THE IMPACT OF ORGANISATIONAL SUPPORT ON SMALL-SCALE FARMING: A CASE STUDY OF DAPP NAMIBIA'S FARMERS' CLUBS IN THE KAVANGO REGION, NAMIBIA

by

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DECLARATION

I, Benjamin Iiyambo (Student Number. 2016304798), declare that this research project titled ***The Impact of Organisational Support on Small-Scale Farming: A Case Study of DAPP Namibia's Farmers' Clubs in the Kavango Region, Namibia***, is my own original work under the supervision of Dr. Andreas Wienecke. I further declare that this work has not been submitted elsewhere in fulfilment of the requirement of this or any other award of Degree/Diploma.

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Benjamin Iiyambo
January 2019

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ABSTRACT

The purpose of this study was to assess the impact of organisational support on small-scale farming, with a specific focus on Development Aid from People to People (DAPP) Namibia's climate smart agriculture-led Farmers' Club programme in the Kavango Region, Namibia. The study focused on programme impact on agricultural methods, knowledge and skills transfer, livelihood and agricultural output.

This case study used the qualitative research methods of interviews, focus group discussions and desktop research to collect the relevant data. Semi-structured interviews were conducted with programme managers at DAPP Namibia at the partnership office, focus group discussions were conducted with randomly selected beneficiaries of the Farmers' Clubs, and the desktop research assessed various reports from the Farmers' Club programme.

The study findings pointed out numerous challenges faced by supported farmers, such as dependence on DAPP Namibia's support. This challenge is further exacerbated by programme implementation loopholes, such as a lack of effective supervision and support. The study concluded that conservation agriculture methods are not only feasible in the Kavango Region, they are also widely accepted. Through DAPP Namibia's conservation agriculture centred programme, farmers' knowledge of climate smart agriculture methods has increased, a notable increase in production has been experienced, and horticultural interventions have improved access to vegetables for households.

In order for the programme to be sustainable, this study recommends that DAPP Namibia creates linkages with the government's systems and that it considers managing the Farmers' Club programme from its Kavango office, as this will enable more timely and effective supervision and support.

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ACRONYMS

CA	Conservation Agriculture
CSA	Climate Smart Agriculture
CO	Civic Organisation
CSO	Civil Society Organisation
DAPP	Development Aid from People to People
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
GRN	Government of the Republic of Namibia
HIV	Human Immunodeficiency Virus
HPP	Humana People to People
IMAWESA	Improved Management of Agricultural Water in East and Southern Africa
MAWF	Ministry of Agriculture, Water and Forestry
MET	Ministry of Environment and Tourism
NAD	Namibia Dollars
NDP	National Development Plan
NGO	Non-Governmental Organisation
NPC	Namibia Planning Commission
NSA	Namibia Statistics Agency
TCE	Total Control of the Epidemic
UNFCCC	United Nation Framework Convention on Climate Change
VDC	Village Development Committees

CHAPTER 1

1 INTRODUCTION

Using relevant literature, this chapter gives a general overview of the topic under study, before assessing the controversies and gaps in knowledge that gave rise to the research problem. The chapter is divided into eight sections. Section 1.1 presents the background of the study, section 1.2 describes the problem statement, section 1.3 provides the aim of the study, section 1.4 lists the objectives of the study, section 1.5 presents the research questions, section 1.6 outlines the significance of the study, section 1.7 provides the structure of the study, and section 1.8 supplies a conclusion.

1.1 Background of the study

The purpose of this study was to assess the impact of organisational support on small-scale farming, with specific attention on Development Aid from People to People (DAPP) Namibia's farmers' clubs in the Kavango Region, Namibia. The farmers' club programme mobilises small-scale farmers and organises them to work together to mitigate the effects of climate change[1] through the use of conservation agriculture[2] methods and the establishment of vegetable gardens to increase food production and household food security in an environmentally sustainable way. The programme creates momentum within rural communities towards positive, productive change, which increases crop yields and income, while improving nutritional status and health (DAPP, 2018:24). The 2016 Namibia Inter-censal demographic survey indicated that the national population stood at 2,324,388. The survey also indicated that 52 percent of this population lives in rural areas, who mostly rely on subsistence farming for their livelihoods (NSA, 2016:14). Statistically, this means that Namibia's population grew at an annual average rate of 2 percent from 2011, when the census survey reported the population to be 2,113,077. The total population of the Kavango Region was 237,779 in

[1] Defined in Namibia's National Policy on Climate Change as changes in measures of climate (temperature, precipitation, or wind) lasting for an extended period (decades or longer) resulting from natural factors, natural processes or human activities (MET, 2011:39).

[2] See definition at 2.5.

2016, having had an annual population growth rate of 1.3 percent between 2011 and 2016. Nationally, farming remains the second highest source of household income at 28 percent, with wages and salaries being the highest at 41 percent. This income trend remains the same in the Kavango Region, where wages and salaries are the leading source of household income at 32 percent, while farming is second at 24 percent (NSA, 2016:19). The majority of the population in the Kavango region reside in the rural areas and derive much of their income from agricultural activities (NSA, 2016:20; NSA, 2015:14).

Unfortunately, numerous challenges affect agricultural productivity and threaten food security[3] for communal farmers in the Kavango Region in particular, and Namibia in general. Firstly, the country is generally hot and dry, and it is highly reliant on climate sensitive natural resource-based sectors such as agriculture, amongst others (Ministry of Environment & Tourism, 2011:2; Ministry of Agriculture, Water & Forestry, 2015:5). Secondly, Zheng (2012:3) noted that Namibia generally experiences unpredictable, irregular and often unsatisfactory rainfall patterns. Namibia's dry conditions are caused by the subsidence of cold dry air over much of Namibia, which suppresses rainfall (Dirkx, Hager, Tadross & Curtis, 2008:4). In addition, other socio-economic factors such as high levels of poverty, unemployment, a high prevalence of HIV and rural-urban migration aggravate the exposure of families to the impact of climate change (MET, 2011:3). In light of these socio-economic and climatic realities, there is a need to ensure that farmers, especially those who are dependent on rain-fed agriculture, are given support that will enhance their resilience and reduce their vulnerability to climate change and climatic events such as droughts.

Namibia has identified the agricultural sector as a significant enabler for economic growth. This is reflected in strategic national development plans in which the agricultural

[3] Defined in Namibia's Agriculture Policy as a situation when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Food self-sufficiency is when a nation [or a household] is able to meet its consumption needs, particularly for staple food crops from its own production rather than importing (MAWF, 2015: vii).

sector is highlighted as a development activity that is indispensable for poverty alleviation, economic growth and the attainment of food security. There is thus a need to support farmers, especially those in rural areas, to ensure they succeed in addressing food insecurity and poverty in the country. As non-governmental organisations (NGOs) can mobilise rural communities and facilitate local initiatives and participation for sustainable agricultural development (Ministry of Agriculture, Water and Forestry, 2015:25), Namibia's agriculture policy has identified them as a stakeholder in the agriculture development process. This policy intervention has created an enabling environment for NGOs, such as DAPP Namibia, to partner government in the achievement of national and local development goals. Further, the realisation that development cannot be achieved by and through government alone led to the development of the Government-Civic Organisations (CO) Partnership Policy. The purpose of this policy is to create a working partnership between government and civic organisations to further the development of the country (Namibia Planning Commission, 2005: 2-10).

1.1.1 DAPP Namibia

Development Aid from People to People (DAPP) Namibia is a NGO that was established in the early 1990s to contribute to the realisation of national development aspirations through its community health, development and educational programmes. Currently, the organisation is implementing one of the largest HIV/AIDS programmes by an NGO: Total Control of the Epidemic (TCE). The TCE programme uses a community mobilisation mechanism to deliver HIV/AIDS-related services within rural communities and underserviced, hard to reach, population groups in Namibia (DAPP, 2011:30). DAPP Namibia's other programme focal areas include the following:

a) **Health**: the organisation implements programmes that are targeted at fighting and achieving control of tuberculosis (TB) and HIV/AIDS in Namibia. Amongst other activities, this is being done through the provision of testing and counselling services; screenings for TB; improved access to condoms through condom distribution to remote rural communities; community awareness educational

activities, especially for youth; the prevention of mother-to-child HIV transmission through referrals; and the establishment of support groups for those living with HIV.

b) **Education**: the organisation runs programmes that aim to provide access to formal and vocational education, especially for poor and marginalised communities. To achieve this goal, the organisation runs an accredited vocational school that offers courses in line with key skills priority areas for the country, such as agriculture, early childhood development and construction.

c) **Environment**: the organisation mobilises, trains and mentors farmers to improve their farming methods utilising Climate Smart Agriculture methods based on adaptive mitigating principles, which secure food for own consumption and selling purposes through Farmers' Clubs. The focus of this study is particularly on the ways in which this organisational support has impacted these Farmers' Clubs in the Kavango region.

1.1.2 Climate Smart Agriculture

Climate Smart Agriculture (CSA) is an integrated approach to address the interlinked challenges of food security and climate change (FAO, 2013:4). The concept hinges on three main pillars: food security, climate change adaptation and climate change mitigation. Food security deals with a sustainable increase in food production, adaptation deals with building resilience in such a way that production still takes place even in times of the changing climate, and mitigation deals with the reduction and/ or removal of greenhouse gas emissions where possible (Neate, 2013:4). CSA includes proven practical techniques such as mulching, intercropping, conservation agriculture, crop rotation, integrated crop-livestock management, agroforestry, improved grazing, improved water management, and innovative practices such as better weather forecasting, more resilient food crops and risk insurance (World Bank, 2012:1).

CSA is therefore premised around the realities of the changes in climatic conditions and the influence such changes have on the agricultural sector. Neate (2013:4) noted that

when the temperature rises, it triggers changes in rainfall patterns and diseases find new ranges, posing risks to food and farming. Climate change is linked to changes in the pattern and seasonality of rain as well as the severity and frequency of extreme weather events such as droughts and floods. It is projected that by the year 2020, 250 million people in various African countries will experience water shortages and up to 50 percent reduction in harvest from rain dependent agriculture, plunging these countries into food uncertainty and undernourishment (Ministry of Environment & Tourism 2011:2). The goals of CSA is therefore food security and development, which can be achieved through sustainable productivity, adaptation to changes in climatic conditions, and the mitigation of such changes by implementing suitable adaptive practices.

1.2 Problem statement

Namibia's long- and short-term strategic development plans have singled out agriculture as a critical enabler for ensuring food security and poverty reduction. Communal farmers in rural areas are experiencing numerous challenges, including a lack of access to finance due to insufficient collateral, and a lack of the machinery and equipment necessary for effective agricultural production (MAWF, 2010:18). Investing in effective irrigation and suitable land preparation is challenging for farmers because of the difficulty in accessing credit to purchase the necessary machinery and equipment. This challenge is further exacerbated by Namibia's rainfall patterns, which are often unpredictable, irregular and unsatisfactory (MET, 2011:2). Therefore, providing support to communal farmers is necessary to forestall the climate change phenomenon, which is aggravating farmers' vulnerability and threatening food sustainability and the livelihoods of the majority population living in rural areas in Namibia.

Nationally, 52 percent of the Namibian population reside in rural areas, which goes up to 66 percent in the Kavango Region (NSA, 2016:14-20). The rural communities in Namibia are predominantly made up of subsistence farmers, who depend on rain fed agriculture (MAWF, 2015:5; MET, 2011:4). This dependence predisposes these households to food insecurity and poverty (MET, 2015:2). While the government has acknowledged that climate change threatens food security and has identified NGOs as

important stakeholders in the agriculture development process, few studies exist on the impact of interventions such as those by DAPP Namibia. This study therefore aimed to examine the impact of NGO programmes on sustainable agricultural practices, as well as to establish the feasibility of CSA practices in the Kavango Region.

1.3 Aim of the study

The overall aim of this study was to establish the extent to which support given by DAPP Namibia to rural small-scale farmers in the Kavango Region has impacted their agricultural methods, knowledge and skills, livelihoods and agricultural output

1.4 Objectives of the study

. The following are the specific objectives of the study:

- To understand the challenges faced by small-scale farmers in the Kavango Region.
- To determine the level of acceptance and/ or adoption of DAPP Namibia's support for farmers in the Kavango Region.
- To determine the impact of DAPP Namibia's support on small-scale farmers' productivity in the Kavango Region.
- To determine the social impact of DAPP Namibia's intervention on small-scale farming communities in the Kavango Region.
- To provide a set of recommendations regarding effective support mechanisms for small-scale farmers.

1.5 Research questions

The following are the research questions:

- What is the attitude towards conservation agriculture in the Kavango Region?
- Is conservation agriculture feasible in the Kavango Region?
- What is the extent of conservation agriculture adoption in the Kavango Region?
- What are the existing traditional farming practices in the Kavango Region?
- What are the factors impacting the success/ failure of conservation agriculture in the Kavango Region?

- Can conservation agriculture improve farmers' resilience to climate change and improve production?

1.6 Significance of the study

Small-scale farming supports the livelihood of the majority of the Namibian people, particularly those living in rural/ communal communities. National development frameworks[4] have singled out agriculture as an important activity necessary to attain food security at the household level in communal areas, and include various strategic initiatives to accelerate the realisation of this aspiration. The government acknowledges that smallholder or communal farmers lack the appropriate equipment, access to capital and modern techniques to withstand occasional droughts, which impacts their productivity and ultimately threatens their food security. Among others, the 5th National Development Plan (NDP5) recognises addressing these areas as enablers for increased productivity for communal farmers (National Planning Commission, 2017:20-21). It is these gaps that government is committed to lessening in its national development frameworks. Further, the government acknowledges that it cannot address issues of development alone, hence it requires the involvement of Civil Society Organisations (CSOs) (NPC, 2005:2).

As stated earlier, various challenges are affecting agricultural productivity and threatening food security for households in rural areas in Namibia. Among these are the arid climate and low rainfall patterns (MET, 2015:2). Given these challenges, there is a need to implement CSA practices to ensure increased production and food security. The findings of this study will be useful in a number of ways. Firstly, it will provide feedback to the implementing organisation regarding the impact of their interventions, and will equally provide sets of recommendations which can be used to improve their interventions. Secondly, the findings of the study will contribute to existing literature on the effectiveness of CSA for productivity, highlighting the feasibility of CSA in the Kavango Region.

[4] Refers to Namibia's Vision 2030, National Development Plans (NDPs) and the Harambee Prosperity Plan (HPP).

1.7 Structure of the study

This study consists of five chapters, which are organised in the following manner:

Chapter 1 provides the background to the study, the problem statement, the aim of the study, the objectives of the study, the research questions and the significance of the study. Chapter 2 reviews various contributions to the subject of small-scale farming and closely analyses those contributions, highlighting agreements, disagreements and gaps in the literature. Chapter 3 outlines the methodology that was used to undertake this research. The chapter covers the population under study, the sample method used, the process followed to collect the data, how the collected data were analysed and the limitations of the study. This chapter also presents the ethical considerations of the study. Chapter 4 presents the data gathered, an analysis of the data and a discussion of the findings. Chapter 5 provides conclusions as well as recommendations based on the findings for future studies.

