SilverStreet Capital

2020 Annual Impact and ESG Report
The Silverlands Funds

Our impact

We employ over **10,400** people, earning a total of **$29m** per annum

Direct economic benefit for **386,000** people
Average incomes increased by **~$299** per annum
Increased community income of **$116m** per annum

Secondary positive impact for **2.3 million** people
Reducing carbon emissions from land clearing by increasing smallholder yields

Silverlands I

- **294,000** people benefit economically
- Average incomes increased by **~$320** p.a. on average
- Increased community income of **$94m** p.a.
- Silverlands I portfolio companies employ **7,000** people, earning a total of **$25m** p.a.
- Secondary positive impact for **1.7m** people

Silverlands II

- **91,000** people benefit economically
- Average incomes increased by **~$240** p.a. on average
- Increased community income of **$22m** p.a.
- Silverlands II portfolio companies employ over **3,400** people, earning a total of **$3m** p.a.
- Secondary positive impact for **551,000** people

Welcome

Welcome to our eighth Annual Impact and ESG Report.

We aim to achieve attractive returns for our investors as well as substantial positive social, environmental and climate impacts through our investments.

We invest into the agricultural sector and our experience has shown that the most impactful investments aim to fix a problem in a value chain thereby enabling the entire chain. By investing to complete the value chain one creates the opportunity for smallholder farmers to ramp up production. They might, for example, have a new market for a higher value crop or access to improved seed. The business benefits from the increased scale by incorporating smallholder farmer production into its operations. The smallholder farmer benefits from greater crop diversity and higher incomes going forward.

Investment opportunities in the agricultural sector that meet an impact objective are therefore typically developmental. One is investing to build an operation that does not yet exist or is in a fledgling state. Creating the missing piece of the value chain jigsaw usually needs patient capital, a high level of technical ability and deep operational experience in the Sub-Saharan agricultural sector.

This report details many such examples. Despite COVID-19, our impact has continued to grow strongly: we estimate that 386,000 people have benefitted directly from our investments. By 'benefit' we mean that 'their incomes have risen since we invested, as a direct result of our investments': increased incomes being our key impact metric. This increased income is typically 50-70% up on their baseline income. This incremental income, in US dollar terms, is estimated at $116 million per annum in 2020, an extraordinary figure given the pandemic. We have been able to increase the incomes of the poorest group in these economies substantially, despite many challenges, including the pandemic.

We have continued to learn how best to maximise both return and impact. New initiatives show exciting investment and impact potential, such as creating a whole new industry in Zambia - the pecan nut value chain. Similarly, creating a date palm value chain in Namibia and a macadamia nut industry in Northern Mozambique.

Probably the most exciting impact strategy is to convert smallholder farmers to using hybrid seed and, to implement conservation farming techniques. Doing both should double a farmer's yields per hectare and therefore his/her revenues. It also substantially reduces the potential for deforestation and has a significant and positive climate impact. This underlines the exciting potential of Zamseed, as we continue to build it into a regional seed platform – in time we expect it to impact hundreds of thousands of farmers and reduce negative environmental and climate impacts on close to 1 million hectares of smallholder farmland. Volumes have grown by over 30% per annum over the first 3 years of this investment. So-far-so-good from both an impact and a return perspective.

One thing to note while reading this report is that many of the photographs were taken prior to COVID-19 and, as such, the standard COVID-19 protocols of distancing and mask-wearing had not yet begun.

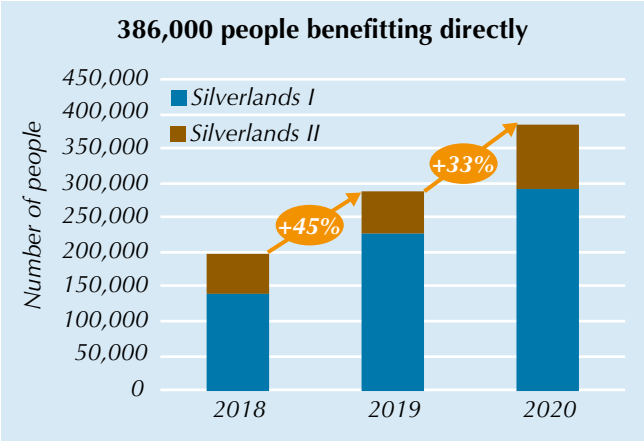
Thank-you again for your support. Please feel free to contact us if you have any questions or comments.

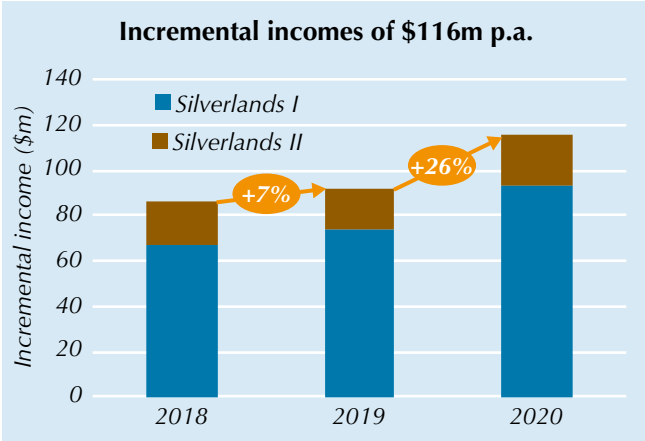
Gary Vaughan-Smith
Chief Investment Officer

Executive Summary

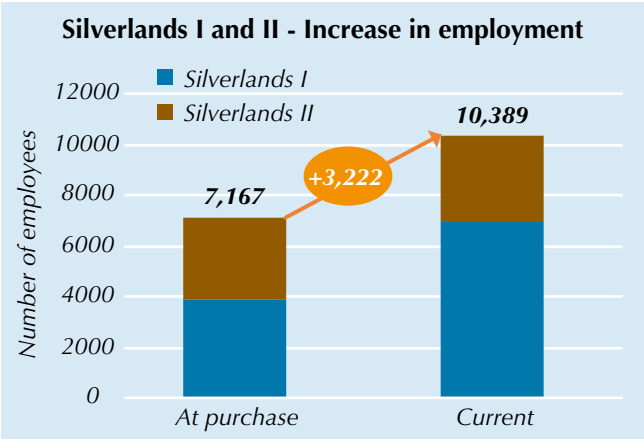
Our objective:
"To seek attractive returns for investors whilst achieving a substantial positive social, environmental and climate impact."

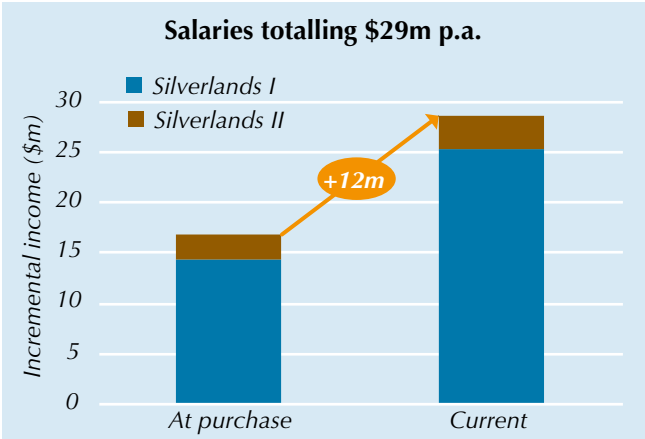
The number of people benefitting economically from our operations has doubled in the last two years to 386,000 this year. We estimate their annual incomes have increased by ~$299 per person, a 50% increase from a pre-investment baseline of $600. In total, communities now earn $116 million more per annum because of our investments, this figure is up 26% from 2019.

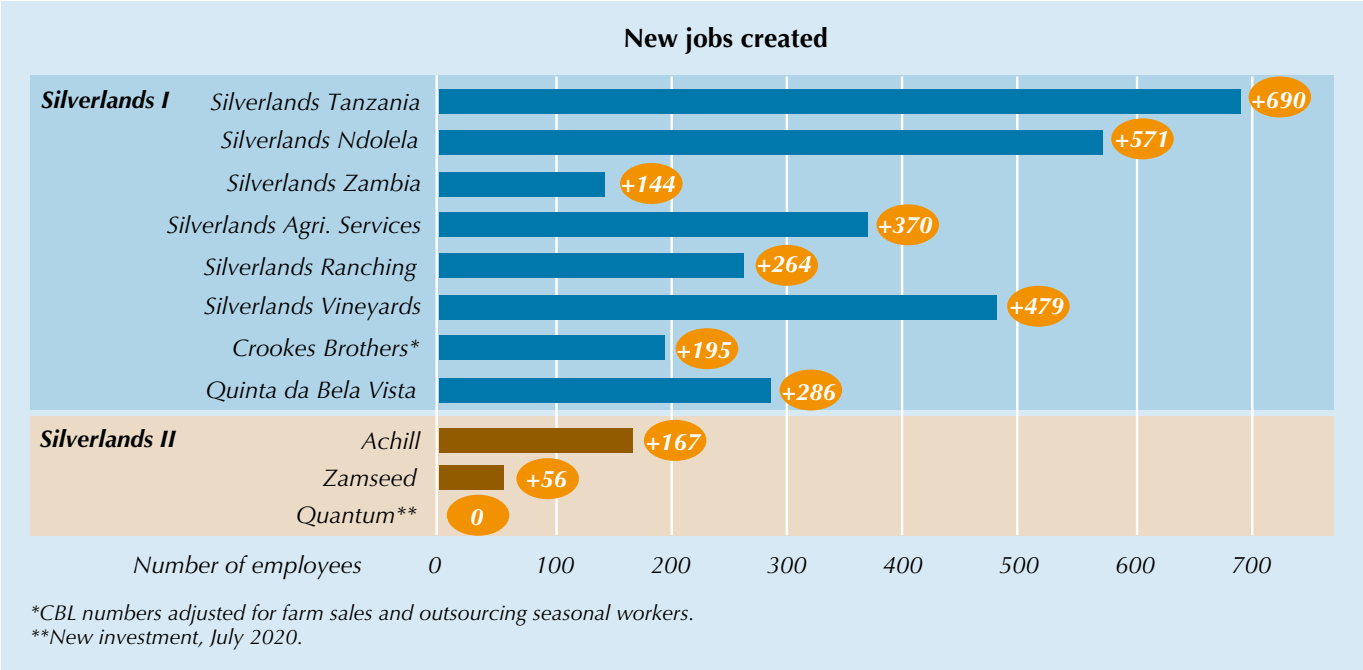




We have created 3,200 jobs since investing and now employ 10,400 people,7,000 in Silverlands I and 3,400 in Silverlands II. 42% of employees are women, a relatively high figure in the agricultural sector. Annual salary spend has increased 1.7-fold since purchase (and 3.1-fold when Crookes Brothers is excluded) – currently at $29 million per annum. The goal is not simply job creation but the creation of quality jobs involving up-skilling and the better remuneration that can come with higher productivity.







*CBL numbers adjusted for farm sales and outsourcing seasonal workers.
**New investment, July 2020.

We create a secondary positive impact for 2.3 million people, 1.7 million from Silverlands I and 550,000 people from Silverlands II.

Impact Summary

Portfolio company	Community participants impacted (#)	Increase in household income ($ p.a.)**	Value added to community ($m p.a.)	Secondary impact (#)
Silverlands I				
Silverlands Tanzania	185,864	343	64	1,115,062
Silverlands Ndolela	59,490	270	16	356,460
Silverlands Ranching	12,464	221	3	75,015
Zambia Grains	22,221	197	4	135,542
Silverlands Vineyards	1,558	722	1	7,427
Crookes Brothers*	12,836	420	5	60,957
Total Silverlands I	**294,432**	**318**	**94**	**1,748,464**
Silverlands II				
Zamseed	88,218	210	19	529,345
Achill	710	1,220	0.9	3,345
Quantum	2,457	1,014	2	17,972
Total Silverlands II	**91,385**	**240**	**22**	**550,662**
Overall total	**385,817**	**299**	**116**	**2,299,126**

*Crookes Brothers figures include Quinta da Bela Vista
**Total is a weighted average

The context of Sub-Saharan Africa where we operate

Sub-Saharan Africa faces significant developmental challenges, including:

- High levels of poverty, persistent underemployment and poor nutrition. Insufficient protein consumption at a young age leads to "stunting": a term given to a resultant reduced height and brain capacity in adults.

- Some of the highest levels of population growth globally, with Central African countries growing at 2.5-3% per annum. The UN is projecting that the population in Sub-Saharan Africa will increase from ~1 billion now to ~2.1 billion in 2050.
- Increasing carbon emissions and ecological damage. Poor farming practices are associated with clearing additional land for cropping, poor soil management leading to desertification, and loss of biodiversity.

Some 60-70% of the Sub-Saharan African population live on small-scale farms, typically 1-2 ha in size. Challenges in Africa's smallholder agricultural sector are creating a poverty trap across much of rural Africa and resulting in negative climate and biodiversity impacts.

Our philosophy

We provide solutions to these challenges by improving access to inputs and technical support, and by creating markets for higher value products.

Smallholder agriculture

	Challenges	Causes	Solutions
Inputs	Productivity well below global averages leading to deforestation and carbon emissions	Farmers using poor quality inputs (e.g. low yielding seed, inefficient livestock)	Facilitate access to high yielding seed, improved livestock breeds
On-farm practices	Climatically and ecologically damaging and inefficient methods	Farmers use sub-optimal agricultural techniques	Provide training in conservation farming and livestock husbandry
Markets	Poor access to markets for higher value products	Lack of a market for higher value crops/livestock products	Develop processing, farming and storage hubs

We show our progress on these solutions in this report.

Mitigating Climate Impacts

Globally, "Deforestation", "Crop burning" and "Agricultural Soils" make up 9.8% of emissions out of ~28% of non-energy related emissions. These are our main target areas from a climate perspective – increasing the use of hybrid seed and conservation farming techniques addresses a very important part of the emissions issue. Practicing conservation agriculture and using hybrid seed also benefits productivity resulting in increased incomes for both our operations and smallholder farmers.

We support the reduction of greenhouse gas emissions by:

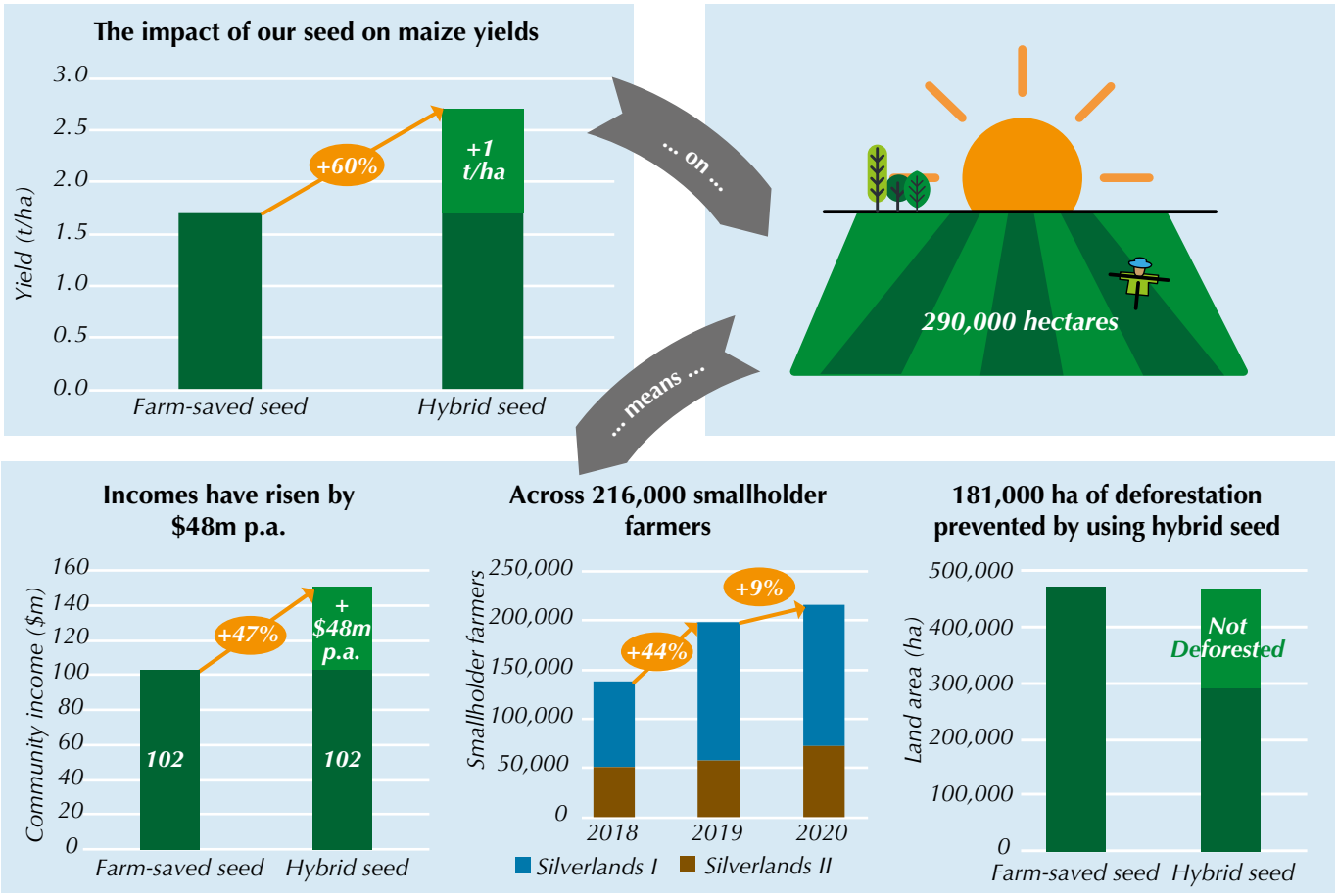
- Raising yields on smallholder farmers, eliminating the need to clear land;
- Implementing renewable energy projects at our operations; and,
- Using innovative technology to reduce unnecessary input use.

Improved or Hybrid Seed

This year we expanded our development and production of high-quality hybrid seed. This increases yields which has significant climatic benefits. Productivity is increased on existing land, thereby reducing the area of land that needs to be converted to agriculture to meet the rising demands. Hybrid seed also improves drought tolerance, counters some diseases and pests and, increases smallholder farmer incomes.

We estimate the 9,100 tonnes of (mostly maize) seed produced and sold this year across our portfolio will be planted by 216,000 smallholder farmers, a 9% increase from 2019. Academic research from across Sub-Saharan Africa has shown

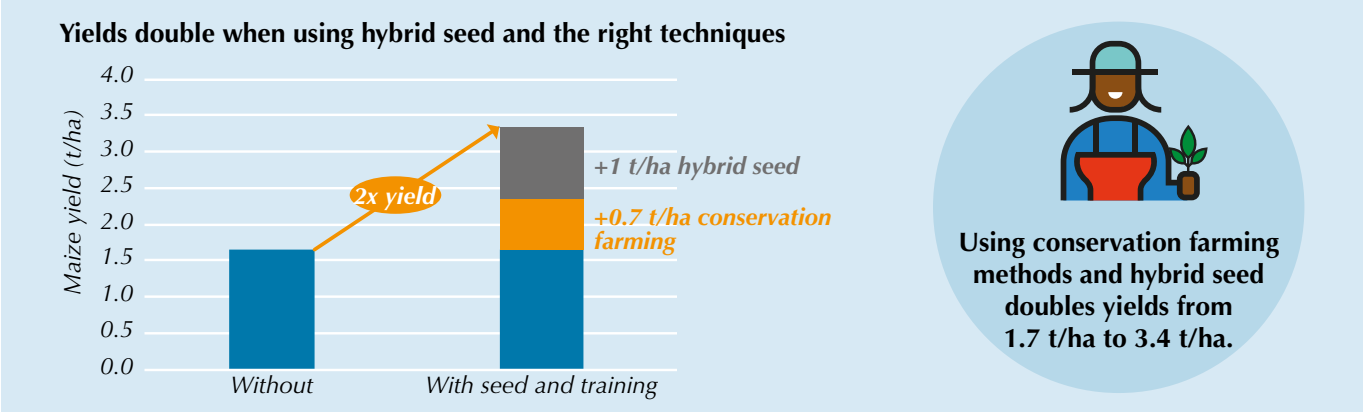
that by adopting hybrid seed, farmers can expect maize yields to increase by ~60%. With this, and accounting for the cost of the hybrid seed, we estimate each farmer's profits to increase by ~$221 per annum, from ~$500 to ~$720, an increase of roughly 44%. This produces a substantial increase in income given the large number of farmers benefitting: these farmers will earn an additional $48 million this year.



On-farm support: Training smallholder grains farmers in conservation agriculture

Using conservation farming techniques increases yields, prevents soil erosion, and mitigates the effects of climate change. Its principles can be implemented using the limited resources available to smallholder farmers: minimum tillage, mulching and crop rotation.

Taken together, academic research has shown that the combination of switching from farm-saved seed to hybrid seed and, implementing conservation farming techniques should double yields per hectare. This extraordinary step-function increase in yields reduces poverty, increases food security, empowers women (roughly two thirds of farmers) and reduces climate risk. It is a key route to obtaining a substantial social and climate impact.



Our work in the poultry sector

Increasing access to chicken and eggs would substantially improve nutrition in Sub-Saharan Africa. Poultry are practical, cheap, transportable and easy and inexpensive to care for. Despite its nutritional benefits, poultry consumption in Africa is low. Egg consumption in East Africa averages around 1 kg/capita against a world average of ~9 kg/capita (FAO 2017).

Modern 'dual-purpose' poultry breeds such as Sasso have multiple advantages for smallholder poultry production when measured against the "village chicken":

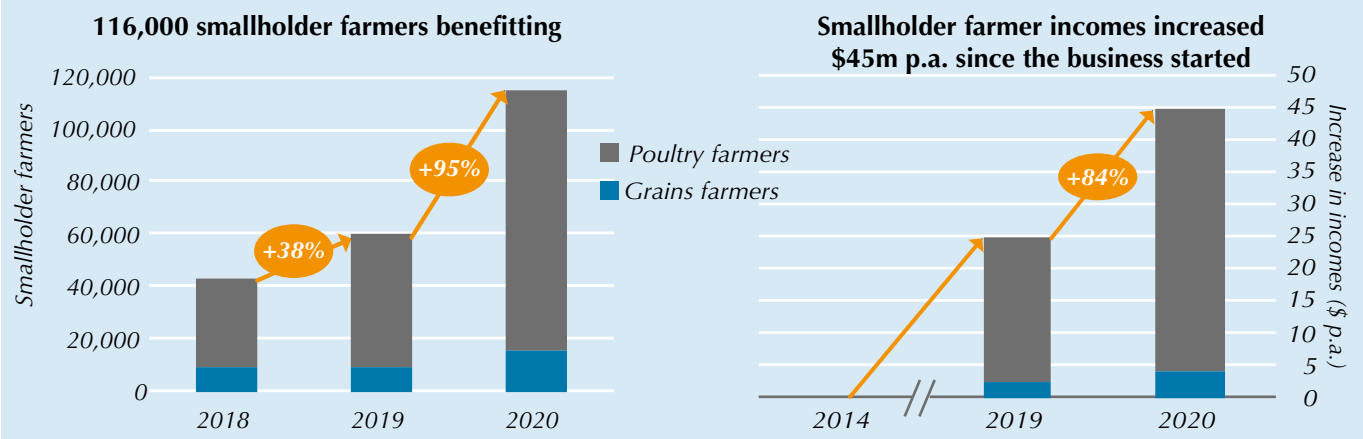
- Productivity: produce 3.3x more eggs and are 1.7x heavier at maturity, than local breeds.
- Resilience: more resilient to free-range smallholder environments.
- Consumer preference: for the colourful feathers and tasty meat.
- Income: an increase in smallholder incomes by as much as 2x to 3x.
- Benefits to women: improved income, nutrition, decision-making and respect.

Silverlands Poultry

Silverlands Tanzania's poultry business produces day-old chicks and poultry feed primarily for sale to smallholder farmers. From a standing start in 2014, the poultry business now benefits 116,000 people including:

- 15,300 grain farmers (up from 9,200 in 2019) - around two-thirds of whom are women
- 100,400 poultry farmers (a doubling from 2019) – 70-80% of whom are women

Incomes per farmer have increased by ~$390 per annum, implying an increase in smallholder net incomes of $45 million per annum (up from $25 million per annum in 2019), a significant multiplier effect. These exceptional increases in economic impact in 2020 have occurred despite COVID-19, benefitting this low-income group.



Quantum Foods Holdings Limited

The huge potential for positive impact, deep expertise and attractive returns has led Silverlands II to invest in the poultry sector and purchase a 31.6% stake in Quantum Foods Holdings Limited (Quantum) in mid-2020.

Eggs and poultry offer affordable protein that provide valuable nutrition. Quantum already sells over 1 billion eggs and ~60 million chickens annually. 200 million of these eggs are sold annually in Zambia, Uganda and Mozambique, equating to 550,000 eggs each day. Quantum has a management team with deep expertise and there is potential for expansion.

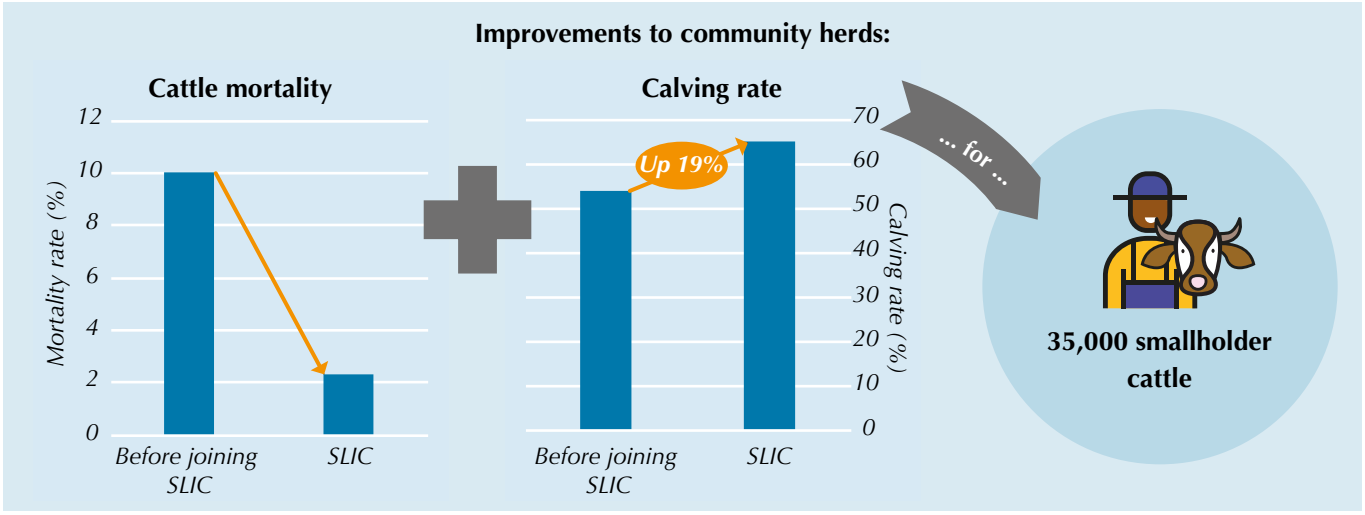
Livestock to livelihoods: Silverlands Ranching

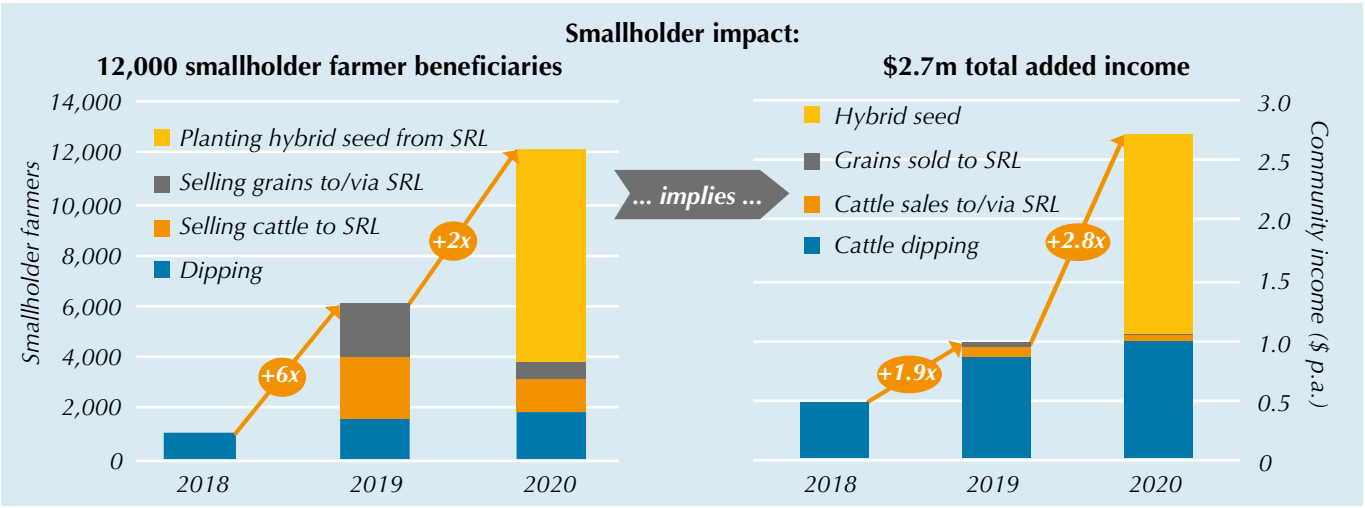
In 2014, Silverlands Ranching began providing technical assistance and cattle dipping in the communities surrounding the ranch, to reduce tick-borne diseases in cattle. This expanded into purchasing cattle and grains, providing training in conservation agriculture and, production of seed maize and seed potatoes. The expanded programme is being rebranded as the Silverlands Livelihoods Improvement Community (SLIC) programme, with 'Livelihoods' replacing 'Livestock'.

