The effect of food safety compliance on emerging commercial farmers and sustainable farming in the Western Cape, Eastern Cape, Northern Cape and Gauteng provinces in South Africa

By

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DECLARATION

I, Mario van Stade, the undersigned, hereby declare that this dissertation, submitted for the degree of Master of Agricultural Extension in the Department of Agricultural Economics, Extension and Rural Development at the University of Pretoria, is my own and original work, except where acknowledged. This work has not been submitted for a degree at any other tertiary academic institution.

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DEDICATION

Growing up on a farm with limited opportunities at my disposal, except for the norm, there was no interest shown in the development of the farming community. People from the farm, like me, have a great deal of dedication and passion when it comes to agriculture because it is part of our heritage. My father always used to say, “My ceiling is your foundation in life and you need to build on it”. Without any formal education, he worked on farms to provide for his family and granted us little finances for tertiary education.

This dissertation is dedicated to all the farm workers, may it be men, women or children, in the world trying to put food on their tables amidst all the difficulties and challenges presented on farms, such as single mothers raising their children alone without any help, working long hours, including nightshifts in pack houses. In rural areas, women must plough, plant, harvest and water the worst part of the land, while men are entitled to the best. Equality for all is needed and not just restricted to the men in agriculture.

This research is devoted to passionate individuals in the agricultural sector willing to make a significant contribution towards safe food production for a growing and demanding world.

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ABSTRACT

THE EFFECT OF FOOD SAFETY COMPLIANCE ON EMERGING COMMERCIAL FARMERS AND SUSTAINABLE FARMING IN THE WESTERN CAPE, EASTERN CAPE, NORTHERN CAPE AND GAUTENG PROVINCES IN SOUTH AFRICA.

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Agriculture is the foundation of every country's economy and is the cornerstone for rural and economic development, both in South Africa and internationally. Given the right technical support, emerging commercial farmers have the ability to produce fresh, quality produce, which complies with food safety standards and requirements. The challenge to meet the demand for food has led to an increase of the use of chemicals during all stages of production. Consumers' health is at risk consuming this food and feed products. Food safety legislation is mainly influenced by consumers worldwide, thus impacting all farmers daily with new laws and legislation. Compliance with food safety laws would provide emerging commercial farmers access to local and international markets.

Food safety compliance has an impact on the lifespan of emerging commercial farmers and sustainable farming, locally and in global agriculture. Food safety includes phytosanitary requirements; safety of food for human consumption; acceptable maximum and minimum residue levels; recall procedures of contaminated food; global market food safety requirements; origin of food safety policies and the financial effect of food safety non-compliance on farmers. Agriculture, rural and economic development are in direct correlation with food safety compliance during all stages of production of fresh fruit and vegetables.

The importance of this research is to demonstrate the effect food safety criteria has on emerging commercial farmers and sustainable farming. Emerging commercial farmers should not only focus on production of commodities, but more attention should be given to food safety legislation and the compliance thereof in order to promote market access. The role of current and future extension advisory services is crucial to the existence of emerging commercial farmers, both in South Africa and internationally. Extension advisory services should place more focus on compliance with food safety compliance criteria in order to provide emerging commercial farmers and smallholder farmers' access to markets. Consumer trends with regards to food safety should be a priority when extension services are rendered, with the efficient communication thereof. Extension advisory officials need to ensure emerging commercial farmers understand the content and context of food safety legislation and the effect on their farming systems. The main objective of the study was reached by means of observing that emerging commercial farmers' need to register their farms at Department of Agriculture, Forestry and Fisheries (DAFF) for traceability of any food safety related issues. The high cost of food safety compliance, implementation challenges of food safety systems in farming operations and lack of knowledge prevents emerging commercial farmers from trade in local and export markets.

The study was conducted in four provinces within South Africa namely: Western Cape, Eastern Cape, Gauteng and Northern Cape. In total, 80 respondents took part in the study.

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LIST OF ABBREVIATIONS

APS Act:	Agricultural Product Standards Act (Act No 119 of 1990)
AFDO:	Association of Food and Drug Officials
AUS:	Australia
CODEX:	Codex Alimentarius
CAC:	Codex Alimentarius Commission
BRC:	British Retail Consortium
DAFF:	Department of Agriculture, Forestry and Fisheries
DOA:	Department of Agriculture
EU:	European Union
EFSA:	European Food Safety Authority
EUROGAP:	Euro-Retailer Produce Good Agricultural Practices
FAO:	Food and Agricultural Organisation
FBO:	Food Business Operator
FDA:	Food and Drug Administration
FSA:	Food Standards Agency
FSIS:	Food Safety and Inspection Service
FSMA:	Food Safety Modernization Act
FVO:	The Food and Veterinary Office
GAP:	Good Agricultural Practices
GHP:	Good Handling Practices
GDP:	Gross Domestic Product
GMP:	Good Manufacturing Practices
GON:	Government of Nigeria
HACCP:	Hazard Analysis Critical Control Points

IFFS:	Integrated Food Safety System
IAFP:	International Association for Food Protection
IPPC:	International Plant Protection Convention
ISPM 15:	International Standard for Phytosanitary Measures
JP:	Japan
MRL:	Maximum Residue Limits
MDG:	Millennium Development Goals
NAFDAC:	National Agency for Food and Drug Administration and Control
NDA:	National Department of Agriculture
NGO:	Non-Government organisations
OIE:	World Organisation for Animal Health
PUC:	Production Unit Code
PPECB:	Perishable Products Export Control Board
SAGAP:	South African Good Agricultural Practices
SDG:	Sustainable Development Goals
SPS:	Sanitary and Phytosanitary Measures
SACU:	Southern African Customs Union
UK:	United Kingdom
USA:	United States of America
USFDA:	United States Food and Drug Administration
WHO:	World Health Organisation
WTO:	World Trade Organisation
WTO-SPS Agreement:	World Trade Organisation's Agreement on Sanitary and Phytosanitary Measures

CHAPTER 1: INTRODUCTION TO THE STUDY

The current trend in South Africa is that emerging farmers struggle to become sustainable in farming due to the lower producer prices per product offered by local retailers. Emerging farmers can produce for niche and local markets in South Africa but need to adapt and apply food safety principles in their farming food systems, according to market requirements. Amended policies and approaches are needed to ensure that emerging commercial farmers may participate in the food market (Malan, 2018). Emerging farmers do not have access to markets and thus they are not sustainable (de Chavonnes Vrugt, 2016).

Consumers' buying patterns of food are based on the stimulation of healthy living and not harmful food products that could result in human illnesses. Furthermore, is it evident that consumers are willing to pay more for healthier food products (The Nielsen Company, 2015). In addition, consumers consider food safety very important during shopping (Cook, 2015). Azzurra and Paola (2009) agree that consumer shopping choices of food depends on the food safety status and there is a move away from conventional farm-produced food where chemicals have been used. South African markets and global markets (Directorate Marketing, 2016) are influenced by consumers, whereby a major shift has changed towards compliance with food safety standards. Emerging farmers would be denied market access if non-compliance occurs with regards to food safety criteria. Mushobozi (2010) discusses that both the farmer and consumer will benefit from GAP certified produced products, which would have a positive effect on sustainable agriculture.

Agriculture growth has the potential to positively influence the current stagnant economic growth in South Africa, decrease poverty and the unemployment rate (De Chavonnes Vrugt, 2016).

This dissertation explains, in depth, the consequences of compliance to food safety criteria. Emerging commercial farmers and sustainable farming existence depends on adherence to food safety standards and requirements. Critical elements in the study are

the lack of food safety knowledge, cost of food safety compliance, consumer influence on market access, origin of food safety policies, economic impact of food safety compliance, challenges of implementation of food safety systems, phytosanitary requirements, food safety accountability and the role of extension advisory services and solutions overcoming food safety barriers.

1.1 Problem statement

Smallholder farmer businesses have no in-depth knowledge and skills to asses and address food safety criteria (Fairman and Yapp, 2004). In addition, World Bank (n.d.) expounds that markets remain closed due to a lack of knowledge. Emerging commercial farmers lack knowledge of food safety standards and the requirements and interpretation thereof leading to less or no adoption and implementation.

The cost implication of compliance to food safety criteria is expensive to emerging commercial farmers, in comparison with larger commercial farmers (Chemnitz, 2011). The cost of food safety compliance has a negative effect on developing countries, including producers of food, which have insufficient support to help overcome challenges and help building capacity (World Bank, 2005). Emerging commercial farmers have no finances available to be food safety certified which excludes them from market access and negatively affects their sustainability.

Consumers' shopping confidence has dropped as a result of food safety non-conformance (Oger, Woods and Allan, 2001). Loconto and Dankers (2014) argue that farmers who are not in possession of valid food safety certification will have market access denied as a result of increasing stringent food regulations, standards and retailer specific standards. Non-complying farmers may have problems with market access due to a lack of compliance certificates which are requested from retailers and consumers (Garret, Gorny, Beuchat, Farber, Harris, Parish, Suslow and Busta, 2003). Consumers in developing countries influence the procurement process of fresh produced commodities based on food safety compliance. Policies influencing food safety legislation are influenced by consumers.

Increasing stringent food safety standards limit fruit to importing countries (Drennan, 2009). The international development community is concerned about the pressure food standards would have on developing countries who have made great progress with regards to compliance (World Bank, 2005). The implementation of new policies regulating food safety, according to Oger *et al*. (2001), will lead to increased production costs, affecting food producers.

Export and Import SA (2017) indicate that farmers continuously suffer additional high costs during production, due to phytosanitary requirements. Emerging commercial farmers cannot afford the high financial cost of implementing food safety criteria and phytosanitary requirements. The challenge emerging commercial farmers face is to implement policies and food safety standards into farming systems.

Farmers do not accept accountability to ensure food safety conformance in China. Due to the growing demand for food safety, policy makers are requesting evidence of food safety compliance which could lead to market exclusion in the event of non-conformances (Huang, Wu, Zhi and Rozelle, 2008). The purpose of this study is to show that emerging commercial farmers does not accept accountability to conform to food safety principles, thus being excluded from local and export markets.

Conformance with food safety polices, regulations and the inability of farmers meeting sanitary and phytosanitary standards lead to market closure (World Bank, 2011). Non-compliance with phytosanitary standards and requirements are a contributing factor leading to the closure of markets for emerging commercial farmers.

1.2 Hypothesis

Food safety compliance criteria has a negative effect on sustainable farming and the existence of emerging commercial farmers in South Africa. Emerging commercial farmers are excluded from market access as a result of their limited knowledge of local and international market retailer requirements.

1.3 Research objectives

The main objective was:

- To establish the effect of food safety compliance criteria on emerging commercial farmers and the effect on sustainable farming.

The secondary objectives were to investigate the:

- Challenges with the implementation of food safety systems.
- Possible solutions overcoming food safety legislation.
- Economic impact.
- Who should be held accountable ensuring compliance with food safety criteria.

1.4 Delimitations

Emerging commercial farmers predominantly focus on production but they do not have local and international market access as a result of their limited knowledge of food safety legislation. Without food safety compliance, emerging farmers who do penetrate the markets do not obtain premium prices, which affects their sustainability detrimentally. Personal interviews were rejected as a result of limited time and the far distance between emerging commercial farmers. The data collection for the study took place between September and October 2018, in four agricultural production provinces of South Africa.

1.5 Academic value and intended contribution of the proposed study

Scientific research supports the notion that consumers directly and indirectly influence the sustainability of food producers by means of food safety. Food safety compliance criteria to local informal markets, retail markets and export market requirements have an effect on emerging commercial farmers and sustainable farming. The cost of food safety compliance, certification and phytosanitary standards have a negative effect on the sustainability of emerging commercial farmers. The primary focus of emerging commercial farmers should not only be production, but compliance with food safety legislation, in order to access global and local markets. Higher foreign exchange, due to exports, is possible and local market penetration would lead to a more sustainable future

for emerging commercial farmers in South Africa. Agriculture has the potential to reduce hunger, decrease poverty rate, produce well-balanced healthy food, build the economy of rural agriculture and empower emerging commercial farmers with the knowledge for future generation with effective skills transfer.

CHAPTER 2: LITERATURE REVIEW

2.1 Definition of emerging commercial farmers

Underprivileged farmers trying to perform sustainable agricultural activities permanently and given land via agricultural land reform programmes in the Republic of South Africa (RSA) resorts under emerging farmers (Australian Government, n.d.). Mmatsatsi (2007) articulates that emerging farmers are producers that produce and trade commodities on markets. In general, the term emerging farmer has a racial association which refers to African people, however, this is incorrect due to the fact that not all emerging farmers are African. This classification is needed in order to provide assistance to the correct target group (Mabaya, Tihanyi, Karaan and van Rooyen, 2011). However, Kirsten and Van Zyl (1998) indicate that small-scale farmers in the South African context are successful as commercial farms due to their sustainability, productivity and ability to generate profits.

2.2 Definition of sustainable farming

Green Peace Corps Organization (n.d.) states that sustainable farming aims to grow agricultural commodities by means of ecologically friendly methods which necessitates more manpower and is dependent on various expertise. Sustainable farming only uses chemicals on a small scale from minimal to none when biological control is ineffective. Gold (1999) adds sustainable agriculture refers to an incorporated food production system with long term benefits. Western SARE (n.d.) classifies sustainable farming as “a system that can indefinitely sustain itself without degrading the land, the environment or the people. It reflects our concern with the long-term viability of agriculture”.

2.3 Historic perspective of food safety

Food safety concerns in the world are not a new concept and have been recorded for many years ago. Countries are trying their utmost to control and manage food safety issues, in particular products that are sourced from third world countries (WHO, 2006). In 1960 the Department of Agriculture started addressing food safety compliance, by means of residue sampling for analysis, on all fresh fruit and vegetables destined for exports. The PPECB (Perishable Products Export Control Board) is the mandatory Department of

Agriculture appointed assignee in the Republic of South Africa to assist with sampling of residue analysis for regulated fresh produce (Chidamba, Korsten and Mutengwe, 2016). Pesticide usage is controlled under Act No.36 of 1947, whereby Maximum Residue Limits (MRLs) is regulated by the Department of Health under the Foodstuffs, Cosmetics and Disinfectant Act 54 of 1972. The Department of Agriculture has ownership of monitoring MRL compliance during exports under the Agricultural Product Standards Act (Act No 119 of 1990) (Department: Agriculture, 2008).

The food safety policy has become a key issue during the past 20 years in Indonesia. Act no 7/1996 on food was first promulgated followed by government regulation no. 18/1999 on food labeling and thirdly in 2004 a government regulation 28/2004 on food safety, quality and nutrition was published (Dewanti-Hariyadi and Purnomo, n.d.). The purpose of Act no 7/1996 was to give guidance with regards to production of food, food safety and food sanitation. Non-complying farmers deviating from stipulated requirements would face legal action (Dewanti-Hariyadi and Purnomo, n.d.). Furthermore, Dewanti-Hariyadi and Purnomo (n.d.) articulate that these regulations were instituted by the Indonesian government to ensure GAP are practiced on premises of food producers. The purpose of food safety management is to ensure the consumer is not harmed, trade relations are built by means of export and the effective management of food safety programmes. Holdaway and Husain (2004) indicate that China has many food safety challenges, due to the exceedance of heavy metals in the different products grown. The origin of China's food safety complications is due to intense strain on agricultural production and the need to supply in the growing population's demand for food. Staple food such as rice vegetables are predominantly affected by high heavy metal exceedance, due to excessive spraying of pesticides.

According to the World Bank (2005) Poverty Reduction and Economic Management Trade Unit and Agriculture and Rural Development Department records, the United Nations Food and Agriculture Organisation (FAO) is a regulator accountable for nutrition and related food standards. Secondly, the World Health Organisation (WHO) directive is to ensure that consumed food is safe to eat and not contaminated (World Health Organisation, 2016). Zlotkin, Siekmann, Lartey and Yang (2010) claim the Codex

Alimentarius is an assortment of universally accepted standards, procedures and additional guidelines pertaining to food, production of food, and safety of food. The Australian Government (n.d.) reports that the purpose of the Sanitary and Phytosanitary Measures (SPS Agreement) is to focus on implementing processes to safeguard human, animal and plant health and life.

The World Bank (2005) states there has been tremendous growth in high-value food consumables on global markets, due to buyer preferences. Developing countries have increased their production of fresh food and vegetables to export markets. Export of these commodities has led to growing interest of the management of food safety and agricultural health standards. Standards have been set to contain risks such as bacteriological pathogens, insecticides, veterinary narcotics, macro elements, the spread of plant pests, animal diseases and food safety outrages. Food safety and agricultural health standards were created to assess and verify dangers associated with the spread of plant and animal pests and diseases which could have a detrimental effect on international trade. It is, therefore, critical to observe that food safety should be a fundamental competency in developing countries when trading in high worth agricultural foods.

In order to export fresh fruit and vegetables to the EU, farmers must comply with Euro-Retailer Produce Good Agricultural Practices (EUROGAP) standards (Chemnitz, 2011). The World Health Organisation (2010) has laid down minimum food safety requirements which in general, focus on Hazard Analysis Critical Control Points (HACCP) principles which must be complied with in order to export to key export markets in the EU, USA, JP and AUS. The main objective of The Food and Veterinary Office (2008) is to verify if third world and member countries exporting to the EU have management systems in place with regards to veterinary and plant health law. Compliance and verification are needed to help assist with EU policy matters related to food safety. Supermarket retail stores in Europe have instituted Global GAP requirements in order to ensure and promote good agricultural practices on farm level, thus increasing the consumers' concerns with regards to food safety. Global GAP is purely a private standard while the primary attention would be on food safety and traceability during all stages of production on farm level. Global GAP criteria include all farm level activities ranging from health and safety of workers,

conservational land management, soil management practices, irrigation, production of commodities, harvesting methods and post-harvest practices. Good Manufacturing Practices (GMP) are specific processes and practices known as a standard by which the food industry accepts to ensure compliance to food hygiene and factory hygiene compliance. Hazard Analysis Critical Control Point (HACCP) is a methodological process for the prevention, control and alleviation of glitches in order to prevent any form of contamination which might result in sickness of the consumer (Directorate Marketing, 2012).

2.4 Existent food safety status

Food containing chemicals is dangerous to human health and could lead to long term diseases and illnesses of consumers. The origin of chemicals present in produced food could manifest during the food production process as a result of poor management argues (Unnevehr, 2003). First world countries instituted regulatory systems and measures to protect consumers from harm which includes inspection bodies and laboratories conducting analytical testing. The European Food Safety Authority (EFSA) compiles a yearly distributed list indicating the maximum residue levels of fresh fruit and vegetables indicate (Chidamba *et al.*, 2016). Furthermore, Amodu and Hutter (2008) argue that the purpose of food safety regulations is the prevention of harm to the end user of produced food. It is the responsibility of a food business operator (FBO) to comply with HACCP principles. In Europe, food safety is a serious concern and fresh fruits and vegetables need to comply with legislative and consumer requirements (CBI Ministry of Foreign Affairs, n.d.). Consumers of fresh produced commodities are increasingly affected by food contamination which has led to increased illnesses (Food and Drink iNet, 2007). In addition, The Daily Telegraph (2018) shows that listeriosis in rock melons has taken its sixth victim in Australia. A listeriosis occurrence in the EU has left nine people dead and many consumers ill (The Gardener, 2018).

Products must comply with minimal use of pesticides. The EU has a set of MRLs that producers must comply with in order to evade consumer health being negatively affected. In the event of produce exceeding the MRL limit, such products will be removed from the market. Certain member countries in the EU have higher set MRL limits than the default

MRL limit which originates from niche markets. Consumers have become more inquisitive about food spraying programmes of produce and producers must provide evidence of all spraying programmes applied during production. In order to manage food safety effectively the EU has listed certain chemicals of which imported consignments are subjected to verification. Predominantly, verification of MRL compliance checks are conducted before produce enters the country. Re-occurrence of non-complying commodities from producers of exporting countries will lead to stricter application of measures (CBI Ministry of Foreign Affairs, n.d.). CBI Ministry of Foreign Affairs (n.d.) Furthermore, points out that marketing standards for fresh commodities, including fruits and vegetables, stipulates that imported commodities must be accompanied by conformity certificates. Conformity certificates could be issued by the European control bodies or exporting countries. Furthermore, it is imperative that imported fruit and vegetables must comply with labelling and packaging regulatory requirements.

In South Africa, compliance to SPS measures and food safety standards are crucial to exploit international export markets. New diseases and increasingly higher food safety cases are affecting the well-being of consumers, and livestock, nature and state economies. In order to take part in the sale of livestock, disease management systems must be in place to access markets, thus guarding humans from diseases (Department of Agriculture, 2013). The Department of Agriculture (2013) indicates that South Africa is challenged to react swiftly to the ever-changing food safety environment. Collaboration exists between government departments clarifying the roles and responsibilities of each department involved, including complexity of food regulations. Harmonisation is needed by different government departments in order to ensure standardisation is applied. Lack of skills and capacity building of human resources are the major constraints in food safety compliance. It is the responsibility of Department of Agriculture to ensure compliance with SPS measures through implementation and upkeep of regulatory risk management systems of plant pests.

2.5 Challenges emerging commercial farmers face in South Africa

Commercial farmers face many challenges, and this is even more so for emerging commercial farmers in South Africa. These challenges include lack of finance, market access, and extension services.

2.5.1 Finance

It is evident in developing countries, including South Africa emerging commercial farmers struggle to obtain finance needed for production. No access or limited access to finance has escalated production cost (Von Loeper, Drimie and Blignaut, 2018). Start-up remains an issue in developing countries even if the producers are title deed owners (Yvonne, 2018). Further, it was observed Von Loper *et al.* (2018) that financial institutions prefer to conduct with commercial farmers and does not have credit facilities directed at emerging farmers. In addition, Yvonne (2018) agrees that due to high transactional cost and risk involved financial institutions have not considered financing smallholder farmers.

2.5.2 Market access

Restriction to markets that pay premium prices remain an obstacle for emerging farmers. Market restrictions due to non-compliance with safety legislation, no food safety certification in place, competition with imported commodities, cannot meet the demand to supply retailer programmes and need to compete with successful commercial farmers with higher quality produce (Von Loper *et al.*, 2018). Khapayi and Celliers (2016) agree that smallholder farmers struggle to get market access due to a lack of market knowledge. Emerging commercial farmers need to transition from traditional subsistence farming towards commercial production to meet market demand and gaining profits says (Yvonne, 2018).

2.5.3 Extension services

Limited agricultural advisory services have led to not all emerging commercial farmers acquiring knowledge needed due to limited resources. The result was privatisation of agricultural advisory services to provide a better service. Globally extension advisory services had undergone five percent privatisation leaving more farmers unattended

argues (Yvonne, 2018). In addition, Mutero, Munapo and Seaketso (2016) agree that agricultural extension advisory services to emerging commercial farmers were provided infrequently and extension advisory officers had lack of market access information in most cases of knowledge transfer.

2.6 The role of agriculture extension

The role of agricultural extension is not limit to transferal of agriculture technology during production, but should include provision of financial services, principles of sustainable agriculture management and development of youth on farms. In addition, extension advisory services need redirect from knowledge transfer to have knowledge on policies and help farmers adopting sustainable farming practices (OECD Green Growth Studies, 2015). USAID (n.d.) supports the view that extension advisory services be inclusive of providing market access information, monitoring and evaluation during all stages of production, address food safety and should partner with other institutions providing value added services.

Extension advisory workers should be equipped to use better communication skills influencing adoption and behaviour of smallholder farmers indicate (OECD Green Growth Studies, 2015). In addition, Department: Agriculture (2005) argues more attention should be given to appoint agriculture extension officials credible qualifications in order to provide improved and efficient suit of services to emerging commercial farmers.

Agriculture extension services urged emerging commercial farmers to focus more on compliance with food safety criteria and good agricultural practices (Jovanic and Delic, 2013).

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Quantitative research methods

In order to obtain quantitative data method a researcher may use survey questionnaires (Berhanu, 2009). Klazema (2014) indicates the use of survey questionnaires provide guidance to behavioural patterns of respondents, after information gathered is interpreted and analysed to support the hypothesis. A quantitative method was followed in the data collection process in the research areas among the emerging commercial farmers. The researcher obtained primary data through structured questionnaire design. Respondents were well versed about the study and the primary objectives thereof.

3.2 Data collection source and types

The information used to complete the study was acquired from both primary and secondary sources. The researcher obtained data by means of a questionnaire design after review of literature on food safety compliance criteria. The questionnaire design was done in a manner to give respondents different types of questions. Secondary data was acquired by the researcher by means of journals, internet, dissertation, articles, thesis, public sources and government gazettes. The structured questionnaires were written in English and were translated into Afrikaans where respondents could not understand the questions clearly.

3.3 Data analysis

The data collected from the questionnaire in this study was coded by the researcher. The Microsoft Office Excel 2010 software package was used to capture the coded data. The respondents that did not respond to a particular question were excluded from the calculation of percentage values for that question.

The information that follows result from a descriptive analysis of the data collected. The results are presented using descriptive charts and percentages. The respondents were asked to motivate their answers to verify whether they understood what they were being

asked. In this regard all the results in the present study are assumed to be correct and valid.

3.4 Sampling

The researcher applied stratified sampling method. This method focuses on respondents' level of farming operational activities including management, gender and race groups. For the sampling, we divided the respondents into two strata: (a) programme participants with registered Production Unit Codes - PUC (N=) and (b) programme participants with no registered Production Unit Codes.

The Western Cape was the population and the sample were Saron (1), Piketberg (1) Grabouw (2), Malmesbury (2) and Elim (1). The Northern Cape was the population and the sample were Keimoes (42). Eastern Cape was the population and the sample were Addo (10). Gauteng was the population and the sample was Kempton Park (21).

Probability sampling technique was applied which were further refined into stratified sampling method whereby the population was divided in groups whereby subgroups were formed. Emerging commercial farmers were selected based on food production type: food gardens, school garden, small holding plots, government farms and commercial farms. The population were further divided into subgroups to determine DAFF registration status with regards to PUC/FBO codes. The sample was selected based on the availability of respondents.

3.5 Description of the study area

The sample was drawn from four provinces in South Africa namely, Western Cape, Northern Cape, Eastern Cape and Gauteng.

Table 3.1 gives an indication on the geographical area where emerging commercial farmers are situated. The four provinces were chosen based on farming activities of

emerging commercial farmers with registered Production Unit Codes (PUC)/Food Business Operator (FBO) codes.

Table 3.1: Number of farmers in Western Cape, Northern Cape, Eastern Cape and Gauteng

PROVINCE	MUNICIPALITIES	TOWNS	NUMBER OF FARMERS
Western Cape	Bergrivier	Piketberg	1
Western Cape	Drakenstein	Saron	1
Western Cape	Cape Agulhas	Elim	1
Western Cape	Swartland	Malmesbury	2
Western Cape	Theewaterskloof	Grabouw	2
Northern Cape	Kai! Garib	Keimoes	42
Eastern Cape	Sundays River Valley	Addo	10
Gauteng	City of Ekurhuleni Metropolitan	Kempton Park	21
		Total	**80**

Source: Author's compilation

Bergrivier municipality is in the West Coast District in the Western Cape province and covers an area of 31 119 square km. The Atlantic Ocean borders the west and to the south east, there is the Cape Winelands district, with City of Cape Town to the south. The municipal area includes the town Piketberg, with a population growth of 2.45% per year and a population of 436 403. Only 3.8% of the population had no schooling. The main economic drivers are agriculture, forestry and fishing, trade and wholesale (The Local Government Handbook South Africa, 2019).

Drakenstein municipality is situated in the Cape Winelands District in the Western Cape. Drakenstein municipality borders the City of Cape Town Metro to the west and the West Coast District. The municipal area includes the town Saron, covers an area of 1538

square km, a population of 280 195 with a population growth of 2.48% per year. Only 2.1% of the population had no schooling. Business services, retail trade and wholesale are of the main economic drivers (The Local Government Handbook South Africa, 2019).

Cape Agulhas municipality is situated in the Overberg District in the Western Cape. The municipal area includes the town Elim, covers an area of 3471 square km, a population of 36 000 with a population growth of 1.95% per year. Only 1.5% of the population had no schooling. Agriculture and forestry and fishing are of the main economic drivers (The Local Government Handbook South Africa, 2019).

Swartland municipality is situated in the West Coast District in the Western Cape. The municipal area includes the town Malmesbury, covers an area of 3707 square km, a population of 133 762 with a population growth of 3.68% per year. Only 4.9% of the population had no schooling. Agriculture, industrial and commercial sector are the main economic drivers (The Local Government Handbook South Africa, 2019).

Theewaterskloof municipality is in the Overberg District in the Western Cape and covers an area of 3259 square km. The municipal area includes the town Grabouw, with a population growth of 1.67% per year and a population of 117 167. Only 4.4% of the population had no schooling. The main economic drivers are agriculture, forestry and fishing, agro-processing and tourism (The Local Government Handbook South Africa, 2019).

Sundays River Valley municipality is situated in the Sarah Baartman District in the Eastern Cape. The municipal area includes the town Addo, covers an area of 5995 square km, a population of 59 793 with a population growth of 2.10% per year. Only 5.8% of the population has no schooling. The Addo Elephant National Park and agricultural production are the main economic activities with citrus being the main commodity grown. The weather conditions in summer reaches more than 40ºC and rainfall of 250-500 mm pattern is spread over 12 months of the year (The Local Government Handbook South Africa, 2019).

City of Ekurhuleni Metropolitan municipality covers an area from Germiston in the west to the towns of Nigel and Springs in the east. The municipal includes the town Kempton Park) the area covers 1975 square km with a population growth of 1.39% per year and a population of 3 379 104. Only 4.1% of the population has had no schooling. Manufacturing, transport, trade finance and business are the main economic drivers in the Ekurhuleni Metropolitan municipality (The Local Government Handbook South Africa, 2019).

Kai! Garib municipality is located laterally next to the Orange River and the Kalahari Desert on the other side in the Northern Cape province. The municipal area includes the town (Keimoes) with a population of 68 929 with a population growth of 1.03% per year. Only 5.6% of the population has had no schooling. Kai! Garib municipality covers an area of 26 377 square km with agriculture as the main economic driver (The Local Government Handbook South Africa, 2019).

The researcher made 44 copies of questionnaires and couriered them the PPECB facilitator in the Northern Cape who facilitates food safety workshops and training to emerging commercial farmers throughout all the provinces in South Africa. The purpose of the PPECB facilitator is to prepare emerging commercial for food safety certification audits by means of pre-assessment audits. The researcher informed the PPECB facilitator, through the instructions, how to prepare the respondents and to assist if any explanations were needed. Respondents were informed that the questionnaire could only be read by the principal investigator and authorised member of the research team at the University of Pretoria. The PPECB facilitator allowed respondents to complete the questionnaires within two hours. The PPECB facilitator collected the respondents' questionnaires and couriered them back to the researcher. The data collection for the study took place between September and October 2018, in four agricultural production provinces of South Africa.

3.6 Analysis plan

Food safety compliance criteria has a negative effect on sustainable farming and the existence of emerging commercial farmers in South Africa. Emerging commercial farmers

are excluded from market access as a result of limited knowledge on local and international market retailer requirements.