1.8 Conclusion

In this chapter, a general overview of the topic at hand was presented, which included a discussion on the controversies and gaps in knowledge that gave rise to the research problem. The chapter further provided an overview to the problem under investigation, discussed the concept of CSA, outlined the problem statement and the aim of the study, set out the objectives of the study, listed the research questions, described the significance of the study, and outlined the structure of the study.

CHAPTER 2

2 LITERATURE REVIEW

2.1 Introduction

This chapter presents a review and critical analysis of various contributions to the subjects of small-scale farming and CSA. The chapter is divided into seven sections: Section 2.2 describes the agriculture systems in Namibia, section 2.3 analyses the definitions of a small-scale farmer, section 2.4 critically evaluates the concept of CSA and its practice in Namibia, section 2.5 describes the challenges facing small-scale farmers globally and in Namibia, section 2.6 explains the support programmes that are available for small-scale farmers, and section 2.7 concludes the review.

2.2 Agriculture in Namibia

The agricultural sector in Namibia is divided into two: commercial and communal. The former is also referred as freehold, in which the owners of the land have security of tenure in the form of title deeds. The commercial land is mostly found in the southern and central parts of Namibia, i.e. this is largely where the country's commercial agricultural activities are practiced. The communal land is predominantly rural land located in the northern part of Namibia and the former reserves of central and southern Namibia. Communal land is owned by communities as opposed to individuals (Elkan, Amutenya, Andima, Sherbourne & Linden, 1992:17; NSA, 2018:6). The majority of the population live in the communal areas (NSA, 2016:14) and derive their livelihoods "from small-scale farming using traditional methods of cultivation and producing almost exclusively for self-consumption". The most commonly grown crop is millet and in some areas maize (Elkan et al., 1992:17). Namibia's populations is 2.3 million, of which 52 percent reside in rural areas (NSA, 2016:14). The government has identified poverty and the unequal distribution of assets, as reflected in the country's poor Gini-coefficient[5], as impediments to sustainable economic growth. The government's long-

[5] The Gini-coefficient compares the actual distribution of income to a total equal distribution of income. The coefficient ranges from 0 to 1. An equal distribution of income gives a coefficient close to 0. The more unequal the distribution is the closer the coefficient is to 1 (NPC, 2006:24).

and short-term national development plans, namely Vision 2030, the National Development Plans and the Harambee Prosperity Plan, have singled out agriculture as an enabler for poverty reduction and food security. Recent data recorded poverty[6] incidences at 26.9 percent in 2015 (NPC 2015:2), which translates to more than half a million people for a population of 2.3 million. Krugmann (2001:8) noted that poverty incidences are particularly prevalent among commercial farm workers, those living in the informal sector in urban areas, and those living in rural areas. Vision 2030 envisions a Namibia which enjoys food security, high incomes and economic growth through agriculture (Office of the President, 2004:42). To ensure the realisation of this vision, the 5th National Development Plan seeks to increase food production by 30 percent and reduce the number of food insecure individuals to 12 percent from 25 percent between 2016 and 2022 (National Planning Commission, 2017:20). Finally, another short-term development plan, the Harambee Prosperity Plan, recognises that achieving food security requires deliberate efforts to support farmers to increase food production (Office of the President, 2015:39).

The agriculture sector in terms of land must be understood from the perspectives of both the past and present. Namibia suffered from foreign colonial occupation for more than 100 years between 1884 and 1989, during which time the native occupants lost their land through forceful means. This land appropriation was first inflicted by the Germans, and later by the South African apartheid government. The decision to oppress South West Africa[7], as Gurirab (1988:316) pointed out, was made to allow the colonial settlers to take charge of the land for their farming activities at the expense of the native occupants. When the South African apartheid administration assumed control of the country at the end of the German colonial occupation in 1915, land dispossession continued, with native tribes even being banished from the land that was in their possession at the end of the German colonial rule (United Nations Institute for Namibia, 1986:37; De Villiers, 2003:29).

[6] Poverty incidence refers to the proportion of the population identified as poor. Given a poverty line of NAD 377.96, the poverty incidence is the proportion of the population whose monthly consumption is less than NAD 377.96 (NSA, 2012:10).

[7] Modern day Namibia during German/Apartheid South African colonial time.

When Namibia gained independence in 1990, the society was very unequal with high levels of poverty, as people had been denied opportunities to participate meaningfully in the national life spheres (Office of the President, 2015:10). In post-colonial Namibia, substantial progress in different socio-economic and political areas has been evident, particularly between 2000 and 2015. Among others, poverty levels have been reduced and the country now boasts inclusive development plans. However, development is fundamentally about people, and in many areas there has been a lack of implementation of development blueprints and policies. The failure of institutions to implement policies, coupled with lack of prioritisation and corrupt practices, are some of the hindrances to effective implementation of the national development agenda.

An example of government's (in post-colonial Namibia) failure to implement impressive developmental blueprints is the failing land reform programmes and policies. According to the Ministry of Land Reform (2018:2), few people own Namibia's expanse of productive land, while small areas of land, which are often unproductive, are occupied by the majority of the Namibian people. It is estimated that approximately 69.6 million hectares are available for agricultural purposes, yet 70 percent of the population relies on 48 percent, whereas 4,200 farming households own the remaining 52 percent. The government's land resettlement ambitions are to acquire 15 million hectares by 2020. This target was set just after independence in 1990, but to date only 21 percent of this target has been achieved, i.e. just 3.2 million hectares have been acquired in the past 28 years. This means that an average of 114,285 hectares were acquired annually from 1990, therefore it is improbable that the remaining 11.8 million hectares of land can be acquired in the final two years.

The Harambee Prosperity Plan acknowledges that the government plans well, but fails when it comes to implementation. This failure is often associated with capacity gaps and deficiencies in accountability (Office of the President, 2015:59). In order for the different policies and agricultural development plans to yield results, Namibia will have to improve its implementation, coupled with effective monitoring and evaluation.

2.3 Definition of small-scale farming

There is no one master definition of small-scale farming. Those who have attempted to define who a small-scale farmer is often looked at the size of an agricultural field, the availability of machinery and equipment utilised for farming, or the locality in which a farming activity is practiced. As Proctor and Lucchesi (2012:17) put it, “defining the small-scale farmer is a challenging task”. They pointed out that different writers “illustrated the diversity of conceptual approaches to the term, which included family farms as operated units in which most labour and enterprise come from the farm family, which puts much of its working time into the farm”. According to the FAO (2017:10), small-scale farming in many African countries is defined as farms measuring two hectares or less, however in Europe, it is defined based on a farm measuring five hectares or less. In Asia the measurement is just 1.6 hectares, but it is 121 hectares or less in the United States of America. Proctor et al. (2012:17) defined a smallholder as a “farmer (crop or livestock) practicing a mix of commercial and subsistence production or either, where the family provides the majority of labour and the farm provides the principal source of income”.

Kirsten and Van Zyl (1998:555) provided a definition of a small-scale-farmer as “the one whose scale of operation is too small to attract the provision of the services he/she needs to be able to significantly increase his/her productivity”. According to Proctor et al. (2012:17), “It is estimated that 500 million small-scale farmers worldwide support some 2 billion people, which is one-third of humanity”. In Namibia, a small-scale farmer is defined as a farming plot measuring up to 20 hectares. This benchmark is based on traditional (communal) homestead sizes (Fiebiger, Behmanesh, Dreuße, Huhn, Schnabel & Weber, 2010:1).

Indeed, defining what small-scale farming is, is challenging. Murphy (2012:3) argued that basing a definition on landholding leaves out other important groups of small-scale farmers, for example those with livestock who do not own land. Murphy added that small holding farms must not be thought of as being less productive than large farms, because in any given rural community, some small-scale farmers are more prosperous than larger operations. In the final analysis, the definition of small-scale farming may

vary according to size, however there is a general agreement in the literature that some of the most salient characteristics of small-scale farming include a lack of access to non-land assets. These include equipment, information, access to markets, smart technology, capital and the necessary skills that can improve production (Murphy, 2012:3; Proctor et al., 2012:18).

2.4 Challenges facing small-scale farmers

The challenges facing small-scale or subsistence farmers in Namibia, on the continent and elsewhere in the world are widely acknowledged. In Namibia, the leading challenge facing the agricultural sector is the scarcity of water, which is largely associated with the climatic conditions impacting evaporation rates and influencing rainfall patterns (Fiebiger et al., 2010:1). Namibia's climate is commonly dry and hot, with inconstant and intermittent patterns of rainfall (MET, 2011:2). Worse, climatic projections indicate that Namibia will get much hotter between 2046 and 2065, which will lead to a reduction in rainfall by 10 to 20 percent during this period, particularly in the catchment of the Zambezi, Kavango, Cuvelai and Kunene Rivers. This, in turn, is expected to lead to a reduction in runoff, impacting drainage in these rivers by +/- 25 percent (Dirkx et al., 2008:xii-xiii). Recent continental estimations are that water stress will result in yield reduction from rain-fed agriculture by nearly 50 percent, plunging some African countries into food insecurity and malnutrition by the year 2020, affecting between 75 and 250 million people.

The agriculture sector in Namibia depends on rainfall, and this dependence is further exacerbated by hot climatic conditions that are predicted to become hotter and drier with greater variability in rainfall. Zheng (2012:3) argued that any further reduction in rainfall will affect cultivation activities and render rain-fed agriculture risky and uncertain. The impact of a reduction in rainfall affects farmers in a number of ways. Firstly, not only does it affect crop yield because crops need water to grow, but the dry season affects animals' health, as most subsistence farmers make use of their livestock for ploughing. One of the approaches to dealing with this situation is by combining mechanical agriculture with tested and proven conservation agricultural methods. By ensuring

access to tractors drawing rippers, the dependency of farmers on implements drawn by animals will be diminished, as these animals are often too weak to work during dry seasons (MAWF, 2010:18).

Climatic conditions are not the only challenges facing small-scale farmers. Firstly, limited access to finance means that small-scale farmers are not able to improve their methods of production using advanced technology, or fertilisers to enrich their soil. MAWF (2010:18) noted that there is a need for subsistence farmers to invest in production processes in order to improve agricultural production. This includes investment in land preparation, weeding and harvesting technologies, inputs, fertilisers and safer storage facilities. However, because subsistence farmers in communal settings do not possess collateral, it is difficult to get access to credit facilities.

Humana People to People (2015:3) pointed out some of these challenges include a "lack of access to land and to water supplies. Due to lack of capital and credit, their inputs suffer and infrastructure is not developed. Often these farmers are illiterate and have little access to updated know-how and research". This underscores the importance of access to credit, but also highlights the need for access to the latest knowledge regarding farming methods and techniques. Besides climate change, Namibia's low crop yield is in part attributed to outdated agricultural techniques (Hase, 2013:1). Thus, besides gaining access to credit facilities, it is imperative that farmers are empowered with skills and knowledge on climate adaptive agricultural practices.

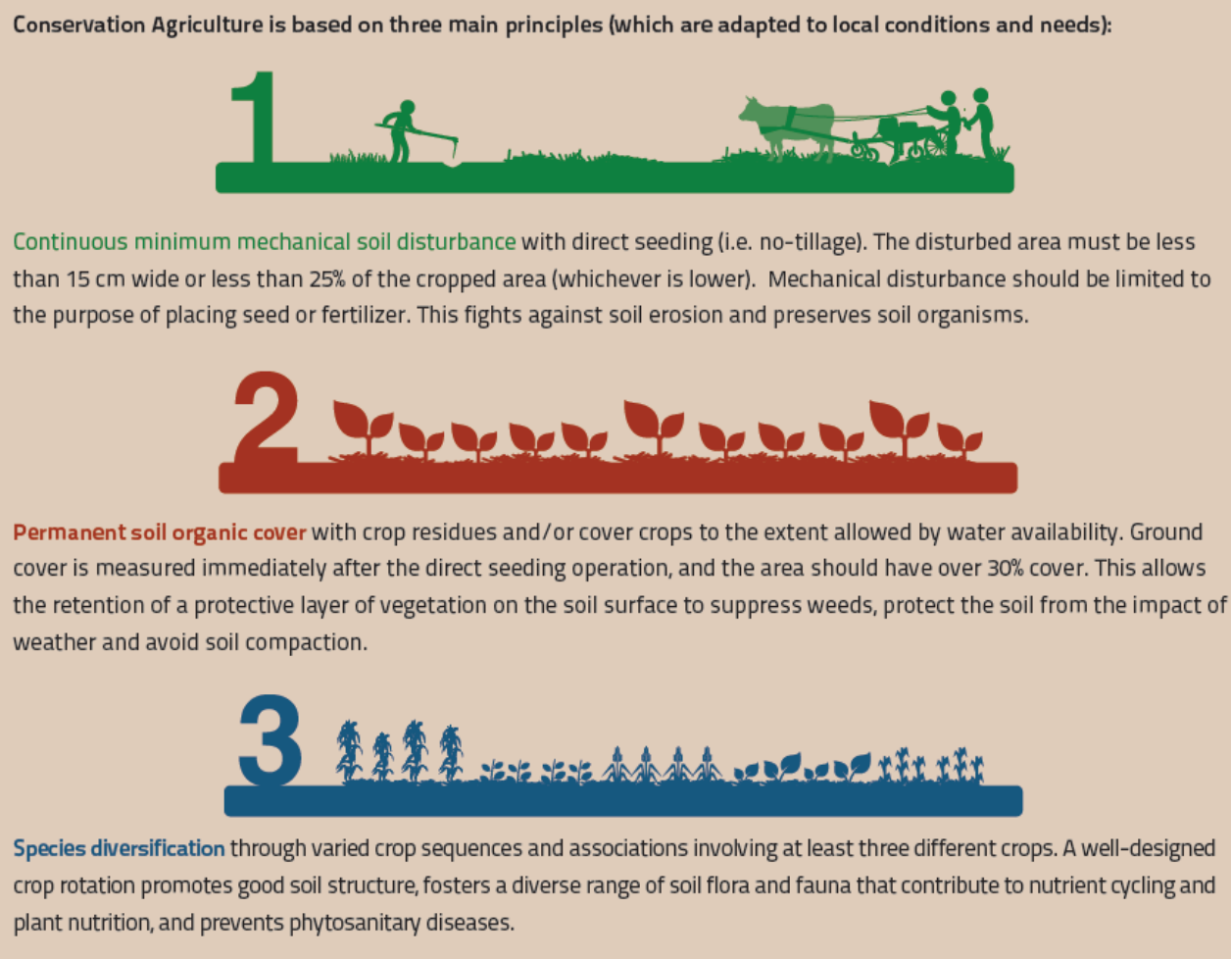
Although Murphy (2012:3) shared similar thoughts on the challenges experienced by small-scale farmers, she also pointed to challenges of exclusion, i.e. it is difficult for farmers to access markets to both buy and sell their crops. A lack of access to transportation worsens their isolation. Chambers (1983:110) referred to this exclusion as living on the 'periphery', whereby communities live in areas that are remote from towns or centres of trading, discussions and information. Murphy (2012) further observed that small-scale farmers often lack access to quality agricultural inputs, such as fertile and productive land, high quality seeds, good irrigation systems, credit, and information about growing conditions.