Overall, 12,100 smallholder livestock and cropping farmers benefit and their annual incomes have increased by $224 per person each year since before the project. This year's value-add to communities is over $2.7 million per annum. Over 35,000 cattle owned by smallholder farmers can now access 35 SLIC dipping stations. Community cattle mortality rates are down from 10% per annum to 2.3%. Calving rates are up 19%. This community dipping program continued to grow at a 25% rate in 2020 during the pandemic and despite the tough economic conditions in Zambia.

We anticipate greater impact should the business develop into the value chain. Introducing an approved quarantine structure will allow the export of beef and we would expect an increase in the price per head of cattle achieved of a potential $345 per head as prices normalise to regional levels, directly improving smallholder cattle farmer incomes and wealth. If this can be achieved then the impact will be transformational for these farmers whose primary wealth is tied up in cattle.

Silverlands is also making the production of cattle more efficient from an emissions perspective through the provision of a market for cattle and improved feed in the feedlot.





Plantation crops

We are growing plantation crops such as date palms, pecans, macadamias, apples, pears and avocados. Plantation crops have a unique set of development impacts:

- **Creating entirely new industries**, spearheading the way for others and earning valuable foreign currency and tax income for governments.
- **Healthy eating**: Avocados, tree nuts and date palms have diverse health benefits. This also means that demand is likely to grow faster than the main staples.
- **Potential carbon benefits**: There are potential carbon storage benefits of planting hundreds of hectares of trees, if planted on previously converted or degraded land.

Incorporating communities – the joint venture model

Plantation crops are expensive to grow per hectare and require capital investment and expertise, which would exclude smallholder farmers from their production. However, communities can still benefit through the joint venture model.

Three communities benefit from joint ventures with Crookes Brothers (Silverlands I) in South Africa. The JVs earned, in aggregate, an average of $2.3 million annually for the communities or $910 per annum on average for each of the 2,500 families (likely about 11,000 people).

Development impact

By creating employment for 10,400 people, a further 61,000 people benefit via indirect job creation and as household members of the employee (38,000 in Silverlands I and 23,000 in Silverlands II).

Our operations rely on the support of 880 small and medium-sized enterprises (SMEs) who earned over $24 million this year from our businesses by supplying various services such as logistics and construction.

This year, $236,000 of CSI donations were made, up from $185,000 in 2019. We estimate that this year's donations benefitted 88,000 people, up from 36,000 last year.

ESG Annual Review

We aim to comply with our own Responsible Investment Code, the IFC Performance Standards and the UN Global Compact. We are signatories of the UN PRI. Compliance with these ESG standards are implemented by people who have been assigned this responsibility within the portfolio companies.

As part of our ESG policy we undertake annual ESG "audits" of all portfolio companies against these standards. Over the last three years these have all been done by independent ESG consultants. We make these substantial reports available to our investors: this year there were 18 reports, on average 50 pages long.

We are proud of the significant improvement in ESG compliance by each portfolio company since purchase. Compliance against our Responsible Investment Code is scored by the external consultants. This year, Silverlands I moved up to the impressive score of 95% and the Silverlands II score increased by 8% to 90%.

Responsible Investment Code (RIC) compliance

	Silverlands I		Silverlands II	
	2019 %	2020 %	2019 %	2020 %
Environment	92	90	64	83
Social	98	100	90	97
Health & safety	88	91	72	91
Other social matters	94	95	88	84
Governance	99	99	94	94
ESG management systems	93	89	88	92
Animal Welfare	98	100		
Overall	**94**	**95**	**82**	**90**

Contents

Glossary of terms and abbreviations

Achill	Achill Island Investments (Proprietary) Limited
CBL	Crookes Brothers Limited
CSI	Corporate Social Investment
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
ESAP	Environmental and Social Action Plan
ESG	Environmental, Social,Governance
ESIA	Environmental and Social Impact Assessment
IFC	International Finance Corporation
JV	Joint Venture
NGO	Non-Governmental Organisation
PPE	Personal Protective Equipment
PS	Performance Standard (from IFC Performance Standards)
QBV	Quinta da Bela Vista Limitada
Quantum	Quantum Foods Holdings Limited
RIC	Responsible Investment Code
SA	Republic of South Africa
SASL	Silverlands Agriculture Services Limited
SEMS	Social and Environmental Management System
Silverlands I	SilverStreet Private Equity Strategies SICAR
Silverlands II	Silverlands II SCSp
SLIC	Silverlands Livelihoods Improvement Community
SNL	Silverlands Ndolela Limited (previously NAPL)
SRL	Silverlands Ranching Limited
SSA	Sub-Saharan Africa
STL	Silverlands Tanzania Limited
SVL	Silverlands Vineyards (Proprietary) Limited
SZL	Silverlands Zambia Limited
Zamseed	Zambia Seed Company Limited

All underlined references are available in the digital version of this document, available on our website.

1 Introduction

1.1 About this Report

This is our eighth **Annual Impact and Environmental, Social and Governance (ESG) Report**, and covers the period 1 July 2019 to 30 June 2020. The report covers investments in both the Silverlands Funds (Silverlands I and II).

Our aim for the report is to provide an update on the Silverlands Funds' impact and a review of ESG compliance within the investment portfolios. Detailed ESG reports for each portfolio company were shared with investors in both Funds in September 2020. For more information, please contact jwakeling@silverstreetcapital.com or visit www.silverstreetcapital.com.

1.2 ESG and Impact Measurement Standards

In compiling this report, we have considered the UN Sustainable Development Goals (SDGs), relevant IRIS metrics, the International Finance Corporation (IFC) Performance Standards, our own Responsible Investment Code (RIC), the UN Global Compact and the UN Principles of Responsible Investment (UNPRI). SilverStreet is a signatory of the UNPRI.

Reporting obligations of the Silverlands Funds are set out in the Appendix.

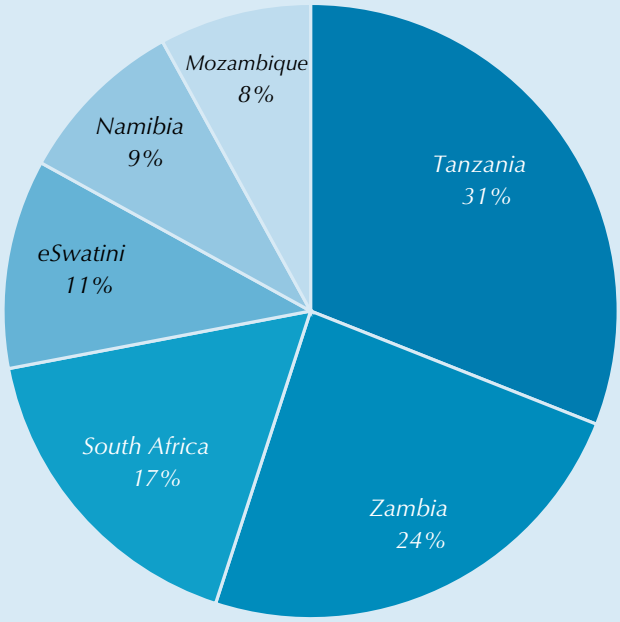
1.3 Silverlands Fund Portfolio Companies

The Silverlands Funds are invested in 11 portfolio companies across eight countries in Southern and East Africa:

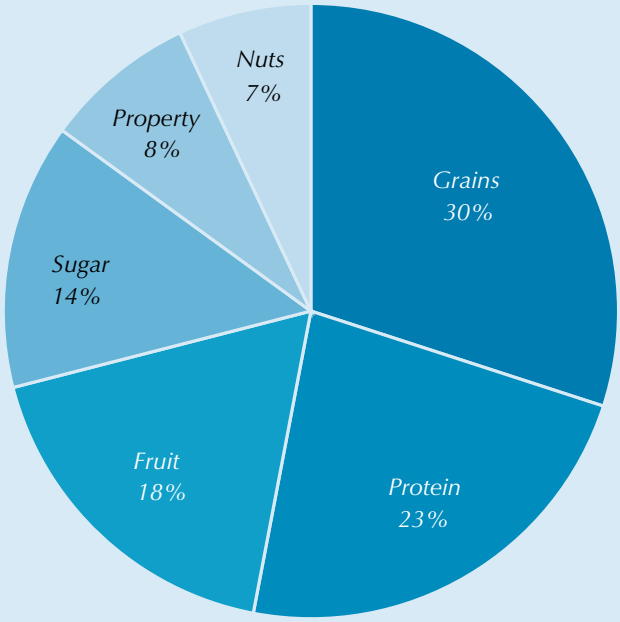
Portfolio company	Abbreviation	Location	Business/product
Silverlands I			
Silverlands Tanzania Limited	STL	Tanzania, Kenya	Poultry, feed, grains
Silverlands Ndolela Limited	SNL	Tanzania	Seed, grains, avocados
Silverlands Zambia Limited	SZL	Zambia	Grains
Silverlands Agriculture Services Limited	SASL	Zambia	Grains
Silverlands Ranching Limited	SRL	Zambia	Pecans, seed, cattle
Quinta da Bela Vista Limitada	QBV	Mozambique	Bananas
Silverlands Vineyards (Proprietary) Limited	SVL	Namibia	Table grapes, date palms
Crookes Brothers Limited	CBL	Regional*	Fruit, nuts, sugar, fruit processing
Silverlands II			
Achill Island Investments (Proprietary) Limited	Achill	Namibia	Table grapes, date palms
Zambia Seed Company Limited	Zamseed	Zambia/regional	Seed sector
Quantum Foods Holdings Limited	Quantum	Regional**	Poultry, feed

**Crookes Brothers has its head office in South Africa and operations in South Africa, Mozambique, eSwatini/Swaziland and Zambia.*
***Quantum has its head office in South Africa and operations in South Africa, Mozambique, Zambia and Uganda.*

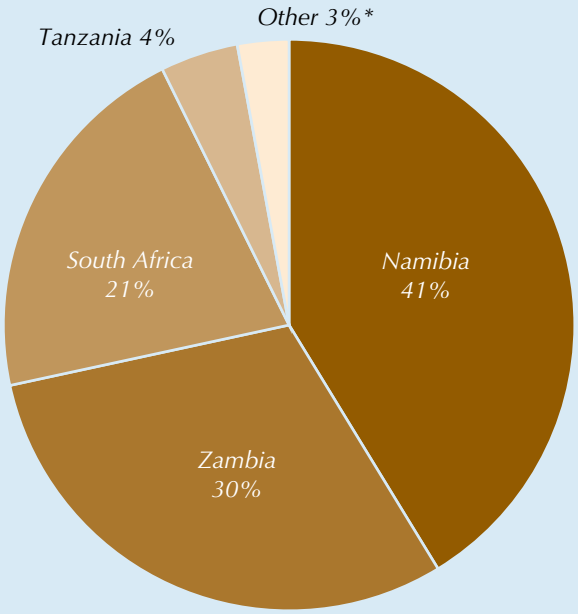
Silverlands I: Country allocation



Silverlands I: Sector allocation

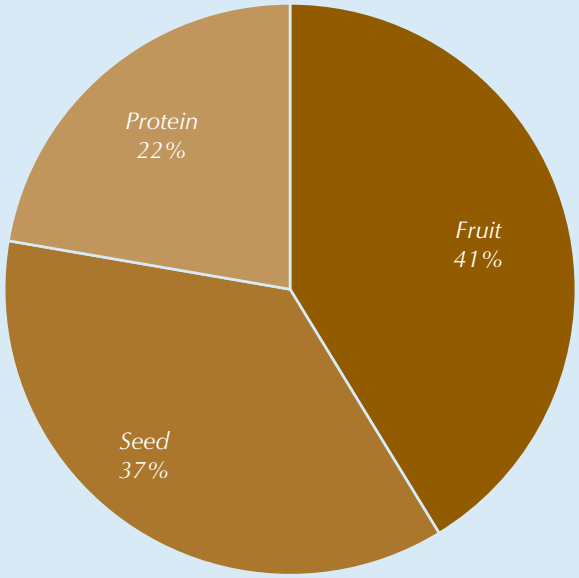


Silverlands II: Country allocation

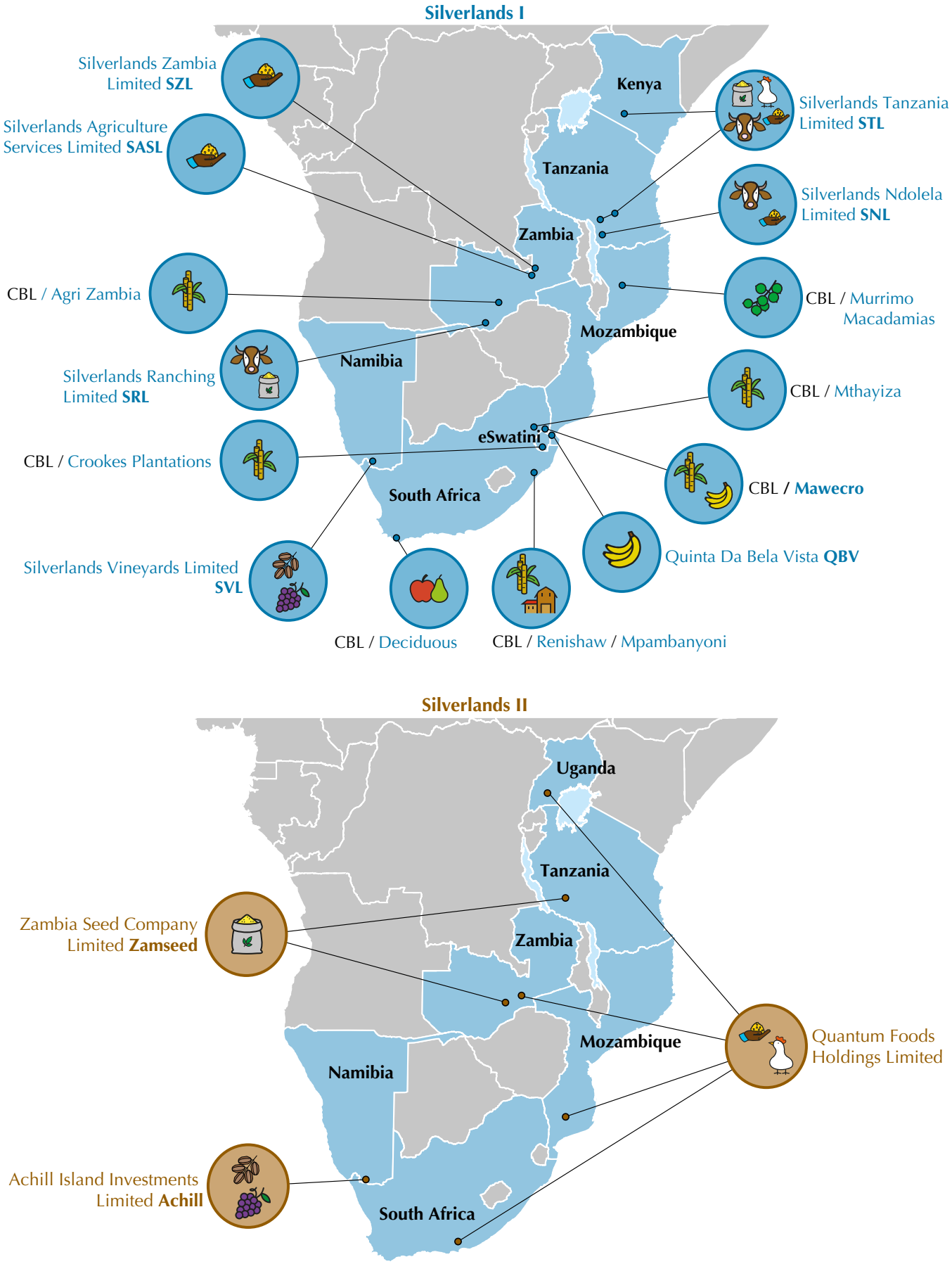


*Other includes Uganda and Mozambique

Silverlands II: Sector allocation



Location of Portfolio Companies Across Southern and East Africa



2 Silverlands' Investment and Impact Strategy

2.1 Our vision and objective

Our Vision:
"To provide the seed capital for a new era in African agriculture."

Our Objective:
"To seek attractive returns for investors whilst achieving a substantial positive social, environmental and climate impact.

We aim to:

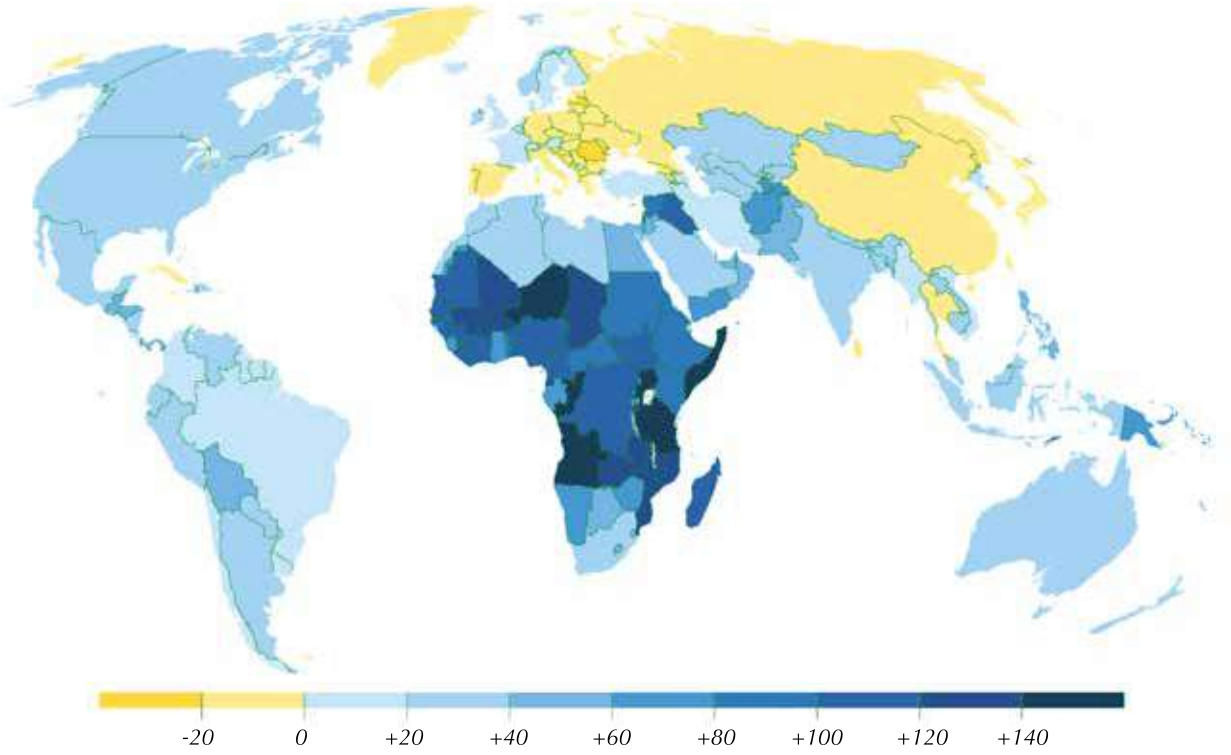
Achieve **attractive returns** for investors	**Strengthen the agricultural sector** through investment in infrastructure, systems and people	**Benefit smallholder farmers** by raising yields, creating markets, providing training and encouraging entrepreneurial activity

2.2 The key issues to solve

a Population growth

Sub-Saharan Africa has a population of 1.1 billion people and this is forecast to rise to 2.1 billion by 2050, implying more than a doubling in size. Comparing population growth rates globally to 2050 highlights how much of this growth is occurring in Sub-Saharan Africa:

Forecast change in population, 2017 to 2050 (%)

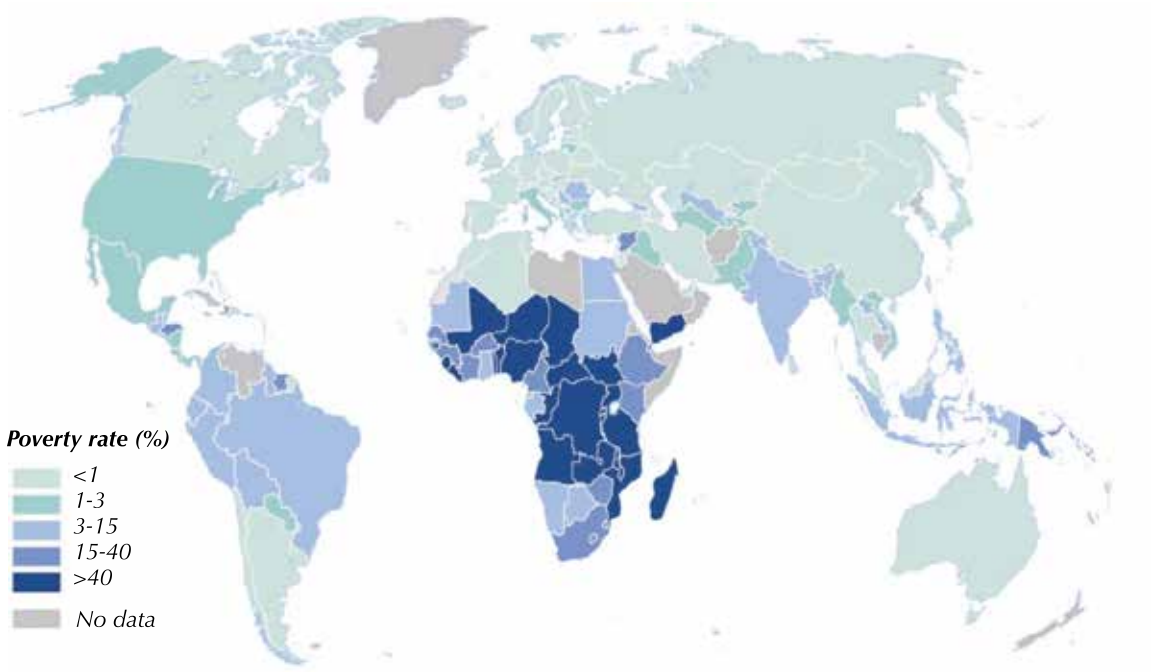


Source: United Nations World Population Prospects (2018): Map: Lazaro Gamio / Axios

b High poverty levels

Poverty levels in Africa are much higher than the rest of the world.

Poverty rate at $1.90/day poverty line



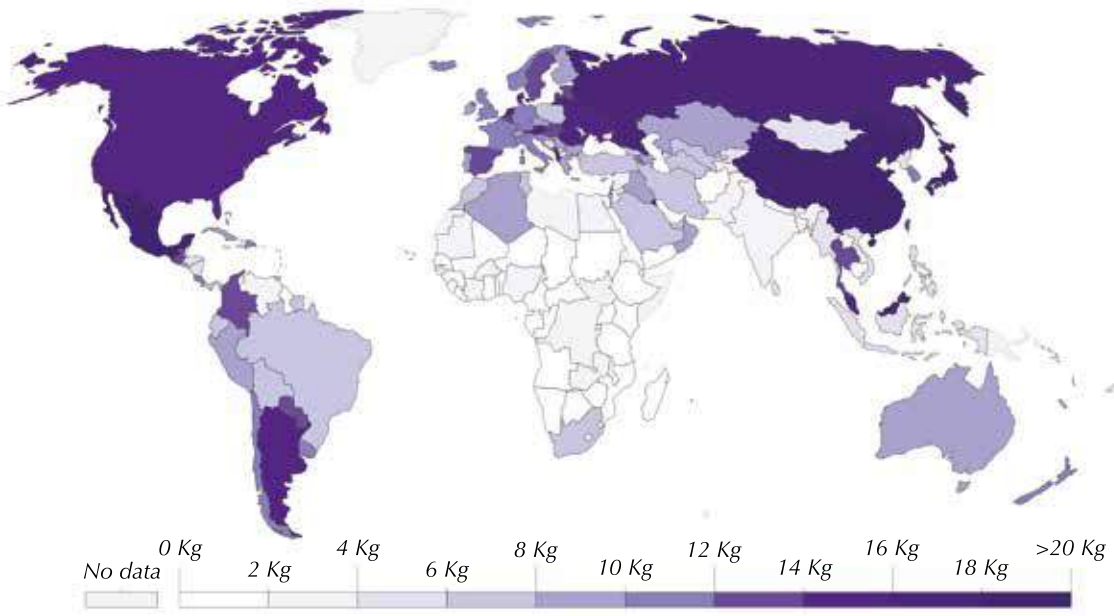
Source: World Bank, Reversal of Fortunes (2020)
PovcalNet (online analysis tool), World bank, Washington, DC, http://iresearch.worldbank.org/PovcalNet/. Note: The map shows the lined-up poverty rates (at the international poverty line) for 2017 for economies with available data in PovcalNet.

c Nutritional issues

In many parts of Africa there are shortages of food, in particular protein. The following map shows egg consumption per capita globally and highlights the very low levels of consumption in Africa.

Per capita egg consumption, 2013

Average per capita egg consumption, measured in kilograms per year (in shell weight)

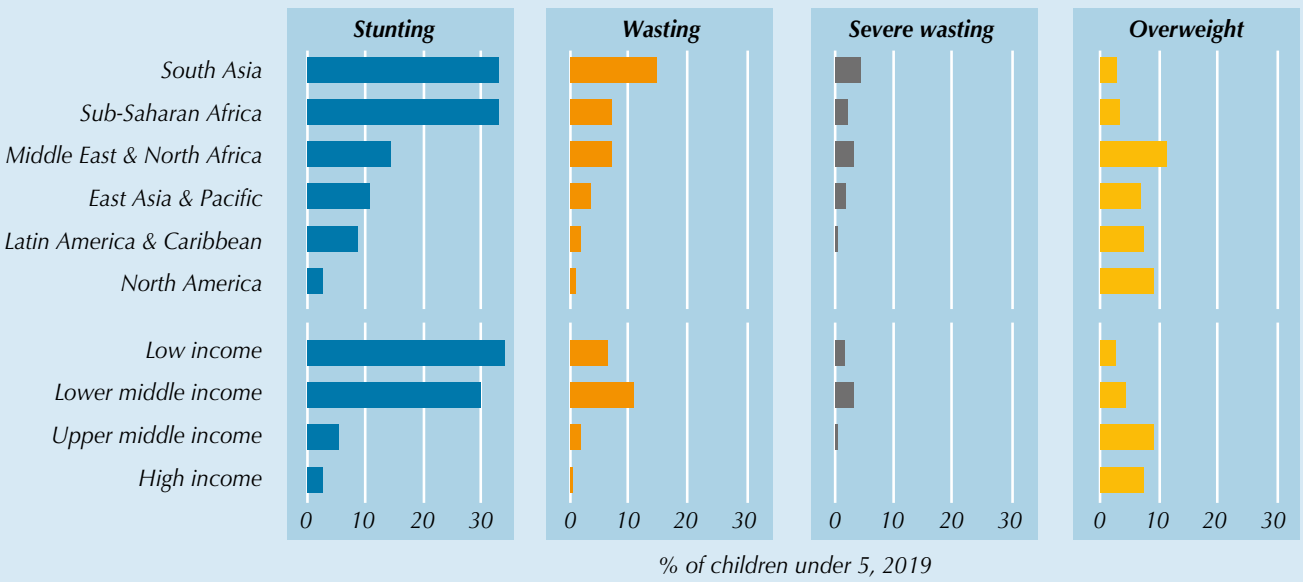


Source: UN Food and Agriculture Organization (FAO)
Note: Data refers to average per capita food supply at the consumer level, but does not correct for any wastages at the household level.

Eggs are generally the cheapest form of animal protein and therefore a useful area to assess. Average egg consumption per capita is ~9 Kg per person per annum globally whereas consumption in Sub-Saharan Africa is generally under 2 Kg per person per annum (FAO 2017).

Low levels of protein consumption by children under 5 years' old leads to "**stunting**": a term given to a resultant reduced height and brain capacity in adults if insufficient protein is consumed at a young age. If insufficient protein is consumed the damage cannot be recovered later in life.

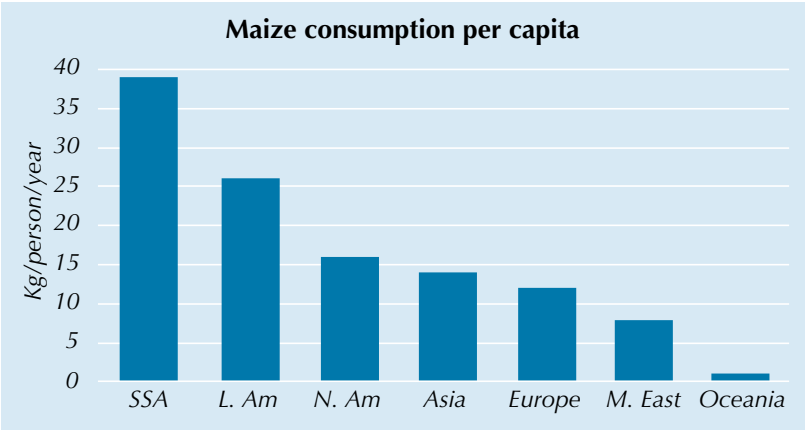
The following table summarises stunting issues for children under 5 years' old globally. In Sub-Saharan Africa approximately one third of children under 5 have a stunting issue. This issue is highly correlated to poverty.



