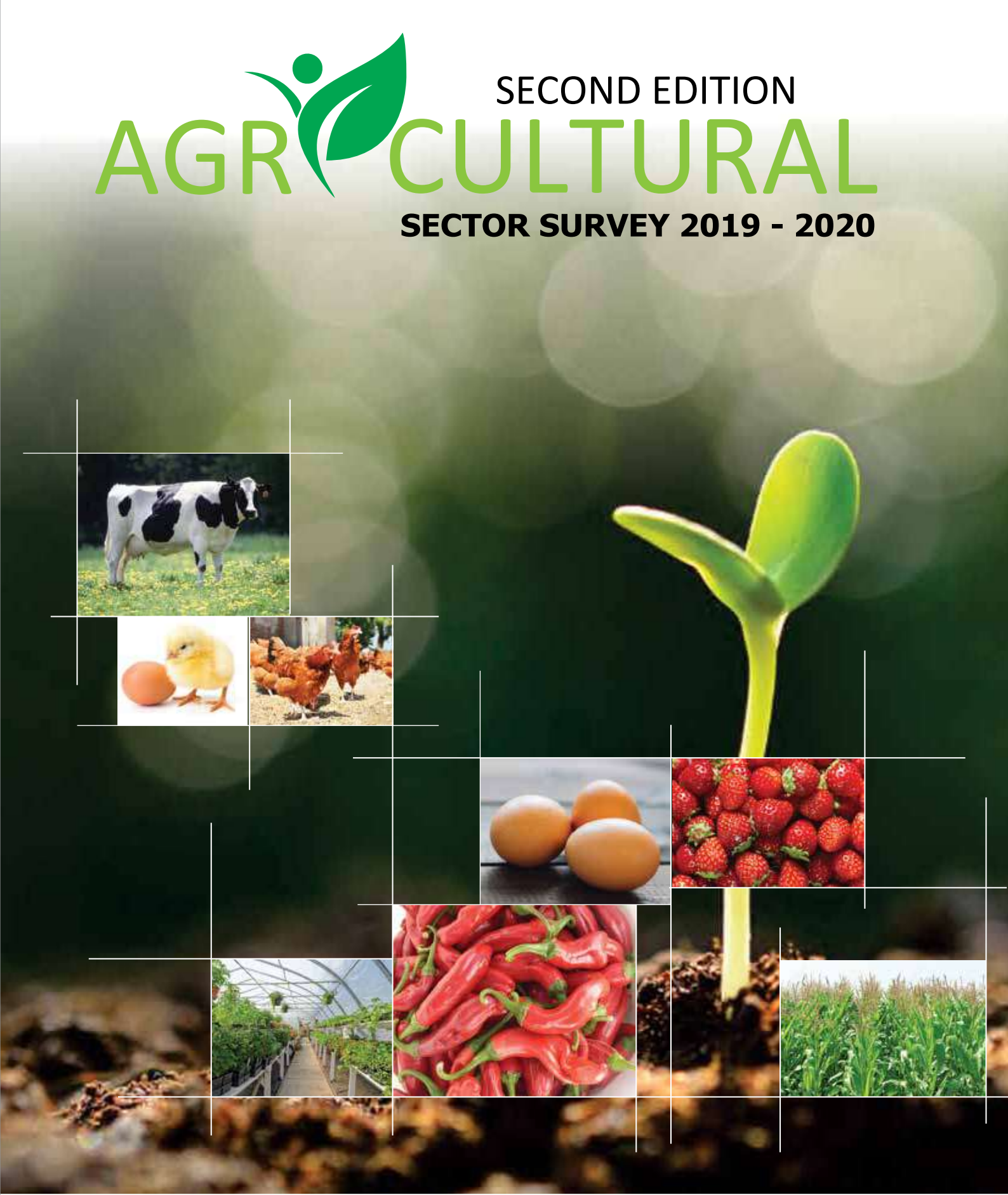
SECOND EDITION

AGRICULTURAL

SECTOR SURVEY 2019 - 2020



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Foreword

Dr. Anxious Jongwe Masuka (Former ZAS CEO, now Agriculture Minister)

This is the second annual Agricultural Sector Survey following the inaugural and successful launch last year. The objective of the survey is two-fold: (1) to complement current public and private sector efforts towards reviving agriculture, and (2) to initiate, inculcate, reinforce and sustain a culture of fact-based farming, fact-based policy making, fact-based investments — a routine evidence — and science-based agricultural development paradigm. The annual survey gathers sector-wide, in-depth, objective, authoritative and independent data on agriculture, agribusiness, machinery, equipment, irrigation, climate change, investment, markets and comparative data from regional economies, to inform our stage of growth, highlight our challenges, and illuminate opportunities in agriculture. The outcome of the annual survey will, hopefully, add impetus to agricultural development.

In 2020, the Zimbabwe Agricultural Society launched its annual theme "Synergies for Growth: Cooperate. Collaborate. Complement" to rally support for the cause of agriculture and attendant value chains for increased "Production, Productivity and Profitability". This was against a background of a second successive drought, punctured by the effects and impact of the devastating Cyclone Idai. And then the Covid-19 pandemic hit just at the tail-end of the season. As we all now know, the pandemic has cataclysmic ethic and mythic effects on health, livelihoods, economies and our future. The disruption of supply and demand routes, its impact on farm productivity and, on profitability can only manifest in the months ahead. This survey serves as a fitting background to timely assess, gauge, rank and rate farmers' and value chain actors' initial responses to the drought and the pandemic, and to gather some insights about preparedness for the coming season, as well as suggesting intervention strategies for agricultural growth.

The continued support from all value chain actors in facilitating the survey is greatly appreciated. The sponsors have again shown great agility in this difficult operating environment, for which we are grateful. We hope readers will find the survey useful as a farming and planning tool for the accelerated development of the agricultural sector, which is so pivotal to our aspirations as a nation of attaining an upper middle class economy by 2030.

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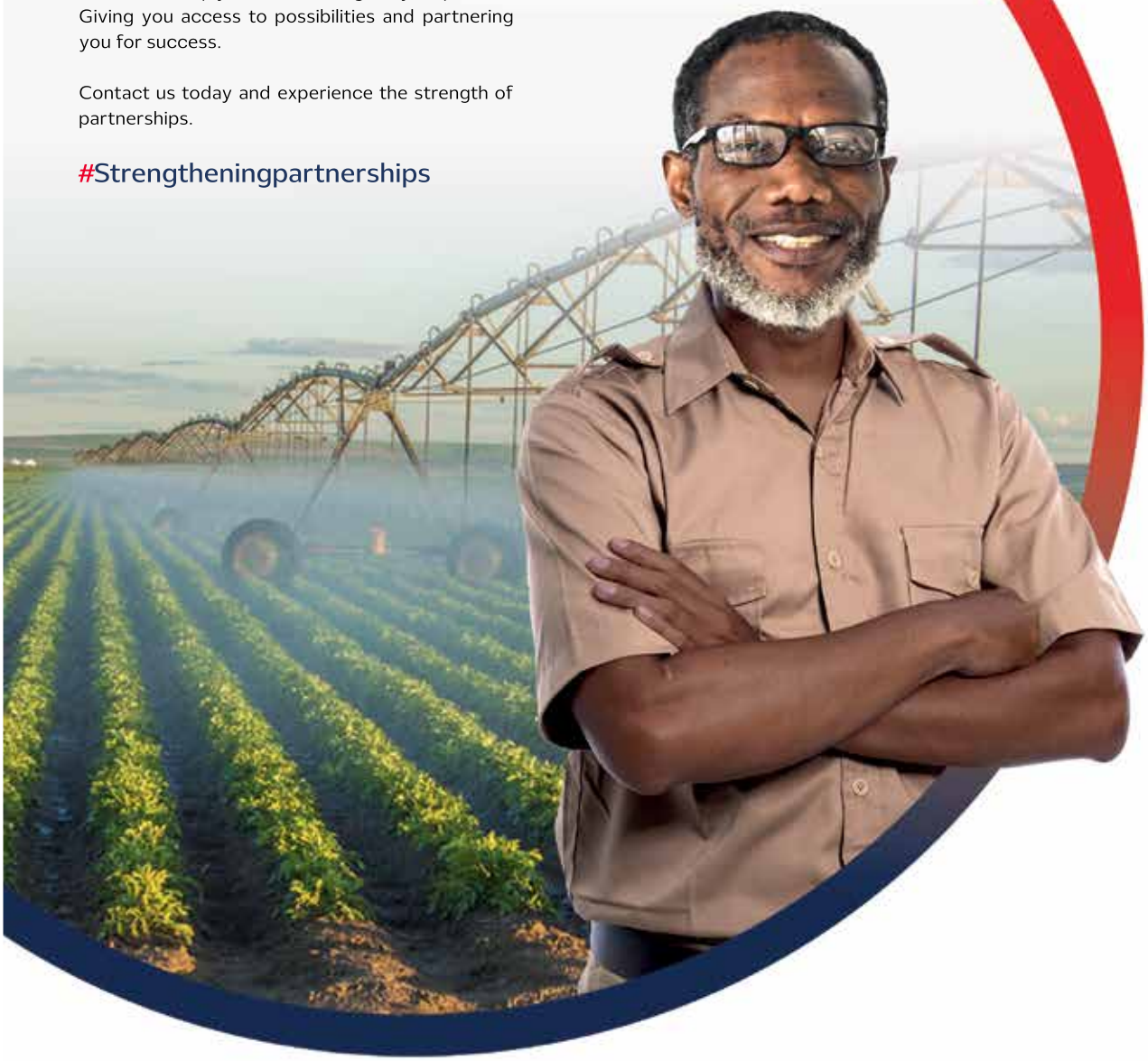

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Sponsor's note

Peter Zimunya (CBZ Bank Managing Director)

The agricultural sector has gone through significant changes over the years, seeing the sectors' production output falling below the country's requirements. It is pleasing to acknowledge its recovery as seen by the significant growth taking place. With this growth, we are seeing massive investment flowing into agriculture as shown most recently by the John Deere Mechanisation Scheme, among other initiatives, to improve productivity.

The sector accounts for around 40% of national exports and supplies 63% of agro-industrial raw materials. Within the financial services sector, CBZ Bank has been a large funder of agricultural activities in Zimbabwe since 2009 and has a market share of more than 45%. The CBZ Group through its new unit CBZ Agro-Yield, which is a successor to Command Agriculture, is geared towards ensuring that the country is food self-sufficient by providing key agricultural inputs to farmers involved in grain and oilseeds.

CBZ Bank is honoured to sponsor the Agricultural Sector Survey in partnership with The Financial Gazette and the Zimbabwe Agricultural Society for the second-year running. The survey is key in bridging the information gap between the various stakeholders mandated to push the country towards food self-sufficiency.

Findings from the survey will continue to help both the public and private sectors in making guided decisions towards reviving the agricultural sector in both the short and long term. Key in this survey, is the potential to establish synergistic relationships that can guide and promote agricultural development.

The CBZ Group as a whole offers a wide variety of services in the promotion of agriculture. These include loan facilities, overdrafts, lease finance, bank guarantees and advisory services.

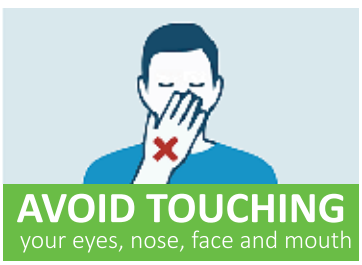
These products and services are available to cover a wide spectrum of projects in the agricultural fraternity from crop production, horticulture, livestock rearing to manufacturing and processing.

We are pleased to have recently partnered Government in the John Deere Mechanisation Scheme, which will go a long way in capacitating our farmers. We are also excited by opportunities that are being worked on to improve our irrigation infrastructure and other key components essential to making our productivity world class.

Our specialist CBZ Agribusiness personnel can be contacted at the CBZ Agribusiness Head Office in Harare and at seven country branches namely Bulawayo, Mutare, Chiredzi, Chinhoyi, Mvurwi, Gweru and Bindura.

Our CBZ Agro-Yield personnel can be contacted at 5th Floor Beverly Court, 100 Nelson Mandela Avenue/4th Street, +263 242 748050-79.

It is our firm belief that the survey results will enlighten you and help make our agricultural sector better.



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Executive summary

Prof. Gift Mugano

Since the turn of the new millennium, Zimbabwe's agricultural output has remained subdued, resulting in a situation where the country consistently spends in excess of US$1 billion on agricultural imports annually. Likewise, because 70% of raw materials used in the manufacturing sector are supplied by the agricultural sector, the industry has been largely fed by imports, thereby exerting pressure on foreign exchange.

In view of this, the Zimbabwe Agricultural Society, The Financial Gazette and CBZ Bank commissioned Africa Economic Development Strategies to undertake a comprehensive survey of the agricultural sector in Zimbabwe. The report, inter alia, is expected to unpack the following:

(a) Trends in crop production;
(b) Trends in livestock production;
(c) Review the state of infrastructure in the agricultural sector;
(d) Estimate agricultural production indices;
(e) Assess financing options for increased agriculture production;
(f) Unpack the impact of climate change on agricultural production;
(g) Review the impact of "ease of doing business" on the agricultural sector in Zimbabwe;
(h) Proffer key recommendations

In order to address the objectives above, various methodological approaches ranging from interviews in eight farming provinces and their respective districts, key informant interviews, focus group discussions and desk research were undertaken. Stakeholders consulted inter alia included farmers, banks, the Grain Marketing Board, Ministry of Agriculture, companies in various agricultural value chains, Agritex officers and business associations.

The significance of this report is centred on the fact that it acts as a dashboard on the status of Zimbabwe agricultural sector as it provides the state of affairs of the agricultural sector and showcases opportunities for investors.

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1. Presentation of Findings

Key findings, in line with the various thematic areas, are as follows:

(a) Trends in Crop Production

One striking observation from the 2019 maize yield is that, on average, maize yield per hectare declined by about 54%. On a farming sector basis, in 2019, A1 communal areas and small -scale farmers constituted 69% of total maize output. They recorded an average yield of 0.27 metric tonnes/ha, down from an average yield of 0.478 metric tonnes/ha in 2019. Because of the significant contribution of these small-scale farmers, from a hectarage perspective, the fall in yield per hectare weighed down heavily national output.

In a similar trend observed in previous years, a review of provincial contribution to national output shows that in 2019, Midlands province had the highest area under maize production, contributing 21% of the total area under the crop followed by Mashonaland West province, which had 18% while third and fourth positions were taken by Manicaland and Mashonaland East and Mashonaland Central provinces with 14%, 13% and 13%, respectively. Owing to semi-arid conditions, Matabeleland South province, at 5%, had the least contribution to area under maize while Matabeleland North was second last with 6%.

What is striking is that Mashonaland Central, Mashonaland East and Mashonaland West, on a yearly basis, produce around 70% of total maize production notwithstanding the fact that less consideration is put in as far increasing land under maize. Midlands, which consistently ranks highest in land under maize has only contributed between 10-12% of total maize output in the last five years.

Key insights emerging from this observation is that, over and above the effects of climate change and economic hardships, policy in a way significantly contributes to poor output in the agricultural sector. For example, if Government places more emphasis in growing maize in Mashonaland Central, Mashonaland East and Mashonaland West provinces and focuses more on traditional grains and livestock in the Midlands, Manicaland and Masvingo provinces, there will be a significant increase in production for livestock and grains.

With respect to production of cash crops such as tea, macadamia, sugar cane and tobacco, the study noted that there has been progressive growth in production of these crops because they are largely funded by the private sector through contract farming, notwithstanding the fact that farmers lack collateral security.

Ironically, the study shows that production of crops such as wheat and soya beans remains low because of price controls set by Government.

Lessons derived here are that deregulation of the markets allows efficient price discoveries and guarantees positive returns, which results in crowding in of the private sector as noted in the production of tobacco, bananas, tea and sugar cane, notwithstanding the fact that the same farmers have no collateral.

It can, therefore, be argued that the most effective form of collateral in the farming sector is a guaranteed free market system and creation of an enabling business environment by the Government.

(b) Trends in Livestock Production

The livestock sub-sector is an important and integral part of the agricultural sector with beef, dairy, small ruminants, pigs, poultry, apiculture, aquaculture and other small and emerging stock such as rabbits making up the livestock industry. The sub-sector contributes about 19 % to the agricultural GDP (Ministry of Agriculture, 2020).

In the last five years, the study noted that on one hand, livestock herd sizes nationally declined by about 20 % for beef, over 83 % for dairy, and 26% and 25 % for pigs and small ruminants, respectively. While the other livestock species have challenges in recovering, the dairy sector is noted to have defied the declining trends due to the presence of an integrated value chain. On the other hand, the productivity of smallholder cattle herds remains very low, with average calving rates of about 45% against a potential of 60%, and off-take rates of about 6% against a recommended 20% annually.

Masvingo, Midlands and Manicaland provinces are the major producers of cattle with 22.1%, 16% and 12.4% of the total herd in 2019, respectively. With respect to sheep production, Matabeleland North, Masvingo and Mashonaland Central are the major producers with 31.3%, 28.8% and 14.5% of the total herd, respectively. On goats, Manicaland, Masvingo and Matabeleland South are the major producers with 31.5%, 19.5% and 12.1% share of total herd in 2019, respectively.

Interestingly, the survey shows that small scale farmers and communal farmers with a combined share of 90% of the total national cattle herd have an average slaughter rate of 5% of total herd per year. The low slaughter rate is attributed to communal farmers, in particular, with 69% of the total herd, who keep cattle as a store of wealth and not for slaughter. Small-scale farmers are not sweating over the value of their cattle, something which could happen if they treated livestock as an enterprise. This observation is similar in other animals like goats, sheep and pigs reared by small-scale farmers.

With this low slaughter level, it means that income is not circulating in the rural areas and poverty levels are anticipated to remain high. This practise, if not reversed, will hinder the country's progress towards attaining Vision 2030 considering the fact that around 70% of the Zimbabwean population resides in the rural areas.

Animals like goats and sheep were observed to be effective in providing coping strategies, particularly in dealing with climate change vulnerabilities in drought-prone areas such as Masvingo, Manicaland and the Matabeleland region.

(c) Assess Role of Financing Options in the Agricultural Sector

International experience, as noted by FAO (2017), shows that there is a positive causal relationship between access to finance in the agricultural sector and agricultural productivity. In Zimbabwe, evidence shows that commercial farmers who have access to funding are getting yields averaging 1.5 metric tonnes per hectare while communal farmers who rarely get funding produce around 0.4 metric tonnes per hectare. However, what was striking is the fact that 73% of the banks interviewed are lending less than 10% of their total loans. Outside traditional loans from the banks, the study noted that the major source of funding which was made available to farmers was through government's Command Agriculture Scheme mainly for maize and soyabeans; contract farming for tobacco, maize and soyabeans; and the Presidential Input Support Scheme for maize, traditional grains and cotton. It was also noted that there was a shift in the command system, with the scheme now being headed by private enterprises such as CBZ Bank.

The study noted that where contract farming was used, the contracting company became the aggregator and on the back of the strength of its balance sheet, has been able to access funds for the farmers who have no collateral. This has resulted in the elimination of challenges related to security of tenure. This observation was largely noted in the tobacco, sorghum sector by the food and beverages sectors and contract broilers production. However, one key feature which enabled the enhancement of these value chain financing models relates to the business environment in these sectors. For example, in the tobacco sector, the crop is sold under an auction system which allows for efficient price discovery, unlike soya bean, maize and wheat whose prices are controlled.

(d) Unpack the Impact of Climate Change on Agricultural Production

In line with the observations of FAO (2016; 2017) on the impact of climate change on agricultural output, the research shows that climate change vulnerability negatively impacted productivity in the agricultural sector. The majority of the people interviewed underscored that the impact of climate change, which has manifested through incessant droughts and reduced precipitation has reduced output of grains by more than 50%.

Climate change has not spared livestock production too as cattle were dying due to food and water shortages caused by droughts. The Veterinary Services' Annual Report (2019) attributed cattle deaths to hunger and/or water shortages. Poverty deaths were noted in Masvingo (17 518) and Matabeleland South (16 863) , which reported the highest number of poverty deaths in cattle while Mashonaland West (47) recorded the least. This trend, if not addressed, will negatively affect the country's progress towards rebuilding the national herd.

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(e) Production Indices

Crop production and livestock indices were estimated with a view to gauge efficiency in the country's agricultural sector.

Crop Production Indices

The crop production indices were calculated based on the average yield figures. As noted by FAO (2016), the index or ratio may be easily calculated based on year-to-year improvements or based on the selected base year for benchmarking or comparison. According to FAO (2016), anything below 100% means there is negative growth for the current period compared to the previous one.

Based on the FAO methodology, the study shows that agriculture output was 48% of the 2017/18 season, reflecting a negative growth of 52% in the 2018/19 season. This was mainly attributed to drought and the harsh economic environment which made it difficult for farmers to scale up agricultural production or go back to the farm. With respect to yields, after using the 2016/17 agricultural season as the base year, crop yields were 41.8% compared to prior year, showing a negative growth of 58.2%, again on the back of drought and a harsh economic environment.

Zimbabwe Livestock Production Ratios

Calving rate figures observed were between 22.9% and 38.7% with an average of 33.37%. The national average is currently between 33% and 45% based on the Veterinary Services' Annual Report, (2019) compared to 31.4% observed in the survey.

According to the study, high cattle mortality rates in Masvingo, Manicaland, Mashonaland Central and West provinces were estimated at 39.2%. The relatively high figures were attributed to the outbreak of January disease (Theileriosis), a tick-borne disease. Some of the deaths were attributed to hunger and water shortages as highlighted in the Veterinary Services' Annual Report, (2019).

(f) GAPs and Opportunities

One of the objectives of the survey was to establish what could present itself as a problem in the sector and turn it into an opportunity for business.

From a crop and livestock production perspective, because the country imports around US$1 billion per year in cereals (US$500 million), soya beans (US$250 million), fruit and vegetables (US$200 million) and a significant value of eggs, meat and milk (International Trade Centre, 2020), this presents itself as a classical opportunity for investors since there is an established demand for these commodities.

Secondary sources have shown that the country has massive deficits in tractors (30,000), combined harvesters (400), rippers (13 800), disc harrows (8 000), planters (17 800), spreaders (4 500), boom sprayers (4 000) and shellers (14 500) which presents opportunities for the private sector to invest in or banks to offer lease finance.

(g) State of Agricultural Infrastructure

One of the objectives of the survey was to review the state of infrastructure relevant for the agriculture Sector in Zimbabwe. In this regard, road network infrastructure relevant and being used by farmers in Zimbabwe, dam infrastructure and irrigation facilities and small-holder irrigation schemes in relation to rural poverty alleviation in the country were reviewed.

Road Infrastructure in Zimbabwe

The road network plays a major role in the movement of the country's agricultural commodities from farms to markets, auctions and national reserves and inputs from the source markets to farms. In terms of road infrastructure, there are 88 100km of classified roads in Zimbabwe, with 17 400km of them paved.

The major component of Zimbabwe roads are tertiary roads comprising about 70% of the total road network. These are feeder and access roads that link rural farm areas to the secondary road network. These are managed by the District Development Fund (DDF) and by the District Councils (DC). The tertiary access roads, together with the unclassified tracks, typically with traffic volumes below 50 vehicles per day, provide for the intra-rural access movements. These are critical as they link rural and farming communities to socio-economic amenities, such as schools, health centres, and markets, and enable government services to reach the peripheral areas. About 95% of farmers interviewed underscored that most feeder roads are in a bad state, requiring rehabilitation and were affecting agricultural production due to their limited accessibility. The current state of the roads has contributed to high transport cost and high post-harvest losses of about 30% as farmers fail to timeously access markets.

Dam Infrastructure in Zimbabwe

There are 10,748 dams, including 260 large ones (World Bank, 2019). Only 850 of them were constructed by the government, and their permits are owned by the Zimbabwe National Water Authority (ZINWA). The remainder are private dams which are small (AfDB, 2019). The term "dam" is often preferred to signify small water bodies/reservoirs.

The survey noted that nearly half of the small water bodies in Zimbabwe are in the size range of 1-5 hectares. Of the 10 748 water bodies, 4 875 (61%) are situated in commercial lands and used for cattle ranching, irrigation or aquaculture. The communal and resettlement areas account for 39% of the dams and cover 40% of the total area. Dams in communal areas are slightly larger in average size. Most dams are along the highveld of the country from the southwest to the northeast.

Irrigation Infrastructure in Zimbabwe

Existing statistics show that informal/traditional irrigation is practised on estimated 20 000 hectares of wetlands/inland valley bottoms (dambos) and small gardens by many rural families. Vegetables are produced during the wet and dry seasons. Usually, irrigation is done with buckets/cans from hand-dug shallow wells.

Based on the frequency of responses from farmers, the majority of farmers use centre pivot, flood irrigation and sprinklers while a small number uses drip irrigation system. On average, the study noted that both flooding irrigation, centre pivot and sprinklers, combined, have an average frequency of about 84%. However, use of flood irrigation (22%) results in massive wastage of water through evaporation — something which must be avoided through the use of drip irrigation if the country is to mitigate the effects of climate change characterised by low water levels. The actual tendency is to promote efficient irrigation systems which use limited water resources, such as drip.

The majority of interviewed small-holder irrigation farmers (90%) agreed the schemes have improved their food security at household level as they are able to produce food throughout the year. However, food security remains under threat at some schemes, due to complex interrelated factors such as theft of technical equipment, poor institutional arrangements, high electricity tariffs and exorbitant charges by bodies such as ZINWA. These factors result in several small-scale irrigation schemes being characterised by low production, minimal contribution to the economy and inability to cover development and operations costs.

Further, the survey reviewed the state of infrastructure such as grain storage facilities, dip tanks and abattoirs.

Zimbabwe has a well developed maize infrastructure with 87 Grain Marketing Board (GMB) depots with commercial storage capacity of 4 782 500 metric tonnes (bulk and bags). These depots provide contract farming services, grain fumigation and grain storage. From a convenience point of view, the study noted that most of the silos are far from most farmers interviewed. In addition, it is also noted in the study that most of these storage facilities (GMB silos) are in a bad state and as such require renovations.

With respect to dip tanks, statistics shows that there are 3 851 dip-tanks which are fairly distributed across the country although the highest number is in Masvingo Province (701).

Physical assessment of the dip tanks shows that even though the country

AGRICULTURAL MARKETING AUTHORITY

The Agricultural Marketing Authority (AMA) is a statutory body established in terms of the Agricultural Marketing Authority Act [Chapter 18:24] and is mandated with overall regulation of the production and marketing of agricultural products in Zimbabwe. The Authority's vision is a sustainable and prosperous agricultural sector driven by effective marketing regulatory services.

AMA endeavours to provide a conducive regulatory environment for sustainable marketing and production of agricultural products. The Authority's key functional roles are as follows:

- Providing a level playing field through regulation of the Agricultural sector.
- Promoting production and marketing of agricultural products and fair trade practices.
- Raising funds for production and marketing of agricultural products through agro bills and levy collection.
- Provision of standards of quality for agricultural products.
- Maintaining a comprehensive information system for the agricultural sector.
- Policy advice, including making recommendations to Government on agricultural producer pricing of strategic crops.

AMA administers a number of statutory instruments (S.I) in an effort to provide a regulatory framework for efficient production, marketing and processing of agricultural products. The regulations provide for standards of quality, maintenance of order in the sector, establishing a level playing field, compliance and enforcement. AMA currently administers the following key instruments in the agricultural sector:

(i) S.I. 142 (2009) and S.I. 63 (2011) for the cotton sector.
(ii) S.I. 147 (2012) for registration of merchants of products and submission of periodic returns to the Authority for compilation of vital statistics relating to the agricultural sector.
(iii) S.I. 140 (2013) for grain and oilseed products.
(iv) S.I. 129 (2017) for collection of the Livestock Development Levy for surveillance, prevention and control of animal diseases in accordance with the Animal Health Act, research on appropriate technologies in livestock production, grading of livestock and livestock products, orderly marketing of livestock and investment in livestock infrastructure.
(v) S.I. 247 (2018) for the Command Agriculture Scheme for Domestic Crop, Livestock and Fisheries Production.
(vi) S.I. 138 (2019) which provides a framework for production and marketing of macadamia nuts and development of the sector.

All institutions and individuals intending to buy, process or trade in agricultural products are required to register and/or renew their licences with the Agricultural Marketing Authority each season. Institutions or individuals in the following subsectors are required to register with the Authority:

- Grains and Oilseeds
- Cotton
- Horticulture and Plantation Products
- Livestock and Livestock Products
- Industry Stakeholder Associations
- Contractors and Input Suppliers.

Farmers should also register in order for them to be put onto the national database of producers and clusters that facilitate access to services.

Registration forms are available on the Agricultural Marketing Authority **website** www.ama.co.zw

Or can be sent by email on request to:
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has a significant number, most of them are dilapidated. If the country is to effectively control ticks and tick-borne diseases, this infrastructure requires urgent attention. It was noted that farmers have lost a significant number of their cattle due to tick related diseases in Mashonaland East, Mashonaland West, Mashonaland Central and other parts of the country. This was mainly due to lack of proper dip-tank infrastructure and poor implementation of mandatory policies including following cattle dipping routines as outlined in the regulations. Farmers also highlighted lack of chemicals at most dip-tanks, which accelerate the crisis.

(h) Ease of Doing Business in Agriculture

Farmers and key stakeholders revealed that lack of competition in the export market due to the high costs of production and compliance costs, high labour/ transport costs, high electricity costs, vandalism and theft of equipment as well as competition from cheap imports are some of the factors affecting the sector. Due to the high costs, farmers sometimes end up harvesting low yields and low quality produce. Retailers demand high quality and failure to meet required quality means produce is returned to the farmer or is bought at very low prices. Quality is rated taking into consideration standard, size, presentation and packaging and failure to meet the minimum expectations sees the farmer making a loss. In an effort to improve quality and yield, agronomy agencies and field agronomists are engaged mainly by retailers and contractors to train farmers on soil, quality, seasonal products and market conditions.

(h) Agriculture Sector Produce Markets in Zimbabwe

Our assessment shows that the bulk of agricultural produce is sold to local markets. There is evidence that contractors are doing a great job to improve agriculture production by providing inputs, knowledge, markets and financing of farming activities. Farmers interviewed cited huge losses during transportation to the markets as a result of poor road networks, price undercuts by middlemen at the markets and at farm premises. For vegetables, farmers interviewed in many cases, failed to get better returns from markets as they will be flooded with the products and they end-up being paid lower prices. It is recommended that farmers should produce based on market demands to minimise losses.

2. Policy Recommendations and Strategic Measures

(a) Addressing Binding Constraints in Crop Production

Central to low production in the crops sub-sector is climate change, lack of funding, price controls and poor farming practices. In dealing with these constraints, the following measures are suggested:

- In dealing with climate change vulnerabilities, one effective way adopted by the United Nations Framework Convention on Climate Change to combat climate change is the adoption of climate-smart agriculture which aims at sustainably increasing food security, incomes and adapting and building resilience to climate change. Climate-smart agriculture connects other innovations, such as conservation agriculture, agroecology, agroforestry and the development of crop varieties that are more tolerant to pests, diseases, drought, waterlogging and salinity (FAO, 2013). FAO (2017) noted that climate-smart agriculture has promoted mixed crop-livestock systems and sustainable livestock production, which integrate environmental and production objectives through, for example, the rotation of pasture and forage crops to enhance soil quality and reduce erosion, and the use of livestock manure to maintain soil fertility. In climate-smart agriculture, agroforestry systems are an important means of sustainably producing food while conserving ecosystems, especially in marginal areas prone to environmental degradation. Zimbabwe can work with development partners who are already active in the country combating climate change. Zimbabwe has recently adopted the Pfumvudza concept to fight the effects of climate change and increase yields.
- Government must liberalise the agricultural sector by operationalising the commodity exchange which must provide a platform for trading of grains as opposed to price setting. Because it comes with warehouse receipting systems and derivatives, a commodity exchange can also assist in unlocking funding into the agricultural sector as witnessed throughout the African continent.
- Training of farmers on best farming practices is key and this requires capacitation of Agritex officers.
- Educating farmers on agribusiness models so they can consider agriculture as a business and not for subsistence.

