

**TOWARDS A FRAMEWORK FOR ENHANCING SCHOOL FEEDING PROGRAMMES
FOR RURAL DEVELOPMENT IN BLOUBERG LOCAL MUNICIPALITY,
SOUTH AFRICA**

By

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DECLARATION

I, **Makwena Cate Molotja**, hereby declare that this thesis for Doctor of Philosophy in Rural Development (PHDRDV) submitted to the Institute for Rural Development at the University of Venda has not been submitted previously for any degree at this or another university. It is original in design, in execution and all reference materials contained therein has been duly acknowledged.

Student's Signature



Ms. M.C. Molotja

Date 08/08/2019

To my father Mr. Matume Wilson Molotja who has been an inspiration for me to take education seriously from my childhood. Your guidance, encouragement, and support throughout my childhood have made me who I am today. I thank God for you.

ABSTRACT

Many countries provide food to school children through school feeding programmes (SFPs). This is designed to alleviate short-term hunger and encourage learners to attend school. Many children in South Africa attend school hungry and lack general knowledge of nutrition, which negatively affects their learning abilities. Not much research attention has been paid to the potential of SFPs to improve learners' knowledge of nutrition. Nor has there been significant effort to stimulate local production of food involving community members, which might contribute to the development of rural areas. In the current study, the degree to which SFPs have alleviated hunger, promoted nutrition education, and enhanced the development of rural communities in Blouberg Local Municipality (BLM) was investigated.

Data were collected from 11 primary schools in BLM where the South African Department of Basic Education implemented SFPs. At each school, quantitative data were collected from learners aged from 10 to 15 years using a structured, pre-tested and validated questionnaire. Qualitative data were collected through individual in-depth interviews and focus group discussions with learners, teaching staff, community members and government officials involved in the implementation of SFPs. Document analysis, direct observation, and taking notes, photographs, Venn and seasonal - diagramming were used to collect data. Descriptive statistics, crosstabulation and binary logistic regression were used to analyse quantitative data. Qualitative data obtained in the form of interview transcripts and field notes were analysed using thematic content analysis. An inductive approach was followed. This entails coding the data and observing emerging patterns, culminating in organising the results into common themes.

A composite index was used as a measure of the quality of SFPs. Perceived benefits of SFPs were assessed based on a validated and standardised 5-point ordinal scale. It was observed that 80 % school children who participated in the study were satisfied with the quality of the SFPs provided to them. The results confirmed those obtained through focus group discussions and individual interviews. Overall satisfaction with the

quality of the SFP in BLM significantly and positively depended on the following knowledge, in descending order of importance: fewer sugary foods should be consumed; fewer fatty foods should be consumed and eating various foods helps in proper growth and development. Four predictor variables significantly influenced satisfaction with SFPs. These were: knowledge that a variety of food types is helpful for growth and development [OR = 3.72; $P < 0.001$; 95% C.I. = 1.77, 7.83]; knowledge that eating too much fatty food is harmful [OR = 2.93; $P < 0.001$; 95% C.I. = 1.83, 4.68]; knowledge that eating too much sugary food is harmful [OR = 2.18; $P < 0.001$; 95% C.I. = 1.45, 3.29]; and knowledge that eating too much sweet food is harmful because it can make people fat [OR = 1.58; $P < 0.05$; 95% C.I. = 1.01, 2.50].

All participants agreed that SFPs alleviated hunger and benefited the learners and their families. Although the participants cited numerous other benefits accrued through SFPs, there were challenges that should be addressed. The involvement of community members in the SFPs was reported to be minimal such as cooking and serving food and working in the school gardens. This could be maximised because SFPs presented an opportunity for local food production and rural community development. Non-delivery of food by suppliers and the negative impact it had on learners was the major challenge. This observation implied that the SFPs constituted a readily available market, which the rural communities could exploit to improve their income, create jobs and enhance the rural economy. Therefore, SFPs and school gardens should be integrated with nutrition education to improve the learners' level of nutrition knowledge and reinforce the consumption of healthy foods. Although initially, the SFP had a community development component, this seemed to be overlooked. A framework that underscores strong partnerships among government departments, NGOs and the private sector in implementing community and/or rural development initiatives was developed. The framework is based on strong partnerships between key stakeholders, policy support, investments in resources and infrastructure for rural development and capacity building.

Key words: School feeding, rural development, nutrition knowledge, undernourishment, learners.

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ABBREVIATIONS

BLM	Blouberg Local Municipality
CADP	Comprehensive Africa Development Programme
CAEs	School Feeding Councils
CRDP	Comprehensive Rural Development Programme
DBE	Department of Basic Education
EPWP	Expanded Public Works Programme
FAO	Food and Agriculture Organization
FBDG	Food Based Dietary Guidelines
FCI	Food Corporation of India
FFE	Food for Education
GSFP	Ghana School Feeding Programme
HGSM	Home-Grown School Meals
HGSF	Home-Grown School Feeding
HSRC	Human Sciences Research Council
IFAD	The International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
INP	Integrated Nutrition Programme
LWC	Local Women's Cooperatives
MDGs	Millennium Development Goals
MDMS	Mid-Day Meal Scheme
MoLGRD	Ministry of Local Government and Rural Development
NCDs	Non-Communicable Diseases
NEPAD	New Partnership for Africa's Development
NFDE	National Fund for Development Education
NMK	Njaa Marufuku Kenya
NSNP	National School Nutrition Programme
NGOs	Non-Governmental Organisations
PCD	Partnership for Child Development
PNAE	Programa Nacional de Alimentação Escolar (National School Feeding Programme)

PSC	Public Service Commission
PSNP	Primary School Nutrition Programme
PTA	Parent-Teacher Association
RSA	Republic of South Africa
SA	South Africa
SADC	Southern African development Community
SANHANES	South African National Health and Nutrition Examination Survey
SDGs	Sustainable Development Goals
SFPs	School Feeding Programmes
SGBs	School Governing Bodies
SNAP	Supplemental Nutrition Assistance Program
StatsSA	Statistics South Africa
US	United States
USA	United States of America
VFHs	Volunteer Food Handlers
WB	World Bank
WFP	World Food Programme

CHAPTER 1: INTRODUCTION

1.1 Background

The right to food is recognised as a human right for all people in the world and is enshrined in the 1966 International Covenant on Economic, Social and Cultural Rights (United Nations Human Rights, 2010). This right is also protected by national constitutions, including the Constitution of the Republic of South Africa (RSA). Despite this universal right, many people in the world are suffering from hunger because they cannot access food. World leaders, including African Heads of State and governments have, in the past, made commitments towards ending hunger and continued the fight against hunger. In 1996, they adopted the Rome Declaration on World Food Security which sought “to halve the absolute number of undernourished people by 2015”. This was further reinforced by adopting the Millennium Development Goals (MDGs) with MDG 1 aimed to halve the proportion of people who suffer from hunger by 2015 (United Nations, 2014; 2015a). In continuing the fight against hunger, the world leaders adopted the Sustainable Development Goals (SDGs) to be achieved by the year 2030. Sustainable Development Goal 2: Zero hunger aims to ensure that, by 2030, “no one (woman, man, girl or boy) should go hungry” (FAO et al., 2015b; United Nations, 2015b; WFP, 2016a; 2017a). Although many countries are devoting efforts and resources to defeat hunger, there are still significant numbers of people around the world who are suffering from hunger and lack the food they need for survival or for an active and healthy life (Nah and Chau, 2010; FAO et al., 2015a; Pérez-Escamilla et al., 2017).

The Food and Agricultural Organization (FAO) and the World Food Programme (WFP) reported large numbers of people suffering from hunger or not having enough food to eat in the world. These world-wide figures of hungry people were as follows: 1.2 billion people (FAO, 2009), nearly 805 million people (FAO et al., 2014) and currently about 795 million people (FAO et al., 2015a; United Nations, 2015a; WFP, 2016a). Although the figures show some progress made in reducing the number of hungry people in the world, the challenge is that hunger still exists and it affects many people in the world. According to the latest available estimates of 2014-2016, one in nine people in the

world is undernourished (WFP, 2017b) and the vast majority of hungry people, which is an estimated 780 million undernourished people, live in developing regions (FAO et al., 2015a; United Nations, 2015a).

Africa is the world's most food insecure continent with around 227 million people or one out of every five people being chronically food insecure (United Nations, 2014). According to WFP (2017c), Sub-Saharan Africa is the region with the highest prevalence of hunger where one person in four is undernourished. In this region, the projections for the 2014–2016 period indicated a rate of undernourishment of almost 23 percent, which is higher than other regions (United Nations, 2015a). The challenge is that, while the hunger rate has fallen, the number of undernourished people has increased by 44 million since 1990 depicting the region's high population growth rate (United Nations, 2015a). Therefore, dealing with hunger remains a serious challenge for many countries, especially the developing countries.

South Africa (SA) is considered to have adequate food at national level, but the reality is that part of the population (an estimation of 13 million people) currently suffer from hunger on a regular basis and more than half of the population is at risk of going hungry (Shisana et al., 2013; Hendricks, 2014; Oxfam, 2014). South Africa has communities with the highest prevalence of poverty, which results in hunger and malnutrition that negatively affect the growth and development as well as the learning process of school children (Integrated Nutrition Programme (INP), 2002; Public Service Commission, 2008). According to the Department of Basic Education (2015), hunger and malnutrition are amongst the barriers to optimum participation in education as no effective learning can take place on an empty stomach. The hunger and poverty situation of most South Africans is a result of the apartheid system that caused racial segregation and inequalities among South Africans. This system favoured the minority and disadvantaged many black South Africans by denying them access to employment opportunities, education, skills, resources and services that the minority South Africans enjoyed. School children from poor and disadvantaged areas received a poor quality education and attended schools that were not resourced as compared to those of the advantaged racial groups. (Spaull, 2013) put it clearly that poorer South African

students perform worse academically, they are unable to acquire the necessary numeracy and literacy skills they should be acquiring in primary school and this is the legacy of apartheid. Apartheid affected the participation of many black South Africans in the economy in the sense that many were unemployed, did not have the necessary skills to acquire employment in sectors other than agriculture and they had low educational levels (Leibbrandt, et al., 2007). This legacy still exist today.

Although hunger still exists in SA, the country has made progress towards eradicating extreme poverty and hunger as defined by the international MDG poverty lines and has reached its target in terms of the MDG indicator of reduced hunger (FAO, 2015). According to FAO (2015) and the Republic of South Africa (2015), food security has improved in SA and the percentage of adults and children reported to have experienced hunger has been halved between 2002 (from 31 % to 17 %) and 2011 (from 32 % to 18 %). Statistics South Africa (StatsSA) reported that, for the period 2002 to 2016, there was a decline in the number of households (from 23.8 % in 2002 to 11.8 % in 2016) and individuals (from 29.3 % in 2002 to 13.4 % in 2016) that were vulnerable to hunger (Statistics South Africa, 2017a). The percentage of households and individuals that had limited access to food also decreased (Statistics South Africa, 2017a). Therefore, hunger has declined and food access has improved in SA but the fight against hunger continues.

According to Bundy et al. (2009) and WFP (2014), the poorest are the most vulnerable to hunger, especially children, women and rural communities. Almost four-fifths, about 78 % of the world's poor live in rural areas (FAO et al., 2015b). In the developing world, an estimated 66 million primary school-age children attend school hungry and 67 million do not attend school at all due to hunger (World Bank, 2012; WFP, 2012a; Kretschmer et al., 2014). The situation of these children becomes worse due to the devastating effects of hunger that could ruin their futures as well as the futures of their families and countries. The number of primary school-age children who attend school hungry across the developing countries has increased from 60 million (Bundy et al., 2009) to 66 million with 23 million residing in Africa alone (World Bank, 2012; WFP, 2012a). Therefore, developing countries, including Africa as a continent, face an enormous challenge of

feeding their population (including school children) and changing the devastating results of hunger in people's lives.

The WFP affirmed that no child should attend school hungry (WFP, 2012a; b). In order to achieve this, WFP is working with various governments, non-governmental organisations (NGOs) and donors to ensure that school children receive food through the school feeding programmes (SFPs) (Bundy et al., 2009; WFP, 2012a; b; WFP, 2017b). In its efforts to fight hunger, WFP's 2016 annual performance report indicated that it had provided school meals to 14.9 million school children through the SFPs (WFP, 2017b) and the latest figure reported was 16.4 million children who received school meals (WFP, 2017c). In the poorest countries, SFPs are emerging as a common social safety net response to crisis, which protects the poorest and feeds hungry children (Bundy et al., 2009). School meals are an essential safety net, helping to ensure that every child has access to education, health, and nutrition (WFP, 2016a). Therefore, a daily school meal provides a strong incentive to send children to school and to alleviate short-term hunger.

Hunger is a real problem affecting millions of primary school learners from poor households every day as these learners face the risk of reduced capacity to learn because of nutritional deprivation (Public Service Commission, 2008). The Human Sciences Research Council's (HSRC) study of the health and nutritional status of South Africans revealed that 29.8 % of school children did not have food at home and relied on school meals (Human Sciences Research Council, 2013). Another cause for serious concern is that 71.7 % of school children aged between 10 and 14 years had a low score on general nutrition knowledge (Human Sciences Research Council, 2013). Although SA has reduced food insecurity and hunger, the nutritional status of children is cause for concern (Republic of South Africa, 2015). Therefore, it is clear that most South African school children rely on school meals to alleviate hunger and majority of them lack general nutrition knowledge that could assist them to make informed healthy food choices. In order to address hunger in the country, the SA government placed a high priority on its constitution and several national policies and programmes such as the Integrated Food Security Strategy, the National Development Plan Vision 2030, the

Zero hunger programme, which contribute to the common goal of improving food security and nutrition in the country (FAO, 2015).

In South Africa provision of food to school children is done through the National School Nutrition Programme (NSNP) in line with one of the strategies to alleviate poverty and address barriers to learning associated with hunger and malnutrition (Public Service Commission, 2008; Department of Basic Education (DBE), 2015). This was a strategy of the government to address the imbalances and inequities of the apartheid era (Public Service Commission, 2008). According to the Republic of South Africa (2015), the NSNP is one of the programmes that were introduced to boost food security and nutritional well-being, especially of the children of SA. Research revealed that more than half of the children (51.1 %) aged between 10 and 14 years relied on the school meals provided through the SFPs (Human Sciences Research Council, 2013). More than a third (37.2 %) of the school children indicated that the food provided at school was enough for the whole day (Human Sciences Research Council, 2013). Therefore, food provided through the SFPs helped to alleviate hunger. School feeding programmes offer various benefits such as educational, nutritional and social protection (Bundy et al., 2009; Masset and Gelli, 2013; WFP, 2013). However, SFPs have another dimension for which there is less empirical evidence. This dimension is the link between school feeding and local agricultural production and its potential related benefits to the local economy and the incomes of farmers (Masset and Gelli, 2013; WFP, 2013).

According to Drake et al. (2016), connecting school feeding with local food production and purchase is a new trend that many countries are pursuing. In SA, this concept is promoted through the Zero Hunger Programme that seeks to link subsistence producers and small-scale producers to markets and government institutions such as schools, hospitals, and prisons (FAO, 2015). South African schools with SFPs are required to implement food production initiatives such as school food gardens, depending on available resources, from which to obtain fresh vegetables and fruits to supplement the menu (Department of Basic Education, 2015). The concept of local agricultural production defined as buying and using food produced locally by small-scale farmers for the SFPs is sometimes referred to as “home-grown school feeding”

(HGSF) (Sumberg and Sabates-Wheeler, 2011; Lawson, 2012; WFP, 2013). Locally produced food may be food produced within a country, province, municipality or communities around the schools. Therefore, if the concept of HGSF is supported and adopted, then the communities around the schools can also benefit. Based on the above information, it is clear that the SFPs provide more than just food to the school children, but can also present opportunities for rural development. Lawson (2012) shares these sentiments as he mentioned that SFPs can be a powerful instrument for achieving many multi-sectoral benefits such as education, gender equality, food security, poverty reduction, nutrition and health, and agricultural development in the sense that they will stimulate local food production and economic opportunities in rural communities.

In SA, agriculture plays an important role in the process of economic development and can contribute significantly to household food security (Statistics South Africa, 2017). Limpopo Province has the highest percentage of households (38.3 %) that are involved in agricultural production activities in an attempt to secure an additional source of food (Statistics South Africa, 2017). Most households in Limpopo Province (67.8 %) cultivated grains and food crops; 55 % grew fruit and vegetables and 25.2 % of the households produced livestock (Statistics South Africa, 2017). Blouberg Local Municipality's major economic sectors are agriculture, mining and tourism (Blouberg Municipality, 2017). In terms of agriculture, there is livestock and game farming as well as crop and vegetable production. Blouberg Municipality (2017) reported that the farming sector in the municipality consists of an established, commercial white farming community and the less established subsistence black farming community. Where land is scarce, subsistence farmers use communal areas and most farmers do not have access to research information and markets (Blouberg Municipality, 2017). Therefore, the fact that there are already food production activities taking place in the province and the study area is a positive indication that communities could take advantage of the opportunity presented by SFP if given the support needed.

The information presented above necessitated this study, which sought to review and describe the potential of the SFPs to alleviate hunger, create jobs and empower rural

communities such as learners and community members with knowledge and skills, thus contributing to rural development. Despite the many opportunities that SFPs offered to communities, many of these have not been explored in South Africa, hence this study. The next section will present the background information about the SFP in South Africa, its legislative framework and the conceptual framework of this study.

1.1.1 School feeding programmes in South Africa

Based on the prevalence of poverty in South Africa, the democratic government established the Primary School Nutrition Programme (PSNP) in selected schools in 1994 (Public Service Commission, 2008). According to the Department of Basic Education (2015), the PSNP was introduced for poverty alleviation, specifically to uphold the rights of children to basic food and to contribute to learning in schools. In its first 10 years, the programme was managed by the Department of Health, but it was transferred to the DBE in 2004. At its inception in 1994, the PSNP was mainly regarded as a health promotion initiative and its aims were to (1) improve education outcomes (by improving active learning capacity, school attendance, and punctuality by providing an early morning snack); (2) improve health (through micronutrient supplementation; parasite control/eradication; and providing education on health and nutrition); (3) enhance broader development initiatives, especially in the area of combating poverty; and (4) link the PSNP to other RDP programmes and to integrate it into a broader Integrated Nutrition Programme (Public Service Commission, 2008).

When the PSNP was transferred to the DBE in 2004, it was renamed as the National School Nutrition Programme (NSNP) and the focus was on educational outcomes and not on nutrition. The aims were refined as follows: (1) to improve education by enhancing learning capacity, school attendance and punctuality, and contribute to general health development by alleviating hunger; (2) to educate pupils on nutrition and to improve their nutritional status through micro-nutrient supplementation; (3) to improve health through parasite control/eradication; and (4) to develop the nutrition component of the general education curriculum (Public Service Commission, 2008). The SFP in SA is now officially known as the NSNP. The NSNP was extended to secondary schools in

2009. The government funds the programme and the funds are transferred to the provincial education departments. The Department of Basic Education (2015) re-emphasises that the overall purpose of the SFP is to enhance access to education by providing daily nutritious meals on all school days to learners across the country. The objectives of the SFP, as outlined by the Department of Basic Education (2015), are as follows: (1) to provide daily nutritious meals to enhance learning capacity; (2) to promote healthy lifestyles through nutrition education; and (3) to support the development of food gardens in schools. The Public Service Commission (2008) emphasised that the NSNP was conceptualised primarily as an educational intervention aimed at addressing children's ability to learn, rather than a health intervention to improve the nutrition of children. Although this was the case in the past, the NSNP still provides food to school children but it also now has an educational, nutritional and food production component.

1.1.2 The legislative framework for the national school nutrition programme (NSNP)

The aims of the NSNP were meant to respond to the articles in the Bill of Rights of the Constitution of South Africa, sections 27, 28 and 29 which stipulate the constitutional rights of citizens to health care, food, water and social security, children and education (Public Service commission, 2008). The following sections of the Constitution relate to the NSNP:

- Section 27 (1) (b) on the right of access to sufficient food;
- Section 28 (1) (c) on the right of children to basic nutrition; and
- Section 29 (1) (a) on the right to basic education (Republic of South Africa, 1996).

As per regulation, the NSNP provides one meal per school day and this meal should consist of a starch, protein, and a fruit or vegetable serving, with standard menus and preparation guideline provided (Department of Basic Education, 2015). At its inception, the implementation of the NSNP included community participation in the form of school governing bodies (SGBs) who were supposed to monitor the implementation of the

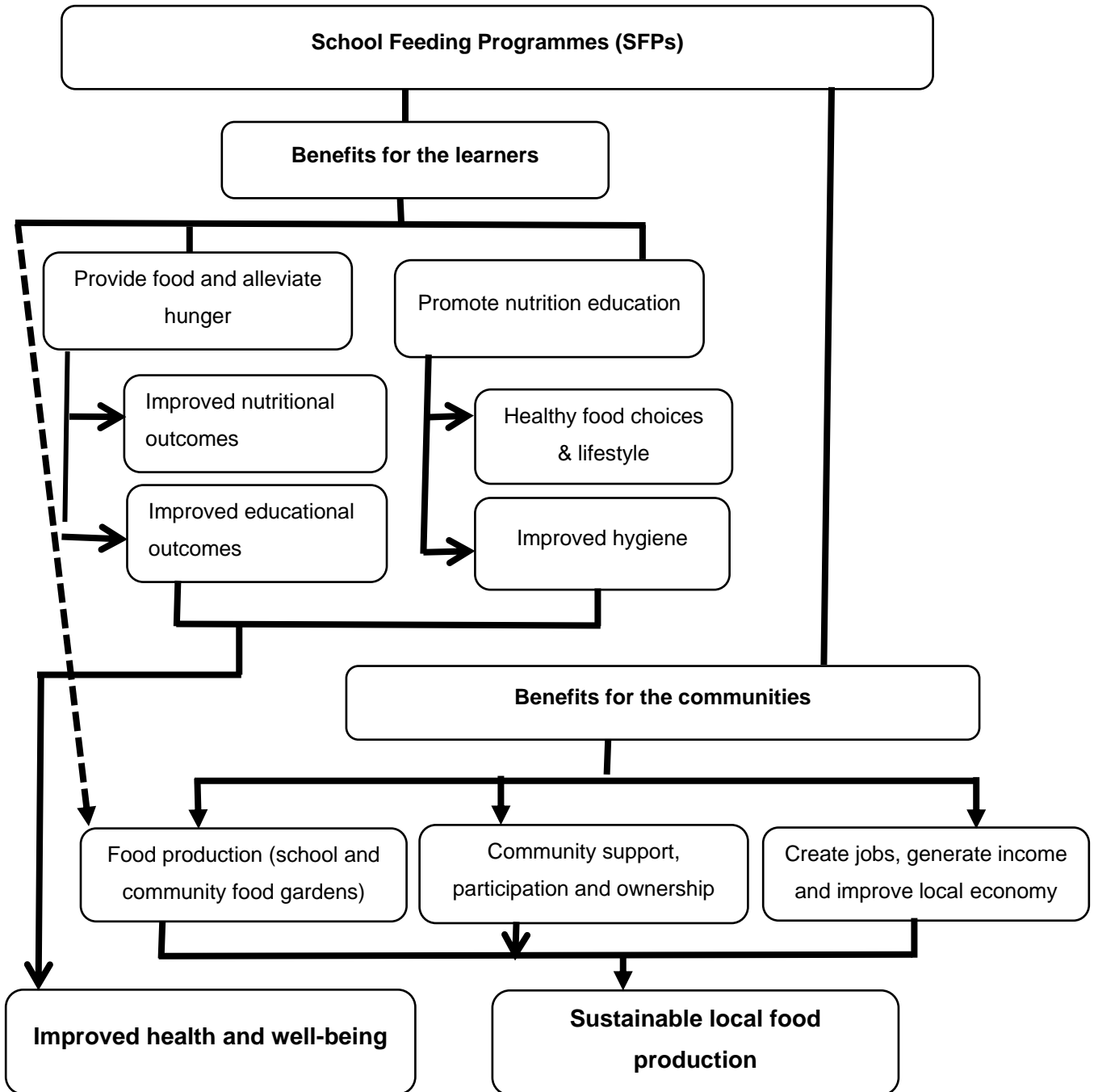
programme and women volunteers, regarded as Volunteer Food Handlers (VFHs), who cooked and served food at schools (Public Service commission, 2008). Aspects of local economic development were included whereby small medium and macro enterprises (SMMEs) were contracted as service providers to supply food to schools (Public Service commission, 2008). The above aspects are still emphasised by the Department of Basic Education in terms of the ideal implementation of the programme. The implementation of the NSNP is based on the following legislative provisions contained in the White Paper on Reconstruction and Development:

- Access to quality food and basic nutrition enshrined in the South African Constitution, and part of the International Children’s Charter;
- Access to quality basic education and learner success as stipulated in the National Education Policy Act 27 of 1996, South African Schools Act 84 of 1996;
- Targeting schools for school feeding as informed by the norms and standard for funding of public schools, according to the Department of Education general notice 2362 of 12 October 1998;
- Provision of Grade R as enshrined in the White Paper no 5 and the cabinet resolution of January 2002 in which the transfer of the NSNP is addressed; and
- Caring for children affected by HIV/AIDS, and with regard to orphans and vulnerable children as espoused in the strategic objective of the Department of Education (Public Service commission, 2008).

1.1.3 Conceptual framework of the study

The conceptual framework for this study (Figure 1.1) outlines the opportunities that the SFPs offer to both learners and their communities with the overall aim of contributing to rural development. This framework suggests that the SFPs can provide food to learners and thereby alleviate hunger. SFPs can be used as a means to promote nutrition education to learners thereby improving their general nutrition knowledge that will encourage them to make healthy food choices and adopt healthy lifestyles now and in the future. This will be partly responding to one of the pillars of SFPs in SA, namely, nutrition education which promotes healthy lifestyles among learners and school

communities (Department of Basic Education, 2015). Moreover, SFPs can be linked to food production in schools through the school gradens. When learners are involved with food production activities, they gain the skill that they can even use at home to start food gardens. Learners gain knowledge of vegetables and fruits, their importance and may eventually increase their consumption. All of the above can improve the nutrition of the child. For the communities, through their participation and involvement, SFPs can provide



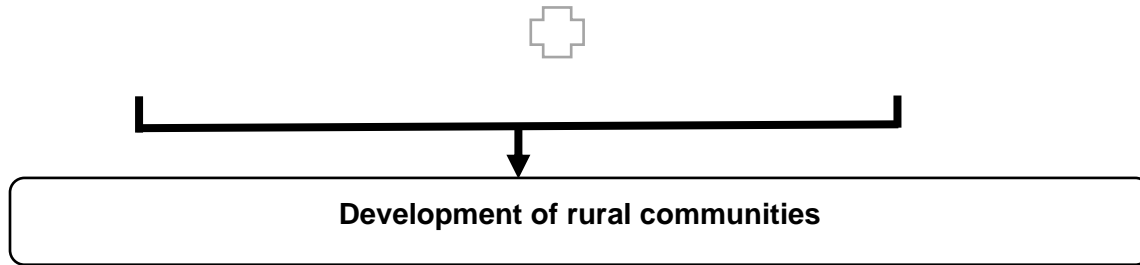


Figure 1.1 Conceptual framework of the study

an opportunity for them to (1) produce food; (2) acquire food production skills; and (3) access a market where they can supply certain foods (e.g. vegetables, legumes such as dry beans and indigenous fruits etc.) to complement the food for the SFPs. If the concept of the school gardens is expanded to the communities, this will encourage more community members to participate in food production activities and supply food to the SFPs, create job opportunities and improve the local economies of the communities. In this way, the communities will take ownership of the programme. If the government can train and support community members to produce food for the SFPs, this will ensure the sustainability of the programme, assist in alleviating hunger and empower community members. If all of these are achieved, then the SFPs will be contributing to the development of rural communities. It is important to note that although SFPs are mainly associated with educational outcomes and to some extent with nutritional outcomes, these aspects were not included in the conceptual framework due to the scope of this study. However, the importance of the SFPs in contributing to both the educational and nutritional outcomes of the learners were acknowledged and discussed in the literature review section.

1.2 Statement of the Research Problem

Despite the many opportunities that the SFPs may bring to rural communities, the potential for linking SFPs to rural development has not received much attention in South Africa. The existing SFPs in some schools of Limpopo Province are rarely linked to local food production activities such as school and community food gardens.

The suppliers of food for the SFPs are usually not from the local communities and they often travel long distances to deliver the food to the schools and sometimes the foods are a few days late. School feeding programmes have always been linked to educational outcomes with little or no attention to other possibilities such as nutrition education and rural development (Jomaa et al., 2011; Alderman et al., 2012; Kazianga et al., 2012; WFP, 2013). The SFPs in SA have three objectives, namely, (1) to provide daily nutritious meals to enhance learning capacity; (2) to promote healthy lifestyles through nutrition education; and (3) to support the development of food gardens in schools from which they obtain fresh produce (vegetables/ fruit) to supplement the menu (Department of Basic Education, 2015). Although the SFPs have these objectives, to date, there is little empirical evidence on the link between school feeding and local food production and the potentially related benefits to the local economy and the income of communities (Masset and Gelli, 2013; WFP, 2013). Based on the above facts, it is crucial to ensure that all the objectives of the SFPs are achieved and benefit the wider local communities.

School feeding programmes are not used to promote nutrition knowledge in schools hence most South African school children lack nutrition knowledge. According to Jomaa et al. (2011), the problem with SFP studies in developing countries published to date is that they lack an in-depth investigation of whether children are receiving culturally and developmentally appropriate nutrition education lessons to complement the nutritious foods and snacks being offered on a regular school day. Therefore, there is a need to link the meals served at schools with appropriate nutrition education lessons thereby contributing to the promotion of healthy lifestyles. Learners should be able to link the theory on healthy food choices to the food they eat in the SFPs.

This study sought to fill these gaps through reviewing and describing the school feeding programme as an intervention to alleviate hunger and its potential to contribute to rural development in some rural communities in Blouberg Local Municipality, South Africa.

1.3 Research Objectives and Questions

The main objective of this study was to assess ways in which the school feeding programme could contribute to rural development in Blouberg Local Municipality, South Africa. In order to address this broad objective, the following specific objectives and related research questions were formulated as presented in Table 1.1 below.

Table 1.1 Specific objectives of the study and related research questions

Main research question	Objective	Research questions
1. What is the type of SFP implemented in the schools of Blouberg Local Municipality?	a) Describe the type of SFPs implemented in the schools	<ul style="list-style-type: none"> i. How is the SFPs implemented in the schools? ii. What kind of food is provided in the SFPs? iii. What is the degree of learners' satisfaction with the SFPs? iv. What are the benefits and challenges associated with SFPs?
2. How do learners and community members participate in food production?	b) Describe the roles of learners and community members in food production.	<ul style="list-style-type: none"> i. How do learners participate in food production? ii. How do community members participate in food production?
3. What level of nutrition knowledge do the learners have?	c) Establish the nutrition knowledge of the learners.	<ul style="list-style-type: none"> i. What is the learners' level of nutrition knowledge? ii. How do the learners acquire nutrition knowledge? iii. How can the SFP be used to complement the learners' nutrition knowledge?
4. How can SFPs facilitate development of the rural communities?	d) Propose ways in which the SFP can facilitate the development of the rural communities.	<ul style="list-style-type: none"> i. What development activities are implemented in the communities? ii. How can the SFPs facilitate development in the rural communities?
5. How can school and community food gardens promote local food production?	e) Develop a framework that could be used to encourage local food production activities through school and community food gardens.	<ul style="list-style-type: none"> i. How can the SFPs be used to empower community members? ii. What food production activities are the schools and communities engaged in and how do they contribute to the SFPs?

SFPs = School feeding programmes

1.4 Research Hypotheses

The following null hypotheses (H_0) relating to ways in which SFPs implemented in Blouberg Local municipality (BLM) could contribute to rural development were tested:

- a. The provision of school meals to learners does not alleviate hunger during the school day;
- b. The views of learners, government officials, educators and community members on the benefits of SFPs differ;
- c. The degree of satisfaction of children with the quality of school feeding programme does not depend on the degree of understanding of children on the potential benefits of eating a variety of food types;
- d. The degree of satisfaction of children with the quality of school feeding programme does not depend on the degree of understanding of children on the harmful nature of eating too much fatty food;
- e. The degree of satisfaction of children with the quality of school feeding programme does not depend on the degree of understanding of children on the harmful nature of eating too much sugary food;
- f. The degree of satisfaction of children with the quality of school feeding programme does not depend on the degree of understanding of children on the harmful nature of eating too much sweet food; and
- g. School feeding programmes do not contribute to the development of rural communities.

1.5 Operational Definitions of Key Terms and Concepts

The definitions of key terms and concepts are explained in the context of the research study conducted. Bundy et al. (2009) and WFP (2013) define school feeding as “the provision of food to school children”. The food could be cooked meals or pre-packed snacks given to learners in school. For the purpose of this study, school feeding refers to the provision of food to school children. The food comes in the form of cooked meals that are prepared and served at school premises. The school feeding programme (SFP)

in South Africa is called the National School Nutrition Programme (NSNP), therefore, for the purpose of this study; NSNP will be used for the South African context and SFP will be used for non-South African context.

Rural development is about enabling rural people to take control of their destiny, thereby dealing effectively with rural poverty through the optimal use and management of natural resources (Republic of South Africa, 2009). The Comprehensive Rural Development Programme (CRDP) framework of South Africa (SA) mentioned that an effective response against poverty and food insecurity is through maximising the use and management of natural resources to create vibrant, equitable and sustainable rural communities. This could be achieved through the redistribution of 30 % of the country's agricultural land; improving food security and alleviating poverty of the rural poor; and job creation (Republic of South Africa, 2009; National Planning Commission, 2011). For the purpose of this study, rural development is the process of improving the quality of life and economic well-being of people living in relatively isolated and sparsely populated rural areas.

Hunger is a feeling of discomfort or weakness in the stomach that is caused by lack of food, coupled with the desire to eat. Prolonged hunger can lead to undernourishment. This definition applies to this study.

Undernourishment is a state, lasting for at least one year, of inability to acquire enough food, defined as a level of food intake insufficient to meet dietary energy requirements (FAO et al., 2014).

Nutrition knowledge, broadly defined, refers to knowledge of concepts and processes related to nutrition and health including knowledge of diet and health, diet and disease, foods representing major sources of nutrients, and dietary guidelines and recommendations (McKinnon et al., 2014). This broad definition of nutrition knowledge is needed to capture the complex and wide-ranging nature of the information used to inform dietary choice. For the purpose of this study, nutrition knowledge refers to (1) the knowledge of the different food groups, types of food and the nutrients they contain; (2)

knowledge of healthy food choices; and (3) an awareness of the relationship between diet and disease.

Nutrition education is any combination of educational strategies, for example, information and activities, designed to help individuals, families, and communities to make informed choices about food and other food- and nutrition-related behaviours conducive to health and well-being (McNulty, 2013). Nutrition education is not just learning about foods and nutrients, but learning what to do and how to act to improve nutrition. The ultimate goal of nutrition education is behaviour change. In this study, nutrition education refers to information shared and activities done to create awareness of healthy food choices and eating habits.

Home-grown school feeding (HGSF) refers to SFPs relying on food that is locally produced and/or bought (WFP, 2013). For the purpose of this study, the above definition was adopted and, in this case, the food will be bought within South Africa, and mainly from small-scale farmers residing in Limpopo Province.

A learner is a person who is learning a subject or skill. In this study, learners refer to primary school children. Therefore, the terms learners and school children are used interchangeably in this study.

Local may be used to refer to within the boundary of a village or area surrounding a single school, or to within the national boundary of the country within which the same school is situated (Sumberg and Sabates-Wheeler, 2011). In this study the term 'local' refers to within the boundary of a village, including nearFpby villages surrounding schools.

1.6 Organisation of the Thesis

This thesis is made up of seven chapters. Chapter 1 introduces the study and provides the background and justification of the study. It also includes the statement of the research problem, research objectives and related questions, hypotheses and the

operational definition of key terms and concepts. In Chapter 2, a critical review of literature around SFPs is presented. The review starts by explaining what school feeding is and then gives international as well as South African perspectives on school feeding. The benefits of school feeding, as well as its potential contribution to rural development and nutrition education, are discussed.

Chapter 3 is devoted to research methodology that explains the steps followed to carry out the research study. It presents the description of the research area, research design, preparation for fieldwork, study population, sampling procedures, data collection methods and techniques, ethical considerations and data analysis methods and techniques. The results and discussions on the type of SFPs implemented in primary schools of Blouberg Local Municipality and their benefits are presented in Chapter 4.

Chapter 5 presents the results and discussions of the nutrition knowledge of the learners. In Chapter 6, the ways in which SFPs can facilitate the development of the rural communities are presented. Finally, Chapter 7, which is the final chapter of the thesis, synthesises the findings of the entire study, presents the conclusions drawn based on the results of the study and the recommendations for (1) rural development practice and policy; and (2) further research. All the literature sources cited in the thesis are presented in the list of references and selected key appendices are included at the end of the thesis.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Many countries provide food to their school children through the school feeding programmes (SFPs) to alleviate short-term hunger and encourage learners to attend school. According to FAO et al. (2015a), more than 100 countries have implemented conditional or unconditional cash transfer programmes that focus on promoting food security and nutrition, health and education, particularly for children. Bundy et al. (2009) and WFP (2013) define school feeding as “the provision of food to school children”. School feeding programmes (SFPs) are sometimes referred to as Food for Education (FEEs) (Alderman et al., 2012; Kazianga et al., 2012). There are different types of SFPs implemented by various countries. School feeding programmes can be classified into two main groups: (1) in-school feeding, where children are fed at school; and (2) take-home rations, where families are given food if their children attend school (Bundy et al., 2009; WFP, 2013; Yendaw and Dayour, 2015; Drake et al., 2016). These authors further indicated that in-school feeding has two categories: (1) programmes that provide meals, and (2) programmes that provide pre-packaged high-energy biscuits or snacks. According to Bundy et al. (2009) and Drake et al. (2016), some countries combine in-school meals with take-home rations for particularly vulnerable students, including girls and children affected by HIV. The purpose is to generate greater impacts on school enrolment and retention rates and reduce gender or social gaps (Bundy et al., 2009; Drake et al., 2016).

This chapter reviews the literature around the implementation of SFPs in South Africa with lessons drawn from other countries to give a broader understanding of the programme implementation. The discussion will include the benefits and challenges associated with SFPs, how SFPs can be used to (1) promote nutrition education and thereby improve the nutrition knowledge of learners, (2) encourage local food production and (3) facilitate the development of rural communities. The chapter concludes with a summary, highlighting the major issues from the literature.