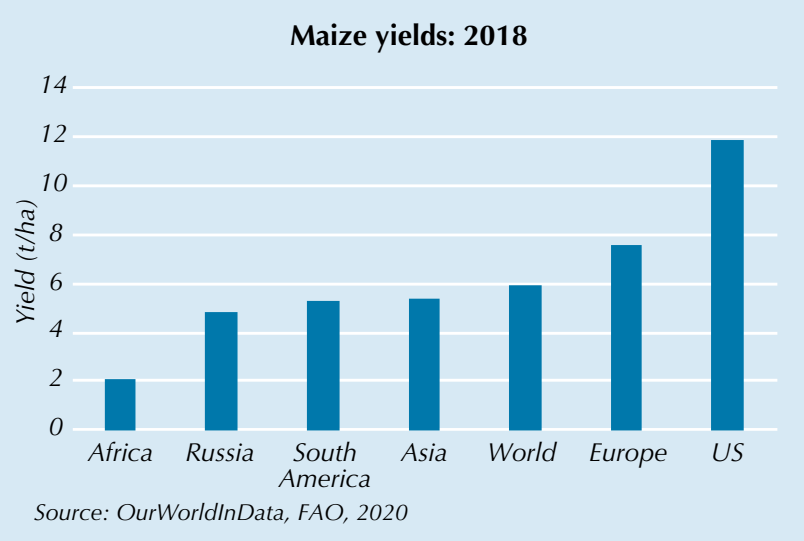
d Low crop yields

Crop yields in Africa are significantly lower than the rest of the World. Fewer tonnes per hectare means less food available or conversely, that more woodlands need to be cut down to feed the population with consequential negative climate implications.

Maize is the most important example. It is a staple for 900 million people, accounting for ~45% of total calories and protein consumed in Sub-Saharan Africa. Grown on ~40 million hectares in Sub-Saharan Africa, it occupies over 50% of the land devoted to cereal crops. This chart compares amounts of maize consumed per capita globally with Sub-Saharan Africa being the highest.



Yet in Sub-Saharan Africa, yields continue to underperform relative to those achieved globally and by commercial farmers in Africa. This chart compares maize yields globally:



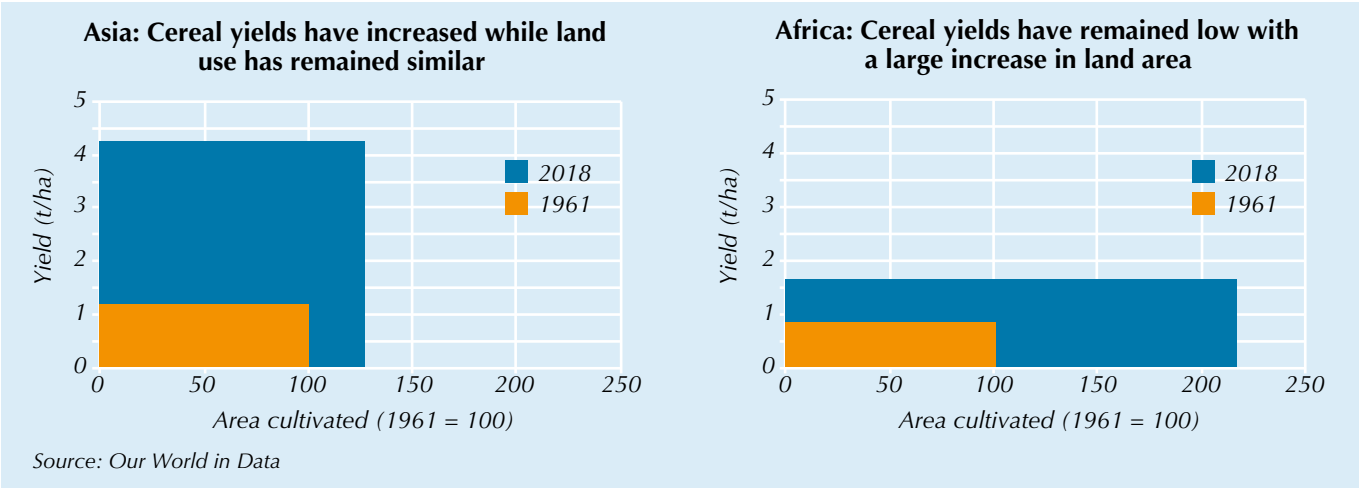
Clearly, increasing this yield can resolve nutritional and income issues for smallholder farmers.

e Increasing ecological damage and climate change impact

Across Sub-Saharan Africa, typically around 60% of the population live in rural areas on smallholder farms. This group typically farm low value crops such as maize, sorghum and cassava. These smallholder farmers typically utilise unsustainable and poor farming practices, in particular the monocropping of a crop such as maize. This leads to a so-called "slash-and-burn" approach in which the area being farmed is abandoned after 6-8 years and adjacent woodlands cut down so that crops can be planted on this new area. Poor soil management often leads to erosion and, in some areas, desertification and loss of biodiversity.

Since 1960, the global population has more than doubled from 3.1 billion to 7.8 billion. The following charts illustrate the differing paths that Asia and Africa have taken to increase food production given their rising populations.

In this time, most of Asia's increased food production has been achieved through yield gains. However, unlike Asia, Africa has increased food production since 1961 largely by expanding the cultivation area, with little yield improvement. The implications for climate change if this continues is clearly negative. This trend needs to be halted to achieve a sustainable increase in food production with a focus on greater yields and more sustainable farming practices.



2.3 How can we help to solve these problems? Creating a positive social, environmental and climate impact

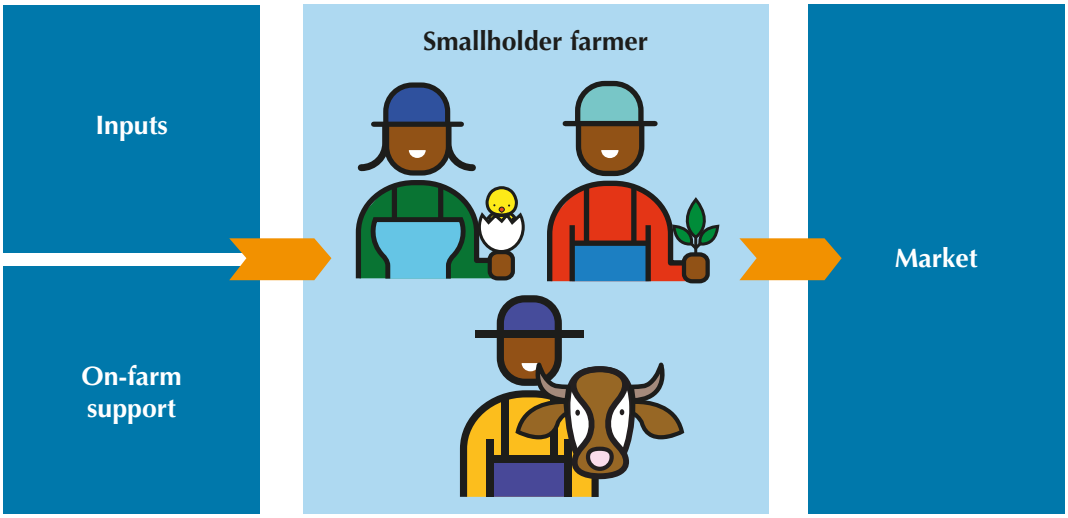
a Our impact target: smallholder farmers

The issues described in the previous section converge on smallholder farmers. This group is our impact target and represent an important and exciting prospect to create substantial social, environmental and climate impacts:

- **A broad-based group, the lowest income group in these economies:** An estimated 60%+ of Sub-Saharan Africa's growing population live on smallholder farms. This group is amongst the lowest income part of the population and is caught in a poverty trap.
- **High potential for a productivity step-change**: There is the potential to double yields per hectare, significantly boost rural incomes and improve food security.
- **Reduce negative climate and environmental impacts**: Higher crop yields come hand-in-hand with the introduction of more sustainable farming practices and this also helps to reduce negative climate impacts in a material way.
- **Entrepreneurship and empowering women**: Targeted interventions in the sector offer a significant opportunity to stimulate entrepreneurial activity, empower women, and drive broader development in the rest of the economy. Women benefit to a greater extent through interventions in the sector because a high proportion of smallholder farmers are women.
- **Promoting food security and social stability**: Boosting agricultural productivity contributes to the alleviation of nutritional challenges and improves social stability.

b How do we create this impact?

We think of the smallholder farmers as our target impact group. Raising yields, reducing negative environmental impacts, and raising incomes can be achieved by targeting investment in three key areas as illustrated below.



1 Improved inputs

To improve their productivity, smallholder farmers need access to **higher quality inputs**, in particular higher yielding hybrid seed, and more productive livestock breeds, which we collectively describe as "**improved genetics**".

Providing **hybrid seed** that is adapted to local conditions has an enormous multiplier effect. We reviewed 13 recent academic papers analysing yields of over 10,000 smallholder farmers. These studies found that those planting hybrid seed produced ~60% greater yields than those using farm-saved seed. This is discussed further in Chapter 3.

Cropping farmers also need soil correction inputs such as lime and fertiliser. And critically, these are all required **on time**. Delayed planting can significantly reduce yields. A trial at one of our demonstration plots showed that maize yields reduced by 20% simply by planting a month late.

2 On-farm support

We provide training to smallholder farmers in conservation farming and animal husbandry, as well as access to infrastructural improvements and business advice. Employee training and management programmes improve local expertise.

Training and extension support for farmers can improve their agricultural productivity enormously. For example, training in conservation farming techniques makes a material difference:

- No tillage allows for limited soil disruption and erosion and increases the soil's organic content.
- Mulching involves placing the prior crop waste on the soil – it retains moisture in the soil and improves its quality.
- Composting involves decomposing organics into simpler organic matter with more readily available nutrients that can then be applied to improve soil quality.
- Rotation with a legume allows the soil to improve through the nitrogen fixing qualities of a legume like soya and, to reduce disease pressure.

Conservation farming methods are simple, requiring no specialist equipment, and are therefore easy for smallholder farmers to implement. These methods increase yields, improve soils, raise soil moisture levels making crops more tolerant to drought periods, while reducing soil erosion, disease pressure and ultimately labour time.

Additionally, conservation farming techniques are considerably more sustainable. This approach implies that farmers can end "slash & burn" practices and this has significant climate benefits because deforestation is reduced.

Conservation farming studies: We reviewed 14 studies covering 7 countries. These collectively involved ~900 smallholder farmers and ~85 scientifically monitored trial plots. They showed that by implementing conservation agriculture methods alone, smallholder farmers can increase their maize yields by 40%. This is discussed further in Chapter 3.

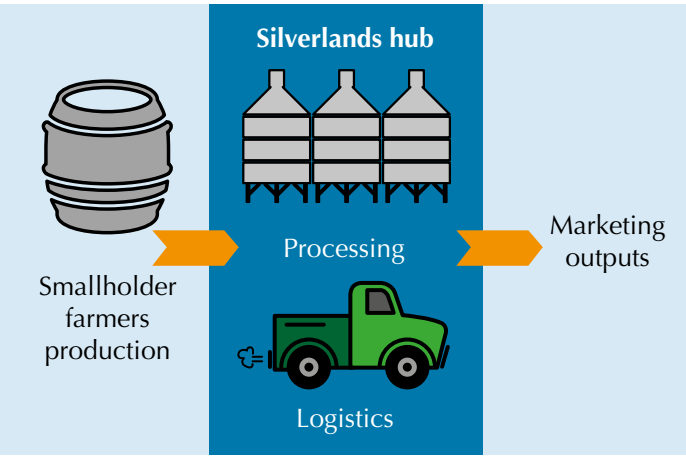
3 Providing a market

Smallholder farmers require markets for higher value crops/livestock products, to be able to generate more income than from low value crops such as maize and cassava.

A 'market' for most farm production is normally a processing plant: a wheat mill, soya processor, or fruit packing and juicing plant. In our hub out-grower model, neighbouring farmers are producers for a central processing facility, developed by the portfolio company.

Silverlands benefits by having access to greater input volumes, while growers benefit by producing higher value crops that Silverlands processes and markets. Current outgrowing projects include soya, poultry, cattle, sunflower, sorghum and beans.

It is estimated that as much as 37% of grains grown by smallholder farmers is lost through a lack of reliable storage compared to 6% in the USA (World Resources Institute, 2013). Businesses that improve crop storage, cold storage and the logistical aspects of transporting crops can have huge impacts on entire value chains.



2.4 Creating other positive impacts: developing new industries, creating quality jobs and planting tree crops

Employment and food production impact

- **Employment**: Large commercial enterprises bring direct benefits to an area, such as jobs on site and within surrounding services. Silverlands directly employs over 10,000 people who earn salaries totalling $29 million per annum. The impact goes beyond our boundaries, with 15,000 indirect jobs created and 46,000 household members impacted.
- **Food production:** Most of our produce is for local or regional consumption, strengthening local economies and increasing food security.

Developmental impact of plantation crops

Plantation crops have a unique set of development impacts:

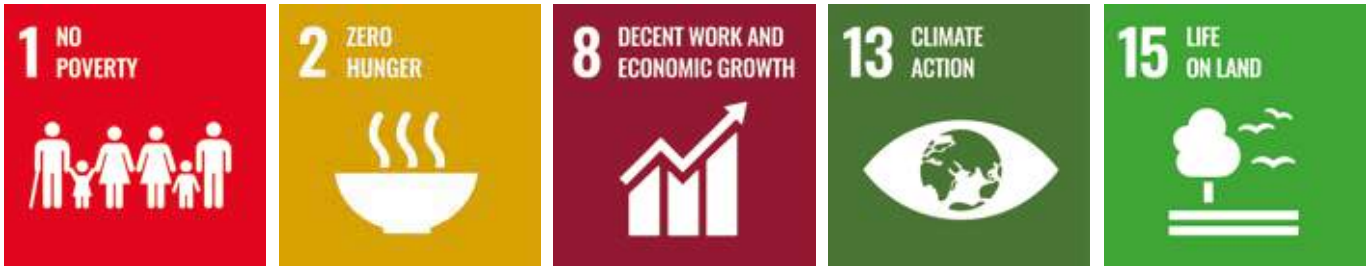
- **Creating entirely new industries:** We are growing plantation crops such as date palms, pecans, macadamias and avocados. In most cases these crops, and the revenues that they produce, are new to the countries or regions. This implies developing a whole new industry for that region or country, spearheading developments which will open doors for others.
- **Healthy eating:** These plantation crops produce products with diverse health benefits, such as avocados, tree nuts and date palms (e.g. for diabetics). Demand is likely to continue to grow faster than for the main staples.
- **Potential carbon benefits:** There are potential carbon storage benefits to planting large areas of trees, if planted on previously converted or degraded land. As we have seen with the production of apples, the orchards can last 30 to 40 years and when replaced, the old trees are chipped and added back to the soil, ensuring retention of the bulk of the carbon.
- **Creating a social impact through the community joint venture model**: Plantation crops are expensive to develop and require capital investment and expertise, normally excluding smallholder farmers from their production. However, communities can still benefit through the joint venture model.

Under our model, the portfolio company partners with a community for a long period, typically 15-20 years, and a joint venture company is formed. The JV leases the land from the community and pays a management fee to our portfolio company. Profits are split between the community and the portfolio company. A pro-active skills transfer then takes place over the period of the JV.




Smallholder farmers are a particularly attractive target group for development opportunities:

Opportunities: to improve nutrition and environmental benefits over huge areas



2.5 Acting responsibly and raising governance standards

We believe that if value is created across Africa's agricultural chain, then a sustainable infrastructure can be built, permanently raising living standards for farmers, mitigating negative environmental impacts, and creating a multiplier effect across local economies to increase overall prosperity.

Our goal is to help build sustainable businesses that survive the Silverlands Funds and strengthen economies in Sub-Saharan Africa.

SilverStreet's work seeks to address the root causes of these development challenges by realising some of the associated investment opportunities, informed by the following underlying objectives:

1 Building profitable businesses

Our approach to building profitable businesses is guided by the following premises:

- **Profits are essential**: Building successful commercial operations is at the core of our social impact strategy, informed by the belief that business success underwrites the sustainability of the human development we seek. We bring infrastructure, high-quality inputs, and world-class expertise to pursue returns.
- **Long-term risk mitigation and diversification**: Silverlands sees its ultimate impact in decades rather than years. To deliver on our long-term approach, we mitigate risk through meticulous site and business selection. Our metrics include climate and geography; access to water, transport, and labour; community willingness; and political risk management. Our portfolio is diversified across the value chain in eight countries and various climates.
- **Long-term investment partners**: We are grateful to be backed by patient investors, managing institutional, family office or government funds, who share our objectives and do not compel us to pursue short-term profits at the expense of long-term benefit.

2 Operating responsibly

We are committed to operating responsibly by pursuing ethical business practices and ensuring responsible environmental management.

- **Ethical business practices**
  - Our investments are governed by a Responsible Investment Code. In addition, we adhere to the IFC Performance Standards and the UN Principles for Responsible Investment (UNPRI). We are signatories of the UN PRI and follow the UN Global Compact. We adhere to international accounting standards and enforce strong anti-bribery and anti-corruption policies. We support honest and transparent governance and reporting standards.
  - In adopting the IFC Performance Standards, we monitor: environmental and social risk management activities; fair labour practices; conservation of resources, preservation of biodiversity and reduction of pollution; community health and safety; and the safeguarding of cultural heritage. We have annual independent ESG audits and publish these reports of ESG compliance.
  - Each portfolio company has a corporate social investment programme, donating towards community projects such as schools, bursaries, clinics and agricultural education centres.

- **Environmental responsibility**
  - **Efficient water use**: Using the most efficient irrigation methods and automated systems, we minimise water use while increasing yields. Practising minimum tillage on our farms, and teaching this to smallholder farmers, leads to increased soil moisture, reducing irrigation needs and enhancing drought tolerance in lower rainfall periods. Drought-tolerant seed also has water-use benefits.
  - **Reducing energy use**: We continue to implement clean energy solutions - solar and hydroelectric power developments help reduce reliance on fossil fuels and unreliable grids.
  - **Improving soils**: This reduces erosion and agrochemical use and has a carbon benefit. We practise and teach smallholder farmers conservation farming methods, including minimum tillage, composting, mulching and crop rotation. These increase soil organic matter, which has a carbon benefit and reduces erosion and fertiliser requirements.
  - **Biodiversity benefits**: Raising the productivity of smallholder farmland reduces deforestation of woodlands and helps to preserve biodiversity. Extraordinary yield improvements in maize, from 1-2 t/ha to 4-5 t/ha, are possible in a short space of time, raising food production without the need for farmers to increase the area farmed.

CorporateLiveWire GLOBAL AWARDS 2020/21

This year, SilverStreet Capital won the following two awards in Corporate LiveWire's Global Awards 2020/21.

Corporate LiveWire's Global Awards honour outstanding performance and continued excellence within the global financial services industry. SilverStreet Capital was recognised for its continued efforts in creating sustainable, ethical and positively impactful businesses.

SilverStreet Capital
2018, 2019 & 2020/21 Award winner
Ethical Investor of the Year

For the third consecutive year, SilverStreet was named 'Ethical Investor of the Year'.

"SilverStreet have shown that a sustainable investment model that promotes improving the living standards of communities can work fluidly with profitability," Andrew White, Corporate LiveWire.

Judges commented on the recognition, saying, **"It is very rare that we can so clearly see a business which invests such time and resources into ensuring investments are made where it matters most. We are extremely pleased to recognise you again."**

SilverStreet Capital
2020/21 Award winner
Emerging Markets Investment Company of the Year

SilverStreet Capital also won the **'Emerging Markets Investment Company of the Year'**. This is the first time in the awards' history that a company or individual winner has been recognised in multiple categories in the same year.

3 Improved Seed and Conservation Farming Training

3.1 Impact summary

High yielding seed

We estimate that 9,100 tonnes of (mostly maize) seed produced and sold this year across our portfolios will be planted by an estimated 216,000 smallholder farmers. We estimate each farmer's profits to increase from a baseline level of ~$500 per annum by ~$221 per annum, from ~$500 to ~$720, an increase of roughly 44%. This produces a substantial increase in income given the large number of farmers benefitting: these farmers will earn an additional $48 million in 2020.

Fund	Community participants (# 2020)	Increase in household income annually ($ p.a. 2020)**	Value added to community annually ($m p.a. 2020)
Silverlands I	157,699	236	37
Silverlands II	87,969	203	18
Overall total*	**216,017**	**221**	**48**

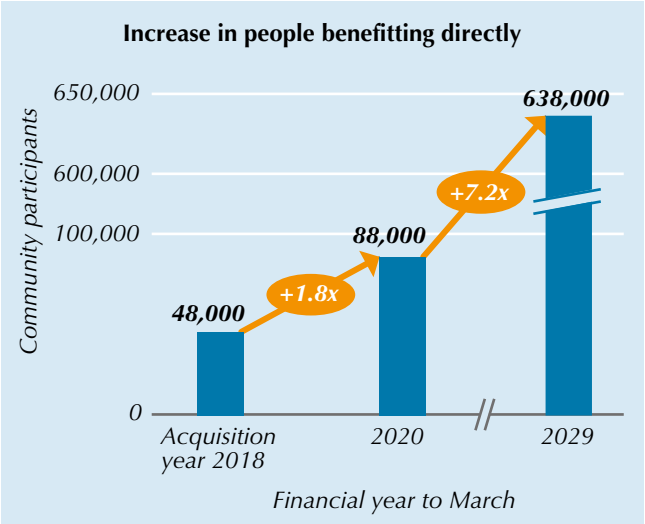
**Adjusted to avoid double-counting*
***Total is a weighted average*

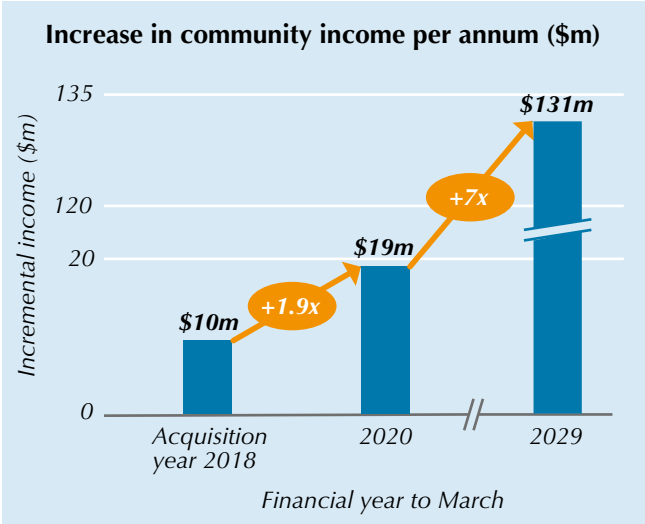
Zamseed

In 2020 we estimate that Zamseed would sell seed to 88,000 smallholder farmers, up 42% from 2019.

- This seed can be planted on 120,000 hectares.
- By increasing their yields using this hybrid seed, we estimate a smallholder farmer can increase their income by ~$203 per annum, resulting in an increased community income of $18 million per annum.

Our growth plans project that Zamseed will sell 26,000 tonnes of seed in 2029. This seed could be planted by nearly 640,000 smallholder farmers on 870,000 hectares of land. Increased yields and incremental income per farmer of $203 per annum, would result in a total smallholder farmer income improvement of $130 million per annum. That is a remarkable impact that we look forward to achieving.





Conservation Farming techniques

We estimate that 3,100 farmers have benefitted from training during field days. Research has shown that yield improvements of around 0.7t/ha are achievable following such training.

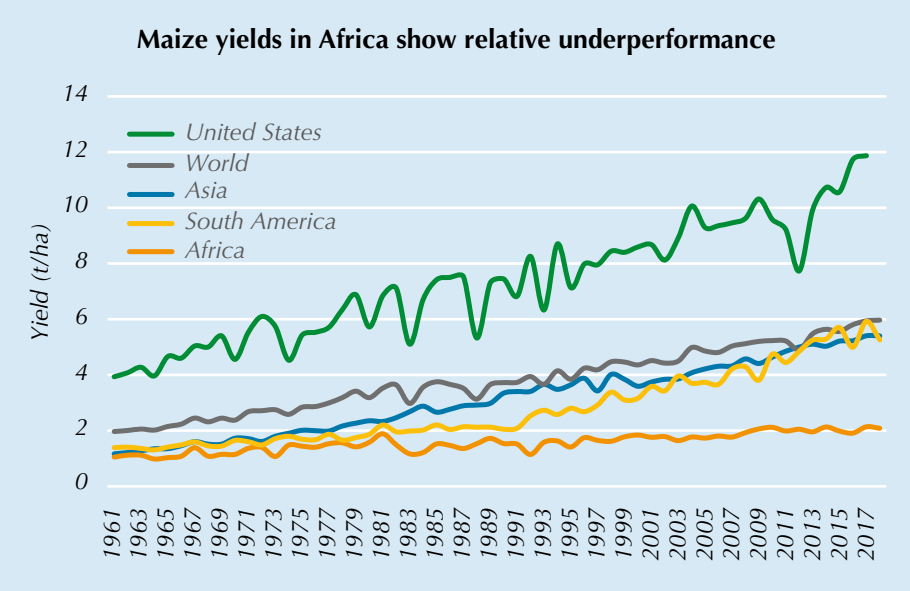
Country	Primary crops in training	Demonstration plots (#)	Estimated number of farmers benefitting (#)
Tanzania	Maize, soya, sunflower	22	1,024
Tanzania	Potato	-	100
Zambia	Maize, soya, groundnuts	15	200
Zambia	Maize, sunflower, sorghum	18	1,776
Total		**55**	**3,100**

3.2 Introduction

In Chapter 2 we highlighted the central importance of inputs and on-farm technique to solving the issues listed: population growth, high poverty levels, nutritional issues, low crop yields, environmental damage and a negative climate impact.

The two key responses to these issues are to encourage the use of improved or hybrid seed and the deployment of more sustainable farming methods, namely conservation farming techniques.

In Chapter 2 we also showed how low maize yields are in Africa compared to the other main growing areas. Maize yields in Sub-Saharan Africa continue to underperform relative to those achieved globally and, compared to yields achievable by commercial farmers in the region: this chart is from the 1960's.

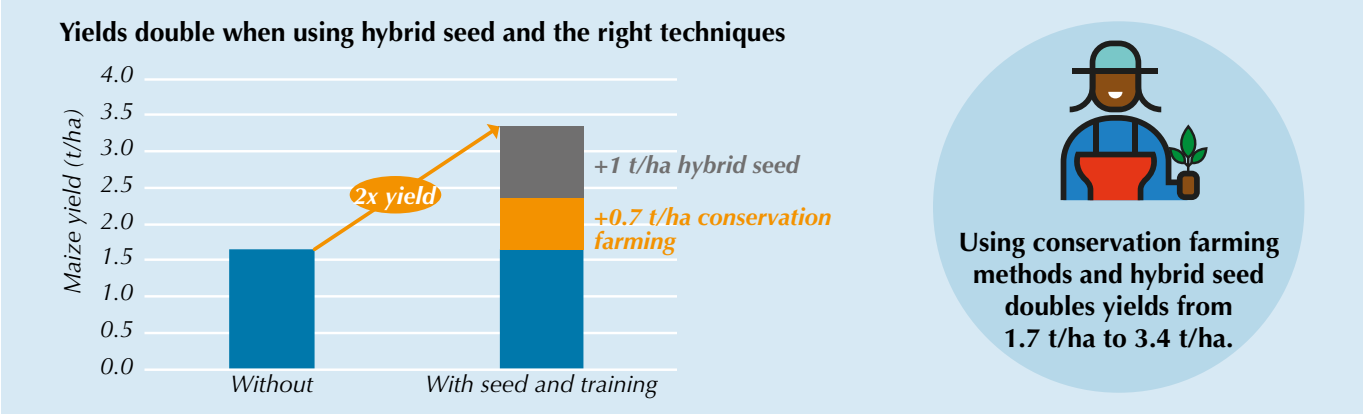


3.3 What does academic research tell us?

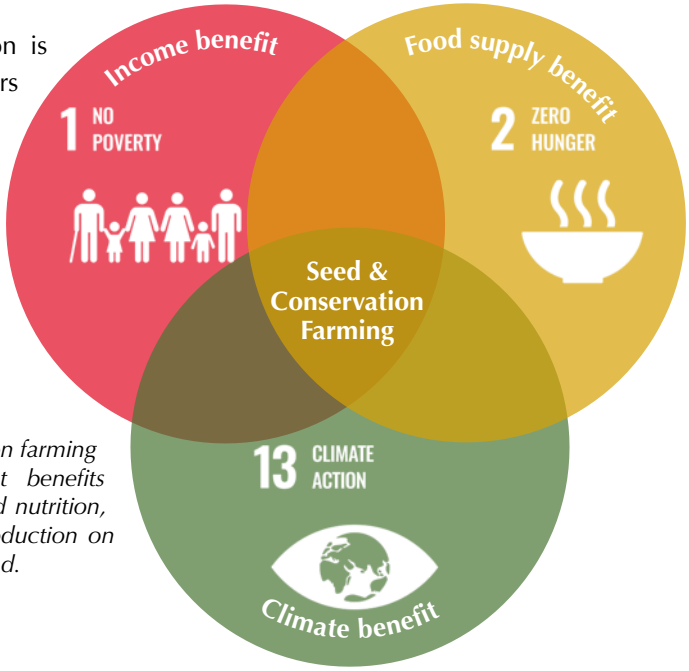
Our surveys of yields in the countries that we operate in indicate that smallholder farmers typically produce maize yields of around 1.6 t/ha. This is far below yields achieved by commercial farmers (often 8-10 t/ha) and the potential yield under smallholder farmer conditions.