(b) Addressing Binding Constraints in Livestock Production

Like crop production, central to low production in the livestock sub sector is limited funding, climate change, poor farming practices and disease outbreaks. In dealing with these binding constraints, the following measures are suggested:

- There is need to train farmers to build their capacity to treat cattle and animal rearing as a business. In addition, there is need to create strong value chain linkages between farmers, the Cold Storage Company, other meat processors and abattoirs.
- Given that livestock producing districts are in semi-arid conditions, key informants noted that Government should incorporate drought mitigation measures in the Command Livestock programme, for example, through setting up community livestock centres with access to supplementary feeding.
- The livestock centres which can be operated by the private sector or farmer groups will be designed to provide attendant services to small scale farmers such as cattle buying points, livestock input selling points and farmer training points. Furthermore, the community livestock centres can also be used as artificial insemination and bulling points in a bid to improve rural livestock genetics and quality of beef herds.
- There is need for the Department of Veterinary Services to put in place measures that completely eradicate the continuous outbreak of diseases such as FMD and Avian Influenza Virus. Furthermore, enforcement and review of statutes on animal health ought to be timeously carried out to avoid unnecessary disease outbreaks. Effective management of the FMD problem can be achieved by moving towards a more decentralised marketing and slaughter system. This development would require the construction of abattoirs in strategic locations with a complementary marketing system that minimises transportation of live animals from high risk areas to low risk areas.
- Stakeholders advocated for the implementation of a value chain focused livestock policy whose traits are; enhancement of efficiencies along the livestock value chains, security of livestock resources against natural and man-made disasters, equitable development of livestock value chain stakeholders and protecting consumers against risks arising from livestock development.

(c) Improving Access to Finance in the Agricultural Sector

Government must liberalise the agricultural sector and operationalise the commodity exchange which will come with effective financial instruments such as warehouse receipts and derivatives which were noted to be effective in funding the agricultural sector.

In addition, fiscal incentives aimed at supporting companies who are funding the sector under contract farming should be considered with a view of encouraging the practice.

(d) Attending to Dilapidated Infrastructure

Regarding dip tanks, if the country is to effectively control ticks and tick-borne diseases, such infrastructure requires urgent attention. There is need to urgently rehabilitate infrastructure and follow up with provision of dipping chemicals and implementation of mandatory policies to ensure adherence to cattle dipping routines as outlined in the regulations.

In the same vein, there is need to undertake massive de-siltation across the country with view to build the capacity of dams to irrigate the potential two million hectares. In addition, there is need for massive rehabilitation of GMB silos and constructions of new ones across the country for the farmers' convenience. In this regard, Government should consider opening the space for private sector perhaps through operationalisation of the commodity exchange.

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(h) Ease of Doing Business in Agriculture

In order to raise competitiveness of the agricultural sector, Government must consider a two-pronged approach, that is, macroeconomic and microeconomic.

From a macroeconomic perspective, since the agricultural sector is not insulated from the vagaries of economic swings and volatilities in the domestic economy, there is need for Government to ensure economic instability. This is key as the current economic status quo, characterised by exchange rate spikes and inflation, has a net effect of shrinking farmers' capital and that of key players in the farming value chains.

From a microeconomic perspective, deliberate effort must be made by both Government and business to reduce the cost of inputs, high compliance costs, high labour/transport costs as well as high electricity costs and taxes.

SECTION ONE:
INTRODUCTION TO PROBLEM SETTING

1.1 Introduction

The agriculture sector has traditionally and continues to be a very important sector for the Zimbabwean economy. Agriculture constitutes the most significant part of this economy. In addition, it plays an important role in rural development, employment and in the development and maintenance of external trade links. Agriculture is regarded as the use of land for production of food, fodder, fibre, energy, medicine, etc and for rearing of animals (Helcom, 2001). The sector has undergone rapid transformation in the past two decades due to change in policies, global trends and global warming. This has opened up new ways of doing business in the sector.

Due to the rapid transformation and importance of the sector, African Economic Development Strategies (AEDS) were tasked by the Zimbabwe Agricultural Society (ZAS), The Financial Gazette and CBZ Bank to conduct a survey and to unpack the state of the agriculture sector in Zimbabwe.

This report contains a description of the background, objectives, review of literature, research methodology, presentation of findings and recommendations for possible implementation and improvements. Understanding the status quo is key in designing appropriate governance and policy interventions in the agricultural sector that optimise benefits in backward and forward linkages within the sector's diversified value chains.

1.2 Background on Research Problem

The agriculture sector provides livelihoods to approximately 70% of the population, contributes 15%-20% of GDP and 40% of exports and supplies 63% of agro-industrial raw materials (Ministry of Agriculture, 2020). Women contribute about 70% of the agricultural labour and the bulk of them are subsistence farmers. There are more than 65 crops that the country can benefit from. Therefore, the sector is important because it creates employment, economic growth, reduces poverty, and ensures food and nutrition security.

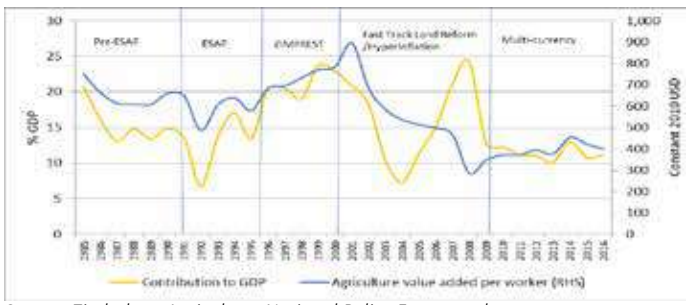
Agro-processing manufacturing derives inputs from the sector and in turn provides services and inputs to the sector through backward and forward linkages. The agricultural sector produces various commodities which contribute to the sector's GDP as follows: maize 14%, tobacco 25%, cotton 12.5%, sugar and horticulture 7%, beef and fish 10%; at least 24% is devoted to the rest of livestock (cattle, sheep, goats, pigs, poultry and ostrich etc.), 0.5% is accounted by subsistence crops (Ministry of Agriculture, 2019). Of these commodities, tobacco, cotton, sugar, horticulture crops, tea, and bananas account for exports.

Despite emerging postulations that mining is overtaking agriculture as the mainstay of the economy, Zimbabwe is predominantly an agro-based economy, with the mining sector depending on the agriculture sector for food supply. The agriculture sector is a source of food, income and livelihoods to over 70 % of the country's population and creates jobs to nearly 30% of the formally employed workforce (Ministry of Agriculture, 2018).

1.2.1 Contribution of Agricultural Sector to GDP and Value Addition

During the pre-ESAP phase, the agriculture sector's contribution to GDP declined from 20.7% in 1985 to 6.8% in 1991. The contribution recovered during the ESAP and ZIMPREST period, peaking to 23.7 % in 1999 before declining in 2000 to 7.2 % in 2004, following the FTLR programme. Another decline in the contribution was registered from 2001 till 2003 when a low of 7% was recorded. The central bank responded by giving financial support to the agricultural sector through the Productive Sector Facility (PSF 2004) and Agriculture Sector Productivity Enhancement Facility (ASPEF 2005), the contribution of agriculture to GDP recovered again and registered a peak of 24.2 % in 2008, before declining again between 2009 and 2013 with a marginal increase of 1.1 % in 2016. The contribution to GDP oscillated between 10% and 15% during the multi-currency period between 2009 and 2016.

Figure 0.1.1: Agriculture Sector Contribution to GDP and Value Added per Worker



Source: Zimbabwe Agriculture National Policy Framework

The country's agriculture sector is diverse, with various types of food and cash crops grown and a livestock sector comprising beef, small stock (goats, sheep and pigs), dairy and poultry among others. According to the Ministry of Agriculture (2018), tobacco, cotton, sugar, beef, horticultural produce, coffee and tea are Zimbabwe's key agricultural exports. There is also a wide range of 'minor' crops such as sweet potatoes, round/bambara nuts and cowpeas, among others, that are grown and livestock species such as rabbits and donkeys that are reared in Zimbabwe.

1.2.2 Contribution to Employment

The agricultural sector employs 66% of the country's total labour force (FAO 2016). Most of those employed in the agriculture sector are women, youths and elderly males. They are predominantly employed on small farms and engage in auxiliary non-agricultural activities to ensure an additional source of income. The overall skills level in the sector is comparatively low, farmers are hardly encouraged to develop professionally, and employee training possibilities offered are very limited.

1.2.3 Zimbabwe Agrarian Reforms

Since the attainment of independence in 1980, Zimbabwe has implemented a series of land and agrarian reforms to address imbalances in land ownership that was skewed in favour of the white minority. The country's agricultural sector has therefore, evolved under a series of economic phases and agrarian reforms. These reforms have had wider redistributive outcomes, including alteration of the agrarian structure and consequences on the backward and forward linkages of value chains of various crops and livestock.

According to Murisa and Mujeyi (2015), Zimbabwe has undergone three distinct phases of agrarian reforms since independence, particularly with reference to the reform of the agricultural policy. The first phase, which was characterised by widespread state involvement, entailed the promotion of a bimodal structure of agriculture and the revitalisation of the smallholder sector between 1980 and 1990. The heightened state support to the smallholder sector culminated in the green revolution of the 1980s (Rukuni et al., 2006).

The second phase of agrarian reforms witnessed the withdrawal of state support from agriculture, resulting in liberalisation and deregulation of the economy during the economic structural adjustment programme (ESAP) from 1991 up to 2000. By the year 2000, following the redistribution of about 3.5 million ha

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from 1980, Zimbabwe's agriculture was characterised by a dualistic structure – a low-input-low-output smallholder sector comprising mainly black indigenous farmers and high-input-high-output, large scale commercial farmers (LSCF) sector comprising mainly white farmers.

The third phase, which is dubbed the Fast-Track Land Reform Programme (FTLRP) was characterised by the abandonment of market-based approaches to land reform in favour of revolutionary approaches and to land distribution, witnessed the reinstatement of state controls and pronounced involvement of the central government in agriculture. During the FTLRP, over 10 million hectares of land were acquired and redistributed to a broad range of beneficiaries including landless peasants, war veterans, middle-class urbanites and farm workers.

Table1.1: Zimbabwe's Land Distribution following the FTLRP

Farm class	Farm category	Farm House hold		Area		
		Numbers	% of total	Hectors (Million)	% Total	Farm size
Small-holder/ Peasantry	Communal	1,100,000	81.2	16.400	49.9	15
	Old resettlements	75,000	5.5	3.667	11.2	49
	A1	145,800	10.8	5.759	17.5	40
	Sub-total	1,321,800	97.5	25.286	78.6	
Medium scale Commercial	Old SSCF	8,500	0.6	1.400	4.3	165
	Small A2	22,700	1.7	3.000	9.1	133.9
	Sub-total	31,200	2.3	4.400	13.4	
Large scale Commercial	Medium-large A2	217	0.03	0.509	1.6	2.345
	Black LSCF	956	0.07	0.531	1.6	555
	White LSCF	198	0.01	0.117	0.4	593
	Sub-total	1,371	0.11	1.157	3.6	
Agro-Estates	Corporates	20	0.001	0.806	2.5	40,320
	Conservancies	8	0.001	0.247	0.8	30,875
	Parastatals	106	0.01	0.296	0.9	2,788
	Institutions	113	0.01	0.146	0.4	1,289
	Sub-total	247	0.022	1.495	4.6	
Total		1,354,00	100	23.878	100.0	

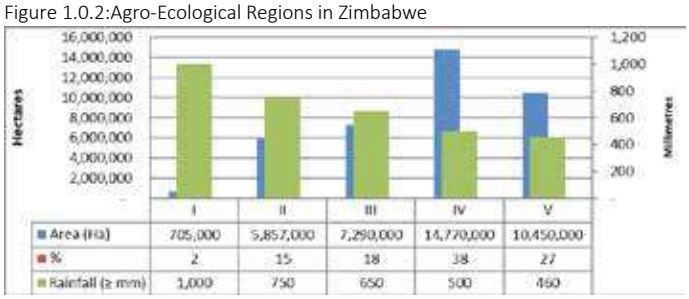
Source: Moyo (2013)

Of the three main phases of agrarian reforms in Zimbabwe, the FTLRP is the most prominent one as it had wide and varied consequences on the performance of the agriculture production and the whole spectrum of value chains. The FTLRP entailed the redistribution of land from the minority white large scale farmers to mostly small and medium scale farms and also the introduction of new state based tenure regimes. Thus, the FTLRP has led to a significant reconfiguration of the agrarian landscape as shown in Table 1.1. Prior to the FTLRP, the large- scale commercial farming sector comprised of about 4,500 farm owners and around 6,000 farms but these had been decimated to around 300 by 2010 (Moyo, 2013). The area covered by white-owned large-scale commercial farms has decreased drastically from over 15 million ha in 1980 to just around 3.4 million ha in 2010 following the FTLRP (Moyo, 2011).

The FTLRP introduced two new land settlement/ownership categories/models; the A1 and the A2 resettlement schemes with average farm sizes of 37ha and 318 ha, respectively (Scoones, et al., 2010). The A1 resettlement model is largely an expansion of old communal areas which has witnessed the area under smallholder farming increase by about 16%. The new agrarian structure emerging from the FTLRP has 73% of the total agricultural land now falling under smallholder production while approximately 8% is now under small to medium scale commercial farming in which the majority of the A2 farms fall under. The balance of 19% comprise of remaining LSCFs, large A2 farms, state farms and large corporate estates. In place of the approximately 6,000 farms, the FTLRP has created close to 180,000 (over 160,000 A1 and about 20,000 A2) farms in the country (Moyo, 2011b; Scoones et al., 2010; Moyo, 2013). It is important to note that there are no studies that show that there are further changes to the land ownership structure in Zimbabwe after the publication done by Moyo (2013).

The emerging agrarian structure has wider implications for trends in the agriculture sector, state of agricultural infrastructure, agriculture market linkages, the link between finance and agriculture production. Given that the country's agricultural sector is predominantly smallholder-led with over a million communal farmers relying on rain-fed agriculture, and close to 70% of them making a livelihood on less than 2 hectares, the debate, however, should not be on whether to promote smallholder farmers or turn the focus on to the new medium/large-scale, but to find policy options that are suited to different farm categories. A 'one-size-fits-all' strategy will likely leave many trapped in poverty due to stubbornly low productivity and resource constraints facing the different farmers.

Figure 1.0.2:Agro-Ecological Regions in Zimbabwe



Source: Ministry of Agriculture (2018)

Zimbabwe is divided into five natural farming regions based on agro-ecological factors that include rainfall regime, temperature, the quantity and variability of average rainfall, as well as soil quality and vegetation. The characteristics and major activities of each region are as follows:

- Region I is characterised by over 1,000 mm annual rainfall and relatively low temperatures. Agricultural activities suitable for the area are dairy farming, forestry, tea, coffee, fruit, beef and maize production. Region I is found in the eastern border of the country in Mutare, Manicaland Province.
- Region II receives rainfall that is between 700 – 1,050 mm and is suitable for intensive farming maize, tobacco, cotton and livestock production.
- Region III receives 500 – 800 mm of rainfall and experiences relatively high temperatures and is subject to seasonal droughts. The region is suitable for production of fodder crops and cash crops under good farm management.
- Region IV receives between 460 – 650 mm of rainfall and is subject to droughts. Region IV is suitable for farm systems based on resistant fodder crops, forestry and wildlife/tourism.
- Region V receives less than 450 mm of rainfall and is suitable for extensive cattle ranching, forestry and wildlife/tourism.

1.2.4 Agriculture Sector Rebound

Notwithstanding the importance of the agricultural sector to economic development, Zimbabwe witnessed a massive decline in agricultural production since the turn of the new millennium. Zimbabwe, which used to be the bread basket of Southern Africa became a net importer of various agricultural produce which inter alia include wheat, maize, soya bean, fruits, vegetables, meats and eggs among others.

The current crop production trends of various crops for 2016/17, 2017/18 and 2018/19 agriculture season, still confirms that the sector is still facing a host of challenges among them being climatic change. Maize production, for example, dropped by 21% from 2,155,526 metric tonnes in 2016/17 season to 1,700,702 metric tonnes in 2017/18 season and went down by another 54.3% in 2019 to 776,635 metric tonnes. The same trend was also witnessed in other crops such as sorghum, pearl millet, finger millet, groundnut, round nut, sweet potato and cowpeas. The country experienced an early-season dry spell from second week of December 2019 to end of January 2020 which reduced area planted to crops and this also negatively affected productivity of most crops (Ministry of Agriculture, 2020).

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In 2020, because of climate change vulnerabilities and a harsh economic environment which eroded farmers' capital, the country witnessed reversal of gains which had been propped up by Command Agriculture. Losses in agricultural output were defined across all crops including cash crops.

While there has been notable success in the growing of tobacco and maize — coming on the back of contract farming and command agriculture, respectively, agricultural productivity in the rest of the crops and livestock is still elusive. Incessant droughts together with a poorly performing economy caused sluggish growth rates in as far as production of crops and livestock is concerned. For example, in 2019, maize output plummeted by more than 50% and this negatively impacted on farmers' ability to go back to the farms. Huge livestock losses due to hunger and water shortages were experienced in Masvingo and Matabeleland provinces.

Because of low production in the agricultural sector, Zimbabwe imports around US$1 billion worth of agricultural produce which inter alia include cereals (+US$500 million), soya beans (US$250 million), fruits and vegetables (US$200 million) and other commodities such as fertile eggs, meat and milk. Imports of the commodities, which can be produced locally, coupled with the fact that 70% of raw materials used in industry comes from the agricultural sector, weighs down on the country's ability to stimulate economic growth as well as stabilising the national currency.

It is against this background that Zimbabwe Agricultural Society, The Financial Gazette and CBZ Bank commissioned African Economic Development Strategies (AEDS) to carry out this survey whose thrust is to unpack the state of agriculture sector in Zimbabwe.

1.3 Objectives of the Study

The overall goal of the survey is to unpack the state of Zimbabwe's agricultural sector. The specific objectives of the assignment are to:

- Establish production trends of various crops and livestock;
- Establish the state of agricultural infrastructure (irrigation, grain storage, etc);
- Establish the role of agriculture sector produce markets in Zimbabwe;
- Establish the link between finance and agriculture production;
- Establish the impact on the ease-of-doing business on agriculture in Zimbabwe;
- Establish the impact of climate change on agriculture productivity;
- Establish economic opportunities which the Zimbabwe agricultural sector presents;
- Estimate agricultural production index; and
- Develop clear, practical responses and proposals (solutions) to problems identified that affect Zimbabwe's agricultural sector in the following way:

(a) Specific recommendations targeting Government of Zimbabwe and its agencies; and

(b) Specific recommendations to the stakeholders in the agricultural sector on how they can sustainably support agricultural development.

1.4 Terms of Reference

AEDS as the consultants to this survey were tasked to provide leadership and technical support to facilitate the development process for the survey to the state of the agricultural sector report. The consultants' responsibilities included taking overall responsibility for drafting the final report. The Terms of References for undertaking the work at hand were as follows:

- Conducting literature review on the country's agriculture sector performance and identify critical factors impacting on production and marketing in agriculture
- Carry out Key Informant Interviews (KIIs) with key stakeholders in the public and private sectors;
- Prepare a synthesised paper or executive summary (max of two pages) focusing on key observations/findings;
- Prepare and present the draft to Zimbabwe Agriculture Society (ZAS), The Financial Gazette (FINGAZ) and CBZ;
- Submit the final report; and
- Develop policy briefs focusing on each thematic area.

1.5 Scope of Study

This agriculture sector study covered all eight agriculture/rural provinces namely, Mashonaland Central, Mashonaland West, Mashonaland East, Masvingo, Manicaland, Midlands, Matabeleland North and Matabeleland South. Data was gathered from provinces and districts throughout the country.

1.6 Justification of the Study

This study was carried out to produce findings that will serve as a mechanism to identify, prioritise agriculture improvement areas and provides a benchmark upon which future improvements in the sector will be measured. In addition, the study was undertaken with a view of identifying opportunities for further investment in the agricultural sector. It is also aimed at informing policy makers in terms of decision making.

1.7 Methodology

The study on state of agriculture sector in Zimbabwe was developed through extensive document reviews of previous case studies and international experiences on agriculture. In addition, an integrated triangulation approach that allows for the collection and analysis of both qualitative and quantitative data was also used. Approaches that were used are primary data collection through interviews using interview guides and questionnaires; and secondary data sources, through desk review of previous studies on agriculture sectors from other developing countries, relevant national policies such as Zimbabwe Agriculture Investment Policy, Zimbabwe National Agricultural Policy Framework, Comprehensive Africa Agricultural Development Policy and National Budget Statements. Key informant interviews, case studies and focus group discussions were employed to collect data. The key informant interviews to gather primary data were held as follows; parastatals (10), agricultural extension officers and veterinary officers (104), business membership organisations (8), industry (25), development partners (3), and banks (10). In addition to key informant interviews, 135 farmers and 3 focus group discussions were held.

Survey questionnaires were used to complement key informant interviews and focus group discussions. The interview guides and questionnaires sought to collect data on production trends of various crops and livestock, agricultural infrastructure and its effect to agricultural production, the role of agriculture sector produce markets, the role between finance and agriculture production and the effect of climate change on agriculture productivity. Raw gathered by the survey cleaned by checking and eliminating data entry and other errors. Survey data was analysed with SPSS general version IBM 22 in respect to descriptive and inferential statistics.

SECTION TWO:
REVIEW OF RELATED LITERATURE ON AGRICULTURE

2.1 Introduction

This section presents the theoretical underpinning of the agricultural sector, global trends on agricultural production and challenges faced by farmers. This review is undertaken with a view of building a solid theoretical underpinning for the research as this will be tied to the research objectives.

2.2 Profile of the agricultural sector

Agriculture is defined as the use of land for production of food, fodder, fibre, energy, medicine, etc and for grazing (landscape preservation) (Helcom, 2001). Of the four sub sectors of agriculture (growing of crops, farming of animals, mixed farming, agricultural service activities), the first three sub sectors share many characteristics, including in the structure of, and trends in, employment, and face similar opportunities and threats. The fourth sub sector is primarily involved in service activities that are dependent on agriculture with landscape gardening involving direct links with the final customer. However, globally, this sub sector is relatively small accounting for less than 10% of sectoral employment. In the same vein, market gardening activity is also relatively small accounting for less than 5% of activity. These two activities, market gardening and landscaping gardening represent niche opportunities for a small number of entrepreneurs

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but their impact is very small relative to the developments that are occurring in mainstream agricultural activities. Given the dependence of market gardening on agriculture and other external factors, trends in the sub sector are similar to the other three sectors.

In Zimbabwe, agriculture occupies a central place in the economy for employment, incomes and poverty reduction. It contributes 15-18 % of Gross Domestic Product (GDP), 23 % to the total formal employment, and provides livelihoods to approximately 70 % of the rural population (54 % of which are women). It also supplies about 63 % of industrial raw materials with the share of agriculture in manufacturing value added at 60 %, and the share in export earnings at 30 %. Ministry of Agriculture (2018) noted that 15 out of the 31 industry clusters in Zimbabwe depend on agriculture for feedstock. Agriculture-related employment supports a third of the formal labour force.

Maize, tobacco and cotton account for more than 50% of the agricultural GDP, with tobacco leading the pack with 25%, followed by maize at 14%, and cotton at 25%. Al least 10% is accounted for by the beef and fisheries sectors, while about 24% is devoted to the rest of the livestock like sheep, goats, pigs, poultry and ostrich. Within the milieu of commodities; tobacco, cotton, sugar, horticulture, tea, and bananas collectively account for about 40% by value of national exports. The performance of the agricultural sector, therefore, has a direct bearing on overall national economic performance, and on human development especially with regard to national and household food and nutrition security.

Ironically, the contribution of the agricultural sector to national GDP has been falling in recent years. For example, the contribution of the agricultural sector fell from the peak of 12.5% in 2015 to 9.4% in 2018 (see table 2.1).

Table 2.1: Contribution of Various Agro Sub-Sectors to GDP

Crop	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Tobacco	3.2	4.9	4.3	4.3	4.8	4.8	3.2	2.6	3.6	3.2
Maize	1.8	1.4	1.2	0.8	0.6	0.9	1.8	1.4	1.2	0.8
Beef	1.3	0.9	0.8	0.7	0.7	0.7	1.3	1.1	0.9	1.0
Cotton	1.6	1.5	1.1	1.4	0.6	0.5	1.6	1.3	1.1	0.9
Sugar	0.9	0.7	0.7	0.7	0.6	0.7	0.9	0.7	0.6	0.8
Horticulture	0.8	0.7	0.6	0.7	0.7	0.7	0.8	0.7	0.6	0.9
Poultry	0.6	0.5	0.6	0.7	0.8	0.8	0.6	0.5	0.3	0.5
Groundnuts	0.4	0.3	0.3	0.1	0.1	0.1	0.4	0.3	0.2	0.1
Wheat	0.5	0.3	0.3	0.2	0.1	0.1	0.5	0.4	0.2	0.1
Dairy	0.4	0.3	0.2	0.2	0.2	0.3	0.4	0.3	0.3	0.2
Coffee	0.3	0.2	0.2	0.1	0.1	0.1	0.3	0.2	0.1	0.2
Soybeans	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2
Tea	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Paprika	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Pork	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.1
Wildlife	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Sorghum	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1
Barley	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Sheep & goats	0.0	0.0	0.2	0.3	0.3	0.3	0.0	0.0	0.0	0.0
Sunflower seeds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ostriches	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Agric Contribution to GDP	**12.7**	**12.3**	**11.1**	**10.8**	**10.2**	**10.7**	**12.5**	**10.35**	**8.52**	**9.4**

Source: Ministry of Agriculture (2020)

2.3 Global Trends in Investments into Agriculture

Overall, agriculture remains much less capital intensive in low and middle-income countries (FAO, 2017). FAO (2017) noted that to date low and middle-income countries invest in agriculture almost as much, in absolute terms, as high-income countries, that is, around US$190 billion in both country groups. In the period 1991–2014, agricultural investment levels increased in all country groupings, although at different rates. In high-income countries, investment increased from around US$120 billion to US$190 billion, an annual average growth rate of around 2%. In China, investments into agriculture grew from less than US$10 billion to US$75 billion, a growth rate of around 9%, while investment in agriculture in the remaining low- and middle-income countries grew from US$45 billion to US$115 billion, a growth rate of around 4%.

The preponderance of low- and middle-income countries in global investments in agriculture does not imply the sector is seen as more important, relative to its size. A comparison between the shares of agricultural investment in total investment and the shares of agricultural value added in GDP reveals important structural differences across groups of countries, as well as different dynamics.

First, only in high-income countries is the agricultural investment share larger than agricultural value added share. In the last two decades, high-income countries have always devoted a larger share of investment to agriculture than the share of the sector in GDP. This is reflected in the fact that the 'agricultural investment orientation ratio' has remained consistently above 1. In low- and middle-income countries, in contrast, this ratio is much lower, at around 0.4 (FAO, 2017).

Second, diverging patterns across regions have developed in the past two decades. While the investment orientation ratio is increasing in high-income countries, East Asia and the Pacific (including China), South Asia, Europe and Central Asia, it is decreasing in the Middle East, North Africa, sub-Saharan Africa and, to some extent, Latin America and the Caribbean.

Degrees of capital intensity in agriculture sectors also vary. FAO (2017) noted that agriculture in high income countries is significantly more capital-intensive than in low and middle income countries – it requires 4 units of capital to generate one unit of value added, compared to around 1.5 in low- and middle-income countries. However, in East Asia and the Pacific (including China), South Asia, Europe and Central Asia, the capital-intensity of agricultural production is increasing. While this cannot be interpreted as a signal of convergence towards the type of agriculture found in high-income countries, it may indicate that capital is progressively replacing other inputs and factors, particularly labour.

In fact, the share of labour employed in agriculture in these regions is decreasing. In contrast, in the Middle East and North Africa, sub-Saharan Africa, and Latin America and the Caribbean, capital-intensity has fallen. This study seeks therefore, to review the state of play of investments into Zimbabwe's agricultural sector.

2.4 Trends in Food Prices

After peaking in 2008 and again in 2011, FAO's real food price index has fallen back to levels reached in the early 1980s, although it remains well above the low levels of the 1990s and early 2000s. The most recent joint report by FAO and the Organisation for Economic Co-operation and Development (OECD) provides a somewhat mixed picture of medium-term developments in real food commodity prices to 2025. FAO and OECD noted that while the prices of meat and cereals, with the exception of coarse grains, are projected to decline in real terms, prices for dairy products will tend to rise over the next 10 years.

FAO and OECD notes that future levels of food prices depend, among other factors, on how production will be able to accommodate tightening resource constraints and climate change. Climate change may jeopardise the possibility of expanding agricultural yields in some regions of the globe, which is required to meet growing demand; the result would be upward pressure on prices (FAO, 2016c). In addition, mitigation policies may require the internalisation of carbon-emission costs. Furthermore, prices in the long run may also rise, as long as there will be a need to reduce emissions of greenhouse gases (GHGs) emissions in order to comply with international agreements on climate change. However, adopting these mitigation measures would impose additional costs (at least in the short run), which would put upward pressure on output prices (Smith et al., 2014).

Further, as a result of the Covid-19 pandemic, global markets have witnessed massive disruption in global supply chains and production, food prices is anticipated to rise sharply in the very near future.

This situation is likely to worsen the Zimbabwean balance of payment position considering the fact that Zimbabwe is a net food importer. This calls for the country to institute measures aimed at raising national productivity and overall national output.

2.5 The Impact of Climate Change Vulnerability

One of the objectives of this survey is to establish the impact of climate change vulnerability. This section provides a theoretical underpinning and grounded theory on the impact of climate change on agricultural production and

productivity.

According to the most recent assessment report of the Inter- governmental Panel on Climate Change (IPCC), published in 2014, levels of anthropogenic emissions of GHGs are now at their highest in history (Porter et al., 2014). Agricultural production and its effect on land use are major sources of these emissions. Charting environmentally sustainable pathways for agricultural development has a central role to play, therefore, in mitigating climate change.

The FAO (2017) observed that the impacts of climate change are expected to be most adverse in low and middle-income countries, where millions of people depend on agriculture and are vulnerable to food insecurity. In 2015, world leaders, at the United Nations Framework Convention on Climate Change (UNFCCC) held in Paris, explicitly acknowledged the need to address this threat. The world leaders negotiated, under the aegis of the UNFCCC, the Paris Agreement on climate change, which recognises 'the fundamental priority of safeguarding food security and ending hunger, and the particular vulnerabilities of food production systems to the adverse effects of climate change' (UNFCCC, 2015).

In its latest assessment, the IPCC has stated with high confidence that in low-latitude countries crop production will be 'consistently and negatively affected by climate change'. In northern latitudes, the impacts on production are more uncertain; there may be positive or negative consequences (Porter et al., 2014). Increasing variability of precipitation and increases in the frequency of droughts and floods are likely to reduce yields in general (FAO, 2016e). Although higher temperatures can improve crop growth, studies have documented that crop yields decline significantly when daytime temperatures exceed a certain crop-specific level (FAO, 2016e).

From a Zimbabwean perspective, among identified climate change vulnerability factors such as variability in precipitation, frequency of droughts, floods and high temperatures, this study seeks to establish the major channels or factors through which climate change affects agricultural production.

The IPCC assessment report has stated with medium confidence that climate change will increase the inter annual variability of crop yields in many regions. The use of climate models in conjunction with crop models is contributing valuable insights into the possible impacts of climate change on yields. For the main cereals, projected yields, due to climate change under the different representative concentration pathways show significant regional increases and decreases but mostly downward shifts globally (FAO, 2016e).

A meta-analysis of 1090 studies on yields (primarily wheat, maize, rice and soybeans) under different climate change conditions indicates that climate change may significantly reduce yields in the long run. Further analysis by FAO found quite distinct patterns for low and middle-income countries in tropical areas, and high-income countries in temperate zones. For the former, most estimates for crop yield impacts are negative, with the share of negative estimates increasing the further into the future the study projects. Compared with those outcomes, estimates for high-income countries showed a much larger share of potentially positive changes (FAO, 2016e).

Higher temperatures and unreliable rainfall patterns are expected to create severe hardships for small-scale farmers, particularly in arid and semi-arid grassland and rangeland ecosystems at low latitudes (Hoffman and Vogel, 2008). In the same vein, heat and water scarcity will have a direct impact on animal health and will also reduce the quality and supply of feed and fodder (FAO, 2009).

There is some evidence that global warming has already affected the distribution of some marine species, with warm-water species shifting towards the poles (FAO, 2013a). One modelling exercise has projected that the catch potential in tropical countries could decline by 40%, while in high-latitude waters the potential could increase by between 30 and 70% (Cheung et al., 2009). Changes in temperature and rainfall will also cause the distribution of inland species to shift.