Another important aspect impacting agricultural productivity is farmers' knowledge of climate smart agricultural practices. Adopting conservation agriculture does not merely require changes in practices, but also requires a change in mindset (Milder, Majanen & Scherr, 2011:28). Hase (2013:2) noted that the national yield of mahangu between 1990 and 2000 was dismal, resulting in the country having to import 42 percent of the national grain in 2012. In addition to sporadic rainfall patterns, the widespread use of outdated traditional farming practices are associated with the low yields of grains, thus increasing the average crop yield and mitigating the impact of climate change requires CSA methods and the implementation of conservation agriculture (CA) (Ibid, 2013). Namibia's CA programme acknowledges the need to raise awareness and build the capacity of stakeholders, farmers and agricultural extension workers in CA practice. While conservation agriculture is not entirely new in Namibia, it requires fusion with good practices that will ensure a reduction in soil compaction, an increase in water infiltration, and an improvement in soil fertility (MAWF, 2015:8).

2.5 Conservation agriculture

Three vital principles can be used to best understand conservation agriculture: minimum soil disturbance, the maintenance of permanent soil cover, and the diversification of crop rotations (Milder, Majanen & Scherr, 2011:10). Minimum soil disturbance includes minimum to zero tillage to ensure that the soil surface is not disturbed, which is achieved through direct seeding by digging sticks to plant seeds. Maintaining permanent soil cover is practiced through mulching using crop residue or other organic matter sources. Keeping the soil covered with a protective layer of mulch carries numerous benefits, including reducing weed growth, keeping the soil cooler, maintaining soil moisture, reducing soil erosion either by wind or water, and restoring soil carbon through decomposition. Finally, the diversification of crops reduces crop pests and other crop diseases (Milder et al., 2011:10; FAO, 2013:132; Richards et al., 2014:1).

Figure 2.1: Principles of conservation agriculture



Source: FAO (2016)

The goal of conservation agriculture is therefore to increase crop yield by improving the structure of the soil, retaining water and minimising the necessity for chemical fertilisers. Moyo (2013:4) defined conservation agriculture as a "way of farming that conserves, improves and makes more efficient use of natural resources through integrated management of available resources combined with external inputs. It contributes to environmental conservation as well as to enhanced and sustained agricultural production".

Braby (2015:n.p.) pointed out that conservation agriculture is practiced in Namibia through the application of the three CA principles. Firstly, minimum soil disturbance is ensured through the use of the ripper-furrower method and the ripper-furrower design (both tractor- and animal-drawn). In areas where the line furrows cannot be drawn due to a lack of implements, the hand-hoe basin method is used. Secondly, crop rotation occurs, whereby cereals like maize are rotated with legumes such as cowpeas, beans and groundnuts. In Kavango East, the deep-rooted indigenous tree, *Faidherbia albida*, adds nitrogen through its root nodules, sheds its leaves in winter, and provides wind shelter for crops. Finally, permanent soil cover, through mulching or by using plant residue, supports the soil by retaining its moisture and countering losses from evaporation.

Conservation agriculture is acknowledged in Namibia as a better way of ensuring improved production and food sustainability. In consideration of the implications for climate change globally, the government ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1995 (MET, 2011:2), while the Ministry of Agriculture, Water and Forestry has developed a comprehensive conservation agriculture programme for Namibia. The purpose of this programme is to "counter and reverse land degradation and to adapt to climate change/variability through the adoption of CA as a basis for sustainable crop production and improved food security at both national and farm, including smallholder levels" (MAWF, 2015:6). Further, the 2015 National Agriculture Policy acknowledges the need to ensure soil conservation efforts that will ensure good crop yields and other agricultural prosperities.

Reports on the implementation of the various conservation agriculture programmes are difficult to find. In addition, while several CA initiatives have been undertaken in Namibia by the government and NGOs, there is a need for testing and evaluation across the various agro-ecological zones (MAWF, 2015:8). Amongst others, one such CA initiative in Namibia is DAPP Namibia's Farmers' Clubs, which encourage climate smart agriculture for the improved resilience and livelihoods of small-scale farmers in the Kavango Region. It is noted that there is a need for different implementers to

collaborate for optimal results and to avoid a duplication of services. Braby (2015:n.p.) commented that there is a lack of harmonised approaches because of the fragmentation of services, adding that there is a need for more monitoring and evaluation research to document impact. In the final analysis, Namibia has good policies and plans in place for conservation agriculture, however there is little documentation on the status of the implementation of such.

2.6 Conservation agriculture adoption

Conservation agriculture is growing momentum in Africa, with numerous CA programmes being led by governments and NGOs. Countries where CA is particularly popular in Africa include Angola, Botswana, Zambia, Tanzania, Lesotho, Swaziland[8], Malawi, South Africa, Madagascar, Mozambique, Namibia and Zimbabwe. The promotion and adoption of CA is comparatively better in these countries, partly due to funding (Milder et al., 2011:18). The table below indicates the extent of CA adoption in selected African countries.

Table 2.1: CA adoption in selected African countries

Country	Area under CA (ha)	Number of smallholders conducting CA
Ghana	30,000 / 300,000	Up to 400,000
Kenya	15,000 / 18,000	5,000
Malawi	47,000	5,400
Morocco	4,000	No data
Mozambique	9,000	No data
South Africa	368,000	No data
Sudan	10,000	No data
Tanzania	6,000	No data
Tunisia	7,000	No data
Zambia	40,000 / 110,000	70,000 / 100,000
Zimbabwe	7,500 / 15,000	No data

Source: Milder et al. (2011:19)

[8] Currently called eSwatini.

Although not extensive, available data indicates that CA is working. In Zambia, CA was practiced by more than 180,000 farmers, representing approximately 30 percent of the country's small-scale farmers. Through CA an increase in maize yield was recorded, while cotton production increased by 60 percent compared to conventional plowing systems. CA programmes are said to have attained the triple win of improved productivity, resilience and carbon sequestration (World Bank, 2012:13). Another CA success story is that of Andhra Pradesh in India, where through the efforts of the Centre for Sustainable Agriculture and the Society for the Elimination of Rural Poverty, 350 farmers were supported to implement CA methods to increase water for crops on 162 hectares of land. These farmers had previously practiced farming methods that required chemical applications, which resulted in many of them putting their farms up as collateral to borrow finance in the 1990s. By the end of 2009/10, CA methods had been implemented on 715,314 hectares, benefiting 738,000 farmers. The significant achievements in Andhra Pradesh included a decrease in the cost of cultivation and improved soil fertility, which impacted the government's decision to scale up their CA programmes (Word Bank, 2012:16).

Milder et al. (2011:21) pointed out several case studies that suggest a CA yield increase in Africa across different geographies and crops on the continent. In the district of Laikipia in Kenya, it was discovered that harvests in beans, potatoes, wheat and maize came 50 to 200 percent more from CA fields than conventionally cultivated fields. In Ghana, maize yields were three times more with CA than conventional methods. In Tanzania, maize and sunflower yields from CA farms rose by 93 to 360 percent, while in Uganda, where traditional farming practices yield about 2,500 kg/ha of grains, CA farms produce 3,000 to 3,100 kg/ha. Other countries' with recorded success stories include Zimbabwe, Malawi and Zambia.

Despite these success stories, there are several critiques of the CA approach. Firstly, it is alleged that the methods have not been deeply analysed, i.e. it is unclear whether there is a need for less labour and if there is increased soil fertility, reduced soil erosion and an increased yield. Secondly, given that CA is an integrated approach of practices, it is not sufficiently clear which practice (principle) led to the desired outcome. Finally,

there is insufficient evidence of the adoption of CA methods in every environment (Milder et al., 2011:22).

In its study on small-scale farming in Sudan, the FAO (2017) contended that conservation agriculture can reap various socio-economic benefits, including reducing rural-urban migration, underdevelopment, food insecurity, poverty, inequality and the weakening of the natural resource base. Amongst others, the FAO (2017:139-141) provided the following recommendations for what should be done if small-scale farmers are to thrive. Firstly, there is a need to ensure that they have access to finance, as this will enable them to invest in their production processes and acquire production resources that may improve their productivity. Secondly, the FAO recommends the facilitation of the transfer of skills and knowledge to build the capacities of subsistence farmers to enable them to utilise new technologies and to put climate change adaptive methods in place. The third recommendation is that marketing opportunities be opened up to rural farmers to provide them with easier access to markets to sell their produce. Finally, enabling policies must be developed and implemented to support and protect small-scale farmers.

2.7 Conclusion

In this chapter, the literature on small-scale farming and conservation agriculture was reviewed, with a particular focus on agricultural systems in Namibia. The chapter also provided an analysis of the challenges facing small-scale farmers in Namibia, the continent and globally. The next chapter presents the research methodology that was utilised, and includes a discussion on the study's design, population, sampling techniques, data collection, analysis and ethical considerations.

CHAPTER 3

3 METHODOLOGY

This chapter discusses the steps that were undertaken to study the research problem and the logic for selecting those steps. This chapter is divided into the following sections: section 3.1 describes the research design used, section 3.2 discusses the population of the study, section 3.3 outlines the sampling techniques used, section 3.4 discusses the data collection strategy for the study, section 3.5 highlights the strategies used by the researcher to analyse the data, section 3.6 reviews the ethical considerations observed by the researcher, and finally, section 3.7 addresses the limitations of the study.

3.1 Research design

As indicated in the research topic, this study focused on a single case that was analysed to determine the impact of organisational interventions on small-scale farmers in the Kavango Region. Qualitative research methods were used because the study involved documenting what people said during interviews and focus group discussions, as well as a desk review of the organisational interventions for small-scale farmers in the Kavango Region. The research design for this study was therefore a case study. Mathews and Ross (2010:128) explained that “a case study includes either a single case or a small number of cases but each case is explored in detail and great depth. A variety of different types of data about the case may be gathered, and both cross-sectional and longitudinal data may be included”.

The information that the study required was descriptive, hence the use of a qualitative methodology. In this context, the interviews, group discussions and desk reviews were used to collect information regarding the impact of CSA interventions by DAPP Namibia on small-scale farmers in the Kavango Region. The goal of the study was to acquire more knowledge and information regarding the contribution of DAPP Namibia’s intervention towards small-scale farming activities in the Kavango Region. The choice of this type of design was largely because the study was not guided by any hypotheses.

The research strategy employed by this study was evaluative. Mathews and Ross (2010:132) described this strategy as one that assesses "the value of something in terms of the impact that it has on a situation, individual(s) or organisation. Evaluatory social research usually relates to an intervention or change that has been made, and whether the intervention has achieved the change or outcomes that were intended. The key issue is to decide how those outcomes are to be identified and measured. Value may be defined in terms of observable or measurable benefit to particular groups of people, efficiency, and satisfaction, value for money or improvement in practice".

3.2 Population

In terms of research, a population can be called a "universe of units from which a sample is to be selected" (Bryman, 2012:187), while Mathews and Ross (2010:154) defined a population as "the total number of cases that can be included as research subjects". An example of a population may be all people who live in a particular area or students studying Development Studies at a university. The population of this study was members of DAPP Namibia's Farmers' Clubs in the Kavango Region. This included representatives from DAPP Namibia who are directly engaged in the administration of the activities of the Farmers' Club programme.

3.3 Sample

Bryman (2012:187) defined a sample as a "part of a whole" or a "segment of the population that is selected for investigation or a subset of the population. The method of selection may be based on a probability or a non-probability approach". As indicated in section 3.2, the study collected information from two kinds of populations: members who were beneficiaries of the farmers' clubs and programme implementers from DAPP Namibia. Various data collection methods were used with both these sets of respondents. Because of this, both probability sampling techniques and non-probability sampling techniques were used to collect data. These sampling techniques were systematic (probability sampling) and purposive/ convenience sampling).

3.3.1 Systematic sampling

The study used systematic sampling to select participants from the membership of the farmers' clubs that are supported through CSA interventions by DAPP Namibia. This was done for a number of reasons. Firstly, the population of small-scale farmers supported by DAPP Namibia was known, i.e. every 1,000 farmers are divided into farming units/ cooperatives of 100, and each cooperative has 10 members. In selecting participants for this study, one cooperative was picked randomly and thereafter every 10^{th} group was selected. This meant that data were collected from 10 cooperatives for this study. Secondly, all members of a Farmers' Club are from the same region, have similar support and utilise the same technology. Given these striking similarities in both socio-economic characteristics and type/level of support, collected data from the sample size were deemed representative. The study thus collected data from 10 focus group discussions with 10 people in each, i.e. it derived its data from 10 percent of the total population. Mathews and Ross (2010:200) noted that when a population is fairly similar, variations are less, therefore the sample size can be smaller. Contrastingly, when the diversity of a population is larger, so will the size of a sample be.

3.3.2 Purposive sampling

The study only sampled employees of the implementing organisation who were directly involved in the implementation of the farmers' club. This was not for convenience purposes, but because only certain staff were in a position to provide the information required by the study. At the time of the study DAPP Namibia has only two staff members who are directly involved in the design and implementation of the farmers' club programme, therefore they were both interviewed for this study. Bryman (2012:418) explained that with purposive sampling, the researcher does not seek to sample research participants on a random basis. This is because the goal of purposive sampling is to sample cases/participants in a strategic way, so that those sampled are relevant to the research questions that are being posed.

3.4 Data collection strategy

Qualitative methods of data collection were used by this study, i.e. focus group discussions, interviews and desk reviews. “Qualitative research methods are primarily concerned with stories and accounts including subjective understandings, feelings, opinions and beliefs. Qualitative data is typically gathered when an interpretivist epistemological approach is taken and when the data collected is the words or expressions of the research participants themselves” (Mathews & Ross, 2010:142). In collecting data, the study thus made use of focus group discussions, interview schedule and desk reviews.

3.4.1 Interview schedule

Mathew and Ross (2010:219) defined an interview as a dialogue in which one person asks questions and the other responds to those questions. Interviews often take place through different modes, including by telephone or face-to-face. Interview questions can be structured, semi-structured or unstructured. Structured interviews are those where an interviewer asks prearranged questions, whereas semi-structured interviews are those where prearranged questions are incorporated along with open, additional, often follow-up questions. In unstructured interviews, the questions are usually not prearranged or rehearsed. Semi-structured interviews were used in this study, with the researcher developing prearranged questions in order to establish the groundwork as a base for follow-up questions. The follow-on questions enabled the researcher to seek further clarity from the respondents, especially when additional information was required. The study made use of interviews with the implementing staff of DAPP Namibia.

3.4.2 Focus group discussions

A focus group interview/ discussion is a conversation in which several participants are involved. The discussion is focused as only people involved in a particular issue or experience are selected (Bryman 2012:502). Because DAPP Namibia’s farmers’ club is made up of a known population of 1,000 small-scale farmers, who are further

subdivided into cooperative groups of 10 (DAPP, 2017), ten randomly selected groups took part in the focus group discussions. A semi-structured discussion was utilised to gather the participants' stories, feelings and experiences. Dates and times for when the group discussions could be conducted were arranged in advance through the implementing organisation. This was done to prevent the researcher wasting his time and resources. During the focus group discussions, the researcher recorded the conversations by audio tape and took notes related to the predetermined questions. In this way he was able to cross check people's responses and administer follow-up questions for a clearer understanding where necessary, as well as for future referencing. The advantages of the focus group discussions were that the participants shared ideas on what their experiences have been using CSA methods, as well as how they experienced production utilising these methods.

