V500
	V501

7.8 Are you personally happy with the progress being made on your vegetable business? 1=Yes 2=No

	V502

Yes give the most important reason		
1. I am making enough of money out of it		V503
2. It has enhance my status in community		
3. I have sense of security of my family		
4. Other (specify)		

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No give the most important reason		
1. I am not making enough money		V504
2. It has put me in debt		
3. I do not get any support from any sources		
4. Other specify		

J. INFORMATION AND TRAINING

8.1 Before starting farming with vegetables did you seek information or advice from anyone about how to do it? (Multiple options possible). How much did this information or advice cost?

Source of information or advice	Method of obtaining 1=Visit 2=phone	Cost of information or advice	
1. Lawyer			V505-506
2. Friends or relative			V507-508
3. Government agency (specify)			
4. Fertilizer Distributor (specify)			V509-510
5. Shopkeepers (Traders) (Specify)			V511-512
6. None			V515-516
7. Others (Specify)			

a) If more than one source: which source of information or advice was the most usefu V517
……

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8.2 What sources of information do you make use of in your day to day decisions on the farm?

Source of information	Management and production decisions ie. nursery preparation, Time to transplant	nancial decisions ie. How much to spend on inputs	Marketing decisions ie. Time to sell, where, what price etc.	When you need training or advice	
1. Relatives, friends and neighbours					V518-521
2. Local market					V521-524 V529-532
3. Radio					
4. Television o					V525-528
5. Newspapers					V533-536
6. Groups or associations					V537-540
7. Business or work associates					V541-544
8. Community leaders					V545-548
9. Extension officials					V549-562
10. Internet					V563-566
11. Other (specify					

8.3 Do you keep records on your vegetable production? 1=Yes 2=No

1. Production records ie. Quantity produced		V567
2. Financial records ie. Input purchases, income from sales		V568
3. Health records ie. diseases		V569
4. None		V570
5. Other (specify)		

8.4 Have you received training on vegetables production? 1=Yes 2=No

1. Threshing/ shelling		V571
2. Storage		V572
3. Harvesting		V573
4. Drying		V574
5. Cleaning, sorting or grading		V575
6. Packaging		V576

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7. Milling		V577
8. Pricing		V578
9. Irrigation		V579
10. Farm planning / financial management		V580
11. None of the above		V581
12. Other (specify)		

8.5 Relatively speaking, indicate how you learnt TECHNICAL (production) and FINANCIAL knowledge and skills : 1=Yes or 2=No

Variable	Technical	Financial	
1. School/college/tertiary institutes?			V582-583
2. Watching parents/relatives?			V584-585
3. Watching other farmers?			V586-587
4. Field days?			V588-589
5. Reading books, magazines, papers			V590-591
6. Radio/TV programmes?			V592-593
7. Short courses/lectures?			V594-595
8. Extension officials			V596-597
9. Others specify			

8.6 What specific training do you wish to receive on horticultural production in the future?

Type of training	Reasons why you need this help	
1. Vegetable production		V598
2. Fertilizers application		V589
3. Pesticides application		V600
4. Financial and record keeping		V601
5. Marketing of products		V602
6. Other (specify)		

8.7 Give any comment or information that you think is necessary to know about your farm……

THANK YOU VERY MUCH