The IPCC has projected that global warming between 1 and 2°C will have a moderate impact on the planet's biodiversity (Porter et al., 2014). For agricultural ecosystems, there is evidence that some crops species and varieties currently grown in a particular area may not be able to adapt quickly enough to the changes. Because different species will react differently, the complex interactions among species will be disrupted, potentially affecting ecosystem services such as pollination and the control of crop pests by natural predators. Plant and animal pests and diseases may spread into areas where they were unknown before, but important knowledge gaps remain in this area (Porter et al., 2014). For example, in Zimbabwe, the army worm has been noted as one of the menace of climate change. FAO (2017) noted that climate change will also contribute to existing long-term environmental problems, such as groundwater depletion and soil degradation, which will affect food and agriculture production systems.

2.6 Agricultural Productivity and Innovation

To meet demand in 2050, when the world population is expected to reach 9.73 billion, as noted by the United Nations (UN), the global agriculture sector needs to produce almost 50% more food, feed and biofuel than it did in 2012 (FAO, 2017). In sub-Saharan Africa and South Asia, agricultural output would need to more than double by 2050, to meet increased demand, while for the rest of the world, the projected increase would be about one-third above current levels (FAO, 2017).

From a global perspective, meeting the increased demand is not expected to be a major challenge, if past achievements are a guide (FAO, 2017). Historically, much bigger increases in agricultural production have been recorded in comparable time frames. For example, between 1961 and 2011, global agricultural output more than tripled (FAO, 2017). In low-income countries, livestock production has been one of the fastest growing agricultural sub sectors. Since the early 1970s, per capita consumption of milk, dairy products and vegetable oils has almost doubled, while meat consumption has almost tripled (Alexandratos and Bruinsma, 2012).

FAO (2017) notes that rapid technological development and innovation offers the prospect of meeting future food needs sustainably. However, this can only be achieved through discerning public policies, increased investments and public-private partnerships, which exploit the opportunities for maintaining current levels of productivity, sustainably raising yields, and reducing poverty and food insecurity.

The question as to whether Zimbabwe will be able to adopt the same strategies and policy measures with a view of coping with global demands of food will be an empirical one which will be addressed in this survey.

2.7 Trends in Yields and Agricultural Efficiency

One of the objectives of this study is to review the performance of the agricultural sector from a productivity perspective, that is, yields per hectare. In order to build a theoretical underpinning of agricultural productivity, this section reviews global experience on agricultural productivity.

At a global level, since the 1990s, average annual increases in the yields of maize, rice, and wheat have been slightly more than 1%, much lower than in the 1960s, while those of soybeans and sugarcane have been below 1% (FAO, 2017). Because the substantial additional amounts of food needed in coming decades will be produced mainly through yield increases, rather than major expansion of the cultivated area, cereal yield growth rates below 1% a year would be a worrying signal. There are also very large differences in crop yields between high-income and low-income countries (see table 2.2). Yields of wheat and rice in low-income countries are currently about half of those in high-income countries.

Table 2.2: Annual Average Crop Yields [2001-2012] Tonnes/Hectare

Country Group	Wheat	Rice	Maize
Low income	1.82	3.3	1.54
Lower middle income	2.74	3.65	2.74
Upper middle income	2.67	5.28	4.41
High income	3.5	6.64	8.99
World	2.92	4.16	4.87

Source: FAO (2017)

Yields of major crops (cereals, roots and tubers, pulses, sugar crops, oil crops and vegetables) also vary substantially across regions. Estimated yield gaps,

expressed as a percentage of potential yields, exceed 50% in most low-income countries. They are largest in sub-Saharan Africa (76%) and lowest in East Asia (11%). The gap between farm yields and potential yields reflects constraints, such as insufficient adoption of more productive technologies, a lack of market integration and gender inequalities in small-scale family farming (FAO, 2011b).

FAO noted that in recent decades increased use of land, irrigation and agro-chemicals played a major role in the growth of agricultural production during the Green Revolution. Sadly, gains in agricultural production were often accompanied by negative effects on agriculture's natural resource base, including land degradation, salinisation of irrigated areas, over-extraction of groundwater, the build-up of pest resistance and the erosion of biodiversity. Agriculture has also damaged the wider environment through deforestation, the emission of greenhouse gases and nitrate pollution of water bodies (FAO, 2011a).

This current study aims to review Zimbabwe's productivity trends. In this way, production trends across all crops and livestock are presented with a view to showcase how Zimbabwe has performed in recent years. In addition, production indices and production efficiency indices are used to assess production efficiency in Zimbabwe.

2.9 Global Trends in Agricultural Financing

One of the objectives of this study is to review the impact of finance on the state of the agricultural sector in Zimbabwe. In providing theoretical underpinnings to this objective, this section reviews global trends on agricultural financing with a view of juxtaposing the observations with the Zimbabwean experience.

Overall, FAO (2017), noted that the public sector is not a major investor, but its role can be catalytic. Public investments in agriculture, related infrastructure, and research and development only represent a fraction of total investment in the sector in low-income countries. Most investments in agriculture tend to be made by private sector agents, especially by the farmers themselves. This is particularly so because more than 90% of the estimated 570 million farms worldwide are family farms (FAO, 2014).

In low-income countries, the vast majority of these farms are less than 5 hectares in size, which is a similar situation to Zimbabwe where the majority were resettled under A1 as well in communal areas. Many smallholders tend to face major barriers accessing the finance needed for investment in improving productivity and adopting sustainable farming practices. FAO (2016) also noted that most of the smallholders farmers have limited financial literacy, collateral and credit history, and few other sources of income.

FAO (2017) noted that governments can support and play a catalytic role in stimulating pro-poor investments, by securing producers' property and tenure rights, and developing rural infrastructure and public services. Public investment in public goods and services – such as institution building, agricultural extension, productivity-enhancing research, rural transport, health, education and social protection – will be fundamental to creating an environment favourable to pro-poor investment. A positive recent trend is the emergence of partnerships between the public sector, private sector and communities, which promote agriculture and rural development, poverty reduction, food security and improved nutrition.

Globally, agricultural investments generally are considered high-risk given the susceptibility of production to weather and other climatic hazards. This applies particularly to low-income countries, where infrastructure, processing capacity, and cold storage and transportation may be poorly developed. This limits farmers' options to reduce the impacts of seasonality and uncertain weather conditions on incomes and local price stability. Improving infrastructure, building resilience, and strengthening risk-coping mechanisms (e.g. through social protection and agricultural insurance) will be essential to help farmers and agricultural investors hedge against the risks inherent in agricultural production (FAO, 2017).

In order to reduce the risk involved in funding agriculture, FAO (2017), noted that provision of incentives to private banking institutions (including cooperatives) aimed at increasing their rural coverage has been effective in promoting access to finance to smallholder farmers. In the same vein, FAO noted that creation of employment opportunities in infrastructure development and the public procurement of agricultural products generated by smallholders can also help to stabilise incomes and provide opportunities for low-income rural people to acquire productive assets and inputs, such as land, equipment, fertiliaers and seeds. This has been observed as one way in which government plays catalytic role in encouraging funding for the agricultural sector.

However, more in general, private investments in agriculture will be influenced through broader agricultural and food price policies. FAO (2017) noted that governments around the world provide incentives to farmers and agribusinesses in order to increase agricultural production, influence input costs, supplement farm incomes and achieve other social, economic and environmental objectives, such as landscape preservation, water conservation, poverty reduction, and climate change mitigation and adaptation. Much of the existing production support, worldwide, involves subsidies on inputs, such as fertiliser and energy, particularly fossil fuels, or direct payments to farmers. The OECD countries spent US$211 billion in agricultural production support in 2015, while in the non-OECD countries for which data are available, this support reached US$352 billion in the same year (OECD, IEA, NEA and ITF, 2015).

From the perspective of sustainable development, such support measures may have unintended impacts on the environment. For example, input subsidies may induce inefficient use of synthetic fertilisers and pesticides and increase the emission intensity of production. Almost half of all agricultural subsidies provided by governments of OECD countries in 2010-2012 were classed as 'potentially most harmful to the environment' because they induced greater demand for chemical fertilisers and fossil fuels, which lead to more GHG emissions (OECD, IEA, NEA and ITF, 2015). Such policies influence the magnitude and the nature of investments in agricultural sectors and food systems. Making support conditional upon the adoption of practices that lower emissions and conserve natural resources would be one way of aligning agricultural development and climate goals. Policies in areas such as nutrition, food consumption, food price support, natural resources management, infrastructure development and energy, may similarly need to be reset (FAO, 2016).

This study seeks to evaluate the role of finance in Zimbabwe's agricultural sector as well as reviewing impediments faced by both financiers and farmers with a view of coming up with policy measures.

Subsequent chapters present findings of the study based on the objectives of the study.

SECTION THREE:
PRODUCTION TRENDS IN CROPS

3.1 Introduction

This section provides production trends in crops focusing on area cultivated, annual production and productivity levels. The study established trends for cereals which form the staple food for the country, cash crops, oil seeds, pulses, plantation crops and horticultural crops. The study provides a comparative analysis of production and yields by province and district highlighting the main producing province and district in order to guide policy interventions. The contribution to national production and productivity levels by land ownership structure was also analysed for major crops to advise government on food security issues in the country.

3.2 Trends in Cereals

In order to unpack the state of affairs in the production of cereals, this section discusses production trends of maize, sorghum, millet and wheat.

(a) Production Trends of Maize

Figure 3.1 (a) shows production trends of maize from 2007 to 2019. Maize is Zimbabwe's main staple crop grown in all areas of the country at both small scale and large scale. The crop is so central to people's lives and as such because of competitiveness challenges, the Government provides farmers with price support policy incentives, that is subsidisation, leading to a situation where the

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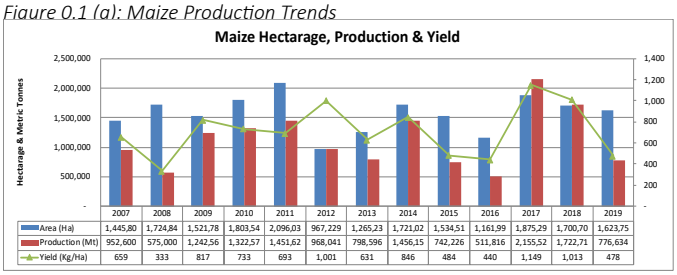
local price of maize is higher than the average regional parity price of US$200 per metric tonne.

Figure 0.1 (a): Maize Production Trends



Source: Ministry of Agriculture (2020)

For the last decade production of maize was below the national optimal level. In a number of cases there was inconsistency in production. For example, in 2007 the country produced 952 600 metric tonnes and later fell sharply to 575 000 metric tonnes in 2008. For the subsequent years, that is, 2009, 2010 and 2011, maize output rose to 1.242 million metric tonnes, 1.322 million metric tonnes and 1.451 million metric tonnes, respectively. However, in 2012 and 2013 maize output fell down to 968 000 metric tonnes and 798 500 metric tonnes, respectively again resembling inconsistency in production. In 2014 maize output went up to 1.4 million metric tonnes and later fell to 742,200 metric tonnes and 511,800 metric tonnes in 2015 and 2016, respectively. In responding to this anomaly, Government introduced Command Agriculture in 2017 and hectarage increased by 61% while production recovered by 321% to reach a record output of 2,155,526 metric tonnes. In 2018 season, due to effects of climate change, hectarage decreased by 9% while production reduced by 20%. In 2019, as a result of combined effects of the devastating effects of drought and a harsh economic environment, maize output fell to 776,634 metric tonnes, that is a 54.3% decline from the previous year's output.

One of the striking features which was linked to low production, was reduced hectarage and low yield each year maize output plummeted. For example, in 2008 and 2016, which were marked by the lowest maize output, realised 0.333 metric tonnes and 0.4 metric tonnes per hectare, respectively. In years where the country realised good harvest for example, in 2017 and 2018, the yield per hectare averaged at 1 metric tonnes. In both years, the country witnessed an increase in hectarage under maize production.

In 2019, on the contrary, on the back of climate change, vulnerability and a harsh economic climate, it is noted that area under production declined and the yield per hectare fell too, from an average of 1 metric tonne per hectare to an average of 0.478 metric tonnes per hectare.

In a similar trend observed in previous years, a review of provincial contribution to national output shows that in 2019, Midlands province had the highest area under maize contributing 21% of the area under the crop followed by Mashonaland West province which had 18% while on third and fourth positions were Manicaland and Mashonaland East and Mashonaland Central provinces with 14%, 13% and 13%, respectively (see Table 3.1). Owing to semi-arid conditions, Matabeleland South province, at 5%, had the least contribution to the area under maize while Matabeleland North was second last with 6%.

Table 3.1: Maize Production by Province in 2019

Province	Area (HA)	Area	Yield	Production	Share
Mash West		18	0.77	228,073	29
Mash Central		13	0.76	159,184	20
Mash East		13	0.74	153,831	20
Manicaland		14	0.22	51,070	7
Midlands		21	0.28	93,703	12
Masvingo		10	0.39	60,962	8
Mat North		6	0.13	13,031	2
Mat South		5	0.19	16,781	2
National		100	0.48	776,635	100

Source: Ministry of Agriculture (2020)

In the Midlands, most of the hectarage was observed to be in Gokwe North and Gokwe South with a combined area of 172,372 hectares or 52% of the provincial area under maize which is also 11% of maize area at national level. The prevalence of smallholder resettled farmers in Gokwe North and Gokwe South accounts for the significant area under maize.

The study noted that Mashonaland West which was third in area (ha), although yield had declined by more than half from previous year, has the highest maize production with high average yield of 0.76 metric tonnes per hectare which is almost 3 times higher than the 0.28 metric tonnes per hectare for the Midlands. The differences in yield in these two provinces could be attributed to the rainfall pattern, effects of climate change and agronomic practices. In Mashonaland West, the yield is high because there is a significant number of A1, A2 and small scale commercial farmers who grow maize for commercial purposes and not for subsistence.

The research showed that smallholder farmers both, resettled and communal farmers, did not invest much in crop production and their yields are low compared to commercial farmers. The respondents showed that some of the smallholder farmers in natural regions IV and V have a perception that fertiliser caused crop wilting in light of lower rains and others have the perceptions that it destroys soil fertility. As a result, this has reduced the country's maize average maize yield which averaged 0.478 tonnes per hectare. This is below average comparator countries such as South Africa which has an average yield of 5 tonnes per hectare.

Over the years, a review of sectoral contribution to maize production shows that communal areas (CA) contributes a significant share of maize output in Zimbabwe. For example, in 2017/18 and 2018/2019 farming season the contribution of CA to national maize output is 32% and 32%, respectively. The commercial farmers, that is, A2, like the CA, made a significant contribution of maize output with a share of 31% of total maize output for two consecutive seasons, that is in 2017/18 and 2018/19 (see table 3.2).

Table 3.2: Sectoral Contribution to Maize Production (Metric Tonnes)

Sector	Production (Mt)		%	Contribution (%)	
	2018/2019	2017/2018		2018/2019	2017/2018
CA	251 576	540 939	-53	32	32
OR	69 022	136 973	-50	9	8
SSCA	23 640	46 852	-50	3	3
A1	187 504	434 949	-57	24	26
A2	239 108	527 556	-55	31	31
Peri-urban	5 785	13 433	-57	1	1
Total	**776 635**	**1 700 702**	**-54**	**100**	**100**

Source: Ministry of Agriculture (2020)

Overall, the contribution of small-scale farmers (that is, CA, OR, SSCA, A1 and Peri-urban) to national maize output is 69%.

What is striking from the results, across all farming sectors, is that maize output plummeted by an average above 50%. In 2019, annual maize output fell by 54% from 2018 to 776,635 metric tonnes (see table 3.2). Various stakeholders interviewed underscored that the fall in maize output was contributed by many factors ranging from droughts, poor economic performance, which increased the cost of going back to farming business, thereby rendering farmers highly incapacitated to lack of policy clarity on the pricing regime. With respect to the uncertainties around the pricing regime, stakeholders raised serious concerns over possible losses which arise on the back of distorting effects of subsidies

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and the continued pricing in local currency in the face of massive vulnerabilities around the Zimbabwean dollar. As a result, there was evidence of reduced uptake of contract farming.

Table 3.3: Average Maize Yields by Land Tenure (Metric Tonnes/HA)

Sector	2018/2019	2017/2018	%
CA	0.27	0.54	-50
OR	0.41	0.84	-51
SSCFA	0.43	0.88	-51
A1	0.57	1.30	-56
A2	1.77	3.82	-54
Peri-Urban	0.70	1.54	-55

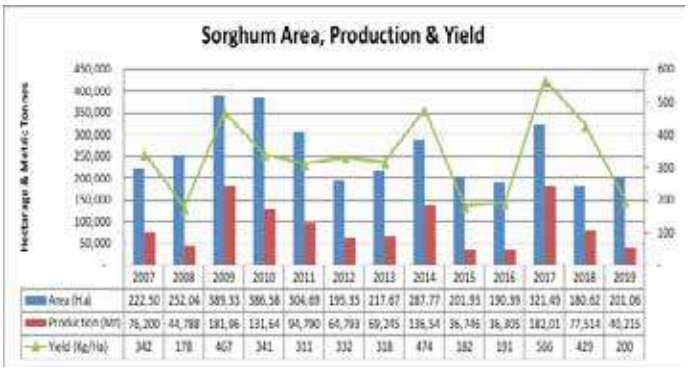
Source: Ministry of Agriculture (2020)

One striking observation from the 2019 maize yield is that, one average, maize yield per hectare declined by about 50% (see table 3.3). On a farming sector basis, in 2019, A1, SSCFA, communal areas and old resettlement areas which constitute 69% of total maize output recorded an average yield of 0.48 metric tonnes down from an average yield of 0.78 metric tonnes in 2018. Because of the significant contribution of these small - scale farmers, from a hectarage perspective, the fall in yield per hectare weighed down heavily national output.

(b) Production Trends of Sorghum

Figure 3.2 illustrate trends in sorghum production. Sorghum is one of the minor staple crops that is also cultivated for beer brewing purposes under contracting farming.

Figure 3.2: Sorghum Trends



Source: Ministry of Agriculture (2020)

The crop's trends sharply declined in 2015, hectarage reduced 30% while production and yields reduced by 73% and 49% respectively. In 2016, the trend stagnated before increasing in 2017 when 69%, 401% and 197% growth in area, production and yield was recorded respectively. The increase in sound contract farming schemes and favourable weather could be attributed to the increase in production and yield levels. Output fell by 57% in 2018 to 77,514 metric tonnes. Likewise, in the same year, yield per hectare declined from 0.566 metric tonnes per hectare in 2017 to 0.429 metric tonnes per hectare in 2018. This trend continued in 2019. The country registered a drastic fall in sorghum production from 77,514 metric tonnes to 40,215 metric tonnes in 2019 on the back of climate change vulnerability and high cost of going back to the farm. Stakeholders who were interviewed underscored that the reduction in production levels in 2017, 2018 and 2019 was caused by dry spells which were experienced from December to January in 2019 as well as economic hardships.

The study noted that at provincial level, over the years, Mashonaland Central, Midlands, Manicaland, the Midlands and Mashonaland Central provinces were the top four provinces that had the highest area under sorghum in 2018 contributing 25%, 22%, 13% and 13%, respectively to national area under sorghum (see table 3.4). The same ranking in the area cultivated are maintained in production whereby Masvingo tops the list with 19% followed by the Midlands province with 17% while Mashonaland West ranks last with 2%. This has remained the same pattern in 2019.

Table 3.4: Provincial Contribution to Sorghum Production in 2019

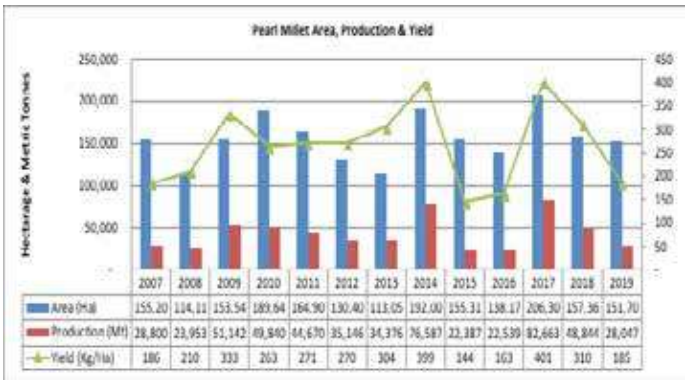
Province	Area (HA)	Area (%)	Yield (MT/HA)	Production (MT)	Share (%)
Mash West	4,361	2	0.36	1,579	4
Mash Central	31,002	15	0.33	10,242	25
Mash East	20,339	10	0.27	5,410	13
Manicaland	25,970	13	0.13	3,388	8
Midlands	33,879	17	0.27	8,993	22
Masvingo	38,068	19	0.14	5,231	13
Mat North	24,234	12	0.11	2,655	7
Mat South	23,212	12	0.12	2,717	7
National	201,065	100	0.20	40,215	100

Source: Ministry of Agriculture (2020)

(c) Trends in Pearl Millet Production

Overall, the production of pearl millet over the last ten years was below the optimal level. Like other cereal crops pearl millet trends oscillate with notable peaks and troughs in hectarage, production and yield.

Figure 3.3: Pearl Millet Trends



Source: Ministry of Agriculture (2020)

The country recorded total output of pearl millet in 2007 of 28,800 metric tonnes and went down to 23,953 metric tonnes in 2008. However, in 2009, 2010 and 2011, pearl millet output was 51,142 metric tonnes, 49,840 metric tonnes and 44,670 metric tonnes, respectively. Of concern are sudden falls in output in 2015 where the country recorded output of 22,387 metric tonnes down from 76,587 metric tonnes in 2014. Ironically, the country went on to record 22,539 metric tonnes in 2016, which was a marginal increase from 2015 and went on to jump by almost four times to 82,663 metric tonnes in 2017. In 2018, production of pearl millet took a steep decline to 48,844 metric tonnes. In 2019, pearl millet output crashed down to 28,047 metric tonnes (see figure 3.3).

What is striking for the years 2018 and 2019, is that the area under production remained almost the same but witnessed drastic fall in the yield per hectare from 0.31 metric tonnes per hectare to 0.185 metric tonnes per hectare. Farmers interviewed revealed that the sharp decline in pearl millet yield was caused by rainfall variability and reduced precipitation.

A review of the contribution of pearl millet production by area shows that this is traditionally dominated by Manicaland, Masvingo and Matabeleland North with a 30%, 24.4% and 20.4% share of national output respectively. Ironically, Matabeleland North province has a larger area under pearl millet production but trail behind in terms of output. Farmers interviewed stressed that climate change vulnerability, characterised by dry spells, contributed to low output per hectare in Matabeleland North province.

The main producing districts in Manicaland are Buhera and Mutare while in Matabeleland North province are Gwanda, Bulilima and Beitbridge. In Masvingo province the main pearl millet producing districts are Mwenezi, Gutu and Chiredzi.

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Table 3.4: Provincial Contribution to Pearl Millet Production in 2019

Province	Area (HA)	Area (%)	Yield (MT/HA)	Production (MT)	Share (%)
Mash West	346.2	0.2	0.08	26.95	0.1
Mash Central	2,118.8	1.4	0.37	780.11	2.8
Mash East	3,908.9	2.6	0.24	953.33	3.4
Manicaland	37,765.7	24.9	0.22	8,427.70	30.0
Midlands	9,141.1	6.0	0.27	2,445.13	8.7
Masvingo	26,734.7	17.6	0.26	6,846.58	24.4
Mat North	46,081.2	30.4	0.12	5,730.47	20.4
Mat South	25,611.5	16.9	0.11	2,836.44	10.1
National	151,708.0	100.0	0.18	28,046.71	100

Source: Ministry of Agriculture (2020)

In 2019, pearl millet yields in Zimbabwe were observed to be 0.18 metric tonnes per hectare which is a significant fall from the 0.5 metric tonnes in 2018.

(d) Production Trends in Finger Millet

Like other cereals, the performance of finger millet is not pleasing. In 2007 and 2008 the country recorded 15,000 metric tonnes and 11,350 metric tonnes of finger millet, respectively (see figure 4.4). In 2009 finger millet production rose to 37,100 metric tonnes before plummeting to 12,400 in 2010. Thereafter, the country witnessed paltry production output of 8,792 metric tonnes, 7,748 metric tonnes, 11,000 metric tonnes and 4,470 metric tonnes in 2011, 2012, 2013, 2014, and 2015, respectively. In 2016 and 2017, finger millet production went up to 17,610 metric tonnes and 24,100 metric tonnes, respectively before it receded to 9,085 metric tonnes in 2018. In 2019, finger millet production took a further decline to 6,947 metric tonnes per hectare notwithstanding the fact that the area under production largely remained the same as in 2018 (see figure 3.4).

Figure 3.4: Finger Millet Trends

Source: Ministry of Agriculture (2020)

With respect to the area under production, the country witnessed a decline in the area under finger millet production, which was correlated to the national output (see figure 3.4). This is a worrying trend considering the increasing importance and relevance of traditional grains in mitigating the effects of climate change.

The study noted that provinces that were leading in finger millet production in 2019 were Masvingo with 45% of total output, closely followed by Manicaland with 21% while Mashonaland East was third with 15.1% and the Midlands province was fourth contributing 10.5%. Mashonaland West which topped in maize production had a paltry 4.8%, Mashonaland Central contributed 2.2% whilst there was no output from Matabeleland North and Matabeleland South (see table 3.5).

Table 3.5: Provincial Contribution of Finger Millet Production

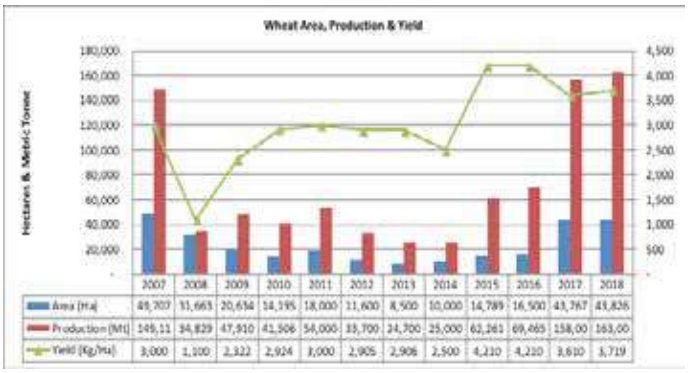
Province	Area (HA)	Area (%)	Yield (MT/HA)	Production (MT)	Share (%)
Mash West	1,537	6	0.22	330	4.8
Mash Central	456	2	0.33	150	2.2
Mash East	3,685	15	0.28	1,047	15.1
Manicaland	7,117	28	0.21	1,520	21.9
Midlands	3,147	13	0.23	732	10.5
Masvingo	9,140	36	0.35	3,161	45.5
Mat North	2	0	0.01	0	0.0
Mat South	63	0	0.10	7	0.1
National	25,146	100	0.28	6,947	100

Source: Ministry of Agriculture (2020)

(e) Wheat Production Trends

Wheat is a strategic cereal crop that forms the major raw material used in the baking industry in the country. Over the years, wheat production in terms of output has been largely disappointing. For example, the country recorded a total of 149,110 metric tonnes in 2007 but plummeted to 34,829 metric tonnes in 2009 and went on to produce an average output of 41,800 metric tonnes for eight years. However, in 2017, the country recorded a massive jump in wheat production which saw it harvesting 158,000 metric tonnes. On a refreshing note, wheat output increased by 5000 metric tonnes in 2018 to 163,000 metric tonnes.

Figure 3.5: Wheat Trends



Source: Ministry of Agriculture (2019)

The hectarage under wheat production for the period 2013 to 2016 recorded a steady increase with 2015 recording the highest growth of 48% in area, 149% in production and 68% in yield. Interviewed farmers argued that the special import substitution wheat loan scheme, which is aimed at funding production through provision of inputs, contributed to the increase in wheat production and yield per hectare as noted in recent years.

3.3 Trends in Cash Crops

This sub-section discusses production trends of cotton seed, tobacco and oil seeds.

(a) Seed Cotton Production Trend

Cotton is one of the major cash crops grown by more than 300,000 small scale communal and resettled farmers under the contract farming scheme with cotton merchants and The Presidential Input Scheme. The crop has been affected by side marketing of the contracted crop, inadequate input support and poor agronomic

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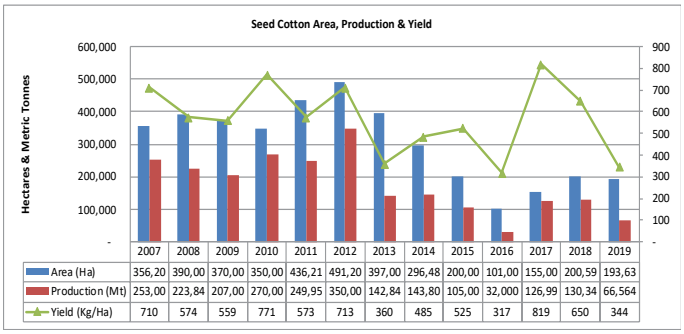
practices. Depressed international market prices of lint directly affected local prices of seed cotton since more than 70% of local production is exported.

Prior to the 2012 season seed cotton area and production averaged 356,000 hectares and 259,000 metric tonnes respectively while the yield ranged from a minimum of 559 kg per ha and a maximum of 771 kg per ha. From 2013 to 2016 season, seed cotton area and production has been on a downward trend. In 2013, there was a sharp decrease in area cultivated by 19% from 491,207 ha to 397,000 ha and production fell by 59% from 350,000 metric tonnes to 142,848 metric tonnes. In 2016, seed cotton production decreased to a record low of 32,000 metric tonnes and Government intervened by injecting working capital.

Trends in seed cotton recovered in 2017 season when hectarage increased by 53% from 101,000 hectares in 2016 to 155,000 hectares while production increased by 297% from 32,000 metric tonnes to 126,995 metric tonnes. In 2018, cotton seed production increased to 130,340 metric tonnes. In 2019, the total cotton seed production declined by an average rate of about 50% (see figure 3.6).

Figure 3.6: Seed Cotton Trends



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Area (Ha)	356,20	390,00	370,00	350,00	436,21	491,20	397,00	296,48	200,00	101,00	155,00	200,59	193,63
Production (Mt)	253,00	223,84	207,00	270,00	249,95	350,00	142,84	143,80	105,00	32,000	126,99	130,34	66,564
Yield (Kg/Ha)	710	574	559	771	573	713	360	485	525	317	819	650	344

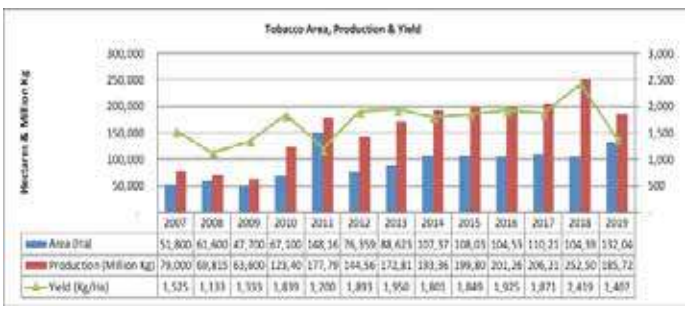
Source: Ministry of Agriculture (2020)

The 2017 season saw an increased yield by 159% from 0.317 metric tonnes per hectare in 2016 to 0.819 metric tonnes per hectare. In 2018 and 2019, yield per hectare fell to 0.65 metric tonnes and 0.344 metric tonnes per hectare, respectively. Farmers interviewed argued that suboptimal prices together with the economic hardships are the major impediments to cotton seed production in Zimbabwe. If all things are equal, the survey revealed that the current seed cotton varieties have potential to produce more than two (2) metric tonnes per hectare under rain fed production hence the need to address the punitive pricing regime in the country.

(b) Tobacco Production Trends

Zimbabwe is ranked as the biggest producer of flue-cured tobacco in Africa and the fifth largest in the world after China, Brazil, India and the United States of America (USA). Following the recent shift in the agrarian structure and demographics since early 2000, 62% of tobacco production comes from small and medium scale farmers.