3.4.3 Desk reviews

Desk reviews occur when a researcher assesses reports and/ or studies on the topic under investigation. Implementation baseline and progress reports were reviewed by the researcher regarding the Farmers' Club programme, which were obtained from DAPP Namibia. These reports provided pertinent information upon which the impact of the Farmers' Club programme was measured.

3.5 Data analysis

The analysis of the data collected for this study was done thematically, as the researcher had ideas about the type of data that would be needed based on the research objectives and questions. The data collection tools were built around the thematic areas and the respondents were required to base their experiences and views around these areas. The predetermined themes were further used to generate sub-themes, from which meaning was extracted. Mathews and Ross (2010:373) defined thematic analysis as "a process of segmentation, categorization and relinking of aspects of the data prior to final interpretation" or "a process of working with raw data to identify and interpret key ideas or themes". Working with qualitative data is thus mainly about

interpreting and getting a good understanding of the words, stories, accounts and explanations of research respondents.

3.6 Research ethics

Research ethics can be seen as a set of moral standards or rules that researchers should abide by. Bryman (2012:71) stated that “ethics in social research is about creating a mutually respectful, win-win relationship in which participants are pleased to respond candidly, valid results are obtained, and the community considers the conclusions constructive”. Ethics in research are thus essentially moral principles that guide research from its start right through to its ending. The following ethical considerations were observed in this study:

a) Informed written consent was obtained from each respondent prior to the interviews and focus group discussions. The respondents were informed that their participation was voluntary and that they could withdraw at any stage of the research.
b) All information gathered through the FGD and interviews have been treated with the strictest confidentiality. The identities of the respondents have been protected as no names appear on any documents of the study.
c) The study took due care to ensure that plagiarism was avoided at all stages of the research, and that ideas borrowed from other scholars or researchers are appropriately acknowledged.
d) A research permission letter from the University of the Free State, in particular the Centre for Development Studies, was submitted to the implementing organisation to validate the authenticity of the research and describe the context in which the study would be conducted.
e) All the data collection tools were anonymous and no respondents were required to provide their names or information about their identities.

3.7 Limitations

The study had four limitations. Firstly, the focus of this study is only on the small-scale farmers that are supported by DAPP Namibia in the Kavango Region. Secondly, besides English, the researcher speaks a different language from that spoken in the Kavango Region. Therefore, although this limited the researcher's ability to communicate directly with the respondents, a translator needed to be present during all focus group discussions to assist with translation. Thirdly, time was a limitation in that the data had to be collected in just three days. Finally, this study was self-funded and the researcher did not have sufficient funding to carry out additional field work.

3.8 Conclusion

The methodology used in this study was discussed in this chapter, as was the research design, the study population, the sampling techniques, the data collection strategy, the strategies used to analyse the data, the ethical considerations, and the limitations of the study. Chapter 4 presents the results of the findings, as well as an analysis and discussion of the findings.

CHAPTER 4

4 DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents the results of the study and an analysis thereof. The chapter is divided into two sections; section 4.1 presents the findings of the study, while section 4.2 presents an analysis and discussion of the findings. The overall aim of this study was to establish the extent to which support given by DAPP Namibia to rural small-scale farmers in the Kavango Region has impacted their agricultural methods, knowledge and skills, livelihoods and agricultural output. The following were the specific objectives of the study:

- To determine the level of acceptance and/ or adoption of DAPP Namibia's methods of farming in the Kavango Region.
- To determine the social impact of DAPP Namibia's intervention among the small-scale farming communities in the Kavango Region.
- To understand the challenges faced by small-scale farmers in the Kavango Region.
- To determine the impact of DAPP Namibia's support on small-scale farmers' productivity in the Kavango Region.
- To make recommendations on what can be done to improve the support systems for small-scale farmers.

4.2 Presentation of findings

A total of 10 focus group discussions were conducted, for which the researcher travelled to ten different villages in various constituencies of the Kavango Region. The researcher also held face-to-face interviews with two staff who were accountable for the execution of the Farmers' Club (FC) programme of the DAPP Namibia organisation, and conducted desktop research. Table 4.1 below shows the villages and constituencies in which the focus group discussions were held.

Table 4.1: List of villages and constituencies in which the focus group discussions were held

No	Village	Constituency
1	Kashira	Ndiyona
2	Makena	Ndiyona
3	Sharuganda	Ndiyona
4	Katere	Ndiyona
5	Mbambi	Mukwe
6	Shamangorwa	Mukwe
7	Ketenture	Mukwe
8	Tjova	Mukwe
9	Nguma	Ndonga
10	Kangweru	Ndonga

The villages were distributed across three constituencies, with the Ndiyona and Mukwe constituencies containing four villages each. The remaining two villages were in the Ndonga constituency.

4.2.1 General

Two farming activities regarding DAPP Namibia's support to small-scale farmers in the Kavango region are divided into two. Firstly, supported small-scale farmers runs horticultural projects allocated to a cooperative[9] of ten members. Each cooperative has approximately one hectare of farming land. All the cooperatives function under the structure of a Service Cooperative, in which each member of the cooperative is allocated a portion of land on which they work. This means that each member is responsible for work done on their piece of land, thus if they do not work, they have no produce for consumption or sale. To ensure the sustainability and upkeep of the cooperative infrastructure, each member is expected to contribute NAD 20.00 per month. Produce from the horticultural gardens are usually used for household

[9] Self-governing association of people who voluntarily come together to establish an enterprise mutually owned to meet its members' socio-economic needs (Ministry of Agriculture, Water & Forestry, 2017:12)

consumption and for sale. The produce from the garden includes various vegetables including green peppers, carrots, tomatoes, onions, cabbage, spinach and beetroot. The money generated from sales is often used for emergencies such as medical care, school uniforms and toiletries.

Secondly, individual members of the cooperatives run demonstration plots at the household level, where they practice conservation agriculture methods to improve their crop yields. Produce coming from these conservation agriculture demonstration plots are primarily for household consumption, with surplus being used for sale to support household income. As indicated above, the proceeds from the sale of surplus produce is channelled towards expenses for emergencies or household goods. The crops planted on the conservation agriculture demonstration plots are mainly pearl millet, mahangu, maize, beans, cow peas and watermelons. These crops are largely grown because they are indigenous to the Kavango Region, but also because they perform somewhat better in dry conditions.

4.2.2 Challenges faced by small-scale farmers prior to DAPP Namibia's intervention

Three types of challenges were discussed by the small-scale farmers who are supported by DAPP Namibia in the Kavango Region, as per Table 4.2 below.

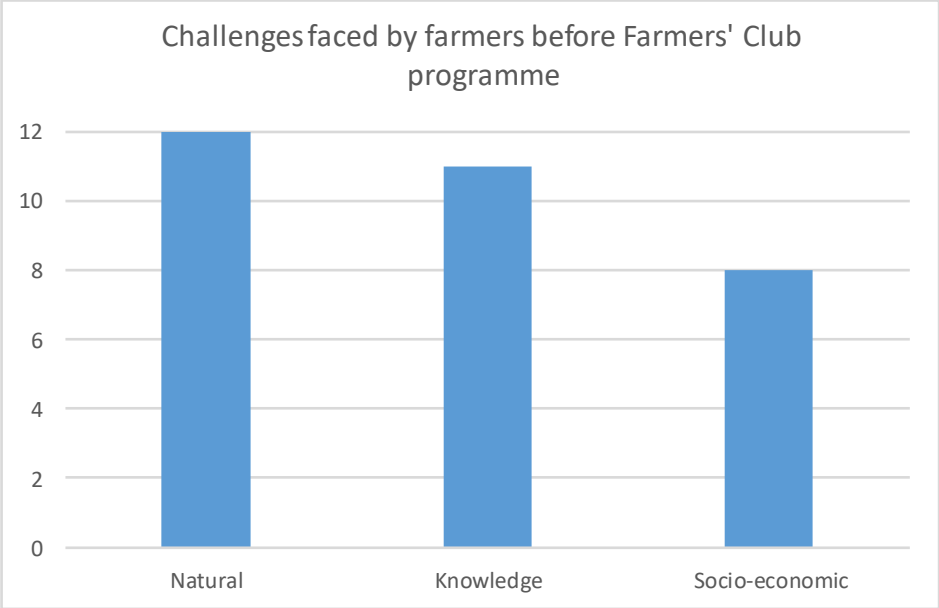
Table 4.2: Challenges experienced by the farmers prior to the FC programme

Challenges	Description
Natural	Drought, late rains, low crop yields
Knowledge	Lack of knowledge on drought resistant crops, crop calendar, crop spacing and crop varieties for certain seasons
Socio-economic	Poor household food security, poor household income, poor health outcomes

Table 4.2 describes three different categories of challenges, i.e. natural, knowledge and socio-economic. Natural challenges are those resulting from the natural processes of

the earth, and include the occurrence of droughts, late rains and low crop yields. Challenges related to knowledge include a lack of knowledge about drought resistant crops, crop calendars, crop spacing and crop varieties for certain seasons. Socio-economic challenges include poor household food security, insufficient household incomes and poor health outcomes. The challenges related to nature and knowledge are widely identified as indicated in the graph below.

Graph 4.1: Challenges faced by small-scale farmers before the FC intervention



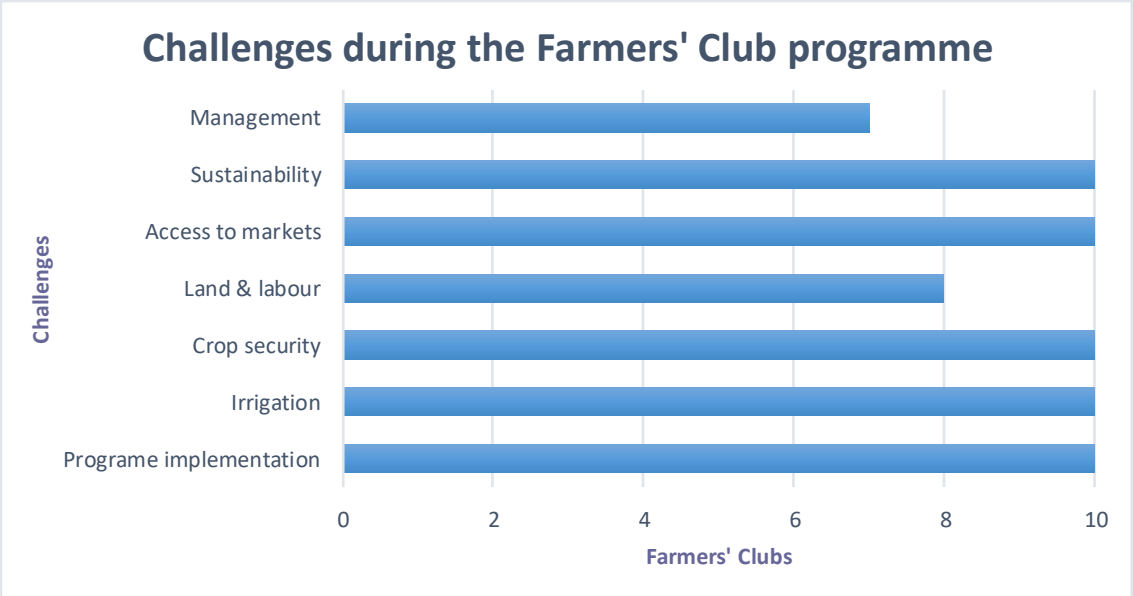
Graph 4.1 above shows that 100 percent of the respondents noted factors related to nature as presenting a challenge. About 91 percent of the respondents identified a lack of knowledge as a challenge, while 66 percent identified socio economic factors as being problematic. The farmers did not have access to water and have been relying on rainfall for their fields. Those that practice gardening activities usually collected water from the river with cans and other humanly possible potable water cans. Farmers also experienced challenges with insects destroying their crops; without the intervention of the government's agricultural extension officers, this could be devastating. The source of income for the majority of households was mainly from social protection schemes

such as old age pensions, child support and disability grants. Those who did not qualify for these grants thus had no other source of income. In addition, the farmers lacked the necessary skills for effective crop production. Finally, access to vegetables was generally limited because the distance to the markets is usually long and traveling is expensive.

4.2.3 Current challenges faced by small-scale farmers

Even with DAPP Namibia's support, the farmers are still experiencing various challenges in seven areas, namely: programme implementation, irrigation, crop security, land and labour, access to markets, sustainability, and management challenges. The graph below presents these challenges across the ten Farmers' Clubs.

Graph 4.2: Challenges during the Farmers' Club programme



Graph 4.2 shows that 100 percent of the respondents identified challenges related to sustainability, access to markets, crop security, irrigation and programme implementation as being the highest. The second highest challenge was related to land and labour at 80 percent, and management challenges was third at 70 percent.

4.2.3.1 Management challenges

The table below presents the challenges related to the management of the supported cooperatives in the Kavango Region.

Table 4.3: Challenges related to management

Challenges related to management
a. Cooperatives are not formalised. b. No constitution or rules governing the operations of cooperative in writing.

Table 4.3 above shows there are at least two management challenges, which refer mainly to the manner in which the cooperatives are set up and how they affect the operations of such cooperatives. Firstly, although the supported farmers in the Kavango Region identified their grouping as cooperatives, these structures are not formalised in terms of Namibia's Cooperative Policy. Secondly, there is no constitution governing the operations of these cooperatives; all the rules are agreed verbally and have not been written down anywhere. The table below summarises the challenges related to management.

4.2.3.2 Sustainability challenges

These are challenges related to the farmers' ability to continue implementing the ideals of the Farmers' Club even after the support of DAPP Namibia has come to an end. The main sustainability challenge is that the cooperatives are unable to carry out infrastructural maintenance without the support of the organisation. One of the contributing factors to this is that all the members are supposed to give NAD 20.00 to the cooperative on a monthly basis, but there is widespread non-compliance with this requirement. Given this pattern of non-compliance, when the funding comes to an end, the cooperative will have difficulties with self-sustenance. The table below summarises the challenges related to sustainability.

Table 4.4: Challenges related to sustainability

Sustainability challenges
a. There is still an overreliance on DAPP Namibia for infrastructure maintenance and seed supply, especially for the gardens. b. Farmers' are not consistently paying their monthly contributions of NAD 20.00 for the upkeep of the cooperative.

4.2.3.3 Access to markets

This refers to the ability to produce goods to sell at the market and the ability to take produce there. Firstly, cooperatives do not have the capacity to produce for the market as this requires bulk and a consistent supply. The cooperatives only have small parcels of land, thus most of their produce goes to household consumption with a very limited supply for sales. Any produce that is sold is usually sold in the home villages where gardens are located, with occasional sales in nearby villages. The reason for this is that the towns are located far away, and the cost of getting there is almost the same as the revenues generated from sales. The primary objective of both the gardens and CA fields is to enhance food security at the household level, while sales of surplus produce is a secondary objective.

4.2.3.4 Land and labour

The table below presents the challenges related to land and labour, as identified by the focus group discussions.