Primary date was completed by means of survey questionnaires. Secondary data was acquired by viewing literature of journals, internet, dissertation, articles, thesis, public sources and government gazettes.

Inclusion criteria would focus on DAFF registration status is an indication of the food safety status of emerging commercial farmers effecting market access and financial sustainability. Finance available to meet food safety criteria influences local and international market access. Consumers has influence on market access effecting food safety legislation which could affect emerging commercial farmers detrimentally. Food safety compliance has a positive and negative economic effect influencing sustainability. Stringent food safety legislation is used as a trade barrier preventing emerging commercial farmers' market access. It is evident that higher income potential is generated from export of agricultural commodities on global markets, predominantly first world countries. Implementation of food safety policies remain a challenge due to literacy levels and interpretation of food policies.

Variables to be used in main analysis Implementing food safety systems based on HACCP principles influence mark inclusion or exclusion of emerging commercial farmers. Overcoming market exclusion would mean emerging commercial farmers would need to comply with food safety legislation, retailer market requirements, understand and implement food safety policies, emerging commercial farmers and retailer markets should accept responsibility, subsidization of cost of compliance.

CHAPTER 4: RESULTS DISCUSSION AND PRESENTATION

4.1 Introduction

Respondents were sampled in four provinces in order to establish whether emerging commercial farmers has similar challenges. It is imperative to determine the DAFF registration status of emerging commercial farmers and how traceability influences market access. Challenges emerging commercial farmers face and their ability to meet food safety compliance criteria. Food safety legislation changes continuously, and the adoption rate thereof is influenced by age group of emerging commercial farmer. There is a direct correlation between profitability and sustainable farming. Non-conformance with food safety legislation impacts sustainable farming detrimentally.

Evidence was gathered from 80 respondents in four provinces in South Africa. The provinces include: Northern Cape, Western Cape, Eastern Cape and Gauteng. In total, 73 respondents did not have the finances available to meet food safety compliance criteria. Respondents profit from farming activities, but sustainability remains questioned although respondents are DAFF registered with the lack of finance to meet food safety criteria. Female respondents in Gauteng profit more from farming activities than female respondents in the Northern Cape. Farming activities in the Western Cape and Eastern Cape are more sustainable than in Gauteng and the Northern Cape.

In essence this means respondents' behavioural response towards change is flexible and not rigid. Agriculture changes continuously and respondents need to adapt to changes in order to stay relevant with farming activities and compliance criteria.

In Figure 4.1.1, the response may vary based on gender and demographic factors which may influence respondents per region. In addition to this, outcome results could be based on elements such as product type per region etc. For example, citrus is considered more of a male product type due to the fact that it is viewed as a more complicated production process which could lead to greater challenges. In comparison with the above mentioned, vegetable and raisin production types are less intensive with minimal challenges during

all stages of production with participation of more female respondents. Cultural diversity could be the reason why there is a difference between male and female participation of respondents in regions.

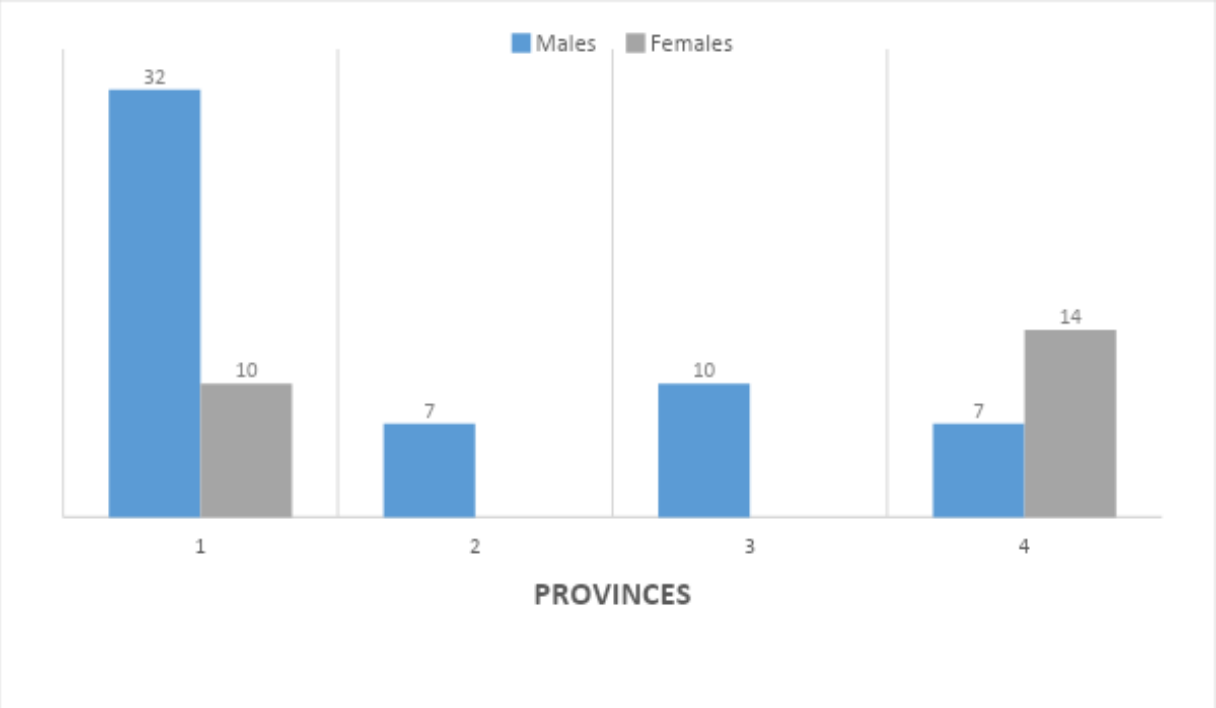

Figure 4.1.1: Respondents per region

Provinces participating in the study were the Northern Cape, Western Cape, Eastern Cape and Gauteng. The respondents in total were as follow: seven males and 14 females in the Gauteng region and 32 males and 10 females in the Northern Cape.

Figure 4.1.2 has relevance to the DAFF registration status of emerging commercial farmers. It is imperative to know if emerging commercial farmers are DAFF registered to determine their food safety status. The purpose of DAFF registration is to promote traceability during all stages of production. In order to get food safety certified, emerging commercial farmers need to be DAFF registered, this will grant emerging commercial farmers local market access and international market access opportunities. The opposite is also applicable; when emerging commercial farmers are not DAFF registered local and international markets would be inaccessible to penetrate.

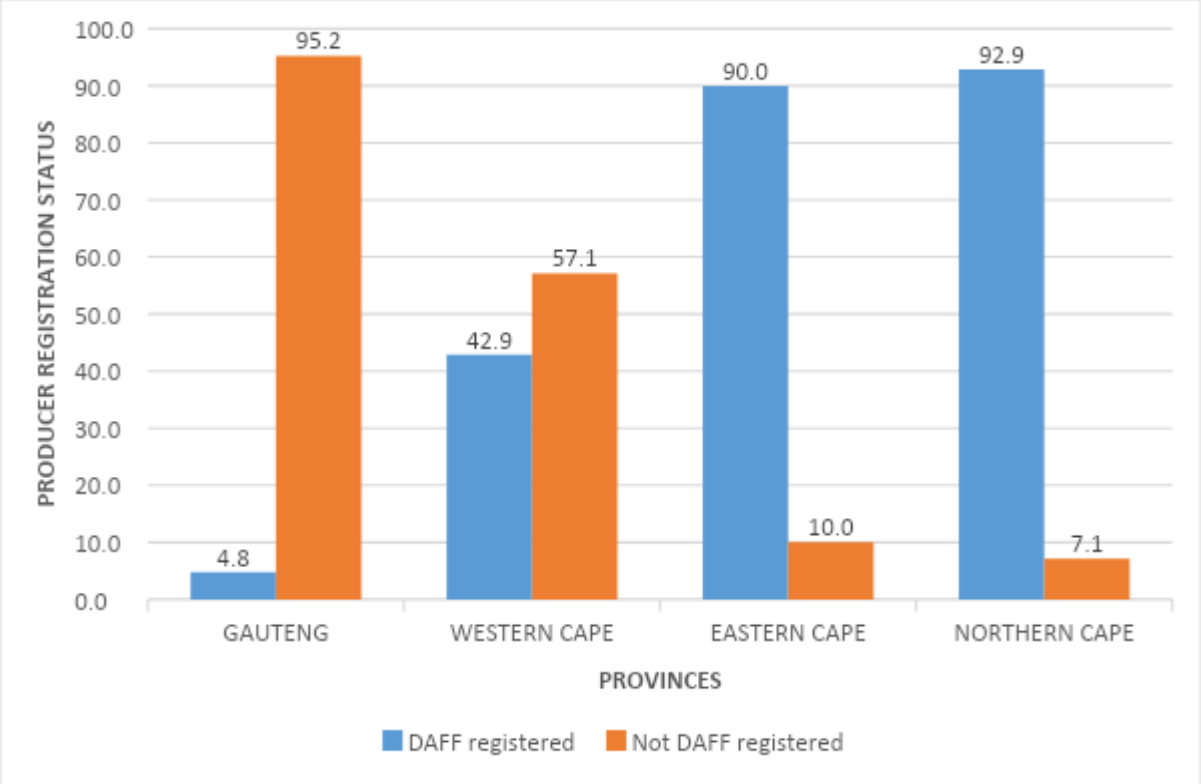

Figure 4.1.2: DAFF registered

It was observed in the above figure, in Gauteng 95.2% respondents were not DAFF registered. In the Western Cape region 57.1% respondents and in the Eastern Cape 10% respondents were not registered with DAFF. Food production units have to be registered with the DAFF in order to promote food safety traceability and provide market access (local and export) to respondents. In order to be certified, food producers need to have a valid PUC/FBO code which is obtained through registration with DAFF.

Finance available to meet food safety compliance criteria is discussed in the next figure. The cost involved to meet food safety compliance criteria is very expensive and it is uncertain if emerging commercial farmers would get certified based on their entry level status in the agriculture sector. In addition, emerging commercial farmers do not know whether market access would be granted by local and export market based on their ability to supply or fulfil retailer programme volumes. The financial impact on emerging commercial farmers to meet food safety compliance criteria is enormous. Emerging

commercial farmers in general, do not have finance available to meet food safety compliance criteria in order to be sustainable.

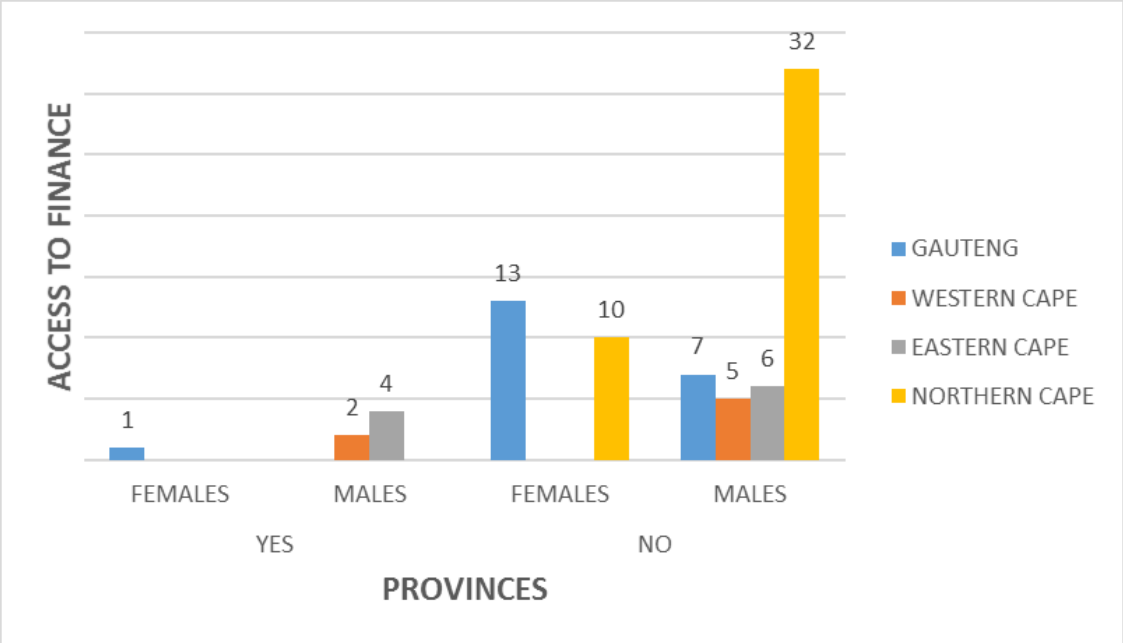

Figure 4.1.3: Finance available to meet food safety compliance criteria

It was evident that 20 respondents in Gauteng, 5 respondents in the Western Cape, 6 respondents in the Eastern Cape and 42 respondents in the Northern Cape did not have finance available to meet food safety compliance criteria. Majority of respondents in all provinces indicated accessing finance is a challenge to meet food safety compliance criteria.

In Figure 4.1.4, the average age of respondents is discussed. The age of average respondents is an indication of their understanding of challenges. The maturity level of respondents influences their ability to continuously adapt towards external factors outside their control. The adoption rate to overcome challenges, are more likely accepted by the younger generation than the resistant older generation.

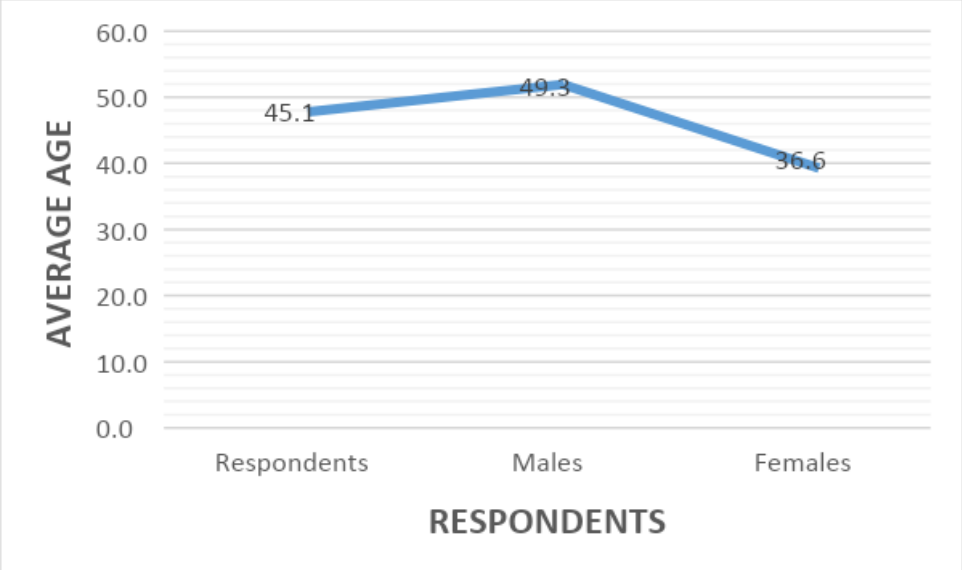

Figure 4.1.4: Average age of respondents

It may be observed in Figure 4.1.4 that the average age of all respondents was 45.1 years. The average age of males was 49.3 years and the average age of females in the study were 36.6 years. The average age of respondents is relatively young meaning the adoption rate to overcome challenges would be high. The respondents would adopt and implement food safety legislation which leads to access to markets. Mwangi and Kariuki (2015) state that older recipients have a negative behaviour towards adoption of innovation and knowledge. Younger recipients of innovation were more susceptible to change.

4.1.1 Impact of Sustainable Development Goals on sustainable farming

Part of the purpose of the Millennium Development Goals (MDGs) was to assist with the eradication of severe poverty and the reduction in hunger from 2000 to 2015. The Sustainable Development Goals (SDGs) from 2015 to 2030 were instituted according to the accomplishments of the MDGs in addressing the sustainable development pillars i.e. economic, social and environmental. The fight against poverty and hunger thus affects food security and increased nutrition through sustainable farming and this remains a global challenge (Setboonsarng and Gregorio, 2017). In addition, according to the United Nations (2010), poverty is the main source of food uncertainty and sustainable improvement in poverty eradication is imperative in order to improve access to food.

Research conducted by Nhemachena, Matchaya, Karuaihe, Muchara and Nhlengethwa (2018) indicates that the challenge is to grow food for an increasing population with fewer natural resources and to ensure future food production for generations to come. Globally, there are 150 million smallholder farmers with the highest rate of poverty. Surman (2017) states that a reduction in poverty is reachable by providing market access for agricultural produce and extension services. Nhemachena *et al.* (2018) argue that agriculture is directly linked to the achievement of the SDGs by 2030. It is argued that eight SDGs are dependent on sustainable agriculture which impacts the remaining SDGs. SDG Compass (n.d.) argues that health has a direct impact on poverty and is a basic human right. Malnutrition is mostly seen in adults and children.

4.1.1.1 SDG 1: No poverty

According to the FAO (2015), most poverty is evident in rural agricultural areas where rural people depend on agricultural activities to sustain their livelihoods. The focus should be on developing rural areas by investment in order to promote agriculture and influence economies. Agricultural growth has led to a decline in the rural poverty rate in Ghana due to stable economic growth (Diao, 2010). Nhemachena *et al.* (2018) state that primary agricultural production sustains rural population's livelihoods by means of economic development. Growth in farming has led to a reduction in hunger and poverty. In addition to this argument, Postnote (2006) states that increased agricultural food production increases the incomes of rural communities and contributes to economic development.

Considering Figure 4.1.1.1, the economic impact of food safety compliance according to farmer respondents is discussed. Food safety compliance has a direct economic impact on emerging commercial farmers in agriculture. It is evident that more foreign exchange can be generated in comparison with selling produce in local markets. Emerging commercial farmers need to understand marketing dynamics and that higher foreign exchange is earned when the South African Rand is weak against the Sterling pound and USA dollar. Certain markets pay premium prices for organic produce. Farm expansion is possible when fresh produce is exported which leads to job creation and the stimulation of agricultural economic development.

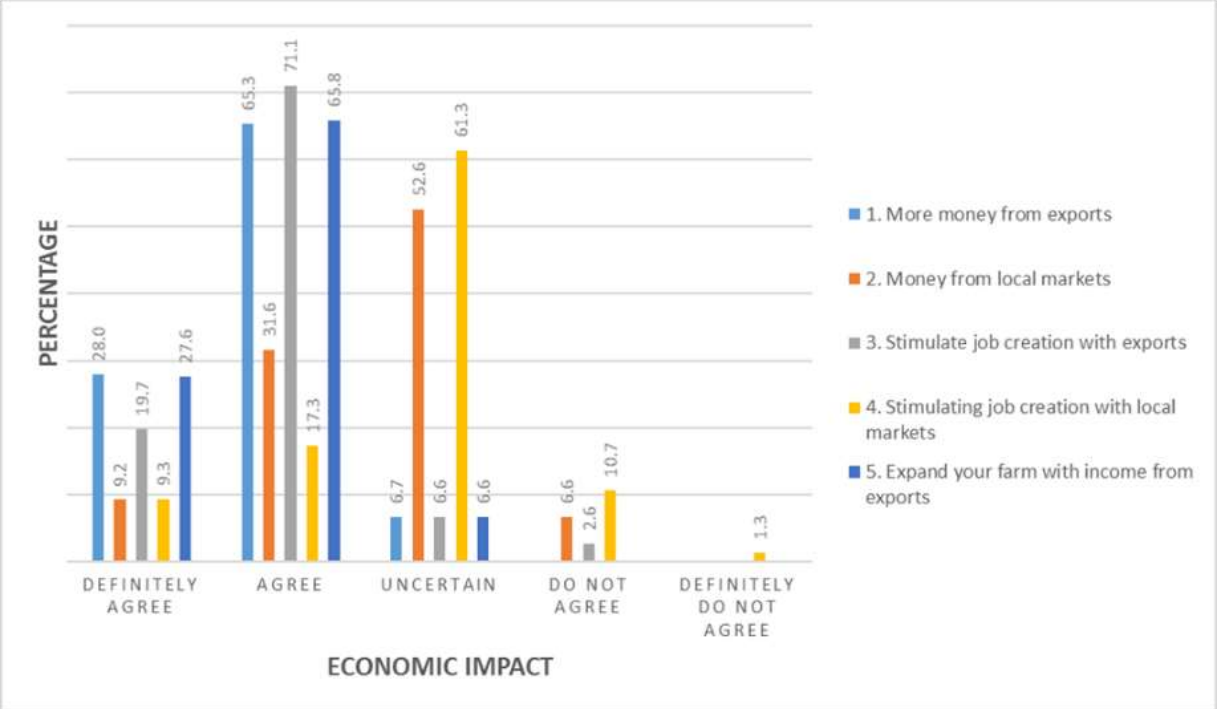

Figure 4.1.1.1: Economic impact of food safety compliance according to famer respondents

As is evident in the figure above, question 1 indicates that 65.3% of respondents agree and 28% definitely agree that more money can be made with exports. However, the opposite was seen where 52.6% of respondents were unsure if more money can be generated from local markets as seen in question 2. It is evident that emerging commercial farmers could generate more money with exports, which means more money in the community that would help alleviate poverty. In addition to the above statement, 65.8% of respondents agree and 27.6% definitely agree (question 5) that expansion of their farms is possible with income from exports. The more income is generated from exports, the more agricultural development can take place in agricultural rural communities. In total, 90.8% of respondents agree and definitely agree (question 3) that exports would enable the employment of more people. Exports of fresh produce help create additional jobs which help alleviate poverty in agricultural communities. Sixty-one-point-three percent of respondents in question 4 are unsure if they can employ more people when selling at local markets. It is clearly evident that supplying local markets is not sustainable over the long term with regard to job creation due to the low demand and high supply of seasonal fresh products.

The effect of agriculture on Sustainable Development Goals is discussed according to respondents in Figure 4.1.1.2 Agriculture has the ability to promote or cripple the core values of SDGs. The sustainability of agriculture is important as helps reducing poverty by means of job creation and decrease hunger when ample food is produced. Diversification of commodities helps minimise the risk and leads to higher farming income, thus reducing poverty. Providing the needed technical advisory support to emerging commercial farmers stimulates economic growth.

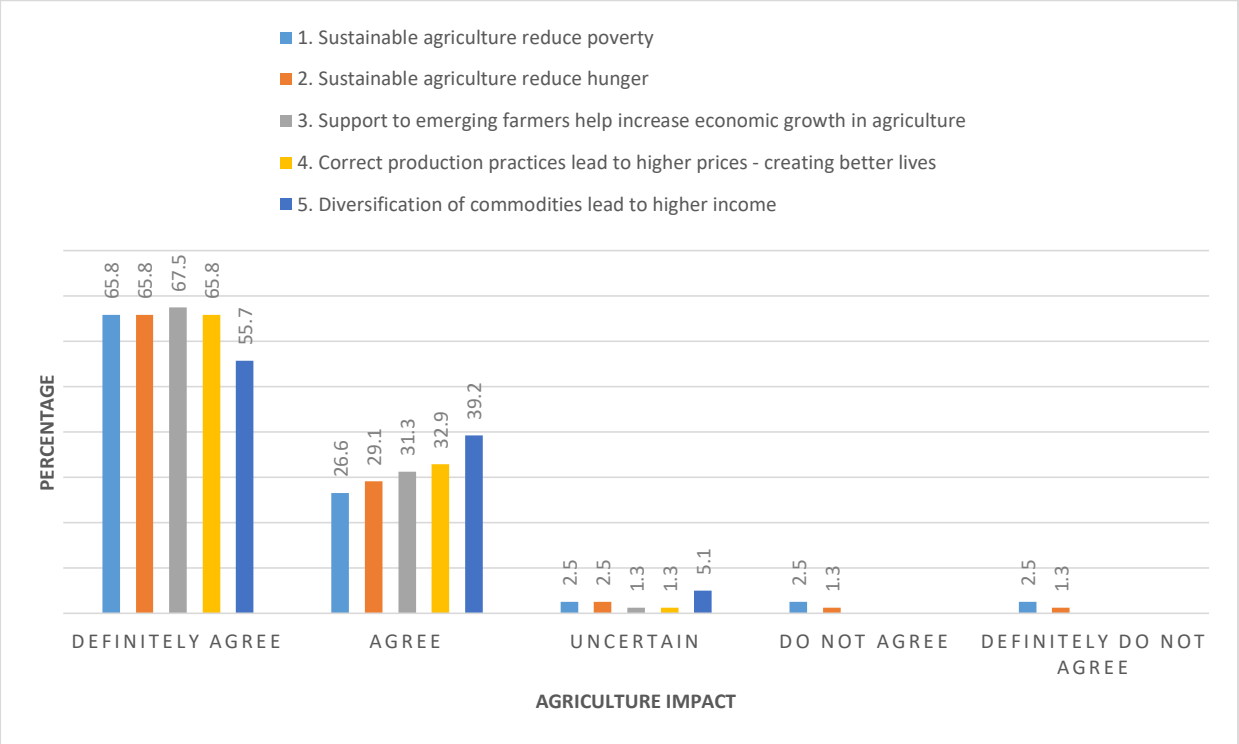

Figure 4.1.1.2: Agriculture impact on Sustainable Development Goals

It was observed that 92.4% of respondents agree and definitely agree that sustainable agriculture can reduce poverty (as indicated in question 1). Consistent agricultural production would generate income and attract investors into rural agriculture which will support economic and rural development. As seen in the above figure, 94.9% of respondents definitely agree and agree that support to emerging commercial farmers would help increase economic growth (question 3). Emerging commercial farmers have the potential to change the economic landscape in agriculture positively when provided with the needed technical support by extension services.

4.1.1.2 SDG 2: No hunger

Research conducted by Nhemachena *et al.* (2018) indicates it is imperative to promote sustainable production of agricultural produce in order to address food insecurity, thus achieving zero hunger. The transformation of farming food systems in agriculture is needed to produce ample food for an increasing population. Setboonsarng and Gregorio (2017) argue that organic farming systems provide ample food for family consumption due to the diversification of products produced. Diversification during production lessens crop losses and increases food security. According to Surman (2017), the implementation of sustainable agricultural practices and market access has led farmers to plant different commodities. Increased financial income has led to the improved diet of children, thus addressing the no hunger goal.

It is evident that 94.9% of respondents definitely agree and agree that the diversification of commodities leads to higher income (as seen in Figure 4.1.1.2, as per question 5). The more diversified the crops are, the less likely the risk of failure during food production. This is in comparison to conventional farming systems. The diversification of agricultural produce in farming systems can supply consumer demand and open up markets. The diversification of produce means different basic commodities can be grown based on market demand**.** In total, 94.9% of respondents agree that sustainable agriculture can reduce hunger, as shown in Figure 4.1.1.2. This is with reference to question 2. It is evident in Figure 4.1.1.2, question 4, that 98.7% of respondents are in total agreement that the application of correct production practices would increase prices per commodity whereby emerging commercial farmers would benefit economically. This reiterates the important role of an extension service to farmers.

In Figure 4.1.1.2.1 the question: do you profit from farming, is discussed with respondents during the study. In order to get entrants into the agricultural sector, one needs to establish whether the agricultural sector is profitable. Agriculture needs passionate individuals in farming and needs to change the perception that the agricultural industry is poor. Different views are obtained in the opinion of respondents per province to assess the profitability of agriculture.

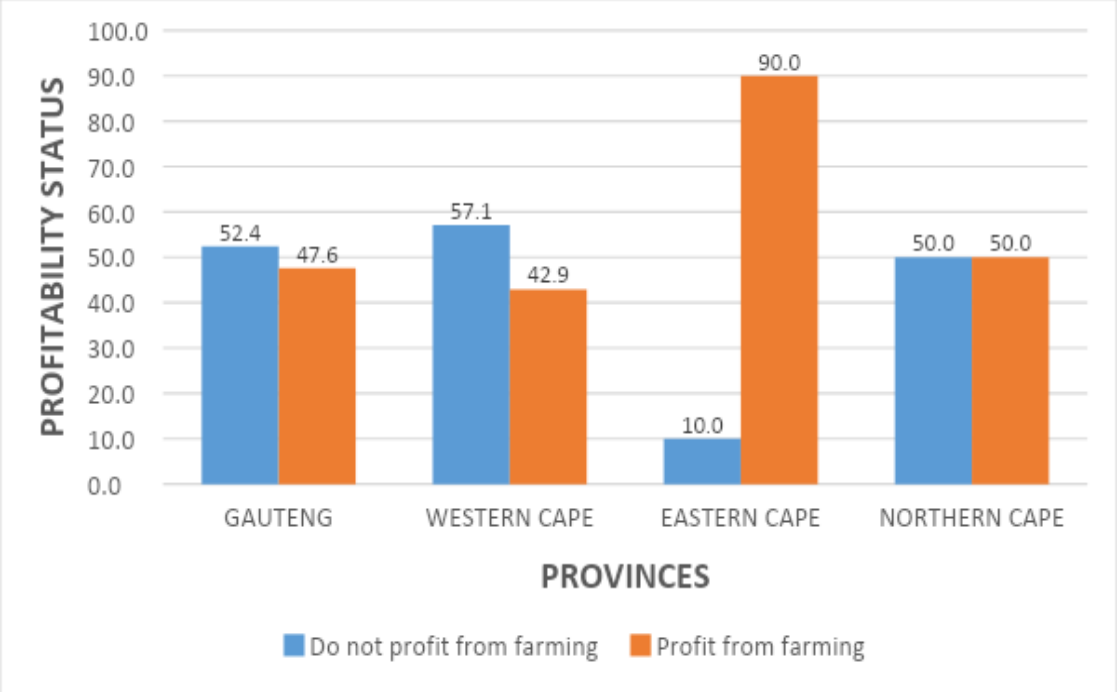

Figure 4.1.1.2.1: Profitability rate of producers

Figure 4.1.1.2.1 illustrates the profitability of respondents per province; 52.4% of respondents in Gauteng and 57.1% of respondents in the Western Cape indicate their farmer operations are not profitable. The reason for the low profitability rate is due to respondents not registered with DAFF; Gauteng indicates 95.2% and Western Cape 57.1% as indicated per Figure 4.1.2. In the Eastern Cape 90% of respondents confirm their profitability status which is as a result of 90% DAFF registration status. Majority of respondents are exporting to global markets which leads to this conclusion. It is evident that the Eastern Cape region is the most profitable and the Northern Cape, Gauteng and Western Cape and provinces less profitable.

In Figure 4.1.1.2.2 the sustainability of farming is discussed. The sustainability rate of emerging commercial farmers is influenced by DAFF registration status which provides access to high value markets with valid food safety certification. This leads to higher profitability with subsequently increased sustainability rate of emerging commercial farmers.