Figure 3.7: Tobacco Production Trends



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Area (Ha)	51,800	61,600	47,300	67,100	168,16	76,359	88,625	107,97	108,05	104,55	110,21	104,39	132,66
Production (Million Kg)	79,000	69,815	63,600	123,40	177,79	144,56	172,81	193,36	199,80	201,26	206,21	252,50	185,72
Yield (Kg/Ha)	1,525	1,133	1,355	1,839	1,200	1,893	1,950	1,801	1,848	1,925	1,871	2,419	1,487

Source: TIMB (2020)

Tobacco production in recent years witnessed sustained growth. For example, between 2015 and 2018, output grew from 199,800 (in 2015) metric tonnes to 252,500 metric tonnes in 2018. However, in 2019, as a result of the deteriorating economic environment which has resulted in incapacitation of contracting companies and loss of competitiveness of farmers, from a pricing perspective, both tobacco output and yield per hectare declined to 185,720 metric tonnes and 1.4 tonnes per hectare, respectively (see figure 3.7).

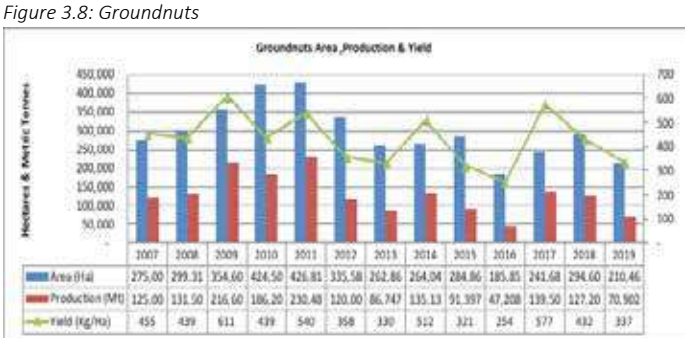
The success of tobacco is due to the auction marketing system which is considered transparent by farmers. In addition, contracting business to farmers seems working as farmers are provided with necessary inputs and agronomy advice from the contractors as they aim to recover their money at all cost from contracted farmers. However, interviewed farmers noted that lower prices from the auction system, which they also attribute to government intervention in the marketing of crops, is likely to affect farmers in the future.

(c) Trends of Oilseeds

(i) Groundnuts Production Trends

Groundnuts have over the past centuries been a celebrated favorite legume in Zimbabwe which generally can be grown in most soil types. In terms of production, the country recorded an average output of 177,600 metric tonnes of groundnuts between 2007 and 2011 with the highest output of 230,480 metric tonnes recorded in 2011. However, from 2012 and onwards groundnuts production an averaged output of 106,000 metric tonnes per year which is significantly lower than previous years (see figure 3.8).

Figure 3.8: Groundnuts



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Area (Ha)	275,00	299,31	354,60	424,50	426,81	335,58	262,86	264,04	284,86	185,85	241,68	294,60	210,46
Production (Mt)	125,00	131,50	216,60	186,20	230,48	120,00	86,747	135,13	91,397	47,208	139,50	127,20	70,902
Yield (Kg/Ha)	455	439	611	439	540	358	330	512	321	254	577	432	337

Source: Ministry of Agriculture (2020)

In recent years, the country witnessed improvements in groundnuts production. For example, production peaked from 47,208 metric tonnes to 139,500 metric tonnes and 127,200 metric tonnes in 2017 and 2018, respectively. However, in 2019, groundnuts production fell by 50% to 70,902 metric tonnes. Interviewed farmers argued that crop is labour intensive and under deteriorating economic environment it becomes expensive to produce hence the fall in production in 2019.

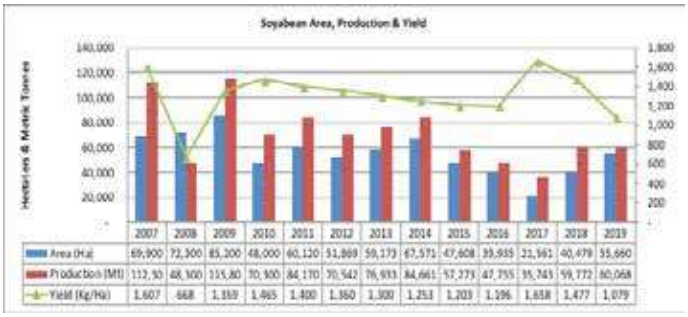
The study shows that the provincial contribution to national output show that Midlands is the major producer of groundnuts in 2019 since it produced 23% of national production. Major producing districts in the Midlands province are Gokwe North, Gweru Urban, Mberengwa and Zvishavane. Manicaland and Mashonaland East contributed 21% each to national groundnut output. In Manicaland 78% of the production come from Makoni, Buhera and Mutare districts while in Mashonaland East much of the output came from Marondera, Seke and Chikomba districts.

(ii) Soya Beans Production Trends

Soya bean is used in the production of oil in the Zimbabwe. In terms of production, between 2010 and 2014, production fluctuated between 70,000 and 85,000 metric tonnes (see figure 3.9). However, for the subsequent years, soya output fell to 57,270 metric tonnes, 47,750 metric tonnes and 35,740 metric tonnes for 2015, 2016 and 2017, respectively. Farmers interviewed explained that the fall in production of soya bean is a result of limited support given to the crop by both Government and the private sector. Also, the farmers indicated that the hectarage/ area decreased due to the land reform programme as land redistribution affected the production level. At the same time with the drop in production and area, it created a 60-70% output gap which increased the soya beans imports.

However, in 2018, Government placed soya bean under Command Agriculture. This saw the country increasing the hectarage under soya bean from 21,560 hectares to 40,470 hectares, that is, 87.7%. This resulted in marginal recovery of soya output to 59,770 metric tonnes in 2018 from 35,740 metric tonnes of 2017 (see figure 3.9). In 2019, soya beans production slightly increased to 60,068 metric tonnes.

Figure 3.9: Soya Beans



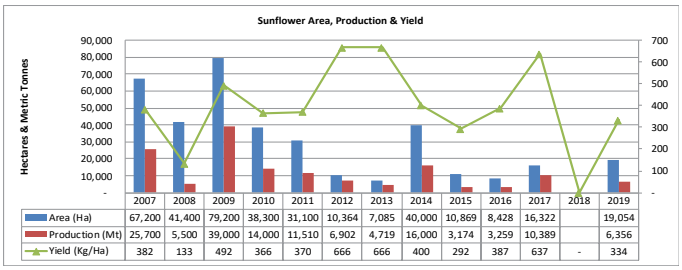
Source: Ministry of Agriculture (2020)

With respect to yield per hectare, on average, the country produced a yield of 1.3 metric tonnes per hectare which is quite low to compensate costs which are involved in the production of soya bean. A review of the provincial contribution to national output showed that 92% of the country's soya bean production in 2019 came from Mashonaland Central, Mashonaland West and Mashonaland East provinces with each contributing 49%, 35% and 9% respectively. In Mashonaland East, the leading districts were Goromonzi, Seke, Murehwa and Marondera with 64%, 13%, 11% and 10%, respectively. The study also noted that in Mashonaland West province the districts with much of the production are Makonde, Zvimba, Hurungwe and Chegutu with contribution of 75%, 18%, 11% and 7%, respectively.

(iii) Sunflower Production Trends

Sunflower production in Zimbabwe is directed mainly towards oil extraction. It is largely produced in Natural Regions II, III and IV by the smallholder farmers, who include communal (CA), Small Scale Commercial Farmers (SSCF) and Resettlement Farmers (RF).

Figure 3.10: Sunflower



Source: Ministry of Agriculture (2020)

Between 2007 and 2009, the country witnessed large tracks of land put under sunflower production. To be specific, in 2007, 2008 and 2009, 67,200 hectares, 41,400 hectares and 79,200 hectares respectively, were put under sunflower production. Sadly, there was no causal link between sunflower production and area covered. In actual fact, sunflower output remained sub optimally low.

However, notwithstanding this observation, the country still witnessed better production levels between 2007 and 2009. In subsequent years, the country recorded low sunflower output with the lowest yield being recorded in 2015 and 2016, that is, 3,174 metric tonnes and 3,259 metric tonnes, respectively. In 2017, the country recorded a significant recovery of sunflower production as output trebled to 10,380 metric tonnes (see figure 3.10). In 2019, sunflower production plummeted to 6,356 metric tonnes (see figure 3.10).

One of the most striking feature in sunflower production noted in the study is the fact that yield per hectare remain consistently low, that is, it ranged from 0.133 metric tonnes per hectare to 0.666 metric tonnes per hectare.

A review of provincial contribution to national sunflower output shows that Manicaland province tops sunflower production contributing 36% to national production. The main producing districts in Manicaland were Makoni, Nyanga and Chimanimani contributing 44%, 18% and 12% respectively to provincial output. Matabeleland South and Mashonaland East were second and third with 25% and 14%, respectively. Mashonaland Central contributed 11%, Mashonaland West 8% and Midlands 7% while Matabeleland North and Masvingo had 1% and nil contribution, respectively.

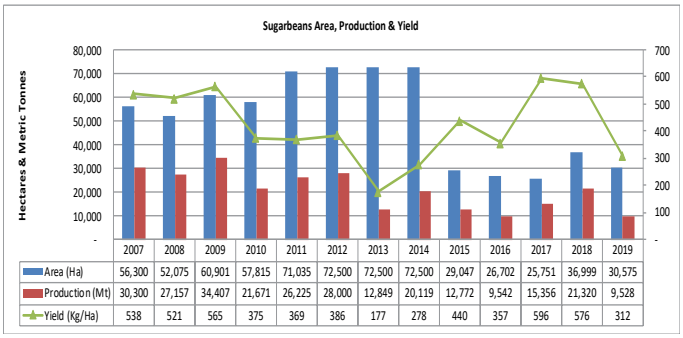
With climatic change looming, it is critical that the government supports sunflower production as it is drought torrent compared to soya bean. This will help ease the oil crisis and protein requirement in the stock feeds production.

3.4 Trends in Pulses

(a) Sugar Beans Production Trends

The production of sugar beans in the last 10 years has not been impressive. Ironically, the area under sugar bean production shot up to an average of 72,500 hectares for the years between 2011 and 2014 (inclusive) but production levels fell to 26,220 metric tonnes, 28,000 metric tonnes, 12,840 metric tonnes and 20,110 metric tonnes in 2011, 2012, 2013 and 2014, respectively. Of interest is the sudden fall which was noted in 2013 where the country recorded 12,840 metric tonnes of sugar beans at an average yield per hectare of 0.177 metric tonnes.

Figure 3.11: Sugar Beans



Source: Ministry of Agriculture (2020)

In the same vein, from this analysis, it is clear that a number of farmers somehow abandoned sugar beans production as noted by the reduction in area under sugar bean production from 2015 – 2018. To be specific, the area under sugar beans production fell by 148% between 2014 and 2015, that is, from 72,500 hectares to 29,040 hectares (see figure 3.11).

A review of the provincial contribution to national output shows that Manicaland province accounted for 36% of the sugar beans produced in 2018, Mashonaland Central and Mashonaland West both contributed 19% each. Leading producing districts in Manicaland were Nyanga, Mutasa, Mutare and Makoni. In Mashonaland Central province Mazowe, Guruve and Centenary were the main producing districts while on the other hand in Mashonaland West the leading districts are Kadoma, Hurungwe, Chegutu and Kadoma.

In 2019, production of sugar beans plummeted by 55.3% from 21,320 metric tonnes in 2018 to 9,528 metric tonnes in 2019.

(b) Cowpeas Production Trends

Cowpea is grown as a low input pulse by many smallholder farmers in Zimbabwe. It is an important vegetable (leaves) and grain in the diets of smallholder households. The grain is an important source of protein. The study noted that Cowpeas can be grown in the marginal areas (agro-ecological zones III, IV & V) of Zimbabwe.

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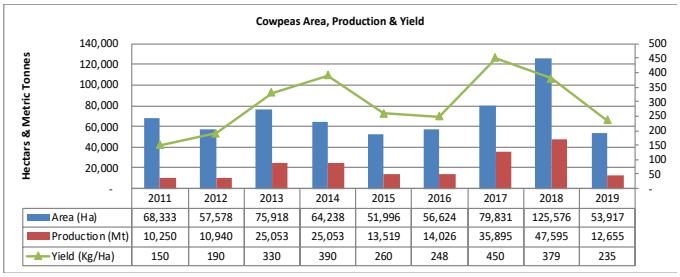
Figure 3.12: Cowpeas Production Trends



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Area (Ha)	68,333	57,578	75,918	64,238	51,996	56,624	79,831	125,576	53,917
Production (Mt)	10,250	10,940	25,053	25,053	13,519	14,026	35,895	47,595	12,655
Yield (Kg/Ha)	150	190	330	390	260	248	450	379	235

Source: Ministry of Agriculture (2020)

The country recorded lower output of cowpeas. The lowest output were recorded in 2011 and 2012, that is, 10,250 metric tonnes and 10,940 metric tonnes, respectively. Although output picked up in 2013 and 2014 with a flat figure of 25,053 metric tonnes, production fell by almost 50% to 13,519 metric tonnes and 14,026 metric tonnes in 2015 and 2016, respectively. In 2017, cow peas production increased by more than 100% and 50% in 2017 and 2018 to 35,895 metric tonnes and 47,595 metric tonnes, respectively. This trend was reversed in 2019 when cowpeas output took a sharp decline by four times to 12,655 metric tonnes.

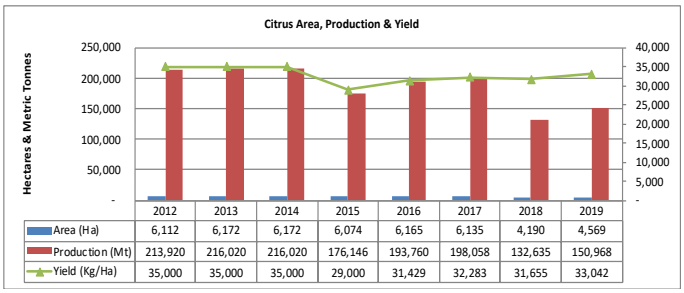
In 2019, as noted in figure 3.12, area under cowpeas production and yield per hectare declined by more than 34,940 metric tonnes from 47,595 metric tonnes in 2018 to 12,655 metric tonnes in 2019. Farmers and AGRITEX extension officers interviewed explained that the low output was as a result of the harsh economic environment, negative impact of droughts, poor farming practices, diseases and pests.

3.5 Trends in Plantation Crops

(a) Citrus Production Trends

Unlike cereal crops, production output of citrus was consistent and averaged 202,280 metric tonnes per year. However, significant outputs were recorded in 2012, 2013 and 2014 with output of 213,920 metric tonnes, 216,020 metric tonnes and 216,020 metric tonnes, respectively (see figure 3.13). In 2015, output went down to 176,146 metric tonnes and recovered to 193,760 metric tonnes and 198,058 metric tonnes for the years 2016 and 2017, respectively.

Figure 3.13: Citrus Production Trends



	2012	2013	2014	2015	2016	2017	2018	2019
Area (Ha)	6,112	6,172	6,172	6,074	6,165	6,135	4,190	4,569
Production (Mt)	213,920	216,020	216,020	176,146	193,760	198,058	132,635	150,968
Yield (Kg/Ha)	35,000	35,000	35,000	29,000	31,429	32,283	31,655	33,042

Source: Ministry of Agriculture (2020)

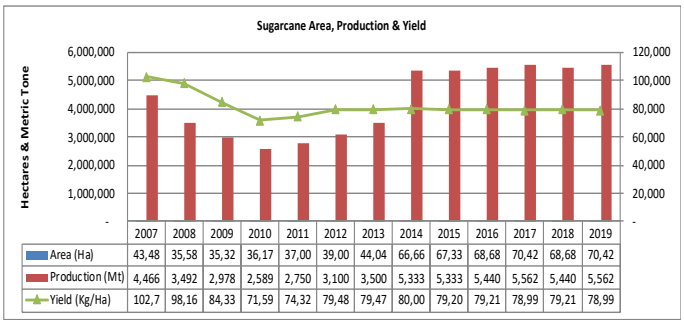
In 2018 and 2019, citrus production was observed to be 132,635 metric tonnes and 150,968 metric tonnes, respectively.

With respect to the area under production, the country consistently maintained same area under citrus production (see figure 3.13). This is mainly because this crop suffers from industrial inertia, that is, it cannot be changed over a season like cereal crops. Interestingly, yield per hectare was also consistent (see figure 3.13).

(b) Sugarcane Production Trends

Earlier years from 2007-2009 Sugarcane production experienced an average production decrease of 16.5% which was adversely affected by the poor economic environment prevalent in 2008. The economy was characterised by shortages of foreign currency and hyperinflation which adversely affected crop inputs that resulted in limited and delayed application for herbicides and fertilisers.

Figure 3.14: Sugarcane Production Trends



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Area (Ha)	43,48	35,58	35,32	36,17	37,00	39,00	44,04	66,66	67,33	68,68	70,42	68,68	70,42
Production (Mt)	4,466	3,492	2,978	2,589	2,750	3,100	3,500	5,333	5,333	5,440	5,562	5,440	5,562
Yield (Kg/Ha)	102,7	98,16	84,33	71,59	74,32	79,48	79,47	80,00	79,20	79,21	78,99	79,21	78,99

Source: Ministry of Agriculture (2020)

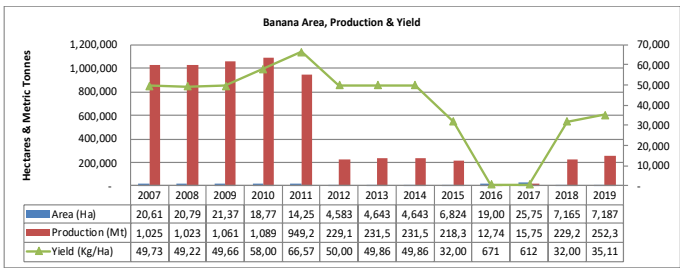
In 2011, there was an increase in both production and yield by 6.2% and 4% respectively. This might have been because of the advent of dollarisation. This boosted the export of sugar production on the other hand the improvement in sugarcane yield was through timely application of required inputs.

Sugarcane in Zimbabwe is mainly grown under full irrigation in the low veld areas this is through the supply of irrigation water by the dams. The supply of water is not consistent hence this explains the consisted production from the period of 2012-2019.

(c) Banana Production Trends

Banana production between 2007 and 2011, averaged an annual output of about 1 million metric tonnes per year. However, in 2012, banana output took a sharp dive to 229,150 metric tonnes per year and maintained a steady output of 231,500 metric tonnes, 231,500 metric tonnes and 218,360 metric tonnes in 2013, 2014 and 2015, respectively. Sadly, in 2016 and 2017, Zimbabwe recorded a paltry 12,742 metric tonnes and 15,751 metric tonnes, respectively.

Figure 0.6: Banana Production Trends



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Area (Ha)	20,61	20,79	21,37	18,77	14,25	4,583	4,643	4,643	6,824	19,00	25,75	7,165	7,187
Production (Mt)	1,025	1,023	1,061	1,089	949,2	229,1	231,5	231,5	218,3	12,74	15,75	229,2	252,3
Yield (Kg/Ha)	49,73	49,22	49,66	58,00	66,57	50,00	49,86	49,86	32,00	671	612	32,00	35,11

Source: Ministry of Agriculture (2020)

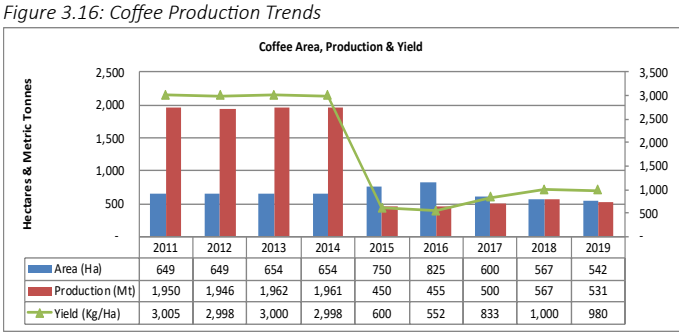
Interestingly, the area under production averaged around 20,000 hectares between 2007 and 2011. Between 2012 and 2015 the land under banana production plummeted by about 15,000 hectares to an annual average of 5,000 hectares. This decline corresponded with the decline in annual production of bananas as explained earlier. However, in 2016 and 2017, land under banana production shot to 19,002 metric tonnes and 25,751 metric tonnes, respectively. In 2018 and 2019, area under banana production fell to 7,165 and 7,187, respectively. Ironically, there was no corresponding causal- link between increase in banana output and land under production. Rather, the country witnessed extraordinary fall in yield per hectare from an average rate of about 50 metric tonnes per hectare to 0.6 metric tonnes per hectare.

Farmers interviewed from Rusitu Valley underscored that the most contributing factor of this decrease was the plant-parasitic nematodes which compromised productivity. Results from a survey carried out in Rusitu Valley indicated that 61.9% farmers grew bananas as a monoculture and 38.1% intercrop bananas with other crops. In addition, about 82.9% of interviewed farmers that grow bananas had little or no knowledge of nematodes that damage bananas.

(d) Coffee Production Trends

Zimbabwe has a long history of producing beautiful coffees, it used to produce about 15,000 metric tonnes of the best quality coffee (Coffee Arabica) alongside coffee producing giants such as Brazil, Kenya and Vietnam. The sector used to employ more than 20,000 people, contributing more than 2% to the GDP and ranking in about US$54 million in foreign earnings.

Figure 3.16: Coffee Production Trends



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Area (Ha)	649	649	654	654	750	825	600	567	542
Production (Mt)	1,950	1,946	1,962	1,961	450	455	500	567	531
Yield (Kg/Ha)	3,005	2,998	3,000	2,998	600	552	833	1,000	980

Source: Ministry of Agriculture (2020)

Production of coffee has been constant over the years at an average of 18% from 2011 to 2014. However, despite the increase in hectarage by 15% from 2014 to 2015, a significant decrease in production and yield was 77% and 80% respectively. From 2016 to 2019, coffee production remained flat at around 500 metric tonnes per year.

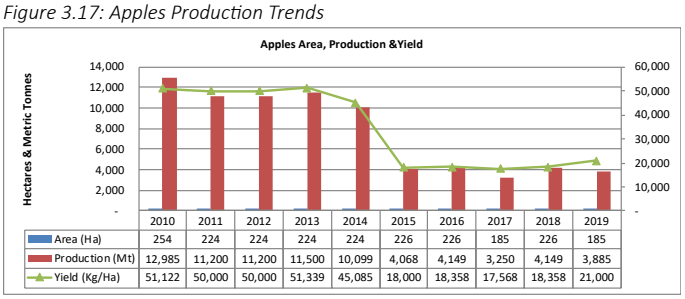
Farmers interviewed explained that the significant decrease was due to the proliferation of alternative and competing crops. Farmers in strategic regions such as the Eastern Highlands abandoned coffee in preference of other plantations. The influx of cheap processed coffee and increasing incidences of pests and diseases such as the white stem borer, coffee leaf minor and coffee berry borer was the major contributing factor.

Respondents indicated that Zimbabwe is only left with two commercial coffee farmers cultivating 300 hectares, down from 145 who were cultivating over 7,600 hectares before 2004. In addition to that, the sector is struggling to attract investment due to land tenure issues emanating from land redistribution program. However, regardless of low commercial farmers numbers, a slight increase of 1% was experienced in production in 2016. This was due to an interest in coffee production by international companies like Nespesso who are investing in coffee farming.

(e) Apples Production Trends

From the period of 2010 to 2013 there was a constant increase in the production of apples of 4% and this was due to the ideal weather which has immensely contributed to the fine production of various fruits.

Figure 3.17: Apples Production Trends



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Area (Ha)	254	224	224	224	224	226	226	185	226	185
Production (Mt)	12,985	11,200	11,200	11,500	10,099	4,068	4,149	3,250	4,149	3,885
Yield (Kg/Ha)	51,122	50,000	50,000	51,339	45,085	18,000	18,358	17,568	18,358	21,000

Source: Ministry of Agriculture (2020)

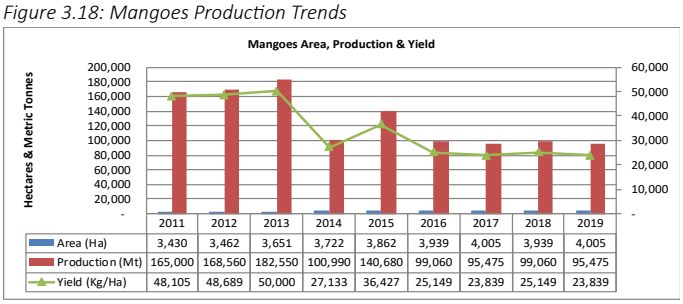
Zimbabwe's apple production and yield both declined significantly in 2015 by 60% despite an increase in hectarage by 1%. From an annual output of 10,099 metric tonnes in 2014 to an annual output of 4,068 in 2015. As a result, from 2015 to 2019, annual production of apples averaged around 4,000 metric tonnes.

Farmers interviewed explained that the decline was mainly due to the replanting of old fruit trees which up to date is still underway. The other factor which affected the production was competition by import which were coming from South Africa.

(f) Mangoes Production Trends

Mangoes production from the period of 2011 to 2013 have been increasing at a constant rate. In 2014 an increase in hectarage of 2% was realised however this did not bring an advantage to production and yield as both declined by 45% and 46%, respectively.

Figure 3.18: Mangoes Production Trends



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Area (Ha)	3,430	3,462	3,651	3,722	3,862	3,939	4,005	3,939	4,005
Production (Mt)	165,000	168,560	182,550	100,990	140,680	99,060	95,475	99,060	95,475
Yield (Kg/Ha)	48,105	48,689	50,000	27,133	36,427	25,149	23,839	25,149	23,839

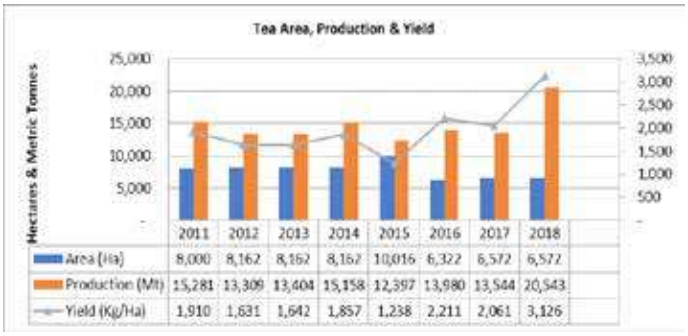
Source: Ministry of Agriculture (2020)

From 2015 the country witnessed notable progress in increasing area under mango production (see figure 3:18). However, with regards to mango output, in 2016 the production of mangoes plummeted by about 40% from 2015 to an average output of 99,060 metric tonnes. In subsequent years, that is, 2017, 2018 and 2019, recorded mangoes production per year was 95,475 metric tonnes, 99,060 metric tonnes and 95,475 metric tonnes, respectively.

(g) Tea Production Trends

Tea trends for the period 2011 to 2014 maintained a steady trajectory with the area cultivated 8,162 hectares while tea output fluctuated between 13,404 metric tonnes and 15,281 metric tonnes. During the same period, yield per hectare ranged from 1.631 metric tonnes per hectare to 1.91 metric tonnes per hectare. In 2015, area under tea production peaked to 10,016 hectares but wheat production fell to 12.397 tonnes.

Figure 3.19: Tea Production Trends



	2011	2012	2013	2014	2015	2016	2017	2018
Area (Ha)	8,000	8,162	8,162	8,162	10,016	6,322	6,572	6,572
Production (Mt)	15,281	13,309	13,404	15,158	12,397	13,980	13,544	20,543
Yield (Kg/Ha)	1,910	1,631	1,642	1,857	1,238	2,211	2,061	3,126

Source: Zimbabwe Tea Growers Association (2020)

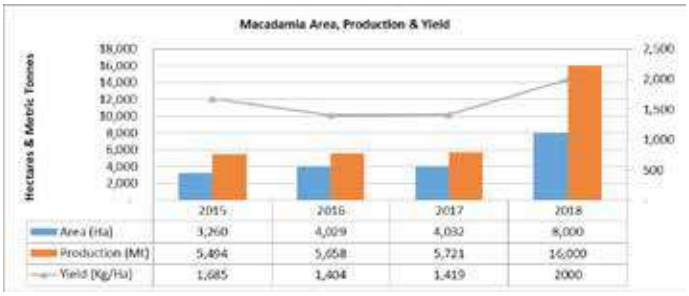
In 2016 and 2017, tea production and yield trends remain subdued around just below 14,000metric tonnes and 2 metric tonnes, respectively (see figure 3.19).

Farmers and Agritex officers interviewed argued that the decrease in tea production was due to the poor quality resulting in low market value and high production cost. However, in 2018 tea production shot up by 7,000 metric tonnes while yield increased by more than 50% notwithstanding the fact that area under tea production declined by close to 40% from 2015 figures.

(h) Macadamia Production Trends

Over the period from 2011 to 2014 the production of Macadamia nuts has been increasing at a steady rate of 27% with a decline in yield of an average of 21%.

Figure 3.20: Macadamia



Source: Chipinge Macadamia Association (2018)

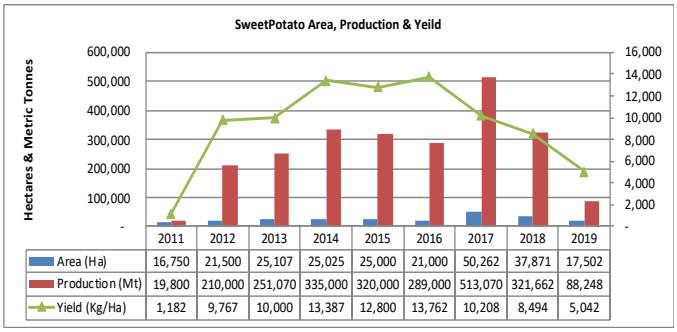
Hectarage under macadamia nuts slightly increased for the period 2015 to 2017. However, in 2018, it significantly increased by 75% to reach a high of 8 000 hectares. Production also followed the hectarage trend whereby it marginally increased between 2015 and 2017 while in 2018 it increased by 182.79% to reach an annual output of 16,000 tonnes. Study respondents attributed the huge increase in area and production in 2018 to the increased production from commercial farmers who contributed 7,000 tonnes. The firming local and international prices of macadamia nuts are the major driver to the huge leap in area under production. Prices in the local market surged from a range of $0.77 to $1.50 in prior years to a range of $1.80 to $3.20 per kilogramme. A total of16 00 tonnes were produced in 2018, 7000 tonnes were contributed by commercial farmers. Study findings also showed that international market prices range from $12 to $16 per kilogram.

3.7 Trends in Horticulture

(a) Sweet Potato Production Trends

The Sweet potato production and yield experienced a sharp increase from 2011 to 2012 of 960% and 726% respectively and also hectarage increased by 28%. Over the years from 2012 to 2017 the production of sweet potatoes continued to increase on an average of 23.26% with an average yield of 3.23% increase.

Figure 3.21: Sweet Potato Production Trends



Source: Ministry of Agriculture (2020)

A review of provincial contribution to national output show that the top four provinces leading in the production of sweet potatoes are Mashonaland East, Midlands, Manicaland and Matabeleland South with 27%, 26%, 19% and 12% of national output, respectively. In Mashonaland East the districts that drive most of the production are Mudzi, Seke, Chikomba, Murehwa and Goromonzi while in the Midlands much of the output comes from Gweru, Mberengwa, Kwekwe Zvishavane and Shurugwi.

Respondents interviewed noted that the increase was due to advantages that the crop has which include the crop having minimal input requirement, storing well and the crop being a famine reserve crop. The crop requires a minimal level of water. With all these advantages the Government of Zimbabwe and some local NGO's are therefore promoting the production of root and tuber crops especially sweet potatoes. The government also established training programs to farmers so as to continuously increase the crop.

3.3 Summary

The main food and cash crops in Zimbabwe include maize, wheat, small grains (millets and sorghum), tobacco, cotton, sugar, horticulture (food and non-food) and groundnuts. The research noted that over the years crop production in Zimbabwe is highly variable due to the heavy reliance on rain-fed agriculture. The stakeholders interviewed underscored that changing climatic conditions and frequent droughts contribute heavily to the volatility in crop production. With the exception of tobacco and macadamia, production of maize, sorghum, millet and other cash crops has continued to trend downwards compared to 1985 production. At the centre of this reduced production is very low productivity. Average productivity of both food and cash crops across all farm types has been declining between 1985 and 2016. For example, maize yields declined from an average 1.2 metric tonnes per hectare between the period 1990 to 1995 to an average of 0.749 metric tonnes between the period 2010 to 2016. These yields have lagged behind those of neighbouring countries such as Malawi, Zambia, Mozambique and South Africa as well as global averages. This observation is the same across most food and cash crops, a situation requiring urgent attention. Tobacco and macadamia have well integrated value chains that with strong backward and forward linkages to sustain and improve high production and productivity levels.