Table 4.5: Summary of challenges related to land and labour

Land and labour challenges
a. Large CA demonstration plot with few labourers at household levels. b. Small piece of land shared by a large number of cooperative members. c. Farmers had to learn to work together as a group. d. Farmers have dropped out of the programme. e. Adaptation to new ways of doing work, such as keeping records.

All the CA demonstration plots are one hectare, which individual household members cultivate. The challenge is that the size of a CA demonstration plot is too big for households with just one or few family members. This is particularly challenging given that CA is labour intensive. On the other hand the horticultural gardens are also one hectare, but have memberships of 10 people. There were differing opinions amongst the focus group members regarding if one hectare is sufficient for 10 people; some members felt it is too small as there is insufficient produce to provide a bulk supply to the market, while others said it is sufficient as it is easy for members to cultivate the entire field.

Another challenge for the farmers was to adopt conservation agriculture approaches to farming instead of their traditional ways. Similarly, the requirement for farmers to record all the activities, such as harvest size and income from sales, is difficult. Further, opportunities such as new jobs have led to members dropping out of the programme.

4.2.3.5 Crop security

The table below presents the challenges related to crop security facing small-scale farmers in the Kavango Region.

Table 4.6: Summary of challenges related to crop security

Crop security challenges
a. Lack of pesticides or insecticides. b. Insufficient greenhouses. c. Occasional breakdowns of water pumps or a lack of fuel, leading to dry gardens.

As per Table 4.6, firstly there is a lack of insect control mechanisms, both at the gardens and the CA demonstration plots, as the programme does not make provision for pesticides or insecticides. Secondly, no cooperative has erected a greenhouse, thus making pest attacks easy. Finally, shortages of water result in dryness at the gardens,

making it easier for insects and pest to attack plants. To control pests, farmers use traditional methods of applying ash.

4.2.3.6 Irrigation challenges

The table below outlines the irrigation challenges experienced by the supported farmers.

Table 4.7: Summary of challenges related to irrigation

Irrigation challenges
a. Lack of adequate watering cans. b. Manual irrigation system. c. Occasional depletion of diesel fuel for the water pump generator. d. Reliance on rain-fed agriculture for CA demonstration plots.

The table above presents the different irrigation challenges faced by the supported farmers in the Kavango Region. These include a lack of adequate watering tools, manual irrigation systems, insufficient fuel for water pumps, and an over-reliance on rain. The CA demonstration plots are rain-fed and thus are only active during the rainy season, however the gardens are operational throughout the year and rely on an irrigation system which draws water from the river. The challenge with this irrigation system is that although there is a pipe drawing water from the river into the gardens, the irrigation is done manually by farmers using watering cans. This is labour intensive given that the gardens are relatively big and that the watering cans are limited. This shortage also impacts the time it takes to complete the irrigation process. All the cooperatives have an average of five watering cans which are shared among the members.

Another challenge affecting the irrigation system is that sometimes the water supply is halted because of a shortage of diesel for the water pump. This is further exacerbated by delayed supplies from DAPP Namibia's National Headquarter (NHQ) and a lack of

commitment among the farmers to pay their membership contributions of NAD 20.00 per month. Additionally, the water pumps sometimes break down, in which case the cooperative members have to physically collect water from the river. This takes time as for some it is 400 to 500 metres to the river. Others are closer to the river however a steep slope makes it a slow process.

4.2.3.7 Programme implementation challenges

The table below describes the challenges related to programme implementation.

Table 4.8: Summary of challenges related to programme implementation

Programme implementation challenges
a. Lack of supervision of, and support visits to, instructors by programme managers. b. Late procurement of seeds. c. Lack of budget transparency and its housing at the National Headquarter offices makes it difficult to access. d. Lengthy responses from the DAPP NHQ.

Table 4.8 highlights the different challenges related to programme implementation experienced by the supported farmers in the Kavango Region. The study found that inputs such as seeds are procured centrally by DAPP Namibia and are delivered to the Kavango Region, however at times the seeds reach the farmers long after they were requested. Although the Farmers' Club programme has instructors based in the region and are designated cooperatives, they receive little supervision and support from the programme managers who are based at the national headquarters in Oshakati and the partnership office in Windhoek. This irregular supervision and lack of support visits to the implementation sites by instructors delays implementation. Further, budgets for the implementation of the Farmers' Club are housed at the national headquarters, which is approximately 480 km from Rundu, the regional capital city. The focus group members

also indicated that they have no idea what budget has been allocated to the programme.

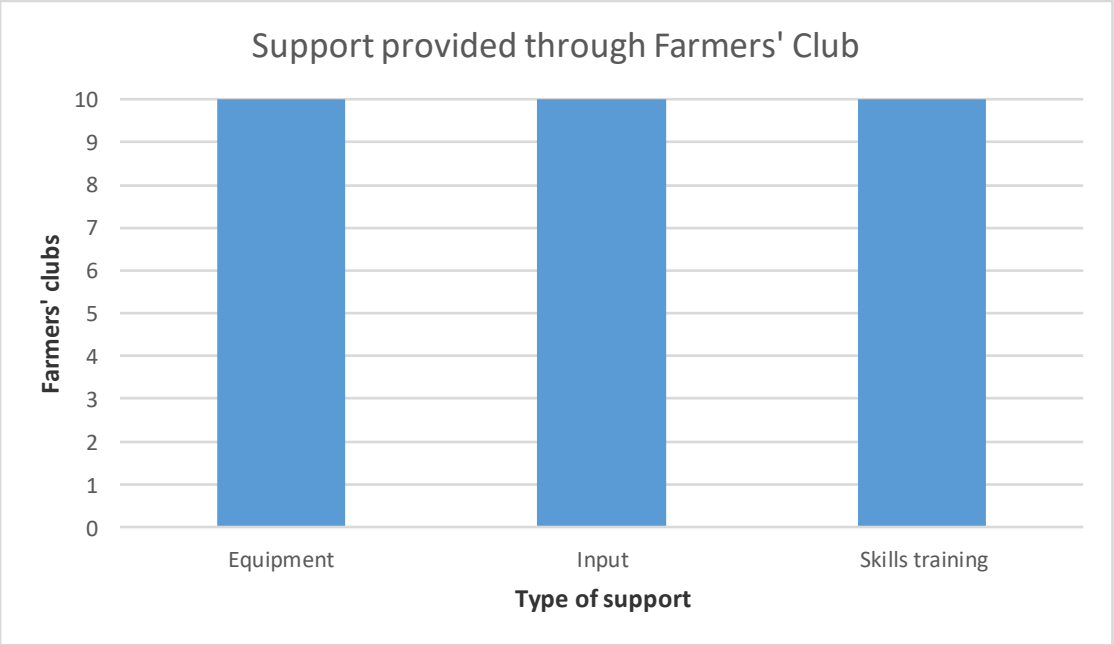
4.2.4 Farming methods

This study focused on five areas under farming methods, i.e. the type of support that the farmers' clubs are receiving from the Farmers' Club programme, the difference between CA and conventional farming practices, the challenges of adopting CA methods, the extent of the application of the CA method, and the level of acceptability of the CA method.

4.2.4.1 Support from DAPP Namibia

DAPP Namibia's main support for small-scale farmers in the Kavango Region under its Farmers' Club programme comes in the form of two sub-programmes. Firstly, DAPP Namibia established CA demonstration plots in order to showcase the system and the success of CA for farmers, to encourage them to follow the example in their own fields. Secondly, the programme established horticultural gardens for vegetable production. To achieve these two objectives, the organisation provided support in the form of infrastructure, inputs, and knowledge transfer. The graph below lists the types of support that the small-scale farmers are receiving from DAPP Namibia through the Farmers' Club programme.

Graph 4.3: Support provided through the Farmers' Club



Graph 4.3 above shows that 100 percent of the Farmers' Club are receiving the same types of support, i.e. equipment, farming inputs and skills training. Table 4.9 below details what these categories of support entail.

Table 4.9: Description of support provided through the Farmers' Club programme

Type of support	What it entails
Equipment	Water pumps, watering cans, pipes, cultivation materials, water tanks
Inputs	Seeds, fuel costs, maintenance of equipment, technical oversight through localised instructors
Skills training	Practical sessions on CA methods for horticultural and dry land grain production

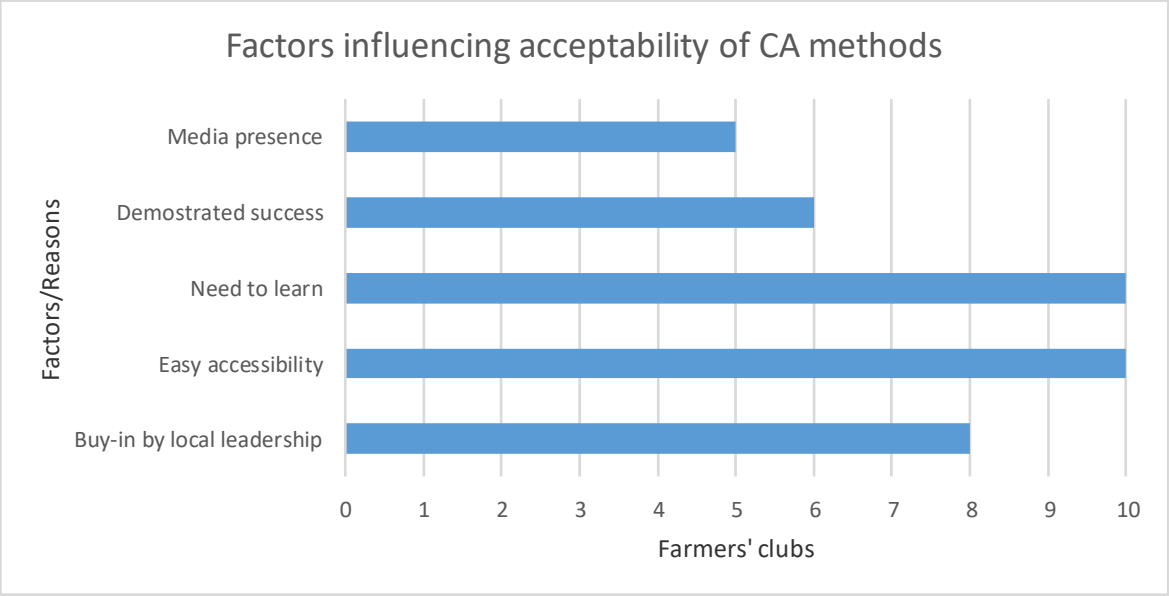
Table 4.9 above lists a description of the type of support in each of the three categories. Firstly, equipment support entails gardening, cultivation materials including wheelbarrows, shovels, picks, irrigation pipes, cans and water pumps for tapping water from the Okavango River. Farmers' clubs are established to leverage water availability

from the river. Further, the organization have assisted the installation of water tanks at the gardens. Secondly, the organization provide inputs such as seeds and fuel for the water pumps and the fencing facilities for the horticultural gardens. Finally, skills training is provided that focuses on CA methods and best practices based on the conditions of the Kavango Region. This includes lessons and practical support exercises to ensure knowledge transfer and the successful implementation of CA farming techniques in support of both horticultural and dry land grain production.

4.2.4.2 CA experience and acceptability

CA has been widely accepted by the supported farmers through the Farmers' Club programme in the Kavango Region. The graph below highlights which factors have influenced the farmers' acceptance of CA methods.

Graph 4.4: Factors/ reasons for the acceptance of CA methods



Graph 4.4 shows that the CA methods are widely accepted for a number of reasons, with the top two being a drive to learn agricultural methods that will ensure high productivity and an income, as well as the easy accessibility of the programme. The members of each club live in the same villages, which are only approximately 1km in

radius. This small size makes it easier for them to reach their garden plots and attend training sessions.

Graph 4.4 further highlighted that the Farmers' Club is implemented with the support of local leadership, including traditional and local authorities and Village Development Committees (VDC), which 80 percent of the respondents believed makes it easier for community acceptance of the programme. Finally, 60 percent of the respondents noted that the observed success of the programme and coverage in the media (particularly newspapers) also influence the acceptability of the programme. During the focus group discussions, all the members noted that based on their experiences, the CA methods work well and produce better crop yields. They further indicated that there is a notable difference between conventional/ traditional methods of farming and those advocated for by the implementing organisation.

4.2.4.3 CA and indigenous farming methods

The study also investigated the contrasts between CA methods and indigenous farming practices in the Kavango Region, as per Table 4.10:

Table 4.10: Contrast between indigenous/ traditional and CA methods in the Kavango Region

Indigenous/ traditional farming methods
a. More seeds, often unmeasured, are planted in the soil at the same time. Often crops will grow in bulk and require additional trimming. b. Manure is not necessarily targeted where crops grow, but is applied randomly in the field. c. Irregular weeding is often practiced. d. Ploughing is often done deep in the soil, with top soil disturbance. e. No mulching is done and weeds are often thrown away from the field. f. After harvesting, any crops that remain are usually used for animal fodder. At times they are burned to clear the fields in preparation for the next crop.

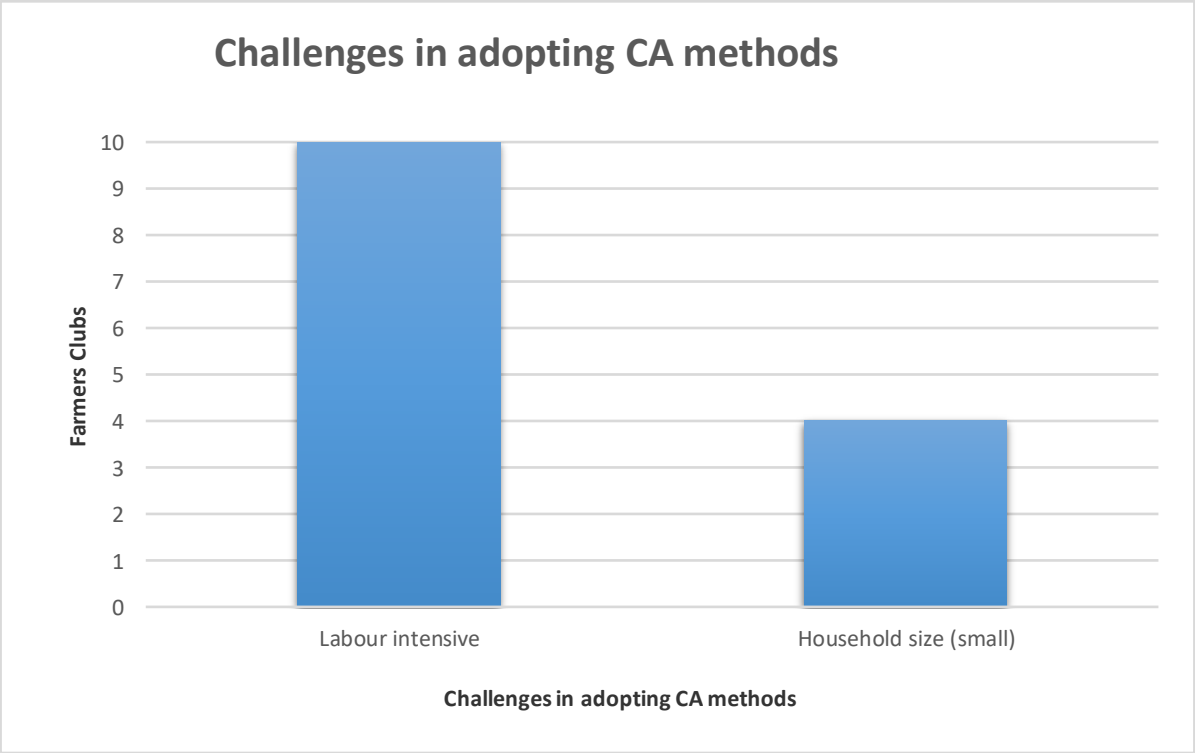
Conservation agriculture methods
a. Mulching is done where weeds are placed between the furrows, as this helps with re-weeding, a reduction in evaporation rate and the retention of soil moisture. b. Weeding is done regularly. c. The application of manure is targeted where the crops are growing. d. Potholing is measured, which enables the retention of water for a longer time. e. Seeding is measured, where only two to three grains are buried in the ground. f. Rip lines are used, which are easier and less labour intensive.