2.2 Food Provision in South African Schools

In South Africa, school children are provided with one cooked meal served at 10:00 in the morning. The provision of food at South African schools was mainly to alleviate poverty, to uphold the rights of children to basic food and to contribute to learning (Department of Basic Education, 2015). As already indicated in chapter 1, the SFP in South Africa is called the National School Nutrition Programme (NSNP). The NSNP has provided daily nutritious meals to an average of 9,630,590 learners (primary, secondary and identified special schools) nationally, for the 2015/16 financial year (Department of Basic Education, 2016). In Limpopo Province, the NSNP reached 1,536,449 learners during the 2013/ 14 financial year (Department of Basic Education, 2015). Globally, the SFPs reached approximately 368 million children and about one out of every five, receive a meal at school every day (Drake et al., 2016). The magnitude with which the SFPs are implemented around the world is a clear indication of the significant role the programme plays in alleviating hunger among school children, keeping them in school and enhancing learning. Hochfeld et al. (2016) argued that SFPs assist children; especially those from impoverished background because they attract them to attend school regularly, address nutritional deficits and improve children's performance in class. Therefore, attending school is the only way that the children can access the nutritious meals served at school. Sumberg and Sabates-Wheeler (2011) highlighted that the primary role played by SFPs is to overcome food and nutrition insecurity because by providing food, these two important challenges are addressed.

Although the NSNP reaches a large number of school children, it does not include all children because it uses a certain inclusion criteria which is children in quintile 1 – 3 no fee-paying primary and secondary schools as well as identified special schools (Department of Basic Education, 2015). Unlike South Africa, Namibia, Kenya and Mali that has limited coverage, SFPs in Brazil (Wittman and Blesh, 2017), India (Jayaraman and Simroth, 2015) and Botswana (Republic of Botswana, 2014) have universal coverage where all school children receive school meals. The issue of coverage for SFPs is a serious concern because countries faced with high levels of poverty and hunger do not have the necessary resources to cover all the needy populations hence,

they use specific criteria to include or exclude certain members of their population. This is supported by the fact that coverage continues to be the lowest where the need is the greatest in terms of hunger, poverty and poor social indicators (WFP, 2013). In high- and upper-middle-income countries, generally, all children have access to food through schools, and the most vulnerable children typically are entitled to subsidised or free meals (WFP, 2013). Despite the challenges of coverage for the SFPs, many countries are concerned about the food and nutrition security as well as the educational outcomes of the school children. The next section discusses the various reasons of implementing SFPs.

2.3 Why Implement School Feeding?

School feeding programmes (SFPs) are more than just giving food to school children. They bring a number of benefits that could be seen as investing in children who are the future leaders. The provision of food to school children helps to alleviate short-term hunger, but Bundy et al. (2009) added that other objectives include increasing attention span, facilitating learning and preventing the need for children to leave the school to find food. Furthermore, in cases where fortified foods are provided, this would also alleviate micronutrient deficiencies and improve learning. Bundy et al. (2009) mentioned that there are three main reasons why countries may choose to implement SFPs: (1) to address social needs and to provide a social safety net during crises (alleviate short-term hunger); (2) to improve learning and educational outcomes and (3) to enhance nutrition.

School feeding offers an excellent opportunity for targeted intervention for school-age children, both as a means for enhancing nutrition and improving school attendance and educational outcomes (Buhl, 2012). This is in agreement with the benefits mentioned by Uduku (2011), namely, reducing hunger and malnutrition and contributing to educational achievements. Buttenheim et al. (2011) also concurred that the goals for providing school meals were to alleviate short-term hunger, improve education (i.e. improved enrolment, attendance, concentration and cognitive functioning leading to better learning and achievement) and nutrition (i.e. to improve children's nutritional

status by providing them with additional nutrient-rich foods) of school children. The above reasons or goals are similar to those mentioned by Bundy et al. (2009). Although the section above stresses the nutritional and educational benefits of the SFPs, Sumberg and Sabates-Wheeler (2011), Lawson (2012) and WFP (2016b) also mentioned these benefits but added that SFPs have the potential to stimulate local food production (especially if locally produced foods are used), ensure food security and reduce poverty thereby creating economic opportunities in rural communities. The latter is in line with the conceptual framework of this study, which emphasises that the SFPs could benefit learners and their communities and thereby contribute to the development of rural communities. This could happen if communities are allowed to produce food locally and supply to the schools. The WFP (2013) mentioned that there is less empirical evidence on the link between school feeding and local agricultural production and its potentially related benefits to the local economy and the incomes of farmers. SFPs also respond to goal 2 of the Sustainable Development Goals, namely, “to end hunger, achieve food security and improved nutrition and promote sustainable agriculture” (United Nations, 2015b). The next section will discuss the benefits of school feeding in detail. Due to the focus of this study, the conceptual framework excluded the educational and nutritional benefits of SFPs, but these benefits will be discussed in the next section as they are also important.

2.3.1 School feeding as a safety net

Drake et al (2016) mentioned that SFPs are gaining increasing recognition because of their dual role as a long-term social protection investment and as a productive safety net for children and their families in the short-term. Bundy et al. (2009) and Drake et al. (2016) reported that SFPs are most frequently viewed in most countries as primarily a social protection measure, with the primary sectoral outcome of eliminating hunger and improving education. According to the WFP (2016b), SFPs help to break the intergenerational cycle of hunger and poverty that affects most vulnerable areas in the world by helping children to become healthy and productive adults. Therefore, SFPs play a crucial role in shaping the future of the world’s children, more especially those who rely on the school meals. In the short-term, SFPs are an immediate response to

social shocks and provide food to those affected. According to the WFP (2013), SFPs have an important role to play in the event of an emergency (e.g. floods), a social shock or conflict because they can increase access to food, reduce hunger and maintain children's access to education by preventing children from dropping out of school. In other words, certain countries have implemented the SFPs as a potential safety net to respond to the social shocks of the global food, fuel, and financial crises, natural disasters, wars and political conflicts. School feeding programmes are also used as a social support measure to keep children in school because, without attending school, they would not get the food.

School feeding programmes are important social safety nets that provide food to school children and alleviate hunger (Sumberg and Sabates-Wheeler, 2011; Hochfeld et al., 2016; Chabite et al., 2018). In order to be effective, safety net programmes (including SFPs) must reach the poor because they are the most affected by hunger. However, SFPs face challenges in reaching the poorest wherever enrolment is less than universal because enrolment rates are always lowest among the neediest as is the case in rural Mali where fewer than half the children attend school (Bundy et al., 2009). This simply means that most of the poorest children in rural Mali are excluded from accessing SFPs. The situation would be different in countries where enrolment is effectively universal and with the chances of children not being in school not a concern. Therefore, school feeding plays a crucial role in assisting poor families and feeding hungry children during times of need.

2.3.2 The educational benefits of school feeding

School feeding is an important intervention to attract children to school and augment their learning. According to Krishnaratne et al. (2013), SFPs improved children's educational outcomes by addressing hunger and nutrition and by increasing school attendance. Various studies reported the positive effects of school feeding on improving school enrolment, attendance and reducing dropout rates (Jomaa et al., 2011; Alderman et al., 2012; Hochfeld et al., 2016; Chabite et al., 2018). School feeding programmes can also improve school enrolments and attendance by girls in countries

where gender disparities are still a problem. In Burkina Faso, school meals and take-home rations increased new school enrolment of girls by about 5 to 6 % (Kazianga et al., 2009; Alderman and Bundy, 2011). Kenya also noted an increased primary school enrolment rate for boys and girls from 77 % in 2002 to 92 % in 2007 (Buhl, 2012). Kazianga et al. (2012) reported that the SFPs implemented in northern rural Burkina Faso increased school enrolment for boys and girls by 5 % and 4 % respectively. Large increases in primary school enrolments have been reported in India's midday meal scheme (Jayaraman and Simroth, 2015). Although school meals increased school enrolments in rural Burkina Faso, absenteeism levels increased especially for children coming from households that rely on child labour and use it to complement adult labour (Kazianga et al., 2009). Therefore, children involved in child labour were at risk of not completely benefitting from school meals because they missed school at certain times.

Improved attendance has been reported in a study conducted by Kristjansson et al. (2007) who argued that this was not just because of a free meal but was also due to improved immune functioning leading to reduced illness and the effects of improved concentration that made schooling more enjoyable. Therefore, the above argument brings about the important link between food, nutrition and education. The SFP in Angola increased attendance from 88 % in 2007 to 94 % in 2008 (Buhl, 2012). School attendance increased for learners (especially girls) who were benefitting from both school meals and take-home rations, and this caused a shift away from on-farm labour and off-farm productive tasks which may be incompatible with school hours (Kazianga et al., 2012). The provision of school meals and take-home rations was an incentive for the learners to attend school frequently because they could access the extra food (take-home rations) if they attended school for a specific number of days per month. According to Kazianga, et al. (2012), FFEs can improve cognitive functions and academic performance by reducing absenteeism and increasing attention and concentration due to improved nutritional status and a reduction of short-term hunger. Although there was no significant impact on educational performances for learners in rural Burkina Faso (Kazianga et al., 2009), the scores on mathematics improved for girls in both school meals and take-home rations (Kazianga et al., 2012). The provision of meals at school can motivate parents to enrol their children in school and have them

attend regularly. When absenteeism is reduced and the duration of schooling is increased, educational outcomes (performance, dropout, and repetition) improve (Integrated Nutrition Programme, 2002). Therefore, SFPs serve as an incentive for children to attend school on a daily basis so that they can receive a meal.

Once the children are in school, SFPs can contribute to their learning by reducing hunger and increasing attention during the school day (Bundy et al., 2009), and improving their nutritional status and their cognitive abilities (WFP, 2013; 2016b; Hochfeld et al., 2016). The improvement of nutritional status and cognitive abilities depends on the quality of the food and the availability of crucial micronutrients in the food needed by the children for development and learning. Short-term hunger, which is common in children who do not eat before going to school, results in difficulty to concentrate and perform complex tasks. The SFP alleviates short-term hunger and improves children's cognitive functioning and attention span (Bundy et al., 2009; Buttenheim et al., 2011). The Public Service Commission (2008) reported the significant impact made by the SFP in two of the poorest provinces in South Africa in terms of improving school attendance and participation, concentration levels, and educational attainment. Hochfeld et al. (2016) reported similar educational outcomes such as increased school attendance, concentration and participation that were attributed to the NSNP together with a private breakfast programme introduced in some schools in Alexandra, South Africa.

Jomaa et al. (2011) argued that the positive impact of school feeding on growth, cognition and academic achievement of school-aged children participating in the SFPs compared to children who were not participating in the programme, were less conclusive. This contradicts the results reported by the WFP (2013) in a study conducted in Guyana whereby the community-based SFP yielded a significant positive impact on academic performance, classroom behaviour and nutritional status of school children, especially for the poorest. The mathematics and English test scores for school children participating in the SFP increased when compared to those of school children attending schools that did not have feeding programmes. Krishnaratne et al. (2013) mentioned that SFPs have small, but significant effects on learning outcomes. Although

SFPs offer educational benefits, they could only contribute if other important aspects that have an impact on learning were in place, for example, the availability of good quality teachers, suitable textbooks, an appropriate curriculum and an environment conducive to learning that would assist learners to improve their learning outcomes. Alderman and Bundy (2011) stated that SFPs or FFE programmes may be an important element in achieving an effective educational system. Based on the above discussion, it is clear that school feeding plays a critical role in getting and keeping children in schools, but there is still some controversy on whether school feeding can improve children's growth, cognitive abilities, and academic achievement.

2.3.3 The nutritional benefits of school feeding

Poor nutritional status have detrimental effects on the growth, development and future potential of many school children. Prominent inequity in access to nutrition exist between rural and urban populations with 26.5% of South African children in rural areas being stunted compared to 16.7% in urban areas (Labadarios et al., 2000). Children in the rural areas are highly affected and this could be attributed to their diet that lacks variety. Maunder et al. (2015) mentioned that one in every ten children in South Africa is underweight, one in every five children is stunted, and deficiencies in micronutrients such as vitamin A, iron and zinc are common. Poor nutritional status in South African children is a cause for concern that calls for urgent attention. Stunting or underweight and micronutrient deficiencies can be clearly linked to poverty in South Africa (Voster, 2010). Children who lack certain nutrients in their diet, particularly iron and iodine, or who suffer from protein-energy malnutrition, hunger, parasitic infections or other diseases, are likely to have less potential for learning compared to healthy and well-nourished children (Public Service Commission, 2008; WFP, 2013). The reason for this is that children who attend school with empty stomachs have more difficulty in concentrating and performing complex tasks, even if otherwise well nourished.

Nutrition and health have major influences on a child's overall growth and can affect learning ability in school. Although SFPs are promoted for increasing educational achievement, they can also play a vital role in promoting good nutrition among school

children. In certain instances, school meals are often the only regular and nutritious meals a child may receive. Without school meals, such a child would be hungry and lack important micronutrients and this will affect the child's growth and development negatively. Sumberg and Sabates-Wheeler (2011) clearly put it that the crucial role of SFPs is to first overcome food and nutritional deficiencies. School feeding programmes were established in many countries of Africa to develop optimal feeding strategies and improve the nutritional status of children (Chabite et al., 2018). In South Africa, the NSNP addresses the link between nutrition and education (Hochfeld et al., 2016). Nutritious school meals that include fresh foods can reduce hunger and micronutrient deficiencies and, when combined with deworming and micronutrient fortification, the nutritional benefits are multiplied (WFP, 2016b). According to Kazianga et al. (2012), FFEs can improve the nutritional status of school-age children over time and alleviate short-term hunger in malnourished or otherwise well-nourished children. Therefore, the benefits can be shared among all children, irrespective of their nutritional status. Alderman and Bundy (2011) state that school meals have the potential to be a vehicle for improving the nutritional status of children if the meals or rations are fortified or if they contribute to an increase of diet diversity. Buttenheim et al. (2011) reported that SFPs implemented in Burkina Faso and Uganda reduced the prevalence of anaemia among 10-13-year-old girls. Take home rations given to learners increased weight-for-age and weight-for-height of their siblings aged between one and five years (Kazianga et al., 2009).

According to Kristjansson et al. (2007), SFPs can have a significant impact on the growth of school-age children, but the effect is small and probably cannot reverse the consequences of earlier malnutrition. A study by Hochfeld et al. (2016) reported that 18.5 % South African school children were stunted and 27.6 % were overweight but there were statistically significant improvements in the nutritional status of the children after they received meals from the NSNP and a private breakfast programme. There was a 4.7 % reduction in severe stunting levels, 3.1 % for overweight and 4.3 % for severely overweight (Hochfeld et al., 2016). Although the positive nutritional changes could not be attributed to either the NSNP or the private school breakfast, it is clear that the two influenced these changes. In order for SFPs to offer important nutritional

benefits, they should include complementary programmes such as deworming, micronutrient supplementation and fortification and should seek to complement and not compete with nutrition programmes for younger children, which remain a clear priority for targeting malnutrition (Bundy et al., 2009; WFP, 2014). It is clear from the above discussion that the SFPs come with some benefits that may greatly contribute to children's growth and development.

The most cost-effective nutrition interventions are those that target the first 24 months of life, which is the most critical period for growth and development (Bundy et al., 2009; WFP, 2013). Therefore, investing in nutrition during the early stages of life has profound consequences for subsequent development. Any nutritional deficits that could not be addressed during the first two years of life may have long-term negative consequences. Providing food for school-age children cannot reverse the damage of early nutritional deficits, but can help to ensure that early development gains are not jeopardised by later failures.

2.4 School Feeding Programmes and Local Agriculture

Food production is crucial to ensure food and nutrition security. More than 90 % of the 570 million farms worldwide are managed by an individual or a family relying predominantly on family labour and producing more than 80 % of the world's food in terms of value (FAO et al., 2015a). FAO et al. (2015a) mentioned that globally, 84 % of family farms are smaller than 2 hectares and tend to have higher yields than large farms. Although many family farms operate on smaller pieces of land, they still produce more food. It is clear that family farmers play a crucial role of ensuring food security; hence this study assesses the potential of the SFPs in alleviating hunger and contributing to rural development by mainly emphasising local food production and supply to the schools by rural community members. Increased productivity in small family farms contributes to more inclusive growth by reducing the prices of staple foods and improving access to food (FAO et al., 2015a). If family farmers were connected to well-functioning rural labour markets such as SFPs, their productivity growth will increase the demand for labour in rural areas, generate jobs for the poor, and raise the

unskilled labour wage rate (FAO et al., 2015a). Therefore, small family farmers or smallholder farmers play a crucial role in contributing to food security and, if given the necessary support, they could change the unfavourable living conditions of poverty and food insecurity in rural communities.

Traditionally, food used in the SFPs came from foreign aid, but recently, even the WFP, which takes the lead in providing food aid to many developing countries, is also encouraging the procurement and use of locally produced food in the school feeding programmes (Sumberg and Sabates-Wheeler, 2011; Lawson, 2012; WFP, 2013; Chabite et al., 2018). The use of food assistance was also highlighted as one of the challenges facing the SFP in SA as it is an expensive and ineffective strategy for solving the problems of malnutrition (Public Service Commission, 2008). Therefore, sourcing food locally for SFPs is a better and more beneficial option for communities and countries like SA. In order to boost local agriculture, and maximise the poverty and hunger-reducing impact of SFPs, some countries made a linkage between school feeding and local food production. This is known as Home-Grown School Feeding (HGFS) whereby the food used in school meals is bought locally from local family farmers or smallholder farmers. According to WFP (2016b), SFPs become more sustainable when linked to small-scale farmers because they support rural economies. Chabite et al. (2018) supports the potential of HGFS to link the increased demands for school feeding goods and services to community-based stakeholders, including smallholder farmers and women's groups. Sumberg and Sabates-Wheeler (2011) mentioned that HGFS can transform the agricultural sector and livelihoods of smallholder farmers in Sub-Saharan Africa for the better through greater engagement with markets. Furthermore, HGFS improves the livelihoods of smallholder farmers and strengthens local food systems (WFP, 2017a; Chabite et al., 2018). Therefore, SFPs address food security and educational challenges of those affected and facilitate social and economic relations between the local farmers as producers and schools as consumers.

Using HGFS presents several benefits for communities. For example, in Brazil, the family farmers, who are small-scale landholdings using primarily family labour to

cultivate for domestic consumption, are supported by the government and 30 % of the SFP budget is legally directed to obtain food from the local family farmers (Sidaner et al., 2012; Sonnino et al., 2014; Wittman and Blesh, 2017). Linking SFPs to family farmers in Brazil resulted in several benefits for the family farmers, namely, increased access to markets, more reliable incomes and food security at the household and community levels (Wittman and Blesh, 2017). The use of HGSF was reported to benefit rural economies and potentially enhance the nutritional quality of the food (WFP, 2016a). Sidaner et al. (2012) reported that the regulation in Brazil improved access to healthier foods like fruits and vegetables by learners and strengthened family farming. Although the use of locally produced food is regulated by policies, the farmers encountered difficulties in terms of technical procedures, purchasing processes and supplying the required amounts of food (Sidaner et al., 2012). Wittman and Blesh (2017) argued that the contract process for supplying food to schools was burdensome for resource-poor family farmers and somehow excluded them because it required online submission of contracts, which was impossible for remote rural communities lacking internet and telephone services. Therefore, in order for the rural communities to benefit from this initiative, there should be support structures in place to enable them to participate optimally. South Africa could learn from Brazil, but it would be important to thoroughly examine what would work for the South African context before adopting any lesson. Sumberg and Sabates-Wheeler (2011) were also of the opinion that, if locally produced food is used in the SFPs, they can provide a regular market opportunity and a reliable source of income for smallholder or subsistence farmers. Several countries have adopted this concept and have reported successes despite the challenges encountered. According to Bundy et al. (2009) and Chabite et al. (2018), African governments welcomed the concept of HGSF and, as of 2003, included HGSF or locally sourced SFPs in the Comprehensive Africa Development Programme (CADP). A number of African countries were invited to implement the programme of HGSF. In Ghana, the GSFP was reported to have created jobs for the local communities, but there was limited evidence of the impact of providing a reliable market for smallholder farmers through the HGSF approach because the evidence was subjective rather than scientific and in Kenya, the local farmers benefited from the HGSF through increased incomes and capacity building (Drake et al., 2016).

Uduku (2011) is of the opinion that most of the literature does not look into the possibility of linking school feeding to local agricultural development. Sumberg and Sabates-Wheeler argued that there is a dearth of empirical evidence on the validity of HGSF proposition, but in their paper they proposed a theory of change linking SFPs as a social protection programme and agricultural growth for improved rural livelihoods in Sub-Saharan Africa. When SFPs can involve the local communities, the benefits of childhood nutrition may be multiplied, for example, by providing healthy eating and linking up with community farm projects (Uduku, 2011). Therefore, SFPs could be positioned as a platform from which nutrition education, health and agricultural interventions can flow. School feeding programmes that are successful in middle-income and high-income countries rely on HGSF or local procurement of supplies as compared to programmes in low-income countries that are dependent on external sources of food aid (Bundy et al., 2009; Masset and Gelli, 2013). If locally produced foods are used, the SFP will not only benefit the children involved but also local farmers, communities and the local economy. This clearly presents low-income countries with an opportunity to consider moving away from relying on external food aid to establishing and using locally produced food in the SFPs and exploring the opportunity of empowering communities to benefit from these programmes.

There is evidence already from two South African schools (in KwaZulu-Natal and Cape Town) where the NSNP was linked up with school farm programs (Uduku, 2011). In this context, some parents had plots in the schoolyard and sold the produce to the NSNP. The families could also use some of the produce to add to their food baskets while gaining profits from the sales. The results reported from the SA schools revealed that SFPs yielded broader benefits to the community when they were coupled with a school-farming programme (Uduku, 2011). Uduku (2011) concluded that integrating SFPs with local agricultural development such as vegetable production in SA, increased benefits for children and their families by improving the livelihoods of the whole community. Although Uduku (2011) reported on the use of plots in the school yard by community members for food production activities, there was no indication of the size of the plots, the amount of food produced or the sustainability of the food supply throughout the

school year and the number of parents involved in food production using plots at schools. This study proposes the establishment of community food gardens, in addition to the existing school gardens, for the purpose of benefiting the rural communities. Many studies looked at SFPs as a tool to achieve educational goals among school children, but these programmes could also be used as a tool for achieving many multi-sectoral benefits such as gender equality, food security, poverty reduction, nutrition and health, and agricultural development (Lawson, 2012). Therefore, the possibility of linking SFPs with local food production initiatives could not be overlooked, as this will contribute to the development of the rural households and communities through job creation, income generation and ensuring food security.

The National Planning Commission (2011) mentioned that, by 2030, South Africa's rural communities should have greater opportunities to participate fully in the economic, social and political life of the country. The vision of the National Development Plan (NDP) for 2030 is that of integrated rural areas where all residents will be economically active, have food security, access to basic services, health care, and quality education. In order for the rural communities to participate, they must be given opportunities and relevant information. Rural economies will be supported by agriculture and, where possible, by mining, tourism, agro-processing, and fisheries. The vision includes a better integration of the country's rural areas, achieved through successful land reform, job creation and poverty alleviation (National Planning Commission, 2011). The SFPs could contribute to the vision 2030 by stimulating agricultural productivity whereby food produced by rural communities could be sold to the SFPs, ensuring food security, creating jobs and thereby boosting the rural economy. In addition to alleviating short-term hunger, the Integrated Nutrition Programme (2002) states that school feeding can be used as a catalyst for development, that is, it can be used to improve educational outcomes, to a certain extent improve the nutritional status of children, increase community participation, promote local food production and consumption, create employment opportunities and reduce poverty. Wittman and Blesh (2017) shared the same sentiments as they reported that HGSP has emerged as an opportunity to address food security and rural development goals, thereby supporting sustainable rural development. Drake et al. (2016) supported the above view and stated that SFPs can

contribute to building food markets and the enabling systems around them by generating a structured and predictable demand for food products thus benefiting local farmers and promoting sustainable local economic development. Activities such as the promotion of school gardens and local agricultural development and the use of locally produced food in the school feeding programmes will contribute to the development of the communities in the sense that it will create markets for local farmers or food producers and therefore reduce poverty and hunger. One of the key pillars of the NSNP is to support the development of food gardens in schools from which they obtain fresh vegetables and fruits to supplement the menu. Although this is the case, it is important to note that not all schools would have the capacity to sustain food gardens in a manner to fulfill the above purpose (Laurie et al., 2017). This study proposes that communities start food gardens and supply food to the schools. This means that linking SFPs to local agriculture has direct economic benefits, can potentially benefit the entire community and thereby contribute to the development of rural communities.

2.5 School Feeding and Community Participation

FAO (1997) mentioned that school feeding programmes have a greater impact and can be sustained longer if they are tied to community activities, for example, school gardens provide an excellent opportunity for community involvement where water availability does not pose a constraint, and agricultural extension can support the programme by providing the necessary inputs and advice. In this way, the programme is not seen as just the responsibility of the educational authorities, but also the parents and the community at large. This is evident from Brazil's SFP where communities play an important role in the day-to-day implementation of the programme as well as in decision-making processes (Bundy et al., 2009; Sidaner et al., 2012; Wittman and Blesh, 2017). The Integrated Nutrition Programme (2002) shared the same sentiments and stated that schools with their communities behind them are more effective than schools with less community involvement. Drake et al. (2016) mentioned that the strongest and sustainable SFPs are those that respond to community needs, are locally owned and incorporate some form of parental or community contribution, whether cash payments or in kind such as through labour or food donations.

School feeding can also increase community involvement in schools, particularly where projects depend on the community to prepare and serve meals to children (Integrated Nutrition Programme, 2002). The involvement of communities is also emphasised in the South African NSNP where each province has contracted volunteer food handlers (VFHs) who are members of the communities and in some cases they are unemployed parents of learners within the community. The VFHs prepare and serve daily nutritious meals to learners on all school days and they receive a stipend on a monthly basis (Department of Basic Education, 2015). This is in agreement with the findings that Uduku (2011) reported from two South African schools that formed part of a research study to look at schools as potential development hubs to integrate community development with outreach activities. There are various ways of involving the community in the SFP. For example, in the Eastern Cape Province, the members of the School Governing Bodies (SGBs) work together with the NSNP team to ensure that food is procured and that schools have adequate cooking equipment and eating utensils (Department of Basic Education, 2015). In KwaZulu-Natal, Local Women Cooperatives (LWC) have been contracted to supply foodstuff to schools and in the North West Province, schools buy food from local supermarkets and engage local community members to transport food from the supermarkets to the schools (Department of Basic Education, 2015). School gardens also provide an excellent opportunity for community involvement as parents or any other community member can volunteer to look after the school gardens. Uduku (2011) also reported that parents who produced food in the school gardens sold the foods to the schools and they, together with other community members, were involved in preparing and serving meals for the SFP. Laurie et al. (2017) mentioned that 36 % of parents and 33 % other community members were involved in garden activities at selected primary schools in South Africa.

Examples of community involvement and participation in several countries differ; some have a higher level of community participation than others. For example, in Ghana, the School Implementation Committee (SIC) (consisting of the PTA representative, the head teacher, one member of the school management committee, one traditional ruler from the community, an assembly member and a boy and girl school prefect) liaise with

the district authorities to develop a locally-driven menu to provide nutritionally adequate meals (Drake et al., 2016). Furthermore, Drake et al. (2016) mentioned that coordination and community participation supported by strong policy is essential for the SFPs to be successful. Although the community members are involved in SFPs, their roles must be clearly defined from the outset and they should get training and support so that they can participate and contribute to the success of the programme.

2.6 School Feeding and Nutrition Education

Nutrition education involves teaching about the importance of nutrition, providing educational materials that reinforce messages about healthy eating, teaching skills essential for making dietary changes, and providing information on how to sustain behaviour change. According to FAO (1997), schools provide a special medium for nutrition education and for interventions to improve children's health and nutritional status. By teaching nutrition education, school children will acquire nutrition knowledge, develop desirable eating habits and be encouraged to make healthy food choices. Nutrition education provides people with information on the nutritional value of foods, food quality, and safety, methods of preservation, processing, and handling, food preparation and eating to help them make the best choice of foods for an adequate diet (FAO, 1997). School feeding can be used to reinforce the consumption of nutritious food. Hochfeld et al. (2016) mentioned that the NSNP together with a private breakfast programme increased the learners' knowledge of healthy foods. If micronutrient-rich foods are included in the school feeding menus, this will contribute to the improvement of the nutritional status of school children. Children can also help change the eating habits of their families by demanding desirable food and when they themselves become parents in the future, they can impart good dietary habits to their children.

FAO (1997) emphasised that nutrition education programmes in schools should be linked with practical food- and nutrition-related activities such as SFPs and gardening. The provision of information is not, in itself, a sufficient objective to improve nutrition, but a supportive environment that links theoretical knowledge with practical activities will result in the most effective nutrition knowledge acquired by learners. Successful

nutrition education goes beyond the simple accumulation of knowledge, towards positive action (FAO, 1997; 2011), for example, growing and eating dark-green, orange and yellow fruits and vegetables to protect the body from infectious diseases. One of the NSNP's objectives is to promote healthy lifestyles through nutrition education and it became evident that school gardens are useful as learning tools for both gardening and healthy eating (Laurie et al., 2017). The integration of school gardens into nutrition education will raise awareness and increase knowledge of fruits and vegetables, their role in the human body and ultimately their consumption. Effective nutrition education programmes must, therefore, be planned and executed to motivate beneficiaries to develop skills and confidence for the adoption of positive and lasting practices (FAO, 1997). According to the United Nations (2014), overweight and obesity levels are increasing and it has been reported that school children consume unhealthy foods and lack the knowledge of healthy eating habits and lifestyle choices. Therefore, countries are facing a double burden of ensuring that populations get enough food to eat, that they have the necessary knowledge to make healthy food choices and are in a position to eat nutritious food. School feeding is one of the important methods of positively addressing these complex issues.

There is consensus that tobacco and alcohol use, physical inactivity, and an unhealthy diet are the four key risk behaviours for non-communicable diseases (NCDs) and these risk factors are on the rise among young Africans due in part to globalisation, urbanisation, and socio-economic development (World Health Organization, 2009; Population Reference Bureau, 2015). Diet is now the number one risk factor for the global burden of disease (IFPRI, 2016). The Population Reference Bureau (2015) reported that Sub-Saharan Africa is undergoing a nutrition transition characterised by more sedentary lifestyles and high-calorie diets filled with highly processed foods that are low in fruits and vegetables, and high in saturated fat, sodium and sugar. These shifts in physical exercises and diet will lead to a rise in NCDs and affect the lives of individuals, communities and populations negatively. Thow et al. (2015) concurs and mentioned that the nutrition transition in Southern African development Community (SADC) countries is characterised by a diet that includes increasing intakes of processed snack foods and soft drinks, which contain dietary calories but few other

nutrients and these foods can displace nutrient-dense foods from the diet. Therefore, nutrition education that will impart knowledge and skills of applying this knowledge, is increasingly important to combat the effect of an unhealthy diet for the benefit of individuals, families and countries.

The International Food Policy Research Institute (IFPRI, 2016) mentioned that nutrition is central to the Sustainable Development Goals (SDGs) because improved nutrition is the platform for progress in health, education, employment, female empowerment, and poverty and inequality reduction. In turn, poverty and inequality, water, sanitation and hygiene, education, food systems, climate change, social protection, and agriculture all have an important impact on nutrition outcomes (IFPRI, 2016). It is therefore important for everyone to be aware and knowledgeable of the importance of eating well and be able to adopt healthy food choices and eating habits for the promotion of good health. Several studies proved that nutrition education interventions can increase nutrition knowledge of people and translates to healthy eating habits. Some studies reported that people with more nutrition knowledge were more likely to make healthy food choices because they applied their basic nutrition knowledge (Read and Schlenker, 1993; Parmenter et al., 2000; Kolodinsky et al., 2007). Nani (2016) reported that nutrition knowledge was significantly related to dietary habits and nutrient intake of college students. According to Steyn (2010), there was sufficient evidence that school-based curriculum-based nutrition programmes significantly increased children's nutrition knowledge and improved their dietary behaviour. This is supported by Kupolati (2016) who reported that a nutrition education programme (and not a school-based nutrition curriculum) improved the mean nutrition knowledge and attitudes of learners. College students who took a nutrition course improved their nutrition knowledge and had a better diet quality (Nani, 2016). Primary school children received a nutrition education intervention that consisted of a card game and a nutrition curriculum for a period of nine weeks. They took a nutrition knowledge test before and after the intervention. The results showed that the nutrition knowledge scores of these school children increased, but their ability to identify healthier foods did not improve (Lakshman et al., 2010). A nutrition education programme was given to eight-year-old Malay school children for three weeks. They completed a knowledge, attitude and practice questionnaire before

and after receiving the nutrition education programme. A follow-up visit was done six months later and the results revealed that the nutrition education programme had a positive impact whereby better nutrition knowledge, attitude and healthy eating habits in children were seen (Ruzita et al., 2007). However, the nutrition knowledge and attitude scores were more apparent compared to the nutrition practices. A weekly afterschool nutrition intervention in a low-income middle school influenced the beverage choices of the students positively (Rodrigues, 2017). Therefore, nutrition knowledge can play a very important role in influencing eating habits.

2.7 Major Issues from Available Literature

The literature reviewed indicated that many countries are implementing SFPs so that they can feed school children and keep them in class for the entire school day. In some countries, school children were also given take-home rations as an incentive for regular school attendance and they shared the food with their families. School feeding programmes offer various benefits to school children. Research on school feeding programmes is concerned with demonstrating their impact on alleviating hunger, improving education (i.e. increasing enrolments, improving attendance, concentration, and outcomes) and nutrition (Buttenheim et al., 2011; Alderman et al., 2012; Kazianga et al., 2012; Hochfeld et al., 2016), but the literature showed that there is more that SFPs can offer. The concept of Home-Grown School Feeding (HGFSF) or the use of locally produced food in the SFPs can be a vehicle for agricultural development (Sumberg and Sabates-Wheeler, 2011; Lawson, 2012; WFP, 2013, Chabite et al., 2018). Many countries are implementing HGFSF or have plans to link SFPs with local food production. Sumberg and Sabates-Wheeler (2011) mentioned that the rationale behind HGFSF was that it could provide a regular market opportunity and a reliable source of income for smallholder farmers. Despite this fact, Masset and Gelli (2013) reported that there is little empirical evidence to prove the link between school feeding and local food production and the potential related benefits to the local economy and the income of communities. This is the case with South Africa where two of the

objectives of the NSNP are to promote healthy lifestyles through nutrition education and to support the development of food gardens in schools from which they obtain fresh vegetables and fruits to supplement the menu, but in practice there is limited evidence to prove that; hence this study.

School feeding presents various opportunities that could benefit school children, their families, and communities, thereby contributing to rural development as proposed by the conceptual framework of this study. If local communities get support from the SFP policies and receive the necessary resources, information, advice, and training (skills development), they could produce and supply food to the SFPs, create jobs, generate income and boost the local economy. When the local economy grows, more jobs are created and more community members are employed. This enables them to access food for their families while participating in the growth of the local economy. Examples from Botswana, Brazil, Ghana, and Kenya demonstrated that SFPs could stimulate local agriculture, create jobs and improve the living conditions of the rural communities. The benefits of linking SFPs and family farmers in Brazil resulted in increased access to markets, more reliable incomes, and food security at the household and community levels (Wittman and Blesh, 2017). SFPs could also be used as a platform from which to teach nutrition education in schools because learners would be taught nutrition-related information in class and eat nutritious food at school. This could reinforce healthy food choices and eating habits that would be carried over to their adulthood. Therefore, SFPs could present many opportunities for the rural communities.

2.8 Conclusion

This chapter discussed the different types of SFPs (i.e. in-school meals and/or take-home rations) implemented in various countries, to provide food to school children. This assisted in describing the type of SFPs implemented in a number of countries, including SA. It became clear that SFPs in high- and upper-middle-income countries target all school children in the public schools and to some extent also provide subsidised or free meals (e.g. take-home rations) to vulnerable children, whereas those in middle- and low-income countries reach certain school children only. The various benefits

associated with SFPs were discussed to further strengthen their important role in the lives of school children. It became evident from the literature that the strongest and sustainable SFPs are those that receive support (good financial support; have strong policies and legal frameworks in place) and involve community members in their planning and implementation, such as in Brazil and India. Although SFPs are implemented in SA, the involvement of the communities is very minimal and does not influence the planning, decision-making and implementation of the programme.

Although there are benefits for linking SFPs with local food production or home-grown school feeding (HGFS), there is limited evidence to prove that this is the case in practice. Success stories from two South African schools in Cape Town and KwaZulu-Natal do not indicate the capacity of the plots that were used to produce food, the amount of food produced, whether the supply was enough throughout the year and the number of parents involved in food production. Although the NSNP in South Africa has the objectives of promoting nutrition education and food production through school gardens with the aim of supplementing the menu with fresh vegetables and fruits, there is limited scientific evidence to prove that this is the case in practice, especially in rural areas. The lack of financial support and dedicated gardeners for schools in South Africa render the objective of food production through school gardens in their current form, unsustainable to fulfill the envisaged goal. Many studies looked at SFPs as a tool to achieve educational goals for school children, but did not look into the possibility of linking SFPs with nutrition education and local food production to enhance rural development. This study envisaged to fill this gap. The next chapter will discuss the research methodology followed in this study.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This study was undertaken to assess the school feeding programme (SFP) and its potential contributions to rural development in Limpopo Province, South Africa (SA). This chapter describes the methods and procedures that were followed to investigate the research problem for this study. It starts by describing the study area, which is followed by the research design, population and sampling procedures, data collection and data analysis methods. The chapter concludes by discussing how ethical issues were adhered to throughout the study. This study applied both qualitative and quantitative research techniques.

3.2 Description of the Study Area

This study took place in Blouberg Local Municipality, which is situated within the Capricorn District of Limpopo Province in South Africa. According to the 2017 mid-year population estimates of SA, Limpopo Province was estimated to have a population of approximately 5,778,400, which is 10.2 % of the total SA population (Statistics South Africa, 2017b). The 2016 General Household Survey (GHS) reported that South Africa had approximately 14 million learners at school in 2016, and school attendance was almost universal at peak ages of 7–15 years. More than three-quarters (77.1 %) of learners who attended public schools in SA benefited from school feeding schemes in 2016 and learners in Limpopo Province (92.1 %) were the most likely to benefit (Statistics South Africa, 2017a).