The study noted that the national average yield has plummeted from an average of 0.749 metric tonnes per hectare in 2018 to 0.4 metric tonnes in 2019. Ironically, the national output is significantly weighed down by small scale farmers, which represent 78% of land under maize production, whose output per hectare is around 0.2 metric tonnes per hectare while the yields by commercial farmers are modest at an average of 1.5 tonnes per hectare.

The study noted small scale farmers lack the necessary resources, infrastructure and proper agronomic practices to boost their yields. A robust production and productivity enhancement programme driven by the government targeting low yielding small holder farmers will go a long way in securing the nation's food security while at the same time increasing small holder farmer earnings since they will be able to produce a surplus.

Climate change vulnerabilities as well as price volatilities, especially in cotton, were noted as major impediments to sustainable agricultural production in Zimbabwe.

In the same vein, strong value chains as witnessed in the tobacco sector, contributed to massive production regardless of the fact that the same communal farmers who are growing tobacco doesn't have security of tenure. In the tobacco sector, contracting companies are playing the role of an aggregator which uses its strong balance sheet and borrow money from banks on behalf of the poor farmers thereby acting as farmers 'collateral'. The striking feature of the tobacco sector is that it is a liberalised sector whose product is sold at the auction. This situation provides an efficient price recovery system and enhancement of derivatives which is totally the opposite of crops like grains which have price floors which in a number of cases more than twice regional prices thereby discouraging companies to finance agricultural production.

In order to unlock funding into the agricultural sector and even attracting international lines of credits as noted in the tobacco sector, Government must liberalise the agricultural sector and one such mechanism is through the operationalisation of the commodity (see Box 5.4 in section 5).

SECTION FOUR:
PRODUCTION TRENDS IN LIVESTOCK

4.1 Introduction

In Zimbabwe, there are a number of livestock species ranging from beef cattle, dairy cattle, small livestock (pigs, goats and sheep) as well as poultry that provide meat and eggs. This section presents trends of each livestock specie and reviews current performance against potential or national requirements. The main challenge faced by farmers across all livestock species is the high cost of production that adversely effects farm viability and competitiveness locally and in the region.

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4.2 Overview of Livestock Production

Table 4.1 shows livestock (cattle, dairy, goat, sheep and pigs) production from 1990 to 2019. What is striking from the statistics presented in table 4.1 is that for cattle herd and dairy herd, production levels were at the peak in 1990 and decreased over the years to the extent that even if there were some noticeable recoveries in cattle herd production the country hasn't reached the 1990 production levels. For example, in 1990 Zimbabwe had in stock 6.218 million of cattle herd and 127,000 dairy herd. The cattle herd declined to 4.768 million of cattle in 2005, being the lowest production level in history and gradually recovered to 5.775 million of cattle in 2019 (see table 4.1).

Table 4.1 Livestock Production (1990 – 2019)

Year	Cattle Herd ('000)	Dairy Herd	Goat Herd ('000)	Sheep Herd ('000)	Pig Herd ('000)
1990	6,218	127,000	2,564	592	289
1991	6,374	126,000	2,539	584	305
1992	5,914	124,000	2,545	485	278
1993	5,020	115,000	2,358	416	240
1994	5,140	105,000	4,471	436	232
1995	4,992	105,000	5,001	435	264
1996	5,078	99,000	4,823	379	268
1997	5,375	96,000	5,054	416	310
1998	5,450	90,000	4,990	386	324
1999	5,837	82,000	4,601	350	257
2000	5,955	74,267	3,751	691	340
2001	6,195	55,150	3,706	634	312.9
2002	5,048	50,650	3,336	542	184.4
2003	5,116	45,000	3,276	485	418.7
2004	5,027	43,159	3,105	441	169.2
2005	4,768	44,000	3,248	317	167.8
2006	4,987	38,000	3,125	389	218.1
2007	5,048	33,000	3,334	295	180
2008	5,012	24,000	3,210	377	200
2009	5,107	25,000	3,707	336	290
2010	5,222	23,000	3,188	414	255
2011	5,157	12,498	2,662	1844	275
2012	5,157	12,498	3,330	528	300
2013	5,241	12,490	3,764	522	316
2014	5,350	13,367	3,941	525	342
2015	5,477	15,611	4,050	457	345
2016	5,528	16,987	3,399	504	426
2017	5,490	17,325	3,405	379	312
2018	5,578	17,968	3,707	398	293
2019	5,775	18,214	4,361	296	236

Source: Ministry of Agriculture (2019)

Likewise, production of the dairy herd was at peak in 1990 with 127,000 cows. The production of dairy cows plummeted from 127,000 in 1990 to 12,490 in 2013. The country witnessed gradual recovery in dairy cows on the back of a dairy sector resuscitation strategy which was instituted by the industry which resulted in the dairy herd growing to 18,214 in 2019, which is still far below the 1990 levels.

Cattle are the most important livestock species, which is a source of milk as well as beef meat for the country. From 2003 to 2019, the number of cattle herd size slightly differed per year, which resulted in a curve being uniform for that period. The findings showed that commercial farmers and A2 farmers are failing to grow their herds due to lack of medium to long term finance.

Evidence from research shows that cattle production has remained flat at around five million since 2001, this could be partly attributed to the outbreaks of foot and mouth disease (FMD) and other diseases that were identified as serious threats to the complete recovery of the cattle herd. Table 4.2 shows the distribution of cattle ownership by farmer group, indicating that 69% of the cattle in Zimbabwe are owned by small scale rural farmers, 11% by A1 farmers. A2 and large scale commercial farmers own a combined 10%, old resettled farmers own 6% while small scale commercial farmers own 4%.

Table 4.2: Cattle Ownership by Farmer Group

Farmer Group	%age of Cattle Owned
A2 and Large Scale Commercial Farming Area	10%
Communal Areas	69%
A1	11%
Small Scale Commercial Farming Area	4%
Old Resettlement	6%

Source: Zimbabwe Agriculture Society (2017) and Ministry of Agriculture (2020)

Masvingo, Midlands and Manicaland provinces are the major producers of cattle with 22.1%, 16% and 12.4% of the total cattle herd in 2019, respectively (see table 4.2). With respect to sheep production, Matabeleland North, Masvingo and Mashonaland Centre are the major producers with 31.3%, 28.8% and 14.5% of total sheep herd, respectively (see table 4.3).

Table 4.3: Livestock Numbers by Species by Province 2019

Province	Cattle		Sheep		Goats		Pigs	
	2017/18	2018/19	2017/18	2018/19	2017/18	2018/19	2017/18	2018/19
Mash West	599 876	497 369 (8.6%)**	14 976	13 365 (2.6%)	276 876	252 515 (5.8%)	25 678	20 785 (7.5%)
Mash Central	580 368	563 470 (9.8%)	68 931	75 946 (14.5%)	321 732	335 310 (7.7%)	51 086	41 421 (14.9%)
Mash East	674 532	554 568 (9.6%)	35 476	29 004 (5.5%)	315 796	218 904 (5%)	46 789	51 443 (18.5%)
Manica-land	591 084	716 262 (12.4%)	75 693	37 034 (7.1%)	637 123	1371925 (31.5%)	41 237	40 579 (14.6%)
Midlands	834 752	922 890 (16%)	24 566	23 476 (4.5%)	538 255	425 326 (9.8%)	30 999	26 453 (9.5%)
Masvingo	1 010 382	1 277 577 (22.1%)	95 460	150 632 (28.8%)	625 541	851 613 (19.5%)	44 733	66 464 (23.9%)
Mat North	647 478	583 871 (10.1%)	39 835	29 580 (5.7%)	415 900	376 018 (8.6%)	29 335	23 560 (8.5%)
Mat South	656 807	658 518 (11.4%)	126 222	163 918 (31.3)	576 134	530 006 (12.1%)	24 356	7 592 (2.6%)
Total	5,578,381	5,774,525	481,159	522,955	3,707,357	4,360,838	294,213	278,297

*Source: MLAWRR, 2019, ** Share of provincial herd to national herd*

On goats, Manicaland, Masvingo and Matabeleland South are the major producers with 31.5%, 19.5% and 12.1% share of the total goats herd in 2019, respectively (see table 4.3).

Farmers interviewed highlighted that the bias towards the concentrations of specific animal species in each province was largely as a result of the resilience of the animals to climatic conditions as well as their role and importance in being part of the coping strategies in dealing with vulnerabilities coming with climate change.

4.3 Cattle Slaughters Trends

Cattle is slaughtered for beef in Zimbabwe. The number of slaughtered cattle is determined by the number of cattle being herd since some have to provide milk.

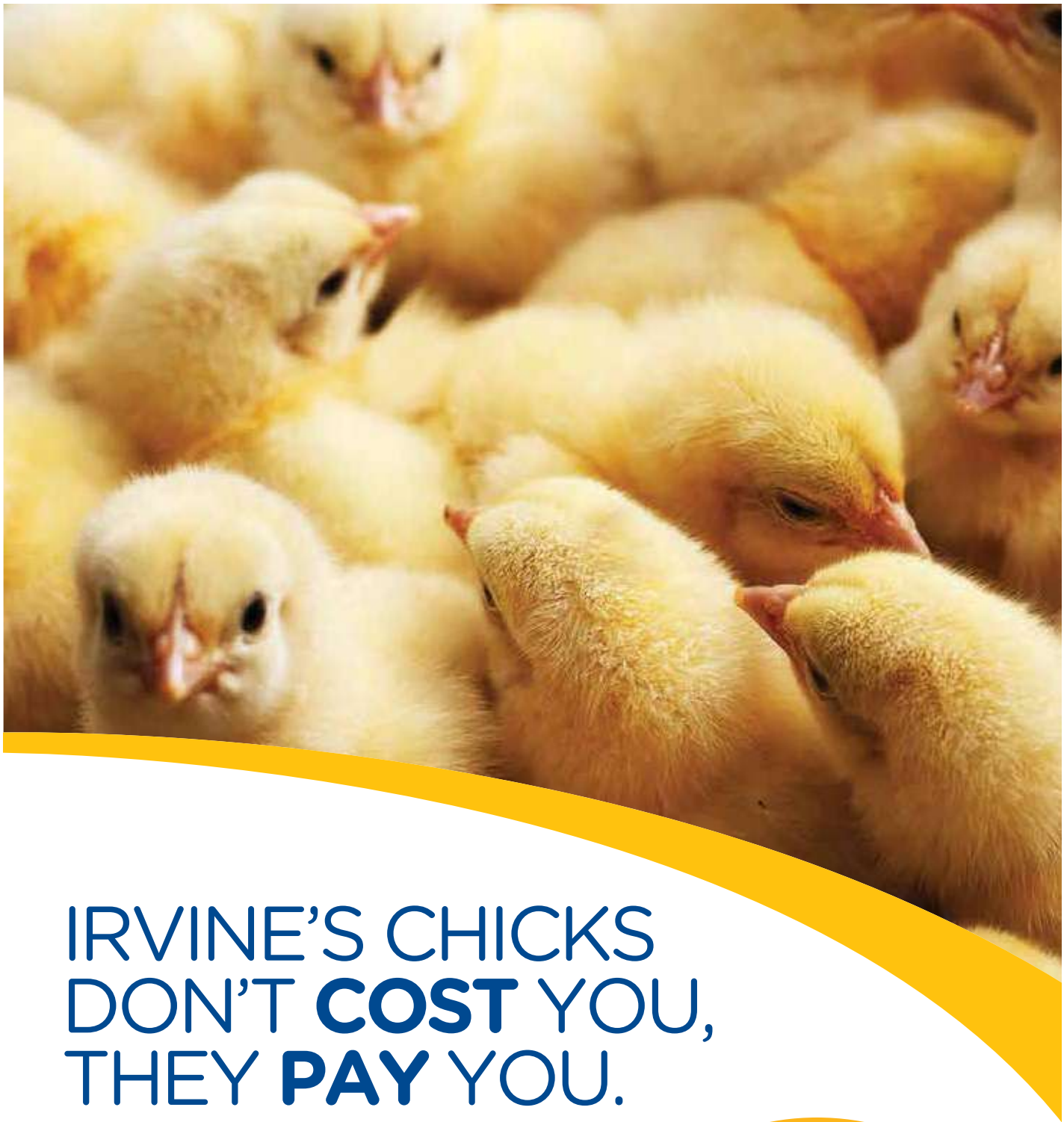

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Table 4.4: Cattle Slaughters (numbers) and Beef Production (kg): 2014-2018

Month/ Year	2014	2015	2016	2017	2018
	No. of Cattle Slaughtered				
Jan	17 380	17 988	18796	20 524	19 338
Feb	15 873	19 162	19549	19 684	18 313
March	10 986	22 133	21421	21751	19 673
April	16 811	20 304	21 201	22272	21 044
May	19 653	24 173	23 166	24094	21 676
June	20 821	22 332	22 297	21544	21 182
July	22 382	23 957	23 870	24085	22 398
Aug	22 907	25 335	24 355	23085	20 727
Sept	20 334	30 461	20 331	20257	20 596
Oct	19 901	18 977	21 349	21771	21 037
Nov	20 729	20 319	20 664	19722	18 185
Dec	21 909	18 983	21 219	21723	22 253
Total Slaughters	229,686	264,124	258,218	260,512	246,422
	Beef Produced (mt)				
Beef (Mt)	39,046.62	44,901.08	43,897.06	44,287.04	41,891.74

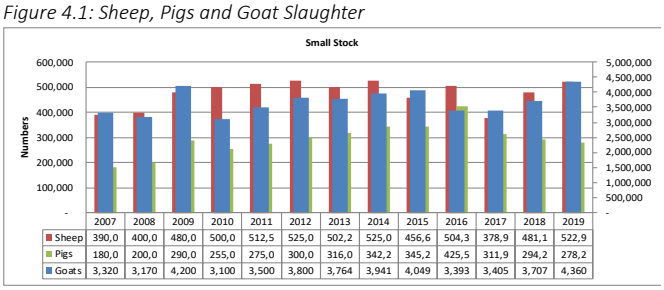
Source: Ministry of Agriculture (2019)

At glance, the country witnessed reasonable high slaughter rates in August and December each year due to cultural activities and festivities, which take place in the months of August and December, respectively (see table 4.4). The statistics show that the proportion of annual slaughter to total number of cattle is 5% and this could be attributed to the fact that 90% cattle is owned by small-scale farmers who keep cattle as a sign of wealth.

4.5 Sheep, Pig & Goat Slaughter

Apart from being reared for subsistence purposes, sheep and goats are a source of income to many rural households since they can be easily converted into cash unlike cattle which require wide consultation before selling or slaughtering. In 2014, the highest slaughter of sheep and goats were in December when a total of 3,593 animals were slaughtered while the lowest was in April when 974 slaughter were undertaken. In 2015 the average monthly slaughter was 2,186 which is 27% higher than the average monthly slaughter of 1,726 recorded in 2014. In 2016 the average monthly slaughter marginally increased by 4% to reach 2,266.

Figure 4.1: Sheep, Pigs and Goat Slaughter



Source: Ministry of Agriculture (2020)

Trends show that December is the month with the highest slaughter and this was attributed to increased meat consumption during the festive period as noted by respondents.

4.6 Dairy

Milk production took a nose dive from 81 million litres in 2007 to 37 million litres in 2009. From 2010, milk production grew steadily from 47 million litres to 67 million litres in 2017 (see Table 4.5). With respect to dairy farmers, the number plummeted from the year 2007 to 2014. Farmers interviewed noted that the decrease in the number of farmers was influenced by high costs of production (feed, energy and labour), lack of competitiveness within the region, out-dated production technology systems and lack of dairy support services (independent laboratory). Key stakeholders interviewed noted that in the early 1990s, the national head size was 122 000. However, the numbers decreased to 33 000 with 14 000 currently used for milk production. Over the past five years the production of milk has been increasing at a steady rate of 3.9% and this indicates that farmers have not been considering cattle rearing for milk production as a lucrative business.

Table 4.5: Dairy Production Trends

Description	2011	2012	2013	2014	2015	2016	2017	2018	2019
Dairy Farmers	233	210	210	210	215	217	224	250	254
Dairy Cows in Milk (000)	12.5	12.5	12.5	13.4	15.6	16.8	17.3	18.0	18.21
Milk Production (Million litres)	57.3	552	54.6	55.4	57.5	65.4	66.4	75.4	79.9

Source: Ministry of Agriculture (2018) & Zimbabwe Association of Dairy Farmers (2019)

Respondents from the dairy sector who were interviewed by researchers underscored that the dairy sector has come up with a strategic plan for the resuscitation of the dairy industry (Zimbabwe Association of Dairy Farmers' Strategic Plan 2018 to 2022).

The strategic plan was developed by the industry with a view of working towards self-sufficiency in milk production. In this regard, the industry is working on mobilising US$46 million which will be used in the local content support programmes, which must yield 131 million litres of milk from 2022.

The dairy industry strategy was mooted when key dairy processors were already working on key local content enhancement programmes which inter alia include:

- Some companies came up with Dairy Empowerment Schemes where an excess of US$20 million was invested in national herd building since 2011;
- Technical and extension support to farmers. The dairy processors have invested in veterinary doctors who are assisting cattle farmers with extension services;
- The dairy processors have used their strong balance sheets to borrow money on behalf of farmers who have no capacity to do so in the absence of collateral;
- Provision of key cattle farming inputs such as feed and drugs through various value chain finance models;
- The dairy industry came up with a number of supplier development programmes outside cattle rearing and;
- Provided a ready market for the milk.

In addition to private sector initiatives, Government is also supporting the sector through the implementation of the Dairy Revitalisation Programme that seeks to develop the dairy value chain using tax proceeds from dairy imports. However, as a result of local content enhancement programmes, Zimbabwe witnessed milk production rising from 39 million litres recorded in 2009 to 66 million litres in 2017. Further, in 2018 and 2019, milk production increased to 75.4 million litres and 79.9 million litres, respectively.

Although the current output is still below the annual national demand of 120 million litres, the country has progressively reduced milk imports from South Africa by about 70%. Specifically, in 2019, the country produced 79.9 million litres thereby leaving a deficit of 40.1 million litres.

4.8 Poultry

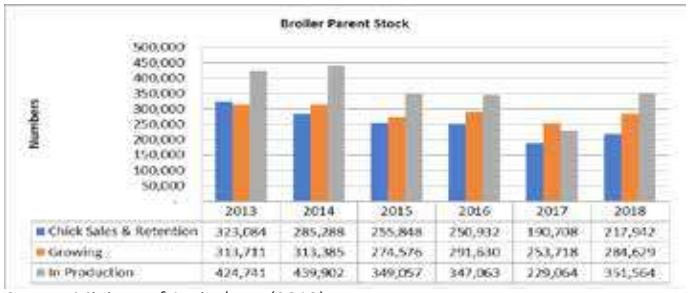
The study noted that the poultry sector registered steady growth since 2009 till 2017 when it was seriously affected by the outbreak of Avian Influenza Virus at one of the major chicken breeders. Despite containment of the AI virus outbreak

full recovery of the sector is yet to be achieved as demand continues to outweigh supply. The gap between demand and supply in the poultry sector is augmented by imports of fertilised eggs which are hatched locally.

(a) Broiler Parent Stock

Overall, the graph indicates a decrease in the broiler parent stock. In the year 2013 and 2014 the number of broilers in production was high and recorded 424,741 and 439,902 respectively.

Figure 4.2: Broiler Parent Stock Production Trends



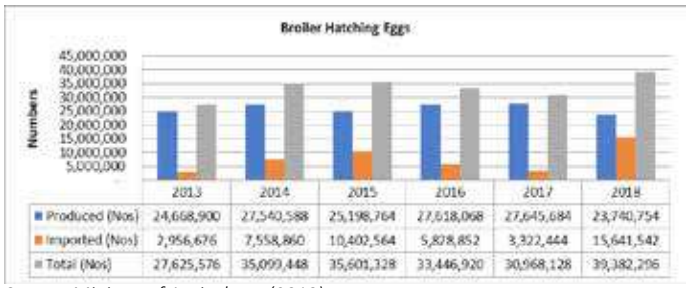
Source: Ministry of Agriculture (2019)

However, the amount of broiler parent stock was decreasing even in growing at an average rate of 289,404 annually. Chick sales and retention decreased drastically in the year 2017 by 24%. This was affected by the decrease in growing of 13% from the previous year. Respondents interviewed underscored that the decrease was caused by the Avian Influenza Virus outbreak which induced depopulation. Average monthly stocks of broiler breeder chick retentions growing and in-lay birds plummeted and in the last quarter of 2017. Average breeder stockholdings were lower than the same period in 2016 and the lowest since 2013. In 2018 the country witnessed a surge of 53.4% to 351,564.

(b) Broiler Hatching Eggs

The number of broiler hatching eggs being produced over the years has been increasing compared to the number that is being imported. This implies an increasing trend in the business for Broiler Hatching eggs and this encourages farmers to venture into broiler hatchings eggs.

Figure 4.3: Broiler Hatching Eggs



Source: Ministry of Agriculture (2019)

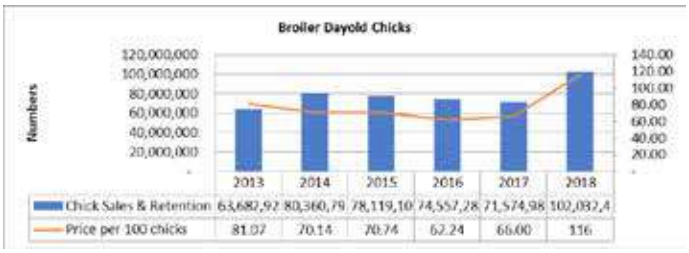
The production of Broiler Hatching eggs is increasing at 3.24% compared to imported eggs, hence an increase in the number of eggs. To continue to boost the production of broilers, Government should engage in activities that support broiler production. A stakeholder respondent mentioned that, total production of hatching eggs in 2017 was 68.9 million, being 8% lower than 2016. Prices of day old chicks (DoCs) rose sharply from 65c in May to 96c in December 2017 mainly due to the effect of the Avian Influenza. The study noted that local production of hatching eggs declined by 35% from a peak of 7.1 million in May to 4.6 million in July and had recovered to 7.4 million in December. Imports of hatching eggs over the period January to July, which averaged 1.0 million per month, increased to 2.0 million per month for the period August to December. Total hatching egg imports over the latter period was 10.1 million, equating to 460,000 eggs per week. This contrasts with the ring-fenced duty-free allocation of 852,000 hatching eggs per week. Total hatching eggs declined by 31% from a peak of 8.5 million in May to 5.9 million in July and recovered to a new peak of 9.5 million in December.

Imports of eggs surged by five times in 2018 to 15.6 million on the back of increasing demand (see figure 4.3).

(c) Broiler Day Old Chicks

Information deduced from the above graph indicates that Broilers Day old Chicks are decreasing at a decreasing rate. Stakeholders in the poultry industry noted that DoCs and retentions declined by 35% from 6.4 million in May to 4.2 million in July and recovered to a new peak of 7.1 million in December 2017.

Figure 0.41: Broiler Day Old Chicks



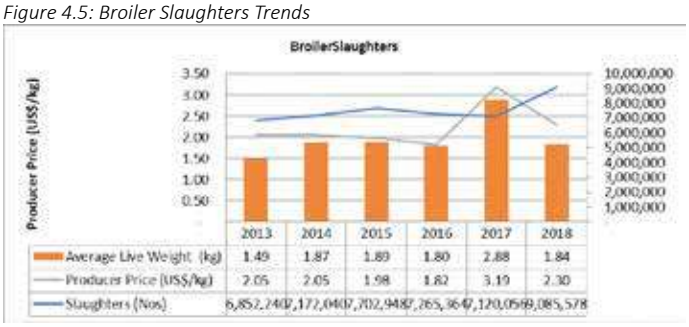
Source: Ministry of Agriculture (2019)

The highest number of day old chick sales and retention was recorded in the year 2014 with 80.4 million chicks at a price of $70.14 per 100 chicks. After 2014 the price per 100 chicks went down, with the lowest recorded at $66 in 2017 together with the chick sales and retention of 71.6 million. This implies the sales of the broiler day old chicks is decreasing hence affecting the production of broilers. In 2018 the country witnessed a sharp surge in broiler chicks sales and retention as total chick sales and retention shot to 102 million. Respondents interviewed attributed this surge to restocking efforts by the industry which saw egg imports surging by five times in the same year (see figure 4.3 and figure 4.4).

(d) Broiler Slaughters

Despite the fact that Broilers are reared for subsistence purposes, they are a source of income to many rural households since they can be easily converted into cash unlike other animals which require wide consultation before selling or slaughtering. From the period of 2013 to 2014, the number of broilers slaughter was less compared to 2015. This was because the average weight of a bird contributed to the price charged by the producer. In 2015 when the price reduced by 3.4% the number of slaughters increased by 7.4%. Respondents interviewed explained that there was a slight decrease of broiler slaughters not only due to average weight requirements but also due to the 2017 outbreak of the avian influenza (AI) which induced serious depopulation of the parent stock.

Figure 4.5: Broiler Slaughters Trends



Source: Ministry of Agriculture (2019)

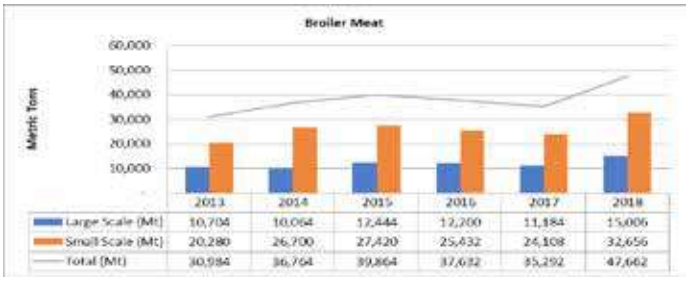
If the price is low more consumers are able to buy more and slaughter more compared to when its high. In 2017 the price charged by the producers increased by 75% from 1.82per kg to 3.19 per kg and this caused the number of slaughters to decrease by 2% from 1,816,341 slaughters to 1,780,014 slaughters. The number of broilers which were slaughtered surged to 9 million in 2018 on the back of an increase of demand since the price fell by US$1 per kg, which is quite significant (see figure 4.5).

(e) Broiler Meat Production

The production of broiler meat increased from 30,984 metric tonnes in 2013 to 36,764 metric tonnes in 2014 and reached a peak in 2015 with 39,864 metric tonnes. In 2016 and 2017 broiler meat production declined to 37,632 metric tonnes and 35,292 metric tonnes, respectively.

Stakeholders interviewed underscored that broiler meat production decreased in the years 2016 and 2017 due to Avian Influenza Virus outbreak which induced depopulation, average monthly stocks of broiler breeder chick retentions, growing and in-lay birds plummeted and in the last quarter of 2017.

Figure 4.6: Broiler Meat Production Trends



Source: Ministry of Agriculture (2019)

In 2018, the country witnessed a recovery in broiler meat production. Again, views from respondents interviewed showed that this increase is in direct correlation with the increase in egg importation as discussed above.

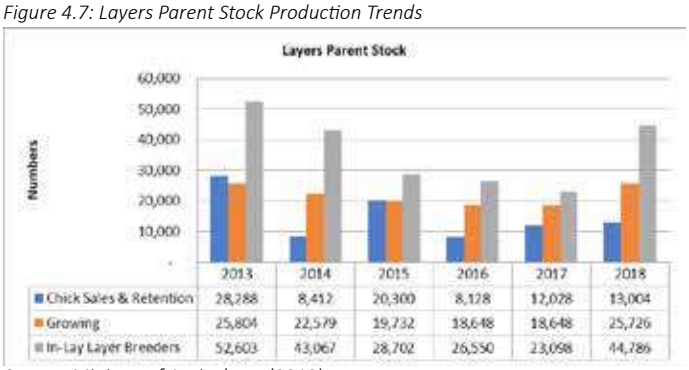
What is striking from the production of broiler meat is that small scale farmers, over the years, contributed more throughput as compared to large scale. Based on available statistics, the small scale producers output is more than double the large scale producers'. For example, in 2017 and 2018 small scale producers produced 24,108 metric tonnes and 32,656 metric tonnes, respectively while large scale producers produced 11,184 metric tonnes and 15,006, respectively.

Therefore, this implies that Government should constantly support the production of broilers to unlock the full potential of the poultry sector to contribute to the national economy through the development of strong, inclusive value chain, incorporating both large scale and small scale broiler meat producers.

(f) Layers Parent Stock

Overall, layers parent stock has been decreasing over the past five years. In lay layer breeders were 52,602 in 2013 and fell to 43,076 in 2014 and further declined to 23,098 in 2017.

Figure 4.7: Layers Parent Stock Production Trends

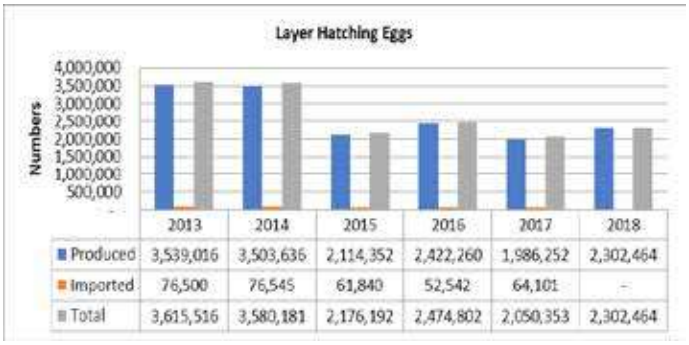


Source: Ministry of Agriculture (2019)

The decrease in lay layer breeders is directly correlated (positively) to the chick sales and retention. For example, in 2013 the country had the highest chick sales and retention of 28,288 because it had the highest number of layers parent stock in the same year. On a positive note, the country witnessed an increase of layers parent stock in 2018 by almost 100% due to industrial resuscitation strategy which was underpinned through egg importation.

(g) Layer Hatching Eggs

In line with previous observations layer, hatching eggs took a nose dive in 2017 due to the Avian Influenza disease. Figure 4.8: Layer Hatching Eggs



Source: Ministry of Agriculture (2019)

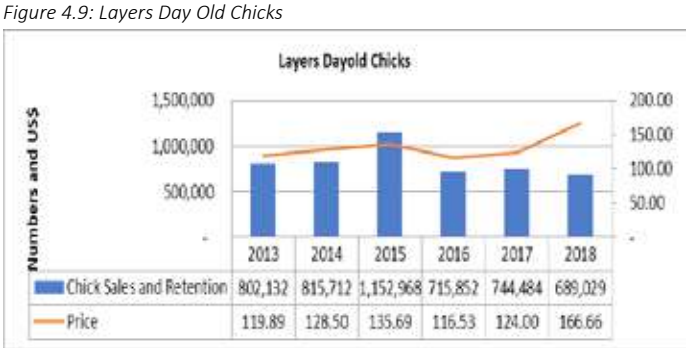
To be specific, eggs produced in 2017 amounted to 1.99 million which is almost 50% of eggs produced in 2013 (see figure 4.8)

Analysing this information, it implies that if the annual average rate continues to decrease, Zimbabwe will now be forced to increase the imports of the eggs. Importing Layer Hatching Eggs will affect the market here in terms of quality of the product and cause trade imbalances.

(h) Layers Day Old Chicks

Figure 4.9 shows that over the years there has been a positive relation between chick sales and retention as well as the price. In the year 2015 when the price increased by $7.11 from 2014, chick sales also increased by 337,256 from 815,712 to 1,152,968 chicks and retention.

Figure 4.9: Layers Day Old Chicks



Source: Ministry of Agriculture (2019)

Likewise, when the price was reduced by 14% in 2016, the sales and retention of layers day old plummeted by 40% to 715,852 in 2016 from 1,152,968. This implies that producers and consumers were both very price sensitive.

4.3 Summary

The livestock sub-sector is an important and integral part of the agricultural sector with beef, dairy, small ruminants, pigs, poultry, apiculture, aquaculture and other small and emerging stock making up the livestock industry. The sub-sector contributes about 19 % to the agricultural GDP (Ministry of Agriculture, 2019). The introduction of FTLR, combined with significant fluctuations in macro-economic conditions, and a transformed agricultural sector post 2000 influenced major changes within the livestock sector. The land redistribution exercise has increased the participation of more than 300,000 newly resettled farmers with varied skills and resources in livestock farming. This transformation of the livestock sector has led to substantial shifts in ownership, use, and livestock management; and associated effects on animal disease management, production and marketing.

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Challenges faced in the sector due to the transformation were identified as the outbreak of diseases, lack of access to affordable funding, expensive inputs when compared to the region and depressed cereal production.