The following chart summarises a literature survey that we conducted to help us understand the impacts of different strategies to increase smallholder farmer yields. We included 13 academic papers on the use of hybrid seed, and these covered over 10,000 smallholder farmers across six countries in Sub-Saharan Africa. We also reviewed nine studies investigating the adoption of conservation farming techniques and these studies covered seven countries across Sub-Saharan Africa.

A switch from farm-saved seed to hybrid seed added, on average, around 1 t/ha and, by changing to conservation farming techniques a further 0.7 t/ha was added. Conservation farming techniques also reduce ecological damage and climate impact. Taken together, these two changes can lead to a doubling in crop yields, an extraordinary step up.



It is easy to gloss over facts like this but, the implication is profound given the huge number of smallholder farmers in Africa. Food production could feasibly double simply through this intervention. Incomes will increase by more than double, helping to alleviate poverty. Climate impact is dramatically reduced by introducing techniques that do not lead to deforestation and are carbon friendly.



Hybrid seed and conservation farming techniques have significant benefits for the climate, incomes and nutrition, through increasing food production on similar or smaller areas of land.

3.4 Improved seed – the benefits

We aim to improve smallholder farmers' yields through the development and production of high-quality improved or hybrid seed. Using improved seeds can:

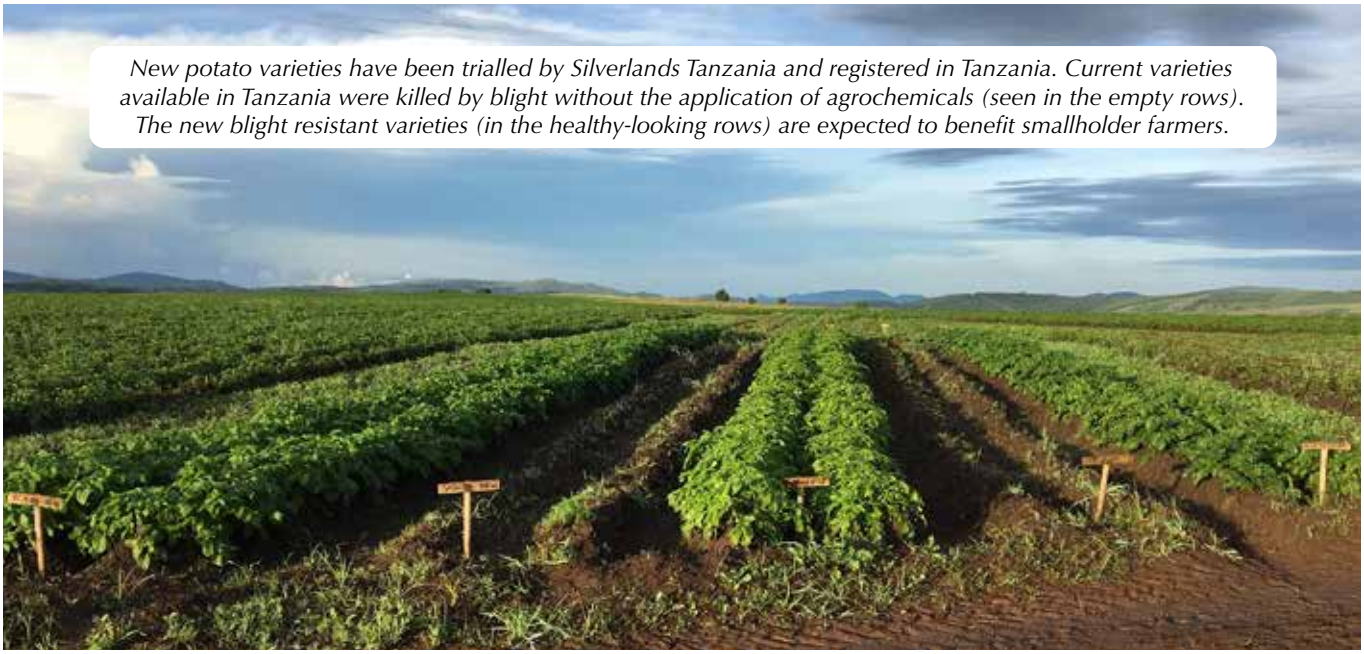
- Increase yields
- Increase incomes
- Improve drought tolerance
- Reduce the impact of some diseases and pests
- Improve adaptation to a changing climate
- Improve nutrition through increased access to micronutrients.

Despite the clear benefits of planting improved seed, a lack of access and information means farm-saved seed is still used in many countries. Studies report that only 42-52% of farmers use hybrid seed (according to a 2019 survey of ours in Tanzania; World bank policy paper, 2011; Abate et al., 2017). In other words, at least half of smallholder farmers do not use hybrid seed. This provides an opportunity for our operations to meet that supply.

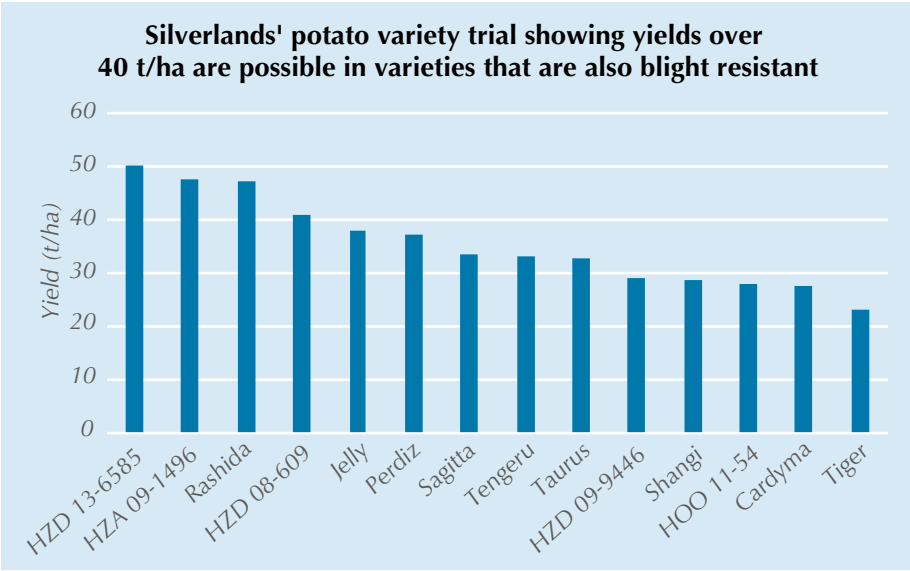
3.5 Case study 1: Introducing disease tolerant seed potatoes in Tanzania

Silverlands Tanzania is introducing new blight-resistant potato varieties to Tanzania. These varieties will benefit smallholder farmers who typically achieve low potato yields of 5 - 10 t/ha, when yields of up to 40 t/ha are possible. The reasons for these low yields include lack of good quality clean seed of improved varieties; no crop rotation; and losses due to soil diseases.

The HZDA 09-1496 variety, with an excellent yield of 48 t/ha, was almost completely blight-resistant in our 2019 trials in Southern Tanzania, making it suitable for smallholder production. It will also be popular with the market as it is suitable for French fries and has yellow flesh which is preferred in Tanzania. The business is now registering this variety, with full-scale production possible in 2 years' time.



New potato varieties have been trialled by Silverlands Tanzania and registered in Tanzania. Current varieties available in Tanzania were killed by blight without the application of agrochemicals (seen in the empty rows). The new blight resistant varieties (in the healthy-looking rows) are expected to benefit smallholder farmers.



Demand for Silverlands' seed potatoes exceeds supply, with 15 farmer groups (AMCOS) pre-ordering seed. Silverlands Tanzania produces seed potatoes at the Ludodolelo farm in the high elevation Makete area that has a perfect climate for growing potatoes.

3.6 Case study 2: Introducing higher yielding sunflower seed in Tanzania

Across Tanzania, more than 1 million ha are planted to sunflower, almost entirely grown by smallholder farmers.

The country still however imports over $300 million of vegetable oil. 85% of farmers are using local varieties that underperform on both yield and oil content. The primary constraint on smallholder production is poor access to improved seed.

Silverlands Ndolela is the first producer of hybrid sunflower seed in Tanzania, registering two new varieties to allow their production and use by smallholder farmers. Silverlands Ndolela's seed, retailed at $6.50/Kg, is almost half the cost of imported seed which costs $12/Kg (or more). This is a huge step in making improved seed varieties more accessible to these farmers.

In 2020, 77 t of sunflower seed were produced in Tanzania. This may be used by 31,000 smallholder farmers to plant 15,000 ha, the higher yields increasing each farmer's income by $72 each year and raising community income by $2.2 million per annum.

Silverlands' new varieties also contain up to 8% more oil than local varieties, oil that is rich in polyunsaturated fats with nutritional benefits. Every tonne of sunflower grown by smallholder farmers contains $70 more oil than local varieties. This seed therefore raises incomes for both the farmer and the owner of the sunflower seed crusher.

Silverlands is working with the NGO Briten to provide agricultural and financial training to 8,000 farmers organised into 35 Agricultural Marketing and Cooperative Societies (AMCOS). These farmers, 43% of whom are women, will plant 12,000 ha with Silverlands' seed. Various banks have been engaged and are available to provide loans for the seed should the AMCOS require. This year, 70 plots will be used to demonstrate the new seed varieties to farmers in the prime sunflower areas, Tanzania's Central Corridor and Southern Highlands. Sunflowers are good to add into the rotation with maize and soya beans as they improve the soil by bringing nutrients to the surface soil layers from deeper down.

Sunflowers require large numbers of bees for pollination, presenting an additional opportunity. This year, smallholders and SMEs earned a total of $10,000 from renting their hives to Silverlands Ndolela.

Multiple bee species are involved in pollinating the sunflowers at Silverlands Ndolela.
An entomologist was engaged to understand which bee varieties are best for pollination and how to manage them.

3.7 Case study 3: Producing hybrid seed for seed companies in Tanzania and Zambia

Silverlands I has become the largest producer of seed in Tanzania, a country with a significant shortage of hybrid seed.

This year the 9,100 tonnes of seed produced can be planted to 290,000 ha of crops, almost all in Zambia and Tanzania.

Overall, we estimate that this seed will be grown by 216,000 smallholder farmers. With increased yields from growing our higher-yielding seed, we estimate that each farmer's profits should increase by $221 annually. This yield improvement is expected to increase incomes of smallholder farmers by $48 million this year, and this should be a sustainable income benefit for these smallholder farmers.

Smallholder farmers growing crops with hybrid seed - 2020

Farm	Our seed production (t)	Area planted with our seed (ha)	Community participants (#)	Increase in household income annually ($ p.a.)***	Value added to community annually ($m p.a.)
Silverlands I					
STL (Tanzania)	3,615	93,721	69,092	238	16
SNL (Tanzania)	1,972	88,458	58,845	255	15
SZL + SASL (Zambia)	698	27,900	21,462	194	4
SRL (Zambia)	408*	10,808	8,271	198	2
Silverlands I total	6,692	220,887	157,669	236	37
Silverlands II					
Zamseed (Zambia)	3,405*	119,819	87,969	203	18
Overall total**	**9,071**	**290,093**	**216,017**	**221**	**48**

**Only seed sold to smallholder farmers*
***Adjusted to avoid double-counting*
****Total is a weighted average*

Hybrid seed production is specialised

Seed breeding typically takes place on small areas. Once the right two 'parent' lines are found, producing large volumes of the hybrid seed takes place on vast areas, yet still entails careful cultivation with vigilant attention to detail. The variety selected to be seed-bearing (referred to as the 'female') is pollinated with a different variety (the 'male'). Every female plant must be 'de-tasselled' to prevent self-pollination. This leaves two rows of male plants for every six rows of female plants.

Seed maize production involves crossing two varieties. Two rows of 'male' lines fertilise 6 to 10 rows of 'female' lines resulting in the 'tram-line' look. Zamseed produced seed maize for the first time in winter, in the warm Zambezi Valley.

Potato seed production at Silverlands Tanzania's high elevation farm in Makete.

3.8 Zamseed: a regional seed business, Silverlands II

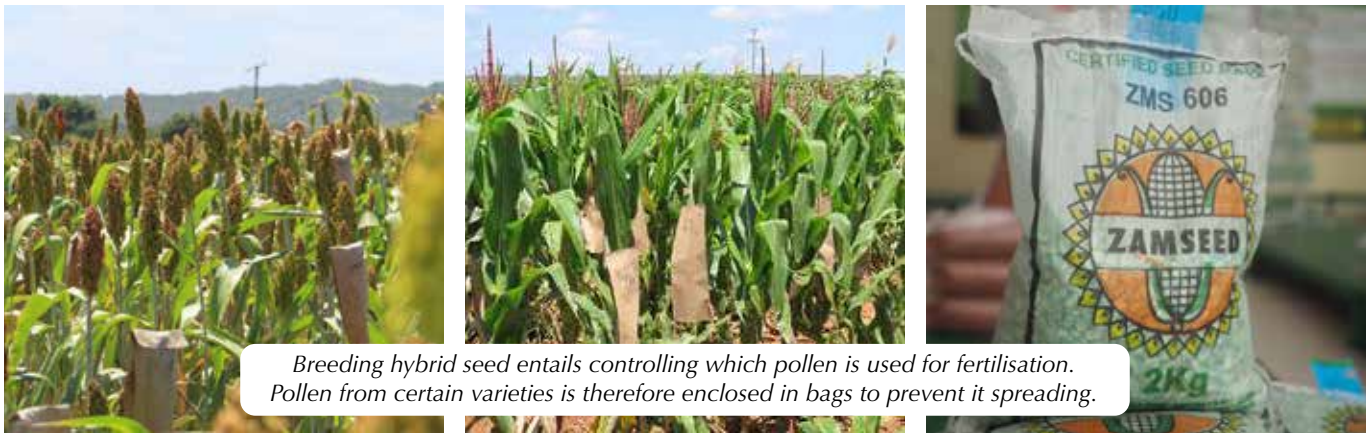
Introduction

Established in 1980, Zamseed benefits from exclusive rights to its own high-quality hybrid seed varieties that are specially bred to perform on smallholder farms across Sub-Saharan Africa. With headquarters in Lusaka, Zambia, and a regional footprint, Silverlands II invested in 2018 with the aim of growing the business into a regional seed champion with significant social and environmental benefits. Silverlands II currently owns ~84% of Zamseed.

Zamseed's hybrid seed varieties have been bred to perform in conditions typical of smallholder agriculture in Sub-Saharan Africa. Many North American or European hybrid seeds are bred to perform in optimal conditions, with high levels of fertiliser and secure water, as is typically found on US/European commercial farms. However, these seeds would not perform in conditions commonly found on smallholder farms, which may lack enough fertiliser, optimal soil conditions, secure water sources, access to pesticides or adequate storage.

By selecting varieties that are drought tolerant, perform with low fertiliser input and are tolerant of common diseases, Zamseed produces seed that significantly outperforms seed saved from the last season's crop. This hybrid seed improves the incomes and lives of resource-poor farmers.

Zamseed now sells 13 hybrid maize varieties. Other products include soya beans, sorghum, sunflower, cow peas, groundnuts, pigeon peas, upland rice seeds and a variety of vegetable seeds.

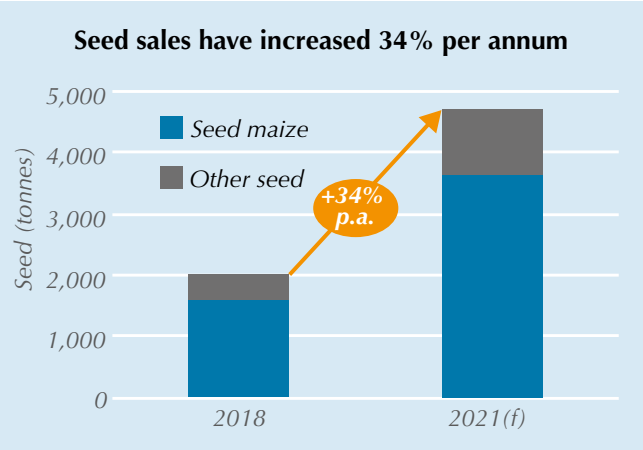


Breeding hybrid seed entails controlling which pollen is used for fertilisation. Pollen from certain varieties is therefore enclosed in bags to prevent it spreading.

Zamseed's financial performance: KPIs

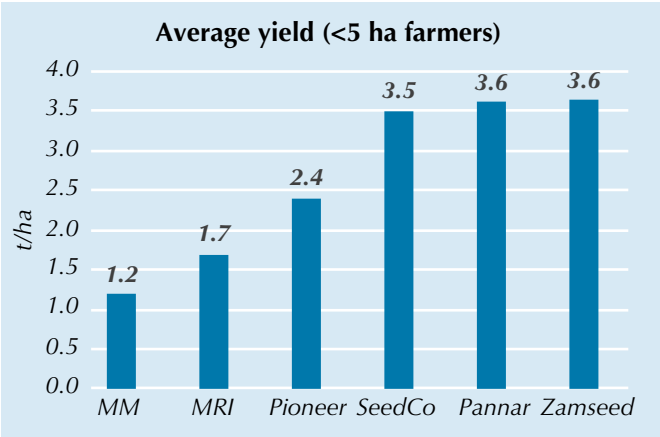
Since Silverland IIs' first investment into the business, Zamseed's sales volumes have already more than doubled. The annualised growth rate is 34% per annum.

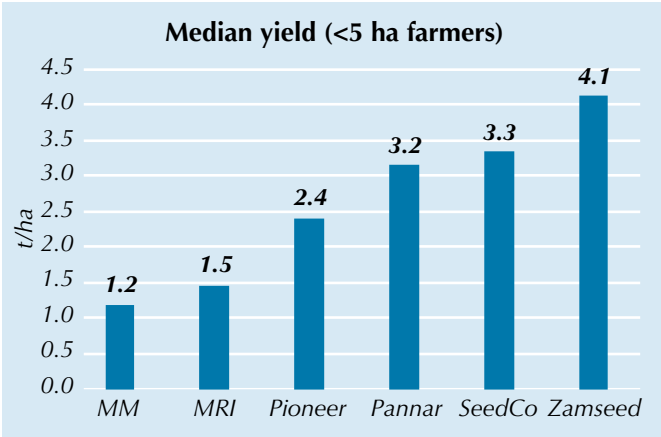
Improved marketing and new seed registrations in Tanzania have helped the business expand its footprint.



Product performance

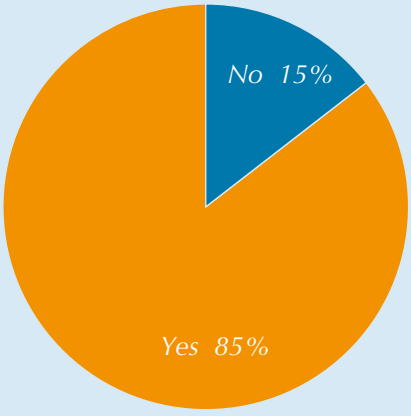
A survey of smallholder farmers was conducted in 2020 and these showed that Zamseed farmers achieved greater yields than those using other hybrid seed and, were likely to be using conservation farming techniques. For smallholder farmers (< 5 ha), Zamseed achieved the highest average yield (3.6 t/ha), as well as the highest median yield (4.1 t/ha).





66% of respondents in our survey practised conservation farming agriculture. Of those, most (85%) say that it made a difference to their cropping, with yield being the most common improvement (48%), followed by various advantages relating to soil (21%).

Does practicing conservation agriculture make a difference to your cropping?



Conservation agriculture comments from respondents:

"Production costs are reduced, and yield is increased"

"Able to plant early and yield is better"

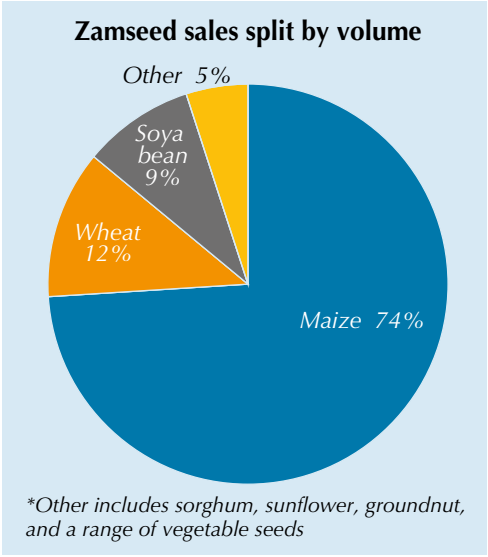
"Yield higher on a small piece of land"

"Good yield and when there is drought I am not affected much"

"Yield is achieved even in times of drought"

Product expansion

Zamseed has already expanded its range of products and plans to substantially increase the varieties it produces. Maize underpins farmers' incomes and livelihoods and forms most of Zamseed's sales (74%), however, the goal is to build a broad seed product range to help farmers to diversify.



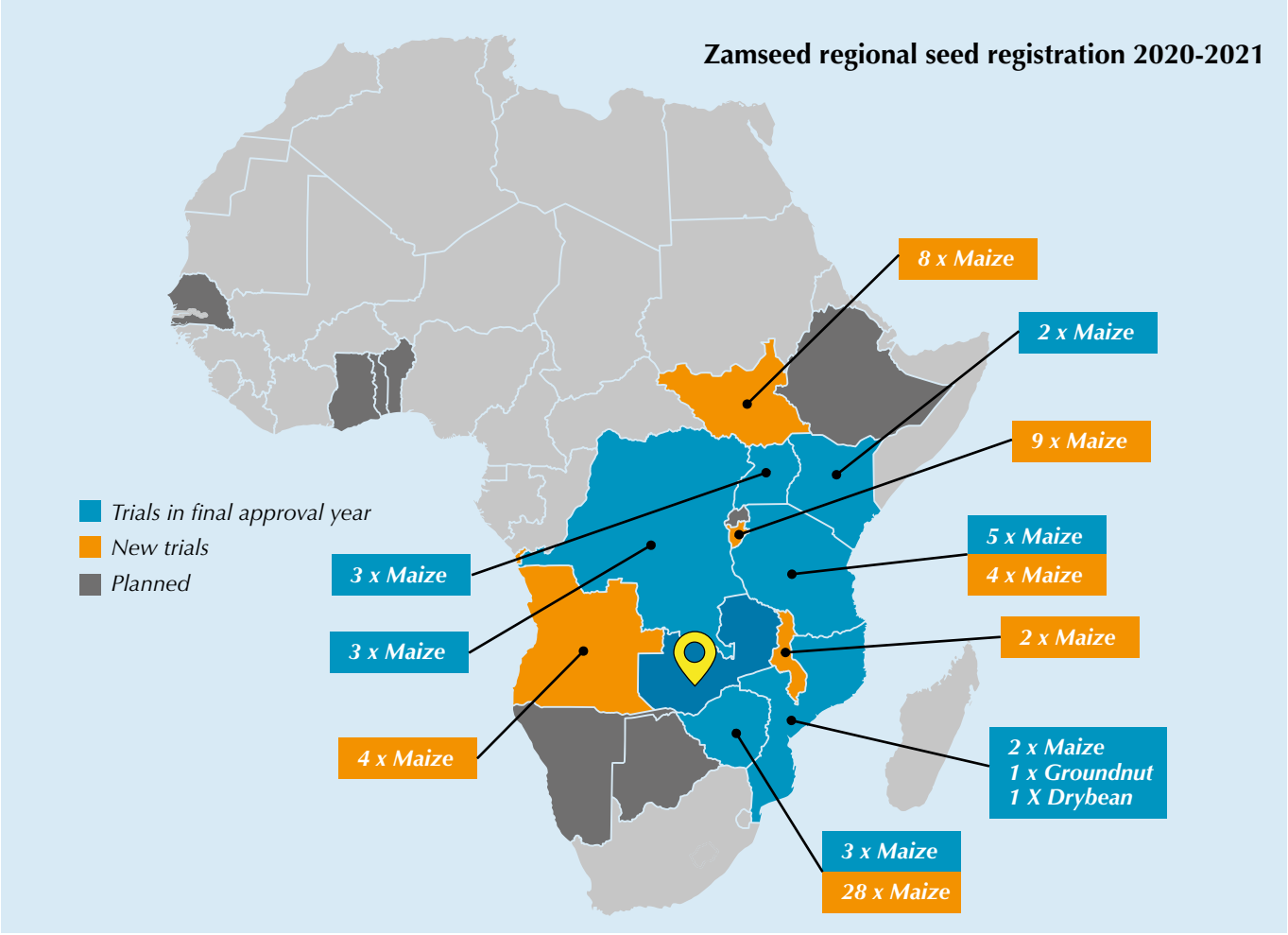
Vegetables: Dietary diversity is a key challenge in Zambia. National vegetable consumption is below both African and Global averages (Global Nutrition Report, 2020). By growing a range of vegetables, smallholder farmers can help contribute to their own dietary diversity and food security. Unlike maize, vegetables can be watered by hand and grown all year round and can therefore provide smallholder farmers with income outside the usual cropping season.

Testament to its effective products, Zamseed has been awarded tenders from NGOs, including USAID.

Geographic expansion

Historically, Zamseed supplied seed predominantly into the Zambian market. Since Silverlands II's investment, Zamseed has begun expanding its geographic presence to become a truly regional seed business. This is the underlying business goal: to expand the business to become a regional platform.

Zamseed has initiated a regional seed registration drive across multiple countries. By trialling varieties in countries that are included in seed harmonisation laws, Zamseed will register a wide range of varieties efficiently across the region. This year, 18 seed varieties across six countries are currently undergoing trials for the second (and final) season, with 55 seed varieties submitted for first round trials.

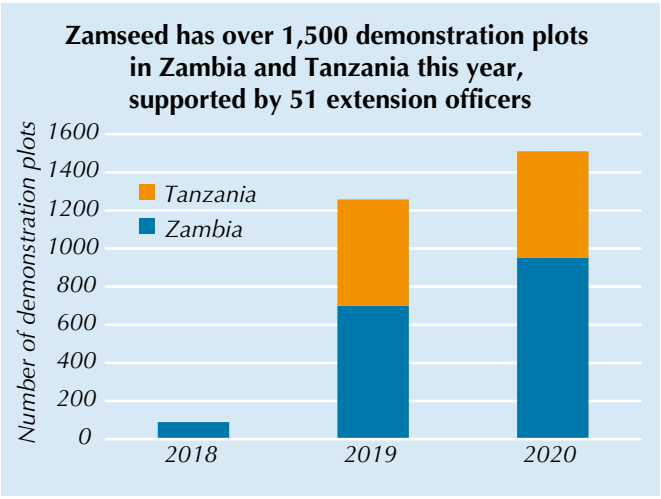


Demonstration plots and conservation agriculture training

To market its seed, Zamseed plants demonstration plots at village level. Prior to investment in 2018, Zamseed used to plant approximately 40 demonstration plots. As the chart shows, this has been ramped up and now includes Tanzania.

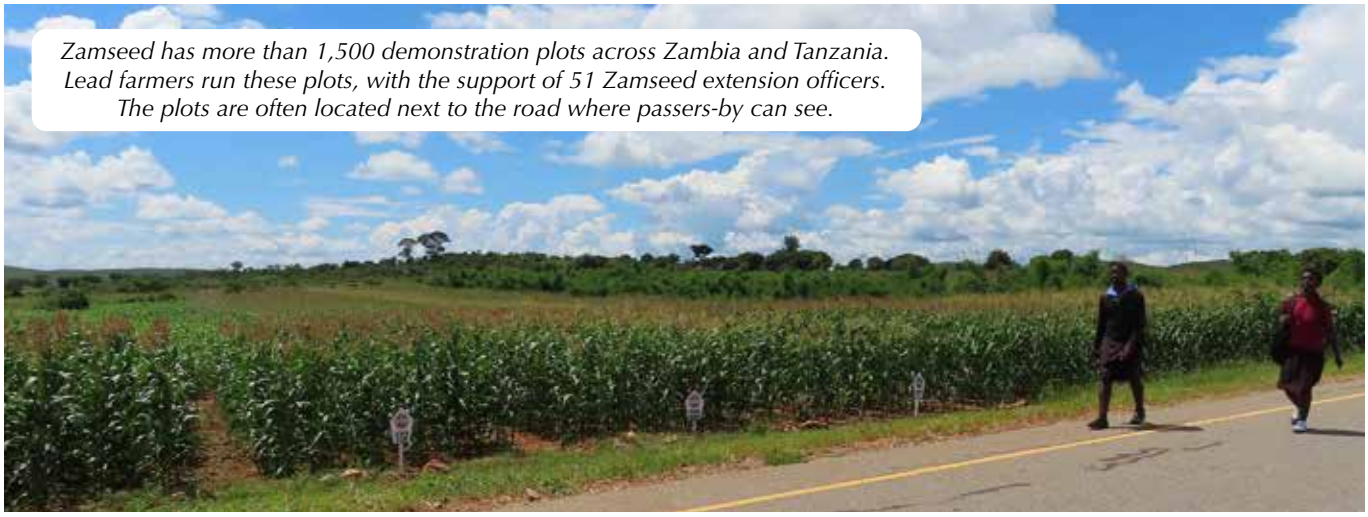
This year, Zamseed has planted over 1,500 demonstration plots across Zambia and Tanzania.