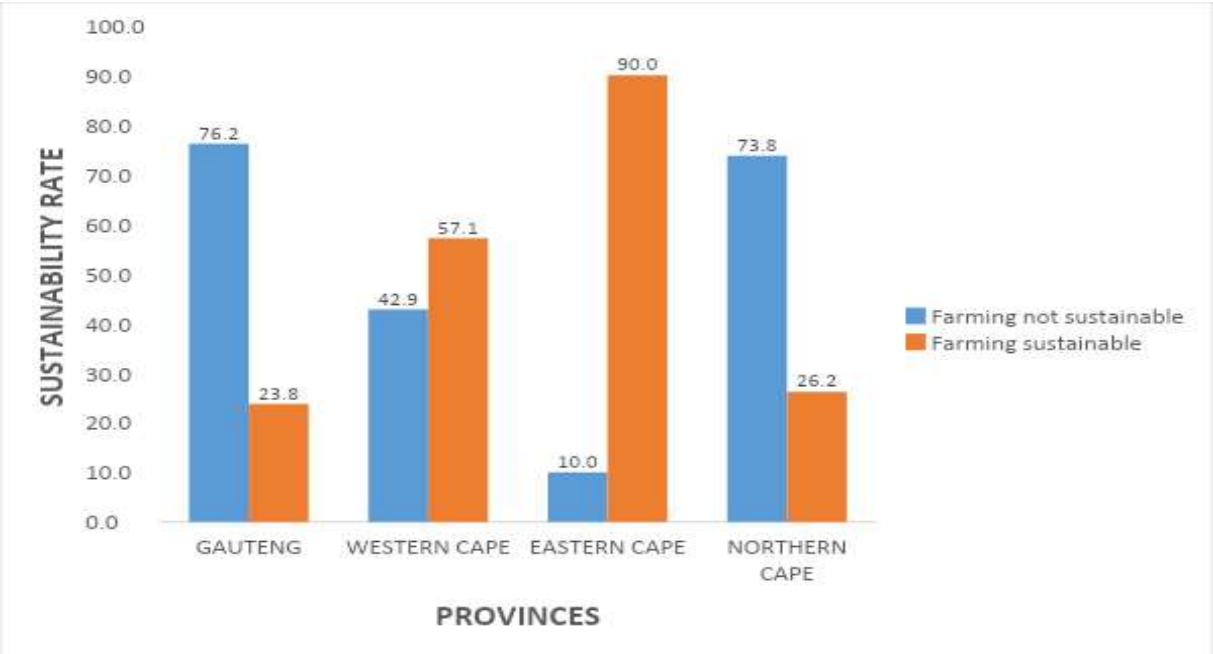

Figure 4.1.1.2.2: Is farming sustainable

During the research study as indicated in Figure 4.1.1.2.2 it was witnessed that 90% of respondents in the Eastern Cape and 57.1% of respondents in the Western Cape concur their farming is sustainable in comparison with 73.8% of respondents in the Northern Cape contesting the above argument and 76.2% of respondents in Gauteng stating farming operations are not sustainable. The Western Cape and Gauteng results do not reflect that registering with DAFF provides sustainability and profitability. However, this could be due to grants, loans and infrastructure development given to emerging commercial farmers. For example, grants and loans could assist with production costs while infrastructure development assists with the establishment and maintenance of the farm. Respondents in the Western Cape have 42.9% emerging commercial farmers registered with DAFF (as seen in Figure 4.1.2) and are 57.1% as indicated per above figure 4.1.1.2.2 sustainable with less profitability rate of 42.9%.

Furthermore, it was observed that 92.9% of respondents are DAFF registered in the Northern Cape. This results in a sustainable rate of 26.2% which further reflects 50% profitability. The sustainable rate stands at 26.2% because of high production costs, poor market access, lack of information, low education levels and interpretation of market information.

4.2 Market access

4.2.1 Consumer influence on market access

Consumers are more worried about their health when buying food, the right choice of food should increase and maintain their wellbeing. Concerns during a shopping experience for clients, are the use of herbicides and pesticides and the effect thereof (Grace Communications Foundation, n.d.).

In Figure 4.2.1.1, it is important to see the influence of food safety on market access. Consumers are the primary users of fresh fruit and vegetables and have become more aware of food safety criteria in first world countries than consumers in third world countries. Consumers in first wold countries are more health conscious and would not buy fresh produce exceeding the MRL limit of products. In comparison with consumers in third world countries it is about availability of fresh fruit and vegetables with less focus on food safety concerns. When consumers become sick or ill due to MRL exceedances in fresh fruit and vegetables, the retailers are sued, or they lose customers due to publicity on international export markets (first world countries). Import of fresh produce would immediately be stopped from implicated emerging commercial farmers leading to market closure.

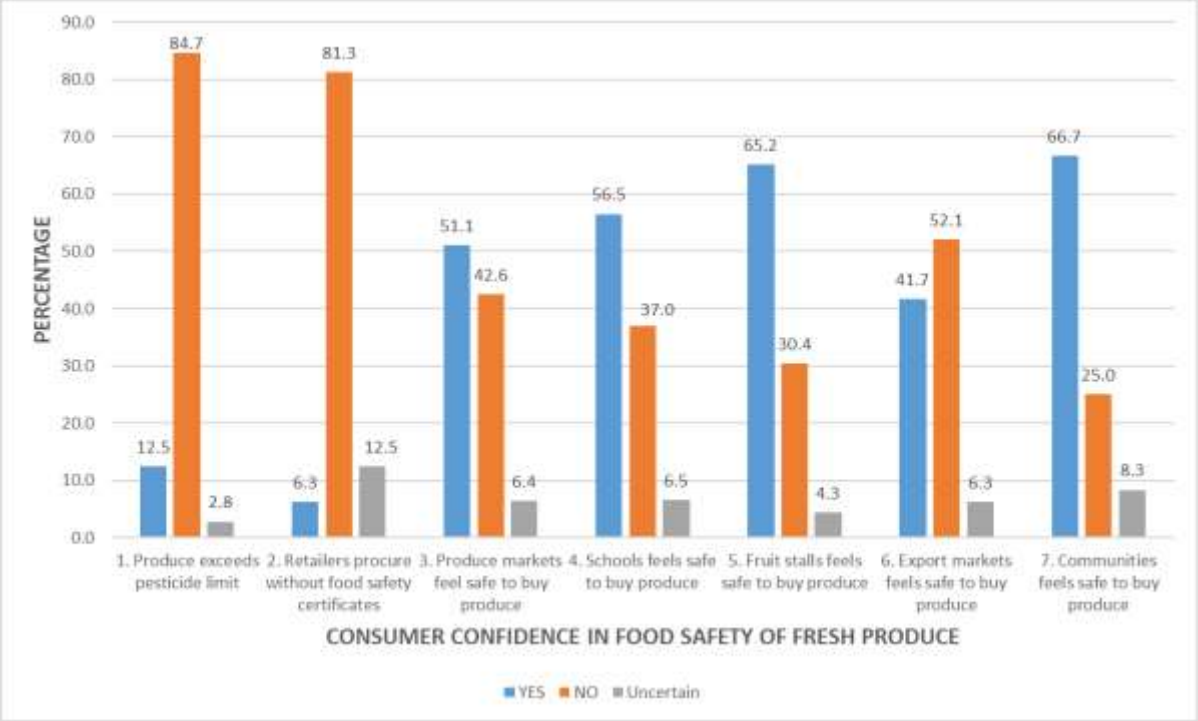

Figure 4.2.1.1: Food safety effecting market access

Based on Figure 4.2.1.1, according to question 1, the majority of emerging commercial farmers that stand at 84.7%, state their customers would not buy fresh produce which exceeds the pesticide limits. This in turn, confirms the findings based on the Grace Communications Foundation (n.d.) that consumers would not buy fresh produce exceeding stipulated pesticide limits. In question 2, it is evident that 81.3% of respondents indicated that retailers would not buy their commodities without valid food safety certificates. The Directorate of Marketing (2012) states retailers would procure fresh produce from food safety certified suppliers. In addition, the Directorate of Marketing (2016) concurs that retailers would procure fresh products from emerging commercial farmers with valid food safety certificates. Furthermore, it was observed in Figure 4.2.1.1, that 51.1% of respondents agree that local markets would buy their commodities as stated in question 3. Chikazunga and Deall (2008) confirm that local fresh produce markets were designed to buy fresh produce from emerging commercial farmers. During the research, it was evident in Figure 4.2.1.1, that 56.5% of respondents agree schools would buy from them and 37% of respondents disagree in question 4. According to Dent and Macharia (2017), schools would procure fresh produced commodities from smallholder farmers.

It is imperative to note that 65.2% of respondents agree in question 5 that fruit stalls would buy fresh produce from emerging commercial farmers. Majority of smallholder farmers sell their produce to fruit stalls (Third Carnegie Inquiry 3, 2014). In question 6 of Figure 4.2.1.1, 52.1% of respondents disagree that export markets would buy from them and 47.1% of respondents agree export markets would feel safe to buy commodities. Ferris, Robbins, Best, Seville, Buxton, Shriver and Wei (2014) are of the opinion that export markets would feel safe to procure commodities from emerging commercial farmers if they comply with food safety standards and requirements. It was observed in question 7, of Figure 4.2.1.1, that 66.7% of respondents agree communities would feel safe to buy fresh produce from emerging commercial farmers. In addition, Ferris *et al.* (2014) agree that communities would feel safe to procure fresh produce from emerging commercial farmers.

In Figure 4.2.1.2 the economic impact of food safety compliance – exports are presented. It is evident that food safety compliance stimulates economic growth whereby customers feel safe to buy fresh produce when valid food safety certificates are produced. Valid food safety certificates are an indication of GAP during all stages of production, fresh produce MRL analysis tested traceability of food safety standards and requirements and consumed fresh food and vegetables are safe to eat. In addition, consumers are willing to pay increased prices for fresh fruit and vegetables when valid food safety certificates are produced on international export markets. The perception, in general, is that valid food safety certificates confirm that producers comply with food safety compliance criteria which are a prerequisite to produce healthy and safe fresh fruit and vegetables. In addition, with the above-mentioned, emerging commercial farmers have the opportunity to obtain higher prices at global export markets.

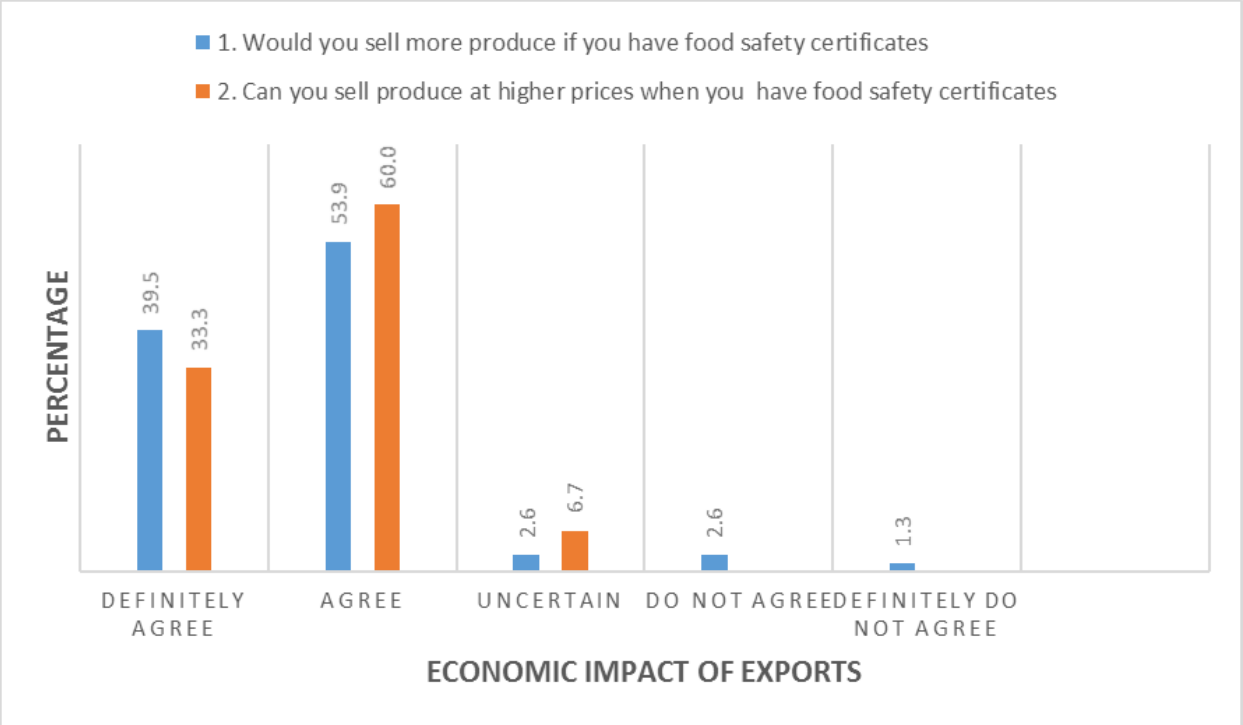

Figure 4.2.1.2: Economic impact of food safety compliance – exports

In reference to Figure 4.2.1.2, question 1 states emerging commercial farmers would sell more produce if they were in possession of a valid food safety certificate: 53.9% agree, 39.5% definitely agree and only 2.6% do not agree with the statement. In addition to this, consumers would, therefore, be more likely to purchase produce from emerging commercial farmers with a valid food safety certificate and would be less likely to purchase produce which exceeds the pesticide limit, as it is perceived to promote consumer health and wellbeing. According to Okello, Narrod and Roy (2007), retailers in the EU are forced to implement stringent standards due to immense pressure from shoppers with regards to food safety standards.

In Figure 4.2.1.3, the importance of market access focuses on food safety standards and requirements, granting emerging commercial farmers' market access when compliance is evident. Food safety standards and requirements have become stricter as a result of pressure from consumer awareness of food safety regulation in first world countries. In first world countries (international markets), consumers are more involved with food safety standards and influence the implementation of higher stricter food safety standards.

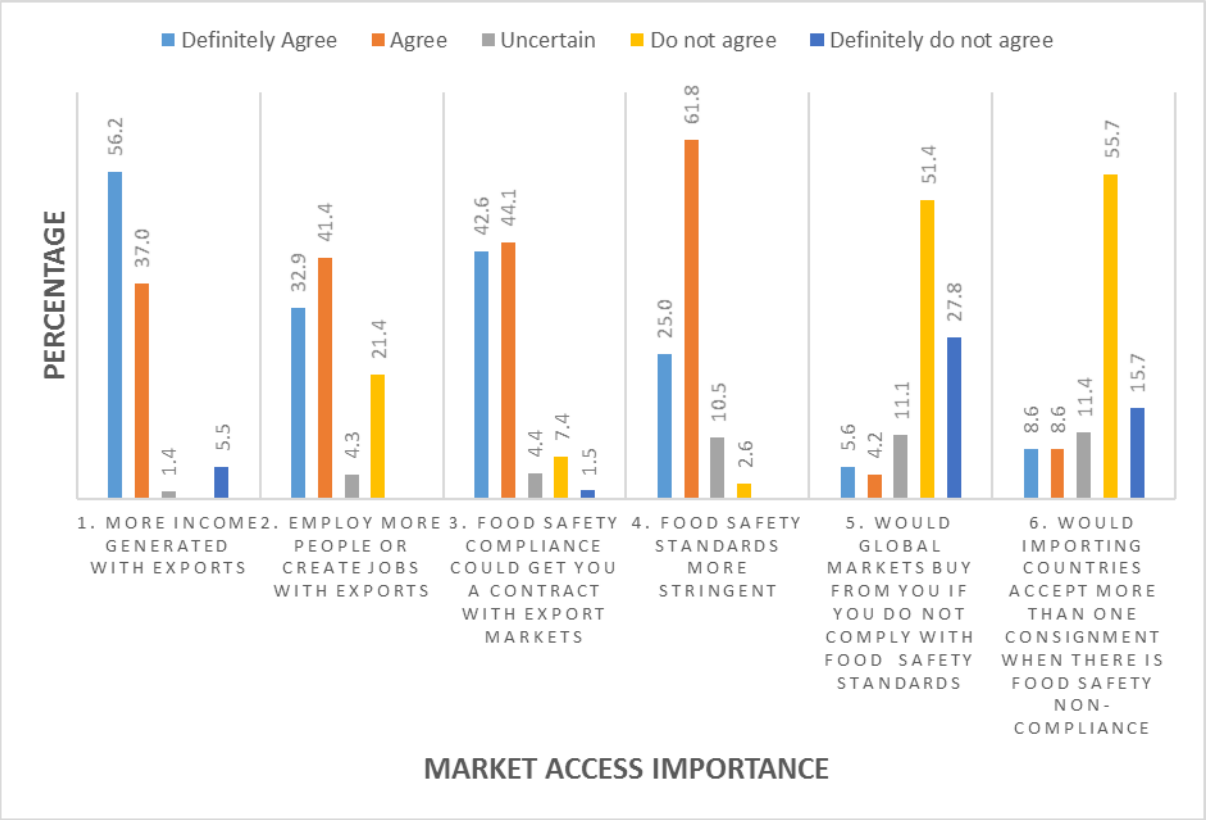

Figure 4.2.1.3: Importance of market access

Based on the research survey conducted as shown in Figure 4.2.1.3, question 4 indicates food safety standards have become more stringent: 61.8% agree and 2.6% do not agree. Stringent food safety standards occur based on consumer awareness of food safety regulation and policies (Okello, Narrod and Roy, 2007).

Furthermore, Ogalo (2009) indicates the EU has general food safety standards and member countries have their own standards based on the EU's generic standard. Member countries' food safety standards originate from consumer demand. Consumers in first world countries (Hobbs, 2003) have an influence on markets to ensure food safety and higher quality of food assurance is accomplished by implementation of GAP. Food safety policies, regulation and standards have a major impact on market access of emerging commercial farmers on fresh produced commodities as confirmed by Ogalo (2009).

In Figure 4.2.1.4 the origin of food safety policies relates to the different role-players, including consumers, governments, international retailers and international policy makers involved with food safety legislation. It is important to note the end-user of produced food products are for human or animal consumption. First world countries are more driven to improve food safety standards, thus preventing harm to humans or animals when consuming any type of produced food product. Enforcing these food safety standard policies and regulations must be driven from within government. South Africa, as a member country of the EU, needs to comply with minimum food safety standards and requirements and higher supermarket standards in order to get international market access.

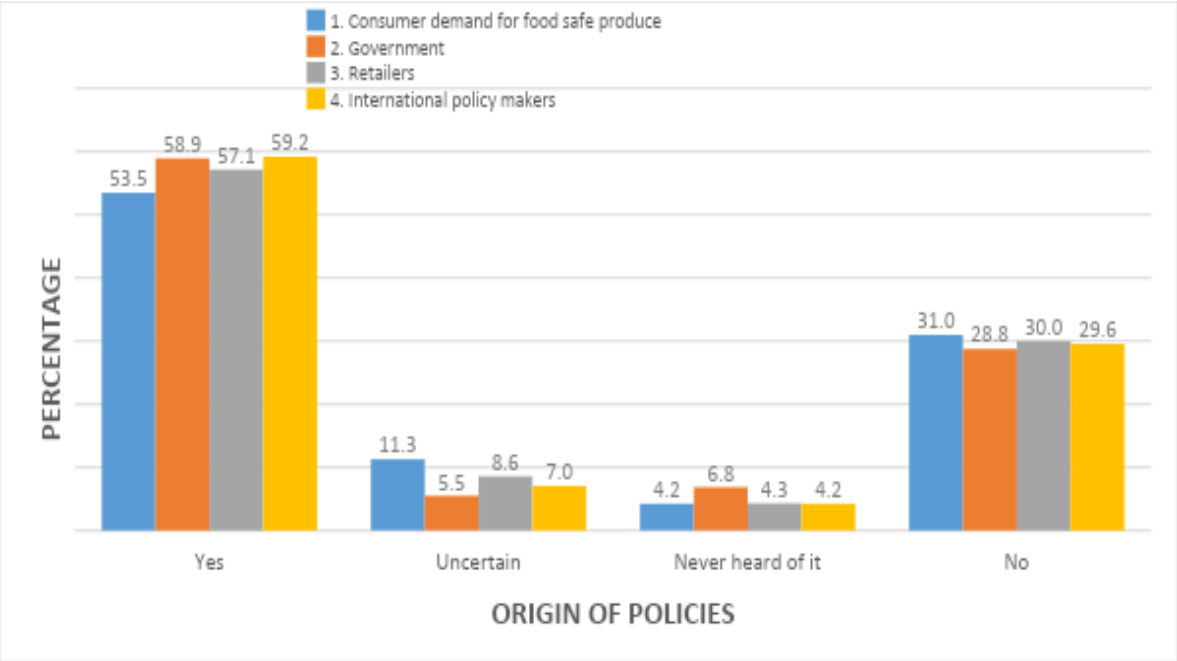

Figure 4.2.1.4: Origin of food safety policies

As stated in Figure 4.2.1.4, question 1 indicates that the demand for safer fresh produce has its origin from consumers, which influences food safety policies. During the research conducted, it was observed that 53.5% of emerging commercial farmers agree and 35.6% are not in agreement with the above statement. It is evident that emerging commercial farmers are aware of the influence consumers have on food safety policies, however, 35.6% of emerging commercial farmers are not aware that consumers have an impact on influencing food policies and standards. Furthermore, it was evident that 58.9% of

respondents agree and 35.6% of respondents are not aware of food safety policies originating from government, as stated in question 2. Government institutes food safety policies and regulations in order to protect market access by implementing preventative measures to ensure alignment with the latest international food safety standards and requirements. In question 4, 33.8% of emerging commercial farmers are not aware that food safety policies originate from international policy makers. The role of international policy makers is to safeguard humans and animals from potential harm with regards to produced food or food related substances during all stages of primary and secondary production. Furthermore, during the research, it was observed through question 3 that 57.1% of emerging commercial farmers agree international retailers play a role in food safety policies and 34.3% of emerging commercial farmers are not aware of the involvement of international retailers. It is important to note that international retailers need to give input into food safety policy and regulation, based on consumer feedback about health and safety issues pertaining to fresh produced commodities. In order to ensure and secure market segments international retailers are contributing towards food safety policies.

4.2.2 Market access information limited

Emerging commercial farmers have limited information on prospective markets resulting in little to no produced commodities being sold commercially (Agri SA, 2017). Research has shown, emerging commercial farmers cannot comply with food safety requirements which are a requirement from clients, due to a lack of market access knowledge (Hellin, Lundy and Meijer, 2007). The Wallace Centre (2012) confirms access to market information and its interpretation thereof, poses challenges to emerging commercial farmers. Furthermore, research by Mpandeli and Maponya (2014) confirms that the lack of market information is a barrier to formal market penetration. Smallholder farmers limit themselves from market penetration as a result of technical information on regulatory standards and higher private standards note (Jaffee, Henson and Rios, 2011).

Food safety compliance information is presented in Figure 4.2.2. It is important to note that each importing country has a unique set of rules which initiates trade between countries. Exporting countries need to comply with these rules which are needed to

penetrate global fruit export markets. Market access information changes based on the risk category and impact on the importing country, meaning amendments may occur at any given time. The ability of the importing country to adapt to these market changes is crucial for market access. Emerging commercial farmers cannot penetrate markets due to a lack of knowledge pertaining to different market requirements. Market access with regards to food safety continuously includes the use of registered chemicals during all stages of production and compliance with Codex MRL limits for each country. It is crucial that the latest updated market access to be circulated to emerging commercial farmers in order to meet the criteria for food safety compliance.

Figure 4.2.2: Food safety compliance information

Information reflected on the above figure, relevant to question 4, indicates 71.8% of respondents do not have market access knowledge and 28.2% of respondents have market access information. In addition to question 3, 69.2% of respondents do not have knowledge about export of fresh fruit and vegetables, while 30.8% of respondents have knowledge about export of fresh fruit and vegetables. The role of extension services, providing updated and relevant advice, is imperative to ensure market access of emerging commercial farmers. This in turn confirms the notion that emerging commercial farmers are denied market access due to a lack of knowledge with regards to export markets, thus

not complying with food safety standards, policies and market information (Jaffee *et al.*, 2011).

4.2.3 Impact of food safety compliance on market access.

Market access would be granted only to producers of fruit and vegetables who are EUROGAP and BRC certified (Okello, Narrod and Roy, 2007).

It is imperative to note that in Figure 4.2.1.3, question 3 identifies that 44.1% of respondents agree and 42.6% of respondents definitely agree that food safety compliance could open international markets. This complements research conducted by Okello, Narrod and Roy (2007), that compliance with international food safety criteria, would open markets for emerging commercial farmers.

Loconto and Dankers (2014) argue certified food producers sell large volumes to markets that do not require food safety certification. Higher prices are obtained when complying with food safety certification.

Figure 4.2.3 indicates the economic impact of food safety compliance and local market as presented by study respondents. Major local retailers in the South African market have made a positive shift towards implementing food safety compliance measures in the procurement processes. Procurement of fresh produce from emerging commercial farmers would only be possible if valid food safety certificates are produced. Certified emerging commercial farmers would be able to sell fresh produced fruit and vegetables at higher prices in the local South African market.

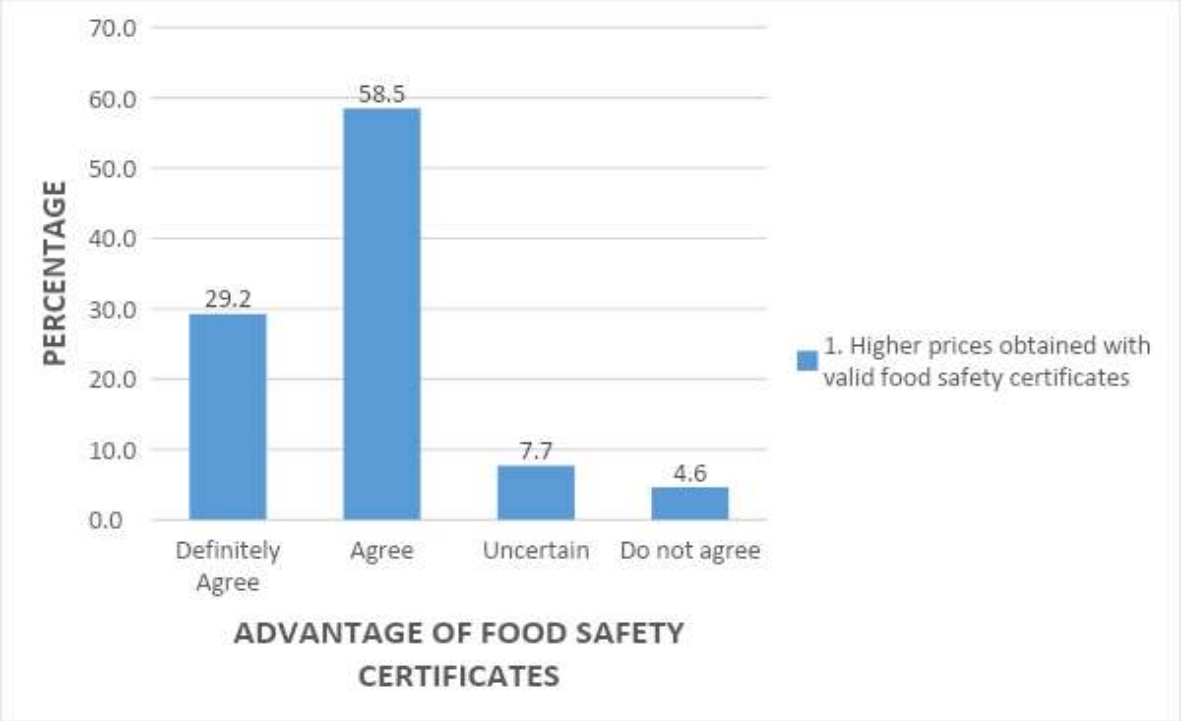

Figure 4.2.3: Economic impact of food safety compliance – local markets

From the information gathered during the research as indicated in Figure 4.2.3, question 1 states that 29.2% of emerging commercial farmers definitely agree, 58.5% agree and only 4.6% disagree that higher prices are obtained with food safety certificates. It is evident that the higher prices per commodity would be possible with food safety certificates on the local market.

In addition to the above statement Figure 4.2.1.2, question 2 observed that of emerging commercial farmers 60% agree and 33.3% definitely agree, higher prices are obtained with food safety certificates at global export markets. Evidence gathered supports the argument of Loconto and Dankers (2014) that higher prices for fresh produce is possible with food safety certificates on markets.

4.2.4 Impact of food safety non-compliance on market access.

Non-compliance to retailer GAP specifications would lead to producers being eliminated as suppliers and subsequently result in the loss of revenue argues (Tobin, Thomson, Laborde and Bagdonis, 2011). Furthermore, research has shown, emerging farmer

participation in exporting of fresh produce has dropped more than 50% as a result of non-compliance with Global GAP food safety standards (Clarke, 2010). In addition, Kariuki (2018) stresses emerging commercial farmers cannot find markets and penetrate value chains for produced commodities due to non-conformance with food safety standards and requirements.

In reference to Figure 4.2.1.3, question 5 indicates 73.2% of respondents disagree that global markets would buy from you if you did not comply with food safety standards. This in turn confirms the notion that emerging commercial farmers are denied market access as a result of non-compliance with food safety standards, affecting emerging commercial farmers financially.

4.3 The economic impact of food safety compliance.

Hobbs (2003) states GAP-certified producers obtain premium prices and signing contractual agreements with retailers and export markets, increase their income. TIPS (n.d.) argues that the result of compliance has led to an increase in South African citrus exports to the US. It is evident that exports of emerging commercial farmers' projected income over a 3-year period has shown an increase from 3% to 28% due to export (Leibniz Institute of Agricultural Development in Transition Economies, n.d.). Due to the exporting of lemons to the EU, Middle East and Far East an increase in export volume was noted from 31 tons to 163 tons (Van der Walt, 2018). Loconto and Dankers (2014) argue that higher prices are obtained when complying with food safety certification when commodities are exported. When food monitoring systems are effective and maintained, consumers feel safe to buy food, the demand for produce increases and more exports of fresh produce takes place, in turn earning a higher foreign exchange (Department of Health, 2000). In addition, Mpandeli, and Maponya (2014) are of the opinion that when emerging commercial farmers produce for specific markets, income increases and alleviates poverty in rural areas. With specific reference to Figure 4.2.1.3 question 1 shows 93.2% of respondents are in agreement that the export of fresh produce means more money. In relation to Loconto and Dankers (2014), emerging commercial farmers would earn more revenue with the export of produced commodities.

The agriculture sector plays a major role in the South African economy, by means of job creation per capita; more than in any other production-driven sector. Primary agriculture is key in alleviating rural poverty according to Reinhardt (2018). Export commodities have the ability to generate revenue, promote job creation, build the economy and assist with development (Food and Agriculture Organisation of the United Nations, 2018). Emerging commercial farmers in rural agriculture have the potential to alleviate poverty by means of job creation (Bienabe and Vermeulen, 2007). Employment in rural agriculture is in direct correlation with the adoption of standards. The study of Ogalo (2009) found an increase in job creation, better quality produced by emerging commercial farmers and more exporter marketing programmes in Kenya. Furthermore, research has shown an increase in job creation where smallholder farmers applied and adopted standards in farm production (Loconto and Dankers, 2014). Based on the research survey conducted as shown in Figure 4.2.1.3, question 2 indicates 74.3% of respondents state exports would create more jobs/employ more people. It is important to note when emerging commercial farmers increase their exports, job creation is stimulated.

4.3.1 Negative economic impact

Reports from the World Bank (2005) indicated third world countries have losses of $1.75 billion due to non-compliance with SPS measures. Only one non-compliance food safety standards are needed to discard all shipments of the same commodity from that country (Ogalo, 2009).