The District Municipality consists of four local municipalities, namely, Blouberg, Lepelle-Nkumpi, Molemole, and Polokwane. Blouberg Local Municipality is characterised by rural areas and had a population size of 162,629 in 2011 (Blouberg Local Municipality, 2011). By 2017, the population size had increased to 172,601, making BLM the largest of four municipalities in the district and making up almost half of its geographical area (Blouberg Municipality, 2017). It is a category B municipality as determined in terms of

section 4 of the Local Government: Municipal Structures Act No 117 Of 1998 (Blouberg Municipality, 2017). Blouberg Local Municipality is situated approximately 95 km from Polokwane towards the far northern part of the Capricorn District Municipality. It is bordered by Polokwane on the south, Molemole and Mogalakwena on the southwest, Makhado on the northeast, Lephalale on the northwest, and Musina on the north. Blouberg Local Municipality is predominantly rural and is characterised by high poverty levels, illiteracy, and unemployment. The main economic sectors in the municipality are agriculture, mining, and tourism (Blouberg Municipality, 2017). Figures 3.1 and 3.2 are the maps indicating the study area.

3.3 Research Design

This cross-sectional study followed a mixed method approach. The mixed method approach was developed as an attempt to legitimise the use of multiple methodological strategies to answering research questions within a single study, and this is considered a more practical approach to research (Edmonds and Kennedy, 2013). The philosophical foundation of mixed methods research is pragmatism whereby the emphasis is on the research problem; and it uses all approaches available to understand the problem (Creswell and Creswell, 2018). Pragmatism is not committed to one way of enquiry such as qualitative or quantitative, but believes in drawing from both qualitative and quantitative methods to derive knowledge about a research problem. Pragmatism allows for the use of multiple methods, different worldviews, and different assumptions as well as different forms of data collection and analysis (Creswell and Creswell, 2018). This philosophy underpins mixed methods research, which according to Creswell (2003) entails collecting and analysing both qualitative and quantitative data in a single study. The study used a convergent design that involves the separate collection and analysis of qualitative and quantitative data in a single study (Creswell, 2015; Creswell and Creswell, 2018). The results were merged during the overall data interpretation. Different but complementary data on the same phenomena is collected and this method is used for the converging and subsequent interpretation of quantitative and qualitative data (Edmonds and Kennedy, 2013).

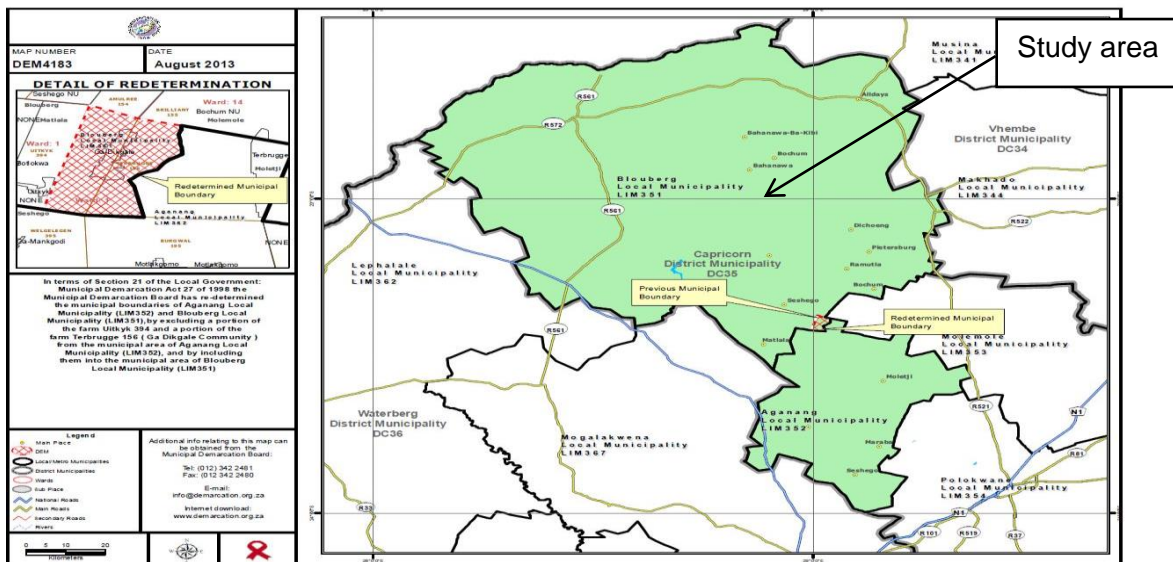


Figure 3.1 A map of Limpopo Province in South Africa showing the location of Blouberg Local Municipality (Municipal Demarcation Board, 2013)

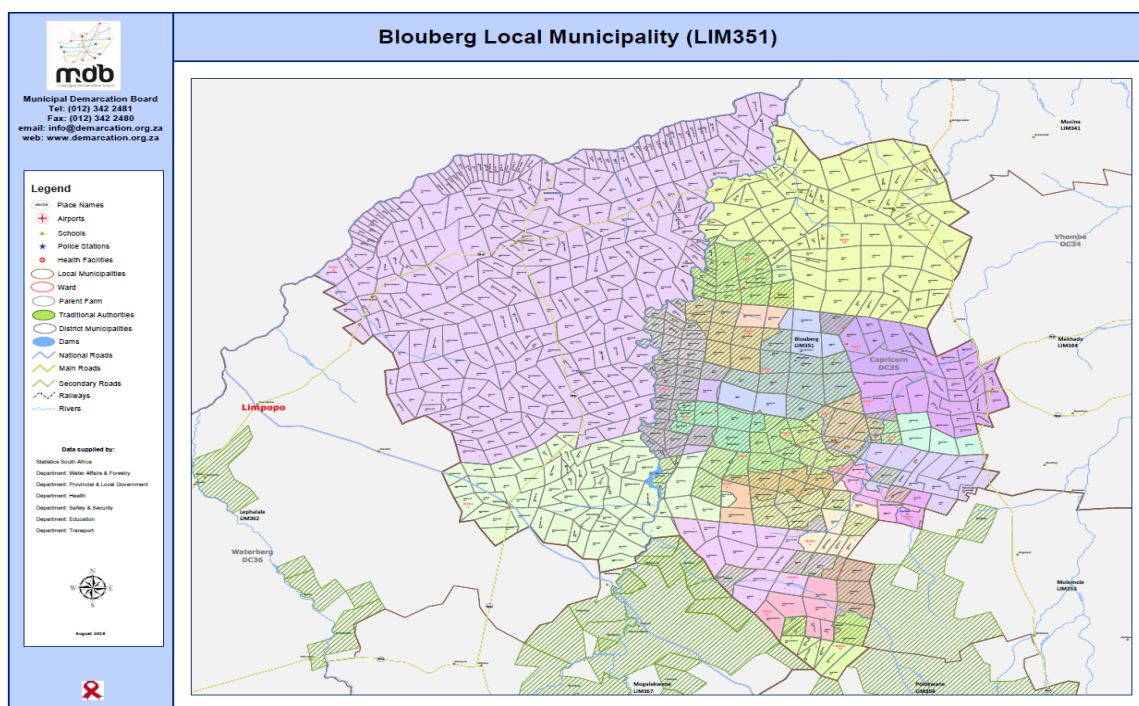


Figure 3.2 A map of Blouberg Local Municipality (Municipal Demarcation Board, 2016)

The rationale for choosing this design is based on the intention of this study which was to merge qualitative and quantitative results to provide a better understanding of the research problem. For example, the quantitative results regarding the level of satisfaction of the learners with the SFPs were compared with the qualitative results to either agree or contrast, thus providing a better understanding of the research problem. Creswell and Creswell (2018) mentioned that the merging of the results provides both a quantitative and a qualitative picture of the problem and that contributes to seeing the problem from multiple angles and perspectives. The interpretation of results is very crucial to this method because this is where the convergence of evidence occurs in which the results of both methods either support or contradict each other (Creswell, 2003; Hearn, 2010). Most of the literature on SFPs that this study consulted used quantitative research designs only and a few that collected both quantitative and qualitative data did not mention any of the mixed method designs used. This together with the nature of the research problem and the intention of the study prompted the use of the convergent design. Both qualitative and quantitative data was collected during a single visit to the study area, and this was less costly unlike if a sequential research design was used.

3.4 Preparation for Fieldwork

The University of Venda's Research Ethics Committee gave approval for the study (Appendix 3.1) prior to its commencement. Preliminary contact was made with the District office of the DBE in Polokwane to get permission for conducting the research study in schools. The District Office provided a permission letter (Appendix 3.2), a list of six circuit managers (responsible for all schools situated in BLM) and their details for contact purposes. Circuit managers were contacted telephonically and through e-mails to explain the purpose of the research and to request a formal meeting. The meeting took place at the DBE offices in Senwabarwana where five of the circuit managers are situated. One circuit manager was situated at Bahananwa circuit, which is very far from the offices at Senwabarwana. A meeting was held with each of the six circuit managers at a time when they indicated their availability. In all the meetings, the researcher explained the following: the purpose of the research, research ethics and adherence

thereof; data collection methods and how the results of the study will be compiled and shared. All circuit managers assisted with lists of schools in each circuit, contact numbers for the school principals and arranged a meeting with the National School Nutrition Programme (NSNP) Officers who provided information regarding SFPs in schools situated in BLM.

The school principals were contacted telephonically to provide the background information of the research study and to arrange for meetings. The meetings with school principals took place at different dates and different time slots as the schools are spread throughout the municipality; some schools were very far from each other. The principals then invited the NSNP educators to the meetings where the researcher explained the purpose of the research, research ethics, data collection methods and the ways in which the results will be compiled and shared. The NSNP educators, in each of the participating schools, arranged a meeting with learners between the ages of 10 and 15 years. The information about the research study (the purpose of the research, research ethics, data collection methods and how the results will be shared) was explained to the learners and assent forms were distributed to those who volunteered to participate. All of this was done with the permission of the school principals and caution was taken not to interfere with school activities.

3.5 Population and Sampling Procedures

The population for this study was the primary schools that implemented SFPs in BLM. Information provided by the circuit office was that all primary schools in BLM (106 primary schools) offer school meals. Although the data sources were people from various categories (i.e. NSNP Officers, NSNP educators, volunteer food handlers, learners and community members assisting in the school gardens), they were all linked to the schools and would be able to provide answers to the research questions. Six circuit managers oversee the running of the schools in the local municipality. Initially, twelve schools were randomly selected from the six circuit offices (two schools per circuit office) using a table of random numbers. The number was later reduced to eleven because there was one circuit under BLM, which had only one primary school at

the time of data collection therefore data were collected from eleven instead of twelve schools. The number of participants per school is presented in Table 3.1.

Table 3.1 Number of research participants per school

<i>School Circuit</i>	<i>Schools</i>	<i>Data sources & sample size</i>				
		<i>NSNP Officer(s)</i>	<i>NSNP Educator(s)</i>	<i>VHFs</i>	<i>Gardeners</i>	<i>Learners</i>
1	1A	1	1	3	0	45
	1B		1	3	0	43
2	2A	1	1	3	0	43
	2B		2	2	0	45
3	3A	1	2	3	2	45
	3B		1	2	0	41
4	4A	1	2	3	1	40
	4B		1	1	0	42
5	5A	1	1	3	0	45
	5B		1	2	0	44
6	6A	1	1	5	0	41
Total	11	6	14	30	3	474

Purposive sampling was used to select the participants in each of the 11 primary schools because they were all regarded as key informants who would be able to provide comprehensive and relevant information regarding SFPs and their potential contribution to rural development. For the quantitative part of the study, the sample size was determined by using the statistical package nQuery Advisor based on the estimates obtained from previous studies. The population size of BLM was estimated at 162,629 in 2011 (Blouberg Local Municipality, 2011). The sample size and statistical power of study were determined in accordance with standard sampling techniques that are recommended for descriptive, cross-sectional surveys. Systematic random sampling (Dawson and Trapp, 2004) was used for selecting eligible learners within BLM. The eligibility of participants was determined based on their willingness to take part in the study voluntarily and to provide accurate information.

Definition of terms

N = Population size of study = 162,629

n = Sample size of study

K = Sampling interval = Ratio of population size to sample size of the study. That is,

$$K = \frac{N}{n}$$

α = Probability of Type 1 error = Probability of rejecting a true null hypothesis by mistake = Level of significance of statistical test

β = Probability of Type 2 error = Probability of accepting a false null hypothesis by mistake

$1 - \beta$ = Power of study

The list of households in BLM was obtained from Statistics South Africa. The list was used as a sampling frame. Every k^{th} learner on the list was selected where K denotes the sampling interval. K is given by:

$$K = \frac{N}{n} = \frac{162,629}{474} = 343 = \text{Sampling interval.}$$

Hence, every 343rd child in the list was selected for the study. Ideally, the list of learners obtained from schools would have been used as a sampling frame but it was not available to the researcher at that time, hence the use of the population size to determine the sample size. The process of selection continued until all 495 eligible children (aged 10 – 15 years) were selected. Twelve learners could not participate in the study because their assent forms were not signed by their parents whereas five (5) learners were absent on the days of data collection. Four (4) questionnaires were not captured because the writing was illegible. Based on the above, the data were analysed from a sample size of 474 learners ($n = 474$). For a descriptive, cross-sectional study of this type, a sample of size $n = 474$ and a power of 95% are suitable for the study (Levy and Lemeshow, 2013).

3.6 Data Collection

This section explains all aspects pertaining to data collection, starting with the steps taken in preparation for data collection.

3.6.1 Preparation for data collection

Several data collection instruments were designed. This included a closed-ended questionnaire for learners (Appendix 3.3) and interview guides (Appendices 3.4, 3.5, 3.6, and 3.7) for various data sources. The design of the questionnaire was based on various literature sources (including the South African food-based dietary guidelines) and a validated questionnaire that was used by the HSRC to conduct a nation-wide study called the South African National Health and Nutrition Examination Survey (SANHANES) in 2012. The HSRC questionnaire had different sections but, for the purpose of this study, the section on dietary knowledge (as it is relevant to test the nutrition knowledge of learners) was used to guide the design of the questionnaire for this study. The data collection tools were shared with the promoters so that they could comment on them and provide inputs for improvement. The questionnaire was also shared with two experts in the field of nutrition and comments were received from one

of the experts. All of this was done to ensure content validity. All inputs were incorporated into the final questionnaire.

As a means of ensuring reliability, the Cronbach Alpha test (Ritchie et al., 2013) was used. The test gave a coefficient of 0.81 ($\alpha = 0.81$) showing that the tools used for measurement were reliable and consistent. Nominal and ordinal scales were used for the measurement of variables. Variables with possible values of Yes and No were measured based on nominal scales in which order did not matter. However, variables with possible values of 1, 2, 3, 4 and 5 were measured based on ordinal scales in which categories 1 and 5 denoted the lowest and highest possible levels respectively.

In order to facilitate data collection, the questionnaire was translated into Sepedi language since this is the first language for residents of BLM. This was done to ensure the full participation of all, including those who could not speak, read or understand the English language effectively. As a means of ensuring face validity, a pilot study was conducted with ten primary school learners of the same age group but at a different school, using the questionnaire. The purpose of the pilot study was to ensure that the learners understood the questions so that any ambiguity could be clarified before the actual data collection. The findings of the pilot study were that the questionnaire was understandable and there was no ambiguity. The only concern raised was that it took a long time to complete.

One research assistant was appointed to assist with data collection. The whole research study (including data collection instruments) was explained to the research assistant and her roles in the study were defined. The researcher explained the importance of research ethics, and other ways of collecting data such as probing, observations, and note-taking. This was to ensure that the research assistant understood her role and had the same understanding as the researcher so that the data collection process could be successful.

3.6.2 Data collection methods and techniques

A combination of qualitative and quantitative data collection methods and techniques were used in this research study. According to MacMillan and Schumacher (2010), the use of different data collection techniques permits triangulation of data that may yield different insights about the topic of interest and increases the credibility of the findings. Qualitative data were collected in the natural settings of the participants (in this case, the schools) using participatory rural appraisal (PRA) methods such as observations, note taking, photographs, Venn diagrams, seasonal calendars, individual and focus group interviews. Table 3.2 presents a summary of data collection methods and techniques used in this study. Data were collected through focus group discussions and key informant interviews (using a predetermined interview guide) that the researcher facilitated with the help of the research assistant. A tape recorder was used to record focus group discussions in instances where the participants consented to its use. Notes were taken during the discussions.

Volunteer Food Handlers (VFHs) from 10 schools participated in focus group discussions (10 focus groups with 29 participants) where they were asked questions about the SFPs implemented in the schools (Appendix 3.5). The discussions were held in Sepedi as the first language of the residents of BLM. Probing questions were asked throughout the discussions in order to clarify issues that were raised. A tape recorder was used to record the data for the focus group discussions and notes were taken. The advantages of using focus groups are that participants are able to discuss the questions or themes with each other and are also able to learn from each other (Bless et al., 2013). An interview was held with one VHF from a specific school because she was the only VHF appointed at that school. Learners also participated in focus group discussions that were guided by an interview guide (Appendix 3.4). Initially, 33 focus groups of learners from the 11 schools (three focus groups per school; each focus group had 10 to 15 participants) participated in this study. Due to the fact that qualitative studies are not concerned with bigger sample sizes, but with the collection of data until saturation or when no new information comes out, data collected from 11 focus groups (one from each school) was used for reporting the findings because saturation was reached with the first focus group from each school.

The discussions started with introductions to create rapport, sharing the background information of the study and participants were reminded that their participation was voluntary and they could withdraw from participating at any time. Participants were requested to respect each other's opinions and give each other a chance to talk.

Table 3.2 Data collection methods and techniques

Data collection methods	Data collection techniques	Data sources
Questioning	Focus group interviews	Primary school learners VFHs
	Individual Interviews	NSNP officers NSNP educators VHF (only at one school)
	Questionnaire	Primary school learners
Observations	Non-participant observation (photographs, note taking)	The school environment
Diagramming	Venn diagrams Seasonal calendars	NSNP officers NSNP educators Gardeners
Document analysis	Reading and analysing documents Taking notes	DBE reports School menus

VFHs = Volunteer Food Handlers

NSNP = National School Nutrition Programme

DBE = Department of Basic Education

All participants sat in a circle and the discussions were informal. The researcher provided flip charts and marker pens to each focus group. For the learners' focus groups, each group chose its own scribe to write all deliberations on a flip chart and a person who would provide feedback to the rest of the participants on behalf of the group. The feedback session was used as an opportunity to ensure that each group's inputs were well captured before consolidation of the information.

Things were handled differently for the VFHs because most of them indicated that they were not able to write. In that case, the researcher and her assistant facilitated the discussions, took notes and recorded the discussions using a tape recorder when participants consented to its use. At the end of the focus group discussion, each participant was requested to say anything they deemed important about SFPs and their contributions to the upliftment of their communities. The information that the participants shared during the discussions was reiterated to ensure that everything was well captured in the notes that were taken.

Semi-structured interviews, using interview guides, were held with the five NSNP officers (Appendix 3.6) and 14 NSNP educators (Appendix 3.7). During the interviews, the researcher and her assistant sat with each of the participants and asked questions relating to SFPs implemented in the schools. This was a two-way conversation whereby the researcher could also probe for more clarity and the participants could query the researcher at any time of the interview process. Although the NSNP officers provided similar information (they perform the same duties guided by the same documents), the researcher could not meet them in a group because they report to different circuit managers and their availability differed depending on the tasks they were allocated. One of the NSNP officers was out of office on the day of the interviews and was not interviewed. The researcher attempted to conduct a telephone interview but was unsuccessful. A decision was taken to exclude her because there was no new information that came from the five who were already interviewed and they attested to the fact that they do the same job and the only difference was that they are responsible for different schools within the local municipality. Therefore, the information they provided reached saturation by the second NSNP officer because there was no new

information that the three NSNP officers provided. A tape recorder was used to record interviews with some of the NSNP officers who had consented to its use. The NSNP officers shared the menus that the schools used.

Other data collection methods that were used included field observations and diagramming. Observation is a way for the researcher to see and hear what is occurring in the natural setting of the participants (McMillan and Schumacher, 2010) and can be an invaluable way of collecting data because what the researcher sees and perceives cannot be filtered by what others might have reported or seen (Yin, 2011). The following was observed during data collection: the food that was served to learners, learners eating (noting what they ate, did not eat and utensils used for eating), the type of foods that learners bought from vendors, whether the school had water and a vegetable garden and the condition of the garden. Notes and photographs were taken during the observations. The NSNP officers and educators were asked to draw Venn diagrams showing the important stakeholders for SFPs on a flip chart. The community member(s) responsible for the school gardens were asked to draw seasonal calendars on flip charts and they did this with the help of educators who were supporting them with the school gardens. This was to find out if there were any food production activities in the schools throughout the year. Not all schools could produce a seasonal calendar.

Quantitative data was collected using a pre-tested questionnaire (Appendix 3.3). All learners who returned signed assent forms were given a questionnaire. They were reminded that participation in the study was voluntary and they could withdraw at any time. Learners were also made aware that they would not receive any reward for participating in the study. The researcher went through the questionnaire (using Sepedi language) with all learners before they could complete it to make sure that they understood it. Learners were also allowed to write certain answers in Sepedi in case they forgot or did not know the English name. The questionnaires were collected and checked for completion. Using different data collection techniques permits triangulation of data and this may yield different insights about the topic of interest and increase the credibility of the findings (McMillan and Schumacher, 2010).

3.7 Data Analysis

This study used a combination of quantitative and qualitative methods of data analyses. Thematic content analysis was used to analyse primary qualitative data. Tape recordings were listened to, transcribed and the discussions and interview data, which were conducted in Sepedi were translated into the English language. The process of listening to the tape recordings was done repeatedly until the researcher was satisfied that all information had been transcribed, translated and captured correctly on a computer. All field notes were read repeatedly, sorted and then typed on a computer. Reading the field notes and listening to the interview recordings repeatedly helped to make sense of the data that were collected, to see how the data relate to the research questions and to see if there were any new insights that emerged. Once the data were typed, the researcher started to organise it so that there was some order in the data. The data was read repeatedly before starting the coding process, which means that different sections of data were given short names called codes or labels that categorised and summarised each piece of data into meaningful units. An inductive approach was followed, codes or labels assigned to the pieces of data were generated by working from the text during the data analysis process. The different codes were clustered into meaningful groups to generate themes or patterns. For example, the theme “benefits of SFPs” included codes such as improved concentration, nutritious meals, meals that filled the stomach, reduced absenteeism, etc. The themes were reviewed and renamed where necessary. The data organised under themes was then interpreted. The process explained above is called thematic content analysis. Three sources of information (i.e. primary data, secondary data from the relevant literature and subject matter opinion) were used to validate the data (triangulation).

The quantitative data derived from the questionnaires were analysed using the statistical package STATA version 14 for performing quantitative data analysis, data entry, checking and validation (STATA Corporation, 2015). This was done with the help of an expert in statistics. The questionnaire was coded and the participants’ responses were captured on a spreadsheet using MS Excel 2016 programme. The choice of statistical methods of data analysis was informed by the research questions and the

nature of variables of study on which data were collected. Descriptive statistics were computed and the data was presented in frequency tables, pie charts and bar charts for each discrete variable of study. For example, discrete variables, such as gender, were analysed using frequency tables and bar charts.

The outcome variable of study (Y) was discrete and had five possible values. The following statistical methods of data analysis were used:

- a. Frequency tables, pie charts and bar charts for each discrete variable of study;
- b. Summary statistics were used for continuous variables of the study;
- c. Cross-tab analyses were used to identify factors that were significantly associated with dissatisfaction with school feeding programmes;
- d. Logit analysis (Hosmer and Lemeshow, 2013) was performed in order to identify key risk factors for inadequate satisfaction with school feeding programmes. Unadjusted and adjusted odds ratios were obtained for influential predictor variables;
- e. Sensitivity and specificity tests were also performed in order to assess the reliability of the fitted logistic regression model.

Two types of variables were used in the study. The first type of a variable of study is the dependent or outcome variable of study (Y). Others are independent or explanatory variables of study that affect the outcome variable of study. The purpose of regression analysis is to investigate the relationship between a dependent or outcome variable of study and a set of independent variables of the study. Values of the dependent variable of study vary as values of the independent variables vary. In this particular study, the dependent variable of study (Y) is a measure of the perceived benefit and degree of satisfaction with the quality of SFPs based on a 5-point ordinal scale. The definition used for creating the dependent variable of study is based on the composite index proposed by Jomaa et al. (2011) for conducting a similar study in which the perceived benefits and quality of SFPs in developing countries were assessed and quantified by using a composite index. Category 1 of variable Y denotes the lowest score, whereas Category 5 of variable Y denotes the highest score. That is, the initial score for the

degree of satisfaction of learners with the quality of SFPs was based on the following ordinal scale varying from 1 to 5:

$$Y: \text{Degree of satisfaction of learners with school feeding programme} = \begin{cases} 1 & \text{if } \textit{never} \\ 2 & \text{if } \textit{Sometimes} \\ 3 & \text{if } \textit{Half the time} \\ 4 & \text{if } \textit{Often} \\ 5 & \text{if } \textit{Always} \end{cases}$$

As the values of variable Y vary from 1 (lowest level of satisfaction) to 5 (highest level of satisfaction), the degree of satisfaction with the quality of SFPs increases. For the purpose of performing multivariate

data analysis, it was necessary to reduce the number of categories of variable Y from 5 to 2. The key statistical method of data analysis in this study was binary logistic regression analysis. As such, the values of variable Y were reduced from 5 to 2 as follows:

Y: Degree of satisfaction of learner with the quality of SFPs

1. Inadequate if learner is not satisfied with the quality of SFPs
2. Adequate if learner is satisfied with the quality of SFPs

In binary logistic regression analysis, the outcome variable of study has only two possible values and not five possible values. Using binary logistic regression analysis greatly simplifies the interpretation of odds ratios. In order to perform binary logistic regression analysis (Hosmer and Lemeshow, 2013), a final score variable having only two possible values (1 and 0) was computed by defining the final score variable as shown below:

The mathematical expression for the dependent variable of study (Y):

Y: Degree of satisfaction of learner with SFPs

$$Y = \begin{cases} 1 & \text{if child is not happy with school feeding programme} \\ 0 & \text{otherwise} \end{cases}$$

In binary logistic regression analysis, the dependent variable of study (Y) has two categories only (1 and 0). Category 1 maximises the likelihood of dissatisfaction with the quality of the SFPs, whereas Category 0 minimises the likelihood of dissatisfaction with the quality of SFPs. Independent variables of study are factors that affect the extent to which learners in BLM are satisfied with the quality of SFPs. Data on variables that are known to affect the quality of SFPs were gathered from each learner.

Binary logistic regression analysis

The dependent or outcome variable of study (Y) has only two possible values. These values are 1 and 0. Y=1 in cases where a child is dissatisfied with the quality of SFPs that are provided to learners at BLM. Y=0 in cases where a child is satisfied with the quality of SFPs that are provided to learners at BLM. Category 1 of Y is associated with dissatisfaction with the quality of SFPs. Category 0 of Y is associated with satisfaction with the quality of SFPs. A dependent variable Y that can only have two possible values (1 and 0) is called dichotomous. The relationship between Y and a set of independent variables that affect the degree of satisfaction of learners with the quality of school feeding programmes provided to learners at BLM was investigated by using the following statistical methods of data analysis:

- a) Frequency tables and bar charts for each discrete variable of study;
- b) Summary statistics and box and whisker plots for each continuous variable of study;
- c) Pearson's chi-square tests of association were used to test the strength of association among pairs of categorical variables (Hair et al., 2010) for performing a preliminary screening of influential factors that were significantly associated with the quality of the school feeding programme;

- d) Binary logistic regression analysis (Hosmer and Lemeshow, 2013) was used in order to identify and quantify key risk factors for dissatisfaction with the quality of the SFPs provided to learners at BLM. Unadjusted and adjusted odds ratios were obtained for influential predictor variables.

The outcome variable Y is dichotomous and has only two categories. That is,

$$Y = \begin{cases} 1 & \text{if child is not happy with school feeding programme} \\ 0 & \text{otherwise} \end{cases}$$

X_1, X_2, \dots, X_k are the independent variables that affect the degree of satisfaction of a randomly identified child at BLM with the quality of SFPs provided to learners.

An estimated regression coefficient is denoted by $\hat{\beta}$. In logistic regression analysis, a regression coefficient is estimated for each explanatory variable included in the model.

Notations used in binary logistic regression analysis:

Y = the dependent variable of study

X_1, X_2, \dots, X_k = the k independent variables of study

p_i = the probability of event i

$\hat{\beta}_i$ = the estimated regression coefficient of the i^{th} independent variable of study where $i = 0, 1, \dots, k$

$\hat{\beta}_0$ = the estimated regression coefficient for the Y-intercept of the line of regression

$\text{logit}(p_i)$ = the natural logarithm of the ratio of probabilities where:

$$\text{logit}(p_i) = \ln\left(\frac{p_i}{1-p_i}\right) = \hat{\beta}_0 + \hat{\beta}_1 X_1 + \dots + \hat{\beta}_k X_k$$

Z denotes the equation of the fitted linear line of regression where:

$$Z = \hat{\beta}_0 + \hat{\beta}_1 X_1 + \dots + \hat{\beta}_p X_k$$

Using the notations introduced above, the binary logistic regression of a dichotomous outcome variable Y on a combination of k discrete and continuous independent variables X_1, X_2, \dots, X_k is defined by the following logit function:

$$\text{logit}(p_i) = \ln\left(\frac{p_i}{1-p_i}\right) = \hat{\beta}_0 + \hat{\beta}_1 X_1 + \dots + \hat{\beta}_k X_k$$

In this specific study, the probability that a randomly identified learner at BLM is not happy with SFPs is denoted by $\Pr(Y = 1)$. The probability that a learner at BLM is happy with the quality of SFPs is denoted by $\Pr(Y = 0)$. For a randomly identified child, the probability that the child is not happy with the quality of SFPs is given by the following statistical expression:

$$\Pr(Y = 1) = \frac{1}{1 + \exp(-Z)}$$

In the above expression,

$$Z = \hat{\beta}_0 + \hat{\beta}_1 X_1 + \dots + \hat{\beta}_k X_k$$

Using the expression for the random variable Z , the probability of $Y=1$ (the probability that a randomly identified child at BLM is dissatisfied with the quality of SFPs given values of the predictor variables X_1, X_2, \dots, X_k can be calculated for a randomly identified child in the study.

Interpretation of odds ratios

The odds ratio corresponding to the i^{th} explanatory variable X_i is equal to $e^{\hat{\beta}_i} = \exp(\hat{\beta}_i)$ where $\hat{\beta}_i$ denotes the estimated regression coefficient corresponding to X_i .

Case 1:

If $\hat{\beta} > 0$, then $\exp(\hat{\beta}) > 1$. In this case, the odds of $Y=1$ are increased by a factor of $\exp(\hat{\beta})$.

Case 2:

If $\hat{\beta} < 0$, then $\exp(\hat{\beta}) < 1$. In this case, the odds of $Y=1$ are decreased by a factor of $\exp(\hat{\beta})$.

Case 3:

If $\hat{\beta} = 0$, then $\exp(\hat{\beta}) = 1$. In this case, the odds of $Y=1$ remain unchanged.

Sensitivity and specificity tests were performed in order to assess the reliability of the fitted logistic regression model.

In order to test the hypotheses, the P-values obtained from binary logistic regression analysis were used to make decisions on whether to reject the null hypothesis (H_0) or to accept the alternative hypothesis (H_a). At the 5 % level of significance, the null hypothesis is rejected if the P-value obtained from binary logistic regression analysis falls below 5 %.

3.8 Ethical Considerations

Approval to conduct the study was granted by the University of Venda's Research Ethics Committee (Appendix 3.1). The researcher provided sufficient information regarding the study and its purpose to all possible participants before they could decide whether to participate or not. All participants were told that their participation in the study was voluntary and that they could withdraw from participating at any given time. All willing participants that were eligible to give consent by themselves signed consent forms (Appendix 3.8) prior to participating in the study. Because learners are minors and could not consent on their own, eligible learners who volunteered and were willing to participate in the study were given assent forms (Appendix 3.9) so that their parents and/or guardians could also sign to allow them to participate in the study. The consent

and assent forms were translated into Sepedi language so that learners and their parents could understand before signing it. The translation was done in consultation with a Sepedi Lecturer at the University of South Africa. All forms were signed except for twelve assent forms. One parent indicated that he/she would not sign anything that had nothing to do with the child's school therefore the child did not participate in the study.

The privacy of all participants was respected throughout the research study and in the thesis, presentations, and papers because none of the sources are divulged. The participants' names are kept confidential and were not mentioned at all. There was no harm to any of the participants during data collection. All records obtained from the fieldwork were kept in a safe place. All ethical research requirements were adhered from the beginning to the end of the research study in order to ensure that the rights and dignity of people involved were protected.

CHAPTER 4: RESULTS OF SCHOOL FEEDING PROGRAMMES (SFPs) IMPLEMENTED IN BLOUBERG LOCAL MUNICIPALITY (BLM)

4.1 Introduction

This chapter presents the findings and discussions on how the school feeding programmes (SFPs) are implemented in some primary schools in BLM, Limpopo Province, South Africa. Both qualitative and quantitative findings are presented to support or contradict each other. The qualitative findings are presented with narratives from the participants to support these findings. The null hypotheses (H_0) were tested and decisions were made at the 5 % level of significance based on P-values obtained from binary logistic regression analysis as well as results obtained from in-depth interviews. A null hypothesis is rejected at the 5 % level of significance if the P-value obtained from binary logistic regression analysis falls below 5 %.

4.2 School Feeding Programmes Implemented in Blouberg Local Municipality

The information about the implementation of the SFPs was obtained from the five National School Nutrition Programme (NSNP) officers situated at the Local Municipality and the NSNP educators from each of the 11 schools that participated in this study. The participants indicated that the DBE has a policy document on how they should implement SFPs and they use the policy to guide them in implementing the programme at the circuit and school levels. The DBE appointed suppliers who buy and deliver food to the schools. The suppliers use a set menu designed by DBE to buy food and the same menu was used by schools to prepare and serve food to the learners. There was only one mid-morning meal served at 10 a.m. in all the 11 schools. The meals were cooked and served at schools. The schools did not have well-designed and equipped kitchens for food preparation and ten schools were using firewood for food preparation in open shacks.

From the individual interviews held with NSNP officers and educators, it was clear that the SFPs involved various stakeholders that must ensure that learners get food at schools. The stakeholders are depicted in the Venn diagrams presented in Figures 4.1

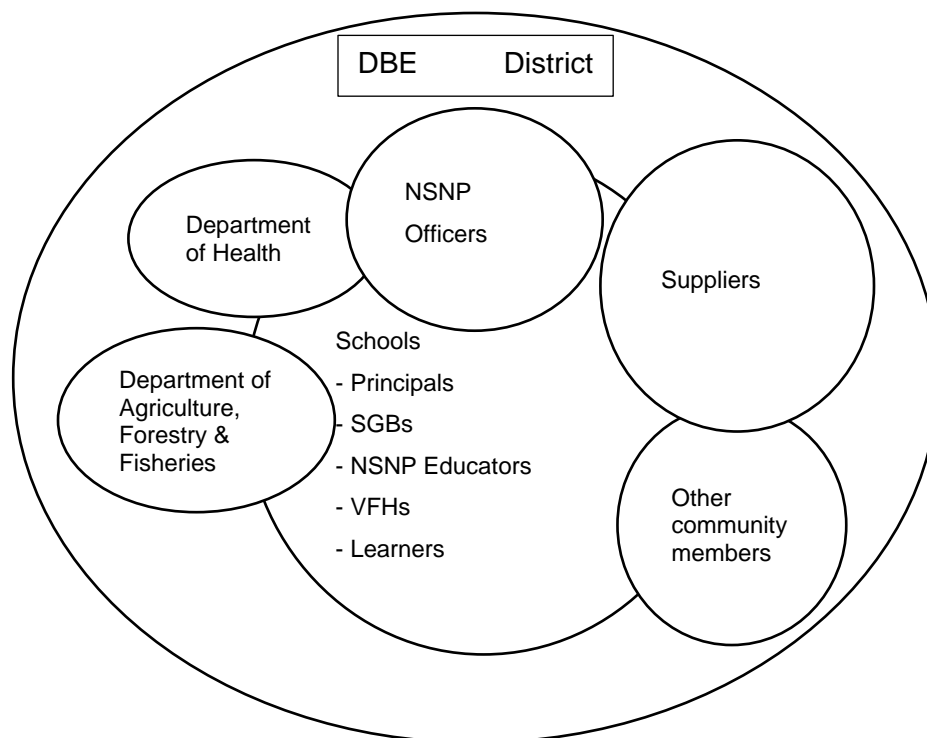
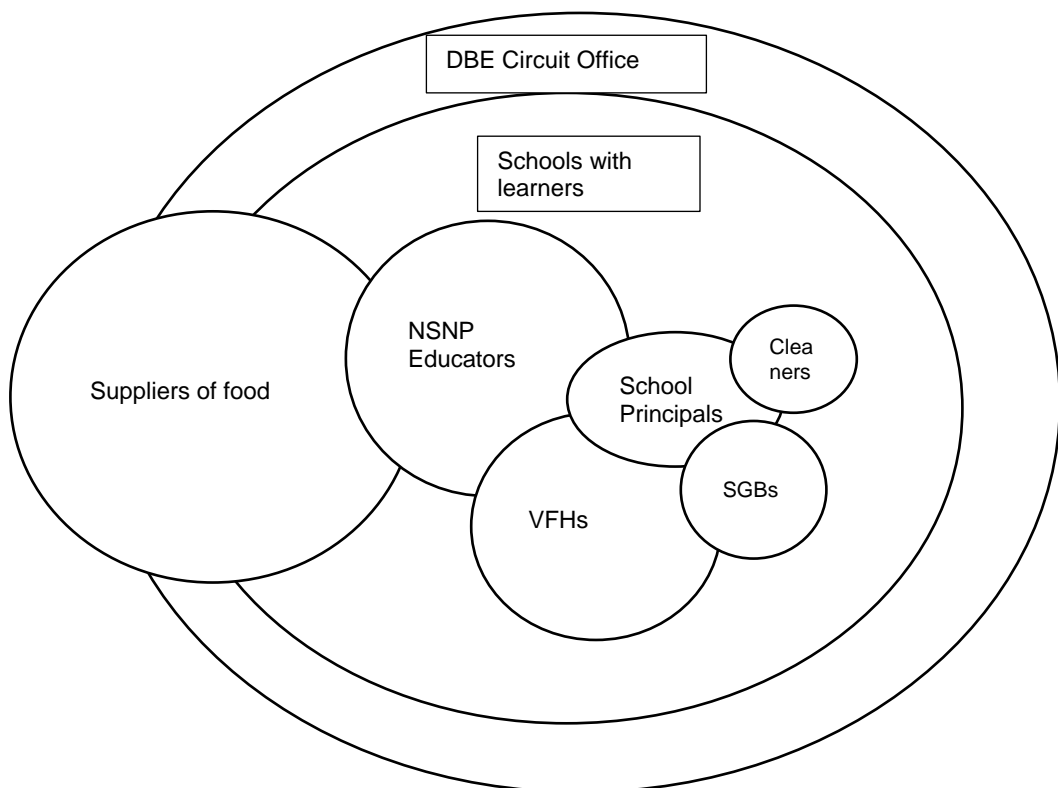


Figure 4.1 Stakeholders for SFPs mentioned by NSNP Officers



Legend:
 DBE = Department of Basic Education
 NSNP = National School Nutrition Programme
 SGBs = School Governing Body
 VFHs = Volunteer Food Handlers

Figure 4.2 Stakeholders for SFPs mentioned by NSNP Educators

(stakeholders mentioned by NSNP Officers) and 4.2 (stakeholders mentioned by NSNP educators). According to Davis (2001), the Venn diagram presents all key players (institutions, individuals) and the interaction with the local community. Each institution is represented by a circle and the size of the circle represents the importance, significance or power of that institution and the degree of overlap between the circles represents the level of interaction that occurs (Davis, 2001). The different roles for each of the stakeholders are explained below so that it is easier to understand the implementation of SFPs in primary schools of BLM.