The study noted that on one hand, the livestock herd sizes nationally declined by about 20 % for beef, over 83 % for dairy, and 26 and 25 % for pigs and small ruminants, respectively. While the other livestock species did not recover, the dairy sector is noted to have defied the declining trends due to the presence of an integrated value chain. On the other hand, the productivity of smallholder cattle herds remains very low, with average calving rates of about 45% against a potential of 60 %, and off-take rates of about 6 % against a recommended 20%.

From the study, it was crystal clear that the average slaughter rate was around 5% of total head. The low slaughter rate was largely contributed to the fact that small scale farmers who controlled 69% of the total head keeps cattle as a store of wealth and as a sign of wealth and hence sees slaughtering as wastage. With this observation, it therefore means that small scale farmers are not sweating value in their cows something which could happen if they were slaughtering and restocking. This observation saw similar trends in other ranges of animals such as goats, sheep and pigs.

Against this background, there is need to train farmers with a view of building their capacity to run cattle and animal rearing as a serious business. In addition, there is need to create strong value chain linkages between farmers, the Cold Storage Company, meat processors and abattoirs.

Given that livestock producing districts are in semi-arid conditions key informants noted that Government should incorporate drought mitigation measures in the Command Livestock programme for example, through setting up community livestock centres with access to supplementary feeding. The livestock centres which can be operated by the private sector or farmer groups will be designed to provide attendant services to small scale farmers such as cattle buying points, livestock input selling points and farmer training points. Furthermore, community livestock centres can also be used as artificial insemination and bulling points in a bid to improve rural livestock genetics and quality of beef herds.

The department of Veterinary Services was urged to put in place measures that completely eradicate the continuous outbreak of diseases such as FMD and Avian Influenza Virus. Furthermore, enforcement and review of statutes on animal health ought to be timeously carried out to avoid unnecessary disease outbreaks. Effective management of the FMD problem can be achieved by moving towards a more decentralised marketing and slaughter system. This development would require the construction of abattoirs in strategic locations with a complementary marketing system that minimises transportation of live animals from high risk areas to low risk areas.

Stakeholders advocated for the implementation of a value chain focused livestock policy whose traits are; enhancement of efficiencies along the livestock value chains, security of livestock resources against natural and man-made disasters, equitable development of livestock value chain stakeholders and protecting consumers against risks arising from livestock development.

SECTION FIVE:
ROLE OF FINANCE IN THE AGRICULTURAL SECTOR

5.1 Introduction

Agriculture production need to be supported by a robust financing model that empowers farmers to increase their production and productivity levels. Farmers require capital for equipment and working capital expenditures to optimise their operations. The country requires over $1.2 billion dollars to effectively fund the agriculture sector yearly. This could come in different forms which include command agriculture, contract farming, bank loans, self-funding and donor assistance. Getting the agriculture sector financed is critical for the success of the sector.

5.2 State of Budgetary Allocation to Agriculture

Table 5.1 illustrates national budget allocations to agriculture since 2009. The share of agriculture in the national budget allocations has remained low, less than the African Union's Maputo declaration target of at least 10% except in 2010 when it reached 14%.

Table 5.1: National Budget and Allocations to Agriculture

Year	National Budget (US$m)	Allocation to agriculture (US$m)	Agriculture as a % of the national budget
2009	1,391.00	343.00	2.47
2010	2,250.00	448.00	14.00
2011	2,746.00	122.00	4.40
2012	3,640.00	184.00	8.43
2013	3,860.00	147.00	3.83
2014	4,120.00	155.00	3.76
2015	4,578.00	161.00	3.71
2016	4,434.00	173.00	3.70
2017	4,100.00	291.60	7.11
2018	6,103.00	549.3	9
2019	8,164.00	989.30	12

Source: Ministry of Finance

However, the share increased from an average of 5.5% between 2009 and 2016 to about 7.1% in the 2017 national budget. The highest share of agriculture in national budget allocation was 14% in 2010 which was mainly a result of drought financing. Similarly, in 2012 the share was 8.43% due to drought financing. However, the share decreased to 3.7% in 2016 and then increased in 2017 mainly due to the government's programmes; Presidential input scheme and command agriculture. Command agriculture and the accompanying growth in budget allocation to agriculture had some positive implications on competitiveness of the agricultural sector.

From this analysis, it is clear that the country has failed to meet the regional benchmark set by the Comprehensive Africa Agricultural Development Programme (CAADP) of a minimum 10% of total budget set aside for support in the agricultural sector. Globally, Zimbabwe's budget allocation to the agricultural sector is far below the European contribution of 38% which is provided under the Common Agricultural Policy (CAP).

5.3 Form of Funding Available for Agriculture

Command agriculture sector funding has attracted a lot of farmers to consider it due to its success in the past two seasons. Stakeholder respondents raised interesting debate on their diverse views on the role of subsidies and how they should be implemented.

- Key stakeholders noted that subsidies should target food crops to secure food security while industrial or cash crops should benefit from integrated value chains that have robust backward and forward linkages. Lessons on the importance of strong value chains in spurring production and productivity could be taken from the dairy and tobacco sub-sectors.

- There is evidence to the effect that subsidies bring distortions in the value chain especially on grains that receive two subsidies with the first one being an inputs subsidy during production and the second one in the form of a price support during marketing.

- The emergence of middlemen in the marketing of subsidised crops especially grains transfers the benefits of the subsidy from the intended beneficiary (farmer) to an opportunist (middlemen) who does not grow the crop in the ensuing season.

A new model of funding, contract farming, was observed as the most common

form of funding. While there has been a renewed approach to funding agriculture through the 'Smart Agriculture Model', the participation of most of the majority of banks has been elusive as a result of lack of security of tenure. A number of key informants argued that the 99 – year lease is not bankable and even the so-called smart agriculture programme is at risk since Government of Zimbabwe is the guarantor, a situation which will bring in moral hazards and high default rate.

Table 5.2: Forms of Agriculture Funding in Zimbabwe

Form of Funding	2017	2018	2019
Command Agriculture (Smart Agriculture)	18%	19%	17%
Contract Farming	20%	22%	24%
Bank Loans	10%	8%	9%
Self – funding	24%	25%	24%
Presidential Input Scheme	12%	12%	11%
Donor Funding	7%	7%	8%
Other (Joint Ventures, PPP)	9%	7%	7%

Source: Researchers' Own Observations

Joint Ventures and partnership finance is increasingly seen as a route for rehabilitating and investing in state farms, for example, Chisumbanje sugar mill and plantation. Self-funding through employment income is relatively small and is not sufficient for major take-offs especially in farm operations that require rehabilitation and capitalisation. Development aid organisations also provide finance by way of subsidised loans and grants. The Credit for Agricultural Trade and Expansion (CREATE) fund was established by SNV Netherlands Development Organisation and HIVOS (also from Netherlands) to facilitate the raising of capital for lending to commercial agriculture value chain actors in Zimbabwe. CREATE provide loans ranging from US$5 000 to US$200 000.

(a) How Agriculture Funding is Instituted

Table 5.3 shows that the greater part of half or more of the agriculture funding go towards acquisition of inputs mainly seeds, chemicals and fertilisers. This reflects that funders are concerned about funding the core aspects of agriculture.

Table 5.3: Forms of Expenditure paid for the Funding

	2018	2019
Agriculture inputs (chemicals, seeds and fertilisers)	50%	45%
Farming equipment and land preparation	5%	10%
Labour	8%	12%
Building infrastructure	7%	3%
Irrigation infrastructure	15%	15%
Harvesting, packaging, curing and transport	10%	13%
Other (training, workshops etc)	5%	2%

Source: Researchers' Own Observations

Some of the funders provide the actual inputs (chemicals, seeds and fertilisers) instead of giving farmer money. Due to high demand for irrigation, some funders are funding irrigation infrastructure in the form of Centre Pivots.

(b) Crops being Funded

Table 5.4: Crops funding

Command Agriculture Funding	Contract Funding Model	Donor Funding
Maize	Maize	Small grains – Finger millet, Pearl millet
Soyabeans	Soyabeans	Ground nuts
Wheat	Tobacco	Soya beans
Cotton	Wheat	
Small grains – finger, millet, pearl millet	Sorghum	
	Cotton	

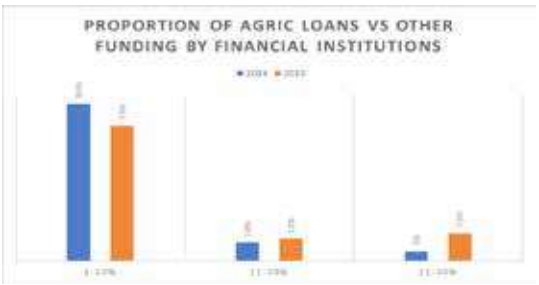
Source: Researchers' Own Observations

Command agriculture is funding maize, soya bean and wheat production. The funding has also been extended to livestock, mainly cattle. Contract funding focuses mainly on tobacco, soya bean and sorghum but has since been extended to maize, and wheat.

(c) Banks Loans

Finance is available from commercial banks and the interest rates charged by banks average 5% per month for short term loans with 1- year repayment period while medium and long - term loans are charged 12% per annum. In order to access funding, in addition to the requirement for a viable business proposal, collateral is required.

Figure 5.1: Proportion of Bank Loans for Agriculture by Funding Institutions



Source: Researchers' Own Observations

Figure 5.1 shows that the majority of financial institutions interviewed, that is, 73%, are spending less than 10% of their funding on agriculture, that is, a decline of 12% from 2018. However, contrary to the 2018 situation where 5% of 21-30% of the loan book was funding the agricultural sector, in 2019, 21-30% of the loan book funded agriculture. This rise, as noted from the study, was driven by the contribution of smart agriculture and its causal effect amongst banks as they crowd in to fund the agricultural sector (see box 5.1).

Box 5.1: The Agro-Yield Programme

Context of the Agro-Yield Programme

The Agro-Yield programme was implemented in 2019 as a private sector led by the CBZ as a successor to the Command Agricultural programme. The main focus of the Agro-Yield is in the finance of maize, soya beans and wheat. Agro-Yield Programme mandate is to improve quality and efficiency in financing agricultural chains. The programme focus on:

1. Identifying the financing needed to strengthen the chain;
2. Tailoring financial products to suit the needs of the participants in the chain;
3. Reducing financial transaction costs through efficient bulk buying
4. Using value chain linkages and knowledge of the chain to mitigate risks to the chain and its partners.

The programme finances maize, soya beans and wheat. Using the e-voucher system, the programme assisted farmers through provision of resources on land preparation and key inputs such as seed, fuel, chemicals and fertilisers. For the 2019/20 farming season, the Agro-Yield programme supported 35,898 farmers covering 208,000 hectares of maize and 38,000 hectares of soya beans.

	Target 2019/20	Actual 2019/20	Achievement %
Hectares	Ha/Tonnes	Ha/Tonnes	Ha/Tonnes
Maize Irrigated (ha)	80,000	65,034	81%
Maize dryland (ha)	130,000	142,065	109%
Total Maize	210,000	207,099	99%
Soya Beans (ha)	30,000	38,026	127%
Total	240,000	245,125	102%
Basal	96,000	75,000	78%
Top dressing	96,000	75,000	78%
Fuel	26,400,000	12,164,000	46%
Maize	5,250	5,177	99%
Soyabeans	3,000	3,803	127%

In building a shield on the prevalence drought of security of tenure which characterises the majority of the farmers, these inputs were given using an e-voucher system. The e-voucher system has the following capabilities which can assist in building "the invisible collateral system":

- accountability;
- Building database of farmers which shows:
- Paid up farmers

- Farmers with creditworthiness (paid up farmers);
- Farmers with equipment;
- Farmers who have demonstrated ability to produce;
- Preferred crops in an area; and
- Disaggregation of farmers by gender.

In order to get the farmers who meets the above criteria with limited handles, CBZ worked with the Agritex and supported 35,898 farmers covering 208,000 hectares of maize and 38,000 hectares of soya beans.

Economic Impact of the Agro – Yield Programme

- The general macroeconomic environment was characterised by exchange rate spikes and chronic inflation, both of which have a combined effect of eroding farmers capital thereby making it difficult for farmers to go back to the farms. Because the Agro-Yield programme provided key inputs as well as land preparation for the 35,898 farmers, in a significant way, brought farmers back to business and saved the country from what could have been a monumental failure of the 2019 agricultural season;
- The Agro – Yield programme has impacted positively on various value chains which inter alia include:
- The timber industry – the sector is witnessing a surge in demand of gum poles by various stakeholders in the farming sector which include GMB to stake the maize;
- The tent manufacturing industry - witnessed increase in demand for tents by farmers and GMB;
- The Agro – Yield programme revamped the irrigation system in the country as the bank directed resources towards irrigation;
- The Agro – Yield programme opened space for more banks to crown in funding the agricultural sector;

The Agro – Yield Future Outlook

Over and above of the input support programme, the Agro – Yield programme envisaged to support farmers in the following areas:

- Irrigation;
- Mechanisation through a scheme of tractors;
- Supporting farmers to put a quota for export market which will be used to build the necessary capacity for servicing of acquired tractors and building more stock of equipment on the farms.

Challenges Faced

The effectiveness of the programme in dealing with security of tenure will be fully tested when the 2018/2019 farming seasons closed end of August 2020. The existing challenges facing the programme are centred around volatile macroeconomic environment which are characterised by chronic inflation and exchange rate spikes both of which causes massive capital erosion – this, if unattended to, will result shrinking of the capital base of the Agro-Yield Programme. In addition, since the price of maize, wheat and soya beans is controlled by Government, delays in adjusting the prices in line with inflation developments poses serious risks of underperformance by the farmers in delivering the product.

Product	Programme Size (HA)	Expected Yield/HA	Total (MT)
Maize Irrigation	80,000	8	640,000.00
Maize Dry Land	210,000	8	1,680,000.00
Total Maize Expected			2,320,000.00
SOYA IRRIGATION	10,000	4	40,000.00
SOYA DRY	50,000	4	200,000.00
Total Soabeans expected			240,000.00

Source: Researchers' Own Observations Based on Interviews Held

Notable agriculture infrastructure projects funded by banks include irrigation equipment, grain storage facilities, tobacco barns, green houses, pen fattening, poultry as well as working capital for inputs and transport logistics.

As a measure to mitigate risk, banks screen farmers for funding and the general requirements are title deeds, stock orders, notarial general covering bonds (NGCBs) over farm machinery and equipment, mortgage bonds and crop stop orders.

Ironically, banks are not willing to lend to small scale farmers who are growing cereals due to lack of collateral but are funding seed growers, tobacco farmers and dairy farmers on the back of a strong value chain which exists in these sub sectors. The 99-year leases should be bankable to allow for long-term investment on the farm and capacitate borrowing when using them as collateral.

(d) Role of Joint Ventures

As noted in the 2018 Agricultural Survey Report, the Government of Zimbabwe, through the Joint Venture Act, has opened up the agricultural sector for private investors. Interestingly, the Agricultural and Rural Development Authority (ARDA) scouted for a number of investors with a view to resuscitate its plantations. Using ARDA as a case study, the impact of the joint ventures on the agricultural sector is thus, presented in box 5.2.

Box 5.2: The Role of ARDA in Zimbabwe's Agricultural Sector

ARDA is a state-owned enterprise under the Ministry of Agriculture Mechanization and Irrigation Development that is responsible for spearheading the advancement of agricultural production and rural development. ARDA derives its mandate from the ARDA Act that seeks to promote development through implementation of vibrant schemes in the agricultural sector with a view of reducing poverty especially in rural areas. The authority has substantial land holding across the country comprising of 21 estates with a total of 98,000 hectares of arable land of which 19.4% is irrigable.

The authority's interventions in the agriculture sector are divided into two main categories, namely commercial/business operations and rural development. Commercial operations involve production of various crops and livestock at the 21 estates which operate as strategic business units (SBUs). In that regard each SBU maintains separate accounts that it can use to secure funding. However, in the last decade financing of all the SBUs became a serious challenge despite the floating of the Agriculture Marketing Authority bonds as a source of funding. Production plummeted to less than 30% of capacity because of lack of funding and the authority responded by adopting strategic public private partnerships (PPPs) financing models to resuscitate operations and to date 18 of its SBUs have entered into partnership with private companies under the public private partnership (PPP) scheme. Under the PPP arrangements, ARDA has used a number of frameworks which ranges from joint ventures (JVs), build operate and transfer (BOT), rehabilitate operate and transfer (ROT), management contracts, leasing and share farming arrangements for its SBUs in sugar cane, ethanol, horticulture, maize, wheat, tea, safaris and gaming and livestock production.

The most famous PPP entered into by ARDA is the Chisumbanje Estate where a businessman Billy Rautenbach provided working capital and invested US$300 million in a sugar cane processing plant under a BOT arrangement. The resuscitation of the Chisumbanje Estates created direct and indirect employment to thousands of people and has increased the production of ethanol used in the blending of fuel. Furthermore, ARDA joined hands with private players in its Antelope Estate to produce cereals. This investment saw 320 direct jobs being created.

In addition to PPPs, ARDA is implementing the Agricultural Based Socio-Economic programmes to improve the livelihoods of rural communities through-out-grower schemes and smallholder irrigation schemes. In this scheme, ARDA provides a ready market to contracted farmers as well as extension services in an effort to boost production and productivity. In the same vein, ARDA is funding infrastructures such as centre pivots and water infrastructures.

With respect livestock, ARDA partnered with private sector in the production of cattle in Matebeleland In this project, ARDA partnered with Kalimba Investments in the production of livestock and pecan nuts in its Balu Estate in Umguza District. Pecan nuts are being produced for export market while the cattled production is earmarked for local market.

Source: Researchers' Own Observation Based on the Interaction with ARDA

(e) Private Sector Credit Schemes

Private sector companies that are interested in getting uninterrupted supply of raw materials from farmers enter into contract farming arrangements or out

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grower schemes with farmers. Crops such as tobacco, seed cotton, maize and sorghum as well as dairy and chicken rearing projects are anchored by contract farming schemes.

Contract farming schemes sustain millions of livelihoods in Zimbabwe, for example, in cotton alone, more than 300 000 households are contracted to grow the crop. The main challenges in contract farming are to do with side marketing, poor loan recovery and poor quality output.

The study noted that the seed industry is supporting seed out growers with an average land size of 15,000 hectares. In support of the out growers' schemes through contract farming, the study observed that companies are applying the following local content enhancement or support programmes:

- Provision of an extension officer for every 400 hectares of land under seed production;
- Provision of working capital and input support. The working capital includes provision of cash for the payment of wages during harvesting;
- Financial support in the establishment of centre pivots, seed drying units, seed graders, on farm weather station, tractors and planters, grading sheds and silos. Since 2015, the seed industry has invested about $7 million into these key farm infrastructures;
- Provision of a ready market for the seed;
- Overall, the seed industry has played a role of an aggregator where they provide a market for the seed growers while at the same time the sector plays a significant role in funding farmers which if left alone have no capacity to access funding from bank since they have no collateral.

(f) Development Partners

Development partners play a critical role in agriculture as they establish a link between farmers donor funds. The funds are provided under pure grants, match making grants, revolving funds and concessionary loans to individuals and farmers groups. They provide funding for incentives to reinvest in agriculture, increase production and in the long run, contribute to food security and income generation. Development partners provide financial assistance to the agriculture sector and private companies with the aim of coming up with innovative solutions to challenges being faced by farmers. They work with banks for farmers to get financial assistance, thus through financial linkage/financial inclusion programmes. Development Partners establishes a link between agriculture and finance as they source funds from donors. Box 5.3 provides a comprehensive illustration of how development partners participate in agricultural sector.

Box 5.3: The Role of DFID in Zimbabwe's Agricultural Sector

The United Kingdom through the Department for International Development (DFID) has supported the agriculture sector in Zimbabwe with a view of reducing poverty in rural areas. The DFID's perspective is grounded on the recognition that agricultural production depends on and is driven by demand from buyers, processers and ultimately consumers along the supply chain, and that agro-industry plays a critical role in value addition, job creation and in shaping diets. In Zimbabwe DFID implements programs that cover 3 thematic areas namely; agriculture productivity and nutrition, market development and climate change mitigation. DFID's programs seek to capacitate smallholder farmers to produce for sustenance and for sale if there is a surplus. DFID operates in 8 districts found in Mashonaland Central, Midlands and Manicaland provinces. The districts covered in Mashonaland Central are Guruve and Mount Darwin while in Midlands province it supports farmers in Gokwe South, Kwekwe and Shurugwi. In Manicaland province the districts covered are Mutasa, Makoni and Mutare. The districts were selected based on poverty levels, food insecurity, the prevalence of stunting and potential for market development.

According to DFID, the agriculture productivity and nutrition programme which is managed by the Food and Agriculture Organisation (FAO), seeks to support the enhancement of productive and technical knowledge of farmers through production technology, bio-fortified and high yielding varieties, rural market financing for training of smallholder farmers. Given that maize is a staple crop for Zimbabwe, DFID prioritized its bio-fortification and fortification for the crop to become more nutritious and accessible to poor households in sufficient quantities. In that regard, DFID supports bio-fortification and fortification at various stages of the production and supply chain and through strategic social marketing to ensure wide adoption and competitive pricing. Other crops supported in the bio-fortification and fortification programme are beans and groundnuts.
Furthermore, DFID also support livestock production to improve on quality through pen fattening projects and improvement of breeds for small livestock such as goats.

With respect to market development DFID explained that it is helping farmers to access markets since markets are an part of an integral production plan. In that regard, DFID is working with the private sector to finance livelihoods and food security programme (LFSP) that promote aggregation at national and community levels, promote market linkages at farmer group level and development of commodity associations. In market aggregation the programme is implemented in partnership with private companies such as Super Seeds, Seed Co-op and MC Meats. The development partner indicated that it also support livestock projects and also provides funding to micro-finance institutions under the Zimbabwe Market Finance Fund facility. DFID underscored that it has received a GBP20 million LFSP facility which will run for the next 2.5 years following the expiry of another GBP 70 million 4 year LFSP in August 2018 that was financed by UK and AusAID.

The climate change mitigation programme is carried out in partnership with United Nations Development Programme (UNDP) and AGRITEX officers in the Ministry of Agriculture to promote climate smart agriculture. A Zimbabwe Resilience Building Fund (ZRBF) worth GBP21.5 million supported by the UK government and the European Union (EU) has been put in place to that effect. The ZRBF seeks to contribute to increased capacities of vulnerable rural farmers to withstand shocks and stress, ultimately leading to a reduced need for humanitarian responses and welfare improvement. The fund supports farmers in natural regions 4 and 5 to grow small grain crops suitable for their areas. In addition to that it also mitigates effects of climate change through drilling of boreholes and providing finance for irrigation kits. Other programs that DFID finances are post-harvest loss and storage issues and taking the product to the market before it loses quality.

Source: Researcher's Own Observation Based on the Interaction with DFID

5.4 Unlocking Funding into Agriculture

From a government perspective, as noted by FAO (2017), government must provide catalytic role in creating an environment for mobilising funding into the agricultural sector. This catalytic role can be through the provision of incentives to banks and companies funding farmers, provision of funding into key infrastructure such as irrigation, road rehabilitation and other infrastructure such as provision of electricity. In order to finance this, government must allocate at least 10% of its budget into agriculture in line with the CAADP. This is expected to attract financiers to participate in funding agriculture.

International experience, as noted by the United Nation Conference for Trade and Development (UNCTAD) (2014) showed that commodity exchanges provide an effective platform for funding agricultural sector as well as an effective market for farmer produce (see box 5.4).

Box 5.4: Unlocking Finance Through Commodity Exchange

Africa's smallholder farmers have long been victim to fragmented, disorganised markets where they have had to sell their products for lower than the market price. Commodity exchanges offer more stable, more ethical trading platforms whereby farmers can benefit from fairer transactions and learn how to make wiser marketing and investment decisions. There has never been a better time to increase the number of commodity exchanges in Africa and ensure fledgling farmers have every chance of survival. Africa's poor tend to be its smallholder farmers. They remain poor because they have no money to buy good quality seeds and fertiliser and no money to invest in machines or techniques that can optimise their farming (e.g. irrigation). With little infrastructure to connect their villages to the markets where agri-products are bought and sold, they are left cut off from a stable and profitable supply chain.

This type of market fragmentation means that many African smallholder farmers are caught in a cycle of poverty. UNCTAD noted that the fragmentation of farmers led to exploitation. In a pattern established over decades, various intermediaries, from private traders to public marketing boards, have taken advantage of the disorganised markets. Typically, such intermediaries can enjoy being the only purchaser a farmer has contact with. This lack of competition means they can ensure that a farmer has no choice but to take whatever price is offered. This is sometimes as low as 10% of the on-going market price (UNCTAD, 2014). Organised and regulated commodity exchanges were noted as effective platforms for the provision of revolutionary changes to the way African smallholder farmers fare.

UNCTAD (2014) explained the benefits of commodity and derivatives exchanges as well as a concise explanation of why they are important:

"Commodity Exchanges are highly efficient platforms for buyers and sellers to meet; primarily to manage their price risks better, but also to improve the marketing of their physical products. They [make] economies more inclusive, boosting the links between agriculture and finance, and making the commodity sector more efficient and competitive."

A study conducted under the auspices of UNCTAD identified a total of 69 positive impacts that commodity and derivatives exchanges offer. The most important can be summarised as follows: Quick and easy dissemination of market price and other information which farmers would not otherwise have access to. This can be achieved without any dramatic technological advances: in India, for example, the national post office delivers daily price information to villages, which is then displayed on blackboards in prominent places. Once farmers know what the market price is, they can enjoy fairer negotiations with purchasers and can make more informed judgments on what to invest in the future and how to market it. A free and open auction system which ensures farmers can sell their goods close to the market price, or even above it. This is another feature that can help farmers make more informed decisions on their future farming activities such as what to invest in and how to diversify their sources of income. The opportunity to 'hedge' against volatile prices, meaning farmers can 'lock in' their sales price at the time of planting particular crops. This way farmers can enjoy an element of certainty about the price they will receive at harvest and can budget accordingly. They can choose which crops to grow and judge when is the best time to sell them on the market, minimising the risk of losing revenues as prices fluctuate. Fewer risks to financiers, who can use warehouse receipts as collateral ready to liquidate in an event of default. Traditionally, financiers have considered agriculture as a high risk and low profit business for standard modes of bank-lending. As a consequence, farmers and others in the commodity value chain pay disproportionately high levels of interest. Through commodity exchange 'eco systems' (such as warehouses) forms of financing have been developed that can reduce financiers' risk and costs of delivery by linking traditional financial tools with commodity exchange services. A stimulus for infrastructure development, as an exchange, by definition, can only truly flourish with as many participants as possible. More commodity exchanges would provide African governmental bodies and investors with an impetus to create better roads to connect farmers to markets and reduce fragmentation.

Source: UNCTAD (2014)

As Zimbabwe is working on establishing the commodity exchange, it is important that the policy environment; rules relating to ownership of exchanges; rules and regulations to underpin a successful exchange; better product development; as well as the creation of clearing guarantee structures are put in place.

5.5 Summary

International experience, as noted by FAO (2017) shows that there is a positive causal relationship between access to finance in the agricultural sector and agricultural productivity. In Zimbabwe, evidence shows that commercial farmers who have access to funding are getting yields averaging 1.5 metric tonnes per hectare while communal farmers who rarely get funding produce around 0.4 metric tonnes per hectare. However, what was striking to note is the fact that 73% of banks interviewed are lending less than 10% of their total loans. Outside traditional loans from banks, the study noted that the major source of funding which was made available to farmers was through contract farming and presidential input support.

The study noted that where contract farming was used, the contracting company became the aggregator and on the back of the strength of its balance sheet has been able to access fund the farmers who have no collateral. This has resulted in the elimination of the challenges related to security of tenure. This observation was largely noted in the tobacco, food and beverages sectors. However, one key feature which enabled the enhancement of these value chain financing models relates to the business environment in these sectors. For example, in the tobacco sector, the crop is sold under an auction system which allows for efficient price recovery as opposed to cereals such as soya bean, maize and wheat which are under price control regime.

Based on this foregoing, it is important that Government liberalises the agricultural sector and operationalise the commodity exchange which will come with effective financial instruments such as warehouse receipts and derivatives which were noted to be effective in funding the agricultural sector globally. In the same vein, fiscal incentives aimed at supporting companies who are funding agricultural sector under contract farming should be considered with a view of encouraging the practice.

SECTION SIX:
IMPACT OF CLIMATE CHANGE ON AGRICULTURE PRODUCTIVITY

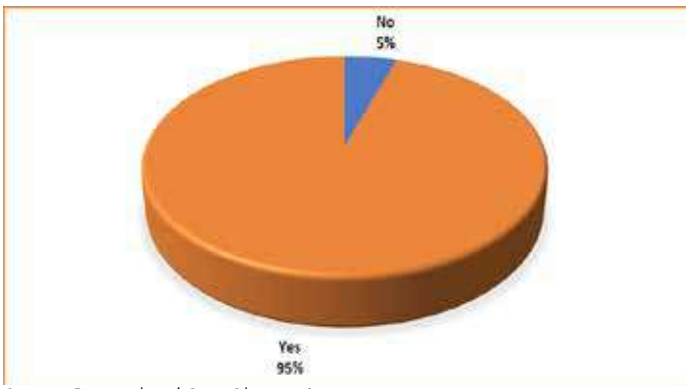
6.1 Introduction

Climate change has adverse effects on the country, mainly due to an increase in the intensities and/or frequency of natural events, drought and floods occurrence in Zimbabwe. The effects of adverse natural events are already being felt. Extreme climate events are having a strong impact on agricultural production in the country and, in turn, on GDP. The agricultural sector is particularly prone to crop yield loss and damage to livestock, fishery and aquaculture infrastructure, and irrigation structures. Two critical impacts of climate change not only on agriculture but also rural livelihoods are reduced water availability, especially for small-scale agriculture, and variability of rainfall.

6.2 Impact of Climate Change

Figure 6.1 shows that 95% of survey respondents indicated that climate change has a significant impact on agricultural productivity. Extreme weather patterns affect crop productivity as high temperatures or excessive rainfall have an adverse effect on both crop and livestock production and productivity.

Figure 6.1: Impact of Climate Change



Source: Researchers' Own Observation

Respondents interviewed highlighted that the rain season in Zimbabwe is no longer falling in the gazetted months and that affects the farmers' planning calendar as the actual planting and stalk destruction dates for crops such as tobacco and cotton no longer match with government's legislated dates.

A development partner DFID indicated that it is working with the Ministry of Lands Agriculture and Rural Resettlement to promote climate smart agriculture. In the climate smart agriculture programme DFID introduced the Zimbabwe Resilience Fund that focus on natural regions 4 and 5 farmers for them to grow

small grain crops that are resistant to drought. In addition, DFID underscored that it provide finance for irrigation kits and drilling of boreholes.

6.3 Forms of Climatic Change Experienced in Zimbabwe

Figure 6.2 shows that droughts, floods, increased temperature, increased rainfall variability and declining precipitation affected negatively agriculture in Zimbabwe, with other districts recording almost nothing in terms of output.

Figure 6.2: Forms of Climatic Change Experienced in Zimbabwe

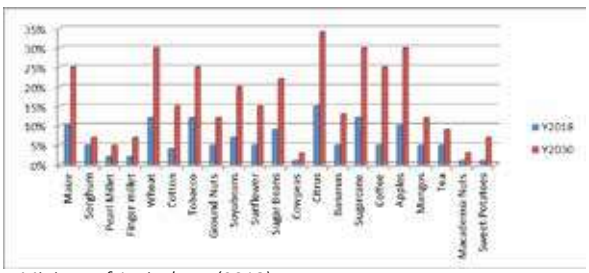
Source: Researchers' Own Observations

Respondents noted that droughts, floods, declining precipitation and rainfall variability were major mechanism which affected agricultural productivity cause by climate change vulnerability (see figure 6.2). In 2019, contrary to observations made in 2018, of interest to note is the increase in the contribution of drought and declining precipitation to agricultural productivity as well as a fall in the contribution of floods. This outcome is consistent with global trends noted by FAO (2016).

6.4 Estimated Percentage loss in Terms of Specified Crops (2018 and 2030)

Figure 6.3 shows that the crops which were negatively influenced by climate change were maize, wheat, tobacco, citrus, sugarcane, coffee and apples. The effects of climate change are expected to increase by 2030. This calls for urgent action by government and private stakeholders to take up some measures to reduce the negative effects of climate change.