Figure 4.3.1 has relevance to sanitary and phytosanitary measures. SPS measures control the conditions under which national and international governments regulate health and safety standards which might influence trade and which poses a threat to human and animal life. It is of utmost importance that emerging commercial farmers must familiarise themselves with the content of SPS measures in order to comply. Non-compliance with SPS measures means international market access is denied. When importing countries intercept non-compliant consignments to SPS measures, a risk analysis will be conducted thereafter a decision will be made to prevent following consignments from entrance at port level.

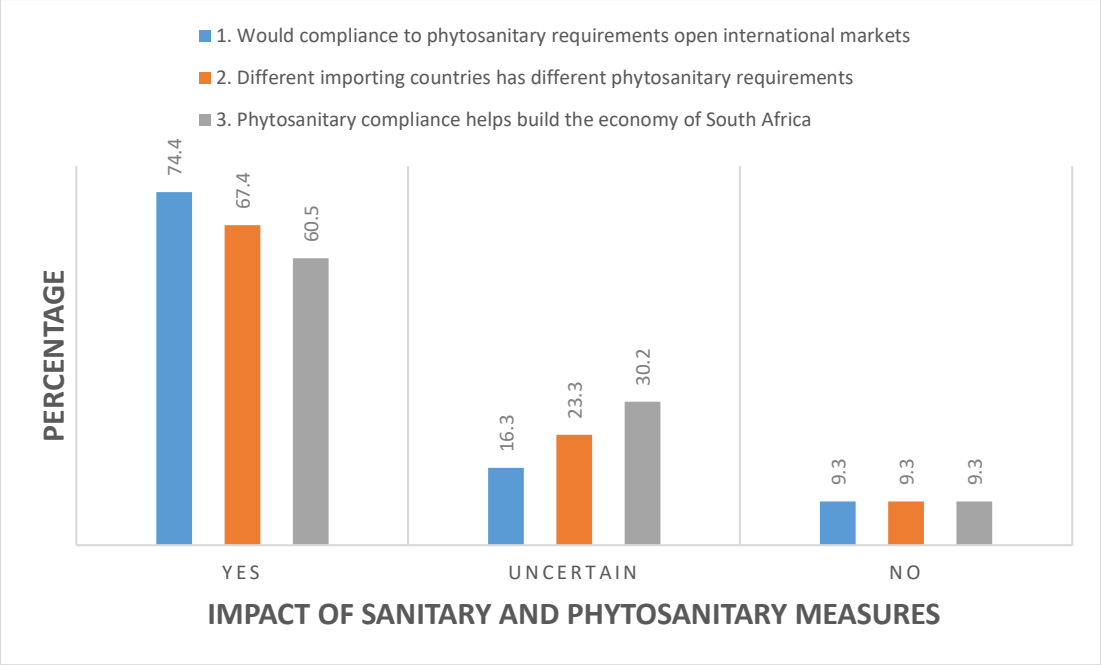

Figure 4.3.1: Sanitary and phytosanitary measures (SPS)

Based on the above figure, according to question 1, the majority, which stands at 74.4% of emerging commercial farmers, indicates compliance with phytosanitary requirements would open international markets. In essence, this means that when emerging commercial farmers comply with phytosanitary requirements, market access is granted. This research agrees with the World Bank (2005) that non-compliance with phytosanitary requirements would result in no market access.

Furthermore, as per Figure 4.2.1.3, question 6 specifies that 55.7% of the respondents disagree and 15.7% definitely disagree, that importing countries would accept more than one consignment when there is food safety non-compliance. This is similar to Ogalo (2009), who agrees that importing would only allow one non-complying consignment from importing countries.

4.4 Food safety policy and governance.

Food safety policies originated as a result of human deaths. The negative impact on the health of consumers and the enormous economic costs of food scandals has led to the establishment of food regulations (Ordonez, 2016). Historical documentation has shown

consumers often became sick from an intake of food which led to policy writing (Tahkapaa, 2016:15). Furthermore, Tahkapaa (2016) indicates that Moses instituted laws prohibiting his people from eating animal meat that were not slaughtered correctly or died from unnatural causes. Trade institutions erected during the middle ages played an important role by regulating the trade of food and prevention of misleading indication of food commodities. Unnevehr (2003) indicates that it has currently become the onus of government, provincial municipalities and local municipalities to oversee food policies and compliance. Policy makers are attending to the presence of dangerous chemicals present in food products, including pesticide residues.

The essence of policies is to address the risk of contamination during agricultural production. Regulations must be applied in synchronisation with each other and cannot function on their own (Holdaway and Husain, 2004:40). Food policies provide a framework for regulation and without food policies there cannot be effective implementation. The Department of Health (2000:4) articulates the importance of food regulations and programmes to manage food safety risks effectively. The initial purpose of food safety laws was to regulate the introduction of control mechanisms to assist with problem solving of pesticide contamination in food. Food regulation according to Tahkapaa (2016), is one mechanism used to provide safer food for human consumption in the EU and focuses primarily on quality of commodities, safety assurance, labeling of products and product accountability.

Policies implemented must support emerging commercial farmers by granting them access to markets and collaboration with other sectors supporting economic development argues (Department of Agriculture, 2002).

4.4.1 Food safety policies

Government of Nigeria (GON), according to Olaito (2013) has instituted national policies and implementation strategies to address food safety compliance through the National Agency for Food and Drug Administration and Control (NAFDAC). According to Buzby (2003), each country has its own food safety standards and requirements which impact the volume of international and national trade.

As stipulated in Figure 4.2.1.4, food safety policies originate from government. 35.6% of respondents were not aware food safety policies comes from government. It is imperative for emerging commercial farmers to know food safety policies originate with government with its purpose to promote trade and export of fresh produce.

Bi-lateral agreements play an essential role and have relevance to volumes traded between countries (Mare, 2017). The Department of Agriculture, Forestry and Fisheries (2010) points out joint agreements (protocols) with several importing countries for different commodities exist. The content of joint agreements is to manage the spread of diseases, pests and unsafe food to importing countries.

In Figure 4.4.1, bi-lateral agreements according to respondents are discussed. Bi-lateral agreements comprises of food safety risk factors including trade volumes, phytosanitary pests and diseases, MRL analysis laboratory testing of fresh produce, the use of registered chemicals during all stages of production, PUC and orchard registration built into a trade agreement prior trade commences between countries. The importing country stipulates certain conditions under which trade would be regulated, any non-compliance would result in failure of the signed bi-lateral agreement leading to market closure.

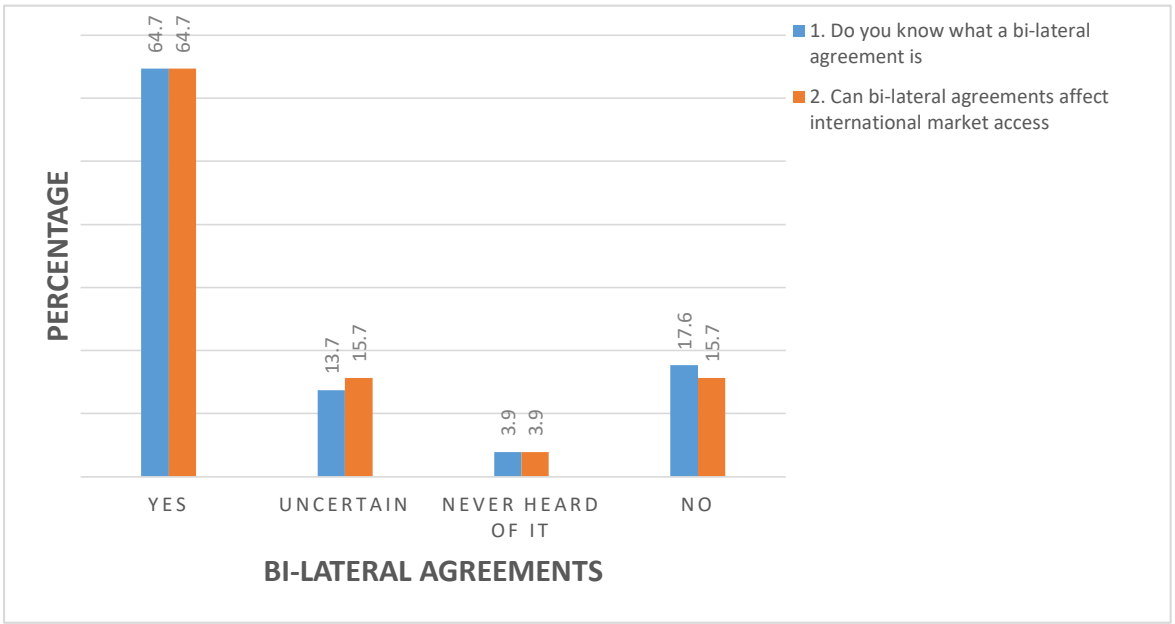

Figure 4.4.1: Bi-lateral agreements

Research conducted as per the figure above, states that 64.7 % of respondents agree bi-lateral agreements affect international market access. Bi-lateral agreements provide international market access to emerging farmers and support the above statement of Mare (2017). Furthermore, it is important to note Figure 4.4.1, question 1 shows 64.7% of emerging commercial farmers know what bi-lateral agreements are about. It is important to note that without knowledge about the content of bi-lateral agreements, a non-conformance may occur, which will lead to market closure for emerging commercial farmers.

Makhafola (2016) provides evidence of requirements within bi-lateral agreement with the Indonesian government, which requires safety certificates for imports. In order to export fruit and vegetables to Indonesia, farmers are subjected to heavy metal and microbiological laboratory analysis. Compliance is verified, based on the outcome of laboratory test results. Laboratory analysis testing is to be conducted at DAFF accredited laboratories (Appendix 1) only. The samples will be drawn by the PPECB per PUC for each variety. Laboratory results will be made available to DAFF from which a safety certificate of compliance is generated with a validity period of 60 days. The PPECB will verify MRL limits against Indonesian MRL list (Appendix 2) for compliance. Compliance means the PPECB will endorse consignment for export and non-compliance means rejection of the consignment.

Makhafola (2018) furthermore, provides evidence that consignments of fresh fruits and vegetables from South Africa are subjected to laboratory testing if exported.

4.4.2 Food safety policy challenges

Challenges comprise of sensitive market prices, extremely competitive markets and the fast growth of suppliers; whereby the emphasis is predominantly on quantity rather than promoting quality. The rapid expansion rate of the human population has resulted in the use of banned and unregistered chemicals in order to manage high production (Holdaway and Husain, 2004:48).

In Figure 4.4.2 chemicals used during food production are discussed by respondents during the study. Agriculture in general is under tremendous pressure to supply in the global food demand of an increasing population. As a result, food producers use unregistered and banned chemicals during all stages of food production to meet the demand for food due to registered chemical being expensive. The use of chemicals during food production assists in meeting the demand for food and a growing population.

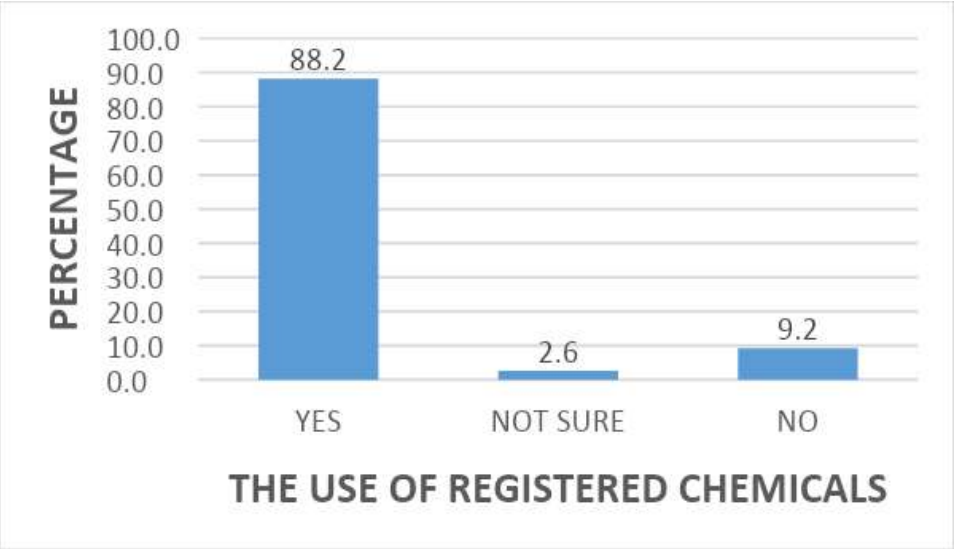

Figure 4.4.2: Chemicals used during food production

The above figure clearly states in question 1 that 88.8% of emerging commercial farmers use registered chemicals and in total 11.8% of emerging commercial farmers do not use registered chemicals. Conducted research in return disagrees with the argument of Holdaway and Husain (2004) that due to increased food demand banned and unregistered chemicals are used during food production.

4.4.3 Cost of food safety compliance

According to Tobin *et al.* (2011), the cost of food safety compliance is high. Buzby (2003) expounds that food safety compliance increases production cost. Furthermore, research by Okello, Narrod and Roy (2007) indicates that due to the high cost of certification, emerging commercial farmers did not adopt this innovation.

In Figure 4.4.3.1 certification cost is discussed by respondents during the study. Certification cost is an annual cost incurred by emerging commercial farmers to get food safety certified by means of food safety certification audits, without valid food safety

certificates emerging commercial farmers cannot penetrate local and global export markets. Food safety certification is expensive and adds to the production cost of emerging commercial farmers. South African Good Agricultural Practices (SAGAP) certification provides excess to markets in Africa and islands surrounding Africa which is not as expensive as BRC and NSF certifications, which provides global market access to international countries.

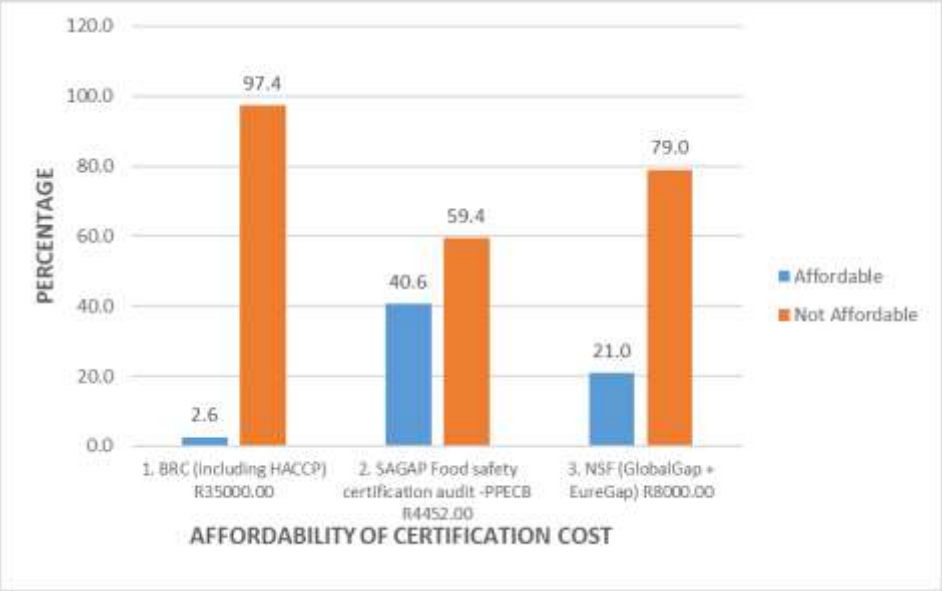

Figure 4.4.3.1: Certification cost

From the research conducted, question 1 in the above figure indicates that 97.4% of respondents agree the cost of certification is not affordable and in relation to question 3, it is observed that 79% of respondents agree cost of certification is not affordable. In addition to question 2, it is evident that 40.6% of respondents agree SAGAP food safety certification is affordable. It is important to note that emerging commercial farmers cannot afford certification there is non-compliance with food safety criteria which uphold local and international market access due to high certification cost. BRC and NSF certification grant emerging commercial farmers international markets in contradiction to SAGAP which is limited to South Africa only.

In Figure 4.4.3.2 that the question: “Do you have money to pay for compliance criteria?” is discussed as observed by respondents during the study. In order to get food safety certification, food producers need to implement a HACCP system into farming operations with relevant documented information. It is evident that the cost of food safety certification, implementation of HACCP systems is for the account of emerging commercial farmers. The challenge is that emerging commercial farmers need to pay these costs, but they are unsure whether it will provide market access based on other quality and quantity factors. Implementation of HACCP systems into farming operation is a pre-requisite for food safety certification and is not affordable for emerging commercial farmers to implement. In essence, it means that if emerging commercial farmers cannot afford to implement HACCP systems, they cannot be food safety certified, meaning market access is denied, thus affecting their sustainability. Furthermore, it is evident that MRL analysis must be conducted at laboratories on fresh produce in order to ensure food safety compliance. Emerging commercial farmers cannot afford MRL analysis tests on fresh produce at laboratories to determine whether fresh produce is within the prescribed MRL limits.

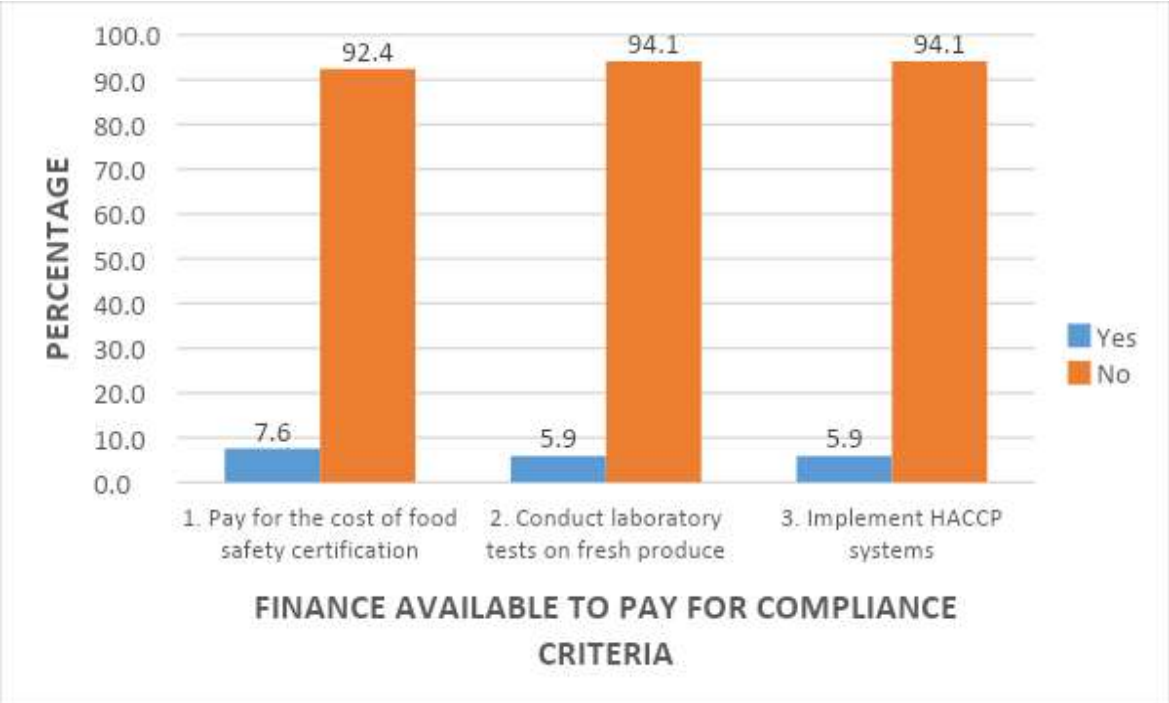

Figure 4.4.3.2: Do you have money to pay for compliance criteria

The information reflected in the above figure, applicable to question 1, indicates 92.4% of the emerging commercial farmers do not have money to pay for food safety certification. This means emerging commercial farmers do not have local and global market access for produced commodities. In addition to the above, it is imperative to note that question 3 of Figure 4.4.3.2 mentions that 94.1% of emerging commercial farmers do not have money to pay for implementing HACCP systems. Question 2 states that 94.1% of respondents do not have money to pay for laboratory tests. Markets would not procure fresh produce without valid laboratory test results, which could affect them detrimentally if consumers are harmed during consumption.

4.4.3.1 Cost of MRL analysis testing

Loconto and Dankers (2014) state that MRL analysis testing at laboratories is expensive. Zagory (2014) confirms microbiological testing is costly.

Cost of MRL analysis testing is presented in the next figure. The importance of MRL analysis testing of fresh produce is to ensure fresh fruit and vegetables adhere with specified local and international MRL limits on pesticides, ensuring no humans or animals are adversely affected. According to the Department of Agriculture, Forestry and Fisheries (2015) all commodities are subjected to MRL analysis testing at accredited appointed laboratories and the related cost is for the emerging farmer.

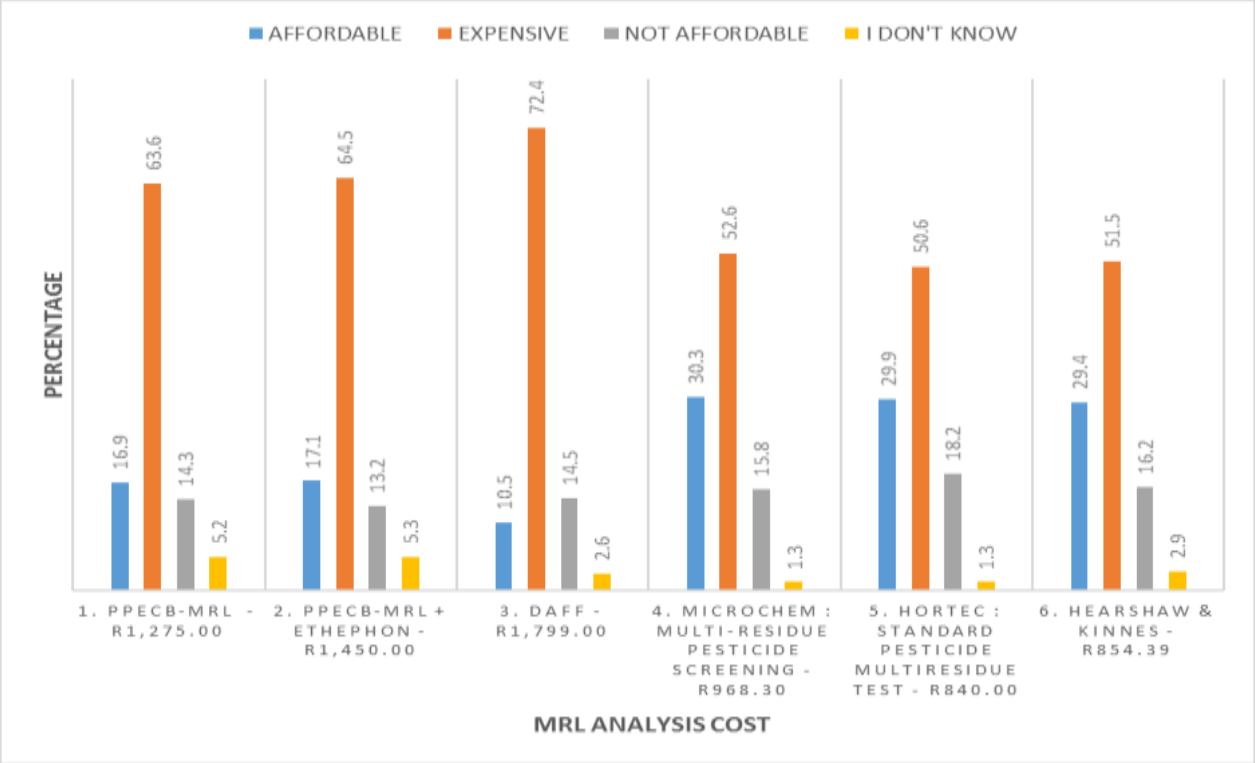

Figure 4.4.3.1.1: Cost of MRL analysis testing

The research findings indicated on Figure 4.4.3.1.1, is applicable to questions 1-6, whereby an average of 59.2% of the respondents clearly state MRL analysis testing is expensive. Emerging commercial farmers agree MRL analysis testing is expensive and do not have finance available to meet food safety compliance in order to export fresh produce. In comparison with the above statement only a total average of 20.9% of emerging commercial farmers agree MRL testing is affordable applicable to questions 1-6.

Makhafola (2016) states that the laboratory analysis costs are for the account of farmers or exporters. Makhafola (2014) provides evidence that farmers are liable to pay mandatory laboratory fees and residue analysis handling sample fees as stipulated per PPECB levies (Appendix 3) and courier fees.

Figure 4.4.3.1.2 shows who should be paying for MRL the analysis cost. Accredited laboratories will not release analytical test results of mandatory samples if the account is not paid in full. Emerging commercial farmers need to have records available of MRL analysis testing, which is needed for *adhoc* food safety certification audits conducted by

accredited certification bodies, local retailers and exports. It is imperative to note that emerging commercial farmers do not have the finance available to pay for MRL analysis cost, which will directly result in local and export market exclusion. Role-players in the value chain, need to accept the responsibility to pay for MRL analysis cost in order to assist emerging commercial farmers.

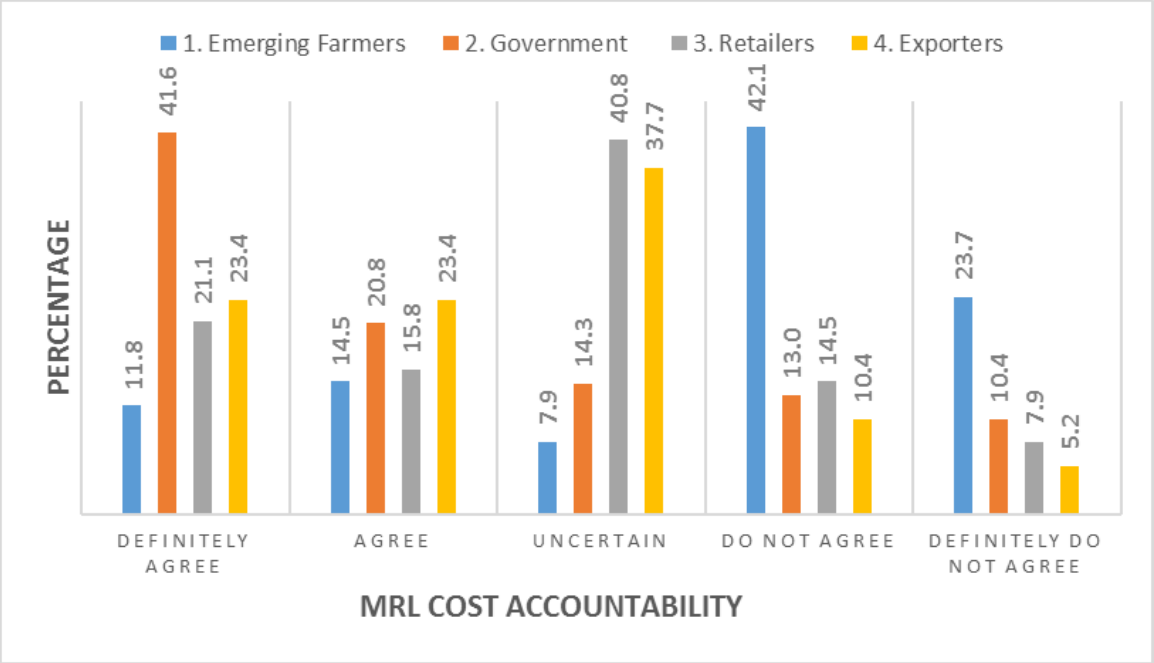

Figure 4.4.3.1.2: Paying for MRL analysis cost

Evidence gathered, as per question 2 indicates 41.6% of emerging commercial farmers definitely agree and 20.8% agree, government should pay for the MRL analysis cost. Furthermore, it is observed, with relation to question 1, that 42.1% of emerging commercial farmers do not agree and 23.7% definitely do not agree to pay for MRL analysis cost. In total, 36.9% of respondents agree that retailers, as stated in question 3 and 68.8% of respondents agree that exporters in question 4 need to pay for MRL analysis costs in order to assist emerging commercial farmers. Emerging commercial farmers will continuously be excluded from market access as a direct result of unavailability of funds to pay for MRL analysis cost. This contests the view of Makhafola (2016), that MRL analysis is the responsibility of farmers.

4.5 Communication barriers

It is evident that communication barriers are a global problem, adding to information not reaching FBOs (Tahkapaa, 2016). Journal of Extension (2011) adds communication is key in compliance of GAP requirements. Market access is denied due to farmers not receiving feedback on quality of produce from clients declares African Development Fund (2016). In addition, Baloyi (2010) indicates emerging commercial farmers have trouble complying with GAP, SPS measures and mandatory market and regulatory requirements due to ineffective communication. It is crucial for governments to have open communication to discuss policies in order to promote trade (Okello, Narrod and Roy, 2007).

Communication of food safety information is presented in the next figure. Food safety information changes continuously in different markets, which is based on proliferation of food safety risks and the effect it has on human and animal health. Local municipalities receive communication from national government informing them of any feedback from markets. Governments of the importing and exporting countries are in direct contact and with respective markets should any food safety non-conformities occur, which is then filtered down to emerging commercial farmers and primary food producers. Export markets notify implicated exporters immediately of any non-conformities. It is thereafter, the responsibility of exporters to inform relevant parties, including emerging commercial farmers. Emerging commercial farmers need to amend their farming operations to align themselves to meet compliance, based on the presented food safety criteria. Ineffective communication may lead to market closure for emerging commercial farmers.

Figure 4.5: Communication of food safety information

In the above figure, question 4 indicates that 45.5% of respondents strongly agree and 22.1% of respondents agree, communication of food safety information should come from exporters. When respondents receive food safety information from exporters, they can amend their farming business to adapt to any food safety criteria to meet compliance. In addition to the above, question 3 indicates that 14.7% of respondents strongly agree and 20% of respondents agree food safety information should come from global markets. Global markets are in effect, direct clients of emerging commercial farmers and should be the first contact point whereby food safety compliance risks could be addressed and rectified in the food production system.

Furthermore, it is observed with relevance to question 1, 63.2% of emerging farmers do not agree and 17.1% definitely do not agree that communication of food safety information must come from the local municipality. Local municipalities get their information from national government, which means emerging commercial farmers have no trust in national government to obtain the needed information timeously.

It is evident in question 2 that 50% of respondents do not agree and 16.2% of respondents definitely do not agree that communication of food safety information must come from local retailers.

4.5.1 Literacy of emerging commercial farmers

Ogalo (2009) mentions that illiteracy of emerging commercial farmers is the primary reason why food safety standards and legislation are not grasped.

In Figure 4.5.1 the literacy level of emerging commercial farmers is discussed by respondents. Literacy level is an indication of, to which degree a person is able to read or write. Matric provides an indication that a person is able to read and write to a certain degree. In order to grasp food safety legislation, a person must have at least matric. It is advisable to have an education higher than matric because the international business language is English and food safety terminology is written in the context laws, acts and a legal framework. This in itself requires more than a matric to understand and a higher level of education. Emerging commercial farmers do not always understand the context of food safety terminology which is a communication barrier and may lead to opportunities not fully utilized.