4.2.1 The Department of Basic Education (DBE): District office

The NSNP are implemented by the Department of Basic Education (DBE). The schools serve cooked meals to all primary school learners. The DBE at the District level appointed suppliers who buy and deliver food to the schools. The suppliers are given information on what is expected from them and they sign an agreement indicating that they would comply with the requirements and specifications as set out by the DBE. According to the DBE policy, meals should be served at 10 a.m. and the schools ensure that they adhere to the policy. The NSNP educators, VFHs, and the learners indicated that the meals are served at 10 a.m. and the researcher has made the same observations during data collection.

4.2.2 The Department of Agriculture, Forestry and Fisheries

The NSNP officers mentioned that the Department of Agriculture, Forestry and Fisheries provided expert advice on sustainable food production and this would be beneficial to the establishment and maintenance of school gardens.

4.2.3 The Department of Health

According to the NSNP officers, the Department of Health employed Environmental Health Practitioners who provided information on food safety and personal hygiene.

4.2.4 The role of the suppliers

The suppliers were appointed to buy and deliver food items to the schools. The suppliers receive a menu from the DBE district office and they use it to buy food items that they deliver to the schools. The menu is similar to the one given to the schools. The NSNP officers and educators mentioned that dry food items and/or food with a long shelf life such as maize meal, rice, samp, dry beans, soya mince, sugar, salt, long life milk or ultra-high temperature milk were delivered once a month. Perishable food items such as fresh fruits and vegetables were delivered on a weekly basis. It was evident from the interviews with NSNP educators that each school that participated in this study had a different supplier. The suppliers deliver food to schools on different days of the week but it is important that the food reaches the schools in time so that learners are fed.

4.2.5 The role of the NSNP officers

The NSNP officers are government officials who were appointed to monitor the implementation of the NSNP in schools. They are situated at the circuit offices and they work closely with the circuit managers. The NSNP officers mentioned that their main role is to monitor the programme (NSNP or SFPs), support the implementation at the schools and ensure that it is implemented according to the policy. The NSNP officers ensure that the stakeholders at the schools (i.e. school principal, VFH, SGB member, NSNP educator) receive the necessary information so that they are able to implement the SFPs at schools. The following extracts corroborate this fact:

We organise food safety and personal hygiene workshop for School principals, NSNP educators, one VFH and one (1) SGB member per school. The educators are supposed to share the information with the learners (NSNP Officers, BLM).

We conduct workshops with school principals, NSNP educators, one (1)

SGB member and one (1) VFH from each school (NSNP Officers, BLM).

The NSNP officers indicated that they visit the schools that they are responsible for and, so far, each NSNP officer could only visit two schools per week due to circumstances beyond their control. The following extract from the NSNP officers supports the above statement:

We are five NSNP officers responsible for many schools in the five school circuits. These schools are scattered far from each other. We are supposed to visit schools on a daily basis, but we cannot because we share one vehicle among the five of us. Each of us can only visit two schools per week (NSNP Officers, BLM).

When they are at the schools, the NSNP officers use a form designed by the DBE as a monitoring tool. The form consists of five sections and the NSNP officer must do observations and check evidence provided by the school. The NSNP officers compile and sign a feedback report for each school and the school principals sign the same report. The sections of the monitoring tool are as follows:

- a) Section A: School details and feeding times;
- b) Section B: Record keeping and management practices (the NSNP educator's file with the following evidence: copies of signed contracts for VFHs, certified copies of VFHs' identity books, attendance registers for VFHs, daily feeding registers for the learners, copies of invoices, delivery notes indicating quantity of food delivered against expected quantities);
- c) Section C: School feeding (specific types of food served on the day of the visit and the quantity cooked);
- d) Section D: Nutrition education, health and safety
 - i. Food preparation area/kitchen: structure of the area, cleanliness of food preparation area and utensils, availability of a copy of the school menu and VFHs' duty list on the wall, storage of the gas cylinder, availability of the first aid kit and a fire extinguisher (serviced in the last 12 months);

- ii. Food storage area (is the area clean?, is food packed neatly on shelves?, expiry dates, packaging of food, condition of fruits and vegetables);
 - iii. Hygiene for learners (washing hands before eating, eating in classrooms under educator's supervision);
 - iv. Cleanliness of school premises (outside and inside classrooms) and toilets;
 - v. Availability of safe drinking water at the schools;
 - vi. Has the NSNP educator and school principal been trained in nutrition education and NSNP in the last 12 months?
- e) Section E: Sustainable food production (does the school have a garden? What is its condition? The purpose of the school garden, establishment of partnerships for sustainable food production? Has the school received training on sustainable food production in the last three (3) years?).

Some NSNP officers mentioned that some challenges they encounter during school visits are that some schools do not adhere to the policy. These extracts support the above view:

Some schools serve meals outside classrooms (NSNP Officers, BLM).

Some NSNP educators do not keep proper records; they do not file all documents that they are supposed to file (NSNP Officers, BLM).

It was observed that, in some schools, food was served in the classrooms and learners ate inside the classrooms whereas, in other schools, learners queued outside the classrooms where they get the food and they sat outside the classrooms to eat their meals. In addition to the above duties, the NSNP officers receive and attend to NSNP challenges reported by the schools, write reports, and ensure that the suppliers and VFHs are paid. The schools notify the NSNP officers when there is no food delivered. Suppliers who do not deliver food as expected, are not paid for the days they did not deliver or the days when learners could not get food due to the unavailability of food at

schools.

4.2.6 The role of the NSNP educators

Each school has given one or two educators an additional responsibility to monitor the implementation of the NSNP at the school level. The educator(s) checked the quality and quantity of the food upon delivery by the supplier, keep record of all invoices, help VFHs to measure food and report on all NSNP related matters at the school. From the interviews with the NSNP educators, it became evident that they performed the following roles in the NSNP:

(a) Quality controller

NSNP educators indicated that when the suppliers deliver food to the schools, they check the quantity delivered against the expected quantity and the quality of food such as the expiry dates, the freshness of fruits and vegetables before signing the invoices and delivery note. They indicated that they sign the invoices only if the order is complete and the food delivered is of good quality. They check if the food has not past the expiry date and if fruits and vegetables are still fresh. The following extracts support the above statement:

If there is a shortage of the food delivered, I make a note and arrange with the supplier to deliver the shortage within a reasonable period (NSNP Educator, BLM).

If the supplier delivers incomplete food items, I immediately notify the driver, make a note and I do not sign the delivery invoice until the right amount of food is delivered. If I do not sign the invoice, then the supplier cannot claim payment from DBE. In case the supplier delivers poor quality food, the school request replacement and the supplier must arrange to deliver soon

(NSNP Educator, BLM).

The school does not accept food past their expiry dates and vegetables that are not fresh – the supplier will arrange to replace such food (NSNP Educator, BLM).

(b) Supervisory and advisory

The NSNP educators mentioned that they help VFHs in terms of measuring the correct amount of food to be prepared and served to learners. This is to ensure that the food lasts until the next batch of food is delivered. The food is delivered every month. The researcher has also observed that containers and cups were used to serve food. One NSNP officer raised a concern regarding the portions served to learners and he mentioned the following:

Some schools do not serve the correct portion sizes; they use more food than they should (NSNP Officer, BLM).

The NSNP educators ensure that the VFHs report to the schools on every school day, sign a register and perform their duties. The Department of Basic Education (DBE), at district level, provides schools with NSNP budgets so that they can pay for the stipend of the VFHs. The NSNP officers and educators supported this fact as per the extracts below:

The stipend for VFHs is deposited into the school's account (NSNP Officers, BLM).

I completed forms to acknowledge receipt of the NSNP funds to pay the VFHs. We (NSNP educator, school principal and a member of the school governing body) issue the VFHs with a cheque and they sign an acknowledgement form after receiving their stipend (NSNP Educator, BLM).

The school received money from DBE and the money is in the school's NSNP account. The money is used to pay the VFHs and to buy firewood (NSNP Educator, BLM).

(c) Liaison

The NSNP educators work closely with the school principals and report all matters related to NSNP to them. They also report any NSNP challenges to the NSNP officers at the circuit office but, in some schools, the school principals report challenges to the NSNP officers. It was observed during the initial visit when assent forms were submitted at the schools, that there was no food served to learners at two different schools. The NSNP educators confirmed that no food was delivered to the school and they had already informed the principals and the NSNP officers. The following extracts corroborate the above facts:

Learners did not get food for the past two days due to non-delivery by the supplier. I have reported the matter to the school principal and the NSNP officer so that the DBE does not pay the supplier for the two days (NSNP Educator, BLM).

NSNP educators and/or school principals report any challenges to us, for example, if the supplier fails to deliver food to the school, the school inform us (NSNP Officers, BLM).

When the schools re-opened in April, learners did not get food from the school for three days due to non-delivery. The supplier sub-contracted someone to deliver the food and the person did not know where the school was located. I informed the NSNP officer and submitted a report to the DBE circuit office so that the supplier is not paid for those days (NSNP Educator, BLM).

The supplier delivered food two days later than expected, I informed the circuit office and they will not pay the supplier for those two days (NSNP Educator, BLM).

(d) Record keeping and reporting

The NSNP educators keep records of all NSNP documents at the school level. These include signed invoices when the suppliers deliver food, delivery notes written when the order is incomplete or the food is of poor quality, copies of learner registers who were fed on a daily basis. Each educator indicated the number of learners who were served with NSNP meals on a class register. The NSNP educators file the documents so that, when the NSNP officers visit the schools, they are able to use the evidence to compile reports. Some NSNP educators indicated that they write reports for non-delivery so that the school principals are able to submit them to the DBE circuit office.

4.2.7 The role of volunteer food handlers (VFHs)

Volunteer food handlers are community members that cook and serve food at schools. The VFHs cook food according to the menu and serve learners. There are times when they deviate from the menu and cook whatever food is available to ensure that learners have a meal. NSNP officers and educators in the following extracts supported this view:

The schools cook according to the menu and if they deviate from the menu, it could be due to problems of non-delivery or late delivery or delivery of incomplete food items (i.e. shortages) by the supplier (NSNP Officers, BLM).

Sometimes they do not cook according to the menu due to non-delivery of food items by the supplier and they cook what is available in the kitchen to ensure that learners have a meal (NSNP Educator, BLM).

4.2.8 The role of the school governing body (SGB)

The SGB consists of members of the community who assist in ensuring that the schools run smoothly. Their roles in the SFPs included the following: appointing VFHs, co-signing contracts for VFHs, signing of cheques for the VFHs, assisting NSNP educators to check the quantity and freshness of the food delivered, signing for the issuing and usage of the school's monies to assist in buying utensils that are used in the SFPs. The role of checking the food delivered was only mentioned in one school. It is important to note that the appointment of VFHs lies with the members of the SGB in all schools that participated in this study, but other roles differed per school.

4.2.9 The role of other community members

It became clear from the interviews with NSNP educators that some community members have somehow contributed to the implementation of SFPs in some schools. Some of these community members established school gardens and continued to look after them. Six schools had community members who volunteered to look after the school gardens and two NSNP educators from a school that participated in this study confirmed that the vegetables produced from the school gardens supplement NSNP meals. The extract below supports this fact:

The spinach that the learners ate today was from the school garden (NSNP Educator, BLM)

Other community members volunteered to supply firewood in two of the schools that used firewood for cooking meals. Some community members who worked under the Expanded Public Works Programme (EPWP) cleaned the schoolyard and classrooms so that learners can learn and eat in a clean environment.

4.3 Food Provided in the School Feeding Programmes

Data collected through document analysis, observations by the researcher, individual interviews with NSNP officers, educators and focus group discussions with the learners and VFHs revealed that the type of SFP implemented at schools in BLM is in-school

feeding, the meals are cooked and served at schools. The NSNP officers and educators mentioned that the DBE, at the district level, issued a menu (Appendix 4.1) that indicates the types of food to be bought, cooked and served to learners. The circuit office distributes the menu to the schools. The suppliers also have the same menu so that they know the kind of food items to buy. According to the menu, the meal should consist of a starch, protein and vegetable or fruit. This was confirmed by observations made at different schools and has also been reported by Hochfeld et al. (2016). Therefore, the schools follow guidelines from the Department of Basic Education in terms of the type of food to serve to learners. The schools have a specific menu that indicates the amount of food to be cooked depending on the total number of learners (Appendix 4.2). Different types of starchy foods (i.e. rice, maize meal porridge or “pap” and samp), protein-rich foods (i.e. soya mince, dry beans, tinned fish and milk), vegetables (cabbage, spinach, pumpkin, butternut) and fruits (banana, apple, orange) were served on different days of the week with repetitions (same foods) served twice per week. The learners get a fruit once per week. All the participants in this study concurred with the fact that there is a menu that indicates the types of food that must be provided to the learners. They adhere to the menu except in situations where there is less or no food available at the schools. The researcher also observed learners in some schools being served with maize meal porridge (“pap”), milk and a banana in one school and, in another, they ate samp mixed with dry beans and spinach. All these food items were on the menu for those specific days.

4.4 The Benefits of School Feeding Programmes

The data generated through focus group discussions (with the learners and the VFHs) and individual interviews (with NSNP educators) revealed the different benefits that the SFPs brought to the learners and their communities. The benefits of SFPs are one of the themes that emerged during qualitative data analysis. The benefits were directly linked to the learners and their families or the community members. The qualitative results regarding the benefits of SFPs are presented in the sections below with extracts from the participants. Furthermore, the benefits were ranked based on absolute magnitudes of estimated odds ratios (Hosmer and Lemeshow, 2013) as presented in Table 4.1. Influential predictor variables of benefits are characterised by odds ratios that

differ from the number 1 significantly, P-values that are smaller than 0.05, and confidence intervals of odds ratios that do not contain the number 1. The benefits as presented in Table 4.1 are ranked in the order of their importance. For example, the participants ranked hunger alleviation as the number one benefit provided by the SFPs, followed by educational benefits. The first two benefits in the table were mentioned by all categories of participants (i.e. learners, NSNP educators, VFHs and NSNP Officers).

Table 4.1 Odds ratios estimated from binary logistic regression analysis for potential benefits of SFPs

Predictor of potential benefits	Odds Ratio	95% confidence interval	P-value
1. Hunger alleviation	3.58	(2.92, 4.47)	0.000
2. Educational benefits	3.39	(2.86, 4.35)	0.001
3. Financial benefits	3.05	(2.71, 4.27)	0.003
4. Nutritional benefits	2.87	(2.54, 3.96)	0.008
5. Saving time	2.74	(2.46, 3.88)	0.012
6. Health benefits	2.55	(2.27, 3.56)	0.037

4.4.1 Hunger alleviation

All participants in this study indicated that the SFPs brought some relief to the learners and their parents because having meals at schools means that learners will no longer suffer from hunger. They all concurred that there are some learners who are orphans, or from poor families, and child-headed households whose parents are migrant workers working far from home and these learners solely depend on the school meals to alleviate hunger. The following extracts support the above fact:

Some of the learners are from poor families where their parents could not afford to give them food and pocket money; getting a meal from school might be their only meal of the day (Learners and NSNP Educators, BLM).

Most learners come from poor families and getting a meal from school might be their only meal of the day (NSNP Officers, BLM).

The community has children that are orphans and a lot of child-headed households (parents are working far from home) and these learners depend on NSNP and, to some, it is the only meal of the day (NSNP Educators, BLM).

Tlala e fedile ka lebaka la dijo tša mo sekolong (There is no more hunger because of school meals) (Volunteer Food Handlers, BLM).

Dijo tša mo sekolong di a khoriša, e bilie di tloša tlala (school meals fill our stomachs and they alleviate hunger) (Learners and NSNP Educators, BLM).

NSNP alleviates hunger to learners who are in disadvantaged rural schools like this one (NSNP Educator, BLM).

Dijo tša mo sekolong di thuša malapa a go hloka kudu kudu. Batswadi ga ba kgone go fepa bana ba bona ka lebala la bohloki bjo. Bana ba kgona go

hwetša dijo sekolong bjalo (School meals took off a lot of pressure from poor households. They brought a relief to parents who are not able to provide food to their children, but the school children can now get food at school) (Volunteer Food Handlers, BLM).

Bana ba go hloka dijo ka gae ba tseba gabotse gore ba tla ja sekolong (Some learners who do not have food at home are now guaranteed of a meal at school) (Volunteer Food Handlers, BLM).

4.4.2 Educational benefits

All participants share the same sentiments that there are educational benefits that they associate with the SFPs. These benefits include improved school attendance, no late coming, improved concentration and participation in class. The extracts below substantiate this fact:

Learners get nutritious meals so that they are able to access learning and concentrate in class (NSNP Officers, BLM).

Learners attend school regularly; the school used to have a lot of absenteeism but since the NSNP was introduced, the situation has improved; learners are always in school knowing that they will have food (NSNP Educator, BLM).

Before the NSNP was implemented, some learners would go home for break and not return to school because they have nothing to eat at home (NSNP Educator, BLM).

Bana ba ba senago dijo ka gae ba kgona go ya sekolong bjale, ga ba sa lofa sekolo (Learners who do not have food at home can now attend school; no more absenteeism) (Volunteer Food Handler, BLM).

Learners get food at school and are able to concentrate in class (NSNP Educator, BLM).

Some children come to school on empty stomachs therefore, the meal served at school fills their stomachs, provides them with energy and they become active, are able to concentrate in class and to participate in class activities (NSNP Educator, BLM).

Some learners are from poor families with no food and when they get a meal from school, they get the energy to focus and concentrate in class and this improves their performance at school and they look happy (NSNP Educator, BLM).

Re kgona go theeletša ge re rutwa ka sekolong, re kgona le go nagana gabotse. Re ka se kgone go theeletša barutiši ge ba re ruta, re ka se kgone go ithuta mola re swerwe ke tlala (We are able to pay attention in class, we can think clearly. We could not concentrate and learn when we are hungry). (Learners, BLM).

4.4.3 Financial benefits

All participants, except the learners, mentioned that the SFPs brought financial benefits to some community members in the sense that they created jobs for VFHs who are able to take care of their families with the stipend they receive. The VFHs are employed for a period of one year and they receive a monthly stipend. The following extracts substantiate this fact:

Tšhelete ye nnyane ye re e humanago ka go šoma mo sekolong e thuša kudu ka gobane re kgona go reka dilonyana tša ka gae (The little money we get from working at the school helps because we are able to buy some things for our families) (Volunteer Food Handlers, BLM).

The stipend given to VFHs assist poor families (NSNP Educators, BLM).

The stipend for VFHs is deposited into the school's bank account (NSNP Officers, BLM).

4.4.4 Nutritional benefits

Some of the participants viewed the SFPs as providing some nutritional benefits for the learners. The extracts below support this fact.

Some children come to school with empty stomachs therefore the meal served at school provides them with energy ... (NSNP Educators, BLM).

NSNP gives nutritious meals to learners so that they are able to concentrate (NSNP Officers, BLM).

Dijo tša mo sekolong di re fa maatla, di fepa mebele ya rena, di a re tiiša ebile di na le phepo (School meals give us energy, nourish our bodies, make us strong and they are nutritious). Dijo tša mo sekolong di na le di aga mmele tša go swana le porotheine le khabohyterate, di aga mebele ya rena, di tiiša marapo le meno a rena (School meals have nutrients such as proteins and carbohydrates, they build our bodies, strengthen our bones and teeth). Lebese le na le poroteine (milk has protein) (Learners, BLM).

4.4.5 Time-saving benefits

The NSNP educators agreed that having school meals saves time for learners and the educators. This enables them to focus on the lesson rather than worrying about coming to school late. The extracts below support this fact:

Before the NSNP was implemented, some learners would go home for break and return to school very late (some would miss a lesson) because

they stay far from the school, but now they eat at school (NSNP Educator, BLM).

Serving meals at school saves time as learners no longer go home to eat during break (NSNP Educator, BLM).

Dijo tša mo sekolong di re fokoleditše nako ya go kitimela gae re ya go ja le ya gore re boele sekolong (School meals saves us time to go home and return to school during break) (Learners, BLM).

4.4.6 Health benefits

The NSNP educators were of the opinion that SFPs provided health benefits to the learners. The following extracts substantiate this view:

The food prevents unnecessary illnesses to learners (NSNP Educator, BLM).

Some learners had sores but since the introduction of the NSNP, they no longer have those sores (NSNP Educator, BLM).

4.5 Learners' Satisfaction with the SFPs

When asked about the quality of SFPs in their schools, 80 % of the learners indicated that they were satisfied. The learners' satisfaction is substantiated by the following extracts from the focus group discussions:

Dijo tša mo sekolong di monate ebile di a khoriša. Motho a ka itoma menwana ge a di ja. (The food served at school is delicious and fills our stomachs. One can even bite their fingers while eating).

Ga re tle le dijo go tšwa gae ka gobane re hwetša dijo tša go khoriša mo

sekolong (We do not bring any lunch boxes because we get enough food at school).

Re a kgotsofala ka dijo tša mo sekolong, di monate kudu kudu (We get satisfied with the school meals; the food is very delicious).

Learners who were not satisfied (20 %) with the SFPs cited the following reasons indicated in the extracts below to substantiate their dissatisfaction:

Ga re khore, ba re solela dijo tše di nnyane (we do not get full, they serve little food).

Ge re jele sopo le setampa mo sekolong re bolawa ke mala (We get sore tummies when we eat soup and samp at school).

Setampa ga se butšwe ebile se na le maswikana (Samp is not cleaned properly and is not well cooked).

Bana ba bangwe ba berekwa ke mala ge ba jele setampa (Some learners suffer from diarrhoea when they ate samp) (Learners, BLM).

Bana ba bangwe ba berekwa ke mala ge ba jele ka lebese (Some learners suffer from diarrhoea when they consumed milk) (Learners, BLM).

Some learners who experienced problems such as sore tummies and diarrhoea after eating some foods in the affected schools indicated that they avoided eating those kinds of food at school.

Although most learners mentioned that they relied on school meals and did not bring lunch boxes to school, there were those who indicated that they took a lunch box to school on a regular basis. The reasons provided by these learners were that sometimes there is no food at school and there is not enough food served at school to fill their

stomachs (five focus groups of learners from different schools attested to this). This is supported by the quantitative results from the questionnaires whereby 171 (36 %) of the 474 learners mentioned that they sometimes take a lunch box to school.

4.5.1 Results from cross-tab analyses

Initially, the study had 183 variables. Screening of variables had to be done in order to reduce the number of variables of study from 183 to a manageable size and this was achieved by using two-by-two cross-tab analyses or Pearson's chi-square tests of associations at the 5 % level of significance. Pearson's chi-square tests of association (Hair, Black, Babin and Anderson, 2010) were used for performing a preliminary screening of influential factors that were significantly associated with overall satisfaction with the quality of the SFP at BLM. Two-by-two tests of associations were performed between the dependent variable of study, Y, and 15 variables of study that are well known to affect satisfaction with the quality of school feeding programme at BLM. The stepwise backward elimination procedure (Hosmer and Lemeshow, 2013) with a probability cutoff point of 20 % was used to select the 15 variables of the study. Values of the dependent variable of study, Y (satisfaction with quality of school feeding programme), were defined as follows:

$$\text{Satisfaction with the quality of school feeding programme} = \begin{cases} 1 & \text{if adequate} \\ 2 & \text{if inadequate} \end{cases}$$

Table 4.2 shows a summary of 15 two-by-two associations obtained from cross-tab analyses. At the 5 % level of significance, significant two-way associations are characterised by large observed chi-square values and P-values that are smaller than (<) 0.05. In Table 4.2, as one goes from top to bottom, the magnitude of the observed chi-square value decreases as the P-values increase. It can be seen from Table 4.2 that three of the 15 two-by-two associations were significant at the 5 % level of significance (i.e. the first three factors has large observed chi-square values and P-values <0.05). The remaining 12 two-by-two associations were not significant at the 5 %

level of significance. For each of the 15 two-by-two tests of association, the expected values of the chi-square statistic were significantly larger than 5, thereby showing that P-values obtained from cross-tab analyses for each cross-tab analysis were theoretically valid.

Table 4.2 A summary of two-by-two associations from cross-tab analyses (n = 474)

Factors significantly associated with satisfaction with the overall quality of school feeding programme (satisfaction)	Observed chi-square value	P-value
Knowledge that sugary foods should be consumed less (sugary food)	58.4653	***
Knowledge that fatty foods should be consumed less (fatty food)	24.0719	***
Knowledge that eating a variety of food is helpful for growing and developing properly (variety)	5.4743	*
Knowledge that too much sweet food can make people fat (sweet food)	3.1360	ns
Knowledge about the benefits of milk for strengthening bones and teeth (milk)	2.8330	ns
Knowledge that eating fruits and vegetables can protect the body from cold and flu (fruits)	2.5203	ns
Age of child (age)	1.6533	ns
Knowledge about food types that protect the body from illness (protect)	1.4512	ns
The practice of taking lunch box to school (lunchbox)	1.3121	ns
Grade of child (grade)	0.7209	ns
Knowledge that maize meal porridge is a good source of energy (porridge)	0.4388	ns
Knowledge that eggs are the best source of protein (eggs)	0.3061	ns
Knowledge that carrots are helpful for good eyesight (carrots)	0.1764	ns
Knowledge that enough fibre is helpful for going to the toilet regularly (fibre)	0.1700	ns
Knowledge about the benefits of consuming more vegetables (vegetables)	0.1202	ns

* = $P < 0.05$; ** = $P < 0.01$; *** = $P < 0.001$; ns = not statistically significant difference

Table 4.2 shows that overall satisfaction with the quality of the SFP at BLM was significantly and positively affected by three factors at the 5 % level of significance. These three factors were: knowledge that sugary foods should be consumed less (sugary food), knowledge that fatty foods should be consumed less (fatty food), and knowledge that eating a variety of food is helpful for growing and developing properly (variety), in a decreasing order of strength. A large observed chi-square value and a small P-value indicate that the variable is highly associated with Y. This means that having knowledge that sugary foods should be consumed less (the observed chi-square value is equal to 58.4653 and the P-value is equal to 0.000) is significantly associated with the overall satisfaction with the quality of the SFPs. Having knowledge that fatty foods should be consumed less (the observed chi-square value is equal to 24.0719 and the P-value is equal to 0.000) is significantly associated with the overall satisfaction with the quality of the SFPs. Having knowledge that eating a variety of food is helpful for growing and developing properly is significantly associated with the overall satisfaction with the quality of the SFPs. The observed chi-square value is equal to 5.4743 and the P-value is equal to 0.019.

The results obtained from cross-tab analyses or Pearson's chi-square test of association as those in Table 4.2 are theoretically less reliable than results obtained from binary logistic regression analysis (Hosmer and Lemeshow 2013). These results showed that having knowledge that sugary and fatty foods should be consumed less is significantly associated with the overall satisfaction with the quality of SFPs. Based on the above fact, subsequent multivariate analyses were done by using binary logistic regression analysis that is more reliable than cross-tab analyses. The variables shown in Table 4.3 were used for performing subsequent multivariate analysis by using binary logistic regression.

4.5.2 Results from binary logistic regression analysis

Results from binary logistic regression analysis are theoretically more reliable than results from Pearson's chi-square tests of association (Hosmer and Lemeshow, 2013).

Table 4.3 List of variables used for binary logistic regression analysis

Overall satisfaction of child with the quality of school feeding programme	Dissatisfied	Satisfied
Knowledge that sugary foods should be consumed less (sugaryfood)	Yes	No
Knowledge that fatty foods should be consumed less (fattyfood)	Yes	No
Knowledge that eating a variety of food is helpful for growing and developing properly (variety)	Yes	No
Knowledge that too much sweet food can make people fat (sweetfood)	Yes	No
Knowledge about the benefits of milk for strengthening bones and teeth (milk)	Yes	No
Knowledge that eating fruits and vegetables can protect the body from cold and flu (fruits)	Yes	No
Age of child (age)	10 to 12 years	13 to 15 years
Knowledge about food types that protect the body from illness (protect)	Yes	No
The practice of taking lunch box to school (lunchbox)	Yes	No
Grade of child (grade)	Grades 3 to 6	Grade 7
Knowledge that maize meal porridge is a good source of energy (porridge)	Yes	No
Knowledge that eggs are the best source of protein (eggs)	Yes	No
Knowledge that carrots are helpful for good eyesight (carrots)	Yes	No
Knowledge that enough fibre is helpful for going to the toilet regularly (fibre)	Yes	No
Knowledge about the benefits of consuming more vegetables (vegetables)	Yes	No

This is because the measure of effect in binary logistic regression is the odds ratio and not two-by-two significant associations. Logistic regression analysis allows multivariate analysis involving several variables that are influential over the level of satisfaction with SFP. It is also possible to assess the reliability of the fitted logistic regression model based on highly reliable diagnostic tests such as the classification table, the likelihood ratio test, the Hosmer-Lemeshow goodness-of-fit tests, sensitivity and specificity.

The selection of variables used for binary logistic regression analysis was based on two criteria; namely, the relevance to the research questions of study and the presence of a significant association with the dependent variable of study at the 0.05 level of significance. Statistical significance was assessed based on Pearson's chi-square tests of association between the various independent variables of study and the dependent variable of study which is the satisfaction with SFPs.

Binary logistic regression analysis was done by performing the regression of the dependent variable of study Y on X_1, X_2, \dots, X_{15} . The stepwise backward elimination procedure was used with a probability cut-off point of 0.20. The measure of effect in binary logistic regression analysis is the odds ratio. This procedure gave estimated odds ratios that are shown below in Table 4.4. There are three indicators of significant odds ratios, namely, (1) a small P-value or P-values that are smaller than ($<$) 0.05; (2) an odds ratio that is significantly different from 1; and (3) a 95 % confidence interval that does not contain the number 1. Note that, in Table 4.4, the P-values are 0.000, 0.001 and 0.047 which are all smaller than ($<$) 0.05. The odds ratios are large and significantly different from 1 and the 95 % confidence interval of the true odds ratio does not contain the number 1 (i.e. the 95 % confidence interval is from 1.77 to 7.83; 1.83 to 4.68; 1.45 to 3.29 and 1.01 to 2.50).

The results obtained from binary logistic regression analysis (Table 4.4) show that four of the 15 variables used for multivariate analysis were influential predictors of satisfaction with the quality of SFP. Therefore, the degree of satisfaction of children with the quality of the SFP was significantly and adversely affected by the four predictor variables as presented in a decreasing order of strength in Table 4.4. The odds ratio of

Table 4.4 Odds Ratios (OR) estimated from binary logistic regression analysis

Factor affecting satisfaction with the quality of school feeding programme	P-value	Adjusted Odds Ratio	95 % C.I. * for Odds Ratio
Knowledge about the benefits of eating a variety of food types	0.000	3.72	(1.77, 7.83)
Knowledge about the harmful nature of eating too much fatty food	0.000	2.93	(1.83, 4.68)
Knowledge about the harmful nature of eating too much sugary food (Sugary food causes disease)	0.001	2.18	(1.45, 3.29)
Knowledge about the harmful nature of eating too much sweet food (sweet food can make people fat)	0.047	1.58	(1.01, 2.50)

*C.I. stands for confidence interval

the variable “Knowledge about the potential benefits of eating a variety of food types” was equal to 3.72. This indicates that a child who lacks knowledge about the potential benefits of eating a variety of food types is 3.72 times as likely not to be satisfied with the quality of SFP in comparison with another child who has adequate knowledge about the potential benefits of eating a variety of food types. The odds ratio of the variable “Knowledge about the harmful nature of eating too much fatty food” was equal to 2.93. This indicates that a child who lacks knowledge about the harmful nature of eating too much fatty food is 2.93 times as likely not to be satisfied with the quality of the SFP in comparison with another child who has adequate knowledge about the harmful nature of eating too much fatty food.

The odds ratio of the variable “Knowledge about the harmful nature of eating too much sugary food” was equal to 2.18. This indicates that a child who lacks knowledge about the harmful nature of eating too much sugary food is 2.18 times as likely not to be satisfied with the quality of school feeding programme in comparison with another child who has adequate knowledge about the harmful nature of eating too much sugary food. The odds ratio of the variable “Knowledge about the harmful nature of eating too much sweet food” was equal to 1.58. This indicates that a child who lacks knowledge about the harmful nature of eating too much sweet food is 1.58 times as likely not to be satisfied with the quality of school feeding programme in comparison with another child who has adequate knowledge about the harmful nature of eating too much sweet food.

The results from binary logistic regression analysis correlate with the results obtained from the cross tab analysis or the Pearson’s chi-square test of association in the sense that having adequate knowledge is significantly associated with satisfaction with the overall quality of SFPs. In Table 4.2, the three factors that were significantly and positively associated with satisfaction with the overall quality of SFPs were presented. These factors are having knowledge that sugary foods should be consumed less, knowledge that fatty foods should be consumed less, and knowledge that eating a variety of food is helpful for growing and developing properly. The implication is that having knowledge, for example, knowledge that sugary foods should be consumed less, is highly associated with satisfaction with the overall quality of SFPs. Table 4.4

indicates that the lack of knowledge is associated with being dissatisfied with the overall quality of SFPs.

The above results were obtained from binary logistic regression analysis model, but it was important to find out the reliability of the fitted binary logistic regression model. This was done using the goodness of fit tests.

4.5.3 Goodness-of-fit tests

Goodness-of-fit tests were used for assessing the degree of reliability of the fitted binary logistic regression model. In this study, the reliability of the fitted model was assessed using commonly used standard diagnostic procedures such as the classification table, the Hosmer-Lemeshow goodness of fit test, the Receiver Operating Characteristic (ROC) plot, sensitivity and specificity plots and the likelihood ratio test.

- **The classification table**

The classification table is the simplest and most commonly used measure of goodness-of-fit in binary logistic regression analysis. The table assesses the capacity of the fitted logistic regression model to classify respondents who took part in the study accurately in terms of their degree of satisfaction with the SFP. The table provides measures such as the overall percentage of correct classification, percentage sensitivity (the ability of the fitted model to accurately detect learners who are not satisfied with the SFP), and percentage specificity (the ability of the fitted model to accurately detect learners who are satisfied with the SFP).

The classification table (Table 4.5) shows that the overall percentage of correct classification for the fitted binary logistic regression model was 89.62 %. This figure is above 75 % and it indicates that the model is quite good. The figures for the percentages of sensitivity and specificity must be 50 % or more for a good fitted model. In this study, percentage sensitivity is equal to 58.21 % and specificity is equal to 89.94

%. Both percentages are above 50 % and this means that the fitted model is good enough

Table 4.5 Estimates from the classification table

Diagnostic measure	Magnitude (%)
Percentage sensitivity	58.21
Percentage specificity	89.94
Positive predictive value	57.89
Negative predictive value	71.86
False positive rate for true negative values	10.06
False negative rate for true positive values	11.79
False positive rate for classified positive values	22.11
False negative rate for classified negative values	28.14
Percentage of overall correct classification	89.62

concerning sensitivity and specificity. Therefore, the fitted binary logistic regression analysis model is highly sensitive and specific (it could accurately detect learners). This means that the model could accurately detect learners who were not satisfied with the SFP and those who were satisfied with the SFP. This means that the results from binary logistic regression analysis are reliable.

- **The Hosmer-Lemeshow goodness-of-fit test**

The Hosmer-Lemeshow goodness-of-fit test is used for testing the null hypothesis that there is no reason to doubt the adequacy or reliability of the fitted model. A P-value that is greater than 0.05 shows that the null hypothesis should be accepted at the 5 % level of significance, thereby confirming that the fitted model is theoretically reliable. In this study, the P-value from the Hosmer-Lemeshow goodness-of-fit test is equal to 0.1812, a figure which is greater than 0.05. Hence, there is no reason to doubt the theoretical reliability of the fitted logistic regression model.

The degree of reliability of the fitted binary logistic regression model was also assessed by using graphical methods. This was done by measuring the magnitude of the area that lies under the ROC (Receiver Operating Characteristic) plot, and by plotting a sensitivity/specificity plot.

- **Magnitude of area that lies under the ROC curve**

Figure 4.3 shows a Receiver Operating Characteristic (ROC) plot. The magnitude of the area that lies under the ROC plot is a measure of variation explained by the fitted logistic regression model. In this case, the area under the ROC plot is 89.12 %, a figure that is significantly above 75 %. The percentage of unexplained variation is equal to 10.88 %. The large percentage of explained variation and the small percentage of unexplained variation indicate that the fitted model is highly reliable in explaining the

degree to which children are satisfied with the quality of SFP at BLM.