As indicated in Table 4.10 above, notable differences can be seen in the application of seeds and manure. Another striking difference is the emphasis on less top soil disturbance in CA. The application of manure is targeted where crops grow in CA whereas the application of manure in the field is rather random in the conventional approach.

4.2.4.4 Challenges in adopting CA methods

Although the supported farmers expressed satisfaction with CA methods, they also pointed out several challenges associated with adopting these conservation methods. Graph 4.5 below presents these challenges associated with adopting CA methods.

Graph 4.5: Challenges associated with adopting CA methods

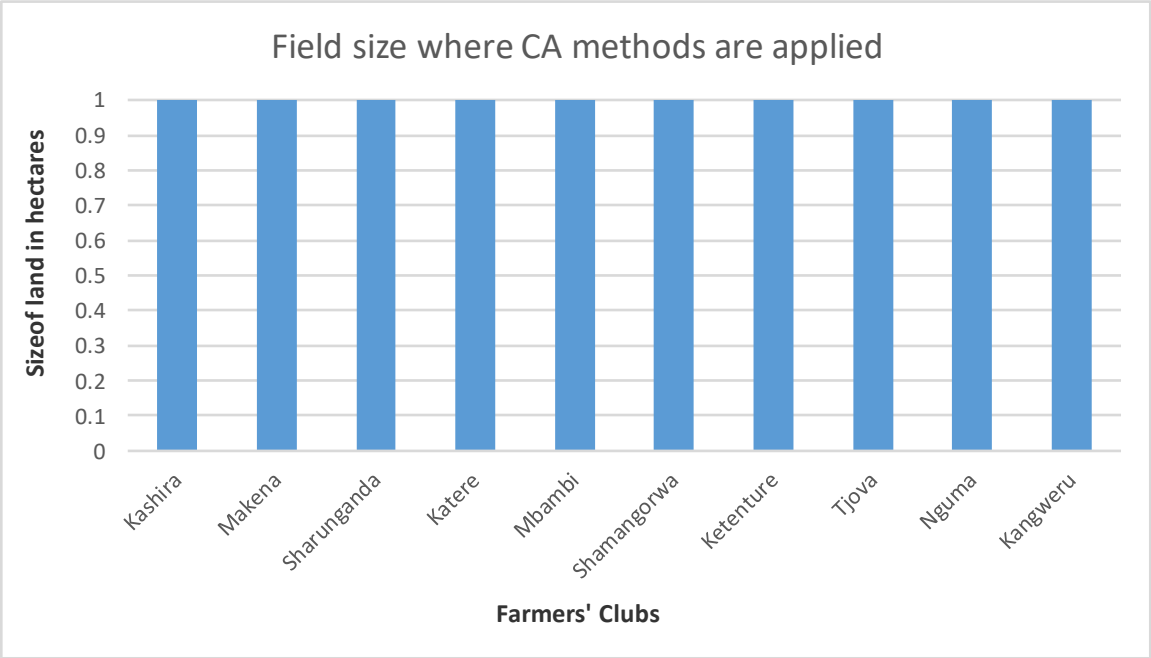


The challenges indicated in Graph 4.5 above are twofold. Firstly, 100 percent of the respondents indicated that CA methods are labour intensive. Potholing was specifically singled out as it must be done in an orderly way, whereby spaces between the potholes must be measured manually. Weeding must also be done regularly, and the collection and application of manure requires physical intensity as the distance from the kraal to the field is often long and the manure is carried manually. Secondly, some households have few family members, making it difficult for them to implement CA methods on a large plot of land. This study did not look into the factors associated with the sizes of households in the Kavango Region, however the following section in which these results are discussed in relation to existing literature makes reference to the socio-economic factors impacting household sizes. The supported farmers thus needed to adapt to new farming practices, which took some time as they initially preferred their conventional ways of farming.

4.2.4.5 Application of CA methods

The graph below present the field sizes where CA methods are applied.

Graph 4.6: Field sizes where CA methods are applied

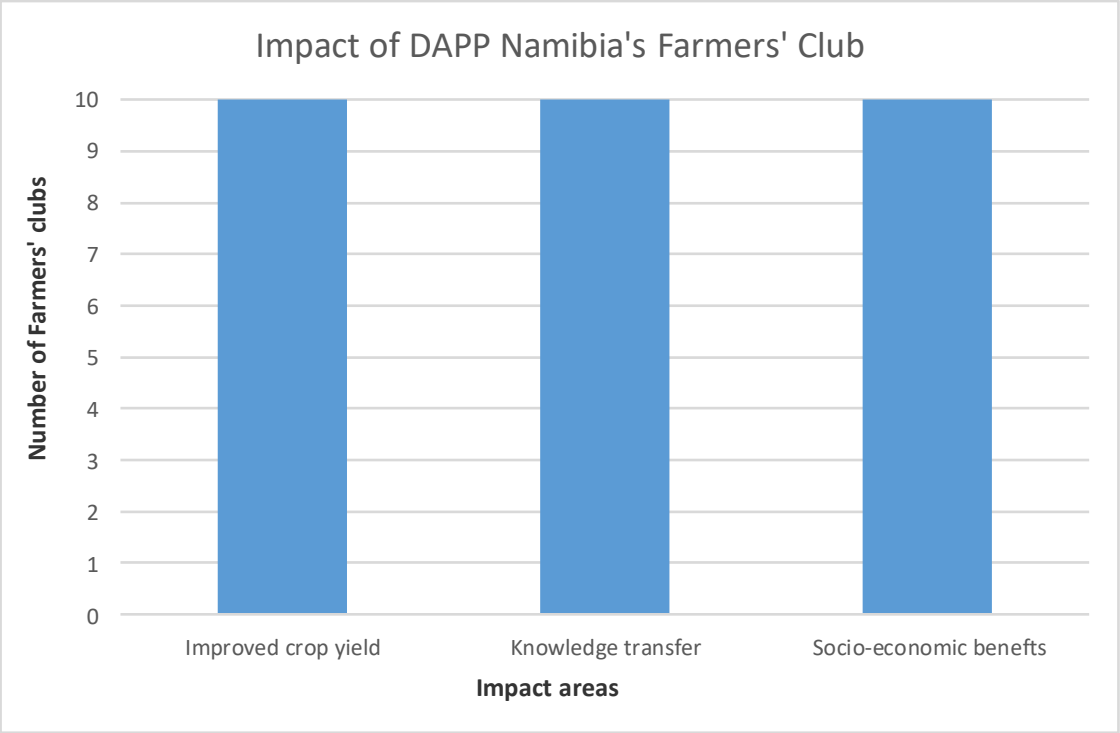


Graph 4.6 above indicates that all the CA demonstration plots are one hectare across all the different localities where the FC programme is implemented.

4.2.5 Impact

The impact of DAPP Namibia's Farmers' Club is reflected in three main areas. The first is in terms of crop yield, the second is in terms of knowledge transfer, and the third is in terms of socio-economic benefits. These areas are indicated in Graph 4.7 below.

Graph 4.7: Impact of DAPP Namibia's Farmers' Club programme

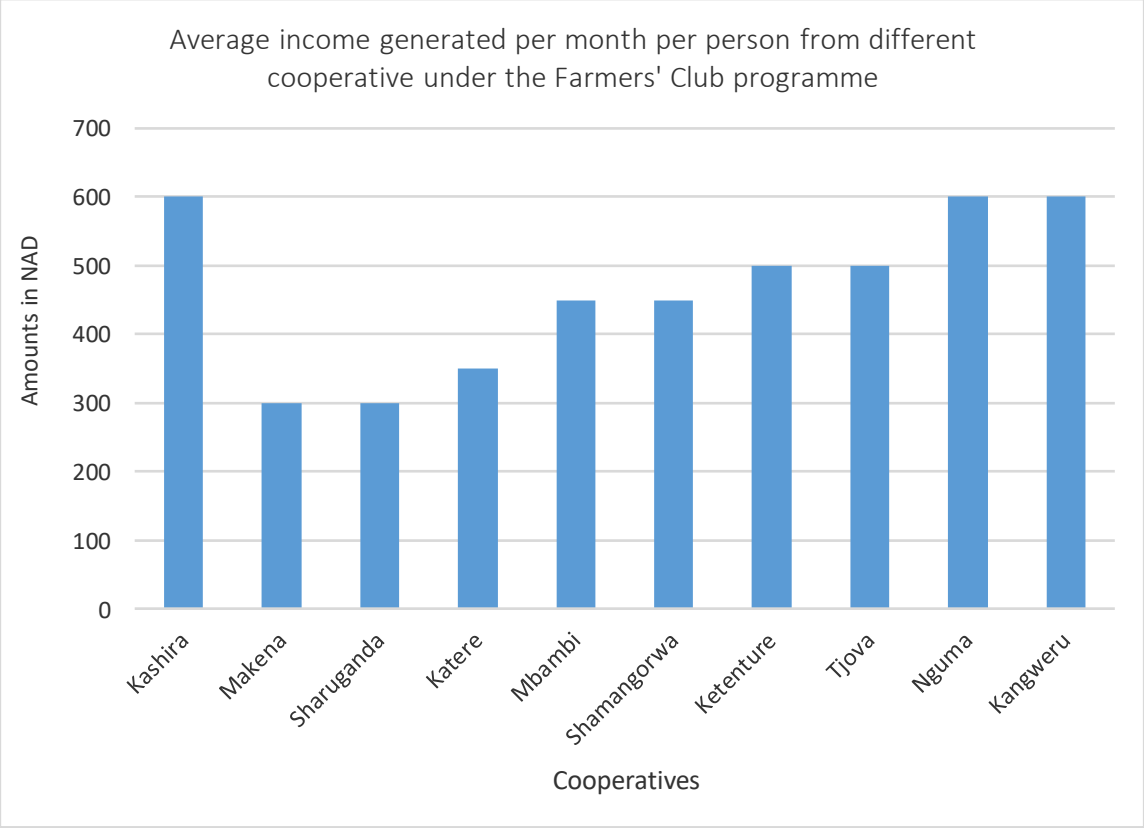


Graph 4.7 above indicates that every respondent identified the three different areas of impact. The first area was an improvement in crop yield, where the farmers noted that there is a substantial difference between the quality of crops from the CA plots and those from the rest of the field where traditional farming methods are applied. Other notable gains are that the crops from the CA fields have bigger heads, larger grains and more yield for pearl millet (mahangu), beans, maize and ground nuts when compared to the yield from same size of field in which traditional farming methods are used. Furthermore, the crops grow faster and appear much healthier. It was noted that half a hectare of land yields around 50 to 100kg more of pearl millet than conventionally cultivated fields. There is no baseline quantification of yield to compare, thus this is based on the farmers' observations. According to the Farmers' Club baseline report, the participating farmers hoped to achieve improvements in crop and vegetable production, and to learn better ways of farming in order to improve their production (DAPP, 2015:3).

Graph 4.7 also indicates that the supported farmers have learned skills on farming methods such as water and moisture retention through mulching and potholing, and better weed control.

Finally, Graph 4.7 indicates that all of the respondents have derived socio-economic benefits from the Farmers' Club programme. Firstly, thanks to the horticultural garden, the farmers now have access to vegetables, whereas previously they had to go to the nearest town, which is located 90km or more from the villages where the Farmers' Club programme is being implemented. Secondly, the farmers are now able to make an income through the sale of surplus production from both dry land crop production and from the horticultural garden. The proceeds from these sales are often channelled to areas such uniforms, school fees, toiletries and eventualities such as transport to health facilities. Graph 4.8 below indicates an average of what farmers earn during a month of good sales from each of the 10 cooperatives where the focus group discussions were held.

Graph 4.8: Average income generated per month per person from ten cooperatives under the Farmers' Club



The results from Graph 4.8 show that the highest monthly average is NAD 600.00 in the cooperative at Kashira in Ndiyona Constituency and those in Nguma and Kangeru in Ndonga Constituency. The lowest average income of NAD 300.00 was reported at Makena and Sharuganda villages in the Ndiyona Constituency. At the time of the FC programme's initiation, the aggregated results demonstrated that the participating farmers did not produce excess cereal and/ or horticultural products beyond their household needs. Consequently, given the reported costs associated with the farmers' production expenses, i.e. for seeds, labour and transportation, there was a negative net average household income from the sale of cereal and horticultural products in the 12 months preceding the programme implementation (DAPP, 2015:7).

Table 4.11 below summarises the programme's impact at the three identified levels.

Table 4.11: Summary of the impact of DAPP Namibia's support

Impact area	**What it entails**
Crop yield	Increase in crop yield, better quality of seeds, bigger crop heads, bigger size of grain, faster crop growth.
Knowledge transfer	Water retention methods, weed control methods, minimum top soil disturbance, factors affecting crop growth.
Socio-economic	Income generation, more access to vegetables than before, improved capacity to support school learners and family.

The Table 4.11 highlights the impact area of crop yield which include increased crop yield, quality of seeds, notable differences in the size of crop heads, the size of grain and generally the fast pace at which crops grow. Further, the table shows that knowledge transfer is of different methods such as water retention, weed control and management, minimum top soil disturbance and generally the different factors affecting growth. Finally, the table indicates the broad socio-economic impact in terms of improved income generation, access to vegetable and family's improved capacity to support their households.

4.3 Discussion and analysis

This segment discusses the collected data as presented above, and provides further analysis regarding the collected data's implication for the programme, and the implementing organisation in particular.

4.3.1 Challenges faced by small-scale farmers prior to DAPP Namibia's Farmers' Club programme

The data collected as per Graph 4.1 shows that 100 percent of the respondents believe that natural climatic factors are the leading challenges in the Kavango Region, which were experienced even before the Farmers' Club programme intervention. These factors include late rainfalls and recurrent droughts, which negatively impact agricultural production, particularly crop production upon which the majority of farmers rely for sustenance. This challenge is in line with Namibia's natural climatic reality, which is characterised by dry and hot weather conditions (MET, 2011:2). Given the expected 10 percent decline in rainfall by 2050, especially in the northern region of Namibia (Ministry of Lands and Resettlement, 2015:72), rain fed agriculture is in grave danger of low productivity. Namibia already experiences unpredictable, irregular and often unsatisfactory rainfall patterns (Zheng, 2012:3), therefore it is important to note the necessity of the Farmers' Club programme, which aims to boost farmers' agricultural productivity in the face of these climatic realities. Two of the aspects upon which the Farmers' Club programme must be evaluated are therefore the extent to which its climate smart agriculture practices have been adopted, and how these practices have improved production for food security.