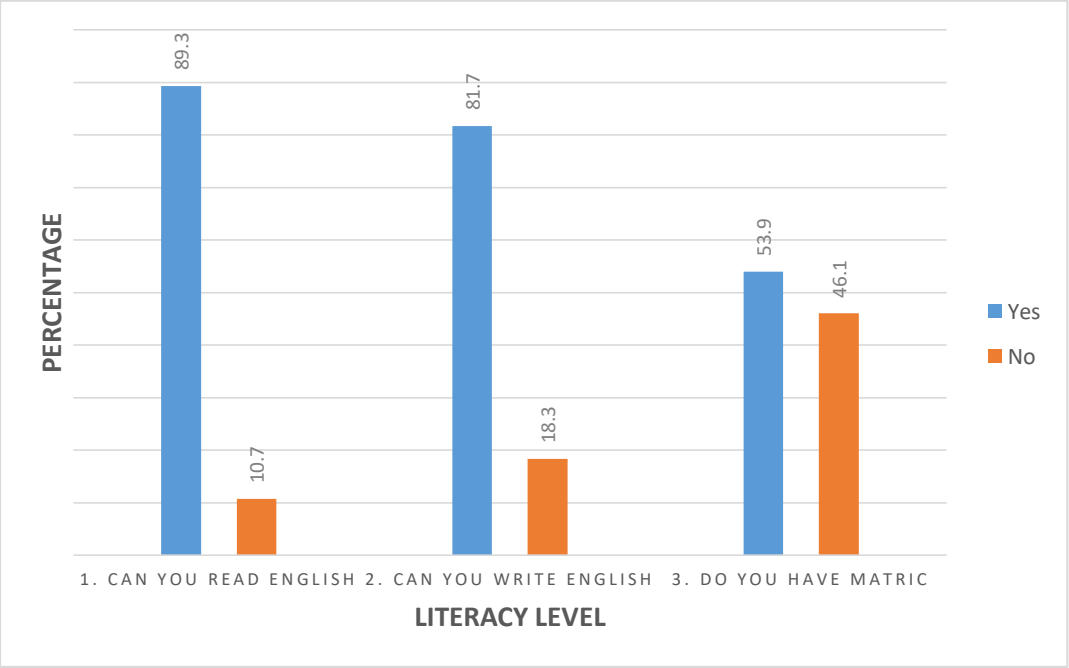

Figure 4.5.1: Literacy level of emerging commercial farmers

In the above figure, a total of 46.1% of respondents show they do not have matric. Matric provides a basic foundation for the learner to understand and interpret reading material, without matric learners are unable to comprehend information in full. 18.3% of respondents cannot write English, so they do not understand food safety jargon. In addition, 89.3% of respondents can read English of which 53.9% of respondents have passed matric. The level of understanding of basic English is a concern. This in essence means emerging commercial farmers do not understand the content of food safety information. This means 46.1 % of emerging commercial farmers are not sufficiently literate to understand food safety jargon which are in agreement with the statement made by Ogalo (2009).

4.6 Lack of knowledge

Farmers in Africa do not have an extensive knowledge of various pests, including fruit fly (Badii, Billah, Afreh-Nuamah, Obeng-Ofori and Nyarko, 2015). In Figure 4.6.1 fruit fly is discussed with respondents during the study. Emerging commercial farmers are not aware that fruit fly is regarded as a quarantine pest to all export countries globally. Fruit fly has the potential to destroy agriculture once it has infested itself with major negative financial repercussions in the agricultural industry. The impact of fruit fly during farming has a negative effect on production by means of early fruit drop, production losses, loss of market segment, additional chemical spraying programmes which leads to additional cost, claims from markets against emerging commercial farmers and rejection of fruit fly infested consignments at the ports of importing countries and economic losses.

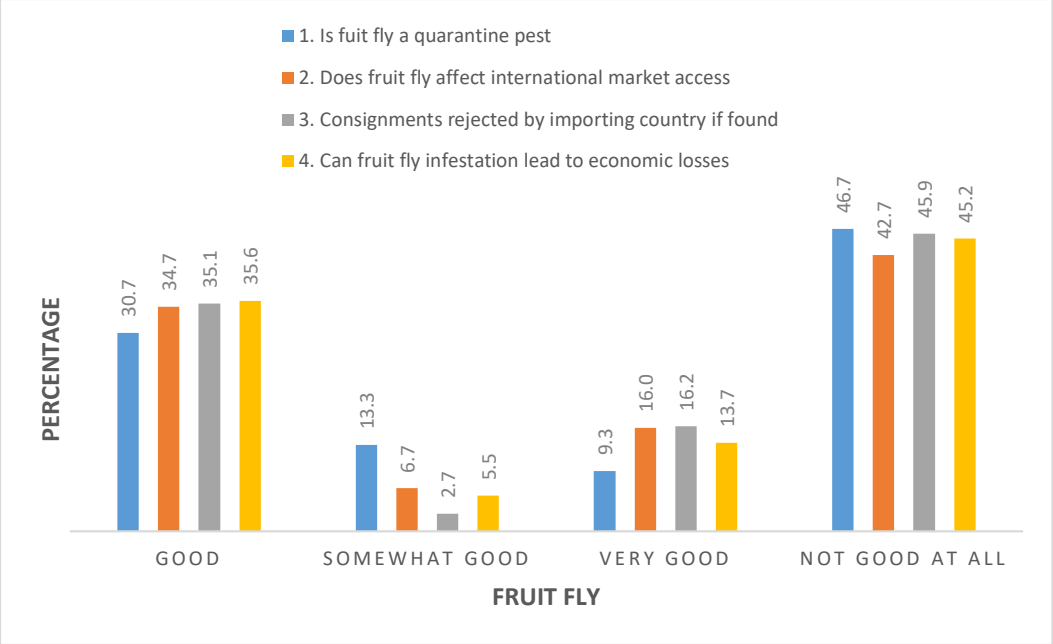

Figure 4.6.1: Fruit fly knowledge

In the information gleaned from the figure above, question 1 indicates 46.7% of respondents have no knowledge that fruit fly is a quarantine pest. Question 3 indicates that 45.9% of respondents of have no knowledge that consignments can be rejected by importing countries. Furthermore, 45.2% of respondents are not aware that fruit fly infestations may lead to economic losses as indicated in question 4. It is further observed in question 2 that 45.2% of respondents are not aware that fruit fly affects international market access. The above research agrees with the argument of Badii *et al.* (2015) that respondents in South Africa do not have fruit fly knowledge.

Citrus black spot (CBS) is presented in Figure 4.6.2. CBS is a fungal disease affecting the outer appearance of the fruit with black spots and is commonly found on citrus in affected areas worldwide. CBS is classified as a critical quarantine pest which is not allowed in sensitive CBS countries such as the EU and US. CBS has a negative impact on citrus during all stages of production, increasing the production cost. If found during port inspections at CBS sensitive countries, consignments will be rejected, leading to economic losses as a result of quarantine status, additional spraying costs and diverting citrus consignments to less CBS sensitive countries. Importing countries such as the EU and USA have implemented measures to manage the risk and spread of CBS by means

of a mandatory CBS Risk Management System. Emerging commercial farmers must have knowledge and evidence of the implementation of the CBS Risk Management System to ensure market access.

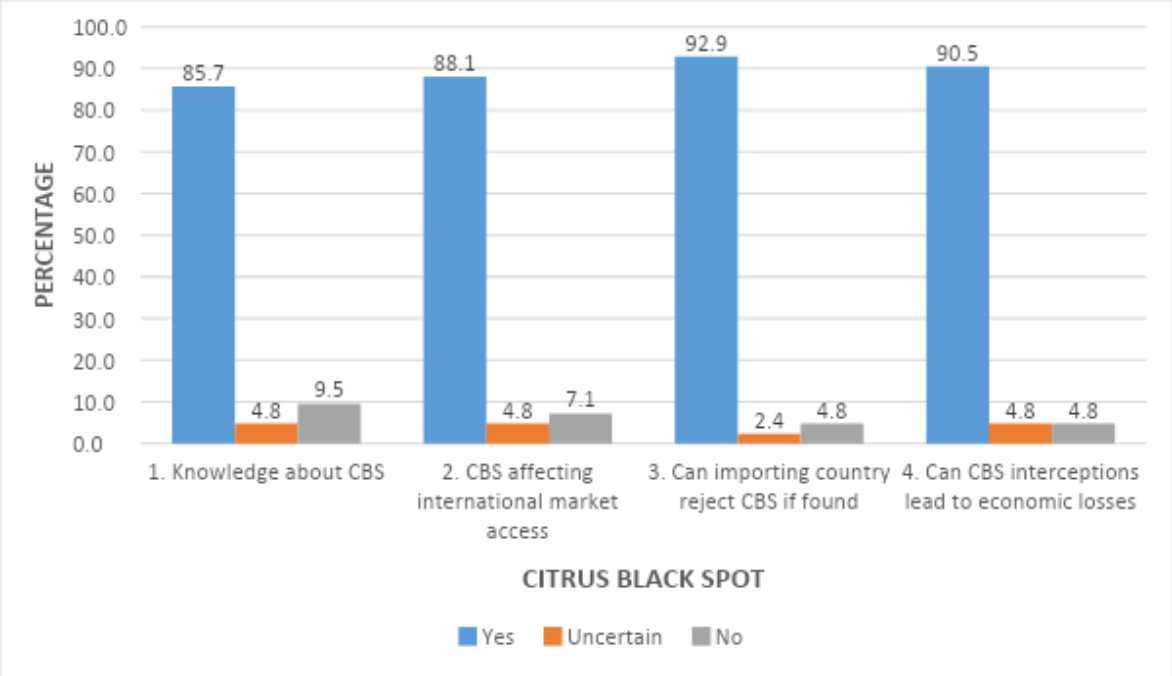

Figure 4.6.2: Citrus black spot (CBS) knowledge

With regard to the figure above, question 1 clearly shows 85.7% of respondents have knowledge about CBS. Emerging commercial farmers have knowledge about CBS which affects their approach and decision-making during production. Question 4 demonstrated that 90.5% of respondents agree that CBS interceptions lead to economic losses. Question 3 denotes that 92.9 percent of respondents agree that importing countries may reject consignments when CBS is found. In question 2, 88.1% of respondents agree CBS can affect international market access. Emerging commercial farmers have knowledge of how CBS can affect their farming operations, sustainability over long term, limitations to markets and economic status. The above research disagrees with the assertion of Badii *et al.* and (2015) that respondents in South Africa do not have knowledge about various pests.

4.7 Impact of phytosanitary requirements on farming.

The Department of Agriculture, Forestry and Fisheries (2014) provides evidence that SA is a member country of the Member Nations of FAO (refer to Appendix 4) of the World Trade Organisation's Agreement on Sanitary and Phytosanitary Measures WTO-SPS Agreement and IPPC member country (refer to Appendix 5) and has a responsibility towards the WTO-SPS Agreement including the IPPC. The WTO-SPS Agreement focuses on safe trade and discards all forms of discrimination in the international trade arena. The ability of the South African government to deal with phytosanitary regulations enhances global competitiveness. This thus limits the spread of diseases and increasingly meets importing countries' phytosanitary demands, including food safety standards and requirements. In addition, the United Nations (2007) argues that the driving force of SPS measures are to protect civilians from harm by adhering to the World Trade Organisation's Agreement on Sanitary and Phytosanitary Measures (WTO-SPS Agreement). The resolution is to guard humans, animals and plant life from food and feed borne hazards and pests or disease-related risks. SPS further stipulates that implemented measures instituted by national authorities are harmonised with specified standards and does not allow any irregularities affecting trade negatively. It is compulsory for member countries to adopt international regulation and standards issued by the Codex Alimentarius Commission (CAC), the International Plant Protection Convention (IPPC) and the World Organization for Animal Health (OIE).

4.7.1 International trade

The Republic of South Africa solely depends on international trade to build the economy and therefore needs to comply with SPS requirements (United Nations, 2007). Henson and Loader (2001) are of the opinion that many third world countries have difficulty in building their economies due to the integration of the global trading system. Developing countries uses the WTO as a platform to build their economies by penetrating first world markets. If developing countries are able to implement systems ensuring compliance to SPS standards, then they can overcome barriers to international trade and will be able to penetrate global markets.

In reference with Figure 4.3.1, question 3 states that 60.5% of emerging commercial farmers agree that compliance with phytosanitary requirements would assist with economic development in South Africa. It is imperative that emerging commercial farmers understand compliance with SPS measures to stimulate trade and the importance thereof in the global trade system.

The Department of Agriculture, Forestry and Fisheries (2016) argues that different requirements exist for different countries and special phytosanitary registration is needed if commodities are exported. The Fruit Industry Workgroup (2018) notes that the bi-lateral agreement with China contains certain critical quarantine pests and diseases which are not allowed in consignments of apples from South Africa.

In reference with Figure 4.3.1, question 2 indicates that 67.4% of respondents are aware that importing countries have different requirements and 32.6% of respondents are not aware. Emerging commercial farmers need to know which pests and diseases are allowed in different importing countries to meet phytosanitary compliance in order be granted market access.

4.7.2 Fruit fly background.

Badii *et al.* (2015) concur that fruit fly is a quarantine pest that manifests itself in the fruit and vegetable production areas in Africa and prevents the agricultural industry from reaching its potential. Barnes (2009) discusses that fruit fly has a universal recognition status under critical quarantine organisms and have high phytosanitary status. Further research proves fruit fly to be a damaging pest of agricultural fresh produce, globally (USDA, 2011).

Fruit fly as discussed in Figure 4.6.1, question 1 indicates 46.7% of respondents are not aware that fruit flies are a critical quarantine pest. Fruit flies as critical quarantine pests are not allowed in any importing country due to their agricultural devastation and high phytosanitary status.

The Organic Farmer (2014) indicates due to fruit fly infestation, Kenyan farmers have lost harvests ranging from 30 to100%. The study of Benjamin, Kelvin, Kwame and Daniel (2012) notes that farmers in the northern region of Ghana have incurred major damages to fruit and vegetable production as a result of fruit fly infestation. Benjamin *et al.* (2012) further mention smallholder farmers have suffered economic losses. Fruit fly invasion has resulted in pre-harvest damages of up to 100% in Vietnam states (Hoa, Dien, Chien, Chau and Viyaysegaran, n.d.). Fruit fly, according to Badii *et al.* (2015), continues with its devastation of production losses on mangoes ranging from 30 % to 70%, affecting fruit quality and limits the selling of produce in other part of Africa where there are fewer sensitive markets.

In Figure 4.6.1, question 4 shows in total 54.8% of respondents agree that fruit fly infestation leads to economic losses. It is imperative to note that fruit fly affects production negatively on all commodities and limits the marketability of fresh produce to only fewer sensitive markets.

4.7.2.1 Effect of fruit fly on emerging commercial farmers

Research by Barnes (2009) indicates that the USA has rejected a consignment of citrus originating from Spain as a result of fruit flies. In another case, a consignment of citrus was denied access to the EU, specifically Spain due to fruit fly interception. The Department of Agriculture (2012) points out that citrus consignments destined for export to South Korea will be rejected if fruit fly is found during phytosanitary inspections. Further research conducted by the Department of Agriculture (2012) indicates that consignments of citrus will be rejected at port level in the Kingdom of Thailand if fruit flies are found. This will lead to the suspension of all consignments from South Africa. In addition, Zaheer (2015) says a consignment of mangoes originating from Pakistan was rejected in The Netherlands during port inspections. The reason for the rejection was the presence of fruit flies. South Africa placed a ban on mangoes originating from Ghana during 2008. The Ghana Business News (2013) acknowledges that global market access was denied to mangoes originating from West Africa by South Africa, EU, USA and Ghana.

It is important to note that Figure 4.6.1, question 3 reflects that 45.9% of respondents are not aware that importing countries will reject consignments if fruit flies are found. Consignments containing fruit flies will be rejected by importing countries if found during import inspections and may affect South Africa's fruit fly status detrimentally.

4.7.3 Citrus Black Spot (CBS) background

Citrus Black Spot (CBS) is a globally recognised disease within the citrus industry (Paul, 2006). Carstens *et al*. (2012) state that CBS originates from *Guignardia citricarpa* and is commonly found in humid regions in summer rainfall areas of South Africa. It is evident that CBS does not occur in the Western Cape and Northern Cape, but only in KwaZulu-Natal, Mpumalanga, Limpopo, North West and the Eastern Cape. The American Chamber of Commerce (2014) states that CBS is a fungus which detrimentally affects the physical appearance of citrus fruit produced in South Africa. South Africa is a WTO-SPS Agreement and IPPC member country and has certain roles to fulfil in ensuring compliance. Responsibilities include transparency to trading partners on scientific data and information about location and risk management of CBS (Carstens *et al.*, 2012).

4.7.3.1 Effect of CBS on emerging commercial farmers

No citrus fruit from CBS infected regions are allowed to be exported to the United States. Consignments originating from CBS infected regions are allowed to be exported to Japan and India that are free from visible symptoms, according to Carstens *et al*. (2012). According to Kapuya (2014), the threshold of 36 CBS interceptions instituted by the EU in 2012, originating from citrus found from South African consignments, has been restricted to five in 2013. In the event of exceedance, additional measures would be implemented by the EU resulting in the banning of South African citrus. The American Chamber of Commerce (2014) argues that there could be a decrease in job creation as a result of CBS interceptions of exported citrus consignments to the EU. In addition, Truter (2010) comments that due to the phytosanitary risk involved, CBS infected citrus is not permitted to be exported to the EU.

Based on the research shown in Figure 4.6.2, question 2 indicates 88.1% of emerging commercial farmers agree that CBS effects international market access. CBS is a phytosanitary risk on citrus to CBS sensitive markets which could lead to market closure if the threshold is exceeded. It is thus of utmost importance that the South African industry stays within the threshold in order to avoid stricter measures being implemented.

In addition to the above mentioned in Figure 4.6.2, question 4 illustrates 90.5 percent of respondents agree that CBS interceptions lead to economic losses. CBS intercepted consignments will be confiscated by sensitive importing countries. It is important to note the majority of South African citrus, from CBS and CBS pest-free areas are exported to CBS sensitive countries. If the market is closed due to exceedance of CBS interceptions, only fewer sensitive countries remain with a smaller demand. This in return would lead to major economic losses for the South African citrus producing sector.

4.8 Chapter Summary

This chapter indicate that respondents were in agreement farming is not profitable thus influencing the sustainability of emerging commercial farmers. Consumers would not buy unsafe food therefore influencing stricter food legislation and market access of fresh produced commodities. High income markets would procure fresh produce only from certified producers whereby low-income markets has no requirements. Lack of knowledge on food safety compliance criteria exclude emerging commercial farmers from market access, including food policies, bi-lateral agreement and phytosanitary requirements. The role of extension advisory services should include transferal of food safety compliance criteria with the aim to create understanding thereof. Food safety compliance stimulate agricultural, rural and economic growth. Majority of respondents concur food safety certification cost is not affordable. The literacy level of respondents influences their understanding and interpretation of food safety information. Exports has higher monetary value stimulating agriculture and economic growth stimulating job creation with a positive effect on SDGs.

CHAPTER 5: TRADE BARRIERS

5.1 Introduction

Food safety standards could serve as trade restrictions but have the ability to attract investors and upon adoption could lead to incentives for compliance to food safety practices in agriculture. It is argued that higher prices are paid for commodities that are food safety compliant. Kenya has reached and maintained food safety standards as a developing country when measures were stricter. The effect of stringent standards has led to more urban job opportunities in the secondary sector (World Bank, 2005). The study of Paul (2006) notes that CBS is used as a phytosanitary trade barrier. Ogalo (2009) expounds that the high cost of certification is perceived as trade barriers by emerging commercial farmers. According to Okello, Narrod and Roy (2007), emerging commercial farmers are denied market access due to the exorbitant cost of implementing food safety systems in order to be compliant. Jaffee *et al.* (2011) add that the cost involved to obtain Global GAP certification and the inability of emerging commercial farmers to meet quality standards has led to market closure.

Trade barriers are shown in Figure 5.1.1. Trade barriers, in the opinion of respondents, are high standards and requirements instituted to prevent market penetration. It is difficult for emerging farming to comply with the food safety compliance criteria of which they are not aware. Certification of emerging commercial farmers ensure traceability during all stages of production from farm to fork. The annual cost of certification is very high and emerging commercial farmers cannot afford to pay for it themselves. Phytosanitary requirements are instituted to prevent the spread of pests and diseases which may cause harm to humans or animals and to protect the agricultural sector in order to continuously produce food. ISPM15 registered suppliers must only be used when emerging commercial farmers procure pallets or bins where fruit or vegetables are transported in to ensure compliance with food safety regulations. Fruit flies are a critical quarantine pest globally which need to be managed during production on farms to manage the risk of spreading. CBS is a fungal disease which affects the citrus industry negatively. CBS infected citrus may only be exported to CBS fewer sensitive countries which pay less per carton. Only citrus free from CBS is allowed into lucrative citrus export markets such as

the USA and EU. Increasingly stringent food standards, requirements, policies and regulations are instituted based on international policy makers' findings on non-compliances that may cause harm to humans, animals and threaten the existence of sustainable agriculture.

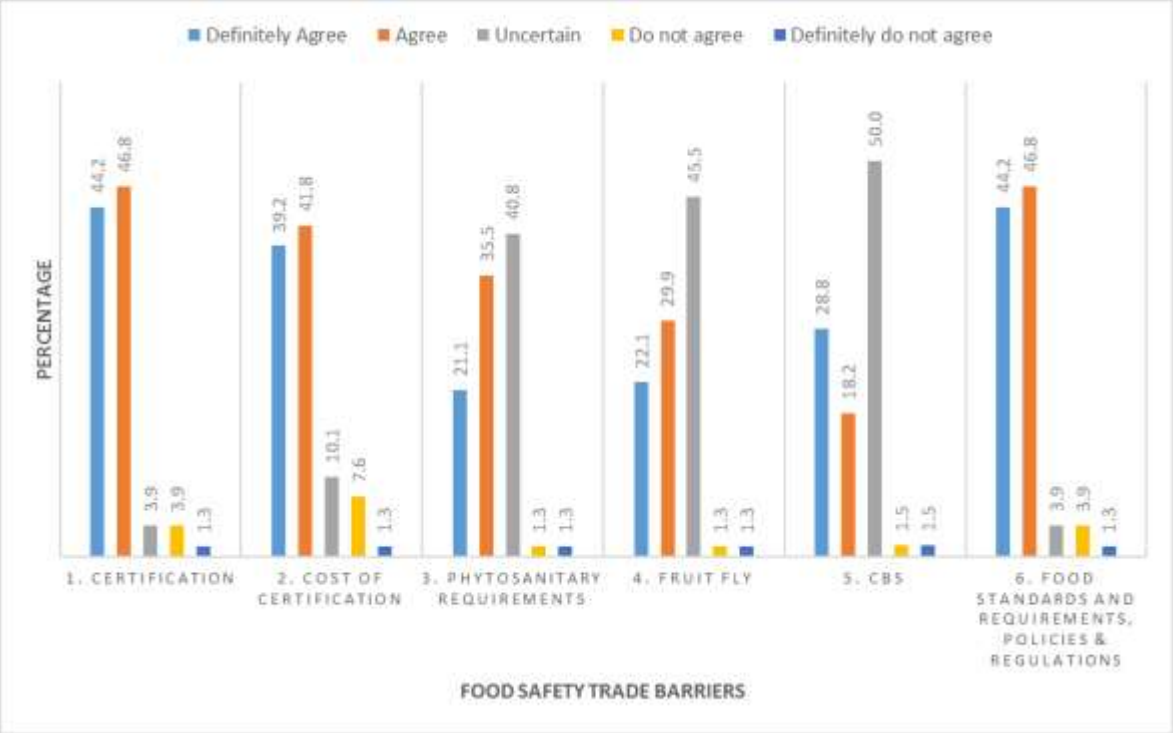

Figure 5.1.1: Food safety compliance criteria as trade barriers

Figure 5.1.1, question 5 indicates that in total, 47% of respondents agree that CBS is used as a trade barrier. Importing countries implement more stringent measures to protect their markets and producers from imported commodities. The above statement is in agreement with the study conducted by Paul (2006).

Research conducted based on the evidence of Figure 5.1.1, question 1 stipulates that 91% of emerging commercial farmers agree that certification as part of food safety compliance criteria is used as a trade barrier. Non-compliance to stringent certification criteria prevents emerging commercial farmers from market penetration. Based on research conducted, Figure 5.1.1, question 2 indicates 81% of respondents are in agreement that the cost of certification is used as a trade barrier. Emerging commercial

farmers cannot afford the high cost of certification which leads to exclusion from local and export markets.

According to Okello *et al.* (2007), emerging commercial farmers are denied market access due to stringent compliant measures to food safety regulations. Food safety standards are also used as trade barrier, as indicated by Schimpf (n.d.). According to Jaffee *et al.* (2011), market access is used as a barrier to trade due to high food safety standards. Developing countries access to international trade, argue Henson and Loader (2001), are restricted due to SPS and food quality standard. Basson and Labuschagne (2012) note a severe decline in table grape exports from South Africa to USA, due to stringent SPS measures imposed. Ogalo (2009) supports the notion that increasing new food safety standards are perceived as trade barriers to emerging commercial farmers.

Figure 5.1.1, question 6 illustrates that 44.2% definitely agree and 46.8% of respondents agree that food standards and requirements, policies and regulations are trade barriers. It is important for emerging commercial farmers to comply with food safety regulations in order to get market access. Non-compliance with food safety legislation would lead to a decrease in exports effecting trade negatively.

Phytosanitary requirements are used as a trade barrier, argues Bahamas (2018). Phytosanitary and sanitary measures, according to Soko and Sakala (2011), are strategically used as non-tariff barriers to agriculture trade. This strategy prevents third world countries from building economies of scale and develop their agricultural sector. Buzby (2003) adds that food safety regulations are perceived as barriers to trade by food producers.

Research conducted, as shown in Figure 5.1.1, question 3, states that in total, 56.6% of respondents definitely agree and agree, while 40.8% of respondents are uncertain that phytosanitary requirements are used as trade barrier. In order to build the economy by means of agricultural international trade, emerging commercial farmers need to comply with phytosanitary requirements as indicated in the study of Buzby (2003).

As Figure 5.1.1, question 4 indicates, in total, 52% of respondents agree that fruit fly is used as a trade barrier. Fruit fly is a quarantine pest which is not allowed in any country and the presence of this pest could cripple any countries' agriculture sector. In essence, fruit fly should not be seen as a trade barrier, but as a risk to sustainable agriculture. According to the Department of Agriculture (2012), fruit fly is listed as a quarantine pest and is not allowed to be exported.

5.2 Accountability of stakeholders

5.2.1 Responsibility of emerging commercial farmers

Chipane, Makhafola and Mutengwe (2014) note that food producers should register with DAFF to obtain a unique food business operator (FBO) code which is a requirement for export of fresh fruit and vegetables from South Africa. It is imperative and mandatory that food producers have a registered Production Unit Code (PUC) in order to export to importing countries (Department of Agriculture, Forestry and Fisheries, 2010). According to the apple export standards and requirements, each producer must have a PUC in order to export consignments of agricultural plant origin (Department of Agriculture, Forestry and Fisheries, 2016).

Figure 5.2.1.1 indicates whether a farm is registered with DAFF under a PUC OR FBO code. Commercial farms from which fresh produce is exported must be registered with DAFF and the PPECB. Without this registration, the export of produce is not allowed. The purpose of DAFF registration is to have full traceability during all stages of food production. Export markets can trace any non-conformities to a specific farm and not implicate compliant food producers from South Africa.

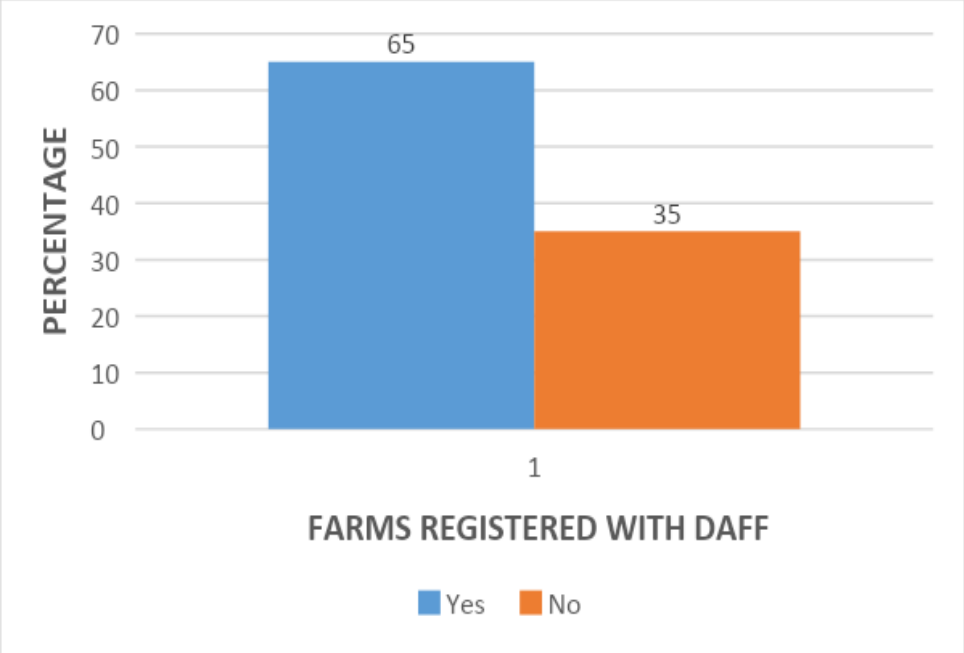

Figure 5.2.1.1: Is your farm registered with DAFF under PUC OR FBO code

With reference to Figure 5.2.1.1, it is evident that 35% of emerging commercial farmers are not registered with DAFF under a PUC OR FBO code. Emerging famers cannot export fresh produce or sell at local retail outlets in South Africa without valid registered PUC or FBO codes that are not registered with DAFF. Implicated consignments from unregistered PUC OR FBO will be rejected for export by the PPECB and DAFF.

Figure 5.2.1.2 indicates the reasons why farms are not registered with DAFF. Emerging commercial farmers' knowledge about food safety legislation is limited. Production in many instances is for subsistence only or is sold directly to the public and not to the commercial market. These farmers are involved in community food gardens. Based on the above, the perception of emerging commercial farmers is that they do not need to register when they are not exporting.