Demonstration plots give the opportunity for local communities to see first-hand how the varieties perform in their location and are a point of contact for farmers to obtain information about growing Zamseed's varieties.



Zamseed's team of 51 extension officers (33 in Zambia and 18 in Tanzania) visit the farmers running demonstration plots frequently to provide support and training. Training includes the principles of conservation agriculture, and Zamseed are in the process of formalising this.

In a recent Zamseed survey, for those respondents not purchasing Zamseed seed, the primary reason given (16% of respondents) was that the performance of the seed was unknown. In the same survey, the most important aspect about a variety is yield (ranked first by 50% of respondents).

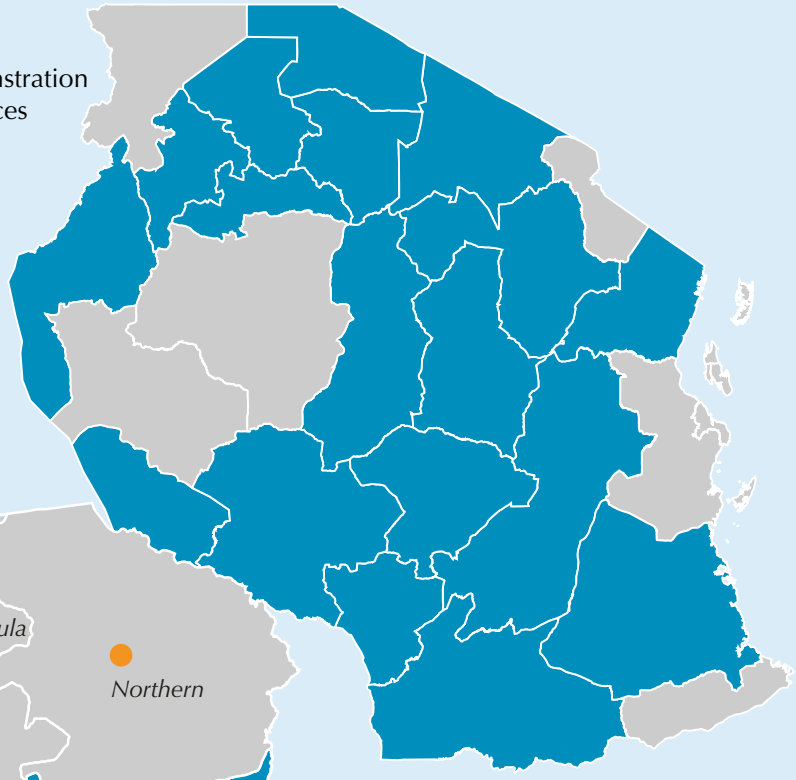


Zamseed has more than 1,500 demonstration plots across Zambia and Tanzania. Lead farmers run these plots, with the support of 51 Zamseed extension officers. The plots are often located next to the road where passers-by can see.

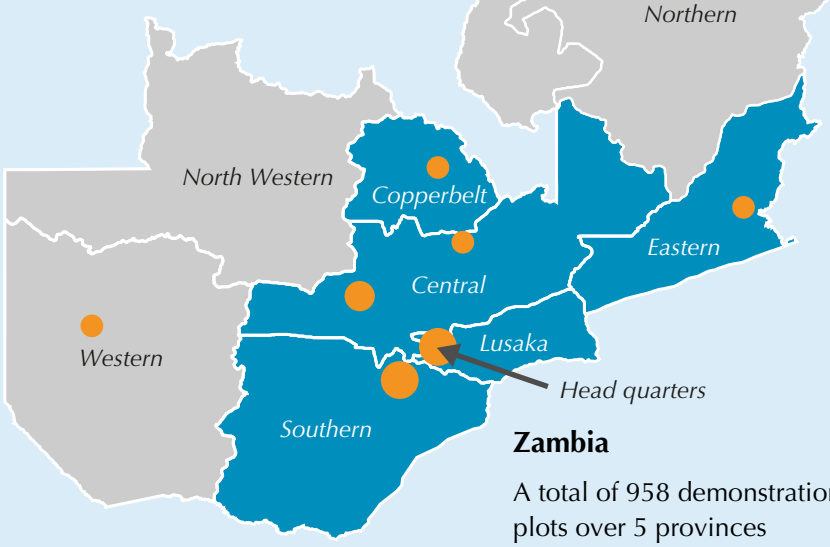
Zamseed demonstration plots across Zambia and Tanzania

Tanzania

A total of 555 demonstration plots over 18 provinces



Depots - point sizes represent relative sales magnitudes



Zambia

A total of 958 demonstration plots over 5 provinces

Dr Amsal Tesfaye

"Since 1980, Zamseed has been committed to serving Zambian farmers with quality, high yielding certified Zambian seed and prides itself on this and increasing yields for smallholder farmers in particular. Following Silverlands' investment, Zamseed has already made great strides towards becoming the leading seed company in the country and in expanding its regional footprint. As a company we believe that key to the development of the business is increasing our positive social impact across Sub-Saharan Africa."

Chairman of the Zamseed Board, Jordan Soko

Research and development

Research and development is core to Zamseed and, is guided by a committee of experts that convene weekly. The research team is led by two of the top breeders in Africa: Dr. Bhola Verma and Dr. Amsal Tesfaye. This year, Dr. Amsal Tesfaye was recognised as one of Africa's 20 most influential plant breeders in Africa by SAPBA, an association of his peers.

Zamseed's research focus is to continue developing varieties that meet the challenges experienced by smallholder farmers. Zamseed breeds and develops new varieties on its research farm near Lusaka. The varieties are tested under as many farming techniques and conditions as possible across Sub-Saharan Africa.

Zamseed's products are bred specifically for smallholder farmers.

Smallholder challenge	Zamseed's response
Low yield potentials: Farm-saved seed typically has low yield potential, even when cultivated under optimal management, rendering smallholder farmers investment in inputs such as fertiliser ineffective.	Zamseed's varieties can yield up to 12 t/ha (ZMS 620), raising potential yields substantially.
Diseases and pests: Smallholder farmers may not have knowledge about pests and diseases, and usually lack access to expensive agrochemicals for pest control.	Zamseed's maize varieties are more resistant to pests and are tolerant to some of Sub-Saharan Africa's common diseases.
Drought and heat stress: With climate change, wet seasons are shortening and rainfall events becoming less frequent and more intense.	Early-maturing varieties (such as Zamseed's ZMS 301 and ZMS 405) are especially drought tolerant and ensure consistent yields, reducing the risk of climate variability.
Little access to fertiliser: If recommended application rates are followed, fertiliser is the largest input cost for smallholder maize farmers.	Zamseed's maize varieties are bred to perform under low fertiliser input, making them widely adaptable.
Post-harvest losses: Up to ~30% of maize is lost post-harvest due to moisture and insect damage.	Zamseed concentrates on flint type maize that are more difficult for pests and water to penetrate, reducing crop spoilage.
Diets low in micronutrients: Deficiencies in micronutrients such as vitamin A can have detrimental effects on child development.	Zamseed's orange maize holds 2.7 times more vitamin A than a regular variety.

Some of Zamseed's new products

Zamseed's answer to climate change: ZMS 301

Smallholder farmers are uniquely vulnerable to the effects of climate change. With little access to irrigation, farmers are reliant on rain. As cropping is often smallholder farmers' main source of income and food, negative effects of climate change pose a severe risk to livelihoods.

In Southern Africa, climate forecasts are for shorter wet seasons with more infrequent and intense rainfall events, and more days without rain (Dunning et al., 2018).

To adapt to this new climate and equip smallholder farmers with the technology they need to continue production, Zamseed has developed its ZMS 301 maize variety, dubbed 'Zamseed's answer to climate change'. The very early-maturing new hybrid maize seed is a short variety with disease tolerance and high drought tolerance. Although lower in yield than longer maturity varieties, the cobbs mature in around 75-100 days, ensuring farmers achieve a yield despite a shorter rainy season. Yields in independent trials under optimal smallholder farming conditions were good at around 7t/ha despite it being a short season variety.

"Climate change is more prevalent now. Southern Africa is experiencing more frequent droughts and high heat. We must understand the change in climate and help smallholder farmers continue to increase their yields."

Dr. Amsal Tesfaye, Deputy Seed Breeder.

Breakthrough wheat variety: Harrier

This year, Zamseed released a breakthrough new variety of wheat seed called Harrier. Harrier is tolerant of the main diseases and has very high yield potential (over 10 t/ha), around one third higher than the average yields achieved in Zambia (7.5-8 t/ha). As Zambia already achieves among the highest wheat yields in the world, this increase in yield is a major step upwards.

With an annual production of ~300,000 tonnes of wheat each year, Zambia must import ~100,000 tonnes to meet domestic needs. If farmers planted Harrier, it is estimated that national wheat production would increase to ~400,000 tonnes making Zambia the first country in Africa to be self-sufficient in wheat. This would be an extraordinary achievement given that Zambia's annual wheat production was only 60,000 tonnes per annum as recently as 2000.

"A yield potential of over ten tonnes per hectare is seldom even seen or talked about in the tropical or semi-tropical world – but Zambian farmers are of high calibre and this seed gives them the means to achieve even better results."

Dr Bhola Verma, Zamseed's Director of Research

Improving nutrition: Orange maize

A significant proportion of Zambia's rural population suffer from vitamin A deficiencies. Some estimates state that ~54% of children under the age of five are vitamin A deficient. Severe vitamin A deficiency can cause eye damage and is the leading cause of childhood blindness.

Zamseed's orange maize variety (GV 664A) is bio-fortified (non-GMO) with 2.7 times more vitamin A than a regular variety. By increasing access to varieties that are fortified with micronutrients, produce good yields and are disease and drought tolerant, smallholder farmers can bolster their diet without reducing their yield. This provides low cost nutrients and removes the need for costly and often inaccessible supplements.

In partnership with the International Institute of Tropical Agriculture, Zamseed will release a second group of hybrid orange maize varieties that will contain five times more vitamin A than a regular variety – and a significant increase from Zamseed's current orange maize variety.

Positive environmental and climate Impacts

A recent summary showed that agriculture, forestry and land use change accounts for 18 - 23% of global greenhouse gas emissions (Ritchie, 2020 with data from Climate Watch, the World Resources Institute; IPCC Climate Change and Land, 2020). Also, expansion of land area under agriculture and forestry contributes to the loss of ecosystems and biodiversity (IPCC Climate Change and Land, 2020).

Productivity on already cultivated land must increase to prevent more land clearance while meeting the food requirements of a growing population. High yielding hybrid seed is critical to realising this productivity increase and is key to Africa realising a sustainable increase in food production without accelerating climate change and biodiversity loss through land clearing.

To illustrate this point, if we assume that average yields are 1.6 t/ha using farm-saved seed (average from our research) and 2.6 t/ha for hybrid seed (additional 1 t/ha from the switch to hybrid), 1 tonne of hybrid maize seed can produce 104 tonnes of maize for food, on 40 ha. To achieve the same production with farm-saved seed, with an average yield of 1.6 t/ha, 63% more land (65 ha) would be required. In other words, every tonne of hybrid seed produced, saves 25 ha of land from being cleared.

If yields are not increased, feeding the extra people will require 1 billion hectares of land to be cleared by 2050 (Tilman et al., 2011), releasing enormous amounts of greenhouse gases and accelerating climate change. If under-yielding countries increased their yield moderately on already cultivated land, demand could be met with 80% less land cleared (0.2 billion hectares) and releasing two thirds less greenhouse gases (Tilman et al., 2011). This would save the planet an estimated two gigatonnes of GHG emissions per year, equivalent to 37% of the world's total agricultural emissions per year (FAO 2017).

Hybrid seed allows the same production on a smaller area of land

Seed type	Hybrid	Farm-Saved	Difference
Yield	2.6 t/ha	1.6 t/ha	Hybrid = better yield
Seed volume	1 t	1 t	Constant
Production	104 t	104 t	Constant
Area needed	40 ha	65 ha	Hybrid = less land needed

Zamseed – supporting farmers through COVID-19

Zamseed helps Zambia respond to the COVID-19 pandemic with production boost

The COVID-19 pandemic has had a negative impact on smallholder agricultural production around the world, disrupting supply chains and production of seed and food. International organisations, including the UN, have warned that the world is on the edge of a food crisis worse than any seen for at least 50 years.

There is currently a shortage of hybrid seed in the region. To ensure that farmers had sufficient to plant in the 2020 summer planting season, Zamseed doubled its production of seed by planting a winter seed maize crop in southern Zambia.

continued ...

Maize is a summer crop but, the area chosen for the winter crop has warm temperatures in winter, good soil, and a secure water source from the Zambezi River. A winter seed maize crop is therefore feasible.

To undertake the project, Zamseed collaborated with Zambeef, which owns the Chiawa Farm and leased 365 ha of irrigated land for Zamseed to plant the seed maize; a successful partnership between two Zambian companies to support smallholder farmers during COVID-19.

"Through an initiative such as this, our farmers, the poor and the vulnerable that my Minister tries to save, will be able to have food and to ensure that they are food secure throughout the season."

Edmond Mwakalombe, Director of Planning and Information at the Ministry of Community Development

Zamseed in the press

The Sun, Zambia, 15th June 2020

ZAMBIA GETS WHEAT YIELD BOOST

ZAMBIA could become the first country in Africa to be a self-sufficient wheat producer following a new high yielding wheat variety which has been developed by Zamseed.

The new variety called Harrier, is tolerant to Zambian wheat's four main disease risks: leaf rust, powdery mildew, Septoria and bacterial leaf streak.

With imports disrupted due to Covid-19, increasing local supplies of staple crops is vital to meet food needs, says Zamseed's Director of Research, Dr Bhola Verma.

Dr Verma explained that the variety was a unique breakthrough for wheat yields and was developed in Zambia to respond to the country's commercial farmers' modern techniques…

Read the full story at www.thezambiansun.com

Zambia Daily Mail, 5th August 2020

ZAMSEED goes for winter maize project

by Nancy Mwape, Lusaka

TO CUSHION the country against potential food shortages, the Zambia Seed Company (ZAMSEED) is implementing a winter seed maize project in Zambezi valley.

ZAMSEED chairman Jordan Soko said his organisation is committed to serving Zambians with quality, high yielding Zambian seed. "Since 1980, ZAMSEED has been committed to serving Zambian farmers with quality, high yielding certified Zambian seed and prides itself on this and increasing yields for small-scale farmers. I am proud that Zamseed has fulfilled its mandate to help small-scale farmers in Zambia and the region in a time of international crisis," Mr Soko said.

Read the full story at www.daily-mail.co.zm

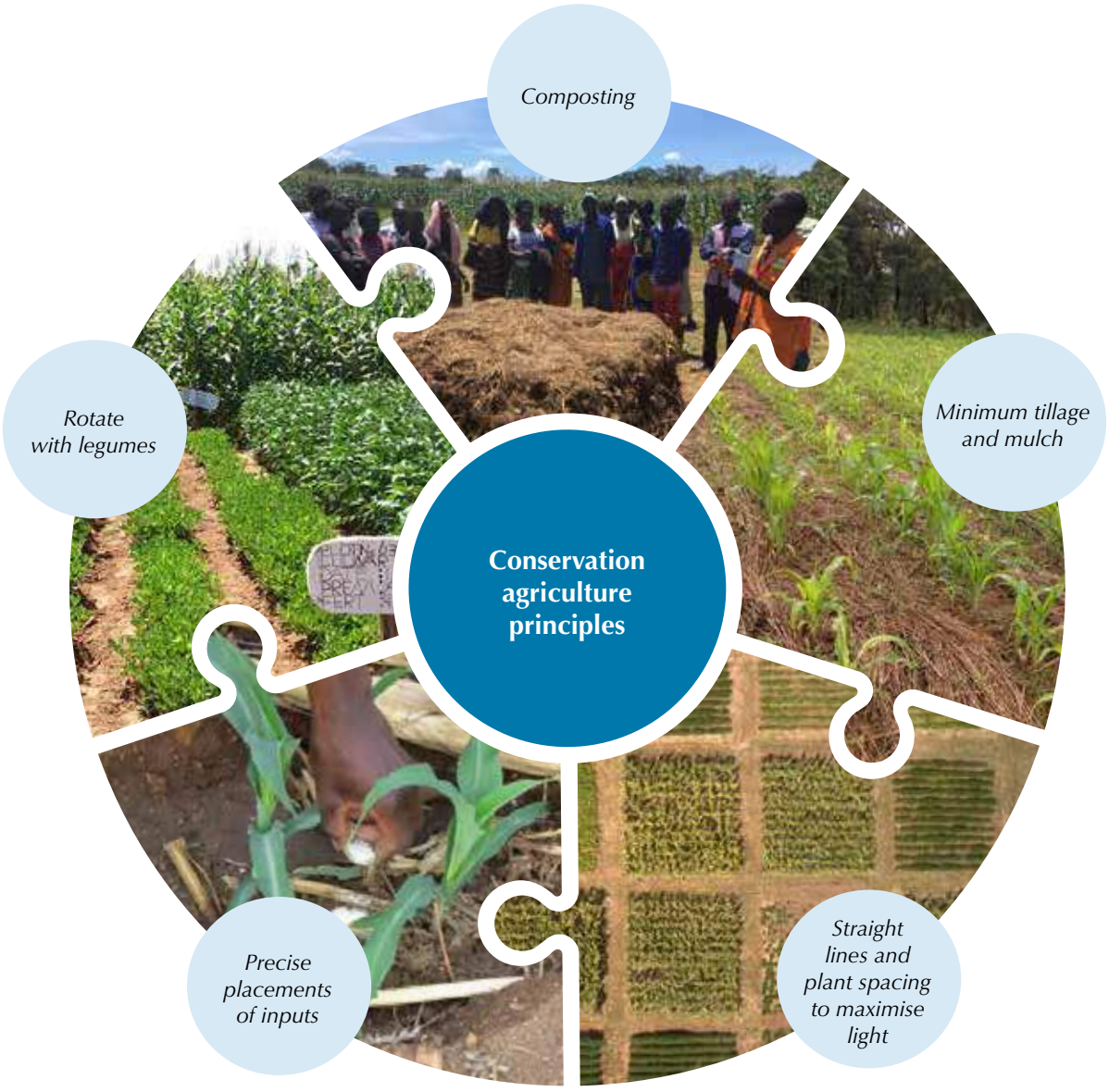
3.9 Training in conservation farming techniques

The importance of teaching conservation farming techniques

Our aim is to improve smallholder yields and incomes through providing training in conservation farming techniques. Using these techniques can increase yields, reverse soil erosion, and mitigate the effects of climate change.

It has three key principles that can be followed using resources available to smallholder farmers, requiring minimal financing:

- Minimum or no tillage
- Using crop cover, residues or mulch
- Crop diversification, whether intercropping or rotation with legumes.



Conservation farming significantly increases smallholder farmer incomes, with studies reporting income improvements between $128/ha (Komarek et al., 2019) and $361/ha (Ngwira et al., 2019). Our estimates, based on reasonable yield improvements shown in academic research (0.7 t/ha) and average price levels, show an annual increase of $212 is achievable by smallholder farmers from a base income of $500 per annum, simply from this change in technique.

Conservation agriculture also has positive environmental impacts. With minimum tillage, farmers can improve moisture levels and biodiversity in soils, increasing fertility and reducing the effects of droughts. Rotating with a legume fixes soil nitrogen which increases yields and reduces pest and disease pressure common under monocropping. Additionally, conservation agriculture helps return atmospheric carbon to the soil.

Training smallholder cropping farmers

Our training of smallholder cropping farmers has centred around four areas:

1 South Western Tanzania: maize, soya bean and sunflower farmers
2 Tanzania's Makete highlands: potato farmers
3 Southern Zambia: sunflower and sorghum farmers around SRL
4 Central Zambia: maize, soya bean and groundnut farmers around SASL and SZL

1 South Western Tanzania: maize, soya bean and sunflower farmers

Silverlands has been working with NGO Caritas to run demonstration plots to display and train smallholder farmers in the advantage of using improved maize and soya bean varieties, conservation farming techniques and crop rotation of maize with soya beans, sunnhemp and sunflower. At the 23 demonstration plots last season, 1,024 farmers (67% women) received training on layout, spacing, fertiliser application, timely weeding, disease scouting and chemical application.

2 Tanzania's Makete highlands: potato farmers

As described earlier in this chapter, Silverlands Tanzania is registering new blight-tolerant potato varieties in Tanzania. In addition to providing the improved varieties, Silverlands is training smallholder farmers on best production methods, the long-term benefits of soil fertility management and crop rotation.

Over 100 smallholder potato farmers attended two training days hosted by Silverlands Tanzania.

Smallholder potato farmers received training from Silverlands Tanzania in soil management, crop rotation and the new blight-resistant varieties that Silverlands has introduced.

3 **Southern Zambia: sunflower and sorghum farmers around SRL**
Silverlands Ranching trains smallholder grain farmers in conservation agriculture and drought resistant crops with assistance from NGO Conservation Farming Unit, AgDevCo and an independent consultant. 62 field days including over 1,700 farmers have been hosted at 18 demonstration plots in community areas in the last year. Training focuses on conservation agriculture and drought tolerant crops. (See more detail in Chapter 5.)

4 **Central Zambia: maize, soya bean and groundnut farmers around SASL and SZL**
Training of communities surrounding the two Silverlands grains farms in Central Zambia (SZL and SASL) is assisted by our partner, Foundations for Farming, and includes the key conservation agriculture principles. Demonstration plots are run on the Silverlands farms and by community groups in surrounding areas, with roughly 200 people regularly attending training sessions.

FOUNDATIONS ZAMBIA

We have partnered with Foundations for Farming for a number of years and commission them to run training sessions at the Silverlands' demonstration plots and in surrounding areas. The focus is on conservation farming methods such as minimum tillage, composting and mulching, and crop rotation, with additional modules on finances and family principles.

Foundations for Farming's curriculum is practical and relevant for rural settings where access to equipment and resources is limited. Once farmers have learnt the basics, training in vegetables, agroforestry and poultry rearing can be added.


Classroom training


Compost training in the field

Foundations for Farming have demonstrated extraordinary results on their training plots using the same implements as smallholder farmers. Soya yields of 4 t/ha have been achieved, compared with an average of 1 t/ha achieved by smallholder farmers, and maize yields of 9 t/ha compared to 1.7 t/ha in the same area. This clearly indicates the substantial scope for boosting yields and increasing smallholder incomes.

Communities are invited to the Silverlands' training days. Enthusiastic communities form 'Foundation Groups' and plant their own plots of maize, soya and groundnuts with regular visits and support from Foundations for Farming. This way training is held within communities making it accessible to all, particularly women whose domestic duties may restrict their travel yet who are heavily involved in farming.

Thirteen Foundation Groups are currently running, with eight of them running for two seasons or more. The best groups are getting yields of 2-3 t/ha for soya and 6 t/ha for maize. These yields are a huge improvement on average smallholder yields and demonstrate the improvements that implementing conservation agriculture can have in just a couple of years.

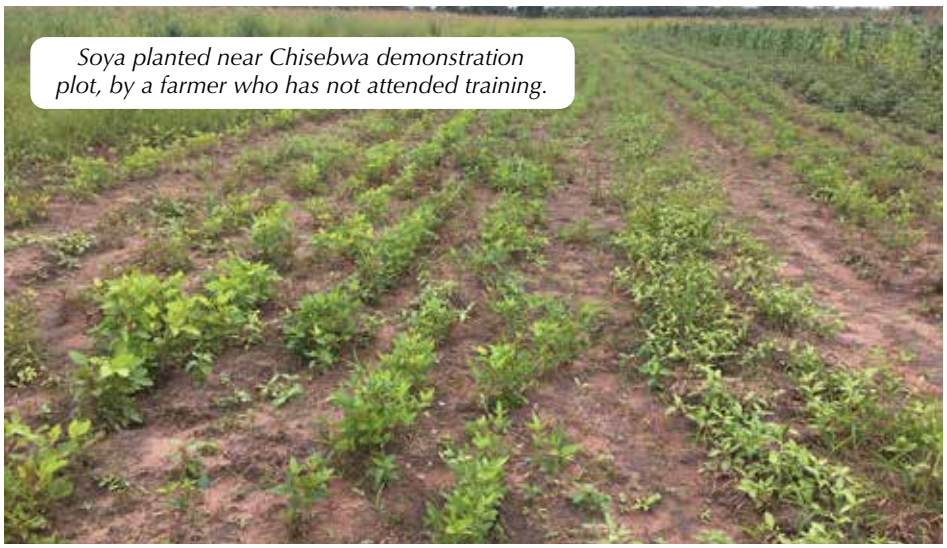
The demo of one group in their second season attracted a lot of attention from the community and they were requested to hold a field day for the government agriculture camp.

This year, Foundations for Farming are strongly promoting making compost in anticipation of high fertiliser prices resulting from supply chain delays due to COVID-19 disruptions. On their own demonstration plot, Foundations for Farming have achieved yields of 4-6 t/ha without any fertiliser. These yields give hope to smallholder farmers achieving real sustainable food security in the coming years.

Chisebwa demo plot soya beans

The new Kabundi community group compost heap

Chisebwa maize demo plot



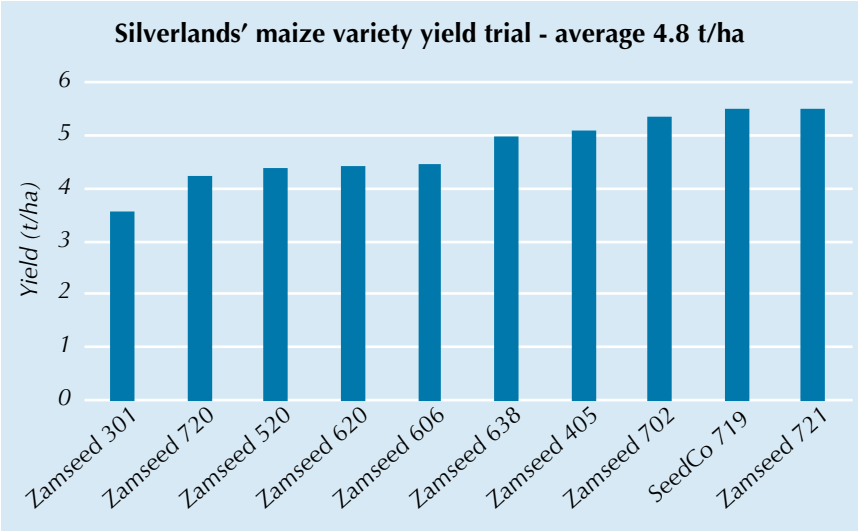
Soya planted near Chisebwa demonstration plot, by a farmer who has not attended training.

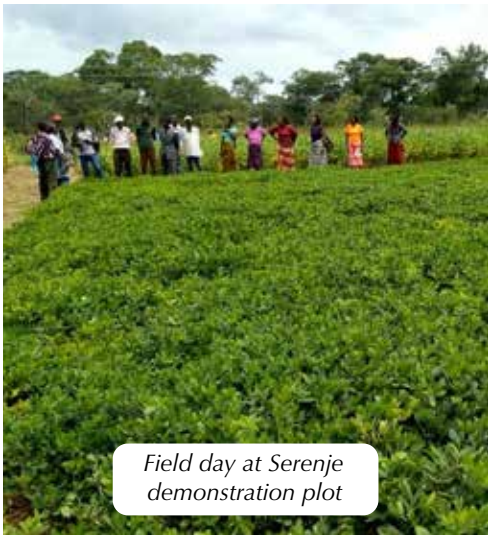
One of the Chisebwa farmers, Values Kakompe, applied the training to her individual maize field.

The Sambashi demonstration plot. This group went above and beyond what was expected. They expanded their demonstration area to include other varieties of groundnuts and beans with different individuals responsible for different plots.

Silverlands' demonstration plots with Foundations for Farming

These plots trial different varieties of maize, soya, sugar/dry beans and groundnuts – useful knowledge for both commercial farms and smallholder farmers. These plots serve as a 'classroom' for training sessions with smallholder farmers.



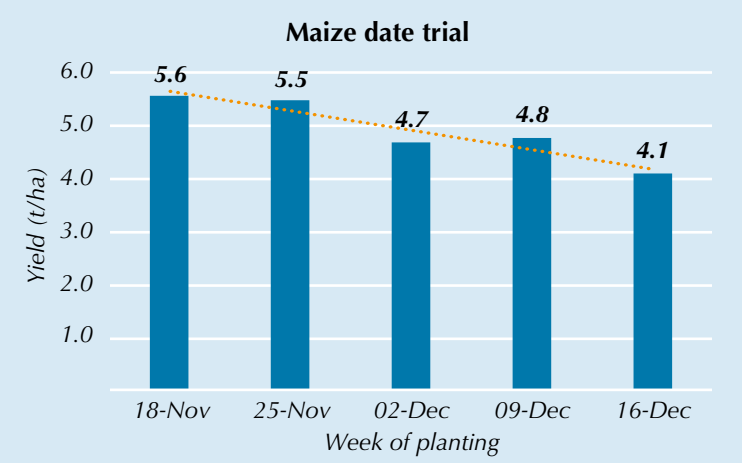


Field day at Serenje demonstration plot

Silverlands' demonstration plot at SASL with silo development beginning in the background

Demonstrating the importance of timeliness when planting

Planting on time is a key message because the timing has an enormous impact on crop yield. Last season's demonstration plots showed maize yields reduced 26% (from 5.6 t/ha to 4.1 t/ha) simply by planting a month later (18 December versus 18 November).