Figure 6.3: Estimated %age loss in terms of specified crops (2018 and 2030)



Source: Ministry of Agriculture (2018)

A review of secondary data from NAPF 2018 statistics reveals that climate change have triggered yield reductions for Southern Africa. These have been estimated to decline by averages of between 11% and 30% by 2030. The NAPF further states that climate projections up to 2070 for Zimbabwe show a 2.5 degrees Celsius increase in temperature. On the other hand, rainfall will decrease by 4.1 % and 5.9 % by 2030 and 2070 respectively. The effects of temperature changes on agricultural production will be more pronounced in the south-western parts of the country where temperatures will increase by 2.2 degrees celsius; while those triggered by rainfall reductions will be highest in Mashonaland Central, Mashonaland East, Manicaland, and Masvingo provinces.

Key respondents interviewed highlighted that Government has recognised the importance of dealing with climate change, numerous programmes and projects have been designed and implemented, but there are still many shortfalls. Respondents revealed that at the government level, arrangements for climate change adaptation are mostly weak and lack an appropriate legislative framework. Donors and NGOs also complimented government efforts, but the resulting efforts related to climate change in agriculture are highly fragmented and ad hoc. Vision 2030 does not deal explicitly with the effects of climate change. In fact, climate change is normally placed under the theme of environmental management in hazard risk reduction.

6.5 Summary

The research shows that climate change vulnerability negatively impacted on productivity in the agricultural sector. Against this background, there is need to come up with practical measures aimed at mitigating and adapting to the effects of climate change.

One effective way which has been adopted by the United Nations Framework Convention on Climate Change to combat climate change is the adoption of climate-smart agriculture which aims at sustainably increasing food security and incomes, and adapting and building resilience to climate change. Climate – smart agriculture connects other innovations, such as conservation agriculture, agroecology, agroforestry and the development of crop varieties that are more tolerant to pests, diseases, drought, waterlogging and salinity (FAO, 2013). FAO (2017) noted that climate-smart agriculture has promoted mixed crop-livestock systems and sustainable livestock production, which integrate environmental and production objectives through, for example, the rotation of pasture and forage crops to enhance soil quality and reduce erosion, and the use of livestock manure to maintain soil fertility.

In climate-smart agriculture, agroforestry systems are an important means of sustainably producing food while conserving ecosystems, especially in marginal areas prone to environmental degradation. Zimbabwe can work with development partners such as DfID who are already working with farmers in combating climate change through climate-smart agriculture.

SECTION SEVEN:
AGRICULTURE PRODUCTION INDICES

7.1 Introduction

Agriculture Index numbers are required in order to study the trends over time in respect of area, yield, production, productivity, prices, etc. and for studying the comparative picture of the performance of the agricultural sector. Zimbabwean agriculture is two-fold that is crop and animal. This study assesses Zimbabwe crop production ratios, livestock ratios and farmers' livelihood ratios.

7.2 Zimbabwe Crop Production Ratios

The crop production ratios were calculated based on the average yield figures. As noted by FAO (2016), the index or ratio may be easily calculated based on year to year improvements or based on the selected base year for benchmarking or comparison.

Year on year trends between seasons, the study adopted the following formula:

$$\left[\frac{\text{Total average yield for current season}}{\text{Total average yield for previous season}} \times 100\right] \qquad \textit{Equation 1}$$

According to FAO (2016) any percentage below 100% means there is negative growth for the current period compared to the previous period.

In terms of this formula, agriculture output was 48% of the previous season, reflecting a negative growth of 52% in 2018/19 season from 2017/18 season (Table 7.1). This was mainly attributed to drought.

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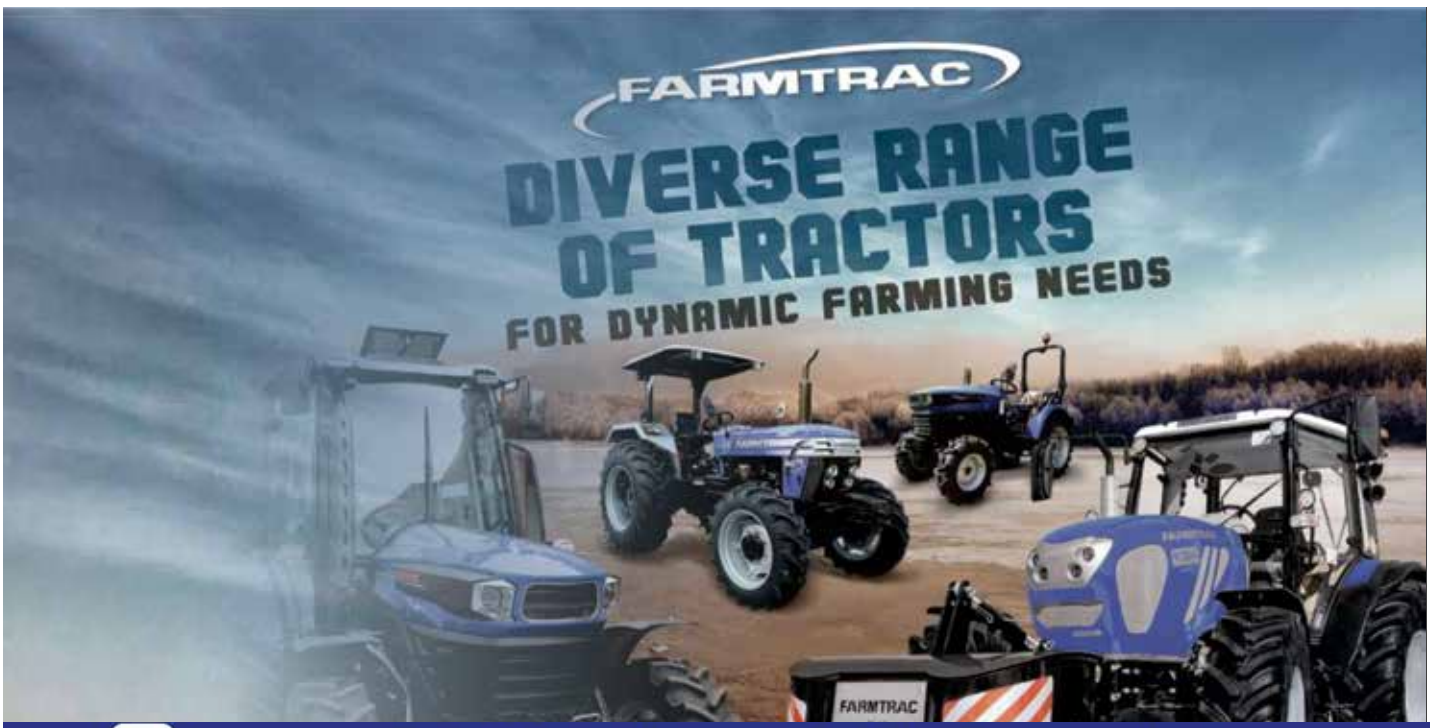

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Benchmarking with the base year, the study adjusted the formula to:

$$\left[\frac{\text{Total average yield for current season}}{\text{Total average yield for base season}} \times 100\right] \qquad \textit{Equation 2}$$

In terms of this formula any percentage below 100% means there is negative growth for the current period compared to the base year period.

In terms of the study crop production in the 2018/19 season based on 2016/2017 season as base year, agriculture production was 41.8% showing a negative growth of 58.2% (Table 7.1).

Table 7.1: Crop Production Ratios

Crop Production Ratio	Output Ratio	Growth Ratio
Using Year on Year	48%	-52%
Using Base Year	41.8%	-58.2%

6.3 Zimbabwe Livestock Production Ratios

6.3.1 Calving rates

Calving rate measure of productivity in livestock

Calving rate is a production parameter that a cow/calf producer can record because it has both input and output components. Inputs include genetic selection, nutrition and management, management during the breeding season, management during the calving season and management from calving to weaning. The output component is based on reproduction which influences total kilogrammes of weight that is available for sale at weaning. It is calculated as a number of calves weaned (numerator) divided by the number of females exposed to produce that calf (denominator) and this number times 100 to get it to a percentage as shown in Equation 3.

$$\left[\frac{\text{Number of calves weaned}}{\text{Number of cows exposed}}\right] \times 100 \qquad \textit{Equation 3}$$

Calving rate figures observed were between 22.9% and 38.7% with an average of 33.37%. The national average is currently between 33 and 45% compared to 31.4% observed in the survey.

Table 7.2: Calving Ratios

Province	Calving Rate%	Cattle mortality rate %
Manicaland	22.9	30.1
Mashonaland Central	33.2	22.6
Mashonaland East	28.5	19.6
Mashonaland West	32.4	29
Masvingo	35.6	39.2
Matabeleland North	38.2	9.1
Matabeleland South	37.5	7.8
Midlands	38.7	17.01
Overall	33.37	21.8

The cattle mortality rate was measure using the following formula;

$$\left[\frac{\text{Number of cattle died during the year}}{\text{Average headsize}} \times 100\right] \qquad \textit{Equation 4}$$

The high cattle mortality rate (39.2%) were recorded in Masvingo, Manicaland, Mashonaland Central, and West provinces. The relatively high figures were attributed to the outbreak of January disease (Theileriosis), a tick-borne disease. In addition, some of deaths of cattle were attributed to hunger and/or water shortages (Veterinary Services, Annual Report, 2019). Noted poverty deaths were as provided in table below.

Table 7.3: Noted Poverty Cattle Deaths in Specific Provinces

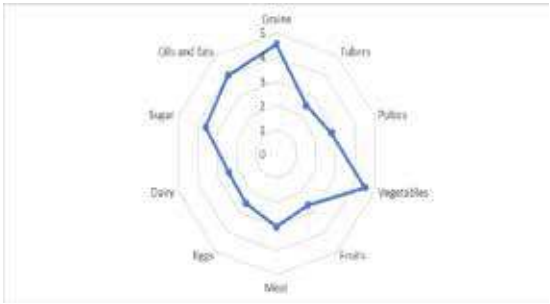
Province	Poverty Deaths
Matabeleland South	16,863
Matabeleland North	6,420
Masvingo	17,518
Midlands	6,800
Mashonaland West	47
Total	47,648

Table 6.2 shows that Masvingo (17 518) and Matabeleland South (16 863) provinces reported the highest number of poverty deaths in cattle while Mashonaland West (47) recorded the least. Accordingly, farmers should always be prepared to reduce the effects of cattle poverty deaths by providing supplementary feed, i.e., harvesting grass from provinces with abundance.

7.3.2 Farmers Livelihood Ratios

The household dietary diversity score (HDDS) is used to assess the extent to which households had access to food in the right quality and quantity (USAID, 2019). A number of approaches are used to determine HDDS including the 24-hour recall and the seven-day method. In this study, the 24-hour recall period was used, in this case 10 food groups were identified: grains, tubers, pulses, vegetables, fruits, meat, eggs, dairy, sugar and oils/fats as shown in Figure 1. This provided a proxy for the availability of the main nutrients required for a normal and healthy life: carbohydrates, vitamins, minerals, and proteins for most farmers in Zimbabwe. The HDDS was computed as the unweighted sum of each of the ten food groups.

Figure 7.1: Food dietary diversity among farmers and rural households



Source: ZIMVAC (2020)

Figure 7.1 shows that the diet of farmers was based on grains and vegetables in the form of maize and greens. There is a deficit in terms of dairy, eggs, and pulses. These findings could potentially change if conducted at different times of the year. This is also aided by the major support or contribution rendered to rural households as articulated in the ZimVAC Report (2020) that most concentration is to provide cereal crops to districts with cereal gaps in order to reduce hanger and poverty. Table 7.4 provides the mean values for farmers' dietary diversity scores disaggregated by eight provinces.

Table 7.4: Food dietary diversity among farmers in Zimbabwe (24-hour recall)

Province	HDDS
Manicaland	4.80
Mashonaland Central	3.95
Mashonaland East	4.37
Mashonaland West	4.56
Masvingo	3.33
Matabeleland North	4.95
Matabeleland South	5.20
Midlands	4.70
Overall	4.40

Table 7.4 shows that Matabeleland South had the highest HDDS and Masvingo had

the lowest. From observations, most of the provinces which are high crop producers have lower HDDS than those which are livestock producers. This is support by the ZimVAC Report (2020) majority of the households consume poor diets.

7.4 Summary

The survey results showed negative growth rates for crop production for the period under review. The negative growth was mainly attributed to drought. Therefore, farmers are encouraged to have irrigation infrastructure to mitigate the effects of drought. Irrigation infrastructure can be acquired through government initiatives for improved irrigation infrastructure and partnering with other institutions which provide irrigation equipment.

The survey also revealed high cattle mortality rates. This mortality rates were mainly attributed to January diseases which is a tick-borne disease, which can be controlled by dipping cattle regularly. It is critical to educate farmers to dip their cattle at farms as government is having challenges to provide the service. Farmers must acquire their own dipping chemicals.

SECTION EIGHT:
GAPS AND OPPORTUNITIES ZIMBABWE AGRICULTURE SECTOR

8.1 Introduction

This section identifies gaps and opportunities that are available in the agriculture sector in Zimbabwe. These are identified on the basis of need, demand, the potential, risk and relevance on the value chain.

8.2 Gaps and Opportunities in Agricultural Sector

8.2.1 Crops

Zimbabwe, as noted by the International Trade Centre, imports annually cereals worth $510 million and a further $250 million on oil seeds. These cereals and oil seeds include wheat and soya bean which has reported serious deficits as shown in table 8.1. This therefore presents investment opportunities for both agro-processors and financial sector.

Table 8.1: Crop Production Compared to National Requirements

Crop	Requirements (MT)	Available Food Production (MT) in 2020	Surplus/ Deficits (MT)
[1]Cereal (Maize, sorghum, pearl and finger millet)	2 204 225	851 844	-1 352 381
[2]Groundnut	101 217	70 902	-30 315
[2]Roundnut	130 136	29 396	-100 740
[2]Sugarbean	101 217	9 528	-91 689
[2]Cowpeas	86 757	12 655	-74 102
[2]Sweet Potato	303 651	88 248	-215 403
Total	2 458 124	1 055 563	-1 402 561

Source: Ministry of Agriculture (2020) and Researchers' Own Observation

Crop and livestock production and productivity has significantly declined and remains too low to sustain agricultural growth. The survey noted that several factors combine to engender low productivity and low production in agriculture. These include: low skills and knowledge base of farmers; a weak research, education and farmer training and extension system as a source of technology and innovation; the shortage of inputs and equipment; low levels of mechanisation; reliance on rain-fed agriculture; limited access to market information and marketing facilities; limited access to finance; limited security of tenure; pest and disease attacks including the fall army worm; low capacity to manage post-harvest losses; and increased incidence and intensity of climate shocks such as El Niño.

8.2.2 Irrigation and Water Management

Irrigation plays an important role in agriculture because it reduces farmers' vulnerability to weather and climate shocks and risks. The study noted that Zimbabwe has a potential to irrigate more than 2 million hectares of land and yet, less than 206,000 hectares are currently under irrigation. The utilisation of existing water bodies, underground water and transboundary water bodies such as the Zambezi River and Limpopo Rivers can make a significant contribution to food security and agricultural growth in the country, especially in drought periods. However, the available water bodies are currently under-utilised, mainly due to lack investment in irrigation development, rehabilitation and modernisation. A number of stakeholders interviewed noted with concerns that the majority of these water bodies are silted. And, as such, there is need for massive investments towards desilting. However, regardless of this observation, the study noted that Zimbabwe has potential irrigable land which is not being fully utilised (see table 8.2).

Table 8.2: Opportunities for Irrigation

Name of Dam	Province	Potential Irrigable Area (Ha)	Natural Region
Zhowe	Matabeleland South	500	V
Muzhwi	Masvingo	680	IV
Manyuchi	Masvingo	330	V
Osborne	Manicaland	1700	IV
Mbindangombe	Masvingo	100	V
Mtshabezi	Matabeleland South	300	V
Tshatshani	Matabeleland North	230	V
Mwarazi	Manicaland	400	IIB
Mwenje	Mashonaland Central	400	IIA
Mazvikadei	Mashonaland West	1000	IV
Tokwe Mukosi	Masvingo	25000	IV
Total		31140	

Source: Ministry of Agriculture (2020) and ZINWA (2019)

Investment opportunities presented through various irrigation schemes which looks very lucrative considering the fact that climate change vulnerability is negatively affecting yields. Investment into irrigation will not only mitigate climate change but also raise productivity and national output considering the fact that farmers will not have to wait for the rains.

8.2.3 Opportunities in Farm machinery and Agricultural Mechanisation

The limited access to agricultural machinery and implements is compromising timeliness of farm operations. For instance, the current national requirements for tractors and combine harvesters stands at 40,000 and 400 units respectively, against the currently available of 14,000 tractors and 300 combine harvesters (Ministry of Agriculture, 2020). This is maintaining the labour-intensive narrative about the agricultural sector in the country. Farm structures for both crops and livestock such as greenhouses, animal handling, crop produce handling, tobacco curing bans, sales pens, dipping tanks, storage facilities and machinery sheds as well as accessible roads are in a poor state and require rehabilitation. Insufficient skills in the use and maintenance of agricultural infrastructure and technology negatively impacts the lifespan of the agricultural infrastructure. From this perspective, there is scope for investment into mechanisation of the agricultural sector in Zimbabwe.

Table 8.3: Available Machinery Nexus National Requirement

Type of Machinery	Number of Machinery/Implements				
	National Requirement	Functioning	Need Refurbishment	Total Available	Deficit
Tractors	40 000	6000	4 000	10 000	30 000
Combines	600	150	50	200	400
Ripper	15 000	1 000	200	1 200	13 800
Disc Harrow	25 000	3 000	500	3 000	8 000
Planter	20 000	2 000	200	2 200	17 800
Spreaders	5 000	400	100	500	4 500
Boom sprayers	5 000	800	200	1 000	4 000
Sheller/ threshers	15 000	400	100	500	14 500

Source: Ministry of Agriculture (2020)

Specific areas of opportunities relate to the national deficits in shellers, boom sprayers, spreaders, planters, disc harrow, rippers, combined harvesters and tractors as presented in the last column of table 8.3.

From a financial sector perspective, there is massive scope for lease finance for the acquiring of tractors and combined harvesters. By virtue of the fact that most of the equipment in table 8.3 are fixed assets and can last for 10-15 years, can be used as collateral when issuing funding linked to these equipment meaning that the need for collateral from the farmers may not arise.

8.2.4 Opportunities in Livestock Production

The study noted that there are numerous opportunities in the livestock sector which range from the actual rearing of animals, the production of stock feeds and the provision of veterinary drugs and services. The cattle herd to cater for beef and milk needs is not enough to meet the demands of local and export markets.

In milk production, the study noted that the country has 34,000 cows for milk production against national target of 122,000. This therefore shows a gap of 88000 cows which present itself as an investment opportunity. In the same vein, in line with the disparities of dairy cows production, the country has a deficit of 51 million litres of milk which is can be filled through investment into dairy farming.

In beef production, the sector requires private sector re-stocking initiatives to complement the Command Livestock programme by the Government. In that regard, banks can avail funding for cattle restocking programmes. Alternatively, abattoirs and other upper value chain participants can also participate in the restocking exercise by providing funding arrangements such as contract production or out-grower schemes.

Investment in veterinary drugs and veterinary services is important to the sector as a lot of farmers have lost their animals to diseases. Farmers require good quality drugs that are affordable.

In addition, evidence from the Stockfeed Manufacturers Association shows that there is a production gap of 30%, 21% and 26% for layers production feeds, beef maintenance feeds and layers feeds, respectively. This present opportunities for stockfeed manufacturers who intend to upscale production or invest into new factories.

Table 8.4: Investment Opportunities and Risks in Zimbabwe's Agricultural Sector

Animal	Opportunities	Risk
Cattle	• Conduce environment for cattle production • High Demand in domestic market • Potential for export – organic meat • Earnings in Foreign currency • Growing demand for Canned beef	• Outbreak of diseases eg foot and mouth, tick borne diseases • Stock theft • Inbreeding challenges • Poor agriculture practices • Coplex logistics – transportation
Dairy	• Conduce environment for milk production • High Demand in the domestic market over supply • Milk requirement is 120 million litres against a production level of 70 million litres	• Complex logistic when transporting • Lack of Competitiveness in Foreign Markets due to high production cost • Poor Agriculture Practices • No export opportunities • Cheap import alternatives
Pigs	• Conducive environment • High demand in domestic market • High demand in foreign markets (Mozambique) • High demand from Far East countries • High potential of earnings in forex	• Complex export processes • Religion differences • Central Bank regulation of foreign earnings • Poor Agriculture practices
Poultry and eggs	• Conducive environment • High demand in domestic market • High demand for processing machinery eg hatching machine on commercial basis • Fertilised egg production for broilers and layers is 93.6 million eggs against a national requirement of 106.2 million eggs.	• High cost of proper infrastructure • Regulation of exports • Outbreak of diseases – bird flu, Newcastle,
Aqua culture	• Conducive environment • Increasing demand in domestic market • Production can be achieved on a small space • High Potential for export	• Complex logistic when transporting • No Tradition in Fish farming in the country

Source: Authors Own Derivation

From a financial sector perspective, there is scope for advancement of loans, insurance products for each of the categories of investment opportunity with a view of raising production.

SECTION NINE:
AGRICULTURE INFRASTRUCTURE

9.1 Introduction

This section assesses forms of infrastructure relevant for the Agriculture Sector in Zimbabwe. The first section assesses the road network infrastructure relevant and being used by farmers in Zimbabwe. The second section assess dam infrastructure and irrigation facilities. The additional component looks at the small-holder irrigation schemes in their relevance to rural poverty alleviation in the country.

9.2 Road Infrastructure in Zimbabwe

The road network plays a major role in the movement of the country's agriculture commodities from farms to markets, auctions and national reserves and inputs from the source to farms. In terms of road infrastructure, there are 88,100 km of classified roads in Zimbabwe, 17,400 km of which are paved (Table 9.1).

Table 9.1: Road Networks for Zimbabwe (in KM)

Nature of Road	Depart of Roads	Urban Council	RDCs	DDF	Total	
					KM	%
Regional-Paved	2306.8	----	----	----	2306.8	2.6
National Primary						
Paved	2021.3	----	----	---	2021.3	2.3
Gravel	214.0	----	----	---	214.0	0.2
Subtotal	2235.3	----	----	---	2235.3	2.5
Secondary						
Paved	4571.7	----	356.0	----	4927.7	5.6
Gravel	5847,6	----	----	----	5847.6	6.6
Earth	1698.4	----	----	----	1698.4	1.9
Subtotal	12117.7	----	356.0	----	12473.7	14.2
Tertiary Feeder						
Gravel	1212.3	----	33988.0	21500.0	56700.3	64.3
Earth	107.7	----	2133.0	3500.0	5740.7	6.5
Subtotal	1320.0	----	36121.0	25000.0	62441.0	70.8
Tertiary Access						
Gravel	303.1	----	----	----	303.1	0.3
Earth	178.9	----	----	----	178.9	0.2
Subtotal	482.0	----	----	----	482.0	0.5
Urban						
Paved	----	8164.0	----	----	8164.0	9.3
Gravel	----	26.0	----	----	26.0	0.0
Earth	----	4.0	----	----	4.0	0.0
Subtotal	----	8194.0	----	----	8194.0	9.3
Total						
Paved	8899.8	8164.0	356.0	----	17419.8	19.8
Gravel	7577.0	26.0	33988.0	21500	63091.0	71.6
Earth	1985.0	4.0	2133.0	3500	7622.0	8.6
TOTAL	18461.8	8194.0	36477.0	25000	88132.8	100

Source: Department of Roads

From Table 9.1, about 5% of the network is classified as primary roads and has some of the most trafficked arterials that link Zimbabwe to neighbouring countries. About 14% of the network is classified as secondary roads that link the main economic centres within the country, enabling internal movement of people and goods. The primary and secondary roads are collectively referred to as the trunk road system; they carry over 70 % of the vehicular traffic (measured in vehicle kilometres) and they are managed by the Department of Roads (DoR).

The major components are tertiary roads which are about 70%. These are feeder and access roads that link rural and farm areas to the secondary road network. These are managed by the District Development Fund (DDF) and by the District Councils (DC). The tertiary access roads, together with the unclassified tracks, typically with traffic volumes below 50 vehicles per day, provide for the intra-rural access movements. These are critical as they link rural and farming communities to social economic amenities, such as schools, health centres, markets and enable government services to reach rural areas.

Table 9.2: Nature of Roads in Farming Areas

Factor of Road Network	Yes	No
Roads to the main road needs rehabilitation	95%	5%
Farm roads needs rehabilitation	95%	5%
Roads to the next farm(s) are in need of rehabilitation	94%	6%
Nature of Roads affects supply of commodities to markets	80%	20%
Poor road network reduces customers to reach the farmers	85%	15%
Poor road network increases cost of transporting commodities	90%	10%

Table 9.2 revealed that the greater percentage of farmers that are negatively affected by poor road network (Tertiary Feeder and Access roads) caused by rains. It is the state of these roads which causes the transport costs charge to be higher as transporters fear for their vehicles and isolate some of the farmers from customers who want to buy the produce at the farmer's premises.

9.3 Dam Infrastructure in Zimbabwe

There are 10,748 dams, including 260 large ones (World Bank, 2019). Only 850 of them were constructed by the government, and their permits are owned by ZINWA. The remainder are private dams which are small (AfDB, 2019). The term "dam" is often preferred to signify small water bodies/reservoirs. Other major dams in the country reflected in Table 9.3.

Table 9.3: Major Dams and their Main Purpose in Zimbabwe

Name	River	Year of construction	Purpose	Capacity (in million m^3)
Kariba	Zambezi	1959	Stock and irrigation	160 368
Tugwi Mukosi	Mukosi	2017	Stock and irrigation	1802.6
Mutirikwi	Mtilikwe	1961	Irrigation	1 425
Manyame	Hunyani	1976	Water supply	480.23
Manjirenji	Chiredzi	1966	Irrigation	285
Hunyani Poort	Hunyani	1952	Water supply	250
Mayfair	Insiza	1976	Water supply	182
Sebakwe	Sebakwe	1957	Water supply	154
Ruti	Nyazwitza	1976	Irrigation	140
Bangala	Mtilikwe	1963	Irrigation	130
Siya	Turgwe	1977	Irrigation	106
Inyankuni	Inyankuni	1964	Water supply	82
Ingwezi	Ingwezi	1967	Irrigation	70
Palawan	Ingesi	1978	Irrigation	69
Umzingwane	Umzingwani	1958	Water supply	57
Ncema Upper	Ncema	1973	Water supply	45
Amapongokwe	Mapongokwe	1980	Water supply	39
Mushandike	Mushandike	1938	Irrigation	38
Mazowe	Mazowe	1920	Irrigation	35
Gwenoro	Lundi	1958	Irrigation	32
Ngezi	Ngezi	1945	Irrigation	26
Silalbuhwa	Umzingwane	1966	Irrigation	24
Claw	Umsweswe	1973	Water supply	21
Ncema	Ncema	1943	Water supply	18
Antelope	Shashani	1971	Irrigation	15
Tiyabenzi	Shangani	1972	Water supply	14
Charliesona	Bembezi	1973	Irrigation	14
Mwenje	Trib. of Mazoe	1969	Irrigation	13
Eben	Mfurudzi	1968	Irrigation	12
Makado Ranch	Umtshabezi	1968	Irrigation	12
Mananda	Nata	1967	Irrigation	12
Esquilingwe	Mtilikwe	1945	Irrigation	11
Tokwe weir	Tokwe	1965	Irrigation	10
Henry Hallam	Hunyani	1973	Water supply	9
Exch. Block	Trib. of Shangani	1972	Irrigation	9
Rixon	Insiza	1967	Irrigation	9

Maitengwe	Tegwane catchment	1965	Stock and irrigation	9
Suri Suri	Suri Suri	1968	Irrigation & Industry	9
Pampoenpoort	Trib. of Umguza	1970	Irrigation	8
Tuli-Makwe	Tuli	1966	Irrigation	8
Ngondoma	Ngondoma	1967	Mine and Irrigation	7
Odzani	Odzani	1965	Water supply	6

Source: FAO, World Bank and ZIMWA and ZimVAC Report (2020)

Table 9.4: Distribution of Dams by Land Type in Zimbabwe

Land type	Dams		Number with known capacity	Average surface area	Total surface area	
	(no.)	(%)	(ha)	(ha)	(ha)	(%)
Communal	1 983	25	1440	22.8	32 789	34
Resettlement	1111	14	762	5.75	4 382	5
Commercial	4 875	61	3 304	13.5	44 472	47
Other	31	0	25	533*	13 327	14
Total	8 000	100	5 531	17.0	94 970	
Unknown ownership	2 747		2 078	12.8	26 585	
Zimbabwe has 10 747 dams (117 662 ha)						

Source: FAO, World Bank and ZIMWA (2019)

Nearly half of the small water bodies in Zimbabwe are within the size range of 1-5ha (Table 9.4). Of the 10,747 water bodies in Zimbabwe, 4,875 (61%) are situated in privately-owned commercial lands, used for cattle ranching, irrigation or aquaculture. The communal and resettlement areas account for 39% of the dams and cover 40% of the total area. Dams that are situated in communal areas are slightly larger in average size.

Most dams are along the highlands running across the country from the southwest to the northeast, comprising the provinces of Matabeleland South, Masvingo, Manicaland, Midlands and the Mashonalands.

Table 9.5: Distribution of Dams by Province

Provinces	Total no. of dams	% by number	Total capacity (m^3)	% capacity
Bulawayo	32	-	9 785	-
Harare	75	-	13 272	-
Manicaland	679	7	148 656	2
Mashonaland Central	763	8	691 113	9
Mashonaland East	1 363	14	292 378	4
Mashonaland West	1 413	14	1 334 765	17
Masvingo	1 044	11	2 339 527	29
Mat North	611	6	190 498	2
Mat South	2 243	23	873 271	11
Midlands	1 620	17	2 098 731	26

Source: Agritex Database (2019)

Table 9.5 shows that the dry cattle county of Matabeleland South accounts for 23% (2,243) of the 9818 dams followed by 17% in the Midlands and 14% each in the East and West Mashonaland provinces. The dams in Masvingo have the maximum capacity of 29%, followed by Midlands with 26% capacity. In all the provinces, most of the dams are small with a capacity of less than 100,000 m^3.

Out of the total number of dams, 4229 are registered with ZINWA while the remainder are unregistered with ZINWA but are managed by the District Development Fund (DDF) (these small earth dams are estimated to be 3271).

Table 9.6: Zimbabwe Dams Registered with ZINWA by Province

Province	Number of Registered Dams
Harare	75
Manicaland	513
Mashonaland East	1,020
Mashonaland Central	799
Mashonaland West	740
Matabeleland North	302
Matabeleland South	232
Midlands	365
Masvingo	181
Bulalwayo	2
Total	4,229

Source: Zimbabwe National Water Authority (2019)

9.4 Irrigation Infrastructure in Zimbabwe

Zimbabwe is undergoing extensive irrigation development in both large- and small-scale sectors as a result of climatic constraints, including periodic mid-season drought and recurrent seasonal droughts, which make dryland cultivation a risky venture and the need to be self-sufficient in food production. Irrigation is considered essential for wheat and sugarcane. It is preferred for coffee, tea and cotton. Recently, it has also been used for high value crops, such as tobacco and horticulture and food security crop production such as maize.

9.4.1 Current status of irrigation development

In addition, informal/traditional irrigation is practised in an estimated 20000ha of wetlands/inland valley bottoms (dambos) and small gardens by many rural families. Vegetables are produced during the wet and dry seasons. Usually, irrigation is done with buckets/cans from handdug shallow wells.

Table 9.7: Current formal irrigation developments in Zimbabwe

Agricultural sub-sector	Area developed (ha)
1. Large-scale commercial	98 000
2. Parastatal	13 500
3. Settler (out-growers)	3 421
4. Small-scale commercial	(insignificant)
5. Communal smallholder	6 000
Total	120 900

Source: FAO (2019)

About 75% of the formal irrigation area is under sprinkler/overhead irrigation, most of the remaining area (18%) being under flood irrigation. Micro-irrigation (drip) is used in only 7% of the total area. Table 9.2 shows the types of irrigation used by farmers interviewed.