Secondly, skills transfer is key to the sustainability of the Farmers' Club, as conservation agriculture methods are best implemented when people are correctly able to apply such methods. The supported farmers noted that the knowledge they have acquired regarding better ways to farm in the midst of challenges has been an enabler for improved productivity. Adopting conservation agriculture requires not only changes in practice but also in mind-set, however (Milder, Mejanen & Scherr, 2011:28). Hase

(2013:1) also noted that low crop yield is in part attributed to outdated agricultural techniques. Further, agricultural production is worsened by various socio-economic factors, including poor household food security and poor health, which often results from poor nutrition or illness. Finally, the coping capacities of families are strained due to rural migration and the HIV/AIDS pandemic.

In the final analysis, the Farmers' Club programme must be evaluated based on three aspects. Firstly, its impact on improving rural farmers' resilience to climate change, secondly, its contribution to improved food production, and finally, its impact on the wellbeing of the community at both the household and community levels. It is because of these aspirations that in the concept design of the Farmers' Club programme, DAPP Namibia committed itself to actions that will build resilience and facilitate climate change adaptation in the Kavango region through agricultural productivity increases, improvements in water access and use, and institutional strengthening (DAPP, 2015:4).

4.3.2 Current challenges faced by the supported farmers

In addition to the challenges experienced by the supported farmers prior to the Farmers' Club programme, the study also explored the challenges that they have faced during the programme. Graph 4.2 presented these challenges in seven areas, namely: programme implementation, irrigation, crop security, land and labour, access to markets, sustainability, and management challenges. Of these challenges, sustainability, implementation, irrigation, crop security and lack of access to markets were noted by all the participating Farmers' Clubs. This should raise a concern for DAPP Namibia because of the risk of the programme dying when the funding ends.

There are a number of reasons for these threats to the programme's sustainability, the first of which is that the cooperatives are unable to carry out infrastructural maintenance without the support of the organisation, in part because not all the members are contributing NAD 20.00 to the cooperative on a monthly basis. Given this, when the funding comes to an end, the cooperatives will have difficulties with self-sustenance as they overly rely on DAPP Namibia for all infrastructural maintenance. Further, the

cooperatives are not formalised in terms of the by-laws[10] that govern cooperatives in Namibia. This means that they are not duly recognised by the government's cooperative structures, therefore they cannot benefit from the cooperative schemes run by the government until they are recognised through cooperative formalisation.

Secondly, there is a widespread lack of programme supervision and support systems, which impacts on the effectiveness of the Farmers' Club programme and ultimately its sustainability. The World Health Organization (2008:1) defined supportive supervision as the process of helping staff to improve their own work performance continuously, focusing on monitoring performances towards goals and using data for decision-making. This depends upon regular follow-up with staff to ensure that new tasks are being implemented correctly. Swanepoel and De Beer (2006:71) highlighted that it is through monitoring and evaluation that one can really determine whether initial plans have been put into practice and whether they are being carried out accordingly.

There are many indicators of a lack of programme supervision and support systems, for example seeds are procured centrally by DAPP Namibia, but are late by the time they are delivered to the Kavango Region. Although the Farmers' Club programme has instructors based in the region and are designated as cooperatives, they rarely receive supervision and support visits from the programme managers based at the national headquarters in Oshakati and the partnership office in Windhoek. This irregular supervision and support thus delays implementation. Further, the budgets for the implementation of the Farmers' Club are housed at the national headquarters, which is approximately 480 km from Rundu, the regional capital city.

Thirdly, all of the respondents noted that they have difficulties accessing markets where they can sell their produce, which limits their capacity to generate income and ensure their sustainability. This is due to the fact that the towns are some distance from the villages, and the cost of getting there is similar to the revenues the famers generate from their sales. The cooperatives also do not have the capacity to produce for the markets, as they require bulk and a consistent supply. The challenge of access to

[10] Refers to the 2017 Namibia Cooperative Policy.

markets was also identified by Murphy (2012:3), who described the isolation of the famers which is in large part due to their lack of access to transportation. Chambers (1983:110) described this exclusion as living on the 'periphery', i.e. communities live in areas remote from towns or centres of trading, discussion and information.

In the final analysis, the current challenges threaten the effectiveness of the programme and ultimately its sustainability. The United Nations (2013:36) defined sustainable development as an undertaking that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. In the context of the Farmers' Club programme, sustainability in this context is about the ability of the programme to continue operating even after the support from the implementing organisation has come to an end.

4.3.3 Farming methods

The discussion and analysis of CA farming methods is built around five areas, i.e. the type of support that the farmers' clubs are receiving, the differences between CA and conventional farming practices, the challenges of adopting CA methods, the extent of the application of the CA methods, and the level of acceptance of the CA methods.

4.3.4 Support from DAPP Namibia

Graph 4.3 in section 4.1 above indicates that the beneficiaries of the Farmers' Club programme receive support in the form of equipment, input and skills training. The 2015 DAPP Namibia Farmers' Club baseline survey report indicated that the participants had several expectations of the programme, including learning best practices to improve crop and vegetable production. The baseline report also noted that 99 percent of the respondents had seen a decline in crop production, which they attributed to a decline in rainfall both in terms of quantity and timing - however no farmers were able to identify mechanisms by which they could either individually or at the community level manage these changes (DAPP Namibia, 2015:4). These factors could thus be seen as a motivation for their continued participation in the programme, both individually and collectively. Morgan, King, Weisz and Schopler (2010:268) defined motivation as the

“driving and pulling forces which results in persistent behaviour directed toward particular goals”.

It was therefore imperative that DAPP Namibia provided the necessary skills and knowledge on farming methods to yield improved agricultural results based on the CA methods. A lack of skills and knowledge regarding effective agricultural methods to deal with the effects of climate change was identified as one of the challenges facing small-scale farmers. In fact, Hase (2013:1) noted that Namibia’s low crop yield is in part attributable to outdated agricultural techniques. Humana People to People (2013:1) also noted that coupled with low literacy levels, small-scale farmers rarely have access to the latest knowledge and research. Other challenges identified by Humana People to People (2015) were a lack of access to water supplies, undeveloped infrastructure, and ownership of only one of the means of production, i.e. land. The success of the Farmers’ Club programme thus hinges on addressing farmers’ lack of access to the necessary equipment, and empowering them with skills and knowledge on effective agricultural methods, particularly in the era of climate change.

4.3.5 Acceptance of CA farming methods

As indicated in Table 4.10, there is a distinction between conventional and CA farming methods. Firstly, CA methods are more systematic than the conventional way of farming, for example the CA method incorporates the measurement of seeds (i.e. 2 or 3 seeds). Secondly, the CA approach is more deliberate in that actions are taken intentionally with the aim of achieving specific outcomes. An example of this is the water retention strategy, where mulching is done by placing weeds between the furrows to help with re-weeding, reducing the evaporation rate, and retaining soil moisture. Thirdly, CA methods can be more cost effective, because methods such as potholing and rip lines do not require full cultivation where the top soil is significantly disturbed. These methods are cheaper as cultivation requires a tractor or an animal drawn ripper. CA methods are thus often easier and much less labour intensive.

Moyo (2013:5) concurred with the above, noting that CA methods reduce tillage as ploughing is eliminated, reduce weed pressure due to mulching, and are faster and less labour-intensive thanks to the ripper system. Hase (2013:22) also noted that CA is less costly and a “better way of doing land preparation than the traditional method”.

Regarding the acceptance of the programme, many writers have indicated that various principles of community development influence a community’s acceptance of a development programme. Graph 4.4 highlighted the different reasons for CA programme acceptance in the Kavango Region, chief amongst which were the need to learn and the ease of accessibility of the programme. The third most common reason was support for the programme by the local leadership. The 2015 DAPP Namibia Farmers’ Club baseline survey report indicated that the participants had several expectations of the programme, including learning best practices to improve crop and vegetable production (DAPP Namibia, 2015:4). Swanepoel and De Beer (2006:32) also listed learning as a principle of community development, noting that participation in a project brings about learning, which is an important reason for why people should participate in projects. This learning is not only limited to the beneficiaries of a programme, but extends to the implementers as well.

Another important factor for acceptance of the programme is buy-in from the local and regional leadership. Grobler, Seibes-Bock and Muinjangue (2007:118) wrote that community leaders represent all members of a community, and are in the best position to help with mobilising communities and activating them into community development actions. Thus community leaders are an important bridge between communities and development agencies, and ignoring community leadership structures could create setbacks in community development programme implementation.

The most important motivation is the understanding that this project is a community project that brings with it an opportunity to gain better farming skills that can improve production. In the final analysis, this speaks to community development principles of “felt need”. Grobler et al. (2007:108) cautioned that a programme that does not address

the needs and aspirations of the people is destined to fail. Fortunately, the Farmers' Club does respond to the needs and aspirations of the people in the Kavango Region.

4.3.6 Adoption challenges

The majority of the farmers expressed their satisfaction with the CA methods implemented through the Farmers' Club programme, however two main challenges were raised, i.e. it is labour intensive and potholing needs to be done in an orderly, manual way. Yet CA is not just about potholing; it is also about other methods such as the use of a ripper, which is often animal drawn and much quicker than potholing. As the CA process is not entirely labour intensive, DAPP Namibia should thus focus on less labour intensive methods, while being cognisant that not all families have the animals required for ripping. Another challenge is that some households do not have many family members, making it difficult for them to implement CA methods on a large plot of land. This study did not look into the factors associated with the sizes of households in the Kavango Region, however.

Richards et al. (2014:3) pointed out the following challenges associated with the adoption of CA methods:

- Weed control is a major challenge, particularly in smallholder cropping systems. The elimination of tillage can increase weed pressure in the early years of CA adoption, but this decreases over time if controlled well.
- Yield benefits may only be experienced in three to seven years, as farmers are required to gradually gain experience in conservation agriculture. If DAPP Namibia is to build a strong business case for CA, the organisation should consider implementing its programme for a period of at least two years so that it can document the effectiveness of CA methods not only on yield, but also on other enablers for improved yield such as weed control.

4.3.7 Impact

The findings of this study regarding the impact of the Farmers' Club were unanimous on three aspects, with 100 percent of the respondents noting that the programme has impacted positively on their yield; that learning of different farming methods has taken place; and that there have been notable socio-economic gains as a result of this programme. These findings are highlighted in Graph 4.7, while Table 4.11 details what these three areas of impact entail, such as crops having bigger heads and more yield when compared to the yield from same size of field in which traditional farming methods are used. It can also be argued that CA produced crops make better seeds. For the Farmers' Club to be successful it had to meet the farmers' expectations; this study shows that the supported farmers have observed improvements in crop production and have learnt new farming methods, i.e. the programme has done well in this regard.

Secondly, the learning of the different methods has led to the acquisition of skills and knowledge of various conservation farming methods. This is important because organisations come and go, yet knowledge acquired remains with individuals and communities, and can be passed on through generations.

Finally, through the horticultural garden, supported farmers now have access to vegetables, whereas previously they were only accessible from the nearest town, Rundu.

The 2015 baseline report reveals that despite the current challenges, the Farmers' Club has created a positive impact. For example, the participating farmers used to not produce excess cereal and/ or horticultural products beyond their household needs (DAPP, 2015:7), however they are now able to generate an income through the sale of surplus production from both dry land crop production and the horticultural garden. Graph 4.8 indicated that farmers are making a monthly income of between NAD 300.00 and NAD 600.00.

4.4 Conclusion

This chapter presented the results of the findings of this study, which were then analysed and discussed. The following chapter will present conclusions related to the findings of the study as well as an analysis of the findings, before providing recommendations based on those conclusions and possible areas for further research.

CHAPTER 5

5 CONCLUSIONS AND RECOMMENDATIONS

This chapter is divided into four sections. Section 5.1 presents a summary of the findings in relation to the research objectives and research questions; Section 5.2 reaches a conclusion about the findings; Section 5.3 offers recommendations based on the conclusion; and finally Section 5.4 highlights areas for further research.

5.1 Summary of findings in relation to the research objectives and questions

5.1.1 Research objectives

The following is a summary of the findings of the study:

Objective 1: To understand the challenges faced by small-scale farmers in the Kavango Region.

The results of the study indicate that there is a myriad of challenges facing small-scale farmers in the Kavango Region. These challenges are not only unique to the geographical and climatic realities of the region, but are also related to the way in which programmes are implemented. A lack of routine supervision and support visits have also had negative repercussions on the performance of the Farmers' Club programme. Specific challenges identified in this study are water scarcity, as rural agricultural activities in the Kavango Region rely on rainfall, and a lack of access to capital to invest in tools for production. These findings are consistent with those in the literature, which associated water scarcity (Fiebiger et al., 2010:1) with erratic, sporadic and often unpredictable rainfall patterns (MET, 2011:2) in both the Kavango Region and Namibia as a whole.

The results of the study also indicate that although CA is feasible in the Kavango Region, recurring dry seasons negatively affect farmers' ability to plough as their animals are often weak due to a lack of grazing land. The findings of this study have indicated that farmers do not have access to capital resources, thus they do not have

the capacity to turn to a more mechanised agricultural production approach. This finding is also consistent with the literature, which acknowledges that for CA to work effectively, it will require mechanised agriculture through access to tractors drawing rippers (MAWF, 2010:18).

Objective 2: To determine the level of acceptance and/ or adoption of DAPP Namibia's support for famers in the Kavango Region.

The results of the study indicate that CA is feasible in the Kavango Region and is widely accepted, due to improved yields from the CA demonstration plots and the satisfaction of the supported farmers with the results of their CA interventions. The involvement of the local leadership in the programme and good publicity has also contributed to the acceptability of the Farmers' Club programme. The findings of this study with regards to acceptance and improved yield will assist in contributing to the call for reports on CA programmes, as there are few reports available on the implementation of CA programmes in Namibia (MAWF, 2015:8). This finding is aligned to the literature, which claims that CA is growing momentum in Africa, with numerous CA programmes being led by governments and NGOs. Amongst others, countries where CA is said to be particularly growing momentum in Africa include Namibia (Milder et al., 2011:18).

Objective 3: To determine the impact of DAPP Namibia's support on small-scale farmers' productivity in the Kavango Region.

The study findings indicate that DAPP Namibia's Farmers' Club programme has resulted in improved crop yields through the CA demonstration plots; farmers' acquisition of skills and knowledge regarding better farming practices; and positive impacts on the socio-economic lives of households. This finding is in line with the goal of CA, which is to improve crop yields through its methods for improved soil structure and water retention (Moyo, 2013:4). Although few reports on the implementation of the CA programmes exist in Namibia (MAWF, 2015:8), there is literature available elsewhere in Africa and the world attesting that CA can affect improved production. In

Laikipia District, Kenya, harvests from CA fields were recorded to be more than those from conventionally cultivated fields by 50 to 200 percent, especially for beans, maize, potatoes and wheat. In Ghana, maize yields were three times more with CA than with conventional methods, while in Tanzania, maize and sunflower yields from CA farms rose by 93 to 360 percent. In Uganda, where traditional farming practices yielded approximately 2,500 kg/ha of grains, this rose to 3,000 to 3,100 kg/ha from CA farms. Other success stories have been recorded in Zimbabwe, Malawi and Zambia (Milder et al., 2011:21). In the state of Andhra Pradesh, India, CA is reported to have decreased the cost of cultivation, improved soil fertility and boosted production (World Bank, 2012:16), therefore the findings of this study are in line with the available literature, i.e. CA can improve crop yields.