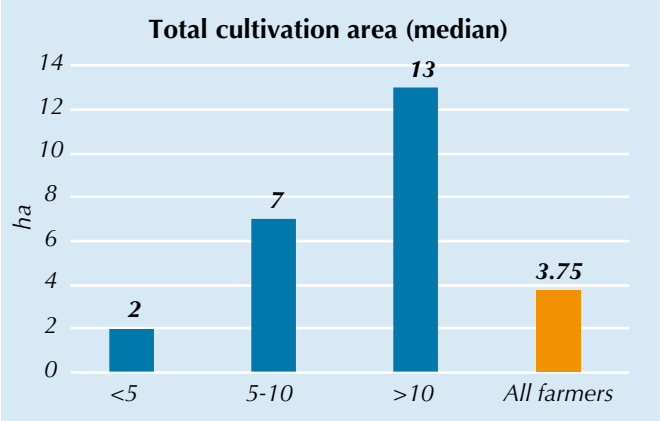
3.10 Appendix: Zamseed Survey 2020

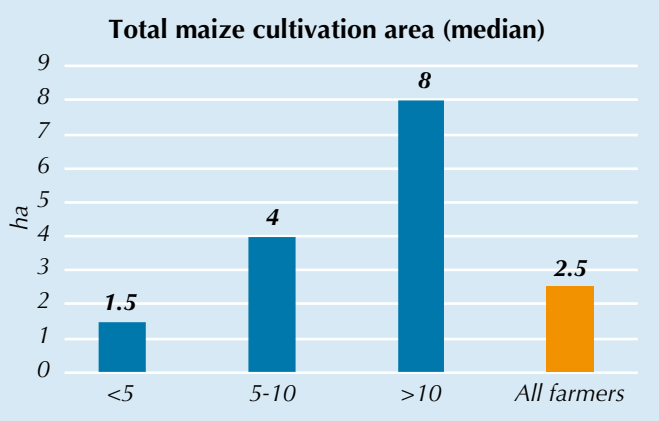
A smallholder farmer survey was conducted by Zamseed in August 2020. The aims were to better understand the smallholder market, perceptions of Zamseed, aspects of hybrid seed that smallholder farmers value, and livelihood benefits of hybrid seed.

Demography: Of the 96 participants, 18% were female. The majority were between 41 and 65 years.

Defining farmer types: In academic literature, smallholder farmers are defined as planting < 5 ha and medium farmers as having 5-100 ha of cultivation area (including maize and all other crops) (Jayne et al, 2016; Sitko and Chamberlin, 2015). The 5-ha cut-off was therefore used in summarising the data. In the Zamseed survey, over 10 ha, a steep increase in cultivation area was observed and those participants have been put in their own category.

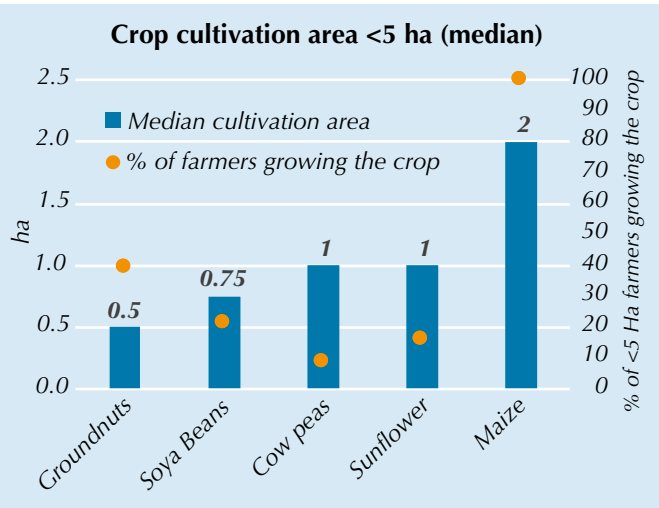
Crop cultivation area: In the Zamseed 2020 survey, 58% of participants cultivated < 5 ha, with a median cultivation area of 2 ha (average of 2.3 ha) and a maize cultivation area of 1.5 ha. (Due to outliers, the median is shown.)





Number of crops: All participants grew maize. Most smallholder farmers (< 5 ha) grew only maize (41%) or maize and one other crop (39%). 13% grew three crops and only 7% grew four crops.

More than half the participants (59%) did not cultivate any vegetables. 11% grew one vegetable, another 11% grew two vegetables and 19% grew three types of vegetable.



Area per crop: Maize occupies most of farmers' cultivation area. For smallholder (< 5 ha) farmers:

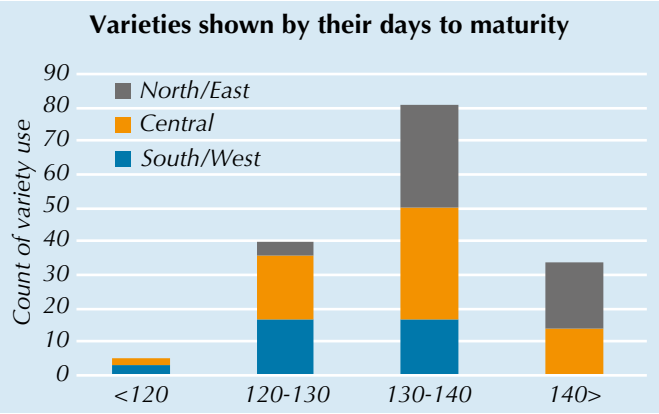
- 40% grew 0.5 ha groundnuts.
- 21% grew a median of 0.75 ha soya beans.
- Few farmers (9-16% respectively) grew 1 ha of cowpeas and sunflower.

Maize production and income: Smallholder farmers (<5ha) sold on average 4.3 t maize (59% of the maize they produced) and crop income fulfilled most (78%) of their total household income. Larger farmers (>10ha) had other sources of income and cropping only constituted about half (47%) of their household income.

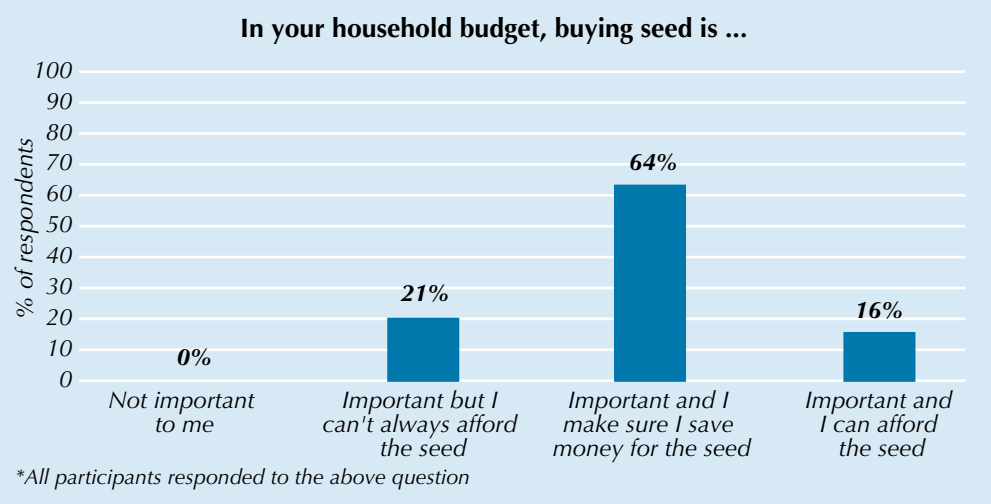
Importance of hybrid seed: Although some farmers (21%) say they can't always afford seed, the majority make sure they save money to buy seed (64%) or can already afford the seed (16%).

Seed varieties: 38 different varieties of maize had been cultivated by respondents. By far the most popular were those that matured in a medium season length. No long-season varieties were grown in the dry South Western part of Zambia. In this area, shorter season varieties are preferred.

Maize yield: Average maize yields (all farmers and for those cultivating < 5 ha) were 3.5 t/ha. Two outliers achieved magnificent yields of 9.9 t/ha and 12.9 t/ha. (Detailed results earlier in this chapter.)

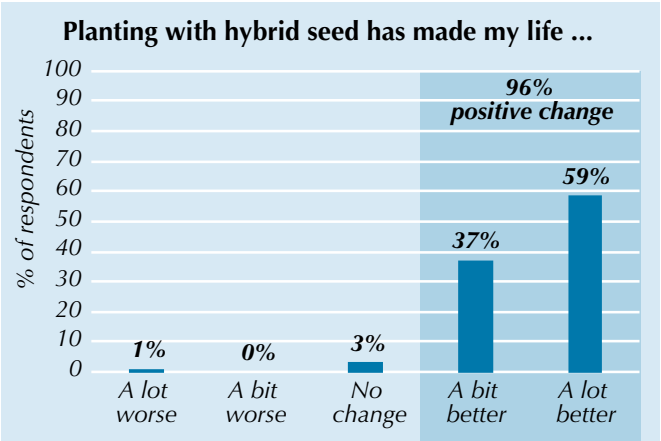


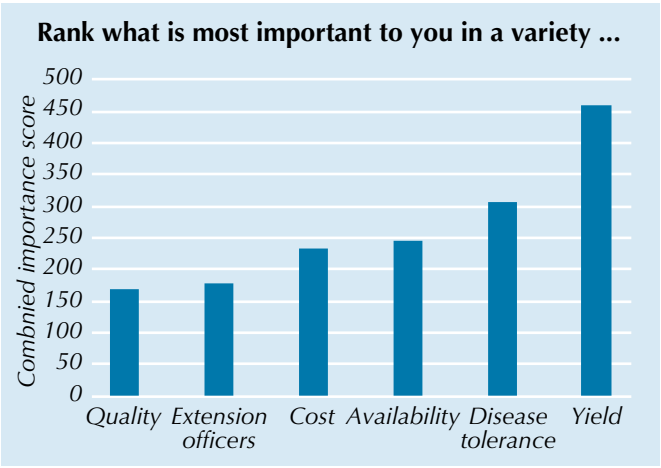
100% of respondents stated that hybrid seed was important to their cropping.



Livelihood changes with using hybrid seed: 96% of farmers report a positive impact to their lives from planting hybrid seed. 97% of farmers reported their income is "better" due to planting hybrid seed.

Current seed satisfaction: 78% of Zamseed seed users scored Zamseed's seed performance as 8 or more out of 10. Three respondents (11%) gave Zamseed a score of only 1 out of 10. 89% of Zamseed seed users stated that





Zamseed was better than other seed producers (11% said they were similar).

Preferred characteristics of seed: Respondents ranked "yield" as the most important characteristic of hybrid seed, followed by "disease tolerance".

Challenges with agriculture: Some respondents reported challenges with their agricultural production. By far the greatest challenge was with pests (27%).

"Nothing better than ZMS 702"

❹ Our Work in the Poultry Sector

4.1 Summary

In many ways, Silverlands Tanzania is a case study in impact investing: creating a profitable and fast-growing business whilst achieving a substantial social impact. The business started from scratch in 2014 and is now the largest feed producer in Tanzania and the second largest producer of day-old chicks. It exports to several other countries and sold 11 million day-old chicks in 2020, up some 20% on 2019 despite COVID-19. It has distribution centres around Tanzania and sells through some 300 agents. It has a poultry training centre and an extension officer network throughout the country supporting smallholder farmers.

It has also achieved a substantial impact, covered in this chapter. Some key metrics:

- In 2020 it has benefitted:
  - 100,500 poultry farmers
  - 15,400 grain farmers
- The incomes of these farmers have risen collectively by $45 million per annum because of Silverlands Tanzania, an extraordinary figure highlighting the huge multiplier effect of a business of this kind.
- The large majority of these farmers are women.

4.2 Nutritional issues and the opportunity for the poultry sector

Poor nutrition restraining development

Africa experiences some of the highest levels of poverty and malnutrition globally. 19% of people in Africa are undernourished, double the global average (WFP, 2020). This number has risen from 181 million people in 2010 to almost 222 million in 2016 (WHO, 2019).

Most of Africa's nutritional challenges are experienced by children; Africa has some of the highest rates of stunting in the world. 58.7 million children, 30% of children in Africa, were affected by stunting (WHO, 2019). Stunting occurs when a child experiences poor nutrition, impairing growth and development. This has significant and irreversible adverse consequences on the child. A study conducted in 2008 concluded that low birth weight and stunting in low to middle income countries resulted in "shorter adult height, less schooling, reduced economic productivity, and - for women - lower offspring birthweight" (Victora, 2008).

Poor nutrition: Case studies

Tanzania: Tanzania's population is prone to significant nutritional challenges. In 2015, over 2.7 million Tanzanian children (under five years old) were stunted and a further 600,000 experienced acute malnutrition (UNICEF 2015). The World Health Organization has identified Tanzania as one of the ten worst affected countries for childhood malnutrition in the world (WHO, 2012).

Kenya: 24.2% of Kenyans were undernourished in 2018 and 4% of children under five experienced child wasting, a strong predictor of child mortality (Global Hunger Index, 2018). Also, the national rate of stunting in Kenya is greater than for developing countries on average, with 26.2% of under-five year olds affected (Global Nutrition Report, 2019).

Poultry for improving nutrition

Increasing access to chicken and eggs would substantially improve nutrition in Sub-Saharan Africa. Poultry are practical, cheap, transportable and easy and inexpensive to care for. Eggs are rich in nutrients, eating just one per day can provide a significant proportion of one's daily requirements of vitamin B12 (25%), protein (13%) and vitamin D (9%) (FAO 2015). A trial conducted in 2015 found that by eating one egg per day the prevalence of stunting in children reduced by a staggering 47% (Lannotti, 2017).

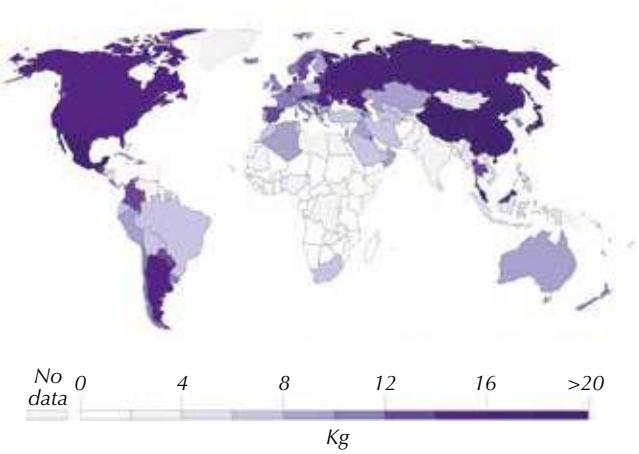
> **"It's pretty clear to me that just about anyone who's living in extreme poverty is better off if they have chickens."**
>
> *Bill Gates - Bill and Melinda Gates Foundation*

Low poultry and egg consumption in Africa

Despite its nutritional benefits, poultry consumption in Africa is low. In Tanzania for example, families of five may consume only one chicken and five eggs per month between them (ILRI Tanzania Baseline Report, 2018). Egg consumption in East Africa ranges from around 0.4 to 1.3 kg/capita against a world average of ~9 kg/capita (FAO 2017). Tanzania's egg consumption is a mere 6% of South Africa's.

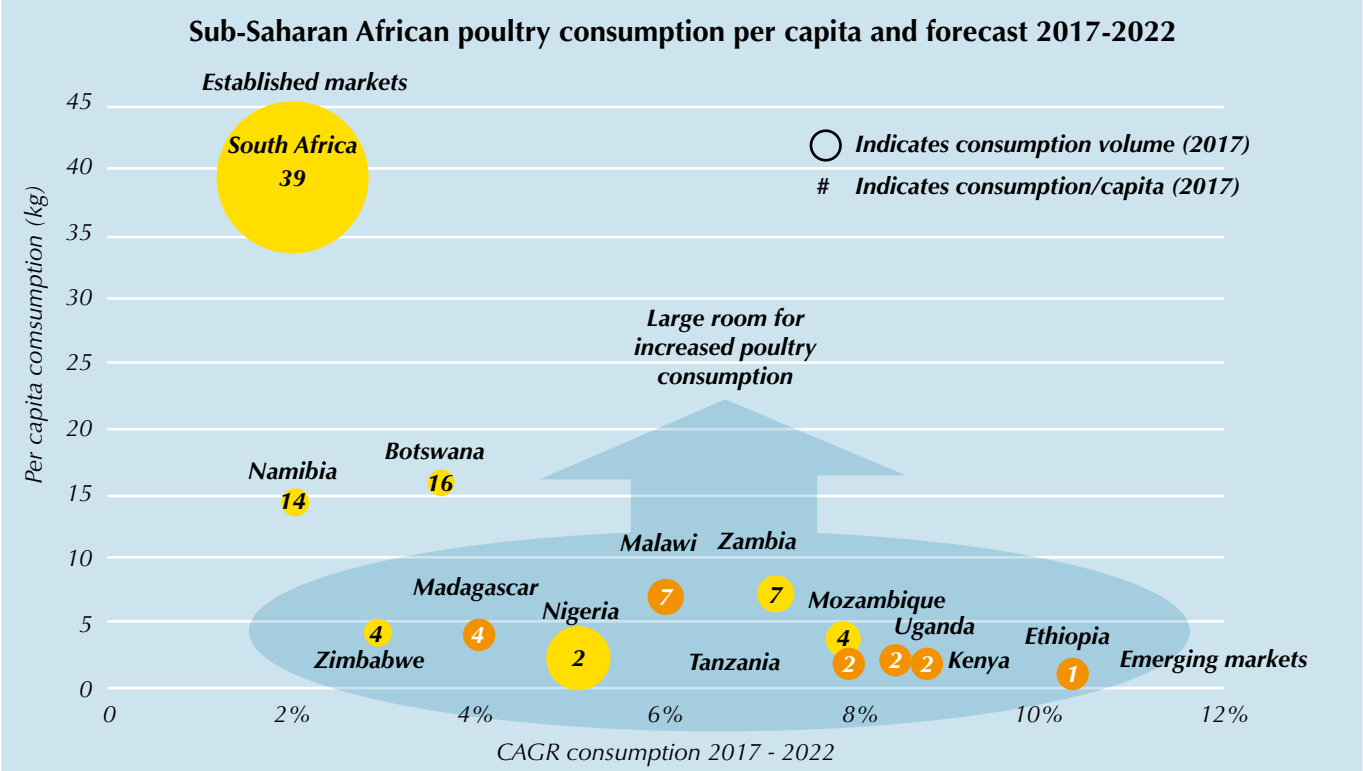
Annual egg consumption per capita	Kg per annum
Kenya	1.3
Tanzania	0.4
South Africa	6.6
Global	9.2

Average per capita egg consumption (kg/year)



4.3 Growth potential for the poultry sector

Poultry consumption per capita is expected to grow notably in Africa north of South Africa over the next decade, taking account of the current relatively low levels of poultry and egg consumption, coupled with the high population and per capita GDP growth. As households in Sub-Saharan Africa become more affluent, demand for livestock protein is expected to increase, coupled with increased population, this represents a significant area of growth for poultry. The following graph shows per capita consumption of poultry per annum on the vertical axis and growth rate on the horizontal axis. The potential for growth north of South Africa is clear.



Source: Rabobank, FAO, Worldbank Gira, local statistics. South Africa consumption based on a 2018 report by SAPA.

4.4 Why have the poultry sectors not developed?

Prior to Silverlands' investment, the Tanzanian poultry industry had not developed fully. This, despite high GDP growth of 5-7% per annum over 10+ years (World Bank). We identified two key issues that were holding back the development of the poultry sector in Tanzania:

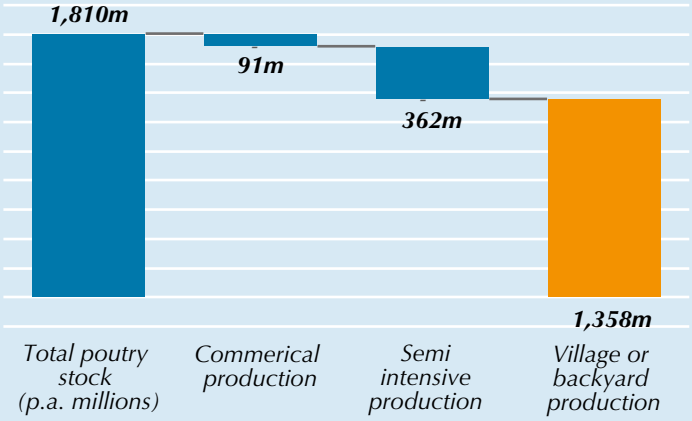
1 Inefficient poultry breeds

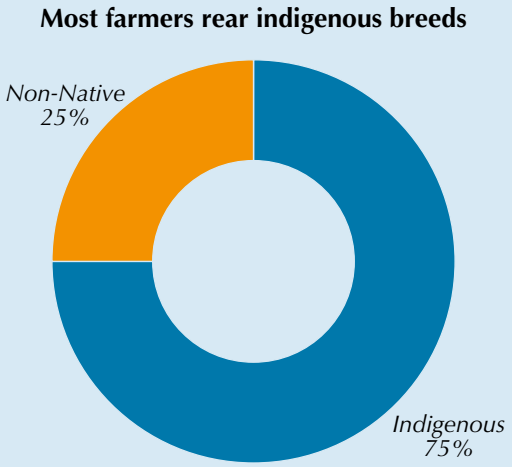
2 Poor quality feed.

4.5 Enablers for growth: better breeds of poultry

Most poultry in SSA are traditional breeds reared by smallholder farmers

Smallholder chickens constitute the majority of Sub-Saharan Africa's poultry production. As the region does not have extensive cold-chain storage, rearing poultry at the household level makes chicken and eggs accessible and cheap. However, most of these chickens are local breeds which are unproductive and prone to disease. These inefficiencies significantly hamper the poultry industry in Sub-Saharan Africa.





Source: Bill and Melinda Gates Foundation

Most modern and more productive poultry breeds used in developed countries are either layers, producing a large amount of eggs, or broilers, which are used for meat. These breeds are generally not well suited to smallholder poultry farmers, who require both eggs and meat to adapt to changes in the market, and a more robust breed suitable for the free-range environment in a village.

The majority (62%) of Silverlands Tanzania's day-old chick sales are of Sasso with 6.9 million Sasso day-old chicks sold in 2020. Although Silverlands' focus is on the dual-purpose breed there is also a market for broilers and layers that Silverlands supplies with the productive Ross and Hyline breeds.

Sasso: The value of dual-purpose poultry

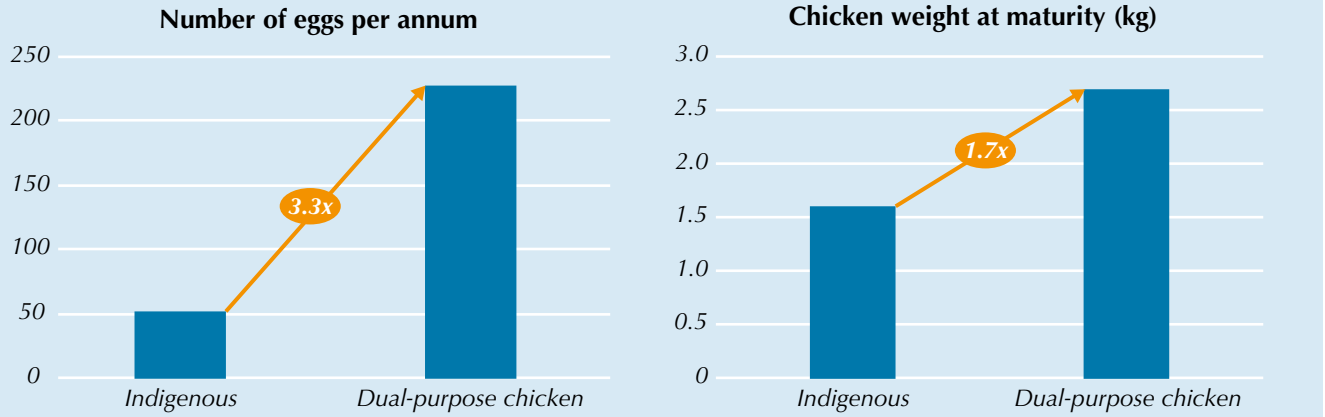
A 'dual-purpose' bird is a modern poultry breed that is highly efficient as both a layer and a broiler. This means that smallholder farmers have greater flexibility and can be adaptable according to changes in household needs, demand, or poultry prices. Sasso is an example of a dual-purpose breed originally developed in France, that Silverlands Tanzania has introduced into Tanzania.

> **My family and neighbours respect me because I am earning good money from my chicken business.**
> *Female smallholder poultry farmer*

Dual-purpose poultry has multiple advantages for smallholder poultry production:

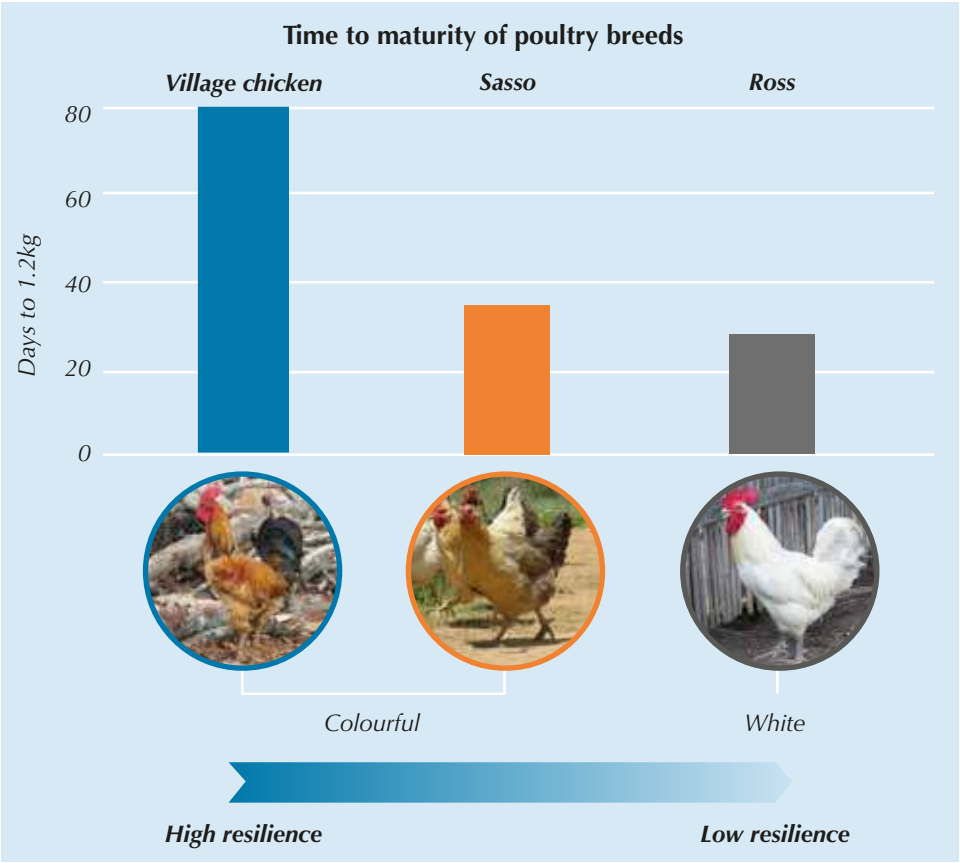
1 Productivity

Dual-purpose chickens are considerably more productive than local breeds and produce 3.3x more eggs and are 1.7x heavier at maturity implying more meat is available for consumption.



Source: Bill and Melinda Gates Foundation

Thinking about it another way, to attain 1.2 Kg a traditional or indigenous breed would take about 80 days, compared with 35 days for the dual-purpose Sasso breed sold by Silverlands. As a result, farmers feed their poultry for shorter periods of time, saving on feed and improving smallholder farmer profits. This is in addition to significant production increases gained from keeping Sasso.



2 Resilience

Dual-purpose chickens are generally more resilient to the local climate, pests and diseases, in comparison to a 'normal' broiler such as the Ross or Cobb which are used widely in the West and, which are not as well adapted to a free-range environment. Subsequently, dual-purpose breeds have far lower mortality rates than standard "Western" breeds.

Also, if the dual-purpose chicks receive the correct vaccinations prior to sale, they out-perform traditional breeds in resilience. In 2020, a survey found that 3% of Sasso reared by smallholder farmers in Tanzania died from disease, compared to 20% for local breeds (ID Insight survey, 2020).

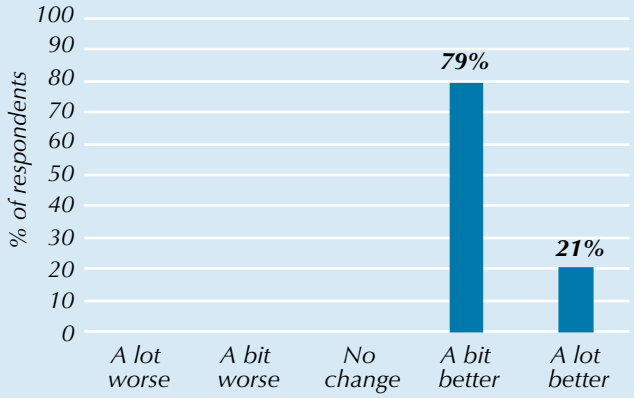
3 Consumer preference

The colour and appearance of a chicken is important to the Tanzanian and regional market. The colourful Sasso is preferred within rural Tanzania where consumers are accustomed to chickens that are multi-coloured. Consumers are additionally very particular on taste. In blind tastings by 400 people, 73% preferred Sasso over the Ross broiler.