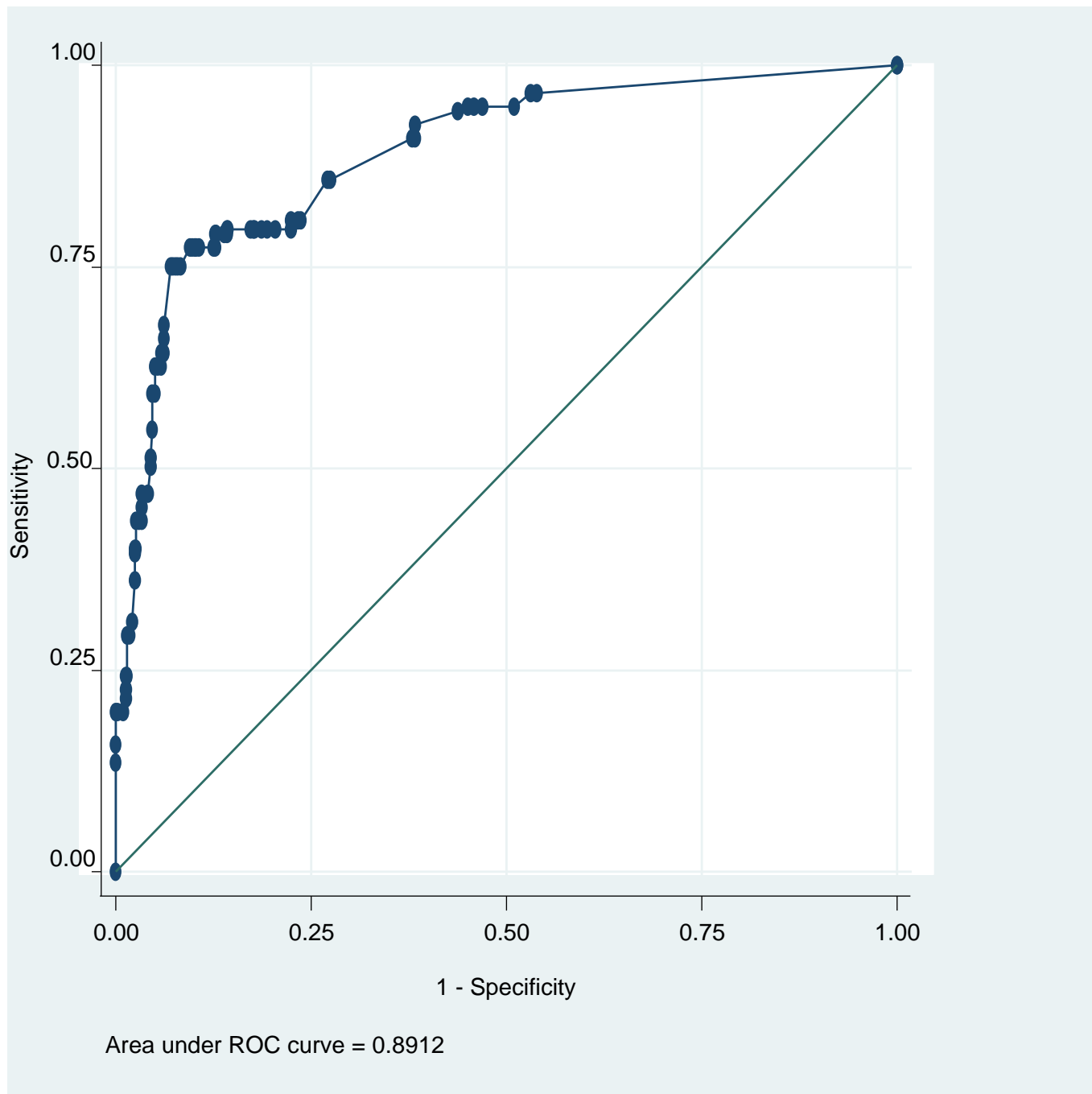


Figure 4.3 Area under the Receiver Operating Characteristic (ROC) plot

- **Sensitivity and specificity plots**

Figure 4.4 shows a plot of sensitivity/specificity versus probability cut-off point. The two plots cross each other fairly close to the number 1, a figure that represents the maximum value of a probability function. This shows that the fitted model is adequately sensitive and specific.

- **The likelihood ratio test**

The likelihood ratio test was used for assessing the collective efficiency of the 4-predictor variables identified in the fitted logistic regression model. At the 5 % level of significance, a P-value that is smaller than 0.05 shows that the 4-predictor variables in the fitted binary logistic regression analysis are jointly efficient in accounting for the degree of satisfaction with school feeding programmes. In this case, the P-value obtained from the likelihood ratio test was equal to 0.0000, a figure that is significantly smaller than 0.05. This P-value shows that the 4-predictor variables in the fitted binary logistic regression analysis are collectively efficient in explaining the degree to which children are satisfied with the quality of the school feeding programme at BLM.

In conclusion, each of the methods used to assess the degree of reliability of the fitted model confirms that the fitted model is adequate, and that results obtained from binary logistic regression analysis are highly reliable.

4.6 Challenges with SFPs

The preceding section clearly indicated that the SFPs provided some benefits to the learners and to some extent, to the communities. Despite the benefits, there are challenges that were highlighted by NSNP educators, officers, VFHs and learners. The following challenges were identified: non-delivery or late delivery of food by the

suppliers; lack of proper food preparation, storage and eating facilities; poor hygienic practices; the quality of food served; non-adherence to the DBE policy; lack of financial support for school gardens; inadequate monitoring of SFPs in schools and suppliers buying from

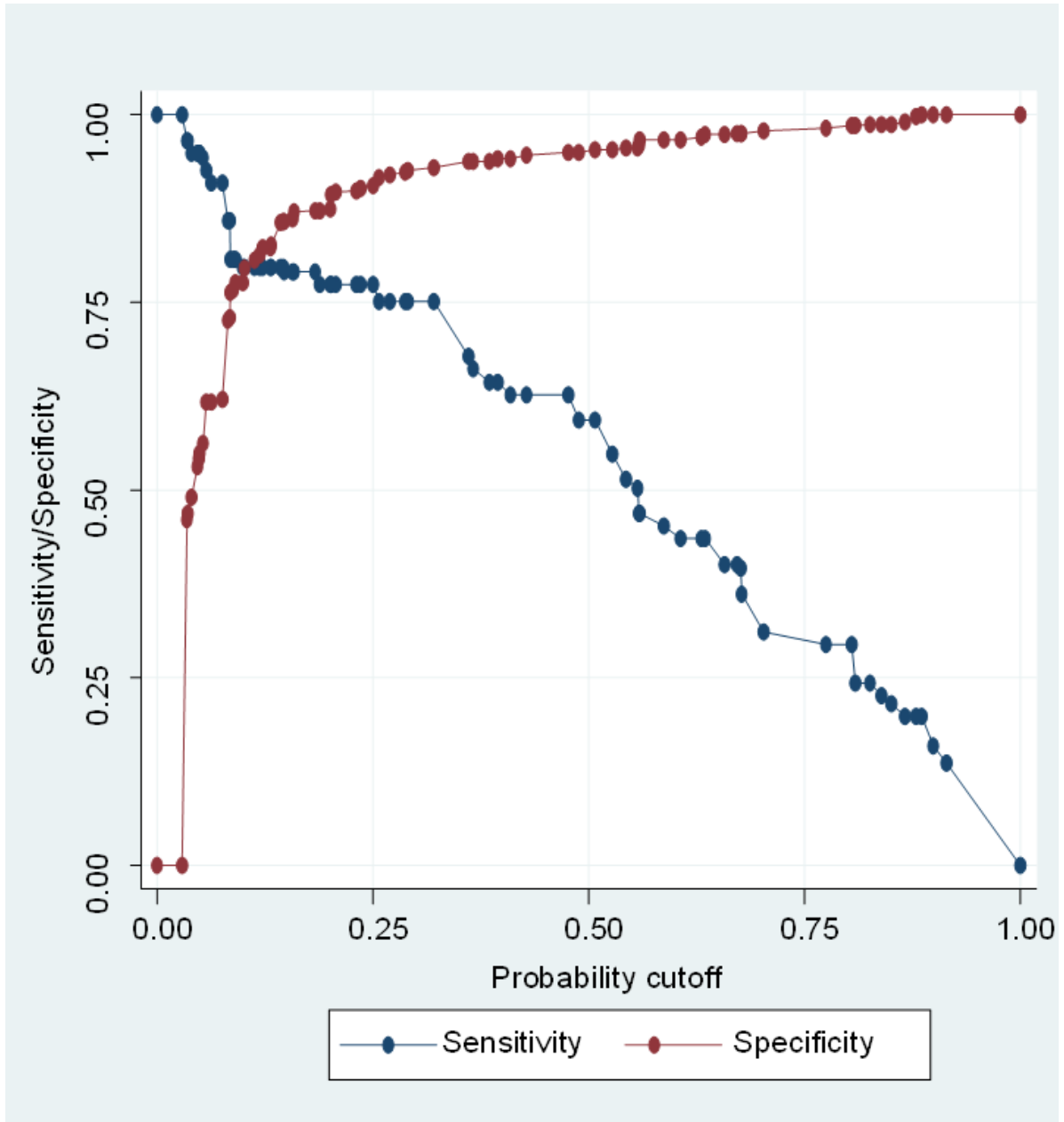


Figure 4.4 Plot of sensitivity/specificity versus probability cut-off point

community members members. Another important challenge that emerged during the focus group discussions and individual interviews is institutional challenges. Table 4.6 presents the odds ratios and P-values of the challenges associated with SFPs. The challenges were ranked based on absolute magnitudes of estimated odds ratios (Hosmer and Lemeshow, 2013). Influential predictor variables of benefit are characterised by odds ratios that differ from the number 1 significantly, P-values that are smaller than 0.05, and confidence intervals of odds ratios that do not contain the number 1. The challenges are presented according to their order of importance from number one to eight.

4.6.1 Non-delivery of food items by the suppliers

One major challenge that was mentioned by various participants was the non-delivery or late delivery of food items by the suppliers and the impact thereof because, when there is no food at schools, learners might suffer from hunger. Observations were made that two schools did not serve food for two days due to non-delivery by the suppliers. The following extracts support this fact:

The main challenge with the SFPs is non-delivery of food by the suppliers (NSNP Officers, BLM).

Learners did not get food for the past two days due to non-delivery by the supplier (NSNP Educator, BLM).

When the schools re-opened in April, learners did not get food from the school for three days due to non-delivery (NSNP Educator, BLM).

The NSNP educators indicated that, when the suppliers deliver food later than expected or deliver an incomplete order (smaller amount of food than expected), the learners do not get food until the delivery is made or they are served smaller portions when there is little available food. Late deliveries and incomplete deliveries are regarded as non-feeding days and the supplier will not be paid for these days. Some learners would

sometimes bring a lunchbox to school because there would be no food served at school.

Table 4.6 Odds ratios estimated from binary logistic regression analysis for challenges of SFPs

Predictor of potential risk	Odds Ratio	95% confidence interval	P-value
1. Non-delivery of food by supplier	4.02	(3.19, 5.25)	0.000
2. Lack of proper food preparation, storage, eating facilities and utensils	3.89	(2.92, 4.36)	0.002
3. Poor hygiene practice such as hand washing	3.76	(2.83, 4.29)	0.004
4. The quality of food served	2.89	(2.92, 4.01)	0.012
5. Non-adherence to DBE policy	2.73	(2.82, 3.87)	0.019
6. Lack of financial support for school gardens	2.64	(2.73, 3.81)	0.028
7. Inadequate monitoring of SFPs	2.59	(2.58, 3.77)	0.033
8. Suppliers buying from community members	2.41	(2.23, 3.56)	0.048

4.6.2 Lack of proper food preparation, storage, eating facilities and utensils

The schools did not have proper food preparation and storage facilities (i.e. well-designed and equipped kitchens). Data obtained through observations, individual interviews, and focus group discussions with NSNP educators and VHFs revealed that nine schools were using firewood as a source of fuel for cooking. The food preparation area in these schools was in shacks that were not entirely enclosed and the foods were prepared using open fires. Only two schools used gas stoves for cooking. In one school, the NSNP educator and VHFs mentioned that it becomes a serious problem if it rains overnight because the firewood would be wet and they would not be able to make a fire for cooking food for the learners. Some schools had community members who volunteered to bring firewood to the schools whereas others had to buy the firewood. The food preparation areas in the two schools that used gas stoves for cooking were very small and congested. The schools used small rooms for storing food items. Although learners in some schools had their meals inside the classrooms, learners in most schools ate their meals outside citing the heat inside the classrooms as a reason for them to eat under tree shades or on the veranda of the classrooms.

Some schools did not have cutlery such as spoons that learners could use to eat. Observations were made that, in some schools, learners were eating samp with their hands and without proper cutlery (i.e. spoons). Eating food with hands that were not washed properly (i.e. washing hands with water that has no soap) could pose a serious risk to food hygiene and ultimately to the health of the learners.

4.6.3 Poor hygienic practices

The NSNP educators indicated that they encouraged learners to wash their hands before and after eating, as well as when they come back from the toilets. Poor hygienic practices were observed in one school where learners washed hands from one bowl of soapy water placed outside the classroom. This practice of washing hands in a

common bowl could allow for the spread of germs, more especially when someone washes hands after coming from the toilet. In other schools, learners washed hands from a tap or using a jug of water and they only used water without soap.

4.6.4 The quality of food served

Some NSNP educators indicated that sometimes the quality of fruits delivered to the schools is very poor. It was observed in one school that there were bananas that were in a very bad condition piled in a box and the Educator mentioned that they were delivered in that condition and learners could not eat them. The extract below supports this statement.

Sometimes we return perishable foods such as cabbages and bananas due to the bad condition they were in and the supplier had to replace them with fresh ones (NSNP Educators, BLM).

Some learners mentioned that certain foods were not well cooked as in the extract below:

Setampa se na le maswikana ebile ga se butšwe (samp has hard things like small stones and is not well cooked meaning that it still needs to be cooked for longer) (Learners, BLM).

Another cause for concern is the fact that some learners indicated that they get “sore tummies” after eating samp and soup. Other learners suffered from diarrhoea after eating samp and consuming milk. This raises serious concerns about food safety and that the cause of these problems (sore tummies and diarrhoea) might be due to unhygienic food handling, preparation, and serving. Food handling methods, especially during storage and preparation, can have a significant influence on the nutritional quality of foods. The food safety and personal hygiene workshop that VFHs attend has a direct link to the manner in which they handle, prepare and serve the food. The NSNP officers mentioned that only one VFH per school is trained and this means that others

do not get first-hand information but might have to rely on the information they receive from the person who attended the training or, in some cases, they might not get the relevant information on food safety and personal hygiene at all. Although the NSNP officers mentioned that they ensure that VFHs attend the food safety and personal hygiene workshop, this was not the case in one school. The three VFHs in that school indicated that they had not attended workshops or training on food safety and personal hygiene and the NSNP educator attested that this was the case. The lack of training has negative implications for hygienic food handling, preparation, storage and serving.

4.6.5 Non-adherence to the DBE policy

Two issues were raised by the NSNP officers about the non-adherence to the policy by some schools, namely, (1) the serving and eating place; and (2) incorrect portion sizes. The extracts below support the above fact.

Some schools serve meals outside classrooms (NSNP Officer, BLM).

The persistent challenge of serving meals outside classrooms and lack of supervision during meals were also reported by the DBE (Department of Basic Education, 2016). It was observed that, in some schools, learners queued outside the classrooms to get food and they also sat outside (under trees) to eat their meals. When they were asked the reasons for having meals outside classrooms, they indicated that it was too hot to eat inside the classrooms. The NSNP officers mentioned that some schools serve large portion sizes to learners and this is supported by the extract below.

Some schools do not serve the correct portion sizes; they use more food than they should (NSNP Officer, BLM).

Despite the views of the NSNP officers regarding large portion sizes served at some schools, some learners (five focus groups of learners from different schools and 36 % of the learners as per the data from the questionnaires) indicated that they sometimes took a lunch box to school because too little food is served at school to fill their

stomachs.

4.6.6 Lack of financial support for school gardens

One of the objectives for the South African SFPs is to promote sustainable food production through the development of food gardens in schools. The NSNP officers mentioned that there was no budget allocated for sustainable food production in schools at the Provincial level and they were experiencing problems with volunteer gardeners who are community members who used to look after the school gardens. They indicated that the gardeners wanted to get a stipend just like the VFHs. The lack of financial support for the school gardens was also reported by the national DBE in the 2015/2016 annual report (Department of Basic Education, 2016). All the 11 schools that participated in this study had access to water in the school premises but only nine had vegetable gardens that were looked after either by volunteer community members or learners. The researcher observed that the school gardens that had dedicated community members looking after them were in a good condition as compared to those that were looked after by the learners. The purpose of the school gardens is to produce food that will supplement the school meals.

A community member who looks after the school garden in one school raised a concern of doing a voluntary job without getting a stipend whereas in reality, he needs money to look after his family. The extract below support this fact:

Re bereka mmereko wa bohlokwa ka gore ge dijo di le gona mo tšhemong ya sekolo, di kgona go fepa bana, efela rena ba go bereka ka tšhemong ga re bohlokwa ka gobane ga re humane mogolo wa gore re thuše malapa a rena. Re fapana ka eng le ba ba go apeela bana dijo? Bona ba humana bonnyanne go tšwa go mmušo. Sekolo se re fa tšhelete ye nnyane kudu ge fela re rekišeditše batho ba mo motseng (Our job is important in the sense that the food from the school garden are used to feed learners, but we gardeners are not taken serious – we do not get any stipend so that we are able

to provide for our families. How different are we from the VFHs? They get a stipend from the government but we get nothing. The school can only give us little money when we sold the vegetables to the community members) (Community member, BLM).

4.6.7 Inadequate monitoring of SFPs in schools

There is no proper monitoring of the SFPs in schools because the NSNP officers do not have the necessary resources (i.e. transport) to do school visits on a daily basis. Based on this, they have to rely on the information they gather on the days of their visits and on what the schools report to them. The monitoring tool they use does not look into the quality of food served to the learners. If this was done, the NSNP officers would have noticed that learners in some schools did not eat certain foods cooked at school and would have tried to find out what the problem was and find ways to address it. The NSNP officers raised concerns that some NSNP educators do not keep proper records of the programme. This additional task for the NSNP educators would increase their workload and responsibilities because they still have their main function of teaching learners the subjects allocated to them.

4.6.8 Suppliers buying from local community members

The NSNP officers indicated that suppliers were encouraged to buy food locally but, in this study, there was an incident in one school that discouraged community members (looking after the school garden) to sell the garden produce to the supplier who delivers food to the school. They indicated that when the supplier wanted to buy spinach from them, they felt exploited as the supplier rejected the price they gave him and told them the price that he would pay for the spinach. This was supported by the following extract from the community members who are gardeners in one of the schools in BLM:

Re bereka boima gore re kgone go rekiša dijo tša go tšwa ka mo tšhengwaneng ye ya sekolo, efela re kwa bohloko ge motho a nyaka go re beela gore re rekiše ka bokae. O nyaka go re hlalefetša mola le rena re leka go fepa malapa a rena (We work very hard so that we can sell the

produce from the school garden but it pains us if anyone can come and dictate to us how much we should sell the produce. That is robbing us of our hard work while we are also trying to feed our families) (Community members, BLM).

4.6.9 Institutional challenges

Four government departments were mentioned as role players in the NSNP and related activities in this study. These included the Department of Basic Education (DBE) which is the custodian of the NSNP, the Department of Health (DoH), the Department of Agriculture, Forestry and Fisheries (DAFF) and the Department of Public Works. The information obtained from interviews with NSNP officers revealed that DoH provides information and training on food safety and personal hygiene to schools, DAFF provides expert advice on sustainable food production to assist schools with the establishment and maintenance of school food gardens. The DOH also assisted with the NSNP menus and advise on the provision of meals according to the Food Based Dietary Guidelines (Department of Basic Education, 2015). It was evident from this study that the Department of Public Works employs community members under its Expanded Public Works Programme. These community members cleaned the schools in some communities and also looked after the garden in one of the schools that participated in this study. Although this is the case, this study found that some VFHs were not trained on food safety and personal hygiene and this was confirmed by the NSNP educator. The schools mentioned that they do not get support in terms of maintaining the food gardens. Some of the issues revealed in this study are the use of firewood for cooking. The chopping of trees for firewood will result in deforestation if left unattended. This is an area where DAFF and the Department of Environmental Affairs can play a role in creating awareness on activities that will lead to the depletion of forests and contribute to global warming. The department (DAFF) can also help communities in planting trees to avoid the depletion of forests. The Department of Science and Technology can assist in suggesting the use of solar energy or biogas. From this information, it is clear that

various government departments can play important roles in assisting the DBE with the proper implementation of the SFPs and extending the knowledge and awareness to the communities. The close collaboration of these departments can address the different challenges raised in this study in an effective manner than when working in silos. Departments might also have activities that overlap and in such cases, their collaboration could strengthen the implementation of such activities.

4.7 Decision on the Null Hypotheses Tested

The following null hypotheses (H_0) were tested using the Pearson chi-square test of association (two-by-two crosstab analyses):

- (H_0): The provision of school meals to learners does not alleviate hunger during the school day.
- (H_0): The views of learners, government officials, educators and community members on the benefits of SFPs differ.

The observed value of the Pearson chi-square statistic for the first null hypothesis is 28.0234 and based on the decision taken at the 5 % level of significance, the null hypothesis (H_0): *the provision of school meals to learners does not alleviate hunger during the school day* is rejected at the 5 % level. It is therefore concluded that the provision of school meals to learners alleviates hunger during the school day. The second null hypothesis (H_0) has an observed value of the Pearson chi-square statistic of 27.5681 and the null hypothesis is rejected at the 5 % level. Therefore, views of learners, NSNP educators, NSNP officers and VFHs on the benefits of school feeding programmes are similar. This means that SFPs play a very important role in the lives of the learners attending schools that participated in this study. All participants in this study agreed that SFPs provide various benefits such as hunger alleviation and improved school attendance, concentration and participation in class. Other benefits included improved nutrition among the learners, improved health status of learners, saving time for the learners and educators and job creation for VFHs who get an income from SFPs. Therefore, SFPs benefit the learners, their families and

communities.

4.8 Discussion

While the preceding sections presented the results obtained from various qualitative and quantitative techniques of data collection and analysis, this section will discuss or explain the meaning or significance of the results of this study as presented in this chapter.

The results indicated that the SFPs implemented in the selected primary schools in BLM of SA are in-school feeding whereby learners only receive mid-morning meals at school. The food given to learners is in the form of cooked meals that are prepared and served on the schools' premises. This is one of the SFPs modalities whereby children receive cooked meals at school (Bundy et al., 2009; WFP, 2013; Yendaw and Dayour, 2015). The provision of food to school children is one way of alleviating short-term hunger and responding to the constitutional right to have access to sufficient food (Republic of South Africa, 1996). This contribution of the SFPs to food provision and hunger alleviation is an important aspect of the conceptual framework of this study. School children that do not have food at home are now guaranteed to get food at school so that they are able to learn and thereby addressing the right to basic education. The important role of SFPs in alleviating hunger cannot be overlooked as it is beneficial to the growth and development of children (Uduku, 2011; Hochfeld et al., 2016) and it contributed to the sustainable development goal 2 of zero hunger (WFP, 2017a). Most learners (nearly 80 %) were satisfied with the quality of SFPs as implemented in their schools. Satisfaction with the food provided in the SFPs were reported by Hochfeld et al. (2016) whereby learners even rated the food from school as more nutritious than food received at home. The majority of the learners (64 %) in this study did not take a lunch box to school indicating that the food served at school was enough to fill them. Although this figure is a bit higher, the results corresponds with the report by the Human Sciences Research Council whereby more than half of the children (51.1 %) did not take a lunch box to school but relied solely on the SFPs and 37.2 % indicated that the food at school was enough for the whole day (Human Science Research Council,

2013). This shows the increasingly important role of SFPs in the primary schools that participated in this study. The NSNP contributed in addressing hunger and poverty among the learners, families and communities in which participating schools are located (Public Service Commission, 2008). Daily meals provided at schools are able to meet immediate food needs, provide future safety nets and offer long-term assistance and empowerment to children, families and communities (Langinger, 2011). School feeding programmes are an important intervention to address hunger, more especially in impoverished, rural communities.

The strongest and most sustainable SFPs are those that respond to community needs, are locally owned, and incorporate some form of parental or community contribution (Drake et al. 2016). It was also evident that the SFPs involved various stakeholders who play different roles to ensure that learners get food at the schools. Stakeholders for the NSNP, namely, school principals, members of the school governing bodies (SGBs), teacher coordinators or NSNP educators and volunteer food handlers (VFHs) were regarded as key role players who are expected to carry out different roles and responsibilities in the implementation of the programme (Public Service Commission, 2008). In South Africa, specifically BLM, the role of community members in the SFPs is very limited in the sense that it is only the VFHs (who cook and serve food for the learners) who play a clear and definite role in the programme. Although some community members look after the school gardens and provide firewood to some schools, these duties are done on a voluntary basis and they can cease at any time. In this study, the members of the SGBs assist with the appointment of the VFHs and sign their stipend cheques. The role of the SGBs to appoint VFHs is also documented by the Public Service Commission (2008). These community members do not have any influence on the design and implementation of the programme.

School feeding programmes in various countries involve communities in one way or another but their level of involvement differs. The conceptual framework of this study proposes that communities can benefit more from SFPs if their level of participation is expanded to more than what they currently do. Communities can be supported in food production activities and supply food to the SFPs. In this way, communities will feel

more involved and can have a sense of ownership of the programme because it will create job opportunities, generate income for the rural communities and improve the local economy. When SFPs buy food from local suppliers, this generates benefits for the local economy (Kretschmer et al., 2014). Kretschmer et al. (2014) share WFP's support for sustainable SFPs that rely more on local resources, local capacity and community participation. Although the level of participation by communities in South Africa's NSNP are currently limited, the conceptual framework of this study proposes expanded roles for the communities. In Brazil, parents together with teachers and representatives from civil society organisations are members of a school feeding committee and they have a supervisory role across the supply chain from food purchase to delivery, support the work of the nutritionists in the design of school menus, monitor the quality of school food, overseeing the use of transferred funds and ensuring product quality (Sonnino et al., 2014). In the case of Brazil, parents play an active role in the implementation of the SFPs. The lack of influence in the design and implementation of SFPs by community members has also been reported with Ghana's SFPs. The inclusion of the community at the school level is well designed and incorporated into the Ghana SFP literature but, in practice, the community's participation is minimal (Drake et al., 2016). In Kenya, community participation in the SFPs is strong as they contribute firewood, water, cash for cooks' salaries and salt (Langinger, 2011). Additionally, every school has a school management committee consisting of parents, teachers and community members and this committee is in charge of buying food from local farmers, cooperatives and traders (Langinger, 2011). Therefore, SA could learn from these countries by putting in place proper coordination and community participation that would be supported by suitable policies and inter-sectoral collaboration among various government departments.

It was made clear in the preceding sections that in addition to alleviating hunger, SFPs offer educational benefits such as improving attendance, concentration, and participation in class. Other benefits mentioned in this study included improving nutrition and health of the learners, saving time and generating income for some families. These benefits are directly applicable to the learners whereas others are directly and indirectly applicable to the communities. Improved school attendance has been reported by

various studies as one of the benefits that SFPs brought (Jomaa et al., 2011; Alderman et al., 2012; Buhl, 2012; Kazianga et al., 2012; Krishnaratne et al., 2013; Yendaw and Dayour, 2015; Hochfeld et al., 2016). Improved concentration and participation in class have been reported as other educational benefits of SFPs (Kazianga et al., 2012; Hochfeld et al. 2016).

By providing children with meals, SFPs seek to overcome food and nutritional deficiencies (Sumberg and Sabates-Wheeler, 2011). Therefore, the nutritious meals provided by SFPs play a very important role in addressing food and nutrition security. Although SFPs contribute to improved nutritional status of learners, this study did not focus on that, but discussions emanating from this study mentioned the nutritional benefits of SFPs which were only based on the theoretical knowledge and opinions of the participants such as “*school meals provide energy*”, “*the meals are nutritious*”, “*school meals have nutrients that protect, strengthen and build our bodies*”. It is true that improved nutrition alleviates hunger and nutritious food will provide energy and other nutrients that play different roles in the body. The subjective experiences of improved energy were also reported in a study conducted by Hochfeld et al. (2016) in schools that were part of an initiative by a private non-profit foundation that provided an in-school breakfast consisting of a fortified cooked porridge that was served every morning to complement the one meal provided by the NSNP. Although the study reported on positive and statistically significant nutritional changes such as the reduction in the number of overweight and stunted children among children in schools that participated in the school breakfast programme, this was based on the anthropometric measurements that were taken during specific intervals of the study (Hochfeld et al., 2016). The authors indicated that it was unclear whether these changes were due to the breakfast programme or other factors that may have also influenced these changes, but they concluded that the breakfast programme could be perceived to have contributed positively to the health and well-being of children participating in the programme (Hochfeld et al., 2016). Bundy et al. (2009) and WFP (2014) argued that, in order for SFPs to offer important nutritional benefits, they should include complementary programmes such as deworming, micronutrient supplementation and fortification and should seek to complement and not compete with nutrition programmes for younger

children, which remain a clear priority for targeting malnutrition. The SFPs were reported to provide health benefits to the learners in this study. This result was also based on observations made by the educators and therefore it could not be concluded that the illnesses and sores that the learners had were healed due to the meals offered at the school. Closely related to health is the aspect of hygiene practices which was observed in this study from learners in several schools when they washed their hands before meals. This practice was attributed to the knowledge shared and reinforced by some educators. The habit of hand-washing was reported as one of behavioural changes that was brought by SFPs in Côte d'Ivoire (Drake et al., 2016). The fact that meals are offered within the school premises is an advantage for both learners and educators as this prevents learners who stay far from arriving late at school as they would have to walk home and back to school during break.

In addition to providing benefits to the learners, SFPs in this study also provide indirect benefits to the communities by creating job opportunities. Thirty (30) community members, who were employed as volunteer food handlers (VFHs) participated in this study and they all mentioned that the income they received helped them to provide for their families. This is the only direct financial benefit that certain community members get from SFPs. The SFPs' role of creating jobs for community members who are employed as cooks or VFHs has been reported in various studies carried out in several countries (Republic of Ghana, 2011; Uduku, 2011; Republic of Namibia, 2012; Department of Basic Education, 2015). In addition to being cooks, local community members in Botswana were employed as hand stampers to process sorghum grain with their own equipment and sell it to the SFPs (Republic of Botswana, 2014). Currently, the suppliers of food who are not from the local communities where the schools are situated benefit from SFPs because they get income from delivering food to the schools. The conceptual framework of this study propose that SFPs could benefit the communities more if they are supported and enabled to produce vegetables and access the SFPs as a market where they can sell their vegetables. The promotion of home-grown school feeding or local food production by local smallholder farmers as suppliers of food to SFPs is receiving much attention in various countries as it can link SFPs and agriculture. The concept of local food production and linking smallholder farmers to

SFPs has yielded good results, such as increased access to markets, increased income and food security at household and community levels (Sumberg and Sabates-Wheeler, 2011; Uduku, 2011; Sidaner et al., 2012; Wittman and Blesh, 2017). One of the objectives of the NSNP is to support the development of food gardens in schools so that the food could be used in the SFPs and at the same time learners could be equipped with food production skills (Department of Basic Education, 2015). This study's conceptual framework propose that food production be expanded to the wider communities so that they could benefit from selling food to the schools. Although nine of the eleven schools that participated in this study had school gardens, the produce from the gardens (if there was any) must supplement the SFPs and the community members do not get direct benefits. If some of the produce is sold, the money goes to the school. Therefore, the aspect of promoting local food production among community members and creating a market through the SFPs is an avenue that is worth pursuing so that the communities can get direct benefits from it.

School feeding programmes involve communities and, in some cases, the community members are exposed to skills acquisition opportunities. This is an additional indirect benefit to the communities. While the SFPS in Côte d'Ivoire increased knowledge and built the capacity of communities through training on agricultural production techniques, entrepreneurship and monitoring activities by community members, smallholder farmers in Kenya's SFP acquired food production skills and agricultural techniques to enable them to improve local food production (Drake et al., 2016). Some of the VFHs that participated in this study attended a workshop on food safety and personal hygiene so that they could apply the knowledge gained into practice when cooking and serving food for learners. This knowledge should also be applied at their homes or at any place where they work with food. None of the participants in this study mentioned this training as a benefit to the community members. This could be because benefits are mostly associated with direct income or getting money. Therefore, community members should be made aware of the importance of benefits, other than money, that they could get from participating in the SFPs and how these benefits could contribute to their lives now and in future.

Although this preceding section discussed the benefits provided by SFPs, challenges were also mentioned. The main challenge in this study was with the supply chain and logistics, which caused the non-delivery of food by suppliers. Some suppliers delivered food later than expected, some deliveries were incomplete and some foods were of poor quality (e.g. bananas) and had to be returned. This affected the learners negatively because, without food at school, they remain hungry and have to go home during break so that they could eat. Learners who do not have food at home were seriously affected. The conceptual framework propose that local community members be afforded an opportunity to produce and supply food for the SFPs, but this should be done without compromising the quality and quantity. The lack of proper food preparation, storage and eating facilities was also mentioned by Rendall-Mkosi et al. (2013). Gresse et al. (2017) reorted that four schools in Nelson Mandela Bay, South Africa had an acceptable kitchen for preparing food but they did not meet the necessary requirements of space, plumbing and electricity. The schools did not have the minimum required amount of equipment and utensils prescribed by the Department of Basic Education (Gresse et al., 2017). The lack of appropriate food preparation facilities such as well-equipped kitchens poses a serious risk and hinders the adherence to food safety and hygiene practices. This is supported by the findings of a study that looked at the hygiene and nutritional content of NSNP in Bloemfontein, SA (Nhlapo, 2013). Proper food storage facilities and practices are necessary to minimise loss of nutrients caused by exposing foodstuffs to surrounding elements (Nhlapo et al., 2015). Poor hygiene practices in terms of hand-washing was also raised as a serious concern in another study whereby VFHs stated that they washed hands properly before and during food preparation but the observations revealed otherwise, only a few (2.5 %) adhered to proper hand-washing and some dried their hands using aprons (Nhlapo, 2013). Rendall-Mkosi et al. (2013) reported poor hygiene practices regarding hand-washing at school in Mpumalanga. Gresse et al. (2017) recommended that due to the high level of parasitic infection, schools should give special attention to hand washing amongst other things. The use of firewood for cooking has a negative impact on the environment because the forests would be depleted due to the continuous chopping down of trees that result in deforestation. Bundy et al. (2009) also mentioned the negative impact of using firewood for cooking as a hazard for the environment. Similar challenges such as

late delivery of commodities and poor quality of some food commodities were reported in Botswana's SFP (Republic of Botswana, 2014). Spoilage of food commodities due to unfavourable conditions at some warehouses; and old storage facilities were other challenges that affected Botswana's SFPs (Republic of Botswana, 2014). The lack of proper food storage facilities as mentioned in this study is a serious risk as this would affect the quality of perishable food such as fruits and vegetables. In this study, there were instances where some learners were dissatisfied with the manner in which certain food items were cooked and some learners experienced sore tummies and had diarrhoea after eating certain foods. This calls for proper monitoring and evaluation of the quality of food cooked and served to the learners and this should be done by qualified people. The identified SFP challenges should be addressed as a matter of urgency so that the programme can yield the desired results and have more impact on the lives of the learners and the communities at large.

4.9 Conclusion

This chapter discussed the SFPs implemented in the primary schools of BLM. It was revealed that the implementation of the SFPs is the same in the schools that participated in this study because they all offer in-school feeding where learners are fed at school. This included among others a centralised food procurement system whereby suppliers are contracted to buy and deliver food based on a menu to the schools, the use of VFHs to cook and serve meals at schools, the time for serving meals was 10 a.m. during school days. It was also clear that the implementation of the SFPs at schools involved various stakeholders (such as the DBE staff members at national, provincial and circuit levels, school principals, educators, learners and community members who are parents, SGB members, VFHs, and gardeners) who can contribute to the success or failure of the programme. The community members had a very limited role in the design and implementation of the programme. All participants agreed that it was good to have SFPs and nearly 80 % of the learners were satisfied with the quality of the SFPs. Of importance were the benefits that the participants associated with the SFPs such as hunger alleviation, improved education, improved nutrition and health of learners, time-saving and income generation. These benefits confirmed that the school

meals play a crucial role in the lives of learners and their communities. Despite the benefits, various challenges such as non-delivery of food, poor quality of food, lack of proper food preparation and storage facilities, inadequate monitoring of SFPs at school level, lack of proper support for school gardens were mentioned and there is a need to address the challenges to ensure the smooth running of the programme. Although this study did not focus on the educational and nutritional benefits of SFPs as well as challenges associated with SFPs, it was worth discussing them because they are somehow linked to the provision or non-provision of food in schools. When children get nutritious food they are able to concentrate and participate in class. When food is not delivered at schools, children would be hungry, their nutritional status would be negatively affected and they would not be able to benefit educationally because learning cannot take place on an empty stomach. Given the benefits of SFPs, it is crucial to explore other areas in which SFPs could make a valuable contribution. The focus of the next chapter would be on the role of school feeding in complementing the nutrition knowledge of the learners.

CHAPTER 5: RESULTS OF THE NUTRITIONAL KNOWLEDGE OF PRIMARY SCHOOL LEARNERS IN BLOUBERG LOCAL MUNICIPALITY

5.1 Introduction

The findings and discussions pertaining to the learners' level of nutrition knowledge, how they acquired the knowledge and ways of using the SFPs to complement the learners' nutrition knowledge are presented in this chapter. The learners were the main key informants in this case as they were given a questionnaire with various sections about nutrition knowledge and they also participated in focus group discussions. The sections of the questionnaire are (1) knowledge of food groups, types of food and their functions in the human body; (2) knowledge of healthy food choices; (3) knowledge on the relationship between diet and diseases; and (4) general questions. The demographic information of the learners is presented first and then the results on the learners' level of nutrition follow. These findings were obtained using quantitative and qualitative methods of data analyses. The findings are presented first and the linkage between the findings and the conceptual framework of the study would be presented later in the discussion section.

5.2 Demographic Information of the Learners

Four-hundred-and-seventy-four (474) learners between the ages of 10 and 15 years participated in this study (Figure 5.1). Fifty-seven percent (57 %) of the 474 learners in the study were female. The number of participants was high in the age groups of 11 and 12 years with very few participants in the age group of 15 years. All learners were Black Africans and almost all (472 of the 474 learners in the study) were South Africans. The learners were between Grades 3 and 7 but the highest number of participants were in Grades 6 and 7 with a few participants in Grade 3 (Figure 5.2).