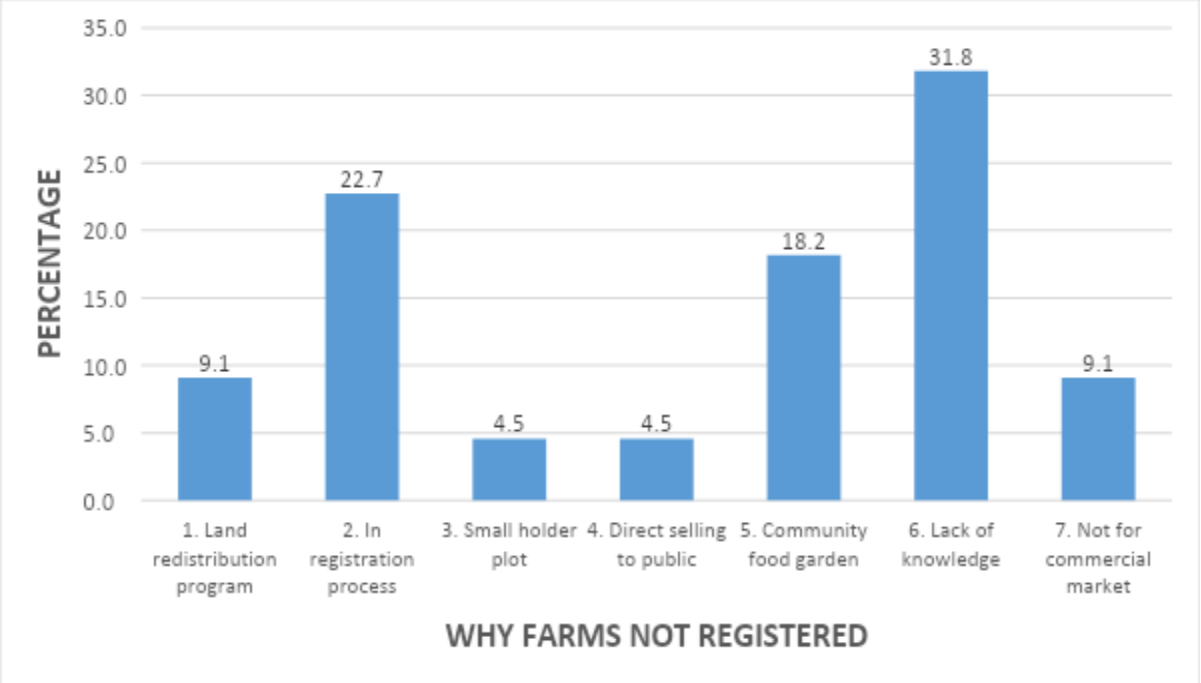

Figure 5.2.1.2: Reasons why the farm is not registered with DAFF

While conducting the research, it was observed, as seen in Figure 5.2.1.2 question 6, that 31.8% of respondents are not DAFF registered due to a lack of knowledge, 9.1% of respondents indicate they are not producing for the commercial market (question 7), and 18.2% of respondents indicate that they are involved with community food gardens in question 5. In question 2, 22.7& of the respondents indicate that they are currently engaged in the registration process at DAFF, and 9.1% of respondents indicate that they acquired the farm under the land redistribution programme from government. In question 3, 4.5% of respondents indicate they are in possession of smallholdings and 4.5% of respondents indicate that they are selling directly to the public. It is the responsibility of emerging commercial farmers to have valid registered PUC or FBO codes despite the food production type or commodity grown and the markets they conduct business with. When fresh fruit or vegetables are sold to any consumer, traceability must be in place in the event of any food safety non-compliance.

Accountability of emerging commercial farmers means they take ownership of their farming operations, including responsibilities concerning non-farming matters which could affect their sustainability. Emerging commercial farmers need to keep record and

document evidence of all farming related processes. Emerging commercial farmers cannot only depend on extension officials for advice on production only, they need to acquire technical knowledge on a regular basis concerning their farming operations.

In Figure 5.2.1.3 accountability of emerging commercial farmers is discussed. Accountability of emerging commercial farmers is taking ownership of farming operations, including responsibilities concerning non-farming matters which could affect their sustainability. Record and document evidence of all farming related processes as evidence for external audit purposes. Emerging commercial farmers rely on extension advisory service to acquire technical knowledge regarding food safety.

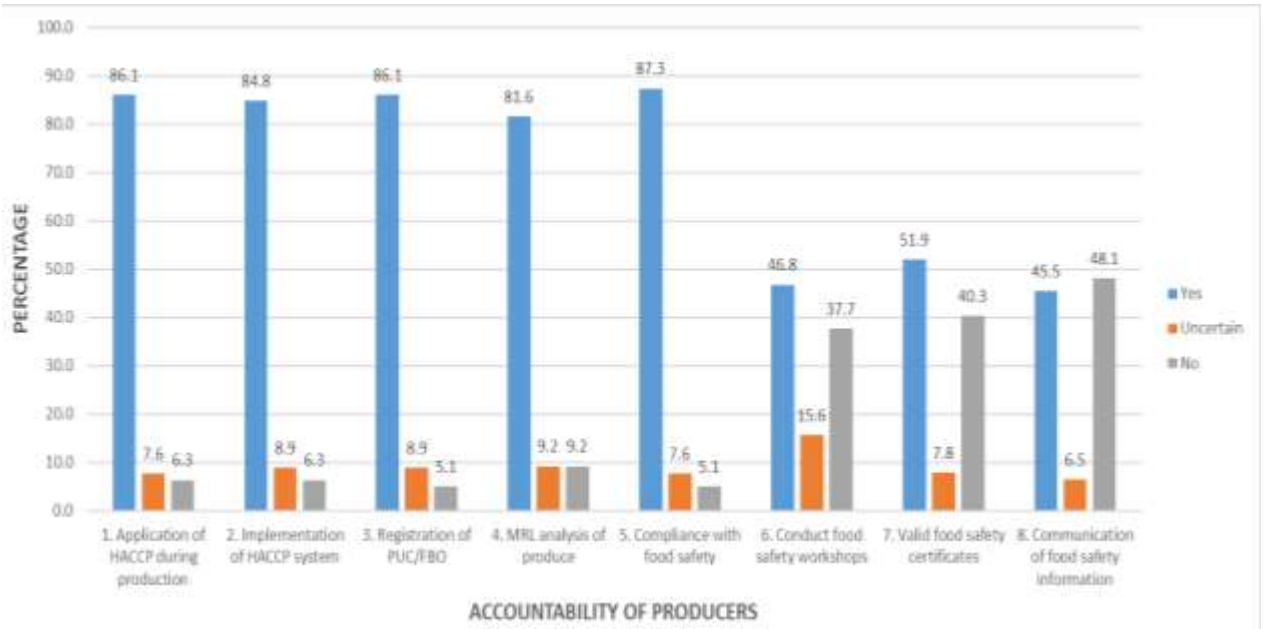

Figure 5.2.1.3: Accountability of emerging commercial farmers

Data reflected in the above figure in question 3 indicate that 86.1% of respondents agree that emerging commercial farmers are accountable for registration of PUC and FBO codes. The purpose of PUC or FBO registration is to ensure food safety traceability during all stages of production until the product reaches the consumer. Valid food safety certificates imply that the emerging farmer has followed HACCP principles during food production thus producing food safe for human or animal consumption. In question 1, 86.1% of respondents agree it is their responsibility to apply HACPP principles during

production. In addition, question 7 indicates that 51.9% of respondents agree it is their responsibility to have valid food safety certificates. Implementation and application of HACCP principles during food production leads to food safety certification when the emerging farmer produces evidence. Further evidence gathered from question 5 of as shown in the figure above, 87.3% of respondents agree it is their responsibility to comply with food safety. It is imperative that change (innovation) must come from within and not a top-down approach. Thereafter guidance will be given to enable emerging commercial farmers to sustain compliance. In Figure 5.2.1.3, question 6, 37.7% of respondents contest the view that it is their responsibility to conduct food safety workshops. Emerging commercial farmers cannot conduct food safety workshop if they themselves do not have any knowledge. A total of 48.1% of respondents disagree that they need to communicate food safety information, as stated in question 8 of Figure 5.2.1.3. Emerging commercial farmers need to obtain updated food safety information from relevant role-players that provide credible information that is correct and just.

According to Chipane, Makhafola and Mutengwe (2014), all fresh produce for exports are subjected to sampling analysis per PUC. MRL sampling will be conducted by the PPECB at the beginning of a season and thereafter every three weeks. South African producers of food are accountable for the production of safe food that is compliant with stipulated mandatory standards and requirements (Department of Agriculture, 2013). The Department of Agriculture, Forestry and Fisheries (2015) states that each consignment of fresh fruit and vegetables will be subjected to laboratory analysis under the Agricultural Product Standards Act No.119 of 1990. The mandatory body responsible for drawing of samples is the PPECB as the assignee.

Information reflected in Figure 5.2.1.3, question 4, illustrates that 81.6% of respondents agree that it is the responsibility of emerging commercial farmers to conduct an MRL analysis of produce. Emerging commercial farmers have the responsibility of informing the PPECB of consignments destined for the export market in order to allow it to conduct an MRL sample analysis verifying MRL compliance as specified per relevant legislation. Emerging commercial farmers are accountable to prove that their fresh produce is within the specified MRL limits. Without MRL analysis and compliance thereto, such

consignments will not be exported and it is the responsibility of emerging commercial farmers to conduct MRL analysis testing on fresh produce. Furthermore, records must be available of conducted MRL analysis done for approval of food safety certification and market access by local retailers and global markets.

It is imperative (see Figure 4.2.2) to note that in question 5, 70% of respondents say they are not getting MRL advice from extension officers on fruit and vegetables in comparison with only 30% of emerging commercial farmers with access to advice. If emerging commercial farmers do not get MRL analysis advice from extension workers, they would not know if produced commodities comply with stipulated MRL tolerances, which is a barrier against market access.

The Department of Agriculture, Forestry and Fisheries (2015) states that producers will only use registered chemicals as specified per commodity. In addition, Unnevehr and Jensen (2001) argue that certain chemicals are registered for specific use based on the product grown with tolerances, which is subsequently regulated by the Environmental Protection Agency (EPA). Food producers are held accountable during all stages of production to keep record of chemicals sprayed which is needed for certification audit contest (Okello *et al.*, 2007).

In Figure 4.2.2, question 2 states that 55.3% of respondents agree that extension workers does not speak about the use of registered pesticides. It is evident emerging commercial farmers are aware of the use of registered pesticides during all stages of food production.

The USA Department of Health and Human Services (2006) states that it is imperative that producers apply HACCP principles during the production of commodities. It is also the responsibility of food producers to take ownership of implemented HACCP systems according to the USA Department of Health and Human Services (2006) after their food safety systems have been analysed. In addition to this statement, Tahkapaa (2016) agrees that it is the responsibility of FBOs to comply with HACCP control points whereby risks could be effectively managed in order to avoid problems relating to food safety.

Certification of FBOs do not secure compliance of the food safety system. It is the responsibility of the FBOs to ensure safe food production and compliance with food legislation. (SQF Institute, 1995:3). Newly instituted regulations specify the implementation of HACCP systems as a tool to prevent, monitor and control the use of chemicals during production stages (Unnevehr, 2003). The certification body has the right to conduct unannounced *ad hoc* audits to verify if the FBO still operates within the certified framework as indicated during the certification process contest (SQF Institute, 1995:3). The resulting accountability would lead to a voluntary implementation of HACCP systems with long term benefits to the implementer. The Department of Health (2000:6) further agrees that food safety compliance starts with producers of food when it comes to implementing HACCP criteria.

Participants' need for assistance with the implementation of a HACPP system are presented in Figure 5.2.1.4. It is important to note that a certain degree of emerging commercial farmers is not aware of what a HACCP system is or what it entails. In general, emerging commercial farmers only focus on production on the farm but neglect the administration part which focuses on recordkeeping. Emerging commercial farmers need guidance on the application and implementation of HACCP principles during food production. If emerging commercial farmers cannot produce evidence of HACCP during a food safety certification audit, they would fail the audit and not get food safety certified which leads to market closure.

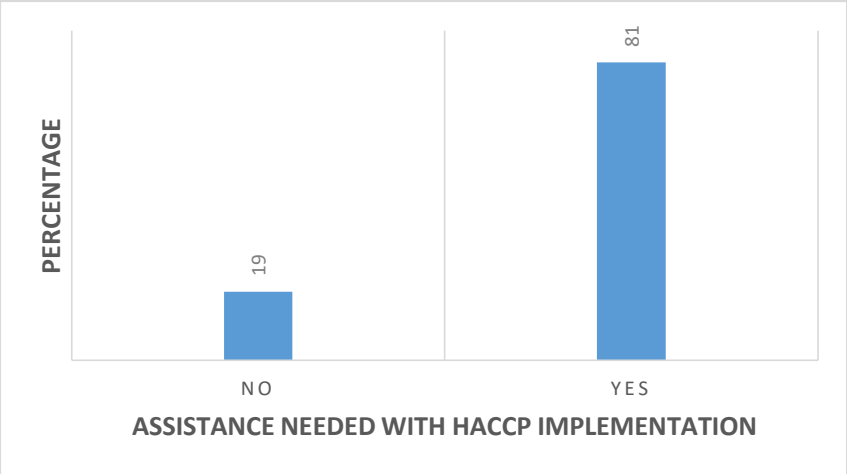

Figure 5.2.1.4: Participants need for assistance with implementation of a HACCP system

It is clear as per the above (Figure 5.2.1.4) that 81% of respondents say they need assistance with the implementation of a HACCP system. This means the majority of emerging commercial farmers do not know how to implement and maintain HACCP systems in their farming systems. Emerging commercial farmers would not be certified by any certification body, thus preventing market access which has a negative impact on their sustainability as farmers.

In Figure 5.2.1.3, question 2, a total of 84.8% of respondents agree that it is their responsibility to implement HACCP systems during all stages of production. Question 1 indicates 85% of emerging commercial farmers agree to apply HACCP principles during production. According to the USA Department of Health and Human Services (2006), emerging commercial farmers are willing to participate and ensure compliance. It is important to note that if emerging commercial farmers know how to implement HACCP principles into their food system, food safety certification would be possible by any accredited food safety organization.

5.2.2 Government

Furthermore, Dewanti-Hariyadi and Purnomo (n.d.) say government cannot only be an institutional policy maker but has the responsibility also to assist producers and processors to comply with regulations. Loconto and Danker (2014) assert that government policy must include lower implementation cost than the actual normal certifying cost applicable in industry in order to promote food safety certification. Goldblatt (n.d.) states that governmental financial contributions for input costs has stopped, thus providing no assistance to South African emerging commercial farmers.

Figure 5.2.1.5 illustrates farmer respondents who are responsible for paying of certification costs. It is imperative to note that all role-players should accept responsibility to pay for certification costs and not only the emerging farmer with limited funds. Agriculture is the cornerstone of the South African economy and if government invests in or subsidises certification costs then emerging commercial farmers would be able to create jobs, reduce poverty and alleviate hunger. Exporters need to procure products in

order to supply retailers based on their demand, which means agricultural, economic and rural development will occur.

Question 20 in questionnaire:

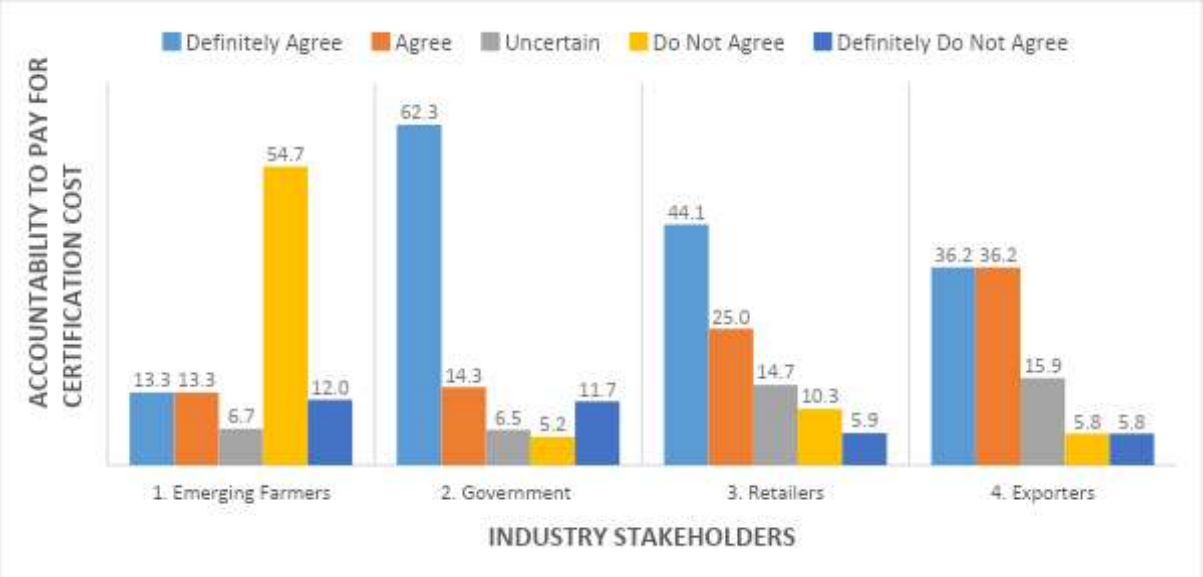

Figure 5.2.1.5: Paying for certification cost according to farmer respondents

The research conducted shows in total more than 76.6% of respondents definitely agree and agree that government should assist with the certification costs in question 2 of the figure shown above. As seen in Figure 5.2.1.5 question 1, 66.7% of respondents disagree that emerging commercial farmers need to pay for certification cost. Furthermore, question 4 indicates that in total, 72.4% of respondents definitely agree and agree that exporters should pay for certification costs. In addition to the above, question 3 indicates that 44.1% of respondents definitely agree and 25% of respondents agree that retailers should assist with certification costs. Government has to assist emerging commercial farmers in paying for certification costs in order not to reject innovation. Rejection of this innovation would mean no market access due to food safety non-compliance. It is the responsibility of all role-players to assist with certification costs in order to open markets for emerging commercial farmers. Exporters need to accept accountability if they want to secure products for international retail markets.

5.2.3 Responsibility of the extension service

Extension services provided should understand GAP and food safety requirements in order to assist producers effectively with compliance (Goetz, 2011). In addition, Loconto and Danker (2014) indicate that extension workers must have knowledge about applicable standards and certification requirements during the production of main crops.

Figure 4.2.2 question 1 indicates that 65.8% of respondents have not received training on food safety from extension workers while 34.2% did receive training. It is imperative that extension workers inform emerging commercial farmers on food safety related criteria.

5.2.4 Responsibility of retailers

Retailers have implemented measures ensuring that food producers have GAP systems in place and these are maintained by means of external audits before procurement commences (James, 2006). The Department of Health (2006) indicates that retail stores should be accountable for the implementation of control systems which would lead to food safety compliance.

As per Figure 5.2.4.1, the responsibility of retailers according to farmer respondents are presented. Retailers are the major buyers of fresh food and vegetables and are the direct link between the farmer and consumer for the accountability of food safety. Retailers have the responsibility of that ensuring food complies with food safety criteria by means of food safety audits on HACCP systems and validity of food safety certificates. Retailers need to effectively communicate food safety information to emerging commercial farmers in order to ensure compliance.

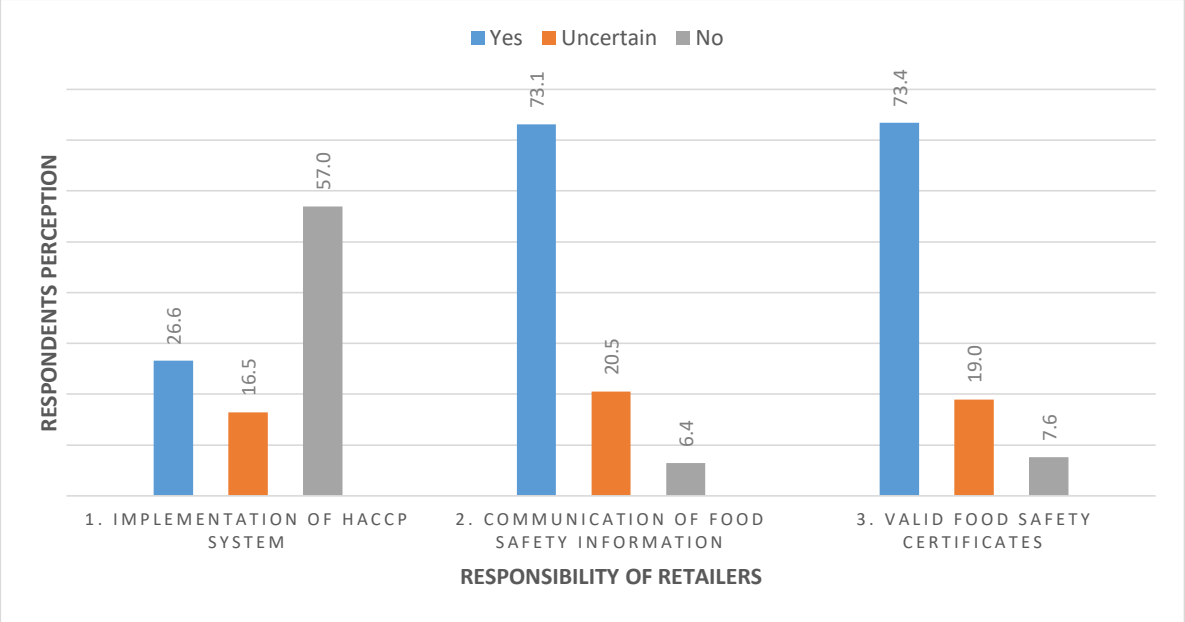

Figure 5.2.4.1: The responsibility of retailers according to farmer respondents

As observed in Figure 5.2.4.1, question 1 denotes that 57% of respondents indicate that retailers are not responsible for the implementation of HACCP systems. This contests the view of James (2006) which states that it is the responsibility of emerging commercial farmers to maintain implemented HACCP in food safety systems.

Retailers communicate their food safety regulations to farmers in order for farmers to meet requirements of stipulated policies (Journal of Extension, 2011).

It is further noted in Figure 5.2.4.1, question 2 that 71.3% of respondents are in agreement that food safety information must originate from retailers. Retailers need to send food safety criteria to emerging commercial farmers in order to verify their status with regard to compliance. Emerging commercial farmers must continuously be updated by retailers of food safety, this will strengthen market access and retailer programmes.

Retail chains require GAP certification from farmers ensuring safer food and preventing illnesses and disease outbreaks. (Penn-State Extension, 2009). Shoprite Holdings (n.d.) clearly indicates that no listing of farmers will occur if there is no valid food safety

certificate and non-compliance to compulsory entry-level food safety requirements. In general, Bienabe and Vermeulen (2007) argue that retailers procure fresh produce directly from farmers with a small portion emanating from distribution centres due to a lack in traceability and compliance with food safety standards. The majority of South African retail stores require accredited global food safety certificates such as EUROGAP certification from farmers and HACCP from packhouses or secondary processing plants.

As clearly stated in Figure 5.2.4.1, question 3, 73.4% of respondents agree it is the responsibility of retailers to ensure that valid food safety certificates are in place. Before retailers list emerging commercial farmers as suppliers, they need to verify the validity of food safety certificates. Valid food safety certificates imply that produced commodities are safe for human consumption and comply with food safety standards and requirements.

5.3 Chapter summary

Food safety compliance are seen as barriers to trade. Respondents agree it is their responsibility to register farms with DAFF in order to comply with food safety legislation. Extension advisory services need to transfer relevant food safety knowledge and application thereof in production systems which is needed to open markets. The cost of food safety certification should be subsidized.

CHAPTER 6: FINDINGS OF THE STUDY

The findings observed during the conducted research affirms the notion that food safety compliance criteria have a negative impact on emerging commercial farmers and effect sustainable farming. It was observed secondary objectives had an influence on emerging commercial farmers; including challenges with the implementation of food safety systems, economic impact, accountability ensuring compliance with food safety criteria and possible solutions overcoming food safety legislation.

The data collected from respondents was interpreted using Microsoft Excel for quantitative data was analysed manually through categorizing into themes, coding and classification. The results are based on challenges of emerging commercial farmers in conformance with food safety compliance criteria.

6.1 Main research objective finding

Comparisons are done per region in order to establish the impact of food safety compliance criteria per region relating to DAFF registrations, trade barriers, certification cost, finance availability, phytosanitary requirements, knowledge of food safety compliance criteria and consumer influence of food safety legislation.

The study found that majority of emerging commercial farmers were not DAFF registered in the Gauteng and Western Cape provinces in comparison with Eastern Cape and Northern Cape where majority of respondents were registered. The findings of this evaluation shapes the notion that profitability effects the sustainability of emerging commercial farmers in South Africa. It was seen the Eastern Cape province had the highest sustainability rate (Figure 4.1.1.2.2) due 90% profitability rate (Figure 4.1.1.2.1) supported by high DAFF registration status (Figure 4.1.2) 76.2 percent of respondents in the Gauteng region indicated farming is not sustainable with 52.4% of respondents shown farming is not profitable with only 4.8% farms DAFF registered.

As shown in Figure 6.1.1, trade barriers are discussed as observed per province. The purpose of food safety standards, requirements and laws is to protect markets in order to promote trade. It is important to note the views of emerging commercial farmers in different regions about food safety laws. Understanding food safety laws and the implementation thereof is of utmost importance to the existence of emerging commercial farmers.

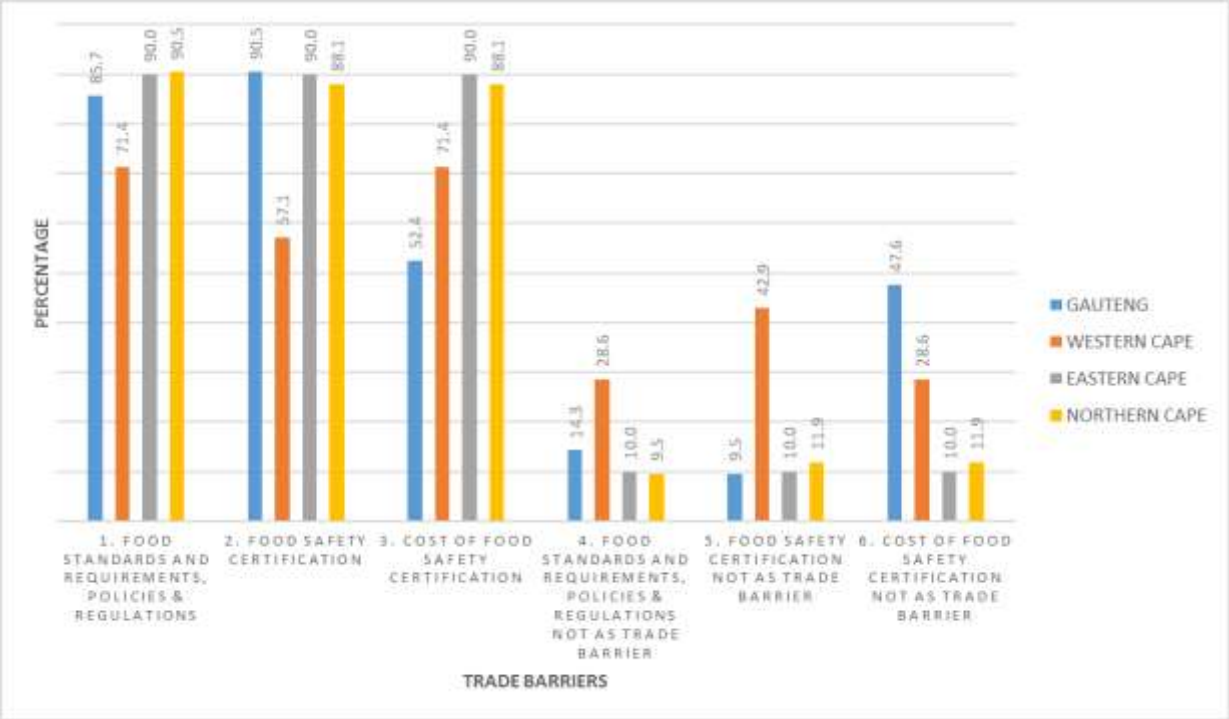

Figure 6.1.1: Trade barriers

More than 70% of respondents in all regions are of the opinion that food standards and requirements, policies and regulations are being used as trade barriers. In the Western Cape region, it was observed that 57.1% of respondents saw food safety certification as a trade barrier with 90.5% of respondents in the Gauteng region, 90% of respondents in the Eastern Cape region and 88.1% in the Northern Cape expressing the same opinion. Emerging commercial farmers in the Western Cape understand that food standards and requirements, policies and regulations are instituted to protect international markets and to promote market access.

Observed during the research study it was seen 78.6% of respondents agreed certification cost is not affordable as per (Figure 4.4.3.1) with an average of 93.5% respondents indicating no finance is available to pay for food safety compliance criteria as seen in (Figure 4.4.3.2). From the provinces where research was conducted, the findings indicate that 73 emerging commercial farmers had no finance available to meet food safety compliance criteria. Further it was observed majority of respondents agree that compliance with food safety compliance would have a positive economic effect as seen in Figure 4.1.1.1.

According to the findings of the survey, a lack of knowledge of food safety policies and legislation were major barriers due to the low literacy levels of most emerging commercial farmers. Majority of respondents agree in Figure 4.2.2 that extension advisory services does not transfer food safety knowledge or related information.

The cost of compliance is presented in Figure 6.1.2. Compliance with food safety legislation is costly and for the account of emerging commercial farmers. Emerging commercial farmers need to have finance available in order to comply and be granted market access. If no finance is available, market access is denied which influences sustainable farming negatively.

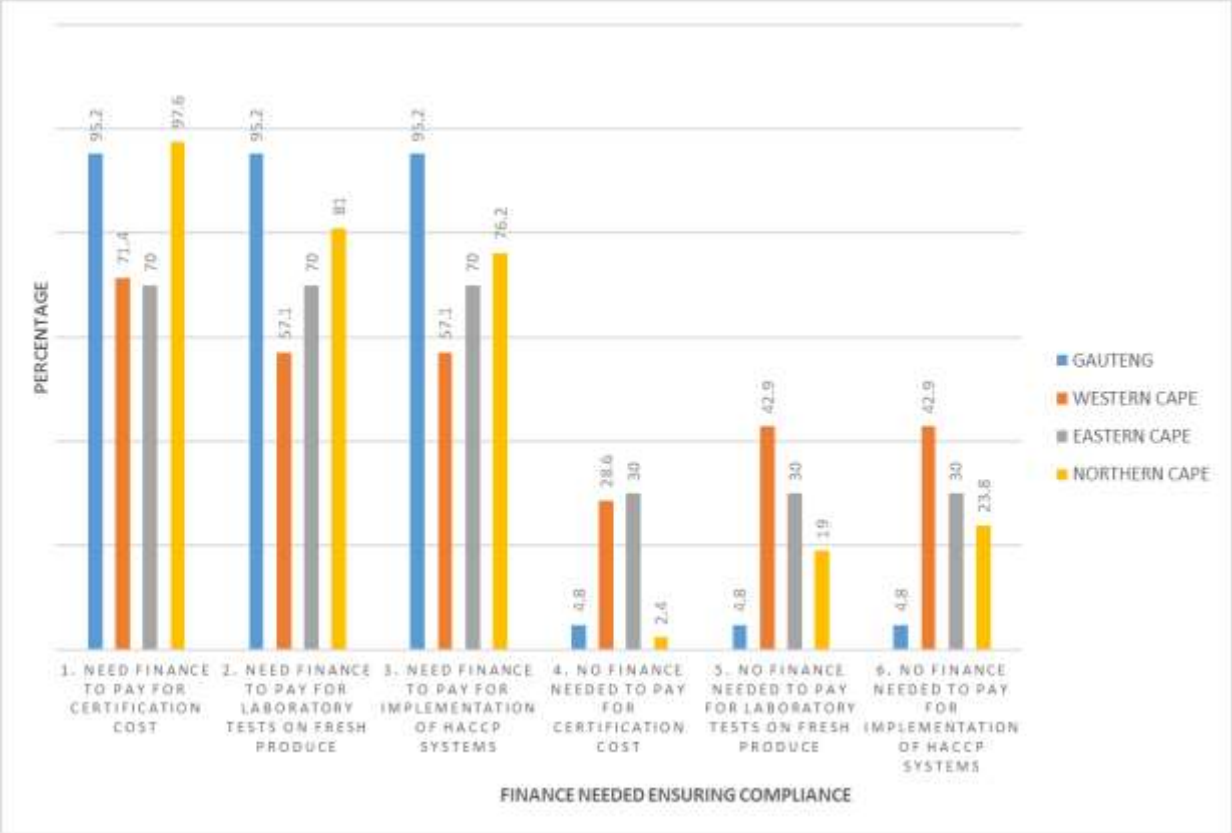

Figure 6.1.2: Finance needed ensuring compliance

Furthermore, it is evident that fresh produce is subjected to mandatory laboratory tests in order to establish compliance with MRL limits which is needed to verify if food or feed products are safe for human consumption. Majority of respondents indicated that finance is needed to pay for laboratory analysis tests, certification cost and implementation of HACCP systems. It is evident that Gauteng and Northern Cape provinces are most detrimentally affected by cost of compliance. The Western Cape and Eastern Cape regions show that emerging commercial farmers are more profitable which means these emerging commercial farmers have made provision for the required services.