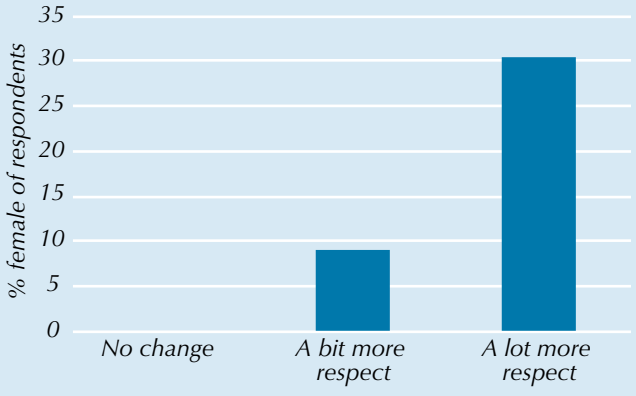
4 Income

By rearing dual-purpose breeds, such as Sasso, smallholder poultry farmers can increase their incomes, by as much as 2x to 3x (Bill and Melinda Gates Foundation (BMGF) 2020). Lower mortality, increased production and marketable characteristics make Sasso extremely efficient and profitable.

In a survey conducted by Silverlands, all smallholder poultry farmers reported increases in income ...



39% of female smallholder poultry farmers experienced greater respect since keeping poultry

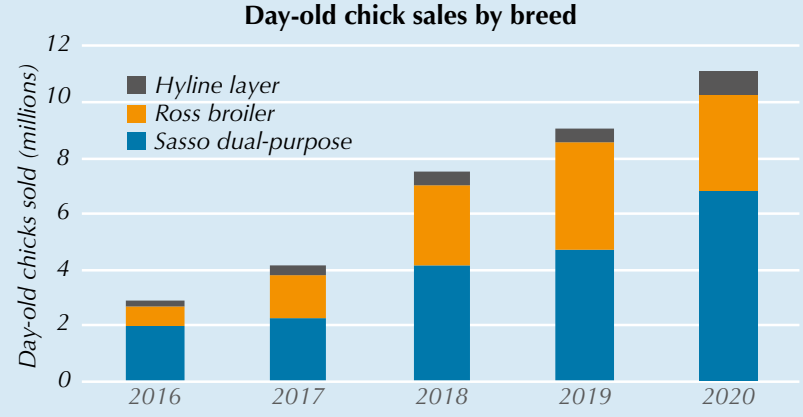


5 Benefits to women

Rearing chickens is commonly done by women and 70-80% of smallholder poultry farmers in SSA are women (BMGF 2020; ID Insight, 2020). This is partly because chickens are kept around the home where women spend much of their time; they need little time for care so do not conflict with other chores and duties; and they require relatively low initial investment.

The benefits to women from keeping poultry are numerous and substantial, including income, nutrition, decision-making and respect, all highly valuable in male-dominated societies. For example, female poultry farmers report receiving greater respect since keeping poultry (Silverlands Tanzania surveys). And women's involvement in household decision-making may improve ~24% as a result of poultry rearing (BMGF 2020).

Day-old chick sales by breed



4.6 Enablers for growth: high quality feed

A productive poultry industry requires a steady supply of high protein feed. Quality feed increases farmer efficiencies through reduced chicken mortality and increased egg production. The secondary impact is thus increasing consumer access to low-cost quality protein.

Globally, the protein content of feed is largely provided by soya. Before Silverlands' investment, there was virtually no soya grown in Tanzania, and the protein for poultry feed was sourced from unsustainable and salmonella-afflicted fish from Lake Victoria.

Farmers traditionally had not been growing soya despite excellent conditions in south western Tanzania and multiple benefits to smallholder farmers. This is because there was no market for the product. Instead, smallholder farmers planted most of their land to maize and were not practising modern agricultural techniques.

SilverStreet saw the opportunity – fix the value chain and create substantial impact

SilverStreet could see the opportunity to fix the value chain by creating quality feed and introducing new breeds, in particular the dual-purpose Sasso breed. Intertwined with this was the potential for substantial social impact as grain farmers could start growing soya beans and the poultry sector would be developed.

Silverlands built the country's first soya processing plant

Silverlands Tanzania built the first soya processing plant in Tanzania. Raw soya must be processed before feeding to animals as it compromises their digestion. Construction of the processing plant enabled soya beans to be used as the protein component of poultry feed. Silverlands Tanzania also built a 40 tonne/hour capacity feed-mill, the largest known feed-mill in East Africa, and 32,000 tonnes of grain storage.

Silverlands Tanzania's feed-mill and silos kick-started the large-scale production of soya beans in Tanzania. High quality poultry feed is produced for sale across the country.

Quality feed

Most chicken feeds available in Tanzania are poor quality and there are limited feed quality control measures (Poultry Subsector in Tanzania, 2018). In contrast, Silverlands Tanzania's feed formulations are designed by a professional international nutritionist to align with the breed standards and all feed is quality tested in a laboratory. A range of feeds are produced for the varying energy and nutritional requirements of birds of different ages, breed and purpose (egg-laying or broilers).

A differentiator of Silverlands Tanzania's feed is that it is in pellets, which it introduced to Tanzania. These tend to produce better food-conversion ratios as chickens receive all the important micronutrients and proteins in a single pellet. With mash, the smaller granules containing vital nutrition may be missed.

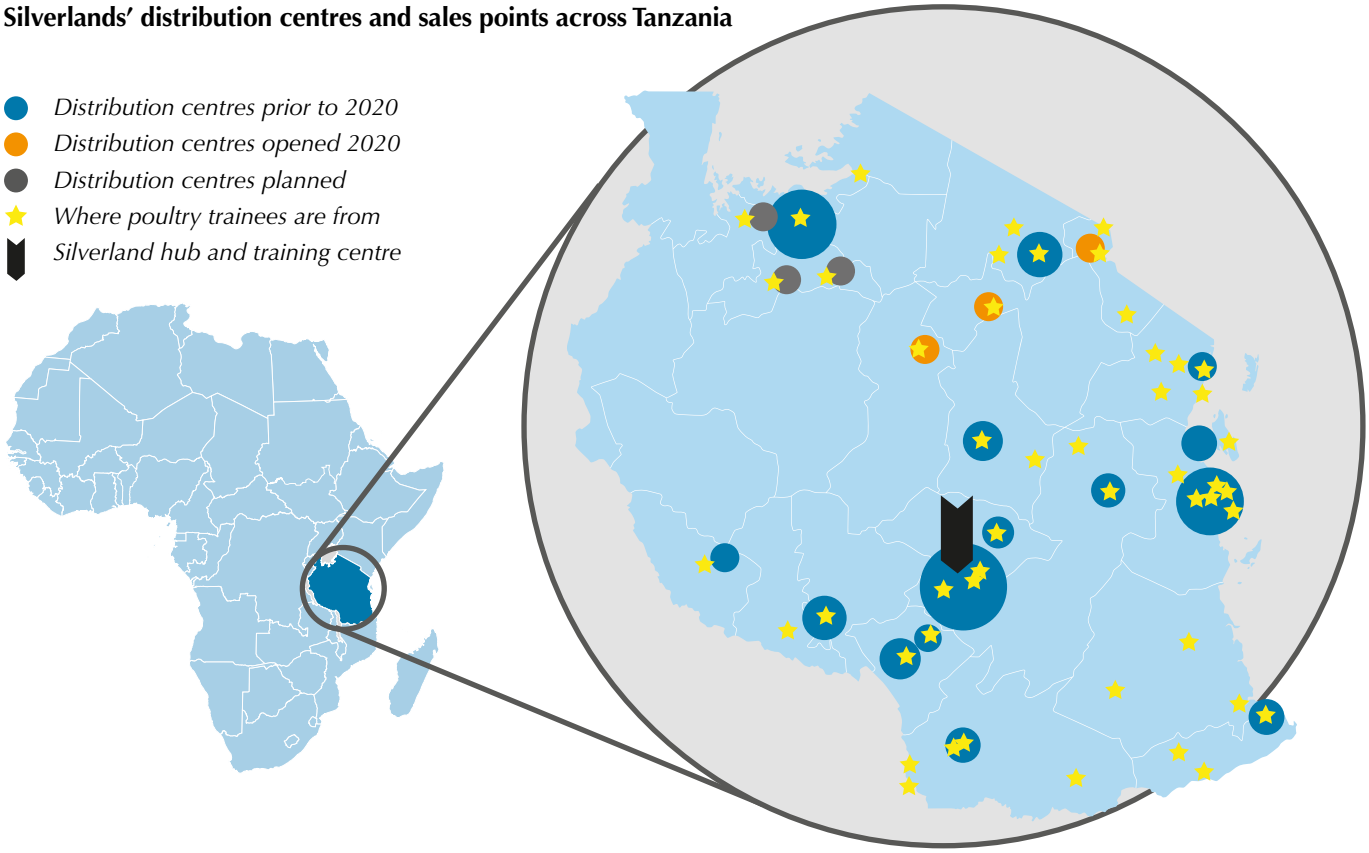
A tipper feeds processed grains into the feed-mill.

Pellets provide all nutrients in one package.

4.7 Enablers for growth: creation of distribution network

To complete the business 'hub', Silverlands developed a distribution network with 18 distribution centres and sales points, and over 300 agents providing products and skills transfer to 100,500 poultry farmers. Silverlands Tanzania is now one of the largest players in the poultry industry and has successfully galvanised the Tanzanian poultry sector.

Silverlands' distribution centres and sales points across Tanzania



Silverlands' laboratories

Testing of every batch of feed is done to ensure excellent product quality is maintained. With no testing laboratories close to Silverlands Tanzania, in 2018 the business established its own facility for testing the quality of inputs and every batch of feed produced.

Neema Fyumagwa in the feed quality control laboratory.

Happy Tendega conducting testing in the new disease diagnostics laboratory.

New diagnostics laboratory

In 2019, Silverlands Tanzania was approached by veterinary drug company Zoetis to partner in developing a disease diagnostic laboratory. The aim is to help control poultry disease in Tanzania, starting by developing a poultry disease map for the country. Disease diagnostics is open to all poultry farmers and there is capability to test for ruminant diseases in future. Extension officers provide technical services to farmers and collect necessary samples for laboratory testing. Testing covers eight poultry diseases using the Zoetis enzyme-linked immunosorbent assays (ELISA) test kits.

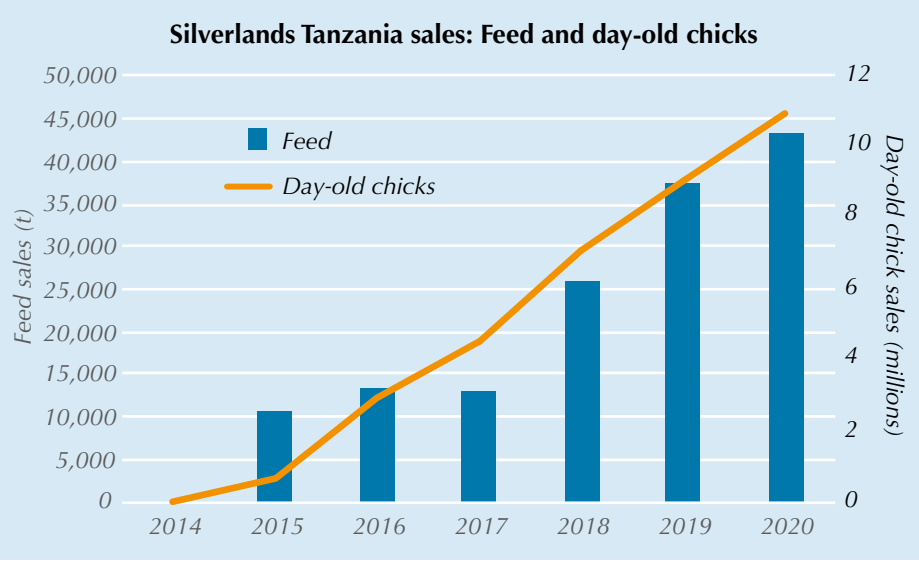
The laboratory started operating fully in January 2020 and by the end of October had conducted 754 tests of 167 poultry flocks. This includes 29 flocks (17%) belonging to smallholder farmers. This is yet another initiative that establishes Silverlands as a poultry centre of excellence in Tanzania.

4.8 Strong business performance

Silverlands Tanzania's results prove the business model

The success of Silverlands Tanzania is because it has 'fixed' key issues in the poultry value chain in Tanzania: no soya processing, inadequate storage, inefficient poultry breeds, and poor farming techniques.

The impressive growth of the business has proven our original investment thesis: from breaking ground in 2014 to over 43,100 t of feed and nearly 11 million day-old chicks sold in 2020, a year-on-year growth of 16% and 20% respectively. Silverlands Tanzania is now the largest feed producer in Tanzania and the second largest producer of day-old-chicks.



2020 sales for Silverlands Tanzania are forecast at 43,100 tonnes of poultry feed and 11 million day-old chicks.

4.9 Creating a substantial social impact

Development impact – integrated into the Silverlands model

In other countries, integrated models are common in the poultry sector, in which the business grows its own soya, processes it, rears poultry, processes the poultry and sells the finished product. This model would have missed the massive development opportunity in Tanzania which is to enable smallholder farmers.

The key success of Silverlands' project design was to integrate with two groups of smallholder farmers, those providing grain inputs for the feed, and poultry farmers who purchase and rear their own poultry. An added value is that women primarily benefit in this model as most smallholder farmers are women. In some cases, the suppliers of raw materials are also customers.

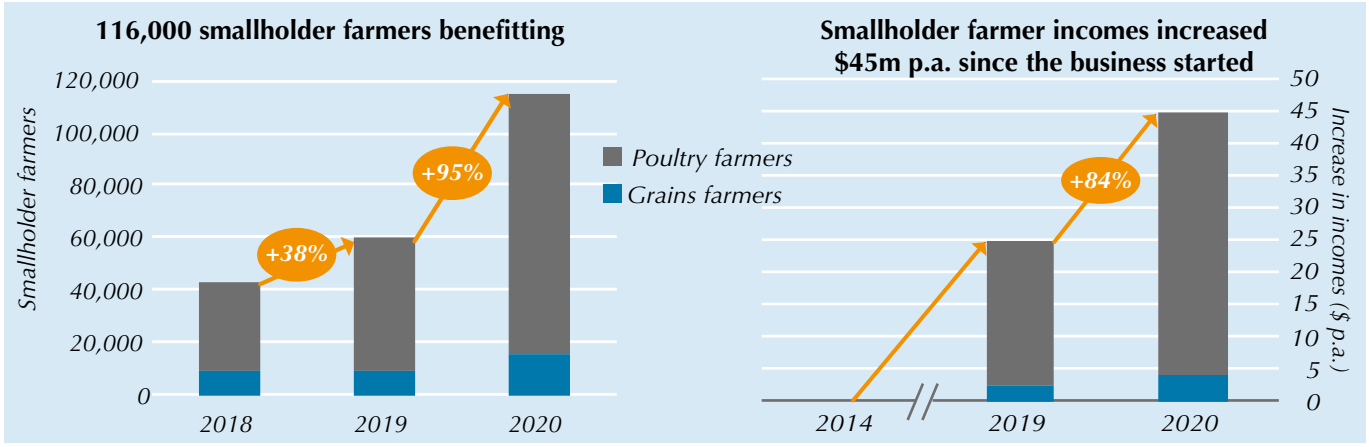
Silverlands Tanzania poultry – Impact summary

Silverlands Tanzania aims to achieve a substantial social impact through working with smallholder farmers. The business produces and sells day-old chicks, poultry feed and hybrid seed specifically for smallholder farmer production. Maize and soya inputs for the poultry feed are purchased from smallholder farmers.

From a standing start in 2014, the poultry business now benefits 116,000 people (up 95% from 59,000 people in 2019), including:

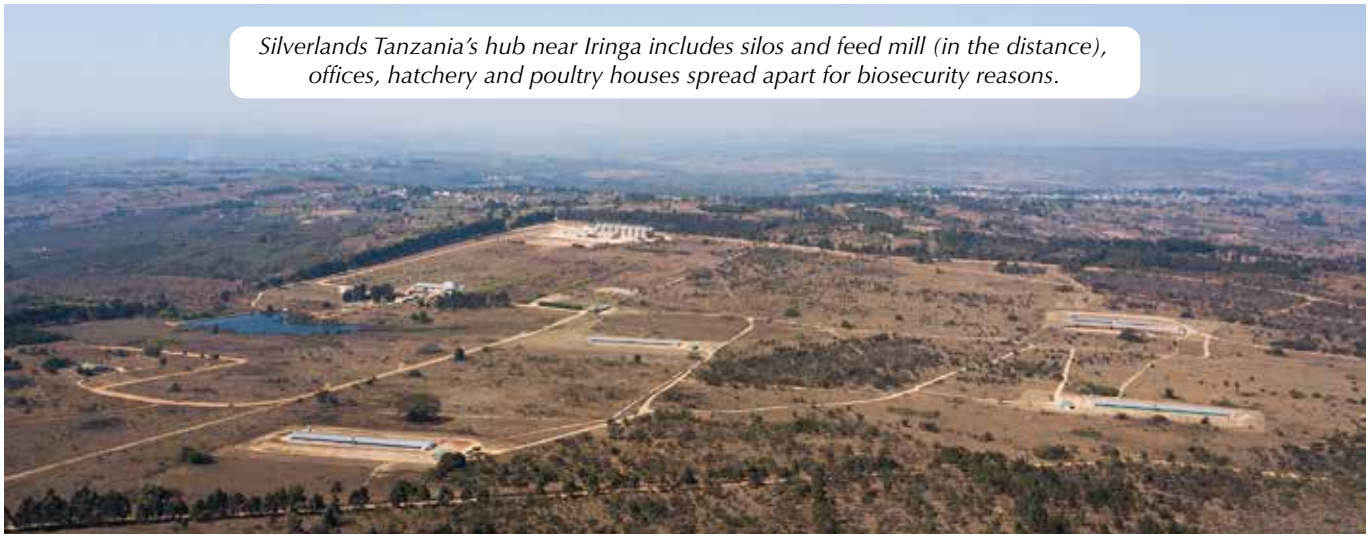
- 15,400 grain farmers (up from 9,200 in 2019) - around two-thirds of whom are women
- 100,500 poultry farmers (a doubling from 2019) – 70-80% of whom are women

From a baseline of $500 per annum, incomes per smallholder farmer that Silverlands has engaged with have increased by ~$390 per annum, implying an increase in smallholder net incomes of $45 million per annum, a significant multiplier effect. The business has a secondary impact of 695,000 people.



Impact group	Community participants impacted (# 2020)	Increase in household income annually ($ p.a. 2020)*	Value added to community annually ($m p.a. 2020)
Grains Farmers			
Farmers selling grains to STL	15,381	253	3.9
Poultry Farmers			
'Mini' smallholder farmers (15 chickens)	86,106	176	15.2
Smallholder farmers (~400 chickens)	11,408	2,010	22.9
Farmers only buying poultry feed	2,957	1,130	3.3
Total poultry farmers	**100,471**	**412**	**41.4**
Total smallholder farmers	**115,852**	**391**	**45.3**

**Total is a weighted average*



Silverlands Tanzania's hub near Iringa includes silos and feed mill (in the distance), offices, hatchery and poultry houses spread apart for biosecurity reasons.

Tanzania's poultry sector was performing poorly because of low quality feed and inefficient poultry breeds. Poultry farming was not profitable for smallholder farmers and therefore had not developed.

4.10 Achieving an impact – training and extension officer network

Training poultry farmers

Training and extension services are invaluable to smallholder poultry farmers whose productivity and profits can increase substantially by following correct procedures. Silverlands Tanzania provides training and support to poultry farmers in various ways:

1 The Silverlands **Poultry Training Centre** built to provide in-depth training to farmers.

2 Silverlands' teams of **extension officers** provide advice during home-visits and information in on-the-ground group training sessions.

3 **Online support** via the Silverlands' Facebook page with 27,000 followers and Silverlands' HelpDesk – an online platform to support farmers, who can ask questions via a helpline, email, webpage, and mobile app. 71% of replies take place within an hour, and the average first response time is under 6 hours.

More details on these initiatives follow.

African Poultry Multiplication Initiative – with funding from the World Poultry Foundation

Some of this training and extension work is assisted by a $3.6 million grant from the World Poultry Foundation in a project called the African Poultry Multiplication Initiative (APMI) run by Silverlands Tanzania. The initial grant was allocated in January 2017, and an additional $450,000 of top-up funding received in 2020 to extend the project. The aim of the project is to increase poultry production by women across Tanzania, with the overall vision of stimulating rural income growth.

What smallholder poultry farmers had to say…

"I am very proud and grateful. Through APMI I have been able to network with lots of farmers"

"Thanks for the APMI project it has saved my marriage"

"APMI has helped change my life. I will in return change lives of other smallholder farmers."

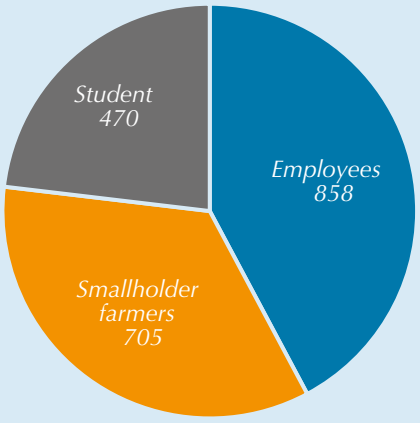
The Silverlands poultry training centre

The Silverlands Poultry Training Centre remains the only poultry training facility in East Africa. Due to its success and the demand for training, Silverlands intend to open additional centres in Kenya and Uganda.

Over 2,000 people have received training at the Silverlands Poultry Training Centre, including students doing practical training, employees and of course smallholder farmers. Employees attend courses on biosecurity, poultry production, poultry advising and a range of technical training for example: vaccinating, hatchery equipment operation, laboratory testing and interpretation of results and transportation of chicks.

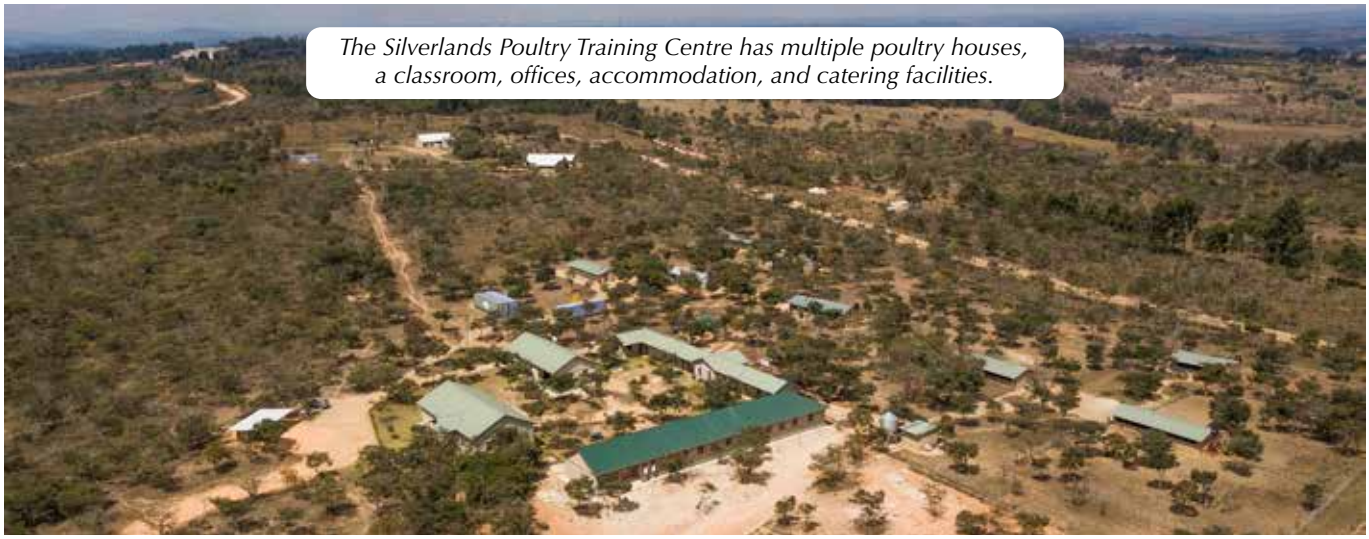
The Silverlands Poultry Training Centre runs five-day courses that combine theory and hands-on practical work. Poultry farmers travel from the furthest corners of Tanzania to attend. The majority of the smallholder farmer trainees (77%) have attended the course on brooder unit management, many funded through the APMI.

Silverlands Poultry Training Centre has hosted training for 2,033 people



What is a brooder unit?

Brooder (or mother) units rear day-old chicks through their first vulnerable 28 days and then sell healthy four-week-old chickens to others in their area. Farmers trained at the Silverlands Poultry Training Centre set up and run these units, with ongoing technical support from Silverlands' extension officers. Over 540 farmers (46% women) have attended the course on managing brooder units. Over 1,000 brooder units have been registered and at least 225 have reared more than one flock. Interestingly, those run by women are more likely to rear more than one flock.

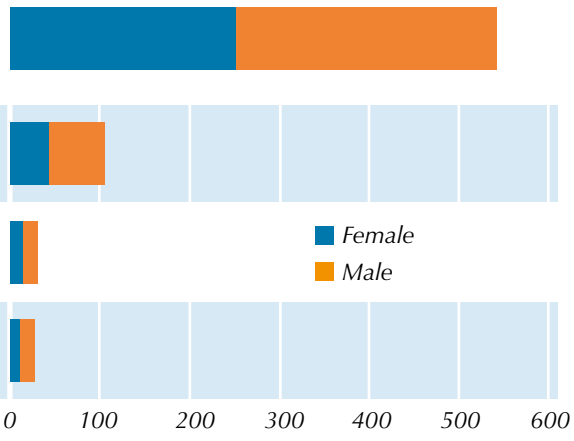


The Silverlands Poultry Training Centre has multiple poultry houses, a classroom, offices, accommodation, and catering facilities.

The Silverlands Poultry Training Centre classroom, lounge, accommodation facilities and mascot.

Courses focus on specific types of poultry breeding:

Course	Focus	Number of attendees
Brooder unit management	Rearing day-old chicks to 3-4 weeks for sale to other farmers. The most difficult phase of chicken rearing is up to three weeks.	
Poultry production	A general course covering all the best practices of poultry rearing.	
Broiler	Rearing day-old chicks or brooders up to 4-6 weeks and then selling for meat.	
Layer	Rearing egg laying hens. This includes egg handling and hygiene.	



All courses include the following basic principles, for successful poultry rearing:

Poultry management	Hygiene	Business management
• House design • Brooding • Feed and water • Vaccination • Environmental management	• Cleaning and fumigation • Biosecurity • Bird health	• Planning • Record keeping • Marketing • Finance management

Training takes place in both the poultry houses and classroom.

Silverlands Tanzania's teams of extension officers

Various teams of Silverlands' extension officers work with smallholder farmers and communities across Tanzania. As the business has grown and developed, the placement of these roles has shifted in the organisation and the extension officers are now imbedded in the core Silverlands Tanzania teams. Despite any organisational rearrangements, the aim remains the same: to provide technical and other support to increase poultry production and thereby improve nutrition and livelihoods.

Technical advisors with technical poultry and veterinary skills visit poultry farmers to assist on the technical side of poultry rearing. The 23 Technical Advisors (including a veterinarian) are part of the sales team and provide ongoing support to customers across the country. As part of this role they can gather samples for analysis at the Silverlands diagnostics laboratory.

Marketeers share knowledge with community members about the benefits of the dual-purpose Sasso breed and poultry in general. For example:

- Poultry consumption improves the health and nutrition of for the whole family.
- Keeping poultry provides an opportunity for economic autonomy by women.
- Sasso is dual-purpose with high productivity and the potential for raising incomes and improving nutrition.

Through discussions, the marketeers identify eager individuals in communities who would like to attend the training and start their own brooder units. The 76 marketeers have engaged with nearly 12,000 community members in meetings across Tanzania.

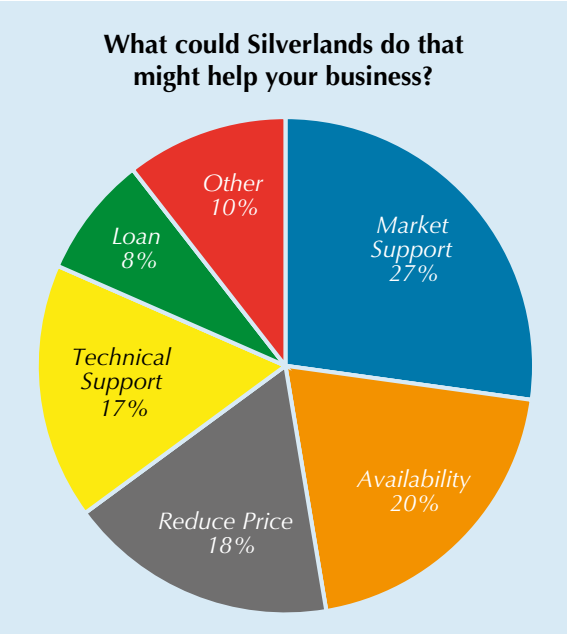
Silverlands' Marketeers provide training to communities in the benefits of poultry rearing and consumption. Messages shared on posters include "Eating chicken eggs helps children to grow up strong and healthy" and "My wife raises Sasso chickens, which is a great help to my family!"