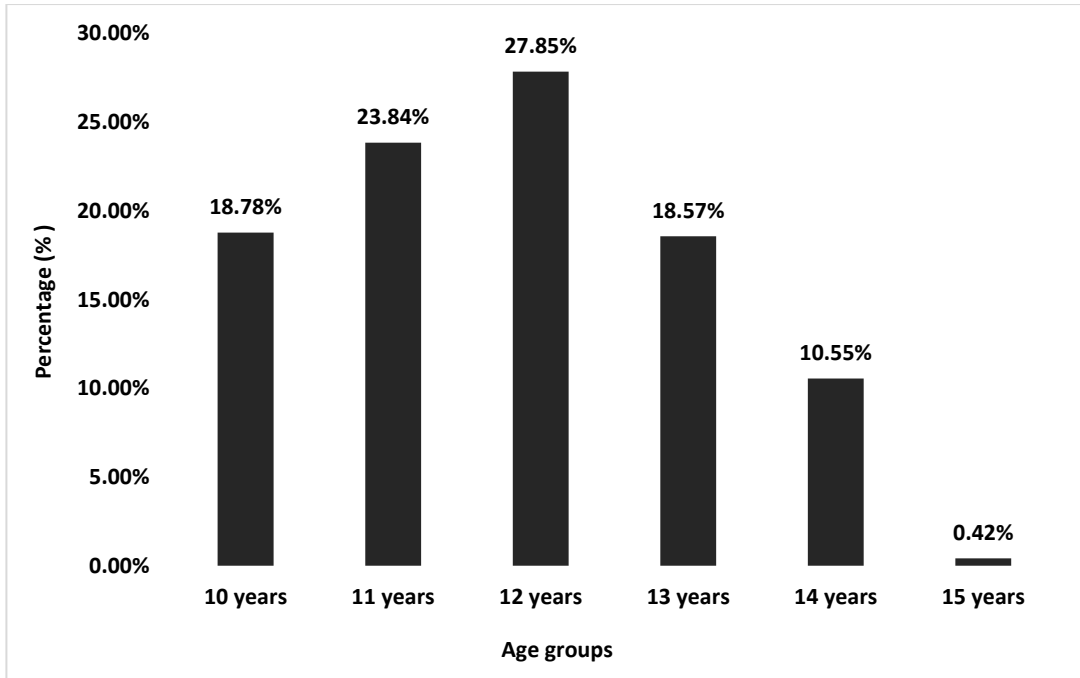


Figure 5.1 Ages of learners

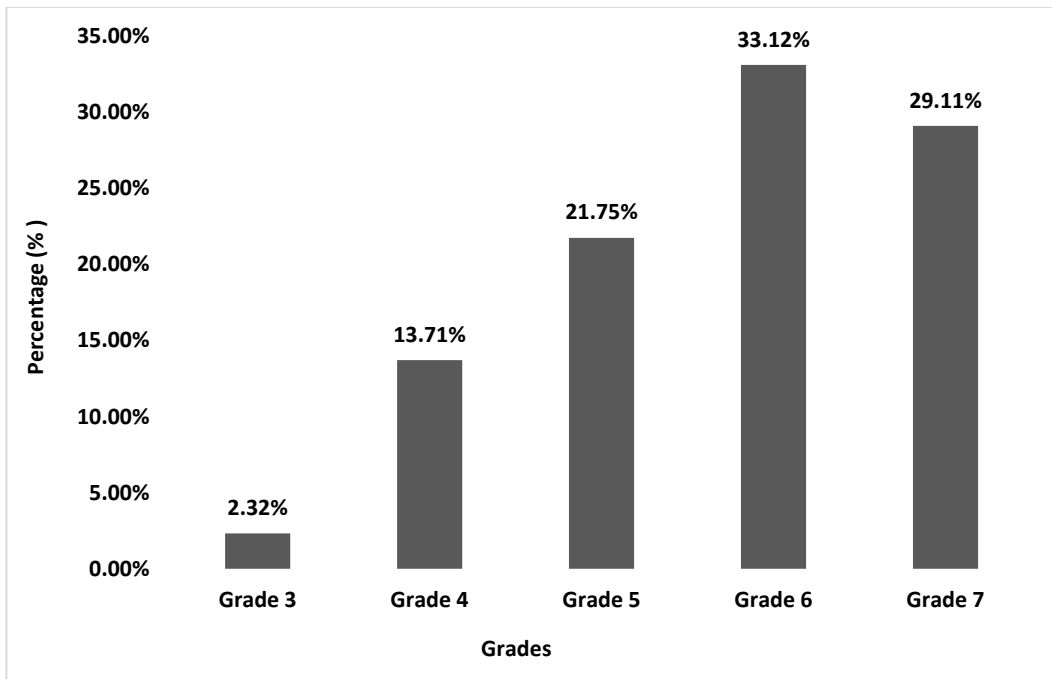


Figure 5.2 Grades of learners

5.3 Nutrition Knowledge of the Learners

5.3.1 Food groups

All learners (474) indicated that they know the different types of food groups. The results revealed that learners had different views when asked about the different types of food groups (Figure 5.3). Most learners could not provide correct answers but more than half knew that fruits and vegetables protect the body against illnesses (51 %) and 61% knew that food from the fats and oils group should be restricted in meals. Some learners mentioned certain food items (e.g. sweets, sugar, chocolate and coke) as playing an important role in their health.

The learners were asked about the amounts of food to be eaten in a healthy diet and most learners were of the opinion that vegetables (83 %), fruits (72 %), and milk and dairy products (63 %) should be eaten more in a healthy diet. Most learners (47 %) mentioned that less amount of meat (i.e. chicken, beef, lamb, pork) should be eaten in a healthy diet. Other learners mentioned that sugary (35 %), fatty (33 %) and salty (28 %) foods should be consumed sparingly in a healthy diet. Some learners were not sure of the amounts of each type of food to consume in a healthy diet. Learners showed varying knowledge regarding amounts of food to be eaten in a healthy diet.

Learners were given statements about food, their functions and potential benefits to the human body. The first set of statements had three possible answers each and learners had to choose the correct answer. The results indicated that most learners knew that water is the best beverage to quench thirst (94 %), carrot is associated with good eyesight (86 %), a peanut butter sandwich is a snack they could eat in the morning (78 %) and maize meal porridge is the best source of energy (60 %). Less than half of the learners (48 %) knew that milk is good to strengthen bones and teeth and 36 % knew that eggs are the best source of protein.

The information presented above clearly shows that the learner's level of nutrition knowledge is questionable as there are some inconsistencies in some answers. They

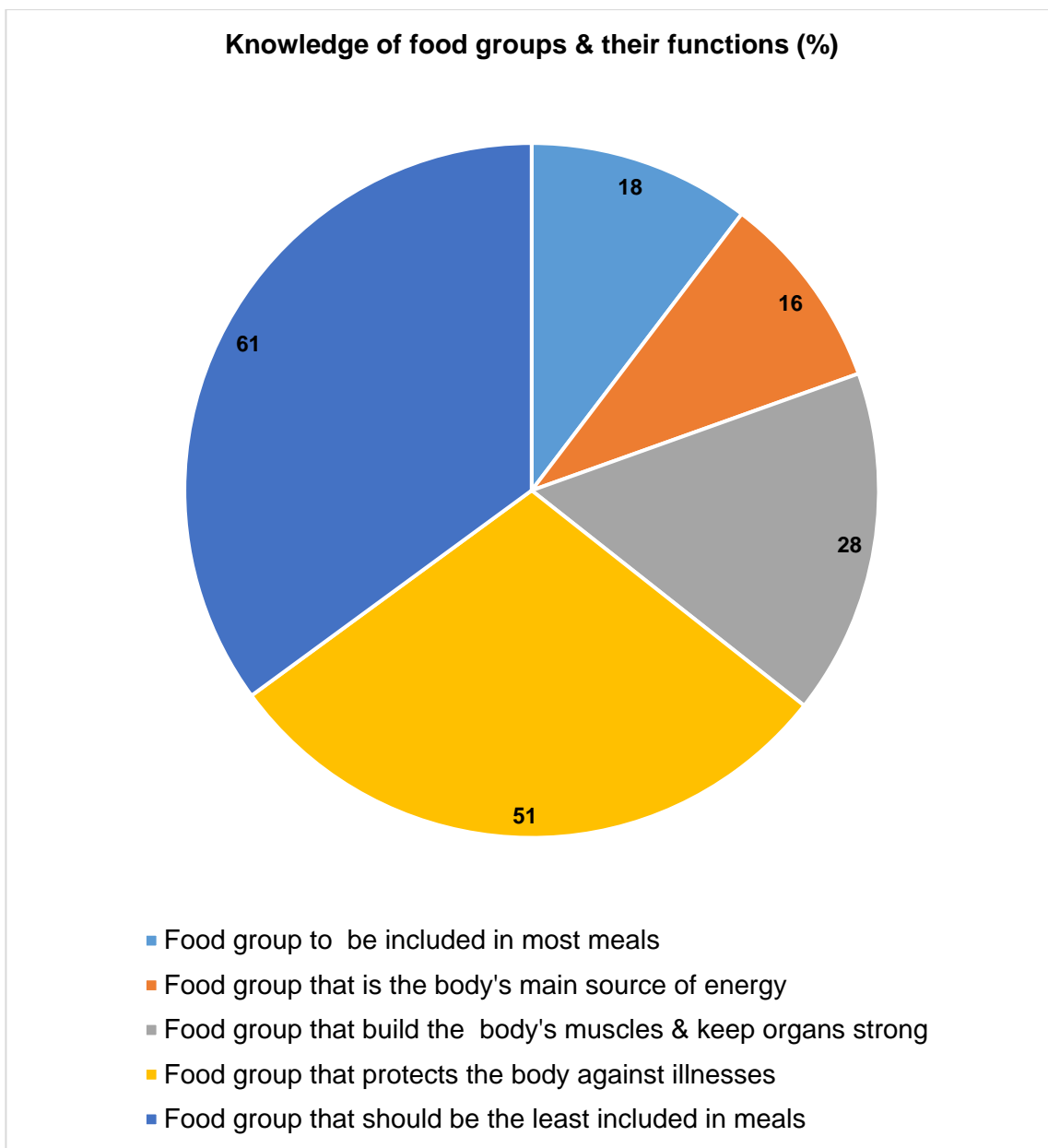


Figure 5.3: Knowledge of food groups

could have been guessing for the sake of just answering.

The second set of statements required learners to indicate whether they agreed or disagreed with each statement by placing a tick in the “Yes” or “No” box. A high percentage of learners (93 %) knew the importance of eating breakfast every morning, as they believed it helped them concentrate better in class. Most learners knew that maize meal porridge is a good source of energy (90 %), cabbage, yellow-flesh fruits, and vegetables are good for their eyesight (86 %), and milk is important for strong bones and teeth (86 %). Most learners (78 %) knew that non-dairy creamers such as Cremora are not as nutritious as fresh milk or *maas*, therefore, they could not replace fresh milk or *maas* in a child’s diet. Most learners (66 %) were of the opinion that eating apples will help strengthen their teeth, 65 % did not know that eating a lot of sugar, sweets and sweet food could result in weight gain and 71 % of the learners did not know that fats and oils play a vital role in their bodies.

5.3.2 Healthy food choices

Learners were given pictures of 20 different types of foods and their names. They were requested to allocate the foods according to the different food groups in a table provided and thereafter indicate the most and least healthy food from each of the food groups. The names of food groups were provided in the table. The results indicated that few learners allocated foods to the correct food groups and differentiated between the most and least healthy types of foods in each of the food groups. Thirty-eight percent (38 %) grouped foods in the milk and milk products food group correctly, followed by 27 % who grouped starchy foods correctly. Only 12 % of the learners allocated fruits and vegetables to the correct food group. Most learners grouped the foods incorrectly and allocated some food items to more than one food group. The same pattern was noticed when they classified the most and least healthy types of foods.

Furthermore, the learners were given pictures of two different foods and their names. Each pair of the pictures of foods consisted of a healthy and an unhealthy food. The learners were requested to choose a healthy type of food from each pair. The results

indicated that most learners (92 % and above) were able to choose healthy types of foods.

The results showed that some learners brought food from home (171 or 36 % of learners) and many of the learners who brought food from home included brown bread in their lunch boxes (131 of the 171). Other food items such as margarine and peanut butter accompanied bread. Food items such as concentrated juice, French polony, cheese, apple, banana, and *atchar* were also consumed as lunch at school. The results showed that 432 of the 474 learners in this study (91 %) took money to school so that they could buy something to eat. Figure 5.4 shows the food choices that learners made when they had money. The top most frequently bought foods were *Dizimba*, which is Simba chips (76 %), sweets (73 %), biscuits (41 %) and sweetened ice (31 %).

The results from the focus group discussions with the learners confirmed that the foods presented in Figure 5.4 were bought by learners at school. The learners' food choices were based on the following criteria:

- the food tastes good and is delicious;
- the food helps to fill the stomach;
- the food gives energy;
- these are the most favourite snacks liked by the learners;
- these are the only foods sold by the vendors; and
- other learners buy these foods and the rest follow (peer pressure).

5.3.3 The relationship between diet and diseases

Five statements about the excessive or inadequate consumption of certain food, the consumption of an unhealthy diet, lack of physical exercise and their association with diseases or health problems were included in the questionnaire. The purpose of including the statements was to find out if the learners were aware of any health problems and/or diseases that are related to any of the statements. The results in terms of the learners' degree of awareness about diet-related diseases revealed that 86 % of

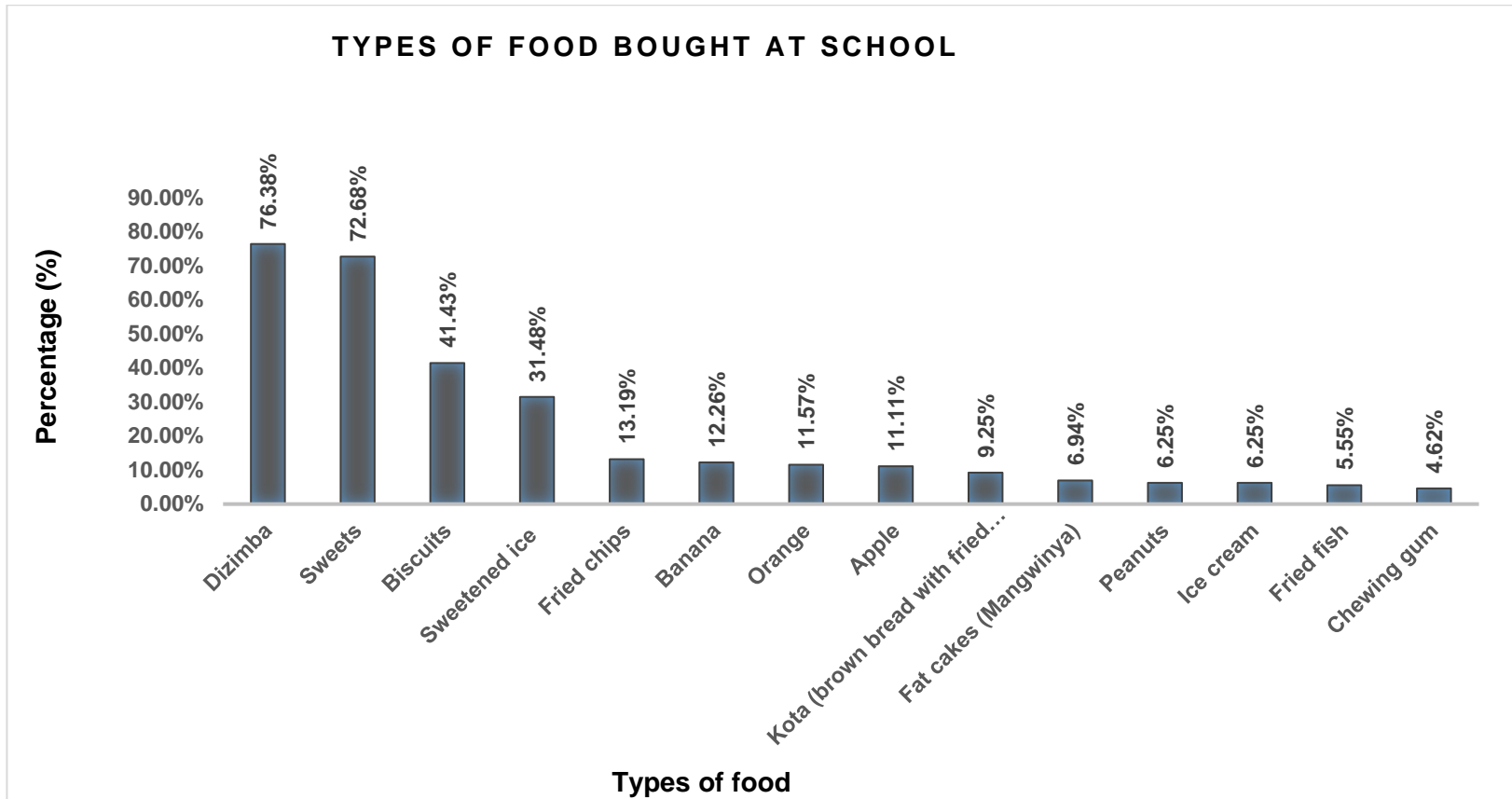


Figure 5.4 Types of food bought at school

the learners were aware of diseases related to the consumption of a diet with too little fibre and with too much salt. The learners (74 %) were aware that the consumption of too much sugar could cause diet-related diseases. More than half of the learners (55 %) were aware that an unhealthy diet coupled with no exercise could cause health problems and 52 % were aware that too much fat in the diet could cause diseases.

5.4 Nutrition Education in Schools

The focus group discussions with the NSNP officers and educators revealed that the learners are taught nutrition education in schools and this is included in the Life Skills (Grades 1–6) and Life Orientation (Grade 7) curriculum. According to the NSNP officers, the NSNP educators attended a workshop on personal hygiene and food safety and they were supposed to share the information with the learners. The NSNP officers also indicated that Environmental Health Practitioners (EHP) visited the schools to share information on food safety and personal hygiene. Two NSNP educators mentioned that they use the food group charts they received from the Department of Basic Education (DBE) to teach nutrition education in addition to the Life Orientation curriculum. Table 5.1 presents the topics included in the curriculum.

The educators indicated that they assess the learners in various ways to ensure that they have learnt about nutrition. The following methods of assessment were mentioned:

- Written tests
- Food recall project (e.g. learners are expected to record all food items they ate for a period of seven days and they should indicate the food groups they belong to and the nutrients they can get from each food item)

Behaviour change, for example, learners were encouraged to wash hands before and after eating. They were also encouraged to wash hands when they come from the toilets – the water for washing hands was placed in front of the classroom as a way of reminding them to wash hands. The researcher has also observed bowls of water outside the classrooms in one school and the

Table 5.1 Nutrition education topics in primary schools

Grade(s)	Subject	Nutrition Education Topics
2 - 3	Life Skills	Healthy eating and a balanced diet <ul style="list-style-type: none"> - Food groups: <ul style="list-style-type: none"> ✓ Vitamins – fruits and vegetables ✓ Carbohydrates – bread, maize/mealie meal ✓ Proteins – eggs, beans, meat, nuts, dairy (milk, cheese, yoghurt) ✓ Fats and oils
4	Life Skills	<ul style="list-style-type: none"> - Personal and household hygiene (hygiene at home, diet and dental hygiene)
5 - 6	Life Skills	<ul style="list-style-type: none"> - Healthy eating for children - South African Food-Based Dietary Guidelines - Dietary needs of children - Factors influencing food intake of children
7	Life Orientation	<ul style="list-style-type: none"> - Personal diet and nutrition - Factors that influence choice of personal diet - Ways to improve the nutritional value of own personal diet: A plan for healthy eating habits.

learners were washing their hands. Some NSNP educators mentioned that learners ate the food served at school because they know it is healthy and will help them concentrate in class. This fact was substantiated as follows:

Some learners did not like spinach and dry beans but after the lessons on foods, nutrients and their roles in the body, the learners changed their attitude and can now eat these foods.

All learners (474) who participated in this study indicated that they were taught about healthy eating at school and gave indication of nutrition–related information that they gained from the lessons. The focus group discussions with the learners and interviews with educators confirmed that learners were taught, as part of the Life Skills and Life Orientation curriculum, about healthy eating, food groups and their importance.

5.5 Decision on the Null Hypotheses Tested

Table 5.2 presents the decisions that were taken on each of the research hypotheses based on the findings of the study at the 5 % level of significance. Decisions were made at the 5 % level of significance based on P-values obtained from binary logistic regression analysis as well as results obtained from in-depth interviews. At the 5 % level of significance, a null hypothesis is rejected if the P-value obtained from binary logistic regression analysis falls below 5 %. Otherwise, the null hypothesis cannot be rejected at the 5 % level of significance.

5.6 Discussion

This section will discuss the results concerning the learners' level of nutrition knowledge and their significance to this study.

Hunger coupled with malnutrition affect the children's health and development and hinders their ability to benefit from educational opportunities (Hochfeld et al., 2016). This could have far reaching consequences for the children who are the future leaders

Table 5.2 Decisions made on research hypotheses

Null hypothesis tested as part of study	Decision made at the 5% level of Significance
<p>The degree of satisfaction of learners on the quality of the school feeding programme does not depend on the degree of understanding of learners on the potential benefits of eating a variety of food types.</p>	<p>Null hypothesis is not rejected with P= 0.000</p>
<p>The degree of satisfaction of learners on the quality of the school feeding programme does not depend on the degree of understanding of learners on the harmful nature of eating too much fatty food.</p>	<p>Null hypothesis is not rejected with P=0.000</p>
<p>The degree of satisfaction of learners on the quality of the school feeding programme does not depend on the degree of understanding of learners on the harmful nature of eating too much sugary food.</p>	<p>Null hypothesis is not rejected with P=0.001</p>
<p>The degree of satisfaction of learners on the quality of the school feeding programme does not depend on the degree of understanding of learners on the harmful nature of eating too much sweet food (sweet food can make people fat).</p>	<p>Null hypothesis is not rejected with P=0.047</p>

of nations. The poor nutritional status of South African school children have been reported in various studies (Vorster, 2010; Shisana et al., 2013; Maunder et al., 2015; Monyeki et al., 2015) and this is a serious cause for concern. Good nutrition is important for the health, development and educational performance of school age children. Poor nutrition knowledge is one of the main factors in the development of malnutrition and needs to be addressed (Briggs et al., 2010). Therefore, school children need nutrition knowledge so that they can make the right food choices and establish healthy eating habits. Nutrition knowledge can be acquired through nutrition education lessons. Therefore, the need for nutrition education, especially for school children, cannot be overemphasised. Schools in this study taught nutrition education as one of the many topics forming part of the Life Skills (Grades 2 – 6) and Life Orientation (Grade 7) syllabus. Schools are the main settings from which nutrition education can be taught (Hawkes, 2013; Kupolati, 2016) and they provide a huge opportunity to reset norms about healthful diets and good nutrition practices (International Food Policy Research Institute (IFPRI), 2016). According to the Department of Basic Education (2015), nutrition education, which promotes healthy lifestyles and sound eating habits among learners and school communities, is a key pillar of the NSNP. Although nutrition education forms one of the objectives of the NSNP in South Africa, it has not been given the necessary emphasis that it needs because it is only included as a small section in the curriculum. This is a finding that concurs with what was reported by Oldewage-Theron and Abdulkadir (2012).

A study by Kupolati et al. (2016) confirms the above statement because the teachers indicated that the time allocated to teach nutrition in schools is inadequate. The main purpose of teaching nutrition is to impart nutrition knowledge that should be translated into behaviour change which require practical demonstrations and activities that goes beyond theory. The little attention given to nutrition education has also been reported by FAO (2011) whereby from 2004 to 2007, only 1.7 % of development and emergency food aid was dedicated specifically to improving nutrition and nutrition still takes only 3 % of the total given for health with a very small proportion dedicated to nutrition education. To supplement the small section of nutrition education in the primary school syllabus, DBE provided educators with resource materials to support the curriculum and

provide information on hygiene practices to learners, educators and parents through awareness campaigns (Department of Basic Education, 2015). It was found in this study that schools used textbooks and posters for food groups and hygiene practices for teaching nutrition education. Teachers argued that although they get support for nutrition education in schools, the support given was inadequate (Kupolati et al., 2015).

Despite the inclusion of relevant nutrition topics (healthy eating, food groups, South African Food-Based Dietary Guidelines, hygiene) in the school curriculum and the confirmation from the learners ($n = 474$) that they had knowledge of these topics, the level of nutrition knowledge for the learners in this study was low as was the case with a study by the Human Science Research Council (2013) that reported that the majority (71.7 %) of SA children had a low score on general nutritional knowledge. The learners in this study had varied views when asked questions about the different types of food groups and their functions. They could not provide consistent answers even when asked the same question repeatedly in different sections of the questionnaire. The South African FBDG emphasises that starchy foods are the main source of dietary energy and they should be part of most meals (Vorster et al., 2013) but most learners (84 %) in this study did not know this. The learners 60 % chose maize meal porridge as the best source of energy over milk and an apple whereas 90 % of the learners agreed that maize meal porridge is a good source of energy. Most learners (86%) agreed that milk will strengthen their bones and teeth, but only 48% of the learners chose milk as a food that will strengthen their bones and teeth, over meat and an apple. Surprisingly, 66% of the learners also agreed that eating apples will help strengthen their teeth. These results show a lot of inconsistencies because different answers were provided to answer the same question that is asked on the different sections of the questionnaire. This could be attributed to the fact that the learners did not know much about food groups and their functions.

Although the FBDG recommends that fatty, salty and sugary foods be used sparingly (Vorster et al., 2013), few learners in this study knew that fatty (33 % learners), sugary (35 % learners) and salty (28 % learners) foods should be eaten sparingly. Most learners (65 %) did not know that eating a lot of sugary foods could result in weight

gain. The consumption of fatty, salty and sugary food in larger quantities could cause serious health problems such as weight gain, high blood pressure, dental decay and obesity (Vorster et al., 2013). The lack of knowledge among learners in this study put them at risk of developing health problems related to the excessive consumption of such foods. The results also revealed that most learners could not allocate the different types of foods into the correct food groups and allocated some food items to more than one food group. The learners were not able to differentiate between healthy and unhealthy foods from a list of 20 food items and this contradicts with the results reported by the Human Sciences Research Council (2013) indicating that most children that participated in the SANHANES-1 were able to identify healthy food alternatives. Contrary to this is that most learners (92 % and above) were able to choose healthy types of foods when they had to choose between two food items.

Although most learners could choose healthy food types from a list of two food items, their buying patterns could not be associated with the knowledge they presented when choosing between healthy and unhealthy food items. These learners preferred and bought unhealthy types of food that were high in sugar, salt, and fat and this contradicts the recommendation by the South African FBDG. The availability of foods high in fats, sugars and salt sold in SA schools have been reported by Gresse et al. (2017) as is the case with this study. These foods included crisps, sweets, biscuits, sweetened ice, chips and fat cakes. Kupolati et al. (2015) concurred that vendors sold unhealthy foods and these foods were cheap, readily available and appealing to learners. In this study, learners based their decisions mainly on taste, likes or preferences rather than knowledge. This finding supports a statement by Zaborskis et al. (2012) who reported that there is growing evidence that young children from developing countries are increasingly making unhealthy food choices especially due to lack of knowledge and wrong perception towards healthy foods. The consumption of unhealthy food is associated with the onset of chronic non-communicable diseases (NCDs). Several studies have shown that an unhealthy diet is one of the key risk factors for NCDs and other health problems (Zaborskis et al., 2012; Hawkes, 2013; IFPRI, 2016; FAO, 2017).

It is evident from the results that most learners were aware of the relationship between diet and disease. They were aware that the consumption of a diet high in sugar, fat, and salt would cause health problems or diseases. They were aware that an unhealthy diet coupled with lack of physical activity could cause health problems. Despite their level of awareness, the learners could not translate this into action when choosing and buying their own food (i.e. they bought unhealthy food items that have a lot of sugar, salt, and fat). This confirms the results of another study which found that half of all young people in SA were reported to consume fast foods, cakes and biscuits, cold drinks and sweets on at least four days a week (Bradshaw et al., 2010). The consumption of unhealthy food confirms the statement by Swinburn et al. (2011) when they reported that populations are undergoing a nutrition transition that is characterised by a shift from traditional foods to a 'Western' diet that is more energy-dense and consist of processed foods, more foods of animal origin, and food with more added sugar, salt, and fat. Spires et al. (2016) mentioned that this transition is also evident in South Africa. The consumption of fatty, salty and sugary food by learners is evident in this study. The increased fat and sugar intakes in the diet of South Africans were also reported a decade ago by Steyn et al. (2006). This is a cause for concern because an unhealthy diet is one of the modifiable risk factors that cause chronic NCDs such as heart disease, stroke, cancer, diabetes and chronic respiratory disease (Beaglehole et al., 2011). The Human Sciences Research Council (2013) also reported on the prevalence of overweight and obesity among SA children (2 – 14 years) and if left unattended, these children will develop NCDs. Based on the above facts, it is crucial that action is taken to address the issue of an unhealthy diet and its related consequences.

For nutrition education to be effective, it should result in behaviour change. In this study, poor hygienic practices were observed whereby learners from some schools were seen washing hands from a common basin. However, learners from other schools used running water to wash hands and this was done without using soap. This happened despite DBE's awareness campaigns to provide information on hygiene practices to learners, educators, and parents. This finding correlates with what Nhlapo (2013) reported in a study whereby VFHs' hand-washing practices were unhygienic. Gresse et al. (2017) emphasised the importance of proper hand washing with the

necessary equipment such as a hand washbasin and soap among others. Some educators in this study mentioned that nutrition education brought positive changes in some learners who disliked spinach and dry beans, hence they did not eat these foods. These learners changed their attitude towards these foods after getting nutrition lessons. This is evidence that knowledge can influence one's attitude. In their study, Kupolati et al. (2015) reported that the teachers's views on the impact of nutrition education taught to learners in class were that it did not seem to significantly influence the learners' eating habits because learners were seen rejecting cabbage served in the NSNP as it was associated with poverty and they opted to buy unhealthy foods for lunch. This is indication that learners lacked proper nutrition knowledge, especially regarding foods beneficial to health. The lack of nutrition knowledge together with inappropriate nutrition education, misconceptions and passing of harmful diet traditions as well as poor nutritional practices from parents to children has been reported to contribute to unhealthy eating habits (Vorster et al. 2001). Kupolati et al. (2015) reported on parents' attitude towards certain foods and the influence thereof on learners eating behaviours and habits. Often, these attitudes are due to lack of nutrition knowledge and they tend to promote unhealthy food choices and eating habits.

The conceptual framework of this study suggests that one way in which SFPs could benefit the learners is through the promotion of nutrition education. One of the study's objectives was to establish the nutrition knowledge of the learners. Nutrition knowledge is acquired through nutrition education, which in turn improves nutrition knowledge. This objective fits well into the conceptual framework because the current nutrition knowledge of the learners will be a starting point to plan and implement any nutrition education lessons. In this study, the learners had poor nutrition knowledge. According to IFPRI (2016), diet choices available to people are shaped by the food systems, which are not sufficiently well geared toward enabling the consumption of high quality, healthy, and nutritious diets. Creating a supportive food environment is also one of the key strategies to make nutrition education effective (FAO, 2011; Kupolati et al., 2015). Therefore, the environment that supplies and makes food available and accessible, plays a crucial role in shaping food choices. Thow et al. (2015) mentioned that international research increasingly associates a rapidly changing food environment, that

is dominated by processed products high in sugar, salt and fat, with increasing levels of chronic diseases. The food environment is more influential than individual factors such as knowledge, attitudes, and behaviours (Thow et al., 2015). Unhealthy food environments promote unhealthy diets. The schools in this study have established a supportive environment that promotes healthy eating by providing nutritious school meals to learners, teaching nutrition in class and establishing school gardens as per the DBE policy. Some parents are involved in food production activities in the school gardens as well as the preparation of school meals for learners. Although the school curriculum includes a small section of nutrition, there needs to be some integration between the theoretical knowledge of nutrition, the school meals and the food produced in the school gardens so that it can bring the necessary change in terms of healthy food choices and eating. Kupolati et al. (2015) shared the same sentiments that the NSNP serves as an additional support to nutrition education in South African primary schools.

If well promoted, nutrition education will not only benefit the health and wellbeing of the learners but also that of educators who teach nutrition, parents and the communities. If learners have adequate nutrition knowledge, they would be able to pass the messages on to their parents and communities and this could enhance healthy eating habits. Kupolati et al. (2015) argued that learners who are well informed in terms of nutrition education can influence parents and communities by passing nutrition messages to them. The efforts made by the schools through the provision of meals, involvement of parents in school gardens and food preparation and nutrition education in the curriculum should be integrated rather than regarded as separate entities so that they will equip learners and parents with the necessary knowledge to make healthy food choices and adopt healthy eating habits. The schools provide learners with a nutritious meal on each school day; therefore SFPs offers an opportunity to influence the eating behaviours of school children.

Although the schools in this study established a supportive food environment for the promotion of healthy eating, the vendors selling food around and within the school premises sell unhealthy food items to the learners, and this together with the learners' low level of nutrition knowledge, jeopardise any good efforts made by the school. The

vendors and local shops (formal and informal) have a major influence on what the learners and the families buy and eat. Therefore, concerted efforts of promoting healthy food choices and eating should be addressed collectively at school, home and community level so that they can bring about the necessary changes. Lovelace and Rabiee-Khan (2015) concluded that food choices are complex and a number of competing and equally important issues, such as skills in implementing knowledge, pleasure, and choice, determine what constitutes the family food basket. The types of food sold, coupled with other factors such as learner's preferences, level of nutrition knowledge, the amount of money they have, socialisation (from home and friends), may promote or inhibit healthy food choices as well as healthy eating habits. In order for the SFP to achieve its objective of promoting healthy eating, the local food environment where learners buy food from should also comply by selling healthy food.

While a supportive food environment is necessary, it is equally important that people have the relevant nutritional knowledge and the skill to be able to apply the knowledge in choosing and eating healthy types of food. In this study, nutrition education, which will equip learners with the necessary knowledge and ability to make healthy food choices, should be given much attention. Kupolati (2016) reported improvements in the mean nutrition knowledge and mean nutrition attitudes for teachers after they took a nutrition education programme. This enabled them to understand nutrition better and to also teach it better to the learners. The learners' mean nutrition knowledge and mean nutrition attitudes which were initially low, improved after the teachers took a nutrition education programme because they were able to teach the nutrition section better than they did before the programme (Kupolati, 2016). Therefore, nutrition education can improve nutrition knowledge and to some extent influence attitudes. With the appropriate level of nutrition knowledge, learners would know alternative foods from each group and be able to make the correct choices when necessary. According to FAO (2011), many causes of poor nutrition are attitudes and practices which can be influenced by education, therefore, nutrition education is critical in this study. The low level of nutrition knowledge for the learners in this study is a serious concern because good nutrition is essential for all people.

Poor nutrition knowledge has been identified as one of the main factors that influence nutritional status (Vorster et al., 2001; Briggs et al., 2010). As a result, the learners in this study are at risk of developing poor nutritional status because of their low level of nutrition knowledge. Nutrition knowledge is one of the key factors in the prevention of risk factors associated with the early onset of chronic diseases because it enhances healthy food choices and optimal dietary practices to help lessen the burden of early-onset chronic diseases (Nani, 2016). Wenhold and Faber (2008) mentioned that forced, limited food choices through lack of availability, accessibility and often, nutritional knowledge, result in a diet often characterised by sufficient quantity but poor quality and this will cause micronutrient malnutrition. Several studies reported that people with more nutrition knowledge were more likely to make healthy food choices because they applied their basic nutrition knowledge (Parmenter et al., 2000; Kolodinsky et al., 2007; Steyn, 2010; Nani 2016). Based on the above, it is crucial that the learners receive appropriate nutrition education that will equip them with the necessary knowledge and skills in applying the knowledge to make healthy food choices. Establishing healthy eating habits in young children can prevent various chronic health disorders in childhood and adult life. Despite the learners' low levels of nutrition knowledge and the negative environmental factors such as vendors selling unhealthy foods and peer influences, more efforts are required to use the SFPs as a channel to reinforce nutrition education for the enhancement of healthy eating habits now and later in life. Healthy learners today will contribute to the development of their communities and ultimately to the economic growth of their communities and the nation in future,

The null hypotheses tested in this chapter revealed that the degree of satisfaction with the quality of SFPs is not associated with the learners' knowledge or understanding of nutrition (e.g. knowledge of the benefits of eating a variety of food types or knowledge on the harmful nature of eating too much fatty food). It is however, expected that when people know and understand the implications of choosing unhealthy types of foods, the chances are that they might use the knowledge they have to make healthy food choices, but this is not guaranteed due to other factors, such as availability, cost, taste, and preferences of food, that could influence people from making healthy food choices. The learners in this study require continuous, action-based nutrition interventions that

would equip them with the necessary information that would ultimately translate into desired behaviour change such as adopting healthy eating habits. The school environment should also support healthy eating and this could be achieved by selling healthy types of food within the school premises. Despite the challenges, nutrition education remains important in promoting healthy food choices and eating habits in school children and the SFPs present a great opportunity for nutrition education at schools.

5.7 Conclusion

Nutrition knowledge becomes important when it influences healthy food choices and eating habits. Nutrition knowledge will indirectly contribute to good nutritional status when good dietary practices are translated into practice and sustained in life. The level of nutrition knowledge for the learners in this study was low and this is a risk factor for chronic NCDs and other health problems. The learners in this study had theoretical knowledge of some components of nutrition, for example, they knew that eating plenty of fruits and vegetables protect the body against illnesses; sugary, fatty and salty foods should be consumed sparingly in a healthy diet and carrot is associated with good eyesight. The learners were aware of the relationship between diet and diseases but they did not have a wide range of knowledge of what constitutes a healthy diet. For example, the learners could choose a healthy type of food when food choices were limited to two but they could not do the same from a list of 20 food items. The learners could not allocate types of food to the correct food groups and choose healthy food alternatives. Moreover, the learners did not know that grains or starchy foods should be included in most meals. In this study, the learners failed to apply their nutrition knowledge when buying food because they chose to buy unhealthy foods such as sweets, chips and sweetened ice (ice-lollies). Although 86.08 % of learners agreed that the consumption of milk is good for strong bones and teeth, 52 % of the learners did not choose milk as a food item to strengthen bones and teeth and 66.46 % of the learners agreed that apples help to strengthen teeth. The findings from this study suggest that there is a need for effective nutrition education and interventions that will equip the learners with the necessary knowledge and encourage them to apply the knowledge to

make healthy food choices. The learners need to understand what constitutes a healthy diet and its benefits for their overall health. If learners could apply the nutrition knowledge when making food choices, this will influence their food choices throughout their lives. School feeding programmes present an opportunity to integrate social protection, education, nutrition, and agriculture to promote access to healthy food at schools and to also impart appropriate nutrition messages to learners.