The Gauteng and Northern Cape regions require more financial assistance to pay for certification cost than the Western Cape and Eastern Cape regions. The Western Cape and Northern Cape regions are DAFF registered and are food safety certified which means they have finance available from products sold on the export market. It was seen the Northern Cape region has 92.2% of respondents DAFF registered which means they are exporting commodities but due to certification status low prices are obtained.

Majority of respondents 74.4% agree compliance with phytosanitary requirements would provide access to international markets as seen in (Figure 4.3.1), which assists with building the South African economy.

In Figure 6.1.3, knowledge of food safety systems are discussed which has relevance to implementing HACCP into farming practices needed to obtain food safety certification effecting market access.

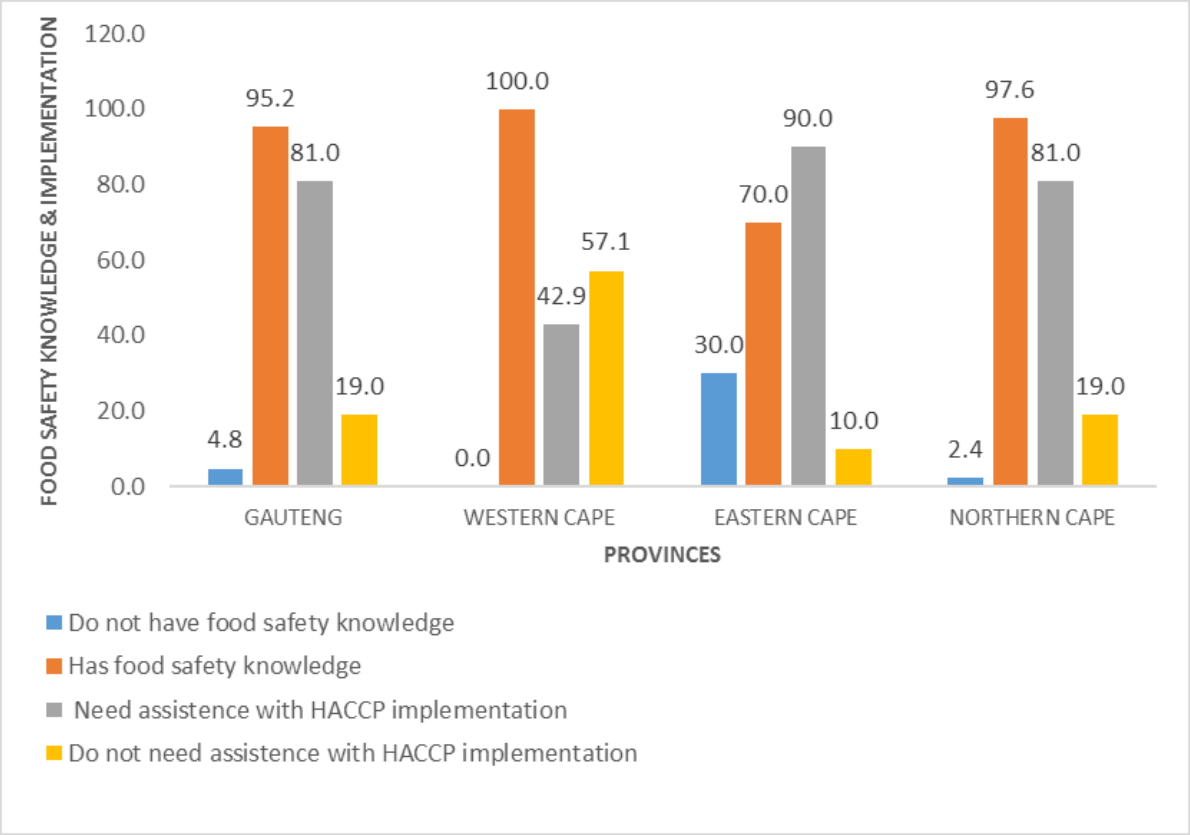

Figure 6.1.3: Knowledge of food safety systems

The above graph demonstrates that more than 70% of respondents in all regions have knowledge of food safety systems. However, 81% of respondents in Gauteng, 42.9% of respondents in the Western Cape, 90% of respondents in the Eastern Cape and 81% of respondents in the Northern Cape needs assistance with HACCP implementation in their farming systems. In the Western Cape region, 51% of respondents indicated that they are not in need of assistance. Majority of respondents, except the Western Cape has

knowledge of food safety, which is questionable is the in-depth knowledge of emerging commercial farmers with regards to food safety legislation, policies and bi-lateral agreements. The fact that respondents need assistance with implementation of HACCP into farming systems means lack of in-depth knowledge in the provinces; Gauteng, Eastern Cape and Northern Cape.

Eighty-six-point-eight percent of respondents indicated consumer influence on food safety has led to more stringent legislation in (Figure 4.2.1.3). Consumers in first world countries has major influence over food safety legislation from buying of fresh produce in retail stores up to policy level in government.

6.2 Secondary objectives of the research study

Secondary objectives were addressed in the research study which includes; challenges with the implementation of food safety systems, economic impact, accountability ensuring compliance with food safety criteria and possible solutions overcoming food safety legislation.

Observed from the research study, in Figure 5.2.1.3, 84.8% of respondents agree it is their responsibility to implement HACCP systems into farming whereby 81% indicated assistance is needed with implementation thereof as per Figure 5.2.1.4.

According to Figure 4.1.1.1, the majority of respondents agree more money from exports are generated than local retail markets which would stimulate job creation leading to expansion of farms. In addition to the above, Figure 4.2.1.2 presented information that 93.5% of respondents would sell produce at export markets with valid food safety certificates. Of the respondents, 93.3% indicated higher prices per commodity is possible with valid food safety certificates as per Figure 4.2.1.2. Further, 74.4% of respondents indicated compliance with SPS would open international markets and 60% of respondents agree this would help build the South African economy.

It was evident to see 54% of respondents indicated export consignments can be rejected by importing countries if found in(Figure 4.6.1 and 92.9% of respondents agree CBS consignments can be rejected as per Figure 4.6.2. It was observed in Figure 5.2.1.3 that majority of emerging commercial farmers accept full accountability of food safety legislation which is the opposite as mentioned in the problem statement.

Figure 6.2.1 illustrates possible solutions that have been discussed to overcome food safety challenges pertaining to emerging commercial farmers. Emerging commercial farmers have identified problem areas which need to be addressed in order to promote compliance with food safety legislation, laws, standards and requirements. Practical solutions must be implemented to solve the problems at hand.

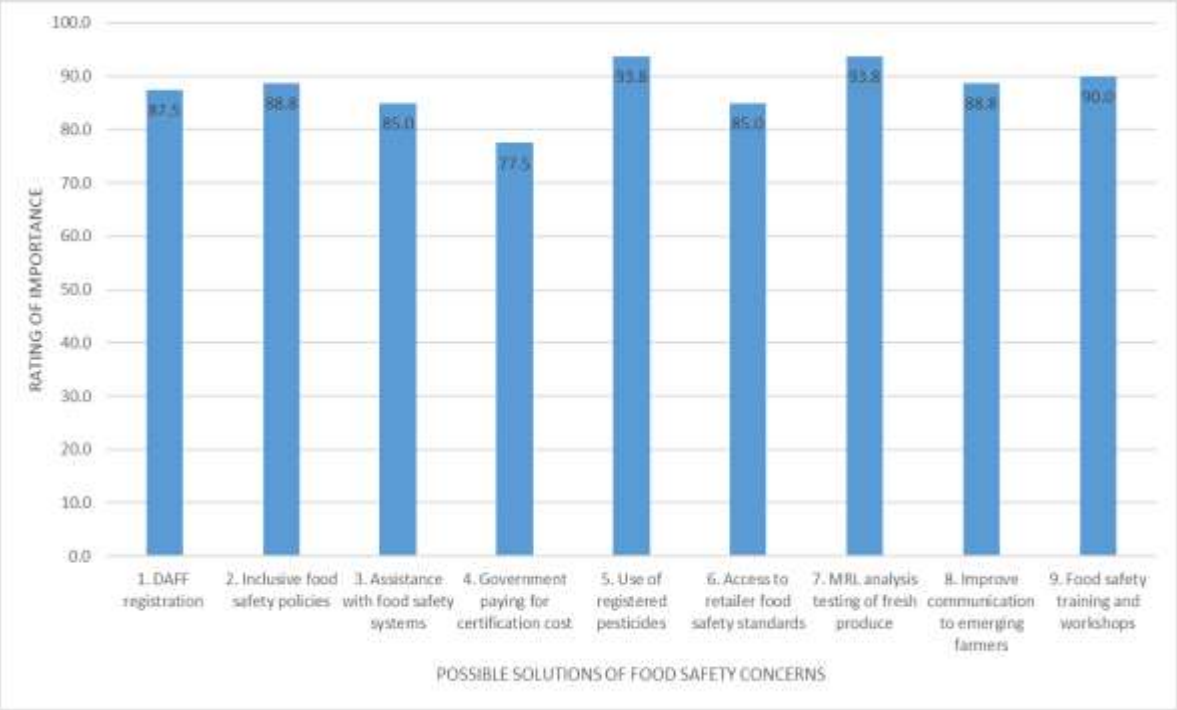

Figure 6.2.1: Solutions to overcome food safety problems

It is imperative to note that in the above figure, respondents provided solutions to overcome food safety problems in general. It was observed that 88% of respondents strongly feel they should register with DAFF in order to obtain a valid PUC OR FBO code in solution 1. In solution 2, it was observed that 88.8% of respondents indicate agricultural

policies need to address food safety. Overall, 85% of respondents agree assistance should be provided with the implementation and maintenance of food safety systems in solution 3 and 77.5% of respondents says government must pay for these costs in solution 4. Furthermore, 93.8% of respondents agree that only registered pesticides must be used during food production in solution 5 and MRL analysis of fresh produce is important in solution 7. A total of 88.8% of respondents indicated that communication of food safety matters would improve the status of emerging commercial farmers. In addition to the above, 90% of respondents agree more training and workshops are needed in solution 9 and 85% of respondents concur that they need access to retailer food safety standards in solution 6.

It was determined that 65% of emerging commercial farmers do not have extension advisory services while 33% of emerging commercial farmers have access to extension advisory services. Fourteen percent of emerging commercial farmers receive international market access information in comparison with 21% of emerging commercial farmers that receive local market access information. In essence, it means that emerging commercial farmers do not receive sufficient market access information.

6.3 Ethical considerations

The following ethical considerations were considered for the research:

1. Written permission was obtained from the PPECB, the researcher's employer to conduct research at farms and information gathered would not be disclosed to any parties other than University of Pretoria.
2. The respondents interviewed for this research remain anonymous and their details confidential.
3. During the research study respondents were not required to provide any other information than survey questionnaire.
4. This research work was academic purpose and conducted independently.

6.4 Strengths and limitations of the study

Data collection had to be done within agreed timelines arranged with emerging commercial farmers. Challenges were to fit group interviews and completion of survey

questionnaires into harvesting schedules and to avoid strikes of workers in the Eastern Cape (Addo). The research study had to be conducted during harvesting period in order to get the research study done. Funds were limited to travel to different regions to obtain data. The literacy level of emerging commercial farmers has led to many fields on the survey questionnaire not being completed, thus leading to inconclusive status on the figures.

The researcher has extensive knowledge and experience on the positive and negative effect food safety compliance criteria has on emerging commercial farmers and commercial farmers in South Africa. Food safety compliance criteria does not refer to the fact if produced food is safe and fit for human consumption. Many factors influencing food safety legislation which are based on the effect thereof on human and animal health. Emerging commercial farmers and commercial farmers does not understand policies, trade agreements and bi-lateral agreements between South Africa and governments of importing countries and implementation thereof. The researcher is a full-time employee of the PPECB which is mandated by DAFF to conduct inspection on all regulated fresh fruit and vegetables. The fifth strategic objective of the PPECB is to ensure emerging commercial farmers are brought into the export mainstream ensuring their sustainability. The PPECB provide HACCP training to emerging commercial farmers nationally, the adoption of HACCP implementation is voluntary. New knowledge obtained during the study shall be used to create awareness food safety criteria and assist conformance to food safety legislation granting more emerging commercial farmers local and international market access. The research findings shall be made available to the PPECB in order to promote emerging commercial farmer development.

CHAPTER 7: CONCLUSION AND RECOMMENDATION

7.1 Introduction

This chapter progresses to the present conclusions looking at the research objectives set for the research study. The purpose of the research was to determine the effect food safety compliance has on the existence of emerging commercial farmers and sustainable farming. The research and a broad interpretation of its findings led to the conclusion that the hypothesis was confirmed whereby emerging farmers were negatively impacted by food safety.

7.2 Conclusion

In conclusion, the statement that can be drawn is the hypothesis was correct based on the findings observed in the research study, except that emerging commercial farmers takes accountability of food safety principles.

The conclusion drawn to the main objective, establishing the effect of food safety compliance criteria on emerging commercial farmers and the effect on sustainable farming, are discussed as follows.

7.2.1 DAFF registrations

It is imperative that emerging commercial farmers are registered with DAFF and have a valid FBO or PUC. Once registered, PUC's/FBOs are considered export ready in terms of traceability whereby mandatory MRL analysis samples are drawn in order to verify food safety compliance by means of laboratory analysis. All agricultural related role-players are accountable for meeting food safety standards and complying with legislation. South African retailers require valid food safety certifications from food producers in order to become a supplier of fresh fruit and vegetables. Food safety certification audits are conducted by certification bodies ensuring compliance to HACCP systems on the farm. If food producers pass food safety audits, they can only then become registered retailer suppliers.

7.2.2 Trade barriers

Through observation of evidence it is clear cost of certification, food safety certification and food standards are trade barriers. Emerging commercial farmers are denied market access due to increasing stringent food policies and regulations, high cost of certification and certification. This is due to literacy levels lack of knowledge and interpretation of food safety legislation. Extension advisory services need to acquire food safety knowledge on relevant compliance criteria thus providing emerging commercial farmers' latest updated information promoting market access.

7.2.3 Certification cost

Emerging commercial farmers cannot afford the high implementation costs of food safety certification (including HACCP, Global GAP and SA GAP), laboratory analysis of produce and adherence to high food safety standards and regulation. Emerging commercial farmers are also not able to compete with the high-quality parameters set by competitors to maintain market share. This poses a trade barrier to developing countries. Due to high certification costs and compliance to additional private standards, most emerging commercial farmers have lost interest in certification. The result is that exporters would not source commodities from uncertified emerging commercial farmers. Most developing countries cannot afford the high cost and costly MRL laboratory analysis associated with food safety compliance which adds to the cost of exporting. Information does not reach emerging commercial farmers timeously in order for them to make informed decisions, thus effecting market access.

7.2.4 Finance availability

The results from the study indicate 73 emerging commercial farmers does not have finance available needed to obtain food safety certification, conducting MRL analysis or get DAFF registered. Emerging commercial farmers has high production cost with access to low income markets, thus not obtaining optimal prices influencing sustainability negatively.

7.2.5 Phytosanitary requirements

Non-complying consignments intercepted at importing countries containing quarantine pests or diseases will be confiscated, rejected or sent back to the exporting country. The economic impact will be financially detrimental to food producers due to blacklisting by importing countries. Once intercepted, no consignments of fresh fruit or vegetables are allowed to be exported into the importing country. Emerging commercial farmers produce food without knowledge of

7.2.6 Knowledge of food safety compliance criteria

The results obtained from the study show that there is a need for extension advisory services to play a more prominent role towards food safety compliance for emerging commercial farmers. The challenge is to effectively communicate the latest food safety standards and requirements, use of registered pesticides, international market access, MRL analysis to food producers and to create an understanding as to the purpose thereof. The illiteracy level of emerging commercial farmers contributes to the interpretation and understanding of food safety legislation. The lack of knowledge of food safety policies and legislation are major barriers due to the low literacy levels of most emerging commercial farmers. Emerging commercial farmers lose interest in exporting due to food safety compliance criteria.

7.2.7 Consumer influence of food safety legislation.

Food safety trends are driven by consumers on global export markets and local South African markets. Consumers are willing to pay premium (higher) prices when food safety compliance is ensured. The development of food safety standards, including EUROGAP and Global GAP, were based on consumer concerns regarding the presence of chemicals. Consumers have become more conscious of food safety with regard to fresh produce with less focus on quality. Countries importing fresh food and vegetables have stricter measures in place to prevent the loss of human life. Recall procedures were instituted informing producers, government and retailers of unsafe food on the market and the destruction of such food.

Food safety standards and requirements, which must be implemented by member countries to obtain market access are set up in developed countries. Standardised food safety policies must be implemented at national levels and harmoniously applied at provincial levels.

7.2.8 Food safety impact on sustainable farming

Market access is the only option to alleviate poverty by granting emerging commercial farmers penetration thus earning a constant revenue which leads to a higher and stable income. Higher stable incomes speak to SDG 1 and SDG 2, empowering rural communities to be sustainable over long term. Due to a lack of finance, most food production is organic which in return provides a higher income for rural emerging commercial farmers. Sustainable food production systems are needed which should include the expansion of crop types into farming in order to produce sustainable food and provide additional income. It is imperative to use registered chemicals during the production of food and the correct application thereof in order to produce healthier food, thus addressing SDG 3. When consumers feel safe buying produced commodities, the demand increases which stimulates exports leading to higher income.

Secondary objectives were addressed in the research study which includes; challenges with the implementation of food safety systems, economic impact, accountability ensuring compliance with food safety criteria and possible solutions overcoming food safety legislation.

7.2.9 Implementation of food safety systems

Emerging commercial farmers may have knowledge about food safety systems but need assistance with the implementation into their farming operation. Without successful implementation, food safety certification is not possible. The result would be no food safety certification which is needed to obtain local and international market access.

7.2.10 Economic impact

Emerging commercial farmers has the potential to generate higher income with exports in comparison with local markets. Compliance with food safety legislation would assist with market access both locally and internationally.

7.2.10.1 Accountability ensuring compliance with food safety criteria

It was seen emerging commercial farmers agree it is their responsibility to adhere with food safety legislation.

7.2.11 Possible solutions overcoming food safety challenges

During the research study it was observed the respondents indicated solutions overcoming food safety challenges in descending order. Eighty-seven-point-five percent of respondents indicated DAFF registration is the most important starting point whereby emerging commercial farmers are officially registered obtaining a PUC code. Eighty-eight-point-eight percent of respondents agree policy makers should include emerging commercial farmers in decision-making of food safety policies. Assistance with food safety system implementation into farming practices in order to get food safety certified during certification audits is an important aspect as indicated by 85% of respondents. Fourthly, Seventy-seven-point-five-percent of respondents agree government should be paying for implementation and certification cost of food safety related services. Agriculture is the basic foundation of each economy thus resulting in economic growth realizing government has a major role to play. Further it was seen 93.8% of respondents agree it is their responsibility to use only registered chemicals during all stages of production. This means emerging commercial farmers is serious to comply with food safety regulation and legislation. It was further observed 85% emerging commercial need access to retailer food safety standards which also could include higher stricter standards granting market access. Without proper communication emerging commercial farmers are excluded from markets resulting in lesser farms being sustainable and more dependent on government grants. Emerging commercial farmers agree record of MRL analysis testing of fresh produce need to be kept according to 93.8% of respondents, availability of finance is still an issue. Lack of communication need to be addressed as 88.8% of respondents confirm communication is a barrier. Extension advisory services needs to play a more prominent

role in diffusion of food safety information. Lastly, extension advisory service needs to facilitate more training and workshops on food safety in order to promote compliance as indicated by 90% of respondents.

7.3 Recommendation

A vast amount of literature has observed food safety criteria has negative impact on emerging commercial farmers and sustainable farming. The researcher would therefore strongly recommend emerging commercial farmers need to register their farming operations with DAFF to obtain valid PUC or FBO codes which is a requirement to get food safety certification. Food safety policies should include emerging commercial farmers by allowing them, over a specific time period, to conform with food safety legislation whilst supplying low risk export and retail markets.

This study is also aimed at better analysis of food safety compliance criteria with focus on market access based on different market requirements in South Africa, as to develop policies supporting emerging commercial farmers towards conformance.

Sustainable farming depends on the adoption of food safety compliance criteria and the ability of emerging farmers continuously stay food safety certified to secure economic income over long term periods.

Extension advisory service should assist with communication of updated food safety standards and requirements, implementation of HACCP systems into farming, pre-verification certification assessments to determine status of farmers and engage with retail and export markets on food safety legislation. Training and workshops must continuously be held to ensure emerging commercial farmers understand the importance of food safety compliance criteria. Understanding needs to be created and the importance of food safety criteria and creating an understanding of legislation to overcome illiteracy challenges must be held for emerging commercial farmers. Extension services should play a more prominent role with the focus on the diffusion of food safety criteria and information to emerging commercial farmers. Further emerging commercial farmers need

to acquire knowledge of their exporting markets with more specific reference to phytosanitary requirements, CBS and fruit fly.

Continuous engagement with DAFF, industry organisations, local markets, export markets and relevant stakeholders is needed to assess the impact of food safety criteria and the implementation thereof. Platforms must be created whereby local and export food legislation, policies and bi-lateral agreements and phytosanitary requirements are sent to all relevant stakeholders providing assistance with interpretation and implementation thereof.

Governments subsidise the cost of compliance and appoint relevant stakeholders to assist with the implementation of HACCP principles. Assistance should be given by certification bodies, laboratories, retailers, exporters and inspection bodies ensuring that emerging commercial farmers are mentored and upskilled. Over the long-term, all of the above-mentioned role-players will benefit financially when emerging commercial farmers convert to commercial farm status. Certification and MRL analysis cost should be subsidized as a recommendation originated from the backdrop that respondents does not have access to finance.

7.4 Further recommendations

The output of transferring food safety knowledge by extension advisory services to emerging commercial farmers need to be measured, monitored and evaluated. South Africa need to investigate further whether emerging commercial farmers would be granted local and international market access based on the following criteria:

- DAFF registration status
- Implementation of food safety systems into farming,
- Phytosanitary requirements
- Food safety certification and
- MRL analysis testing.

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APPENDICES

Appendix 1

ANNEXURE A

Registered laboratoires

Name of the Laboratory	Address	Testing for
Hearshaw and Kinnes Analytical Laboratory (Pty) Ltd	9 Regent Park, Bell Cresent, Westlake Bussiness Park, 7945	Pesticide Analysis
Microchem Lab. Services (Pty) Ltd	Weather House 176, Sir Lowry Road, Woodstock, Cape Town, 8001	Pesticide Analysis, Microbiological analysis and heavy metals
Analytical Services Laboratory (Department of Agriculture, Forestry and Forestry and Fisheries) Stellenbosch	Quarantine Station Polkadraai Road 7599	Pesticide Analysis
Hortec Laboratory	Unit D45, Olive Grove Industrial Estate, Old Paardevlei Road, Somerset West, 7130	Pesticide Aanalysis

1

Appendix 2

LAMPIRAN I PERATURAN MENTERI PERTANIAN REPUBLIK INDONESIA
NOMOR : 04/Permentan/PP.340/2/2015
TANGGAL : 10 Pebruari 2015

PANGAN SEGAR ASAL TUMBUHAN (PSAT), BATAS MAKSIMUM CEMARAN KIMIA, DAN BATAS MAKSIMUM CEMARAN BIOLOGI

NO.	JENIS PSAT NAMA UMUM INDONESIA/*ENGLISH*	JENIS CEMARAN DAN BATAS MAKSIMUM RESIDU (BMR)/ BATAS MAKSIMUM CEMARAN (BMC)	
BUAH/*FRUITS*			
1	Anggur/*Grapes*	Bahan Aktif Pestisida	BMR (mg/kg)
		Acetamiprid	0,5
		Aldicarb	0,2
		Ametoctradin	6
		Amitrole	0,05
		Azocyclotin	0,3
		Azoxystrobin	2
		Benalaxyl	0,3
		Bifenazate	0,7
		Boscalid	5
		Bromopropylate	2
		Buprofezin	1
		Captan	25
		Carbendazim	3
		Chlorothalonil	3
		Chlorpyrifos	0,5
		Chlorpyrifos-Methyl	1
		Clofentezine	2
		Clothianidin	0,7
		Cycloxydim	0,3
		Cyhexatin	0,3
		Cypermethrins (including alpha- and zeta- cypermethrin)	0,2
		Cyprodinil	3
		Deltamethrin	0,2
		Dichlofluanid	15
		Dichloran	7
		Difenoconazole	0,1
		Dimethomorph	2
		Dinocap	0,5
		Dinotefuran	0.9
		Dithianon	3
		Dithiocarbamates	5
		Emamectin benzoate	0,03
		Ethephon	1
		Etofenprox	4
		Etoxazole	0,5
		Famoxadone	2
		Fenarimol	0,3
		Fenbuconazole	1
		Fenbutatin Oxide	5
		Fenhexamid	15
		Fenpropathrin	5
		Fenpyroximate	0,1

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Appendix 3

PPECB - BOARD NOTICE

PERISHABLE PRODUCTS EXPORT CONTROL BOARD

IMPOSITION OF LEVIES ON PERISHABLE PRODUCTS

In terms of section 17(i) of the Perishable Products Export Control Act, 1983 (Act No.9 of 1983), the Board hereby imposes the following levies and tarriffs, in respect of each of the under mentioned perishable products, as defined in section 1 (i) of the above mentioned Act, which may be exported from the Republic of South Africa.
These levies will be valid from 1 April 2018 until further notice.

SEA LEVIES

Conventional (break-bulk)	R 17.00 per pallet
Conventional - Under Cold Treatment Protocols	R 32.10 per pallet
RMT loading/off-loading	R 15.30 per pallet
Containerised harbour	R 476.00 per container
Containerised inland	R 615.00 per container
Containerised - Under Cold Treatment Protocols	R 914.00 per container
Containerised at two loading points	R1 220.00 per container
Products exported by air	R 0.03 per kilogram
After hour callouts (see definition under HOUR rates)	Hour and kilometre rates as listed

- All levies by kilogram will be based on gross weight.

CONTAINER INSPECTION LEVIES

	Week-days	After Hours/Weekends/ Public Holidays
Cleanliness inspection	R23.22 per unit	R46.45 per unit
Technical inspection	R23.22 per unit	R46.45 per unit
Full inspection	R45.45 per unit	R90.90 per unit
After hour callouts (see definition under HOUR rates)	Hour and kilometre rates as listed or Weekend rates as above	

- In all instances where a service is delivered and unit rates are not sufficient to cover costs, PPECB will retain the right to, at it's discretion, charge hour and or kilometre rates as listed instead of or in addition to the published fees above. For administrative purposes hour and kilometre rates may be adapted to an equivalent tariff per unit.

OTHER LEVIES

The fees listed below exclude any travelling; freight and incidental costs, which will be charged for separately.

Calibration of vessel temperature recording equipment	R15 817 per vessel (depending on number of cooling compartments)
Inspection and registration of Refrigerated Road Motor Transport	R688 per vehicle (depending on structure of vehicle)
Stuffing reports	R281.00 per request
Redo of special shipment documentation	R686 per request
Inspection and registration of RMT's & Cold Stores	R686 per RMT/Cold store
Calibration of on-board container data loggers and portable data loggers for use in sterilisation shipments	R88.00 per calibration
Temperature monitoring probes for conventional shipments	R243 per probe
Administration fee for document retrieval	R243 per retrieval and/or hour rates as listed
Food Safety Certification Audit	R4, 452 per audit
Handling fee for residue samples	R85.00
MRL Sample fee	R648 per sample
Sealing hatches; Post harvest claims; Grading Audits	Hour and kilometre rates as listed

Appendix 4

States Members of the UN or Member Nations of FAO Listings for Election to the WFP Executive Board

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1. Developing Countries

States: 140

WFP Executive Board Seats: 20 (ten each to be elected by the FAO Council and the ECOSOC of the United Nations) plus 1 seat to be elected by the FAO Council that rotates between the States included in the lists according to the following sequence: List A (2012-2014), List B (2015-2017), List A (2018-2020) and List C (2021-2023)

The 20 seats will be distributed on the following basis:

List A

States: 53

WFP Executive Board Seats: 8 (four to be elected by the FAO Council and four by the ECOSOC of the United Nations)

Algeria
Angola
Benin
Botswana
Burkina Faso
Burundi
Cameroon
Cape Verde
Central African Republic
Chad
Comoros
Congo
Côte d'Ivoire
Democratic Republic of the Congo
Djibouti
Egypt
Equatorial Guinea
Eritrea
Ethiopia
Gabon
Gambia
Ghana
Guinea
Guinea-Bissau
Kenya
Lesotho
Liberia
Libyan Arab Jamahiriya
Madagascar
Malawi
Mali
Mauritania
Mauritius
Morocco
Mozambique
Namibia
Niger
Nigeria
Rwanda
Sao Tome and Principe
Senegal
Seychelles
Sierra Leone
Somalia
South Africa
Sudan
Swaziland
Togo
Tunisia
Uganda
United Republic of Tanzania
Zambia
Zimbabwe

Appendix 5

IPCC MEMBERS GROUPED ACCORDING TO WMO REGIONS

Region I - Africa

Region II - Asia

Region III - South America

Region IV - North America, Central America and the Caribbean

Region V - South-West Pacific

Region VI - Europe

Members in a Region shall be deemed to be those having their seat of government (capital) within the Region.

AFRICA (Region I)
(53 Members)

Algeria
Angola
Benin
Botswana
Burkina Faso
Burundi
Cameroon
Cape Verde
Central African Republic
Chad
Comoros
Congo
Côte d'Ivoire
Democratic Republic of the Congo
Djibouti
Egypt
Equatorial Guinea
Eritrea
Ethiopia
Gabon
Gambia
Ghana
Guinea
Guinea Bissau
Kenya
Lesotho
Liberia
Libyan Arab Jamahiriya
Madagascar
Malawi
Mali
Mauritania
Mauritius
Morocco
Mozambique
Namibia
Niger
Nigeria
Rwanda
Sao Tome and Principe
Senegal
Seychelles
Sierra Leone
Somalia
South Africa
Sudan
Swaziland
Togo
Tunisia
Uganda
United Republic of Tanzania
Zambia
Zimbabwe

Appendix 6

TITLE: THE EFFECT OF FOOD SAFETY COMPLIANCE ON EMERGING FARMERS AND SUSTAINABLE FARMING.