Table 9.8: Type of Irrigation use in Zimbabwe

Irrigation Infrastructure	2015	2016	2017	2018	2019
Flooding/Canal	27%	23%	24%	25%	22%
Centre Pivot	20%	24%	25%	26%	28%
Sprinklers	38%	35%	35%	33%	34%
Drip	7%	10%	12%	13%	13.5%
Other (siphoned pipes)	8%	8%	4%	3%	2.5%

Source: Researchers' Own Observations

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Based on the frequency of responses in Table 9.2 from farmers, the majority of farmers uses centre pivot, flood irrigation and sprinklers while a paltry uses drip irrigation system. On average the study noted that both flooding irrigation, centre and sprinklers, combined, have an average frequency of about 84%. However, use of flood irrigation (22%) result in massive wastage of water through evaporation something which must be avoided through the use of drip irrigation if the country is to mitigate the effects of climate change which comes with low water levels. The actual tendency is to promote irrigation systems which use more efficiently limited water resources, such as drip.

9.4.2 Smallholder Irrigation Schemes in Zimbabwe

Smallholder irrigation allows farmers to intensify crop production throughout the year. They are a mitigation measure, especially against droughts and the mid-season dry spells where crops severely suffer from moisture stress. They are playing a pivotal role in the reduction of food insecurity, malnutrition and poverty, as well as contributing towards the economic empowerment of the local people.

Smallholder irrigation became prominent in the early 1980s when the new government partnered with several development agencies in establishing small-scale irrigation schemes mainly for rural communities. The Government of Zimbabwe in 1982 partnered with the European Micro Project Programme in funding the establishment of smallholder irrigation schemes across the country premised on the cycle of build–operate–rehabilitate. Some with support from funding organisations such as Danish International Development Agency (DANIDA). This kind of operation is heavily dependent on donor funding and support for sustenance. Thus, where there is lack of donor support, several irrigation schemes in the country would probably cease to function properly. In the past, most smallholder irrigation schemes used traditional methods such as shallow wells, ponds, spring water, dams which mainly use the flooding system. With the aid of government support, community trust and NGO support, some of the schemes have modern irrigation facilities with permanent structures and improved water control systems.

9.4.3 Types of Irrigation Schemes for Small holder Irrigation Schemes

Table 9.9 shows that in the case of smallholders, up to 90% of the 10000ha formal irrigation area is under surface irrigation, water being drawn from rivers, storage reservoirs or deep boreholes. The remaining 10% is under sprinkler irrigation and centre pivots.

Table 9.9: Types of Irrigation Systems in Smallholder Irrigation Schemes

Type	%age
Surface (flood irrigation)	90%
Sprinkler and Pivot	10%

Source: Researchers' Own Observation

9.4.4 Surveyed Small-holder Irrigation Schemes

Average income portrayed in the table above revealed that, smallholder irrigation schemes are a form of creating decent jobs in rural areas. According to (FAO, 2016) decent jobs are opportunities for work that are productive, respect core labour standards, provide fair incomes (whether through self-employment or wage labour) and ensure equal treatment for all. Farmers earning at least US$57.00 per month were regarded as having decent jobs which translates to US$1.90 per day (World Bank). Smallholder irrigation schemes are a potential way of driving the rural populace towards achieving the Vision 2030 of creating an upper middle-income country with a monthly per capita income of US$3500 if properly supported.

Table 9.10: Surveyed Small-holder Irrigation Schemes in Zimbabwe

Name of Irrigation Scheme	District	Province	Crops	-Land Size (LS), -Number of farmers (NF) -Average annual Income (AAI)
Chitora	Mutoko	Mash East	Maize, Groundnuts Sweet Potatoes, Potatoes, Tomatoes, Vegetables, Peas Green pepper, Cucumbers	(LS) 0.5 Ha (NF) 72 (AAI) US$3435
Nyanyadzi	Buhera	Manicaland	Maize, Onions Sweet Potatoes, Potatoes, Vegetables Sugar beans, Wheat	(LS) 0.5Ha (NF) 721 (AAI)uS2974
Tshovani	Chiredzi	Masvingo	Maize, Sweet Potatoes, Potatoes, Vegetables Wheat	(LS) 1-3 Ha (NF) 120 (AAI) US$3847
Tuli Makwe	Gwanda	Mat South	Maize, Potatoes, Vegetables, Wheat, Sugar beans	(LS) 0.5-2 Ha (NF) 476 (AAI) US$1643
Gutsa-ruzhinji	Shurugwi	Midlands	Maize, Sweet potatoes, Potatoes, Vegetables Wheat	(LS) 0.5-1 Ha (NF) 42 (AAI) US$1374
Negomo	Mazowe (Chiweshe)	Mash Central	Maize, Sweet potatoes, Potatoes, Oranges, Vegetables Wheat	(LS) 1.2 Ha (0.5Ha Food & 0.5 Ha Citrus, 0.2 Ha othercrops) (NF) 296 (AAI) US$4423
Musarurwa	Zvimba	Mash West	Green Mealies, Sugar beans, Ground-nuts, Tomatoes, Sweet Potatoes, Leaf Vegetables	(LS) 0.5 Ha (NF) 50 (20 Male and 30 Female (AAI) US1857
Tshongokwe	Lupane	Mat North	Butternuts, Maize, Green-mealies, Sugar beans, Onions, Tomatoes, Potatoes, Vegetables	(LS) 0.4 Ha (NF) 63 (AAI) US$1652

9.4.5 Small Scale Irrigation and Food Security

The Government of Zimbabwe's main objective for small-holder irrigation development is to guarantee food security through increased crop production. Accordingly, food security refers to a situation whereby all people always have physical, social and economic access to enough, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. According to the ZIMSTAT Poverty, Income, Consumption and Expenditure Survey 2017 Report, 70.5% of the population were poor while 29.3% were deemed extremely poor. In addition, the ZimVAC Report (2020) noted that poverty continues to be one of the major underlying causes of vulnerability to food and nutrition insecurity as well as precarious livelihoods in Zimbabwe. Smallholder irrigation scheme emerged as one of the solutions to the challenge.

Figure 9.1: Small-holder Irrigation Schemes and Food Security

Figure 9.1 revealed that the majority (90%) of small-holder irrigation farmers accepted that the scheme have improved their food security at household level as they are able to produce food throughout the year. However, food security is under threat to some schemes due to complex interrelated factors such as theft of technical equipment, poor institutional arrangements, high electricity tariffs and exorbitant charges on water by bodies such as Zimbabwe National Water Authority (ZINWA). These factors result in several small-scale irrigation schemes being characterised by low production, minimal contribution to the economy and inability to cover development and operations costs.

9.4.6 Benefits of Small-holder Irrigation Schemes

Table 9.11 shows that small –holder irrigation farmers are able to grow their crops all year round and the farmers would irrigate their crops during seasons of erratic rains. The growing of crops throughout the year addresses the dimension of 'stability of food supply', thereby ensuring that the farmers are food secure because they would access food on a continuous basis.

Table 9.11: Benefits of Small-holder Irrigation Schemes to Farmers

Benefit	Yes	No
Grow crops throughout the year	97%	3%
Enables food stability at household level	95%	5%
Increased food security to the rest of community	90%	10%
Eases farmers from labour as they can make others work for food	70%	30%
Enables production of surpluses which can be sold	80%	20%
Improves standard of living for households	90%	10%
Develops Cash economy in the rural areas	80%	20%
Enables people to send their children to schools	80%	20%

Source: Researchers' Own Observations

It also reveals that small holder irrigation farming increased household food security in areas with poor rainfall, not only for the farmers but also for the rest of the community. These irrigation schemes enabled farmers to produce surpluses such that even the poor had access to the food because of its abundance in the community as they can come and work for food in the plots. Farmers have improved their standard of living through the selling of agricultural produce. As such, small-scale irrigation schemes can be interpreted to play an important role in the development of a cash economy for many rural communities, with income becoming accessible to many individuals.

9.4.7 Challenges being faced by Smallholder Irrigation Schemes Farmers

Table 9.12 shows that small-holder irrigation schemes, though profitable face several obstacles in trying to achieve food security as in most cases these schemes are too small for them to have economies of scale through growing bigger hectarage. Some of the schemes have fallen into the trap of low levels of technology with mainly flood irrigation system being use and is wasteful in water management. They also lack access to proper institutions and organisations that can provide the necessary assistance for them to be more viable. Some schemes face challenges such as poor marketing arrangements, limited access to water, lack of sense of ownership, problems of financial viability and issues of poor governance which is something that contributed to their dilapidation and vandalism of equipment. Thus, poor maintenance and lack of effective control over irrigation practices have resulted in the collapse of many irrigation systems across the country over years.

Table 9.12: Challenges Faced by Smallholder Irrigation Schemes Farmers

Challenge	Yes	No
Small area such that cannot grow many crops at large scale	87%	13%
Low levels of technology which are wasteful in water	70%	30%
Lack of organisations that can provide the necessary technical assistance	90%	10%
Limited access to water	70%	30%
Lack of sense of ownership	80%	20%
Poor governance	90%	10%
Destruction and breaking of sprinklers and agricultural machinery, breaking the concrete pipes	80%	20%
Vandalism of equipment (electricity transformers, pumps and pipes)	85%	15%
Power outages and load shedding	80%	20%
Theft (irrigation valves and fittings, locks and doors of pump stations)	90%	10%
Problems of financial viability – unable to meet production cost	80%	20%
Poor marketing arrangements	80%	20%

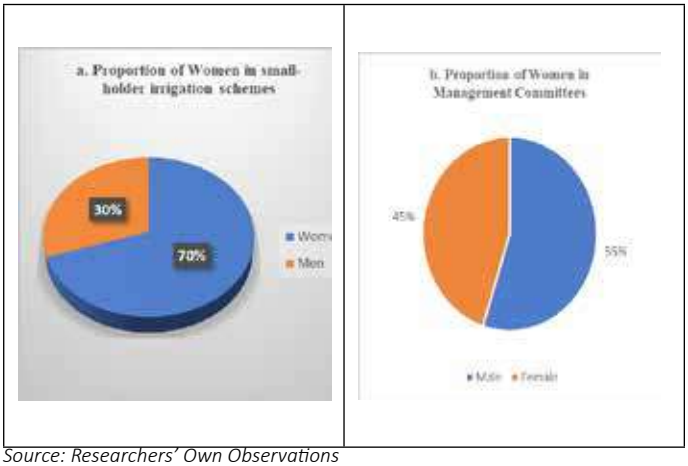
Source: Researchers' Own Observations

Vandalism has also played a negative role on small-scale irrigations leading to the reduction of their outcomes. Farmers actually sited damages such as the destruction and breaking of sprinklers and agricultural machinery, breaking the concrete pipes protecting the risers, stealing of irrigation valves and fittings, stealing of the locks and the doors of pumping stations and avulsing and stealing drip irrigation pipes. Furthermore, vandalism of electricity transformers has been noted to be a common trend in Zimbabwe and this has contributed to power outages where schemes will go for weeks without electricity to power their water pump engines.

9.4.8 Women in Small-holder Irrigation Schemes

Women in Zimbabwe play an important role in small-holder irrigation schemes and were the majority of those in active in the surveyed schemes.

Figure 9.2: Women Influence in Surveyed Small-holder Irrigation Schemes in Zimbabwe



Source: Researchers' Own Observations

This survey indicated that irrigation in smallholder schemes is also dominated by women, although only few are represented in their Irrigation Management Committees (IMCs) constituted by 55% men and 45%t women. Women, who largely provide labour in the surveyed irrigation schemes, also look after children as well as other vulnerable groups, such as orphans and chronically ill persons. The fact that nationally most rural households include one member of these vulnerable groups has therefore a negative impact on the viability of these irrigation schemes.

9.4.8 Other Infrastructure

Infrastructure discussed in this section includes grain storage facilities, dip tanks, and abattoirs.

(a) Grain Storage Facilities

Zimbabwe has a well-developed maize infrastructure with 87 Grain Millers Board (GMB) depots with commercial storage capacity of 4,782,500 metric tonnes (bulk and bags). These depots provide contract farming services, grain fumigation and grain storage. Of these depots some have been converted into agro-processing plants such as Aspindale which provides milling services. GMB depots are classified into four different categories which are Class 1, Class 2, Class 3 and Class 4 as shown in Table 8.12.

Table 9.13: Classification of GMB Depots

Depot Class	Number
Class One	15
Class Two	20
Class Three	29
Class Four	23
Total	87

Source: Grain Marketing Board (2020)

Class One depots are those which are operational though-out the year, have silos and in others instances a milling plant, for example, Lion's Den, Spindale, Chegutu and Masvingo. Class Two depots are those that are used for grain storage and also open all year round such as Chinhoyi, Gokwe and Marondera. Class Three and Class Four depots fall in the category of collection, transit and mobile depots that normally open during intake. The study noted that the GMB has to come up with collection depots during delivery times in order to reduce post-harvest losses, within a distance of 5km. In addition, it is also noted in the study that most of these storage facilities (GMB silos) are in a bad state and as such requires renovations.

(b) The State of the Dip Tanks

There are 3 851 dip-tanks in the country with the highest number being in Masvingo Province (701 dip-tanks). Table 9.14 shows provincial dip-tank distribution in the country.

Table 9.14: Number of Dip tanks by Province

Province	Number of Dip-tanks
Manicaland	543
Mashonaland Central	324
Mashonaland East	474
Mashonaland West	416
Matabeleland North	390
Matabeleland South	460
Midlands	543
Masvingo	701
Total	**3 851**

Source: ZIMSTAT (2019)

The study noted that even if the country has a significant number of dip-tanks, the majority of them are in a dilapidated state. If the country is to effectively control ticks and tick-borne diseases, such infrastructure requires urgent attention. It was noted that farmers have lost a significant number of their cattle due to tick related diseases in Mashonaland East, Mashonaland West, Mashonaland Central and other parts of the country. This was mainly due to lack of proper dip-tank infrastructure and lack of implementation of mandatory policies ensuring following cattle dipping routines as outlined in the regulations. Farmers also highlighted lack of dipping chemicals in most dip-tanks, which accelerates the crisis.

9.5 Summary

The results have shown that tertiary feeder and access roads which are critical to farmers are in need of total rehabilitation. Government through DDF and Local Authorities should rehabilitate the roads for effective supply of farm produce to the markets.

Small-holder irrigation schemes have been seen as a way of creating decent jobs to rural areas. However, most of smallholder irrigation schemes are in need of rehabilitation. It is important for the committees to partner with international organisations, government and farmers themselves to pool resources together to rehabilitate the infrastructure. These irrigation schemes are a way of increasing crop production and output.

Farmers suffered huge losses of cattle due to poverty and water shortages and the January diseases. It is therefore, recommended that grass harvesting should be practised in provinces of abundance and supplied to those in need to reduce poverty deaths. Farmers should also practice self-dipping of cattle to reduce effects of January disease.

SECTION TEN:
EASE OF DOING BUSINESS IN AGRICULTURE

10.1 Introduction

This section assesses the Ease of Doing Business in the Zimbabwean agriculture sector. These affect the competitiveness of Zimbabwean agriculture across all agriculture subsectors and actors along the agriculture value chains. This chapter assesses the indicators and the cost drivers affecting the agricultural business.

10.2 Measurement of Ease of Doing Business

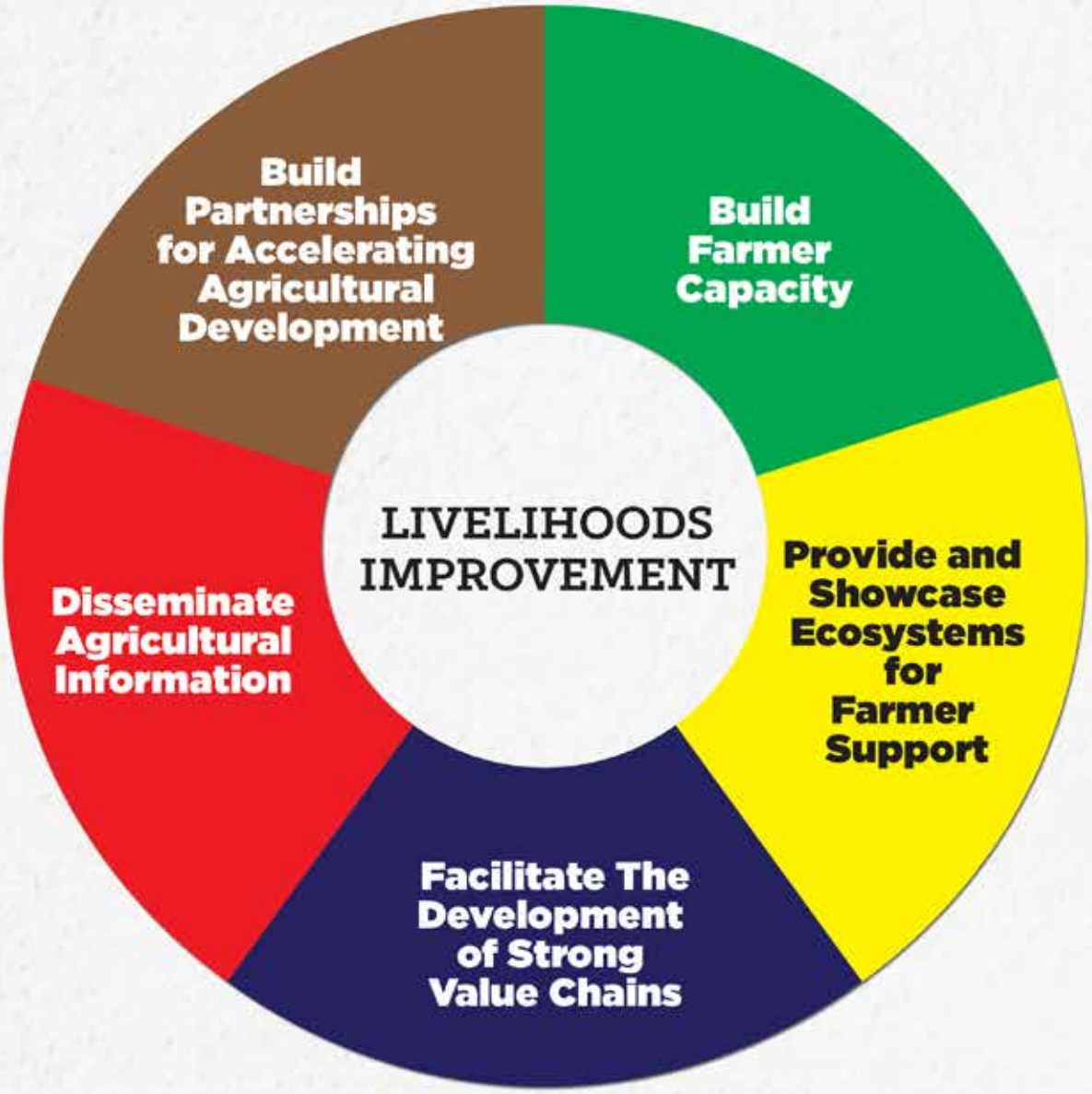
In general Ease of Doing Business means the regulatory environment is more conducive to the starting and operation of a local firm or enterprise. Worldwide, Ease of doing business in agriculture is assessed using the Enabling the Business of Agriculture (EBA) which looks at how the laws and regulations in agriculture affect the farming business. It presents indicators that measure the laws, regulations and bureaucratic processes that affect farmers. It also identifies actionable reforms to remove obstacles for farmers seeking to grow their business. EBA indicators assess whether governments make it easier or harder for farmers to operate their businesses. The indicators provide a tangible measure of progress and identify regulatory obstacles to market integration and entrepreneurship in agriculture.

Table 10.1. Indicators Scores of EBA for Zimbabwe

Indicator	**Score**
Supplying Seed	60.92
Registering Fertiliser	5.56
Securing Water	70.00
Registering Machinery	44.32
Sustaining Livestock	46.67
Protecting Plant Health	20.00
Trading Food	59.44
Accessing Finance	80.00

Source: World Bank (2019)

CENTRE OF EXCELLENCE FOR PROMOTION AND SUPPORT OF AGRICULTURE



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ZIMBABWE AGRICULTURAL SOCIETY

According to the World Bank (2019), a country's indicator score ranges from 0 to 100, where 0 represents the worst performance and 100 represents the best performance. Generally, Zimbabwe is doing well in terms of supplying of seed, securing water and access to finance.

10.3 Factors Affecting Farmers Ease of Doing Business in Zimbabwe

Table 10.2 shows different factors affecting farming business in Zimbabwe. The surveyed farmers revealed that vandalism and theft, availability of finance and cost, transport cost and availability and compliance requirements and cost were major factors affecting their farming business.

Table 10.2: Factors Affecting Farmers Ease of Doing Business

Factor	Yes (%)	No (%)
Labour Cost and Availability	63%	37%
Cost of Water	55%	45%
Electricity Supply availability and cost	60%	40%
Availability of Finance and its cost	74%	26%
Taxes, levies and fees	54%	46%
Compliance requirements and Cost	65%	35%
Policies, legislations and regulations	40%	60%
Documentation requirements	35%	65%
Transport cost and availability	67%	33%
Vandalism and theft	75%	25%

Source: Researchers' Own Observations

(a) Labour Cost and Availability

Labour availability and cost is a deterring factor to many farmers. Surveyed farmers revealed that labour is difficult to recruit during in-season times such as planting, weeding and harvesting. Cost of hiring labour during these times is very high with some labourers requesting for cash payments or payments in foreign currency which most farmers will not be able to pay as they are paid in local currency by most government agencies and as transfer in their bank accounts. Farmers also reviewed that payment for their tobacco through transfers is not helping them to meet some of these labour cost as they want cash only.

(b) Electricity Availability and Cost

Electricity availability is a major concern and is affecting farming operations especially for irrigated crops and when experiencing long dry spells during the summer season. Farmers noted that electricity is always available during the night and it is difficult to operate during night. The number of hours of electricity availability is also a challenge, as this affects the number of hours to irrigate the crops and meeting millimetres of water and hours required. This is negatively affecting the yield. Farmers also highlighted that they are being driven out of producing certain crops due to electricity shortages as they have been experiencing losses for the years they have tried to grow such crops. In addition, farmers also highlighted that the cost of electricity is so high such that you only end-up covering cost from the revenues. This compliment the reason why farmers shun irrigated crops.

(c) Taxes, Levies and fees

Farmers also face some high levies, taxes and fees. Farmers pay land levy, afforestation levies (tobacco farmers), water fees to ZIMWA, tollgate fees when transporting, IMT, and many other forms of levies. Farmers surveyed, revealed that, these taxes are on the high side and they also increase the cost of production. Some also revealed that, when paying labourers using mobile transfer, they also request a top up in payment to cover tax.

(d) Compliance Requirements and Cost

Farmers are expected to comply with many procedures. Tobacco farmers interviewed revealed that they have to comply by Tobacco Industry Marketing Board (TIMB) in terms of renewal of grower's number annually. Animal husbandry farmers cited animal movement permits from veterinary officers and police. For animal slaughtering by abbatoirs, there are levies paid.

(e) Vandalism and Theft

Farmers have experienced and are experiencing vandalism of farm equipment, pumps, irrigation pipes, and irrigation canals. Surveyed farmers also revealed vandalism and theft of electricity transformers and cables. This has actually caused some farmers to stop irrigation as they cannot acquire the transformers as they require foreign currency. These have also increased cost to farmers as they cannot share the cost to many crops.

10.4 Adoption of Renewable Energy

Renewable energy refers to energy sources that are naturally replenishing and inexhaustible in duration but limited in the amount of energy that is available per unit of time. Renewable energy sources include solar energy, wind, falling water, the heat of the earth (geothermal), and plant materials (biomass).

Table 10.3: Farmers adopting renewable energy technologies

Province	Solar		Biogas generation	
	Yes	No	Yes	No
Manicaland	28%	72%	1%	99%
Masvingo	37%	63%	1%	99%
Mash Central	35%	65%	0%	100%
Midlands	45%	55%	3%	97%
Mash West	36%	64%	0%	100%
Mash East	38%	62%	2%	98%
Mat North	32%	68%	1%	89%
Mat South	30%	70%	2%	99%
Total	35%	65%	1.25%	98.75%

Source: Researchers' Own Observations

In the study, solar energy and biogas were the responses obtained. Table 10.3 shows the proportion of farmers using these forms of renewable energy technologies. The tables show that 35% of farmers were adopting solar energy and very few farmers (1.25%) were using biogas as a source of energy.

10.5 Summary

Farmers and key stakeholders revealed that farmers lack competitiveness due to high cost of production due to high compliance cost, high labour cost, high transport cost, high electricity cost, vandalism and theft of equipment and competition from cheap imports are some of the factors affecting the sector. The high cost of production in the country affect farmers' competitiveness in the export market. Due to high cost, farmers sometimes end-up having low yields and low quality produce. Retailers impress upon high quality and failure to meet required quality products are returned to the farmer or are bought at very low prices. Quality is rated on with due considerations on standard, size, presentation and packaging and failure to meet the minimum expectations the farmer makes a loss. In an effort to improve on quality agronomy agencies and field agronomists are engaged mainly by retailers and those contracting farmers to educate farmers on soil, quality, seasonal products and market conditions.

SECTION ELEVEN:

AGRICULTURE SECTOR PRODUCE MARKETS IN ZIMBABWE

11.1 Introduction

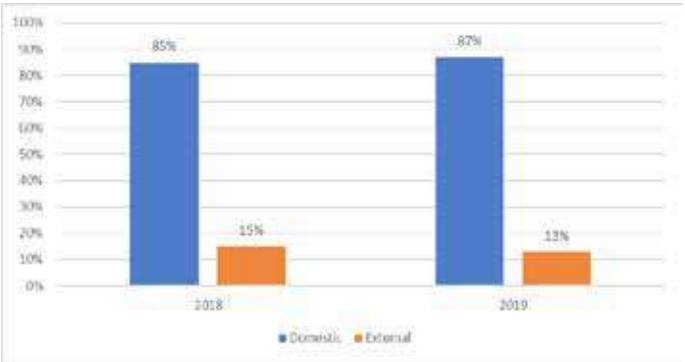
This assesses the agriculture sector produce markets in Zimbabwe. Agricul-

ture marketing involves activities involved in getting agriculture products from the farm to the final consumer. This involves the planning, organising, directing and handling of agriculture produce in such a way as to satisfy the farmer, producer and the consumer.

11.2 Nature of Markets Available

Figure 11.1 shows that most of Zimbabwean products (87%) are marketed locally and a small proportion (15%) is exported.

Figure 11.1: Nature of Market for Agriculture Produce



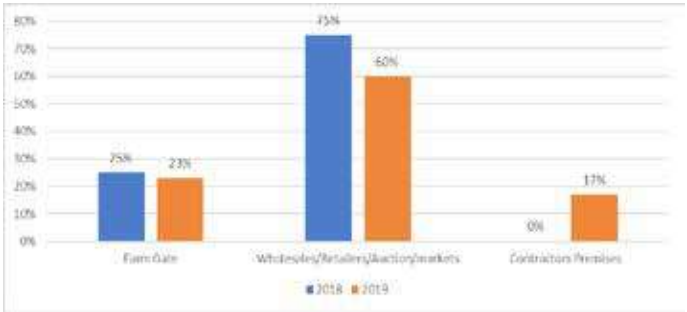
Source: Researchers' Own Observations

Figure 11.1 shows a decline in international markets by 2% from 15% in 2018 to 13% in 2019. Most surveyed farmers attribute the decline to droughts which have affected the greater part of the country and crops.

11.3 Nature of Domestic Markets

Most of the farmers (60%) distribute their agriculture produce to wholesale markets Dairibord and GMB, fresh produce markets such as Mbare Musika, Machipisa Musika, Jambanja Musika (Chitungwiza) and other markets in other towns, fresh produce direct distribution to some retailers such as OK, Spar, TM & PicknPay and some restaurants. About 23% is sold at farm gate or at farms where wholesalers, retailers and other agents buy directly from the farmer.

Figure 11.2: Actual Domestic Markets Available



Source: Researchers' Own Observations

A significant proportion (17%) of respondents acknowledged that their contractors collect the produce direct from them or they will be requested to supply the produce direct to contractors. These contractors include those in tobacco, broiler production (Irvines), maize seed production (Seedco), and sorghum (Delta Beverages). These results reflect the influence and functionality of value chains in certain crops in Zimbabwe.

11.4 Role Played by the Markets to Farmers

Markets play an important role to farmers in Zimbabwe. They provide inputs to farmers (contracted farmers), provide expertise and knowledge of crops being grown (contractors employ their own agronomist and veterinary officers who assist farmers), provide information about prices in the market for the produce and markets are sources of information about crops to grow and in which season (Table 11.1). The table reveals that markets provide linkages between farmers and consumers, they provide places to sell crops produced, they provide timely payment to farmers and some markets finance farming activities. Most farmers cited markets such as the Tobacco Auction Floors, Mbare Musika, GMB depots, Cottco Collection Centres (Gokwe, Sanyati, Muzarabani and Chipinge), Dairibord and contractors (Irvines, Delta Brewaries, Seedco).

Table 11.1: Role Played by the Markets to Farmers

Role	Yes (%)	No (%)
Provide inputs	37%	63%
Provides expertise and knowledge of crops being grown	65%	35%
Provides information about prices running in the market	50%	50%
Source of information about crops to grow and in which season	49%	51%
The availability of markets for farm produce	84%	16%
Market linkages	85%	15%
Timely payment for farmers	70%	30%
Financing of farming activities	40%	60%

Source: Researchers' Own Observations

Some of the farmers appreciated the financing being provided by markets through contract farming which both provided the inputs and act as market for the produce. This was more pronounced in the maize (command) tobacco, soya bean, wheat (winter wheat) and sorghum. However, farmers were not happy with the payment and delays in payment. Farmers highlighted that they have to pay some of their expenses in cash to farm workers but the amount they are getting as cash is not enough especially tobacco which is a labour intensive crop.

The study noted that farmers, especially producing vegetables, have been registered by Emkambo operating in major green vegetable markets. The platform provides farmers with price information on a daily basis. However, the platform does not provide sufficient information in terms of buyers of the products. Therefore, there is need to improve the platform to include nature of buyers and where the farmers can supply directly to reduce transport cost and save time for farmers.

The study noted Government efforts to reduce staple food shortages due to effects of drought and climate change, hence is working on irrigation schemes working with development partners to spearhead irrigation development programme focusing on small scale and large-scale commercial farmers to enhance food security, nutrition and hygiene and poverty reduction. The programme targets irrigation schemes and households practising dryland farming and it focuses on creating linkages to markets and capacity building on aspects of crop agronomy, farming as a business, health and nutrition.

11.5 The Main Challenges to Farmers in Marketing Products

High cost of transporting produce to the market. This is caused by poor road networks for the tertiary feeder and access roads which are in a dilapidated state, causing transporters to charge higher prices as a way of compensating themselves for high cost of maintenance. Farmers also lose a lot of their produce during transportation, which results in them losing revenues.

Currency and pricing problem, the ever-changing prices in the local currency for inputs cause a serious costing challenge to farmers. This transfers also to the pricing of their produce, which sometimes cause them to under-price, resulting in them not being able to buy inputs again. In addition, the process of separating accounts to nostro and local accounts is resulting in them paying charges twice for the accounts every month. Some of the money expected to

be transferred to nostro accounts is not coming in at all. The fact that farmers are expected to wait in Harare for long periods as they wait for money to be transferred to their nostro accounts is affecting production. Late payment for grain delivery is the major challenge faced by farmers selling their produce to GMB and some of them responded by shifting to other crops while others end up selling to middlemen who do not pay the full value of the grain.

Information gathered also revealed that pricing of crops such as maize, soya beans and cotton discourage farmers as some of the prices are below the cost incurred by farmers. Government uses bank rates in coming up with cost but farmers get the inputs from markets which use black markets rates. This creates a huge disparity in prices. Some farmers suggest having the price pegged in US$ and farmers being paid the equivalent on the day, like in the tobacco sector.

Information gathered in the survey indicated some of the contractors are short-changing farmers, especially on prices. This was common with tobacco farmers. However, some farmers were happy with the prices they get from the market, with some specifying that they are aware of the price they would get before production.

The study recommends that there is need to have platforms that facilitate amicable resolution of disputes between farmers and buyers/firms as this is causing short-changing of farmers by buyers and they have nowhere to lodge complaints.

11.6 Summary

It is clear that the bulk of agriculture produce goes to the local markets. There is evidence that contractors are doing a great job to improve agriculture production through provision of inputs, knowledge, markets and financing. Farmers interviewed cited huge losses during transportation to the markets as a result of the poor road network, losses from price undercuts by middlemen both at markets and farm premises and post-harvest losses at the farm. For vegetables, farmers interviewed, in many cases, failed to get better returns from markets as they will be flooded with produce and they end up getting low prices.

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