CHAPTER 6: RESULTS ON THE CONTRIBUTION OF SCHOOL FEEDING PROGRAMMES TO RURAL DEVELOPMENT

6.1 Introduction

This chapter presents the findings and discussion on how the school feeding programmes (SFPs) in Blouberg Local Municipality (BLM) can facilitate rural development. These findings were obtained from focus group discussions with the volunteer food handlers (VFHs) and individual interviews with NSNP educators. While VFHs provided information with regard to development activities within the communities, NSNP educators mentioned development activities that involved the schools but not necessarily the entire communities. This is because they do not stay within the communities and are there for work purposes only. This chapter also presents the proposed framework that could be used to empower community members and promote food production activities through school and community food gardens.

6.2 Development activities in the communities

The results obtained from the VFHs, as members of the communities, indicated that there were not many development activities taking place within the communities. Some VFHs indicated that they were not aware of any development activities taking place in their communities at all. The section below presents development activities that were mentioned during the study.

6.2.1 School feeding programmes

All VFHs indicated that the provision of meals to school children in their communities is an important development activity that brought improvements in the lives of many in terms of alleviating hunger and ensuring food security for school children. The NSNP educators shared the same sentiments that SFPs alleviate hunger.

6.2.2 School gardens

The NSNP educators mentioned that the school gardens are used for sustainable food production. They mainly produce vegetables that are included in the school meals as and when they are available. The school gardens are also used to teach gardening skills to learners. Two primary schools that participated in this study did not have school gardens despite the fact that they had water in the school. Nine primary schools that had school gardens produced vegetables such as spinach, cabbage, onions, tomatoes, beetroot, carrots, butternut, and pumpkin. Four of these schools also had orange, peach and mango trees in addition to the vegetables they produced. Five schools that participated in this study had volunteer community members who looked after the school gardens. The gardens in these schools were in a good condition in comparison to four schools where the gardens were in a poor condition because they did not have dedicated people to take care of them, but the learners and some educators looked after these gardens. Two of these schools reported that goats from the village destroyed the vegetables that were planted in the school garden during the school holidays. Only five schools reported that they used some of the produce from the school gardens in the SFPs whereas others had not yet harvested any food from their gardens. The VFHs indicated that they were aware that some members of their communities were also involved in food production activities, mainly vegetable production and they sold the produce to get income to look after their families.

In SA, the NSNP promotes school gardens to develop skills and knowledge and augment nutrition (Department of Basic Education, 2016). Although the development of school gardens is one of the NSNP's objectives, there is no support from the DBE in terms of ensuring that schools have gardeners. Gardening is a full-time job that requires trained and dedicated personnel and should not be left as a responsibility for learners and educators who already have other important tasks. Bundy et al. (2009) raised similar concerns regarding the use of learners and educators to grow food on a production scale and look after school gardens. Expecting learners and educators to grow food on a production scale is an exploitative and inappropriate use of the education system and could have serious negative implications for education because it

cannot be reconciled with the educational aspirations of SFPs (Bundy et al., 2009). Volunteer community members who work in the gardens also need money to take care of their families. In order for the school gardens to be sustainable and serve their purpose, the DBE should compensate those who look after the gardens as they do with VFHs. Although school gardens can be a foundation for sustainable food production, they are normally too small to produce enough food to sustain the SFPs. Bundy et al. (2009) believes that much more convincing evidence is required before school gardens could be considered part of school feeding operations, except perhaps for educational purposes. A study conducted by Laurie et al. (2017) revealed that some schools in South Africa obtained food for the school meals from the school gardens, but raised concerns with the capacity of smaller gardens that would not be able to provide a continuous supply of vegetables in sufficient amounts for the school meals. In order to ensure sustainable food production in rural communities, community members should be encouraged to start community gardens that might supply vegetables to the SFPs and this could be linked to other food security and poverty alleviation projects implemented within various government departments. For example, food production activities could be linked to the greenery project of the Department of Health as part of the food security and poverty alleviation initiatives.

6.2.3 The Expanded Public Works Programme (EPWP)

The Expanded Public Works Programme (EPWP) employs some community members whose duties include keeping the schools clean. It was evident from one of the primary schools that participated in this study that these community members also look after the school garden. Instead of the EPWP to be implemented as a separate programme, it could be linked to other development activities implemented by other government departments such as the Department of Health, Department of Basic Education, Department of Social Development, Department of Rural Development and Land Reform, and the Department of Agriculture, Forestry and Fishers, among others.

6.3 Decision on the Null Hypothesis Tested

The following null hypothesis (H_0) was tested using P-values obtained from binary logistic regression analysis as well as results obtained from in-depth interviews.

- (H_0): School feeding programmes do not contribute to the development of rural communities

The hypothesis had an observed value of the Pearson chi-square statistic of 19.806 and is rejected at the 5 % level. Therefore, the study concludes that SFPs contribute to the development of rural communities.

6.4 School Feeding Programmes as a Facilitator for Development of the Rural Communities

The VFHs suggested ways in which SFPs could be used to facilitate development in their communities. Their suggestions were grouped into three categories as presented in Table 6.1. The suggestion made by VFHs regarding take-home rations is not a sustainable idea and it would create dependency. If the rural households could get the necessary resources and support to start their own vegetable gardens and other income generating activities, this would alleviate hunger and would be more sustainable than handouts. Other suggestions such as food production, job creation, access to resources, income generation and support by the government correlate to what was reported in the literature (Bundy et al, 2009; Drake et al., 2016; Wittman and Blesh, 2017). According to Drake et al. (2016), SFPs should be responsive to the needs of communities and can create and increase opportunities for the local population. The programme may strengthen the capacity of communities to take advantage of opportunities such as supplying goods and services in response to the demand created by SFPs (Drake et al., 2016). Evidence of community members supplying vegetables to the SFPs has been reported by Uduku (2011). Sumberg and Sabates-Wheeler (2011) mentioned that the SFPs that rely on the supply of vegetables by the local smallholder farmers could promote local food production and reduce poverty. Although this is true, it would require support from the government through policies, funding and capacity development for the rural communities so that they could meet the demand of SFPs and not compromise the quality of food supplied. Bundy et al. (2009) shared the same sentiments and mentioned that low-income countries that are implementing

Table 6.1 Ways in which SFPs can facilitate development of rural communities

Category	Specific suggestions (extracts from VFHs)
Food production, job creation, income-generation and access to resources	<p><i>SFPs should employ many community members.</i></p> <p><i>We (community members) can plant and sell vegetables to the schools.</i></p> <p><i>Vegetables for SFPs should be supplied by the community where the school is located.</i></p> <p><i>If we can expand the school garden and produce more vegetables, we can supply the SFPs throughout the year and no longer rely on suppliers from outside the community.</i></p> <p><i>If we are guaranteed a market, then we (community members) can start fruit and vegetable gardens and sell them for income.</i></p>
Support from Government	<p><i>Some community members have water and can grow vegetables. Identify such people to supply the SFPs with fresh vegetables and be paid.</i></p> <p><i>Community members do not want to work without being paid, we all need money.</i></p> <p><i>The school has water and available land. If community members can be given a portion of land in the school yard to grow vegetables, they can do that and sell directly to the school.</i></p> <p><i>The village has a water problem. The water is opened twice per week. If the water problem is addressed, the community can grow vegetables and supply to the NSNP.</i></p> <p><i>The Department of Agriculture should assist with tractors for ploughing and seeds so that the community members can plant.</i></p>
Take-home rations	<p><i>SFPs should be extended to poor households so that learners can have a meal after school when they are at home.</i></p>

SFPs = School Feeding Programmes

VFHs = Volunteer Food Handlers

NSNP = National School Nutrition Programme

government-funded SFPs are given a perfect opportunity to strengthen the links between school feeding and agricultural and community development. Furthermore, Bundy et al. (2009) reported that local purchase schemes have the potential to yield significant benefits, and have been shown to do so in high- and middle-income countries.

According to the Republic of South Africa (2011), as part of the CRDP, SA pledged to support rural households that had an interest in agricultural productivity through gardens and crop fields but it is not known whether the initiative was implemented and, if so, what the results are. Therefore, if government policies support local food production in rural communities, drive the implementation of such initiatives and use the SFPs as a market for rural communities to sell their produce and provide all the necessary resources and capacity for implementation, then the SFPs' role in rural development would be maximised.

6.5 A Framework to Empower Community Members and Promote Local Food Production

The proposed framework is based on the results obtained and reinforced by the information reviewed from the literature. Chapter 4 of this study revealed that SFPs alleviate hunger and present various benefits to the learners, their families, and communities. It was also revealed in Chapter 4 that the suppliers of food are from outside the communities and, at times, they fail to deliver food in time. This is a great opportunity for the local community members to supply food for the SFPs but they will need to get more information and skills that will empower them to perform this role efficiently. Furthermore, in Chapter 5 it was made clear that the learners need nutrition education interventions so that they could acquire the necessary nutrition knowledge that would enable them to make healthy food choices. Moreover, the sections preceding this one in this chapter clearly proved that SFPs could stimulate local food production and create employment opportunities for rural communities in BLM if the relevant policies and structures (supporting rural communities to supply SFPs with food)

are put in place. The communities in BLM are faced with high levels of poverty, dependency and illiteracy (Blouberg Municipality, 2017), therefore accessing SFPs as a market would offer opportunities for job creation, local food production, income generation and skills development. The literature reviewed also reported on these opportunities hence they could not be overlooked.

The proposed framework is supported by the theory of change underpinning home-grown school feeding (HGSF). This theory states that the social protection benefits and agricultural development benefits associated with HGSF, working in parallel and interacting, will be powerful enough to kick start the transformation of agriculture and subsequently of rural livelihoods in Sub-Saharan Africa (Sumberg and Sabates-Wheeler, 2011). According to Sumberg and Sabates-Wheeler (2011), the promotion of HGSF in Sub-Saharan Africa (SSA) is based on the following justification:

- The agricultural sector and the livelihoods of family farmers in Sub-Saharan Africa (SSA) can be transformed for the better through greater engagements with markets.
- This potential is currently constrained by the failure of input and output markets, poor infrastructure and sub-optimal use of productivity enhancing technology.
- However, by structuring demand in ways that make it easier, less risky and more profitable for family farmers to engage with markets and by providing an array of complimentary services such as training, credit and access to technology can make it possible for family farmers to access the market. Therefore, food procurement for social protection programmes such as school feeding, can be used to kick start this market-based transformational process.

The proposed framework (Figure 6.1) advocates for sustainable local food production in rural communities, the empowerment of community members and the access to markets such as the SFPs for rural economic development. This would be one way of responding to the CRDP's vision of creating vibrant, equitable and sustainable rural communities through strategically increasing rural development. This would be done through (1) the establishment of business initiatives and vibrant markets in rural settings; (2) the empowerment of rural communities; (3) capacity building initiatives

(training of rural communities in technical skills, incorporating indigenous knowledge to

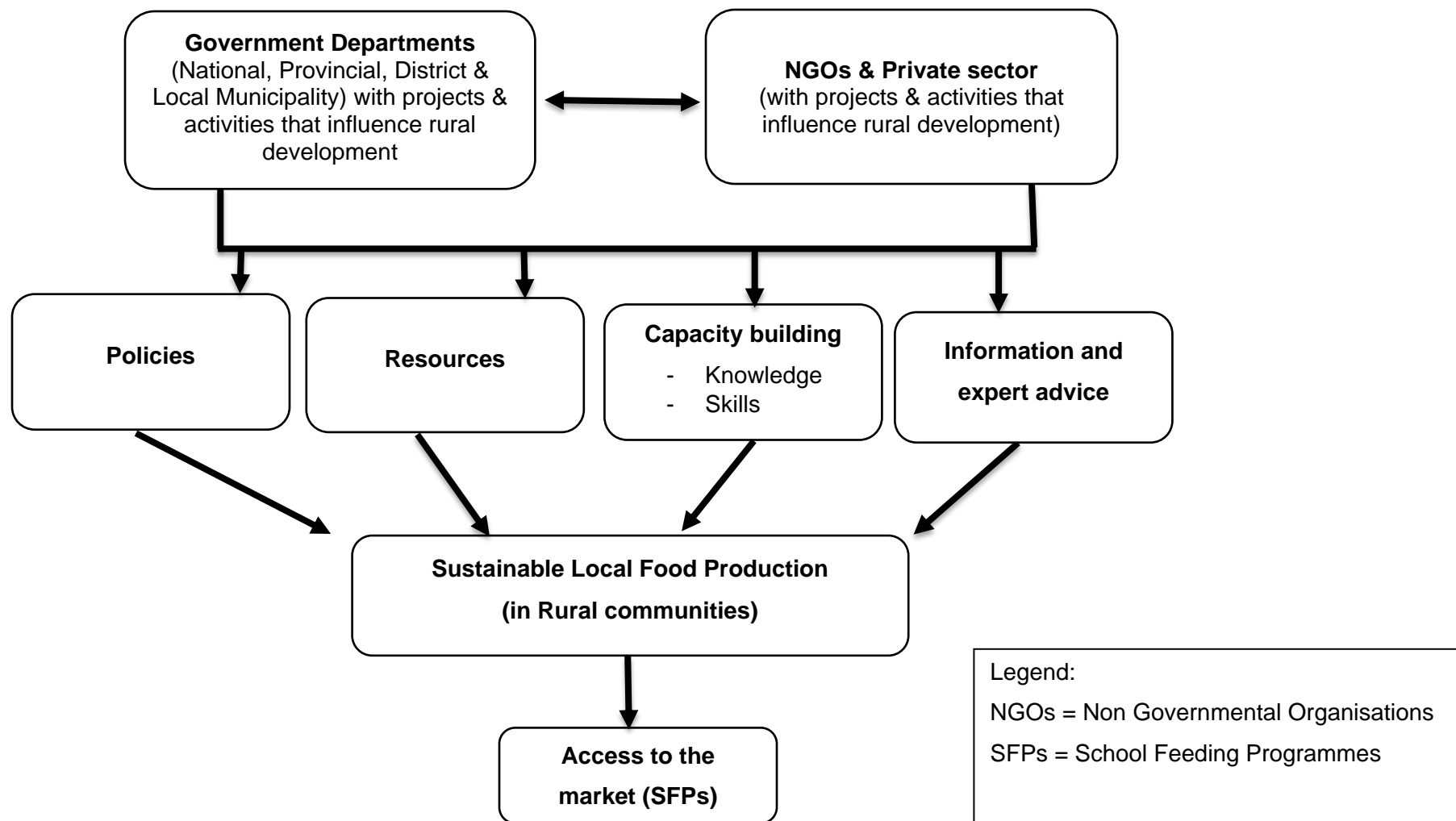


Figure 6.1 Framework for Promoting Local Food Production

mitigate community vulnerability to, especially, climate change, soil erosion, adverse weather conditions and natural disasters, hunger and food insecurity); and (4) the creation of new economic, social and information communication infrastructure and public amenities and facilities in villages (Republic of South Africa, 2009). This framework links better with the conceptual framework of this study (Fig. 1.1). While Figure 1.1 suggests that the SFPs could benefit learners and communities, Figure 6.1 suggests that in order for the communities to access the SFPs as a market and benefit fully from it, they need to be supported, empowered and capacitated with information, skills and expert advice. Learners will get foods that are produced within their communities and these foods will alleviate hunger, enhance nutrition and education. Moreover, the learners will be taught about nutrition at school, using locally produced foods and school meals to encourage healthy eating habits. When communities supply food to the SFPs, they will ensure food security, create jobs, generate income, gain food production and business skills and boost the local economy. Therefore, the SFPs present the rural communities with an opportunity for a stable and accessible market where they could sell their produce. If these were successful, then the SFPs would contribute to rural development.

The framework calls for strong inter-sectoral collaborations between government departments and partnerships between the public and private sectors as well as NGOs. In Brazil, Wittman and Blesh (2017) reported that the Zero hunger social welfare programme has created innovative links between public nutrition and food security programmes and rural development initiatives through mediated market support for the family farm sector. Therefore, this framework proposes that all government departments with community and/or rural development projects such as DBE, Department of Agriculture, Forestry and Fisheries, Department of Health, Department of Social Development, Department of Public Works, Department of Rural Development and Land Reform and others should work together to incorporate local food production by rural communities in their policies. The policy should also advocate for the creation of markets that rural communities could access to sell their produce.

For example, the SFPs are markets that must be accessed by rural communities therefore, there should be ways of preparing the communities and ensuring that they eventually take advantage of these markets. The support and advocacy should be at the national, provincial and local community level to ensure that the implementation is a success. For example, Brazil support rural economic development through policies that allow its national SFPs to use 30% of the budget to buy food from local family farmers, thereby allowing the farmers to

access the markets (Wittman and Blesh, 2017). Although Brazil has policies in place to support local family farmers, the SFPs had demands that were out of reach for the resource poor family farmers, making it impossible to access the markets (Wittman and Blesh, 2017). According to FAO (2017), partner countries have built awareness and developed their legal frameworks for school nutrition, institutionalizing school feeding policies and the public purchase of food from family agriculture.

In order for this framework to encourage local food production in rural areas of SA, there should be enough institutional support from the public and private sectors. The government policies should accommodate the local food producers in terms of the procurement procedures and requirements so that they do not disadvantage the rural small-scale farmers in accessing the SFPs as markets. Although this should be the case, it should not compromise the quality of food. Drake et al. (2016) reported that small-scale farmers in Kenya were discouraged from accessing the markets due to strict procurement procedures and requirements. If local food production initiatives are to be encouraged, there must be ways to ensure that the rural small-scale farmers are capacitated and given an opportunity to participate.

Economic development of rural areas is important to alleviate hunger and poverty; therefore, resources need to be directed to rural areas because broad-based rural economic development is a powerful force for change (FAO, 2017). Prosperous rural economies will reduce hunger, poverty and outmigration. According to FAO (2017), economic growth in rural areas has helped millions escape poverty and, when supported by policies for social protection, infrastructure development and the promotion of local economies, will be critical for ending hunger by 2030 and thereby respond to SDG 2. Designing social protection programmes that link social benefits to direct promotion of rural employment and agricultural production is a positive trend for building strong rural economies (FAO, 2017). For example, linking SFPs to smallholder farmers as suppliers as it is proposed in this framework. The Food and Agriculture Organization of the United Nations (2017) emphasised that social protection programmes foster a healthier, better-educated population and a more skilled workforce capable of responding to changing demand and joining the transition to higher levels of productivity.

The framework proposes that the Local Municipality should be capacitated with the necessary resources, knowledge and skills to work closely with the rural communities in promoting local food production through community-owned gardens. Rural communities could even get start-up grants to kick-start the food production activities. In Ghana, small

farmer groups were provided with complementary grants to improve their agricultural techniques, with the aim of improving the communities' ability to provide the food required (Drake et al., 2016). The Food and Agriculture Organization of the United Nations (2017) mentioned that small-scale producers need the support of policy frameworks in order to invest in productivity-enhancing technologies and sustainable farming practices. Furthermore, FAO (2017) acknowledged that smallholder farmers in many countries still have limited access to the innovations, technology, knowledge and information needed to enhance productivity and incomes. Hence, the conceptual framework proposes that small-scale farmers in rural communities should be connected to sources of knowledge to access information, expert advice, skills, research and development matters and resources such as inputs, credit and equipment that will address their needs and enable them to produce enough food for the market throughout the year. A more skilled labour force in low-income countries would increase the productivity of agriculture and stimulate the growth of high productivity services and industrial sectors (FAO, 2017). The Food and Agriculture Organization of the United Nations (2017) pointed out the gap created by the decline of public-sector extension services in many countries and the need to bridge this gap through improved targeting of resources and greater coordination with private advisory services to help farmers adapt to current and future changes. In this study the collaboration between public and private sectors will address this gap and provide the necessary resources, knowledge, advice and support to ensure that rural smallholder farmers are not left behind.

According to Wittman and Blesh (2017), family farm sectors in Brazil could not produce enough food for the SFPs as expected, therefore it is important to ensure that rural small-scale farmers can produce enough food to sustain the SFPs as markets. Botswana's SFP experienced problems of inconsistency regarding quality and quantity of the food produced by local food suppliers (Drake et al., 2016), therefore rural small-scale farmers should be capacitated to produce enough food of the right quality to sustain the SFPs. They should have land, equipment, water, seeds, finance, knowledge, and skills. Capacity building is important in the sense that they would be trained in various areas such as food production, business skills and food safety, among others. Various role players from the government departments, private sector and NGOs should assist with expert advice to ensure that this initiative is a success. For example, agricultural scientists could offer advice in terms of soil quality, types of food to grow and appropriate agricultural techniques. Agricultural extension services should ensure that rural communities get agricultural inputs such as seeds and irrigation equipment), relevant information and training to ensure the adoption of relevant agricultural techniques for sustainable food production. Capacity building could change people's attitudes and give them a greater understanding of their responsibilities.

Rural development is key to eradicate hunger and poverty and requires strong partnerships between the public and private sectors. FAO (2017) affirms that rural development has been and will continue to be essential in eradicating hunger and poverty, more especially that many people (750 million) continue to live in rural areas. Rural areas are often characterised by high levels of unemployment that leads to increased outmigration to urban areas in search for jobs. Urban areas also have high volumes of people who are competing for scarce jobs; therefore, rural development could be an answer to many rural people. FAO (2017) has estimated that the population will increase in decades to come, and more increase will be in the rural areas of Sub-Saharan Africa. This means that the demands for food and employment will be high. The important role played by small-scale farmers, in producing food cannot be overlooked. Small-scale and family farmers produce 80 % of the food supply in Sub-Saharan Africa and Asia, and investments to improve their productivity are urgently needed (FAO, 2017). To meet the growing demand for food, small-scale farmers need ways to increase their food production and to also use sustainable farming systems that will not impact the environment negatively. Should the proposed framework be adopted, implemented and successful, the small-scale rural communities might even attract other markets such as big-chain supermarkets in future.

6.6 Conclusion

This chapter revealed that the rural communities of BLM in which this study took place have few development activities such as SFPs, school gardens and EPWP. The development activities were linked to the SFPs because one of the purposes of the school gardens was sustainable food production to supplement SFP meals and the EPWP members were looking after the school garden at one primary school. The volunteer food handlers (VFHs), who are community members mentioned that SFPs could contribute to rural development by creating jobs for local community members who could be given an opportunity to produce vegetables for the SFPs instead of relying on suppliers who are not local community members. They even mentioned that government support in terms of resources such as water, seeds, etc. would assist them to succeed in this endeavour. Therefore, SFPs could stimulate local food production and create a market for the local community members and, with proper planning and support by the government, this could contribute to rural development. The null hypothesis also proved that SFPs contribute to the development of rural communities. The chapter concludes with a proposed framework, which calls for partnerships between government departments, the private sector, and NGOs that have projects and activities that impact on rural development. These stakeholders should work together for a common goal,



which is to support rural communities with the necessary resources and empower them with the relevant knowledge and skills so that they are able to produce food and access markets such as the SFPs where they could sell their produce and contribute to rural development. There should be investment in rural infrastructure to create hubs of economic activities, starting with local food production, that would benefit smallholder farmers and the rural communities.

CHAPTER 7: SYNTHESIS OF ISSUES RELATING TO THE WAYS IN WHICH SCHOOL FEEDING PROGRAMMES COULD CONTRIBUTE TO RURAL DEVELOPMENT

7.1 Introduction

School feeding programmes are implemented in many countries with the aim of preventing hunger in school children and supporting the improvement of educational outcomes such as increasing school enrolment, attendance, concentration, and participation. School feeding programmes are reported to improve educational achievement or success rate and nutritional status of school children. There is growing interest in using the SFPs to encourage and increase local food production by small-scale farmers in the rural areas as a way of creating a market for them and enabling them to earn an income. Although SA is supporting the concept of local food production through the school gardens to supplement school meals, more community members around the schools should be involved to realise this. The SFPs present a stable market for the local small-scale or subsistence farmers who can produce and supply vegetables to the schools in BLM instead of getting suppliers from as far as Polokwane to supply perishable food items to schools. This trend has the potential for creating jobs and boosting the economy of the local communities.

The main objective of the current study was to assess ways in which the SFPs could contribute to rural development in BLM, Limpopo Province, South Africa. In order to explore this objective, this study: identified and described the type of SFPs implemented in selected primary schools of BLM; established the nutrition knowledge of the learners; proposed ways in which the SFP can facilitate the development of the rural communities; and developed a framework that could be used to empower community members and promote food production activities. This chapter is presented as a synthesis of the entire study and restates the methodology used, the major findings and conclusions. Recommendations for rural development practice, policy and further research are made in this chapter.

7.2 Methodological Issues

This study followed a mixed methods approach and used a combination of qualitative and quantitative methods to obtain primary data. The aim was to get participants' views, insights and understanding of SFPs as implemented in their communities and ways in which they contribute or could contribute to rural development. The researcher collected both qualitative and quantitative data simultaneously, merged the data using both qualitative and quantitative

data analysis methods and then mixed the results during the overall data interpretation. This is known as a convergent design or concurrent triangulation (Creswell, 2003; Hearn, 2010; Creswell and Creswell, 2018). This design was appropriate for this study because it used various data collection methods which resulted in a more comprehensive set of data that provided a clear understanding of how SFPs could contribute to rural development. The study was based on the following related questions: (1) How are the SFPs implemented and how do they benefit rural communities? (2) What is the nutrition knowledge of the learners? (3) How are the SFPs contributing to rural development? (4) Which framework might be appropriate to use SFPs for effective facilitation of rural development? The views of all participants such as learners, VFHs, gardeners, NSNP educators, and officers were considered.

Preliminary contacts with the district office of the DBE were made through telephone calls and e-mails in order to inform them about the study and to ask for permission to conduct the study in the primary schools in the BLM. This was fruitful because the researcher obtained a permission letter and further information (circuit managers' contact details) that resulted in effective participation in the study. Meetings were held at the circuit level to obtain lists and contact details of schools where most of the data were collected. These pre-data collection activities provided clarity on issues around SFPs in the local municipality and allowed for proper planning of data collection. In preparing for data collection, the researcher developed a questionnaire which was tested for validity (content validity) and reliability (through the Cronbach Alpha test). Interview guides were also prepared and shared with the promoters. The questionnaire and interview guides were translated into Sepedi language to ensure the full participation of all, including those who could not speak, read or understand the English language effectively. A pilot study, whose results were excluded from this thesis, was conducted with 10 learners to ensure that they understood the questions and to clarify any ambiguity before the actual data collection. One research assistant who was fluent in Sepedi assisted with data collection. The research assistant was trained on research ethics, data collection techniques such as probing, observations and note taking prior to data collection and her roles were clearly outlined.

Participation in the study was voluntary, all participants signed consent and assent forms prior to participation. Qualitative data were collected through focus group discussions and key informant interviews using predetermined interview guides. Notes were taken during the discussions and interviews. Some of the interviews were recorded using a tape recorder with consent from the participants. The purpose of recording the interviews was to ensure that the researcher would have the information relating to the entire discussion to augment the notes

taken. All recorded data was listened to and the content was transcribed after each day of data collection. In addition to note taking, photographs were taken and observations of food preparation areas, serving learners with meals, learners eating, conditions of school gardens and availability of water at schools were made. Some participants used flip charts to draw Venn diagrams showing the importance of various stakeholders involved with SFPs and seasonal calendars that indicated food production activities in the school gardens.

Data collection took place at the schools which were the natural settings of the participants and at the times agreed upon with the school principals and participants so as not to interfere with their usual activities. Focus group discussions and the interviews were facilitated, using interview guides. All engagements were conducted in Sepedi as the local vernacular language of the participants. This ensured full participation. The focus group discussions were informal and participants sat in circles so that they were relaxed and comfortable. The rules of engagements such as respect for one another's opinions and giving each other a chance to speak were explained to all focus groups to ensure that the discussions were handled in an orderly manner. Each focus group had a scribe who wrote down aspects that were discussed and a rapporteur who ensured order in the group and provided feedback regarding the aspects that were discussed and agreed upon by the group.

Thirty-three groups of learners and 10 groups of volunteer food handlers (VFHs) participated in the focus group discussions constituting, a total of 43 focus groups. Interviews were conducted with NSNP officers, NSNP educators, and gardeners from the 11 sampled primary schools. Only five NSNP educators and three gardeners participated in the study. Focus group discussions took 40 minutes and interviews took about one hour to complete.

Thematic content analysis was used to analyse primary qualitative data. The analysis involved listening to the tape recordings, transcribing and translating the discussions and interviews, which were conducted in Sepedi, into the English language. All field notes were read repeatedly, sorted and typed on a computer. Reading the field notes and listening to the interview recordings repeatedly helped the researcher to make sense of the data that were collected, to see how the data relate to the research questions and see if there were any new insights that emerged. Once the data were typed, it was organised so that there was some order in the data. The data was read repeatedly before starting with the coding process, which means that different sections of data were given short names called codes or labels that categorised and summarised each piece of data into meaningful units. An inductive approach was followed whereby codes or labels assigned to the pieces of data were generated by working from the text during the data analysis process. The different codes

were clustered into meaningful groups to generate themes or patterns and the themes were associated with the objectives of the study. The data organised under themes were interpreted.

The quantitative data derived from the self-administered questionnaire were captured on MS Excel spreadsheets and analysed using the statistical package STATA version 14. The pre-tested questionnaire was administered to a stratified random sample size of 474 school children between the ages of 10 and 15 years in Grades 3 to 7. Descriptive statistics were computed and the data were presented in frequency tables, pie charts and bar charts for each discrete variable of study. Other quantitative data analyses methods conducted were the Pearson's chi-square tests of association (two-by-two cross-tab analyses to test the null hypothesis) and binary logistic regression analysis for exploring the relationship between a dichotomous dependent variable of study and key independent variables of study that were influential. Unadjusted and adjusted odds ratios were obtained for influential predictor variables. The reliability of all fitted statistical models was rigorously assessed before the results of analysis were accepted.

Various studies on SFPs use either a quantitative or a qualitative approach with the focus on educational outcomes, but this study was unique because it used a mixed methods approach to explore the SFPs and their potential to facilitate rural development in a holistic manner. The study started by exploring and getting an understanding of how SFPs are implemented, how they benefit the rural communities and how SFPs could facilitate rural development.

7.3 Major Findings of the Study

The first objective was to describe the type of SFPs implemented in the study area and it included the learners' level of satisfaction, benefits, and challenges. The study revealed that SFPs provide one mid-morning meal to learners that involves various stakeholders, with community members having a very limited role to play in the design and implementation of the programme. Other important findings from this objective are that (1) most learners, nearly 80 %, who participated in the study were satisfied with the quality of SFPs provided to them; (2) SFPs offered various benefits for the learners, families and, to some extent, the communities (job creation for VFHs); and (3) there were challenges that related to the implementation of the SFPs that need to be addressed for the successful implementation of the programme. All participants mentioned that SFPs had educational benefits such as improved school attendance, learners' concentration and participation in class and social protection benefits because they alleviate hunger. School feeding programmes ensure that

learners get food and stay in school, and has brought some relief to families who were struggling to put food on the table. The null hypothesis was based on the decision taken at the 5% level of significance. The null hypothesis (H_0) = “*the provision of school meals to learners does not alleviate hunger during the school day*” had the observed value of the Pearson chi-square statistic 28.0234 and was rejected at the 5 % level. It is therefore concluded that the provision of school meals to learners alleviates hunger during the school day. This study demonstrated that SFPs play a crucial role in providing food for the learners and employment opportunities to some community members (i.e. the VFHs). The implications for rural development are that, given the crucial role that SFPs play in the lives of learners and their communities, they must be adequately resourced, community-based, integrated with other poverty-alleviation programmes and monitored and evaluated by suitably qualified experts. The programme should ensure adequate participation of all relevant stakeholders such as schools, vulnerable communities, local municipalities, businesses, industry, academic and research institutions, entrepreneurs, the press and media, and non-governmental organisations. Community involvement and participation should be promoted with more support and tangible benefits for the communities. In this way, community members can take initiatives to contribute to the development of their communities and ensure the sustainability of the programmes.

The second objective was to describe the roles of learners and community members in food production. The findings of the study indicated that both learners and community members play different roles in food production. Nine of the 11 schools had food gardens and learners obtain practical food production skills from the gardens. These learners plant the vegetables, water them and do weeding. They learners get advice from the educators and volunteer community members looking after the school food gardens. Some schools have volunteer community members who look after the school food gardens. The food gardens in schools that have dedicated community members as gardeners produced vegetables and were in a good condition than those that did not have dedicated gardeners.

Regarding the third objective, which was to identify and describe the nutrition knowledge of the learners, it emerged that the nutrition knowledge of the learners needs to be improved through nutrition education interventions that would encourage learners to apply the knowledge they have when making food choices. The learners in this study had theoretical knowledge of some components of nutrition but they did not have a wide range of knowledge of what constitute a healthy diet and the benefits thereof. This might be because nutrition education is only included as a small part of the Life Skills and Life Orientation curriculum. Although learners demonstrated a good theoretical knowledge about healthy food choices,

they failed to apply this knowledge when buying food. This calls for more appropriate nutrition intervention strategies that would compel learners to apply their nutrition knowledge to make healthy food choices. Meals served at school should be used as an example to remind learners to ensure that their meals (at home or anywhere else) should comprise a starch, protein, and vegetable and/or fruit of the right quantity and quality. When learners have a sound knowledge of nutrition and apply it when making food choices, they could influence their families and anyone else around them. This could raise nutrition knowledge awareness in the communities and result in nutrition security.

The fourth objective was to propose and explain ways in which SFPs could facilitate the development of rural communities. The findings revealed that community members were of the opinion that SFPs could create more jobs that would provide income for many families within the communities. The communities suggested that they could work together to produce vegetables that would be sold to the SFPs. In communities where water is a problem, the community members should be allocated a space at the schools that have water and produce vegetables for the SFPs. Community members are willing to work but not to volunteer because they have needs and families to provide for. They also mentioned that they would like government support in terms of training, advice, starter packs that include seeds and finance to ensure that they could produce enough food for the SFPs until they are self-sufficient. Local businesses or any other community member with the relevant resources and capacity should be given first preference to supply non-perishable food items to the SFPs. The null hypothesis (H_0): *School feeding programmes do not contribute to the development of rural communities*, with an observed value of the Pearson chi-square statistic of 19.806, is rejected at the 5 % level. Therefore, the study concludes that SFPs contribute to the development of rural communities. The implications for rural development are that the SFPs are an existing market that the rural communities can take advantage of to improve their income. If this market is fully explored by local communities, it could create jobs and consequently improve the rural economy. Therefore, SFPs have the potential to contribute positively to rural development.

The last objective was to develop a framework that could be used to encourage local food production activities through school and community food gardens. A framework was developed, based on the results of this study (Figure 6.1). The framework could be used to foster inter-sectoral collaboration between government departments at the national, provincial, district and local municipality levels, the rural communities, private sector and non-governmental organisations that focus on community and/or rural development to stimulate local food production activities, local job creation and boost the local rural economy

in BLM.

7.4 Contribution to Knowledge

Many studies on SFPs focused more on educational outcomes with little or no attention to other possibilities such as nutrition education and rural development (Kristjansson et al., 2007; PSC, 2008; Bundy et al., 2009; Alderman et al., 2012; Jomaa et al., 2011; Kazianga et al., 2012; WFP, 2013). This study has focused primarily on the potential of school feeding programmes (SFPs) to promote nutrition education and local food production for skills development, job creation, boosting the economy of the local communities and ultimately contributing to rural development. The notion of linking social protection benefits such as SFPs, specifically home-grown school feeding (HGFS) to agricultural benefits to transform livelihoods of people in SSA was proposed by Sumberg and Sabates-Wheeler (2011). The use of HGFS as an emerging concept has been adopted in other countries, but it has not been widely reported about in the south African context. In order for this to succeed, many community members should be encouraged to produce vegetables and be given an opportunity to supply the produce to the SFPs. This calls for the expansion of local suppliers who will produce vegetables within or from the surrounding communities of the schools and empowering the local communities to benefit from the SFPs for income generation and job creation. The supply should be sufficient to cater for the needs of the schools.

Food production using school food gardens is encouraged and in some South African schools, the vegetables produced are used to complement the school menu (Uduku, 2011; Laurie et al., 2017), but the production is in a small scale and will not meet the demands for food throughout the school year. As Sumberg and Sabates-Wheelers (2011) put it, productivity increases for many parts of SSA will be dependent on improved access to information, training, technology, inputs and production credit. The conceptual framework of this study embraces the concept of local food production and acknowledges challenges that rural communities face such as lack of knowledge, skills and resources. The framework calls for inter-sectoral collaboration between the government, private sectors and NGOs to support and empower the rural communities in accessing the SFPs as a market and laying a solid foundation for food security and economic development. Sumberg and Sabates-Wheelers (2011) mentioned that there was an almost complete lack of data on the operation of HGFS in SSA and this limits empirical analysis of the SFPs. This study will add new knowledge to the existing rural development body of knowledge by promoting the SFPs as a potential pathway to bring about positive change in rural communities. The practical application of the proposed framework that advocates for inter-sectoral collaboration

between government departments, business, research institutions and NGOs is an extension of new knowledge that will contribute to rural development. This will benefit policy makers in the sense that they can use the framework to encourage and support food production activities around communities thereby creating job opportunities and improving rural economies.