Objective 4: To determine the social impact of DAPP Namibia's intervention among small-scale farming communities in the Kavango Region.

The results of the findings of this study in relation to this objective indicate that the programme has improved household access to vegetables, which was difficult before the programme. This improved access to vegetables has benefited the supported farmers and the surrounding communities by helping to improve their health status. In addition, by increasing production, the farmers are able to generate a small income from their surplus production.

5.1.2 Research questions

RQ 1: What is the attitude towards conservation agriculture in the Kavango Region?

The attitude towards CA in the Kavango Region is reflected in the acceptance of CA methods in the region. As indicated in research objective 2, there is wide acceptance of CA not only by the supported farmers, but also by the leadership structure of the region. The supported farmers have demonstrated a positive attitude towards CA because they have observed from the demonstration plots that the methods have better crop yields in comparison with fields cultivated using traditional methods. Although not conclusive, it

can be assumed that this wide acceptance could be one of the reasons CA is gaining momentum in Africa (Milder et al., 2011:18).

RQ 2: Is conservation agriculture feasible in the Kavango Region?

The results of the findings of the study indicate that CA is feasible in the Kavango Region, however there are numerous challenges that hinder farmers' ability to farm more successfully. One of these challenges is a lack of access to more mechanised tools such as tractors.

RQ 3: What is the extent of conservation agriculture adoption in the Kavango Region?

Through the Farmers' Club programme, the supported farmers are currently using CA methods on land that is one hectare in size, which are used as demonstration fields to build a case for CA in the region. This size limitation is also due to the fact that the application of CA methods still need to be done manually, which takes much longer and is more labour intensive in comparison with mechanised systems.

RQ 4: What are the existing traditional farming practices in the Kavango Region?

The results of the findings of the study indicate that existing traditional farming practices in the Kavango Region are characterised by total top soil disturbance, whereas CA practices are characterised by minimum soil disturbance methods. Traditional ploughing is done using hand held hoes, animal drawn implements, or for those who can afford it, tractors. As per Table 4.10, traditional farming practices are often not systematic, whereas with CA, the distances between potholes are measured and the application of fertilisers is deliberate. Great care is thus taken in CA to ensure that the top soil is not greatly disturbed.

RQ 5: What are the factors impacting the success/ failure of conservation agriculture in the Kavango Region?

Various challenges hinder the effective implementation of CA in the Kavango Region, including a lack of access to modernised tools that can assist in reducing labour intensiveness in land preparation, and water scarcity.

RQ 6: Can conservation agriculture improve farmers' resilience to climate change and improve production?

The results of the findings of this study indicate that CA can improve farmers' resilience to climate change and improve production. In fact, the supported farmers have observed good crop production through CA's methods of water/ moisture retention, even in a season where less rainfall was experienced. This success is due to the fact that CA methods are more systematic. Secondly, CA approaches are more deliberate in that actions are intentionally done with the aim of achieving specific outcomes. Lastly, CA methods are more cost effective.

5.2 Conclusions

This study has highlighted various challenges facing small-scale farmers in the Kavango Region, which could hamper the success of the DAPP Namibia's Farmers' Club programme and conservation agriculture. These challenges are not only unique to the geographical and climatic realities of the region, but are also related to the way in which programmes are implemented and the challenges linked to adapting to CA methods. A lack of routine supervision and support visits suggests missed opportunities to improve this phase of project implementation.

The results of the study also suggest that conservation agriculture is feasible and widely accepted in the Kavango Region, due to the observed improved yields from the demonstration plots and the satisfaction of the supported farmers with the results of the CA interventions. Yet the full extent of the effectiveness of CA may best be evaluated after a long period of implementation; as Richards et al. (2014:3) put it, with conservation agriculture there could be delays in yield benefits. Thus the full impact of the Farmers' Club programme cannot be conclusively evaluated in one or two years, as

certain enabling processes for improved crop production such as weed control takes time to be effective.

The results of the study further indicate that although there is no baseline quantification against which to compare yields, the observations of the supported farmers indicate that the impact of the Farmers' Club programme has not only resulted in improved yields, but also in socio-economic benefits. Firstly, the programme have improved household access to vegetables which impacts the health status. Secondly, although minute at the time of this study, increase in production enabled farmers to generate an income from surplus production. The proceeds assist households with expenses on education, toiletries and access to health centres. Therefore, conservation agriculture thus has the potential to improve production through increased resilience to climate change, yet the full extent of CA impact requires a thorough investigation, as the findings of this study are limited to farmers' experiences and observations.

In the final analysis, it can be concluded that CA is effective for production, even in seasons where less rainfall is experienced, because its methods are concerned with water/ moisture retention, it is systematic, and it has a deliberate approach with actions that aim to achieve specific outcomes. In addition, CA methods are cost effective as farmers are not required to invest in full cultivation, which also disturbs the top soil. Lastly, although the CA methods have shown to be working, the use of these methods is still seasonal, as the farmers only use CA methods during the rainy season. There is thus a need to identify ways that allow for continued production, for example through water harvesting and irrigation, especially for farmers who are close to the Kavango river.

5.3 Recommendations

Based on the findings of this study, the following suggestions are recommended:

a. To ensure the sustainability of the interventions of the Farmers' Club programme, there is a need to link this intervention to the government's agricultural extension

support services. This can be done through the creation of a technical committee that is representative of the different stakeholders in which the sector relevant ministry (Ministry of Agriculture, Water and Forestry) could be a project champion and whose terms of reference would be to advise at the strategic and technical level. When DAPP Namibia's organisational support ceases, this structure will continue to provide strategic and technical oversight, thus ensuring that the programme does not end the day that DAPP Namibia's support ends. A committee can be established through extant structures such as the Constituency Development Committee (CDC).

b. DAPP Namibia should decentralise its programme management function to the Kavango Region by shifting the Farmers' Club administration from its national headquarters to its regional office in Rundu. This will ensure timely support to the programme on the ground and create agility in the quality assurance and control processes. The current implementation challenges are a result of the programme administration being based in the Oshana Region, yet the organisation has an office in the Kavango Region where the programme is being implemented. This move could also lessen the costs of support visits.

c. For better insect control, especially at the horticultural gardens, there is a need to erect greenhouses which will assist in protecting crops from insects and weather conditions. This will also improve the harvest and could thus increase the quantity available to sell. The organisation should explore mobilizing greenhouse nets through a committee, as proposed in a) above. Further, the organisation could explore cost saving measures by using local resources such as timber to erect the nets.

d. Production processes require their own set of skills, as does running a successful business. There is thus a need to continue training rural farmers not only in climate resilient agricultural methods, but also in business skills. This training will provide farmers with useful knowledge on running successful small enterprises,

especially given that the longer term aspiration of the farmers is to produce more goods to sell. Business training will assist in equipping farmers with good planning (including budgeting and production planning) and marketing skills.

e. The cooperatives should be formalised through registration with the relevant authorities, with a system of governance to oversee the operations of the cooperatives and defined processes regulating the interactions of all members. This will make it easier for cooperatives to gain access to support services from the government, and also make it easier for them to gain access to funding, as most funding agencies fund bodies that are organised through a legal system. It is therefore recommended that the implementing organisation assists with this registration. The formal registration of farmers' associations is an indicator of an improving community and farm-level resilience, as it raises community awareness and builds capacity. The 2015 programme baseline report noted that this indicator will only be measured at the end of year 2 and year 3, however the programme started two years ago and there are no registrations yet.

f. The farmers should be linked to market places such as the Agro Marketing and Trade Agency (AMTA) and the Namibia Association of Horticultural Producers (NAHOP). This will assist farmers to get support from these bodies when it comes to the sale of produce, as it will ensure they have readily available buyers. This will also eliminate the costs associated with transporting produce to market, as these bodies could arrange to pick the produce up from the communities where production is located.

g. DAPP Namibia and organisations providing similar programmes for rural communities should explore providing farmers with sustainable equipment such as solar water pumps instead of fuel propelled equipment. Solar powered pumps will eliminate downtime when fuel is finished and members are unable to refill as is a case with the current system of using diesel powered water pumps.

5.4 Areas for further research

There are various areas in which further research can be undertaken, including a quantitative study on the impact of conservation agriculture with a specific focus on crop yield. Another area of potential research could be on a financial model for rural farmers, as well as an investigation into how conservation agriculture can be used for employment creation in the rural areas.

5.5 Conclusion

This chapter provided conclusions related to the findings of the study, as well as an analysis of the findings. The chapter further provided recommendations based on the conclusions, and finally provided possible areas for further research.

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ANNEXURE I: INTERVIEW SCHEDULE WITH DAPP STAFF

Date of interview:

The overall aim of this proposed study is to establish the extent to which support received by small-scale farmers impacted their agricultural methods, knowledge and skills, and agricultural output.

A. GENERAL

1. DAPP Namibia is involved in supporting small-scale farmers in the Kavango Region. Why specifically the Kavango Region?

2. What is the nature of farming communities you are supporting in the Kavango Region?

B. ON CHALLENGES FACED BY SMALL-SCALE FARMERS IN THE KAVANGO REGION

1. What has been the challenges faced small-scale farmers in the Kavango Region before DAPP Namibia intervention?

2. What are the challenges experienced by small-scale farming communities that you are supporting at the moment?

C. ON FARMING METHODS

1. What support are you giving to small-scale farming communities in the Kavango Region?

2. What would you say is the difference in farming methods now in comparison to those of the indigenous practices/ methods when you were not supporting those communities?

3. If any, what were the challenges in adopting new farming practices/ methods?

4. Are DAPP Namibia's led farming methods and practices applied to the whole field or just portion of the field?

5. Are DAPP Namibia's led farming methods widely accepted amongst the community of farmers you are supporting?

D. ON IMPACT OF DAPP NAMIBIA'S SUPPORT TO SMALL-SCALE FARMERS IN THE KAVANGO REGION

1. What has been the impact of DAPP Namibia support among the small-scale farming communities in the Kavango Region?

2. How have you measured the impact of your support among small-scale farmers in the Kavango Region?

E. ON EFFECTIVE SUPPORT FOR SMALL-SCALE FARMERS

1. In your view, what do you think should be done to assist small-scale farmers so that they can improve their agricultural production?

2. Any other suggestion(s)?

ANNEXURE II: INTERVIEW QUESTIONS/ FOCUS GROUP DISCUSSIONS

Date of interview:

The overall aim of this proposed study is to establish the extent to which support received by small-scale farmers impacted their agricultural methods, knowledge and skills, and agricultural output.

A. GENERAL

1. You are working as a cooperative; what size of land does your cooperative have?

2. How is this piece of land shared among the cooperative members?

3. What type of crops are you producing?

4. Is there any reason for producing that specific type of crop?

B. ON CHALLENGES FACED BY SMALL-SCALE FARMERS IN THE KAVANGO REGION

1. You are receiving some form of support from DAPP Namibia; what were the challenges you faced as small-scale farmers before DAPP Namibia came on board?

2. What are the challenges you are experiencing at the moment?

C. ON FARMING METHODS

1. What support are you getting from DAPP Namibia?

2. What is the difference in farming methods now and the farming methods when you did not have any support from DAPP Namibia?

3. If any, what are the challenges in adopting to new farming practices/ methods?

4. Do you apply DAPP Namibia's led farming methods to the whole field or just a portion of the field?

D. ON IMPACT OF DAPP NAMIBIA'S SUPPORT TO SMALL-SCALE FARMERS IN THE KAVANGO REGION

1. If any, what is the difference in crop production when DAPP Namibia started supporting you and when you were working on your own?

2. What would you say are the key learnings from the intervention by DAPP Namibia?

ANNEXURE III: INFORMED CONSENT

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Researcher: Benjamin Iiyambo
1242 Goreangab
Windhoek
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Email: biiyambo@gmail.com

3 April 2018

Dear Participant,

RE: INFORMED CONSENT

I am a Master of Development Studies student at the University of the Free States and I am writing to invite you to take part in my research project entitled: The Impact of Organizational Support on Small-scale Farming: A Case Study of DAPP Namibia's Farmers' Club in the Kavango Region, Namibia.

This study is conducted for academic purpose and aims at establishing the extent to which support received by small-scale farmers impacted their agricultural methods, knowledge and skills, and agricultural production.

Ten (10) cooperatives out of 100 cooperatives benefiting from DAPP Namibia's Farmers' Club programme have been selected to participate in focus group discussions in this study. This means 100 participants including you have been selected to be part of this study. Systematic sampling was used to select participants by randomly picking one cooperative consisting of ten members and thereafter every tenth cooperative. Kindly note that there are no direct benefits for participating in this study, however the information that you provide will contribute to literature on small farming and will further contribute to a case study that could influence policy for communal farming.

During the group discussion, data will be recorded in written and voice record format. This data will be analysed for final report writing and the report will be in possession of the researcher and the University of the Free States. To ensure the safety of data, voice recorded data will be saved in a computer and its access secured with a

password whereas written data will be filed as hardcopy documents. These data will be kept for a five (5) years period and thereafter will be destroyed.

The study does not require you to disclose your name however, the information gathered from this study will be shared with my supervisor(s) that are involved in this study and may also be published in the journals. Focus group discussions will be conducted in groups and names of participants will not be written down or recorded anywhere. Please be assured that there are no foreseeable risks associated with participation in this research. Prior to group discussions, a further explanation will be provided in the local language where necessary.

While the success of this research depends on your participation which is voluntary, you are under no obligation to participate in focus group discussions. Each group discussion will roughly take thirty (30) to sixty (60) minutes. At any time, participants may leave the discussions if they wish to do so.

Please feel free to ask any questions on any aspect of this study that is unclear to you.

Yours sincerely,

Benjamin Iiyambo

INFORMED CONSENT PAGE (BENEFICIARIES)

Study: The Impact of Organizational Support on small-scale Farming: A Case Study of DAPP Namibia's Farmers' Clubs in the Kavango Region.

Researcher: Benjamin Iiyambo

By signing below, I agree to the following statements:

1) I have read and understood the attached information sheet giving details of the project.
2) I have had the opportunity to ask the researcher any questions that I had about the project and my involvement in it, and I understand my role in the project.
3) My decision to consent is entirely voluntary, and I understand that I am free to withdraw at any time without giving a reason.
4) I understand that data gathered in this project may form the basis of a report or other form of publication or presentation.
5) I have given the researcher permission to audio record the interview.
6) I understand that my name will not be used in any report, publication or presentation and that every effort will be made to protect my confidentiality.

Participant's Signature[11]: _____ Date: _____

Researcher's Signature: _____ Date: _____

Please fill in and return this page. Keep the letter above for future reference.

Please only sign this form if you agree to participate in the study.

[11] Please do not write your name to maintain anonymity