Name	
Surname	
Job Title	
Farm	
Date of research survey	
Signature	
Area	

- Title, initials and surname: Mr. Mario van Stade
- Student number: 14330092
- Contact details:
- E-mail: mariov@ppecb.com
- Tel/cell number: 082 9444 466
- Supervisor: Dr Terblanche
- Degree: M.Agric Extension

PLEASE COMPLETE ALL SECTIONS

1. GENDER

FEMALE	
MALE	

2. RACE

AFRICAN	
WHITE	
COLOURED	
INDIAN	
Other, specify:	

3. WHAT IS YOUR CURRENT AGE

YOUTH	**<35**	
HARD WORKING	36-60	
ELDERLY	>65	

4. RESIDENCE

ADDO	
ELIM	
GRABOUW	
PIKETBERG	
OTHER, PLEASE SPECIFY:	

5. MARITIAL STATUS

MARRIED	
DIVORCED	
SINGLE	
WIDOW/ER	

6. NATIONALITY

SOUTH AFRICAN	
NON-SOUTH AFRICAN	
OTHER THAN ABOVE, SPECIFY BELOW	

7. EMPLOYMENT STATUS

FARM OWNER	
FARM WORKER & FARMING	
FARM WORKER (FULL TIME)	
CONTRACT WORKER	
OTHER, PLEASE SPECIFY	

8.1 LITERACY LEVEL. PLEASE INDICATE.

	YES	NO
CAN YOU READ ENGLISH		
CAN YOU WRITE ENGLISH		
DO YOU HAVE MATRIC		
IF NO, TO ABOVE WHAT IS THE HIGHEST GRADE/STANDARD PASSED		

8.2 DO YOU READ A NEWSPAPER

NO	
YES	
IF YES, WHICH NEWS PAPER?	

8.3 WHICH SECTION OF THE NEWSPAPER DO YOU READ?

GENERAL		
CAREER		
BUSINESS		
AGRICULTURE		
POLITICS		
FASHION, CLOTHES		
NONE		

9. DO YOU READ ANY AGRICULTURE READING MATERIAL REGARDS TO FOOD SAFETY?

	YES	NO
FRUIT JOURNALS		
LANDBOU WEEKBLAD		
CRI COMMUNICATIONS		
AGRICULTURE RESEARCH PAPERS		
FRUIT MAGAZINES		
FARMER'S WEEKLY		
OTHER, NAME THEM		
NONE		

10.1 DO YOU HAVE ACCESS TO THE INTERNET?

NO	
YES	

10.2 IF YES ABOVE, WHAT DO YOU READ ABOUT:

AGRICULTURE NEWS	
MARKET ACCESS	
FARMING RELATES ISSUES	
FOOD SAFETY	
ISPM15	
FRUIT FLY	
BI-LATERAL AGREEMENTS	
FOOD SAFETY POLICIES	
AGRICULTURAL EXTENSION	
GOVERNMENT POLICIES	
NONE	
OTHER (NAME)	

11.1 DO YOU HAVE ACCESS TO A TELEVISION (TV)?

NO	
YES	

11.2 IF YES, WHICH CHANNELS DO YOU WATCH?

DSTV	
BUSINESS NEWS	
MOVIES	
SPORT	
AGRICULTURE PROGRAMMES	
AGRICULTURAL NEWS	
SABC CHANNELS	
ANY OTHER, (NAME)	

11.3 DO YOU HAVE ACCESS TO A RADIO?

NO		
YES		

11.4 IF YES, INDICATE TO WHICH RADIO STATIONS YOU LISTEN TO?

GENERAL NEWS	
BUSINESS NEWS	
MOVIES	
SPORT	
AGRICULTURE PROGRAMMES	
AGRICULTURAL NEWS	
SABC CHANNELS	
ANY OTHER, (NAME)	

FARMING INFORMATION

12. HOW MANY YEARS HAVE YOU BEEN FARMING?

< 1 YEAR	
1 - 5 YEARS	
5 -10 YEARS	
10 -15 YEARS	
15 - 20 YEARS	
20 - 30 YEARS	
30 YEARS >	

13. COMMODITY TYPE?

FRUIT	
VEGETABLES	
FRUIT & VEGETABLES	
LIVESTOCK	
POULTRY	
FLOWERS	
OTHER, SPECIFY	

14. FOOD PRODUCTION TYPE?

FOOD GARDEN	
SCHOOL GARDEN	
SMALL HOLDING PLOTS	
GOVERNMENT FARM	
COMMERCIAL FARM	

KNOWLEDGE ABOUT FOOD SAFETY COMPLIANCE CRITERIA.

15.1 DO YOU KNOW WHAT FOOD SAFETY IS?

NO	
YES	
IF YES, EXPLAIN	

15.2 DO YOU KNOW WHAT HACCP IS?

NO	
YES	
IF YES, EXPLAIN	

15.3 DO YOU KNOW WHAT A PUC (PRODUCTION UNIT CODE)/ FOOD BUSINESS OPERATOR (FBO) IS?

NO	
YES	
IF YES, EXPLAIN	

15.4 IS YOUR FARM REGISTERED WITH DAFF UNDER PUC/FBO CODE?

YES	
NO	
IF NO, EXPLAIN	

15.5 IS FOOD SAFETY IMPORTANT IN YOUR OPINION? IF NO PLEASE EXPLAIN.

YES	
NO	
IF NO, EXPLAIN	

16. WHAT TYPE OF FARMING ARE YOU INVOLVE WITH? INDICATE WITH "1" AS IMPORTANT AND "2" AS LESS IMPORTANT.

	IMPORTANT	**LESS IMPORTANT**
SUBSISTENCE FARMING (OWN FAMILY)		
SUBSISTENCE (OWN FAMILY & LOCAL PEOPLE)		
SMALL HOLDER (LOCAL RETAILERS)		
COMMERCIAL (EXPORT & LOCAL MARKET)		
COMMERCIAL (EXPORT, ONLY)		

<u>COST OF COMPLIANCE</u>

17.1 ACCORDING TO YOU HOW IMPORTANT IS IT TO MEET COMPLIANCE CRITERIA.

VERY IMPORTANT	
IMPORTANT	
SOMEWHAT IMPORTANT	
NOT IMPORTANT ATT ALL	

17.2 DO YOU HAVE FINANCE AVAILABLE TO MEET COMPLIANCE CRITERIA?

	YES	**NO**
DO YOU HAVE MONEY TO PAY FOR THE COST OF FOOD SAFETY CERTIFICATION?		
DO YOU HAVE MONEY TO CONDUCT LABORATORY TESTS ON FRESH PRODUCE?		
DO YOU HAVE MONEY TO IMPLEMENT HACCP SYSTEMS?		

18.1 PARTICIPANTS NEED FOR ASSISTANCE WITH IMPLEMENTATION OF HACCP FOOD SAFETY SYSTEMS.

NO	
YES	

18.2 IF YES, PLEASE INDICATE WHOM MUST ASSIST.

GOVERNMENT	
CONSUMERS	
EXTENSION OFFICIALS	
RETAILERS	
PRIVATE STAKEHOLDERS	
BANKS	
OTHER	

19. IS THE BELOW COST OF CERTIFICATION EXPENSIVE BUT AFFORDABLE, EXPENSIVE BUT NOT AFFORDABLE.

	Cost per Year	**Affordable**	**Not Affordable**
BRC (including HACCP)	R35 000.00		
SAGAP food safety certification audit – PPECB	R4452.00		
NSF (GlobalGAP+ EUREGAP)	R8000.00		

20. ACCORDING TO FARMER RESPONDENTS WHO IS RESPONSIBLE FOR THE PAYMENT CERTIFICATION COSTS
1 = MOST IMPORTANT, 2 = IMPORTANT, 3 = LEAST IMPORTANT

		Definitely agree	**Agree**	**Uncertain**	**Do not agree**	**Definitely do not agree**
1	EMERGING FARMERS MUST PAY FOR CERTIFICATION COST					
2	GOVERNMENT MUST PAY FOR CERTIFICATION COST					
3	RETAILERS MUST PAY FOR CERTIFICATION COST					
4	EXPORTERS MUST PAY FOR CERTIFICATION COST					
5	PRIVATE SECTOR MUST PAY FOR CERTIFICATION COST					
6	CUSTOMERS MUST PAY FOR CERTIFICATION COST					

<u>LABORATORY PESTICIDE ANALYSIS COSTS</u>

21. IS THE BELOW MRL (MAXIMUM RESIDUE LIMIT) ANALYSIS TESTING PRICES AFFORDABLE, EXPENSIVE OR NOT AFFORDABLE. PLEASE INDICATE, BELOW.

	COST	**AFFORDABLE**	**EXPENSIVE**	**NOT AFFORDABLE**	**I DON'T KNOW**
PPECB-MRL: FRESH FRUIT AND VEGETABLES, DRIED FRUIT, GROUNDNUTS AND OTHER OILSEEDS	R1275.00				
PPECB-MRL + ETHEPHON: CITRUS FRUIT AND TABLE GRAPES	R1450.00				
DAFF	R1799.00				
MICROCHEM: MULTI-RESIDUE PESTICIDE SCREENING	R968.30				
HORTEC: STANDARD PESTICIDE MULTIRESIDUE TEST	R840.00				
HEARSHAW & KINNES	R854.39				

22. WHO MUST PAY FOR PESTICIDE MAXIMUM RESIDUE LIMIT ANALYSIS (MRL) COSTS?

	Definitely agree	Agree	Uncertain	Do not agree	Definitely do not agree
EMERGING FARMERS MUST PAY FOR MRL ANALYSIS COST					
GOVERNMENT MUST PAY FOR MRL ANALYSIS COST					
RETAILERS MUST PAY FOR MRL ANALYSIS COST					
EXPORTERS MUST PAY FOR MRL ANALYSIS COST					
PRIVATE SECTOR MUST PAY FOR MRL ANALYSIS COST					
CONSUMERS MUST PAY FOR MRL ANALYSIS COST					

23. CHEMICALS USED DURING FOOD PRODUCTION?

	YES	NOT SURE	NO
DO YOU USE CHEMICALS DURING FOOD PRODUCTION			
IN YOUR OPINION IS PESTICIDES CHEAP			
IN YOUR OPINION IS PESTICIDES EXPENSIVE			
DO YOU USE REGISTERED PESTICIDES			

EXTENSION ADVISORY SERVICES

24.1 DO YOU HAVE EXTENSION ADVISORY SERVICES?

NO	
YES	

24.2 IF YES, HOW OFTEN DO YOU MEET WITH EXTENSION OFFICIALS?

WEEKLY	MONTHLY	ONCE A YEAR	NEVER	OTHER, (NAME)

24.3 EXTENSION ADVISORY SERVICE TO PAY CLOSER ATTENTION TO FOOD SAFETY COMPLIANCE FACTORS WITH LESS FOCUS ON PRODUCTION IN ORDER ASSIST FARMERS.

	YES	NO
DO YOU HAVE EXTENSION WORKERS/OFFICERS/OFFICIALS		
HAVE YOU RECEIVED ANY TRAINING ON FOOD SAFETY FROM EXTENSION WORKERS		
DOES EXTENSION WORKERS SPEAK ABOUT THE USE OF REGISTERED PESTICIDES?		
DOES EXTENSION WORKERS INFORM YOU ABOUT FOOD SAFETY SYSTEMS (HACCP)?		
DOES EXTENSION WORKERS SPEAK ABOUT LOCAL MARKET ACCESS?		
DOES EXTENSION WORKERS SPEAK ABOUT EXPORT OF FRESH FRUIT & VEGETABLES?		
DOES EXTENSION WORKERS SPEAK ABOUT INTERNATIONAL MARKET ACCESS?		
DOES EXTENSION WORKERS ADVICE YOU ABOUT MRL ANALYSIS OF FRUIT OR VEGETABLES?		
DOES EXTENSION WORKERS ADVICE YOU ABOUT CERTIFICATION COST?		
DOES EXTENSION WORKERS ADVICE YOU ABOUT FRUIT FLY?		
DOES EXTENSION WORKERS ADVICE YOU ABOUT ISPM15?		
DOES EXTENSION WORKERS SPEAK ABOUT CITRUS BLACK SPOT?		

25. COMMUNICATION OF FOOD SAFETY INFORMATION?

	Strongly agree	Agree	Uncertain	Do not agree	Definitely do not agree	I don't know
DO YOU GET FOOD SAFETY INFORMATION FROM LOCAL MUNICIPALITY						
DO YOU GET FOOD SAFETY INFORMATION FROM LOCAL RETAILERS						
DO YOU GET FOOD SAFETY INFORMATION FROM GLOBAL MARKETS						
DO YOU GET FOOD SAFETY INFORMATION FROM EXPORTERS						
DO YOU GET FOOD SAFETY INFORMATION UPDATES FROM CERTIFICATION BODIES						

CONSUMERS HAS INFLUENCE ON MARKET ACCESS OF PRODUCERS.

26. BUYING POWER OF CONSUMERS

	YES	NO	UNCERTAIN
WOULD YOUR CUSTOMER BUY PRODUCE THAT EXCEEDS THE PESTICIDE LIMIT			
DO YOU THINK RETAILERS WOULD BUY YOUR FRESH PRODUCE WITHOUT FOOD SAFETY CERTIFICATES			
DO YOU THINK LOCAL PRODUCE MARKETS WOULD FEEL SAFE TO BUY FROM YOU?			
DO YOU THINK SCHOOLS WOULD FEEL SAFE TO BUY FROM YOU?			
DO YOU THINK FRUIT STALLS WOULD FEEL SAFE TO BUY FROM YOU?			
DO YOU THINK EXPORT MARKETS WOULD FEEL SAFE TO BUY FROM YOU?			
DO YOU THINK COMMUNITIES WOULD FEEL SAFE TO BUY FROM YOU?			
DO YOU THINK MARKETING AGENCIES WOULD FEEL SAFE TO BUY FROM YOU?			

27. RASFF (RAPID ALERT SYSTEM FOR FOOD AND FEED) RECALL OF CONTAMINATED FOOD OR FEED PRODUCTS.

	Yes	Uncertain	Never heard of it	No
DO YOU KNOW WHAT RASFF (RAPID ALERT SYSTEM FOR FOOD AND FEED) IS?				
CAN RETAILERS RECALL CONTAMINATED FOOD FROM SHELVES?				
CAN CONSIGNMENTS BE DESTROYED/CONFISCATED WITH A RECALL?				
EMERGING FARMERS DO NOT GET PAID WHEN FOOD IS RECALLED (RASFF)				

ECONOMIC IMPACT OF FOOD SAFETY COMPLIANCE

28. IMPORTANCE OF MARKET ACCESS

	Definitely agree	Agree	Uncertain	Do not agree	Definitely do not agree
DOES SELLING FRESH PRODUCE ON THE LOCAL MARKET MEANS MORE MONEY					
DOES EXPORTS MEAN MORE MONEY IN YOUR POCKET?					
WOULD EXPORT HELP WITH YOUR SUSTAINABLE FARMING					
WOULD LOCAL MARKETS HELP WITH SUSTAINABLE FARMING					
WOULD YOU BE ABLE TO EMPLOY MORE PEOPLE/CREATE JOBS WITH EXPORTS					
WOULD YOU BE ABLE TO EMPLOY MORE PEOPLE/CREATE JOBS WITH LOCAL BUYERS					
DO YOU THINK FOOD SAFETY COMPLIANCE COULD GET YOU A CONTRACT WITH LOCAL RETAILERS					
DO YOU THINK FOOD SAFETY COMPLIANCE COULD GET YOU A CONTRACT WITH EXPORT MARKETS					
WOULD IMPORTING COUNTRIES ACCEPT MORE THAN ONE CONSIGNMENT WHEN THERE IS FOOD SAFETY NON-COMPLIANCE?					
DO YOU THINK FOOD SAFETY STANDARDS HAS BECOME MORE STRINGENT?					
IS IT EASY TO COMPLY WITH FOOD SAFETY STANDARDS?					
WOULD GLOBAL MARKETS BUY FROM YOU IF YOU DO NOT COMPLY WITH FOOD SAFETY STANDARDS?					

29. IMPLEMENTATION CHALLENGES OF FOOD SAFETY SYSTEMS (HACCP)

	Yes	Heard of it	No
DO YOU KNOW WHAT A FOOD SAFETY SYSTEM IS?			
HAVE YOU RECEIVED TRAINING ON FOOD SAFETY SYSTEMS?			
DO YOU KNOW HOW TO IMPLEMENT A HACCP SYSTEM?			
DO YOU KNOW HOW TO MAINTAIN A HACPP SYSTEM?			

30. ECONOMIC IMPACT OF FOOD SAFETY COMPLIANCE – EXPORTS (GLOBAL MARKETS)

	Definitely agree	Agree	Uncertain	Do not agree	Definitely do not agree
WOULD YOU SELL MORE PRODUCE IF YOU HAVE FOOD SAFETY CERTIFICATES					
WOULD YOU SELL MORE PRODUCE IF YOU HAVE COMPLYING LABORATORY RESULTS					
CAN YOU SELL PRODUCE AT HIGHER PRICES WHEN YOU HAVE FOOD SAFETY CERTIFICATES					
CAN YOU SELL PRODUCE AT HIGHER PRICES WHEN YOU HAVE LABORATORY RESULTS					

31. ECONOMIC IMPACT OF FOOD SAFETY COMPLIANCE – LOCAL MARKETS (SOUTH AFRICA)

	Definitely agree	Agree	Uncertain	Do not agree	Definitely do not agree
WOULD YOU SELL MORE PRODUCE IF YOU HAVE FOOD SAFETY CERTIFICATES					
WOULD YOU SELL MORE PRODUCE IF YOU HAVE COMPLYING LABORATORY RESULTS					
CAN YOU SELL PRODUCE AT HIGHER PRICES WHEN YOU HAVE FOOD SAFETY CERTIFICATES					
CAN YOU SELL PRODUCE AT HIGHER PRICES WHEN YOU HAVE LABORATORY RESULTS					

32. ECONOMIC IMPACT OF FOOD SAFETY COMPLIANCE ACCORDING TO FAMER RESPONDENTS

	Definitely agree	Agree	Uncertain	Do not agree	Definitely do not agree
WOULD YOU GET MORE MONEY FROM EXPORTS					
WOULD YOU GENERATE MONEY FROM LOCAL MARKETS					
WOULD YOU BE ABLE TO EMPLOY MORE PEOPLE WHEN EXPORTING					
WOULD YOU BE ABLE TO EMPLOY MORE PEOPLE WHEN SELLING AT LOCAL MARKETS					
WOULD YOU BE ABLE TO EXPAND YOUR FARM WITH INCOME FROM EXPORTS					
WOULD YOU BE ABLE TO EXPAND YOUR FARM WITH INCOME FROM LOCAL MARKETS					

PHYTOSANITARY INFORMATION

33. DO YOU HAVE KNOWLEDGE ABOUT PHYTOSANITARY REQUIREMENTS?

	YES	UNCERTAIN	NO
DO YOU KNOW WHAT PHYTOSANITARY REQUIREMENTS ARE?			
DO YOU HAVE KNOWLEDGE ABOUT PHYTOSANITARY REQUIREMENTS?			
IS NON-COMPLIANCE TO PHYTOSANITARY REQUIREMENTS A TRADE BARRIER TO INTERNATIONAL TRADE?			
WOULD COMPLIANCE TO PHYTOSANITARY REQUIREMENTS OPEN INTERNATIONAL MARKETS?			
DIFFERENT IMPORTING COUNTRIES HAS DIFFERENT PHYTOSANITARY REQUIREMENTS			
PHYTOSANITARY MEASURES IS TO PROTECT CONSUMERS?			
PHYTOSANITARY MEASURES IS TO PROTECT AGRICULTURE SECTOR OF IMPORTING COUNTRY?			
PHYTOSANITARY COMPLIANCE HELPS BUILD THE ECONOMY OF SOUTH AFRICA			

34. DO YOU HAVE KNOWLEDGE ABOUT ISPM15 (INTERNATIONAL STANDARDS FOR PHYTOSANITARY MEASURES).

	Very good	Good	Somewhat good	Not good at all
DO YOU KNOW WHAT ISPM15 IS?				
DO YOU HAVE KNOWLEDGE ABOUT ISPM15?				
DOES ISPM15 AFFECT INTERNATIONAL MARKET ACCESS?				
CAN PALLETS BE REJECTED BY THE PPECB FOR NON-COMPLIANCE?				
CAN PALLETS BE REJECTED BY DAFF FOR NON-COMPLIANCE?				
DO YOU KNOW WOODEN PALLETS ARE CARRIERS OF INSECTS				

35. DO YOU HAVE KNOWLEDGE ABOUT FRUIT FLIES (QUARANTINE PESTS)? PLEASE PROVIDE ANSWERS TO THE FOLLOWING.

	Good	Somewhat good	Very good	Not good at all
DO YOU KNOW WHAT FRUIT FLY IS?				
DO YOU HAVE KNOWLEDGE ABOUT FRUIT FLY?				
IS FRUIT FLY A QUARANTINE PEST?				
DOES FRUIT FLY AFFECT INTERNATIONAL MARKET ACCESS?				
CAN CONSIGNMENTS BE REJECTED BY THE PPECB FOR FRUIT FLY?				
CAN CONSIGNMENTS BE REJECTED BY DAFF FOR FRUIT FLY?				
CAN CONSIGNMENTS BE REJECTED BY THE IMPORTING COUNTRY IF FRUIT FLY IS FOUND?				
CAN FRUIT FLY INFESTATIONS LEAD TO ECONOMIC LOSSES?				

36. DO YOU HAVE KNOWLEDGE ABOUT LISTERIOSIS? PLEASE PROVIDE ANSWERS TO THE FOLLOWING:

	Yes	Uncertain	No
DO YOU KNOW WHAT LISTERIOSIS IS?			
DO YOU HAVE KNOWLEDGE ABOUT LISTERIOSIS?			
CAN LISTERIOSIS AFFECT INTERNATIONAL MARKET ACCESS?			
CAN LISTERIOSIS AFFECT LOCAL MARKET ACCESS?			
CAN LISTERIOSIS AFFECT YOU AS AN EMERGING FARMER?			

37. CITRUS BLACK SPOT (CBS). PLEASE PROVIDE ANSWERS TO THE FOLLOWING:

	Yes	Uncertain	No
DO YOU KNOW WHAT CBS IS?			
DO YOU HAVE KNOWLEDGE ABOUT CBS?			
CAN CBS AFFECT INTERNATIONAL MARKET ACCESS?			
CAN CBS AFFECT YOU AS AN EMERGING FARMER?			
CAN CONSIGNMENTS BE REJECTED BY THE IMPORTING COUNTRY IF CBS IS FOUND?			
CAN CBS INTERCEPTIONS LEAD TO ECONOMIC LOSSES?			

POLICY MAKING

38. BI-LATERAL AGREEMENTS. PLEASE PROVIDE ANSWERS TO THE FOLLOWING:

	Yes	Uncertain	Never heard of it	No
DO YOU KNOW WHAT A BI-LATERAL AGREEMENT IS?				
DO YOU HAVE KNOWLEDGE ABOUT BI-LATERAL AGREEMENTS?				
CAN BI-LATERAL AGREEMENTS AFFECT INTERNATIONAL MARKET ACCESS?				
DO YOU HAVE KNOWLEDGE ABOUT INDONESIAN (HEAVY METALS & MICROBIOLOGICAL) BI-LATERAL AGREEMENT?				
DO YOU HAVE KNOWLEDGE ABOUT EGYPT (LISTERIOSIS) BI-LATERAL AGREEMENT?				
DO YOU HAVE KNOWLEDGE ABOUT CANADA (DITHIOCARBAMATES) BI-LATERAL AGREEMENT?				

39. WHERE DOES FOOD POLICIES COME FROM?

	Yes	Uncertain	Never heard of it	No
COMES FROM CONSUMER DEMANDS FOR FOOD SAFE PRODUCE?				
COMES FROM GOVERNMENT?				
COMES FROM INTERNATIONAL RETAILERS?				
COMES FROM INTERNATIONAL POLICY MAKERS?				

40.1 INDICATE FARMING INCOME

R1000 – R50 000	
R50 000 – R100 000	
R100 000 – R500 000	
R500 000>	

40.2 IS YOUR FARMING SUSTAINABLE?

YES	
UNCERTAIN	
NO	

41. DO YOU PROFIT FROM FARMING

YES	
NO	

42. CAN NON-COMPLIANCE TO THE BELOW FOOD SAFETY ELEMENTS EFFECT SUSTAINABLE FARMING, NEGATIVELY?

	Definitely agree	Agree	Uncertain	Do not agree	Definitely do not agree
PRODUCTION LOSSES - FRUIT FLY					
ECONOMIC LOSSES DUE TO FRUIT FLY INTERCEPTIONS BY AUTHORITIES					
ECONOMIC LOSSES DUE TO FRUIT FLY INTERCEPTIONS BY MARKETS					
ECONOMIC LOSSES DUE MARKET ACCESS DENIED – FRUIT FLY					
PRODUCTION LOSSES - CBS					
ECONOMIC LOSSES DUE TO CBS INTERCEPTIONS BY AUTHORITIES					
ECONOMIC LOSSES DUE TO CBS INTERCEPTIONS BY MARKETS					
ECONOMIC LOSSES DUE MARKET ACCESS DENIED - CBS					
ECONOMIC LOSSES DUE ISPM15 INTERCEPTIONS BY AUTHORITIES					
MRL EXCEEDANCES OF FOOD PRODUCTS					

43. FOOD SAFETY COMPLIANCE CRITERIA USED AS TRADE BARRIERS?

	Definitely agree	Agree	Uncertain	Do not agree	Definitely do not agree
FOOD STANDARDS AND REQUIREMENTS, POLICIES & REGULATION					
CERTIFICATION					
COST OF CERTIFICATION					
PHYTOSANITARY REQUIREMENTS					
ISPM15 REQUIREMENTS					
FRUITFLY					
CBS					

44. CAN AGRICULTURE EFFECT SUSTAINABLE DEVELOPEMNT GOALS?

	Definitely agree	Agree	Uncertain	Do not agree	Definitely do not agree
CAN SUSTAINABLE AGRICULTURE REDUCE POVERTY?					
CAN SUSTAINABLE AGRICULTURE REDUCE HUNGER?					
CAN SUPPORT TO EMERGING FARMERS HELP INCREASE ECONOMIC GROWTH IN AGRICULTURE?					
CAN CORRECT PRODUCTION PRACTICES LEAD TO HIGHER PRICES – CREATING BETTER LIVES?					
CAN DIVERSIFICATION OF COMMODITIES LEAD TO HIGHER INCOME?					

45. WHO SHOULD BE ACCOUNTABLE FOR THE BELOW FOOD SAFETY CRITERIA?

	EMERGING FARMERS		
	Yes	Uncertain	No
APPLICATION OF HACCP DURING PRODUCTION?			
IMPLEMENTATION OF HACCP SYSTEM			
REGISTRATION OF PUC/FBO			
MRL ANALYSIS OF PRODUCE			
COMPLIANCE WITH FOOD SAFETY			
FOOD SAFETY WORKSHOPS WITH EMERGING FARMERS			
VALID FOOD SAFETY CERTIFICATES			
COMMUNICATION OF FOOD SAFETY INFORMATION			

46. WHOM SHOULD BE ACCOUNTABLE FOR THE BELOW FOOD SAFETY CRITERIA?

	GOVERNMENT		
	Yes	Uncertain	No
APPLICATION OF HACCP DURING PRODUCTION?			
IMPLEMENTATION OF HACCP SYSTEM			
REGISTRATION OF PUC/FBO			
MRL ANALYSIS OF PRODUCE			
COMPLIANCE WITH FOOD SAFETY			
FOOD SAFETY WORKSHOPS WITH EMERGING FARMERS			
VALID FOOD SAFETY CERTIFICATES			
COMMUNICATION OF FOOD SAFETY INFORMATION			

47. THE RESPONSIBILITY OF RETAILERS ACCORDING TO FARMER RESPONDENTS

	LOCAL RETAILERS		
	Yes	Uncertain	No
APPLICATION OF HACCP DURING PRODUCTION?			
IMPLEMENTATION OF HACCP SYSTEM			
REGISTRATION OF PUC/FBO			
MRL ANALYSIS OF PRODUCE			
COMPLIANCE WITH FOOD SAFETY			
FOOD SAFETY WORKSHOPS WITH EMERGING FARMERS			
VALID FOOD SAFETY CERTIFICATES			
COMMUNICATION OF FOOD SAFETY INFORMATION			

48. WHOM SHOULD BE ACCOUNTABLE FOR THE BELOW FOOD SAFETY CRITERIA?

	RETAILERS (EXPORT MARKETS)		
	Yes	Uncertain	No
APPLICATION OF HACCP DURING PRODUCTION?			
IMPLEMENTATION OF HACCP SYSTEM			
REGISTRATION OF PUC/FBO			
MRL ANALYSIS OF PRODUCE			
COMPLIANCE WITH FOOD SAFETY			
FOOD SAFETY WORKSHOPS WITH EMERGING FARMERS			
VALID FOOD SAFETY CERTIFICATES			
COMMUNICATION OF FOOD SAFETY INFORMATION			

49. WHOM SHOULD BE ACCOUNTABLE FOR THE BELOW FOOD SAFETY CRITERIA?

	NON-GOVERNMENTAL ORGANIZATIONS		
	Yes	**Uncertain**	**No**
APPLICATION OF HACCP DURING PRODUCTION?			
IMPLEMENTATION OF HACCP SYSTEM			
REGISTRATION OF PUC/FBO			
MRL ANALYSIS OF PRODUCE			
COMPLIANCE WITH FOOD SAFETY			
FOOD SAFETY WORKSHOPS WITH EMERGING FARMERS			
VALID FOOD SAFETY CERTIFICATES			
COMMUNICATION OF FOOD SAFETY INFORMATION			

50. SOLUTIONS TO OVERCOME FOOD SAFETY PROBLEMS. 1 "IMPORTANT" TO 9 "LESS IMPORTANT"

		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	REGISTRATION WITH DAFF TO OBTAIN PUC/FBO CODE									
2	AGRICULTURE POLICIES MUST ADDRESS FOOD SAFETY									
3	ASSISTANCE PROVIDED WITH IMPLEMENTATION & MAINTENANCE OF FOOD SAFETY SYSTEM									
4	GOVERNMENT PAYING FOOD SAFETY IMPLEMENTATION & CERTIFICATION COST (HACCP & GAP, GLOBALGAP, SAGAP)									
5	USE OF REGISTERED PESTICIDES, ONLY									
6	ACCESS TO RETAILER FOOD SAFETY STANDARDS									
7	MRL ANALYSIS TESTING OF FRESH PRODUCE									
8	IMPROVED COMMUNICATION TO EMERGING FARMERS									
9	MORE TRAINING & WORKSHOPS ON FOOD SAFETY									
	ADDITIONAL SOLUTIONS, NAME:									