7.5 Conclusion

School feeding programmes play a crucial role in the lives of the learners, their families, and communities. The community members' involvement in the design and implementation of the programme is vital to ensure that the SFPs enjoy ownership by the community and that they benefit the wider community and consequently contribute to rural development. The study has found that learners do not have the necessary nutrition knowledge of the components of a healthy diet to make healthy food choices. If this is left unattended, it could affect their future negatively as it increases a chance of suffering from chronic illnesses such as heart diseases and high blood pressure later in life. Learners bought unhealthy food items based on their preferences, taste, and availability rather than their nutrition knowledge. The vendors selling food at schools sell unhealthy food items. Providing learners with food to alleviate hunger is essential but it is not enough. It is also necessary to empower them to live healthy and productive lives as well as to make choices for themselves and contribute to the prosperity of their communities. The SFPs could be used as a point of departure to create awareness of healthy eating and as an example for learners to ensure that their meals should follow the same meal plan as that used in the SFPs but, where possible, they should include healthy alternatives to ensure variety. The SFPs could play a role in improving learners' nutrition knowledge. The SFPs can also contribute to the development of the rural communities around them if they serve as a market for the local subsistence farmers who produce and sell vegetables to schools thereby creating jobs for many community members. The SFPs could also be used to empower community members with knowledge and skills such as food production, business and financial management that they could use to improve their lives. The SFPs present an opportunity for rural economic growth and for the rural communities to take advantage and participate in making this work for them. Although the communities would start with local food production activities, they could eventually expand to other agricultural and other income-generating activities, including livestock and poultry, and attract other markets. School feeding programmes could be linked to local food production and nutrition education through integrated policies and programmes thereby improving access to healthier foods. The government should advocate for this integration and involve the participation of communities to make this a success.

7.6 Recommendations

Based on the results of this study, the following recommendations are made for rural development policy, practice and further research:

7.6.1 Recommendations for rural development policy and practice

(a) Timeous delivery of food in schools

Among other things, the study has shown that a higher percentage of learners (80 %) were satisfied with the quality of SFPs provided to them. The null hypothesis was rejected and it was concluded that the provision of school meals to learners alleviated hunger during the school day. Another important finding was regarding the late or incomplete delivery of foods and the poor condition of perishable foods like cabbages and bananas. This needs to be addressed urgently because it has a negative impact on the health and wellbeing of learners and it consequently affects the learning process. The SFPs were introduced to address learning barriers because there is consensus from various literature sources that learning cannot take place on an empty stomach. The current punitive measure of not paying suppliers who do not deliver the correct amount of food timeously does not address the fact that learners are left hungry. In this regard, it is recommended that the Department of Basic Education should develop measures that would ensure that the correct quantity and quality of foods are delivered to schools on time so that learners do not go hungry. The suppliers of food should also be made aware of the correct and acceptable ways of transporting perishable foods such as vegetables and fruits so that they reach the schools in good condition and can stay fresh until they are eaten. Local suppliers from communities surrounding the schools should be invited, encouraged, trained and supported to take over this responsibility in the long run. This should be supported by the policies of various government departments and implementation should be driven at the national, provincial and local government levels with proper support and resources in place.

(b) Establishment of proper food preparation, storage, and serving facilities

The schools that participated in this study did not have proper food preparation, storage, and serving facilities. These are some of the challenges that were reported in the DBE's 2015/2016 annual report. Most of the schools in this study (9 out of 11) cooked food in open shacks using open fires and wood as a source of fuel for cooking. All the 11 schools used

small rooms for storing food items. In some schools, the serving of food took place outside the classrooms and some learners sat outside to eat their meals. The schools did not have cutlery as some learners were observed eating food (e.g. samp) with their hands. With this in mind, the study recommends that schools should be equipped with proper infrastructure to prepare (i.e. cooking facilities or well-equipped kitchens), store (food storage facilities) and serve (i.e. cafeterias) meals to learners.

The establishment of proper food preparation facilities should include the use of renewable sources of energy for cooking such as solar energy and/or biogas energy as these sources of energy can benefit the environment, the health and safety of users as well as reduce expenses for buying firewood. The use of these sources of energy would reduce the destruction of the forests and avoid deforestation, and reduce the production of harmful greenhouse gas emissions that affect the environment negatively. The use of open fires results in people inhaling the smoke that, in turn, causes respiratory problems and could burn users, but using renewable sources of energy could result in significant health and safety benefits. Community members should be made aware of the problem of deforestation and ways of conserving the forests so that they are not completely destroyed for firewood. The communities could, in partnership with the Department of Agriculture, Forestry and Fisheries, plant trees and start conserving the forests with guidance from the Department of Environmental Affairs.

Learners need a multi-purpose hall where they could eat their meals and the hall that could be used for activities other than dining. When schools have proper infrastructure with the necessary ventilation system and furniture, learners would no longer need to eat outside. The schools should also have cutlery so that learners could use them for eating instead of using their hands. All of the above could be achieved through partnerships between communities, NGOs, research institutions (e.g. universities, Agricultural Research Council, Council of Scientific and Industrial Research or CSIR) and various government departments such as the DBE, the Department of Energy, the Department of Science and Technology, the Department of Agriculture, Forestry and Fisheries, the Department of Environmental Affairs and the Department of Health.

(c) Create awareness and improve nutrition education in schools and communities

One of the objectives of the SFPs in South Africa is to promote healthy lifestyles through nutrition education (Department of Basic Education, 2015). Although the DBE's 2015/2016 annual report indicated that healthy lifestyles, hygiene, and food safety are encouraged

through the distribution of nutrition education materials to schools, this study revealed that poor hygienic practices such as washing hands from a common basin and washing hands with non-soapy water were witnessed at some schools. Some learners reported that they had sore tummies or suffered from diarrhoea after consuming food prepared and served at school. Moreover, the learners had theoretical knowledge of some components of nutrition but they did not have a wide range of knowledge of what constitutes a healthy diet and the benefits thereof. They knew about healthy food choices but they failed to apply this knowledge when buying food. Another cause for concern is that a small section of nutrition education is included in the Life Orientation and Life Skills curriculum of learners therefore there is very little they learn about nutrition.

Based on the findings, the study recommends that nutrition education interventions that would create awareness of the benefits of personal and food hygiene, healthy eating and healthy living should be intensified in schools and communities. There should be frequent training and workshops on personal hygiene, hygienic food handling, preparation, and storage so that nutrient losses could be minimised and food-borne illnesses could be avoided. Hygienic practices such as proper hand washing with clean, soapy water should be encouraged at all times to avoid food contamination and related-illnesses. The interventions should target schools (i.e. educators, learners, VFHs), all community members, including households, local shops (formal and informal such as spaza shops) and vendors selling at the schools. Those selling food items should be encouraged to sell nutritious, varied, acceptable and affordable food to learners to discourage unhealthy food choices that could expose learners to future health risks that are preventable. These interventions should be brought to the communities on a regular basis and require joint efforts and commitments in order to be successful. Nutrition experts should work closely with the schools and communities to create awareness, share nutrition education information and engage in activities that will encourage positive change in terms of nutrition knowledge and application by learners, educators and parents.

(d) Improve monitoring of SFPs in schools

Although SFPs have been in existence for decades, there is a dearth of concrete information on their effectiveness and impact. Therefore, there should be monitoring systems that focus on programme processes, that is, how the programme is functioning and an evaluation system to assess the impact of the programme on specific outcomes. The need to monitor and evaluate programmes is not unique to SFPs, but this recommendation is critical to increasing the impact of SFPs. The quality of food provided to the learners should be

evaluated to ensure that the learners' nutritional needs are addressed.

(e) Empower community members to produce and supply food to the SFPs

The DBE indicated that another objective of the NSNP is to support the development of food gardens in schools with the aim of developing skills, knowledge and augmenting nutrition. In this study, nine schools had gardens with volunteer community members who looked after them but, in other schools, the learners were expected to look after the gardens. The gardens in five schools that had dedicated volunteer community members as gardeners were in a good condition and one school reported that they supplied the SFPs with vegetables from the school garden. The gardens that were looked after by learners were in very poor conditions. Although the DBE encourages schools to have food gardens, this study found that there is no support for gardens in schools. Community members who looked after the school gardens wanted to be paid because they needed money to provide for their families. Community members who participated in this study indicated that they were willing to produce and supply food to the SFPs if they could get support and money for their work. Therefore, SFPs were seen as one avenue through which rural communities could get employment opportunities.

In order for school gardens to serve the purpose of supplementing school meals, there must be dedicated personnel who should be employed as gardeners. The gardener(s) should receive regular training and expert advice to gain proper food production skills so that the gardens can be sustainable. Blouberg Local municipality is characterised by high poverty levels, illiteracy and unemployment but has agriculture as one of the three main economic sectors. Taking this into consideration and the willingness of community members to produce vegetables, this study recommends that the concept of school gardens should be extended to the community levels so that all interested community members with available land and water can produce vegetables for the SFPs. If local suppliers are used and they are supported through training and resources to meet the demand for SFPs, this would address the current challenge of non-delivery of food by suppliers who stay far from the schools. It would also strengthen community participation in the SFPs. Capacity building for rural community members is crucial for them to gain the necessary knowledge and skills that would enable them to participate in local food production activities fully and make valuable contributions to the development of their communities. The use of community members as producers and suppliers of food for the SFPs should start gradually and be fully adopted once they have the full capacity as producers and suppliers. Local information sharing forums should be encouraged in rural areas so that community members could learn from

each other and increase their food production activities to become successful businesses. This would require support from the government, more especially local municipalities, private sectors and research institutions so that the local community members could gain knowledge and skills on a continuous basis. The government procurement systems for the SFP should be handled at the local municipality level and be amended to accommodate emerging smallholder and subsistence farmers who are local community members. These community members should get all the necessary support and training to enable them to eventually expand and run food production activities as businesses that would create jobs and improve the lives of local community members.

(f) Encourage inter-sectoral collaboration and increase partnerships

This study revealed that the DBE coordinates all activities for the SFPs and there is some help from two departments, Health and Agriculture, Forestry and Fisheries. The DBE annual reports of 2012/2013 and 2015/2016 reported on partnerships that were established with the private sector to assist with the SFPs. Other government departments (e.g. Health, Social Development, Agriculture, Forestry and Fisheries, Rural Development and Land Reform, Environmental Affairs, Public Works, Energy, Science and Technology, Water Affairs, etc.), NGOs and private businesses have food production activities and/or projects but there are no joint efforts to implement them. Given the above, this study recommends inter-sectoral collaboration between government departments that have community and/or rural development initiatives and activities at all spheres such as national, provincial and local municipality level, NGOs and the private sector to work together for the common goal of using the SFPs as an avenue to improve the lives of rural communities, including learners and their families. The stakeholders should work together in partnership to advocate for the establishment of rural economies through sustainable food production and other agricultural activities. This would improve the lives of many by ensuring food security, alleviating hunger and poverty, and creating employment opportunities. The rural communities should be involved right from the beginning and at all times. Should this happen, the DBE would widen its partnerships so that more efforts and resources are drawn to assist in addressing some of the challenges relating to SFPs. Therefore, the planning and funding of SFPs should involve all stakeholders in order to improve the programme implementation and overcome existing challenges.

School feeding programmes should be integrated with other school health and nutrition interventions to address the primary nutrition and health problems of school-age children and to support positive educational and nutrition outcomes. In order to encourage sustainable

food production, SFPs should be integrated into agricultural interventions. Therefore, SFPs should form part of food and nutrition security policies that are integrated into education, agriculture, and health.

7.6.2 Recommendations for further research

Given the limited geographical scope of this study (11 primary schools in one Local Municipality), it is recommended that a similar study be conducted nationwide in other rural communities where SFPs are implemented to determine the participants' views about the programme, the challenges facing the programme and the benefits it offers to the communities. The findings of this study could not be generalised for the rest of the municipality, the district and the province. Further research is required on the following:

- The SFPs' contribution to the livelihood of community members in areas where local community members supply the SFPs with vegetables produced from the school gardens;
- A comparison study that will investigate the viability of using local suppliers from the communities versus the existing suppliers who are not from the local communities and their contributions to the rural communities;
- A longitudinal study that will investigate the impact of SFPs on the nutritin knowledge of learners and the application of this knowledge in making food choices;
- Nutritional status of prospective learners before starting school so that there can be scientific results to prove whether SFPs improved the nutritional status of learners or not; and
- A similar study must be conducted with the inclusion of ordinary community members other than the volunteer food handlers (VFHs) and gardeners as participants to get their views on how they could be involved in the SFPs and ultimately use the SFPs to contribute to the development of their communities.

7.7 Limitations of the study

The study's limitations are as follows:

- Sample profile: The sample consisted mainly of learners and very few community members who were involved with the school feeding programmes (SFPs) at the time of the study. This was based on their exisiting knowledge with SFPs, easy access and costs for data collection.
- Data collection process: The presence of the researcher could have influenced the

responses from participants. Therefore, participants could have given answers that they thought the researcher wanted to hear and not necessarily the true answers.

- Financial resources: Money was required to conduct the study and this was a serious constraints. Although the study received funding from the University of Venda, the funds could only be accessed after the study has taken place. The researcher had to use her own money and claim it at a later stage and this was a serious financial burden to have the money available to complete the study.

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Appendix 3.1: Ethical Clearance Certificate

RESEARCH AND INNOVATION
OFFICE OF THE DIRECTOR

NAME OF RESEARCHER/INVESTIGATOR:

Ms MC Molotja

Student No:

14009352

PROJECT TITLE: **Participatory approaches to school feeding programmes for rural development in Blouberg Municipality, South Africa.**

PROJECT NO: SARDF/16/IRD/11/2009

SUPERVISORS/ CO-RESEARCHERS/ CO-INVESTIGATORS

NAME	INSTITUTION & DEPARTMENT	ROLE
Prof LL Maliwichi	University of Venda	Promoter
Prof AIO Jideani	University of Venda	Co- Promoter
Ms MC Molotja	University of Venda	Investigator - Student

ISSUED BY:

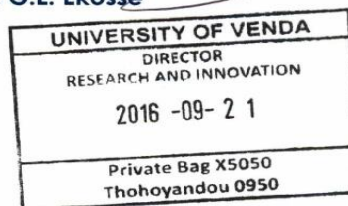
UNIVERSITY OF VENDA, RESEARCH ETHICS COMMITTEE

Date Considered: September 2016

Decision by Ethical Clearance Committee Granted

Signature of Chairperson of the Committee:

Name of the Chairperson of the Committee: Prof. G.E. Ekosse



University of Venda

PRIVATE BAG X5050, THOHOYANDOU, 0950, LIMPOPO PROVINCE, SOUTH AFRICA
TELEPHONE (015) 962 8504/8313 FAX (015) 962 9060

"A quality driven financially sustainable, rural-based Comprehensive University"

Appendix 3.2: Permission Letter



LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

CAPRICORN POLOKWANE DISTRICT

Private Bag X 9711
POLOKWANE
0700
Tel: 015 285 7300
Fax: 015 285 7499

Enq : 2/1/R
Enq : Mphaphuli AJ
Tel No.: 015 285 7410
Email : MphaphuliAJ@edu.limpopo.gov.za

To : **Molotja MC**
Pierre Van Ryneveld Ext 24
Centurion
0157

SUBJECT: PERMISSION TO CONDUCT RESEARCH IN PRIMARY SCHOOLS IN BLOUBERG MUNICIPALITY.


1. The above matter refers.
2. The Department wishes to inform you that your request to conduct a research has been approved.
3. The following conditions should be considered.
 - 3.1 The research should not have any financial implication for Limpopo Department of Education.
 - 3.2 Arrangements should be made with both the Circuit Offices and school concerned.
 - 3.3 The conduct of research should not anyhow disrupt the Academic Programs at Schools.
 - 3.4 The research should not be conducted during the examinations especially the fourth term.
 - 3.5 During the study, the research ethics should be practiced, in particular the principle voluntary participation (the people involved should be respected).

Cnr Blaauwberg & Yster Street, Ladanna

"We Belong, We Care, We Serve"

- 3.6 Upon completion of research study, the researcher shall share the final product of the research with Department.
4. Furthermore you are expected to produce this letter at Schools/ Offices where you intend to conduct your research as evidence that you are permitted to conduct the research.
5. The Department appreciates the contribution that you wish to make and wish you success in your research.

Best wishes


MR MOTHEMANÉ KD
ACTING DISTRICT DIRECTOR

28/04/2016
DATE

Cnr Blaauwberg & Yster Street, Ladanna

"We Belong, We Care, We Serve"

Appendix 3.3: Questionnaire

UNIVERSITY OF VENDA

DIETARY KNOWLEDGE QUESTIONNAIRE (10 – 14 YEARS)

School number (e.g. BES):

Child number (e.g. L01 –

L40):

Greetings! My name is Makwena Cate Molotja from the University of Venda. I will be working with you today and I will really like you to participate to your best ability, as your answers are very important. You are going to help me to complete some questions in this form called a questionnaire. This questionnaire is part of a research study on the school feeding programmes (SFPs) as implemented in your school. It asks questions on what you know about different foods as well as what you like to eat. Please complete all the sections.

SECTION A: DEMOGRAPHIC DETAILS OF THE LEARNER

Questions	Instruction(s)	Coding categories												
1. Are you a boy or a girl	Choose one correct answer.	<table border="1"> <tr> <td>Boy (male)</td> <td>1</td> </tr> <tr> <td>Girl (female)</td> <td>2</td> </tr> </table>	Boy (male)	1	Girl (female)	2								
Boy (male)	1													
Girl (female)	2													
2. How old are you?	Record your date of birth in the spaces provided.	<table border="1"> <tr> <td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> </table>	D	D	M	M	Y	Y	Y	Y				
	D	D	M	M	Y	Y	Y	Y						
Record your age in completed years & months in the spaces provided.	<table border="1"> <tr> <td>Y</td><td>Y</td> <td>M</td><td>M</td> </tr> </table>	Y	Y	M	M									
Y	Y	M	M											
3. In which Grade in school are you this year?	Choose one correct answer.	<table border="1"> <tr> <td>Grade 3</td> <td>1</td> </tr> <tr> <td>Grade 4</td> <td>2</td> </tr> <tr> <td>Grade 5</td> <td>3</td> </tr> <tr> <td>Grade 6</td> <td>4</td> </tr> <tr> <td>Grade 7</td> <td>5</td> </tr> </table>	Grade 3	1	Grade 4	2	Grade 5	3	Grade 6	4	Grade 7	5		
Grade 3	1													
Grade 4	2													
Grade 5	3													
Grade 6	4													
Grade 7	5													
4. What is your race?	Choose one correct answer.	<table border="1"> <tr> <td>Black</td> <td>1</td> </tr> <tr> <td>White</td> <td>2</td> </tr> <tr> <td>Coloured</td> <td>3</td> </tr> <tr> <td>Indian/Asian</td> <td>4</td> </tr> <tr> <td>Other (specify)</td> <td>5</td> </tr> <tr> <td>_____</td> <td></td> </tr> </table>	Black	1	White	2	Coloured	3	Indian/Asian	4	Other (specify)	5	_____	
Black	1													
White	2													
Coloured	3													
Indian/Asian	4													
Other (specify)	5													

5. What is your nationality?	Choose one correct answer.	<table border="1"> <tr> <td>South African Citizen</td> <td>1</td> </tr> <tr> <td>Non-citizen (permanent resident)</td> <td>2</td> </tr> <tr> <td>Non-citizen</td> <td>3</td> </tr> </table>	South African Citizen	1	Non-citizen (permanent resident)	2	Non-citizen	3						
South African Citizen	1													
Non-citizen (permanent resident)	2													
Non-citizen	3													

		(refugee)	
		Other (specify)	4

SECTION B

SECTION B1: NUTRIENTS & FOOD GROUPS

Answer the following questions:

1. Do you know the different types of food groups?

YES	NO
-----	----

If your answer to question 1 is No, please skip to question 3

<p>2. Which food group</p> <p>Record your answer in the spaces provided.</p>	<p>2.1 should be included in most meals?</p> <p>.....</p>
	<p>2.2 is best to build the body's muscles and keep our organs strong?</p> <p>.....</p>
	<p>2.3 is the body's main source of energy?</p> <p>.....</p>
	<p>2.4 should be the least included in meals?</p> <p>.....</p>
	<p>2.5 protect the body against illnesses?</p> <p>.....</p>

3. Do you think you should eat more or the same amount or less of these foods for you to be healthy? (Tick one box per food)

Food	More	Less	Sparingly	Not sure
Vegetables				
Grains/ starchy foods (potato, pasta, bread, rice, samp)				
Fatty foods (chips, fat cakes, fries)				
Milk/cheese/yoghurt				
Fruits				
Sugary foods (cakes, sweets, chocolate)				
Meat (chicken, beef, lamb, pork)				
Salty food (e.g. (processed foods such as French polony)				

4. Read each statement below and tick the correct answer (only 1 answer per question).

4.1 Which of the following foods is the best source of energy?

Milk	<input type="checkbox"/>
Maize meal porridge	<input type="checkbox"/>
Apple	<input type="checkbox"/>

4.2 The following food is the best source of protein.....

Brown bread	<input type="checkbox"/>
Eggs	<input type="checkbox"/>
Orange	<input type="checkbox"/>

4.3 What food is important to have good eyesight?

Apple	<input type="checkbox"/>
Carrot	<input type="checkbox"/>
Potatoes	<input type="checkbox"/>

4.4 In order for you to strengthen your bones and teeth, you should eat...

Meat	<input type="checkbox"/>
Apple	<input type="checkbox"/>
Milk	<input type="checkbox"/>

4.5 What kinds of food will you choose to eat as a snack in the morning?

Peanut butter sandwich	<input type="checkbox"/>
Sweets	<input type="checkbox"/>
Simba chips	<input type="checkbox"/>

4.6 What kind of a beverage is the best to drink when you are thirsty?

Coke	<input type="checkbox"/>
Water	<input type="checkbox"/>
Concentrated juice	<input type="checkbox"/>

5. Please indicate an X under the column that represents the correct answer.

QUESTIONS	Yes	No
1. Do you think that you should eat different kinds of foods (variety) to be able to grow and develop properly?	<input type="checkbox"/>	<input type="checkbox"/>
2. Do you think that eating fruits and vegetables will help your body to fight against illnesses like colds and flu?	<input type="checkbox"/>	<input type="checkbox"/>
3. Do you think that you should consume milk so that you can have strong bones?	<input type="checkbox"/>	<input type="checkbox"/>
4. Do you think that you can sometimes eat dry beans instead of meat?	<input type="checkbox"/>	<input type="checkbox"/>
5. Do you think that eating fruits and vegetables such as mangoes, yellow peaches, carrots, pumpkin, butternut and cabbage will help to improve your eyesight?	<input type="checkbox"/>	<input type="checkbox"/>
6. Do you think that maize meal porridge is a good source of energy?	<input type="checkbox"/>	<input type="checkbox"/>
7. Do you think that eating apples will help to strengthen your teeth?	<input type="checkbox"/>	<input type="checkbox"/>
8. Do you think that Cremora ad Ellis Brown can replace milk (fresh or	<input type="checkbox"/>	<input type="checkbox"/>

mass/inkomazi) in your diet because they supply the same amounts of nutrients as milk?		
9. Do you think that foods from the fats and oils group play an important role in your body?		
10. Do you believe it is important for you to eat breakfast every morning because it helps you to concentrate or learn better at school?		
11. Do you think it is important to eat enough fibre (examples of food containing fibre: brown bread, rice, weet bix) because it helps us to go to the toilet regularly?		
12. Do you think eating a lot of sugar, sweets and sweet food can make people fat?		

SECTION B2: FOOD CHOICES

1. Study the food items in the pictures below.

1. Green apple 	2. Fresh milk 	3. Ice cream 	4. Cheese 	5. Fish 
6. Peanut butter 	7. Avocado 	8. Eggs 	9. Dry beans 	10. Koo baked beans 
11. Canned peaches 	12. Red meat 	13. Chicken 	14. Spinach 	15. French polony 
16. Fried chips 	17. Margarine 	18. Canned tomatoes 	19. Porridge 	20. Rice 





Allocate each of the above food items to the correct food groups and indicate the most & least healthy choices from each of the groups. See example below: if your choice for the grain group is: fat cakes ('Magwinya'), brown bread, porridge & cookies, then the answer will be recorded as follows:







Food group	Foods	Most healthy choice(s)	Least healthy choice(s)
Grain group	<ul style="list-style-type: none"> - fat cakes ('magwinya') - brown bread - porridge - cookies 	<ul style="list-style-type: none"> - brown bread - porridge 	<ul style="list-style-type: none"> - fat cakes ('magwinya') - cookies

Use the Table below to record your answers (record the number allocated to each food item):

Food group	Foods	Most healthy choice(s)	Least healthy choice(s)
Grain group			
Vegetable & fruit group			
Milk & milk products			
Meat & alternatives			
Fats & oils			

2. In order to eat healthy, which of the following foods (a or b) will you choose? Choose 1 correct answer and record the letter (a or b) of the correct answer in column 2.

Food	Your healthy choice
2.1 (a) Chips/ 'disimba'  (b) Orange 	
2.2 (a) Water  (b) Coke 	

<p>2.3 (a) Sweets</p>  <p>(b) Peanuts</p> 	
<p>2.4 (a) Banana</p>  <p>(b) Biscuits</p> 	
<p>2.5 (a) Brown bread & peanut butter atchar</p>  <p>(b) Fat cakes ('Magwinya') & atchar</p>	
<p>2.6 (a) Fried chips</p>  <p>(b) Mashed potatoes</p> 	
<p>2.7 (a) Cremora</p>  <p>(b) Milk</p> 	

SECTION B3: AWARENESS OF DIET-RELATED DISEASES

Are you aware of any health problems and/ or diseases that are related to any of the following statements? If yes, indicate the health problem(s) or disease(s).

Statement	Yes/ No	Name of health problem(s) or disease(s)
The consumption of too much sugar in your diet?		

Consumption of too much fat in your diet?		
Consumption of too little fibre in your diet?		
Unhealthy diet & lack of exercise?		
Consumption of too much salt in your diet?		

SECTION C: GENERAL QUESTIONS

Answer the following questions with a Yes or a No and explain where necessary.

1. Do you have lessons where you talk about healthy eating at school?

YES NO

2. If your answer to question 1 is yes, please provide a brief explanation of what you learn in terms of healthy eating habits.

3. Do you take a lunchbox to school?

YES NO

4. If your answer to question 3 is yes, please indicate the food you take in your lunchbox.

5. Do you take money to school?

YES NO

6. If your answer to question 5 is yes, please list the food you buy at school?

7. Indicate your level of satisfaction with the SFP by placing a tick on the applicable box below.

1 = Never satisfied	2 = Sometimes satisfied	3 = Half the time satisfied	4 = Often satisfied	5 = Always satisfied
---------------------	-------------------------	-----------------------------	---------------------	----------------------



THANK YOU FOR YOUR PARTICIPATION.

Appendix 3.4: Learners' Interview Guide

UNIVERSITY OF VENDA

PARTICIPATORY APPROACHES TO SCHOOL FEEDING PROGRAMMES FOR RURAL DEVELOPMENT IN BLOUBERG MUNICIPALITY, SOUTH AFRICA

INTERVIEW GUIDE FOR LEARNERS AT SCHOOLS WITH SFPS

Hello, my name is Makwena Cate Molotja and I would like to have an informal discussion with you regarding the meals that you get at your school. Please feel free to share any information regarding the school meals with me.

Main questions	Additional questions	Clarifying questions
Is it good to have meals offered at your school?	<ul style="list-style-type: none"> • Why is that? / What are the reasons? • How many times in a day do you get meals at school? • What kinds of food are given to you at school? • Do you enjoy the food given at school? • Do you bring a lunch box to school? • Are the food offered at school enough to fill you? • Do you buy anything to eat at school? 	<ul style="list-style-type: none"> • Are you satisfied with the meals served at school? • What are the times for serving these meals? • Can you tell me more about this? • Do you still feel hungry after eating the food given at school? • What do you do then? • Can you tell me what foods you buy at school? • Why do you buy those foods?
Is there anything else that you would like to share with me regarding the school meals?		

Appendix 3.5: Community members' Interview Guide

UNIVERSITY OF VENDA

PARTICIPATORY APPROACHES TO SCHOOL FEEDING PROGRAMMES FOR RURAL DEVELOPMENT IN BLOUBERG MUNICIPALITY, SOUTH AFRICA

INTERVIEW GUIDE FOR COMMUNITY MEMBERS WHO ARE HANDLING SFPs

Hello, my name is Makwena Cate Molotja and I would like to have an informal discussion with you regarding the meals that you get at your school. Please feel free to share any information regarding the school meals with me.

Main questions	Additional questions	Clarifying questions
Do you think the school feeding programme assist the community?	<ul style="list-style-type: none"> • Is it good to give school learners meals at schools? • How does the school feeding assist the community? • How are the community members involved in the SFPs? • Does the school have a food garden? • What types of food are planted in the school garden? Draw a seasonal calendar) • Who looks after the garden? 	<ul style="list-style-type: none"> • Can you expand a little on this? • What is the community's involvement in the school garden?
What would you as community members suggest that the school feeding programme should help with in terms of uplifting the community?	<ul style="list-style-type: none"> • What development activities are taking place in your community? 	<ul style="list-style-type: none"> •
Is there anything else that you would like to share in terms of how the school feeding programmes assist the community?		

Appendix 3.6: NSNP Officers' Interview Guide

UNIVERSITY OF VENDA

PARTICIPATORY APPROACHES TO SCHOOL FEEDING PROGRAMMES FOR RURAL DEVELOPMENT IN BLOUBERG MUNICIPALITY, SOUTH AFRICA

INTERVIEW GUIDE FOR GOVERNMENT OFFICIALS WHO ARE HANDLING SFPs

Hello, my name is Makwena Cate Molotja and I would like to have an informal discussion with you regarding the school meals (school feeding programme) that are implemented in schools situated in your province, district and local municipality. Please feel free to share any information regarding the school meals with me.

Interviewee's position:

Please indicate your location (e.g. provincial/ district/ local municipality):

Main questions	Additional questions	Clarifying questions
Please share with me the purpose of the school feeding programmes.	<ul style="list-style-type: none"> What are the reasons to implement school meals? 	<ul style="list-style-type: none">
Can you explain to me how the SFP is being Implemented.	<ul style="list-style-type: none"> How does the province/ district/ local municipality monitor the SFPs in school? Who are all the stakeholders for the SFPs? (Use a flip chart and indicate the importance of all stakeholders – Venn diagram) 	<ul style="list-style-type: none">
What is your role (as a province/ district/ local municipality) in ensuring the SFP is implemented at schools?	<ul style="list-style-type: none"> How do you know if the programme is implemented in schools? 	<ul style="list-style-type: none"> How do you get feedback from the schools?
Are the communities	<ul style="list-style-type: none"> How are communities involved? 	

involved in the school feeding programme?	<p>Are there any benefits for the communities?</p> <ul style="list-style-type: none"> • If yes, what are the benefits? 	
Is nutrition education taught in schools?	<ul style="list-style-type: none"> • If yes, how is it taught? • What teaching materials are used? • How should learners be assessed to ensure that they have learned about nutrition? 	
Is there anything else that you would like to share with me in terms of the school feeding programmes?		

Appendix 3.7: NSNP Educators' Interview Guide

UNIVERSITY OF VENDA

PARTICIPATORY APPROACHES TO SCHOOL FEEDING PROGRAMMES FOR RURAL DEVELOPMENT IN BLOUBERG MUNICIPALITY, SOUTH AFRICA

INTERVIEW GUIDE FOR TEACHING STAFF MEMBERS WHO ARE HANDLING SFPs

Hello, my name is Makwena Cate Molotja and I would like to have an informal discussion with you regarding the meals that you get at your school. Please feel free to share any information regarding the school meals with me.

Main questions	Additional questions	Clarifying questions
How is the school feeding programme implemented at your school?	<ul style="list-style-type: none"> • Who decides on the types of food to buy? • What types of food are bought? • How are the foods bought? • Who supplies the food? • Who takes responsibility for the SFP food and how they are used? • Who decides on the types of foods to cook on a daily basis? • Who are all the Stakeholders for the SFPs? (Use a flip chart and indicate the importance of all stakeholders – Venn diagram) 	<ul style="list-style-type: none"> • Do you have menus that guide what to buy & cook?
What do you think are the benefits of the SFP?	<ul style="list-style-type: none"> • How does the school feeding help the learners? 	
	<ul style="list-style-type: none"> • How does the school feeding help the community? • How are the community members involved in the school feeding programme? 	
Does the school have a garden?	<ul style="list-style-type: none"> • If yes, who looks after the garden? • What is the purpose of having a school garden? 	<ul style="list-style-type: none"> • Who decided what to plant? • Who takes care of the

	<ul style="list-style-type: none"> • What is produced from the school garden? (draw a seasonal calendar) • What is done with the produce from the garden? 	<p>garden? Explain how.</p> <ul style="list-style-type: none"> • Does the produce from the garden generate any income? • If yes, how is the money used?
<p>Do you teach nutrition education at your school?</p> <p>NB: Check what is in the curriculum.</p>	<ul style="list-style-type: none"> • How do you teach it? • Which teaching material do you use? • How do you assess the learners to ensure that they have learned about nutrition? 	
<p>Is there anything else that you would like to share with me in terms of how the school feeding programmes assist the community?</p>		

Appendix 3.8: Informed Consent Form

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

TITLE: PARTICIPATORY APPROACHES TO SCHOOL FEEDING PROGRAMMES FOR RURAL DEVELOPMENT IN BLOUBERG MUNICIPALITY, SOUTH AFRICA

My name is Makwena Cate Molotja, and I am a student in the Institute for Rural Development at the University of Venda. I am doing a research study on the school feeding programmes (SFPs). The purpose of this study is to find out (1) how SFPs are implemented in schools; (2) what the learners' level of nutrition knowledge is and how it is acquired; and (3) ways in which SFPs can facilitate the development of rural communities. The results of the study will assist to propose a framework that will outline how SFPs can be linked to the development of rural communities through their participation in sustainable community-driven SFPs. This will benefit policy makers in the sense that they can use the framework to encourage and support food production activities around communities thereby creating job opportunities and improving rural economies. The researcher will request to interview you (face-to-face or telephone interview) using an interview guide. The process should take about 40 – 50 minutes of your time and it will be done at a time that will suit you.

If you agree to participate in the study, please read the section below, and sign your name at the end of this page.

I understand that:

- My participation is voluntary, if I choose not to participate or to withdraw from the study at any time, there will be no penalty.
- I will not be paid to participate in the study.
- My name or any other personal information that would identify me will not be used in the reports of this study; therefore, my identity will remain anonymous.
- The researcher will help protect confidentiality by using a code number for my study data and keep the information in a safe place to ensure that people outside the study do not get hold of confidential study information.
- The results of the study will be published and my name will not be used.

I (name) agree to participate in the study.

Signature (participant)..... Date.....

Signature (researcher)..... Date.....

Appendix 3.9: Informed Assent Form

ASSENT TO PARTICIPATE IN A RESEARCH STUDY (LEARNERS 10 – 15 YEARS OLD)

TITLE: PARTICIPATORY APPROACHES TO SCHOOL FEEDING PROGRAMMES FOR RURAL DEVELOPMENT IN BLOUBERG MUNICIPALITY, SOUTH AFRICA

My name is Makwena Cate Molotja, and I am a student in the Institute for Rural Development at the University of Venda. I am doing a research study on the school feeding programmes (SFPs) as implemented in your school. I'm doing this research study to find out how the SFPs are implemented in your school, the types of food given in the SFPs, the benefits you associate with the SFPs, your level of nutrition knowledge and how you acquire this knowledge. The research study will require that (1) I ask you questions in groups consisting of 20 learners; and (2) each learner complete a questionnaire that asks about their nutrition knowledge. All of this will take place at your school, with permission granted by your school principal. The research will take place after school hours so that it does not interfere with your day-to-day academic activities. The questionnaire will take about 30 minutes to complete. The focus group interviews will take about 20 – 25 minutes.

If you decide to participate in the study and your parent gives permission, please read the section below, sign your name and ask your parent to also sign at the end of this page.

I understand that:

- My participation is voluntary, if I choose not to participate or to withdraw from the study at any time, there will be no penalty.
- This study is not part of my school work, and I won't get grades on it.
- I will not be paid to participate in the study.
- My name or any other personal information that would identify me will not be used in the reports of this study; therefore, my identity will remain anonymous.
- The researcher will help protect confidentiality by using a code number for my study data and keep the information in a safe place to ensure that people outside the study do not get hold of confidential study information.
- The results of the study will be published and my name will not be used.

I (name) agree to participate in the study. Date.....

Signature (parent)..... Date.....

Signature (researcher)..... Date.....

Appendix 4.1 DBE Primary Schools' Menu



2016/ 2017 - PRIMARY SCHOOL MENU

DAYS	MEAL:10h00	MEAL PLAN	MENU (FOOD ITEM)	DRY PORTION SIZE
Monday	Soya mince stew with pap and veg	Protein	Soya Mince	35g
		Starch	Fortified maize meal	50g
		Veg / fruit	Cabbage/Spinach	80g
Tuesday	Bean stew with samp and veg	Protein	Dry beans	35g
		Starch	Samp	50g
		Veg / fruit	Pumpkin / Butternut / Squash	80g
Wednesday	Pilchard stew with rice and veg	Protein	Pilchard	35g
		Starch	Rice	50g
		Veg / fruit	Cabbage/Spinach	80g
Thursday	Bean stew with samp and veg	Protein	Dry beans	35g
		Starch	Samp	50g
		Veg / fruit	Pumpkin / Butternut / Squash	80g
Friday	Pap and milk Fruit in season	Protein	Milk	200ml (sachets)
		Starch	Maize meal	50g
		Fruit	Fruit	1 medium

RULES:

- Milk: Ultra High Temperature (UHT), pasteurized fresh milk or maas should be served. Milk should be approved in line with Dairy Standards set by Milk South Africa.
- Soya should be procured from manufacturers that have an approved certificate.

SEASONING TO PREPARE MONDAY TO THURSDAY STEWS:

Iodated salt:	1g per learner per day
Sunflower oil:	3ml per learner per day
Carrot:	2g per learner per day
Onion:	5g per learner per day
Sugar:	5g per learner per day (for Monday & Thursdays only)


HEAD OF DEPARTMENT

29/01/2016
DATE

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Appendix 4.2 School Specific Menu

MALEBOHO EAST CIRCUIT

SCHOOL SPECIFIC MENU :TEFU PRIMARY

484 Learners (2016/2017)

DAY	PRODUCTS	MENU SPECIFICATION	KGS PER DAY
Monday	Starch Protein Vegetable	Fortified super maize meal Soya Mince Cabbage/Spinach	24 Kg 17 Kg 15 cabbages
Tuesday	Starch Protein Vegetable	Samp Beans Pumpkin/Butternut/Squash	24 Kg 17 kg 04 bags
Wednesday	Starch Protein Fruit	Long Grain, White Parboiled Rice Pilchard fish in tomatoes Cabbage/Spinach	24 Kg 42 Tins 15 cabbages
Thursday	Starch Protein Vegetable	Samp Beans Pumpkin/ Butternut/ Squash	24 Kg 17 kg 04 bags
Friday	Starch Protein Fruits	Maize meal Milk (Sachets) Fruits	24 kg 97 L (484 Sachets) 484