One of the Silverlands' slogans:
"Sasso – chaguo kwa afya bora – a choice for better health"

Understanding and monitoring Silverlands' customers

To understand its diverse customer base, Silverlands has established an online data portal. Extension officers update information on the progress of poultry farmers' flocks. Thus far nearly 10,000 smallholder farmers have been registered on the platform with data and information improving continuously.

The last link in the value chain - helping smallholder farmers sell their poultry



In Silverlands' 2020 poultry survey, the largest challenge, reported by 40% of those reporting challenges, related to a "market". Also, when asked what Silverlands might do to help their smallholder businesses, the primary reason given (27% of respondents) was "market and support".

Silverlands has responded to poultry farmers' needs for market access, by creating a connection between poultry farmers and food outlets, with motorbike traders known in Swahili as 'machingas'. Silverlands Marketeers update the independent machingas with information on current availability of Sasso from smallholder farmers. The machingas then purchase between 15 and 30 birds and transport them to food outlets for sale, with a potential margin of Tsh2,000 ($0.86)/ bird. This works well as the food outlets prefer chickens fresh from the farm. The system is along the lines of 'Uber Eats', but in rural Tanzania.

A motorbike trader or 'machinga' transporting smallholder chickens to a food outlet.

"For delivering my chicken to me, I really appreciate. We are going to be serving the family and the local people together. I would like to say thank you very much."

Daudi, Sasso barbeque chicken outlet

Case studies:

"My family life has been improved because of the chicken business."

"Chicken business has returned joy and value in my life."

"I grow SASSO and I get one-month old birds for 4,500 Tshillings. I grow them for two months, selling a rooster for 15,000 Tshillings and hens for 10,000. I'm making profit, I can afford school fees, I'm paying house rent, eating eggs and poultry meat. I encourage raising SASSO. Thank you."

Nesta Gabriel Gamma, Smallholder Poultry Farmer

"My name is Eva Gabriel, I am a brooder and I grow chicks from day 1 to day 28. You can benefit with the programme, receiving many chicks and selling them off for profit. Also there is training, you can learn how to raise SASSO, along with the skills to know what price to sell them."

Eva Gabriel, Smallholder Poultry Farmer

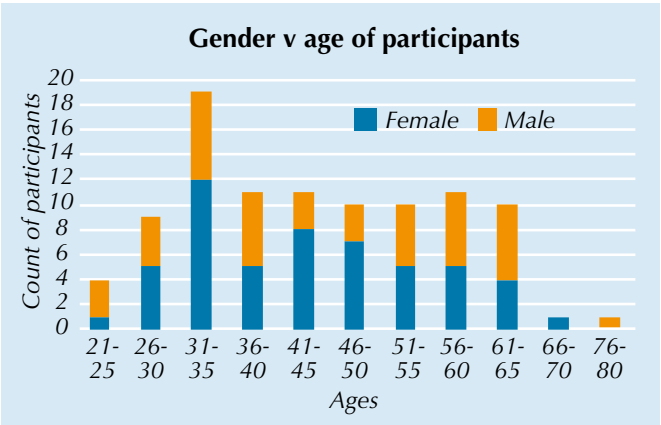
4.11 Results of our survey of smallholder farmers

Silverlands' poultry survey

To learn more about the impact of keeping chickens, Silverlands conducted a survey of 104 smallholder poultry farmers from across Tanzania, this was performed using Silverlands' extension officers.

Of the respondents, 54% were female and 46% male, with more between 31-35 (20%) than other age groupings. Although the respondents in this survey were split relatively evenly between the genders, we know from larger studies that typically 70-80% of smallholder poultry farmers in SSA are women (BMGF 2020; ID Insight, 2020).

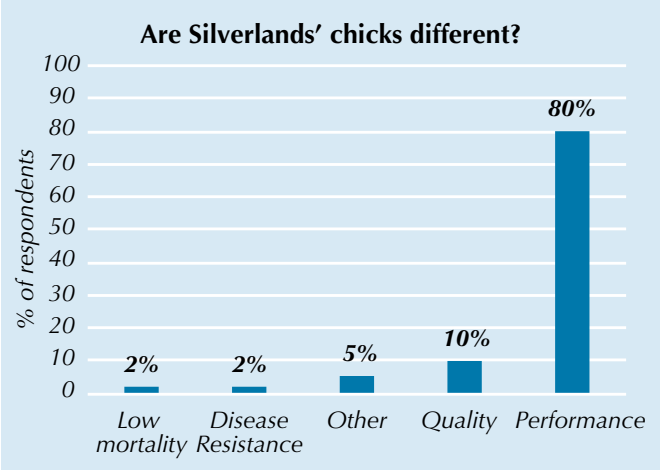
Household size was 4.8 (median of 5) across the sample.

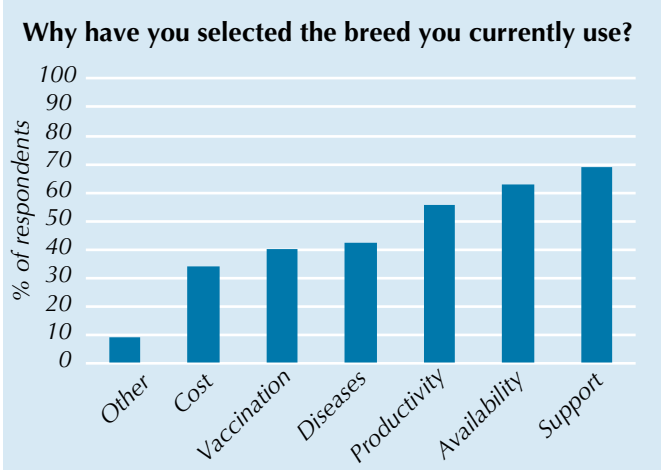


Poultry breeds

89% of respondents stated that Silverlands' chicks were different, with 80% giving "performance" as the primary reason. Other reasons included "quality" (10%), and "disease resistance" (3%).

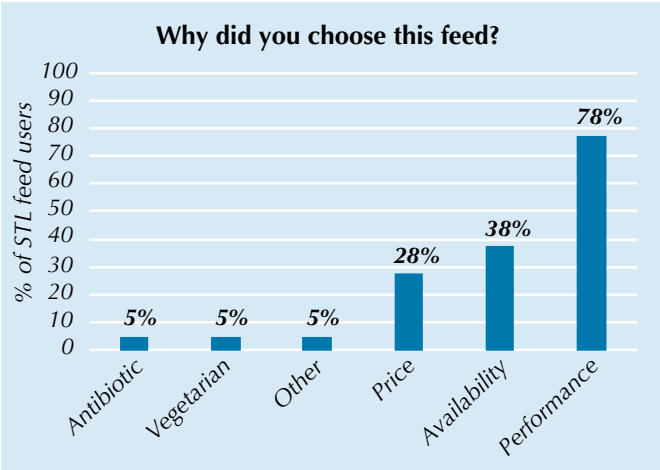
The reasons given for selecting the breed that farmers currently use are "support" (69%), "availability" (63%) and "productivity" (56%).

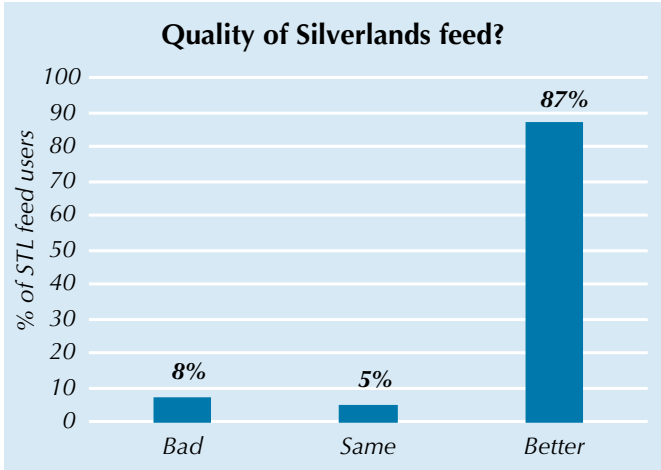




Feed quality

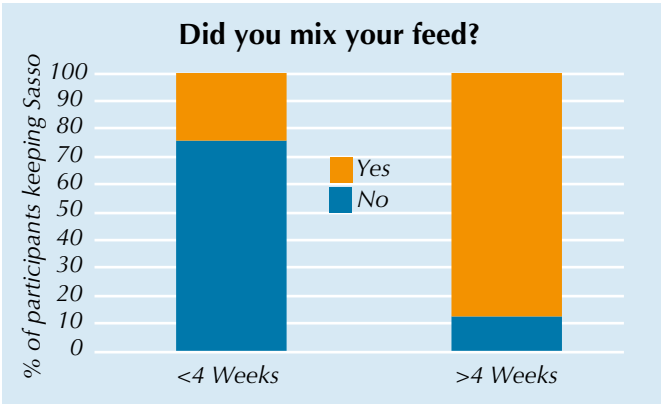
Of the 40 respondents using Silverlands' feed, 78% chose it because of its performance and 87% stated the quality of Silverlands feed was "better" than other feed types.





Also, 86% of farmers using Silverlands' feed could not obtain the same results with another feed supplier and 72% could not find a good alternative.

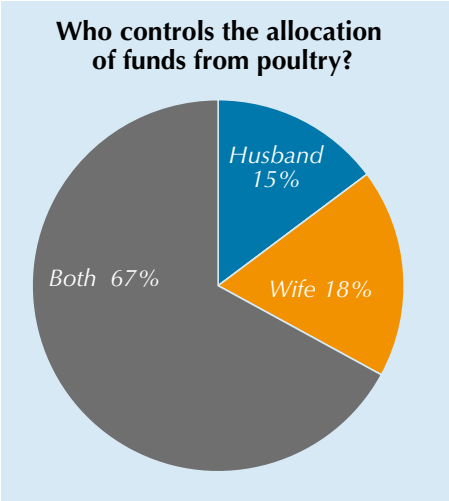
Farmers tend to be diligent at using only purchased feed for the first four weeks of rearing their poultry. After this they typically mix it with other ingredients, such as maize bran they've produced themselves. 76% of respondents did not mix their feed for the first 4 weeks, whereas 88% of respondents did mix their feed after the first 4 weeks.

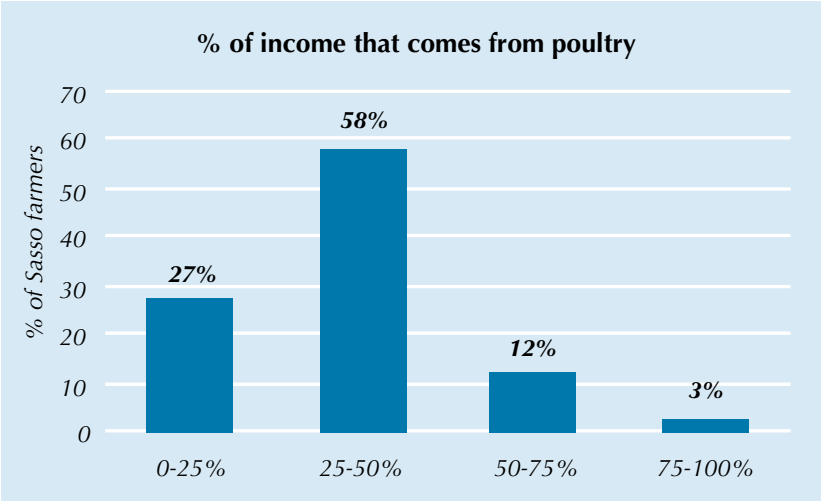


The Sasso breed can scavenge successfully for itself so the strategy followed by farmers is in line with the breed.

Income from poultry

Regarding the allocation of funds received from poultry, 67% of respondents share responsibility between the wife and husband, in 18% of cases, the wife has full control and in 15% of cases the husband has full control. For more than half (58%) of respondents, income from poultry constitutes 25-50% of the total household income.



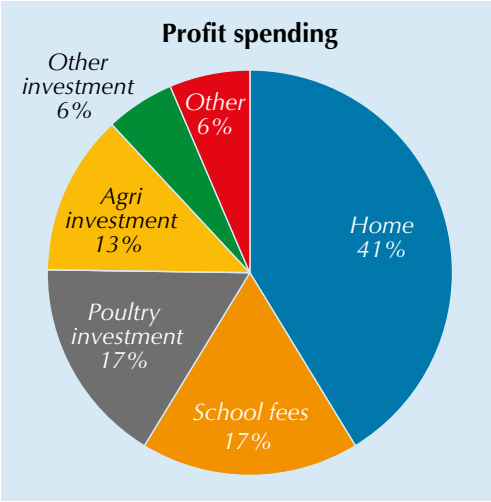


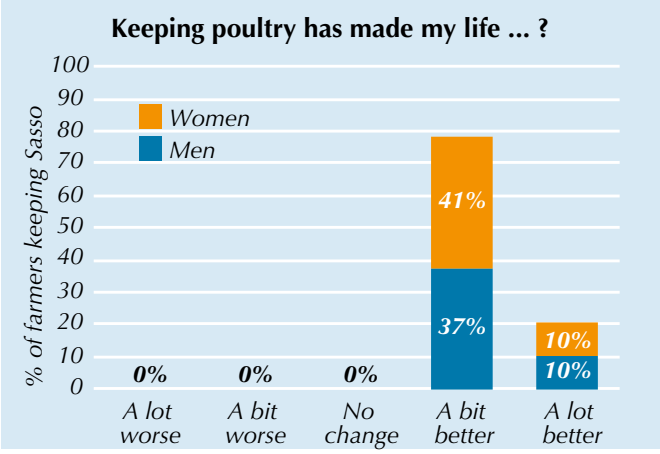
Profits from poultry are primarily spent on home needs (41%), school fees (17%) and investing in poultry (17%) or other agriculture (13%). Home needs include supplies, housing, home investment and electricity.

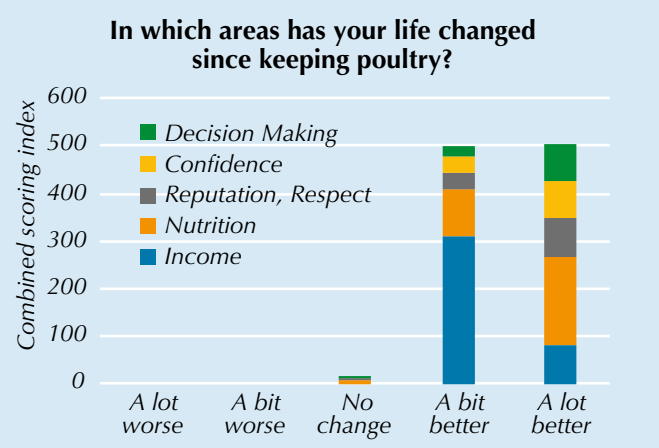
Impact of keeping poultry

100% of respondents reported positive benefits from keeping poultry, 79% said it made their life "a bit better" and 21% said "a lot better". Responses were evenly distributed between men and women.

The primary life improvements given by respondents related to "income" and "nutrition", followed by "respect or reputation", "confidence" and "decision-making". This was followed by a range of other aspects that were made "a lot better" through keeping poultry, including "school fees", "education", "family support" and "business".

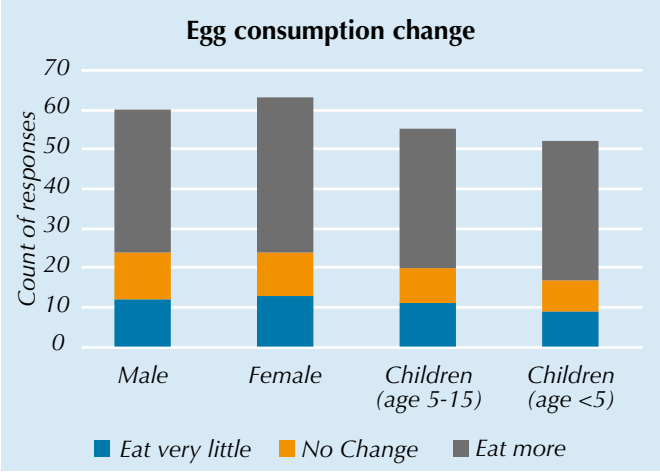


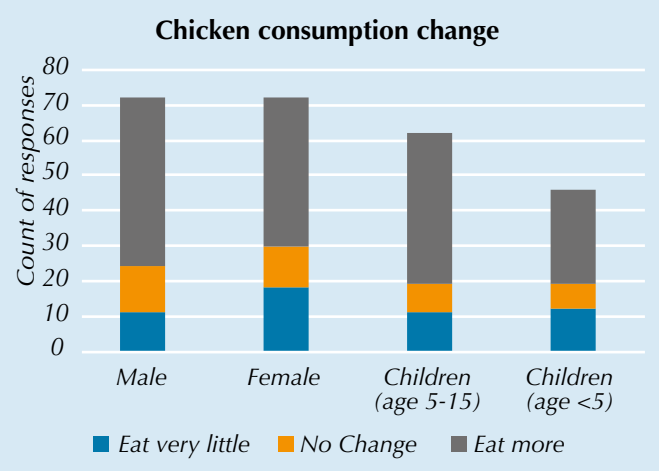




Poultry consumption

Most respondents (63% overall) reported that the whole household now eat more chicken and more eggs since keeping poultry. On average, a household consumes six chickens per month (two per person) and 15 eggs per week (four per person).





Access to Silverlands' training

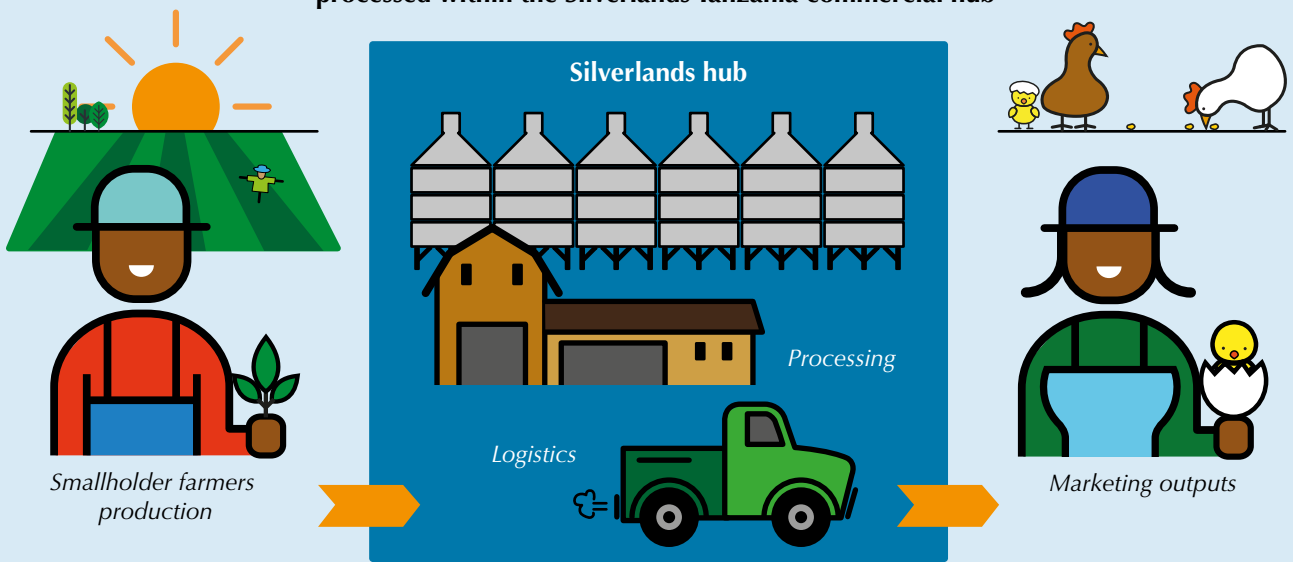
76% of respondents had access to a Silverlands' representative. The same percentage were aware of the Silverlands Poultry Training Centre.

4.12 Working with smallholder grain farmers

Creating the Silverlands Tanzania Hub

In Tanzania 83% of landholdings are cultivated by smallholder farmers (FAO, 2018). Prior to the development of this project there were little/no soya beans grown in the country, mainly because there was no market, namely a soya processing plant. Silverlands Tanzania built the first soya processing plant in Tanzania creating a market for smallholder farmers.

Hub out-grower model in which production from smallholder farmers is processed within the Silverlands Tanzania commercial hub



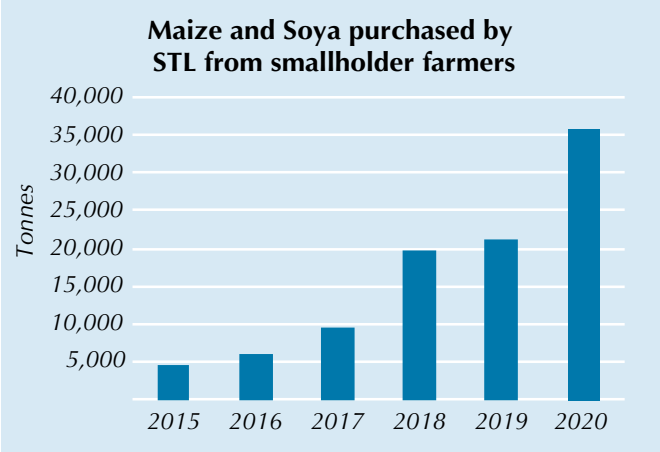
Benefits of soya bean production

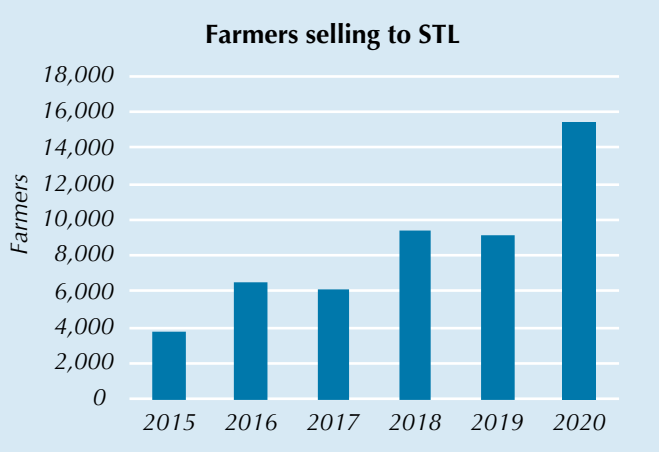
Without a market for alternative crops, farmers mono-crop maize, leading to low soil fertility and disease pressure. With the introduction of a market for soya beans, farmers can now rotate maize with soya. As a legume, soya fixes nitrates in the soil, naturally replenishing the soil and resulting in higher maize yields the following year. As pests and disease tend to be specific to plant groups, farmers also reduce disease pressure by rotating between maize and soya (from the grass and legume families). Furthermore, the input costs for soya are less than maize.

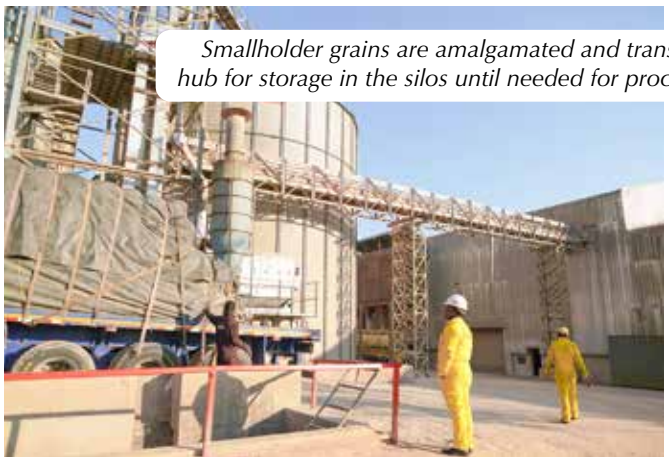
Rotating maize with soya beans naturally replenishes soils.

Huge increases in soya bean production

Silverlands stimulated production of soya beans by smallholder farmers. The annual production of soya has increased significantly and is now sold to multiple buyers across Tanzania and into neighbouring countries. Silverlands is now just one of these buyers.







Smallholder grains are amalgamated and transported to Silverlands' hub for storage in the silos until needed for processing into poultry feed.

Working with farmer groups

To facilitate engagement with smallholder farmers, Silverlands has assisted in the formation of farmer groups, known as Agricultural Marketing Cooperative Societies (AMCOS). This work was conducted by the NGO Caritas with a $160,000 grant from Danida (the Danish Ministry of Foreign Affairs) via the Danish Investment Fund for Developing Countries (IFU), and $110,000 from Silverlands Tanzania. Six AMCOS were formed in the last two years made up of 6,486 farmers (63% women).

Farmers benefit from working in groups through collective purchasing and marketing, and access to training.

- **Collective purchasing**: By working in groups, farmers can purchase inputs collectively and receive cheaper prices for the bulk purchase. Over the last two seasons, 46 tonnes of maize seed were purchased by farmer groups at a price 27% less than in outlets. Over 800 farmers benefitted, with a combined saving of $30,000.
- **Training in good agricultural practices:** To improve smallholder production, smallholder farmers have received training on the advantage of using improved maize and soya bean varieties, conservation farming techniques and crop rotation of maize with soya beans, sunnhemp and sunflower. Silverlands has been working with NGO Caritas to run demonstration plots.
- **Training in post-harvest handling:** It is essential grains are only stored when they are properly dry, to avoid losses to insects and fungi. Training has been provided to farmers on the proper drying of grains and moisture meters are used for quality checks during amalgamation of harvests. This quality checking ensures grains are accepted at the time of sale.

Silverlands Ndolela's grain silos provide valuable storage for securing the harvests of both Silverlands and smallholder farmers. 37% of food is lost during handling and storage in Sub-Saharan Africa compared to just 6% in North America (World Resources Institute, 2013). This is one of the most significant problems for smallholder farmers. Storage facilities in rural areas tend to be poor, and ~30% of harvests are potentially lost as a result.

4.13 Quantum – An exciting new poultry acquisition for Silverlands II

The huge potential for positive impact and deep expertise has led Silverlands II to invest in the poultry sector and purchase a 31.6% stake in Quantum Foods Holdings Limited (Quantum) in mid-2020.

Quantum operates in four countries, South Africa, Mozambique, Zambia and Uganda, and sells eggs, chicken and poultry feed. We feel there is much potential to be excited about with this business, including:

Substantial impact potential: Quantum brings the opportunity to replicate the successes of Silverlands Tanzania in other countries in Africa. Quantum already sells over 1 billion eggs and ~60 million chickens annually. 200 million of these eggs are sold annually in Zambia, Uganda and Mozambique, equating to 550,000 eggs each day.

In addition to this direct provision of nutrition, by engaging with smallholder poultry farmers through the sale of day-old chicks and poultry feed, Quantum has the potential to raise incomes, and improve lives and livelihoods, just as we have seen with Silverlands Tanzania.

Expertise: Quantum has a management team with deep expertise in all aspects of the poultry and feed business. They are particularly strong in the "grandparent" and "parent" bird businesses which produce the day-old chicks.

Expansion opportunities: Quantum has already been operating in countries like Zambia, Uganda and Mozambique for over 20 years with established teams, brands and assets. There is potential to further expand in these and other countries.

Eggs offer a well-packaged and affordable protein source that provides extremely valuable nutrition

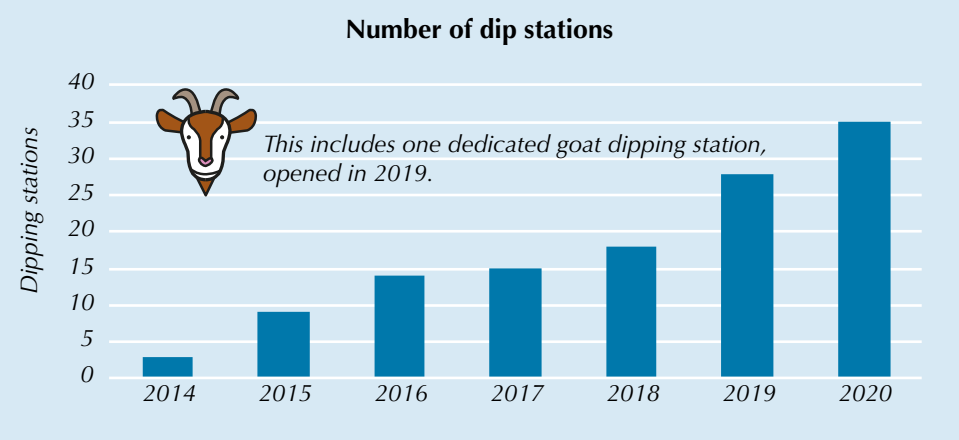
Quantum's Galovos farm in southern Mozambique

One of Quantum's layer operations in Zambia under the "Mega" brand name.

5 Livestock to Livelihoods: Silverlands Ranching Limited

5.1 Silverlands Ranching – Impact summary

Silverlands Ranching's community program (nicknamed "SLIC") has been widely acknowledged as a substantial success story. As this chapter makes clear, the approach has been holistic, starting with a focus on the health of community cattle herds and providing a market for these cattle. The project has broadened to include sorghum and sunflower out-grower programs, goat dipping and training in conservation farming techniques. As this chapter shows, what started as the introduction of dipping for cattle in 2014, now includes the introduction of a payment system using blockchain technology, all in 6 years!



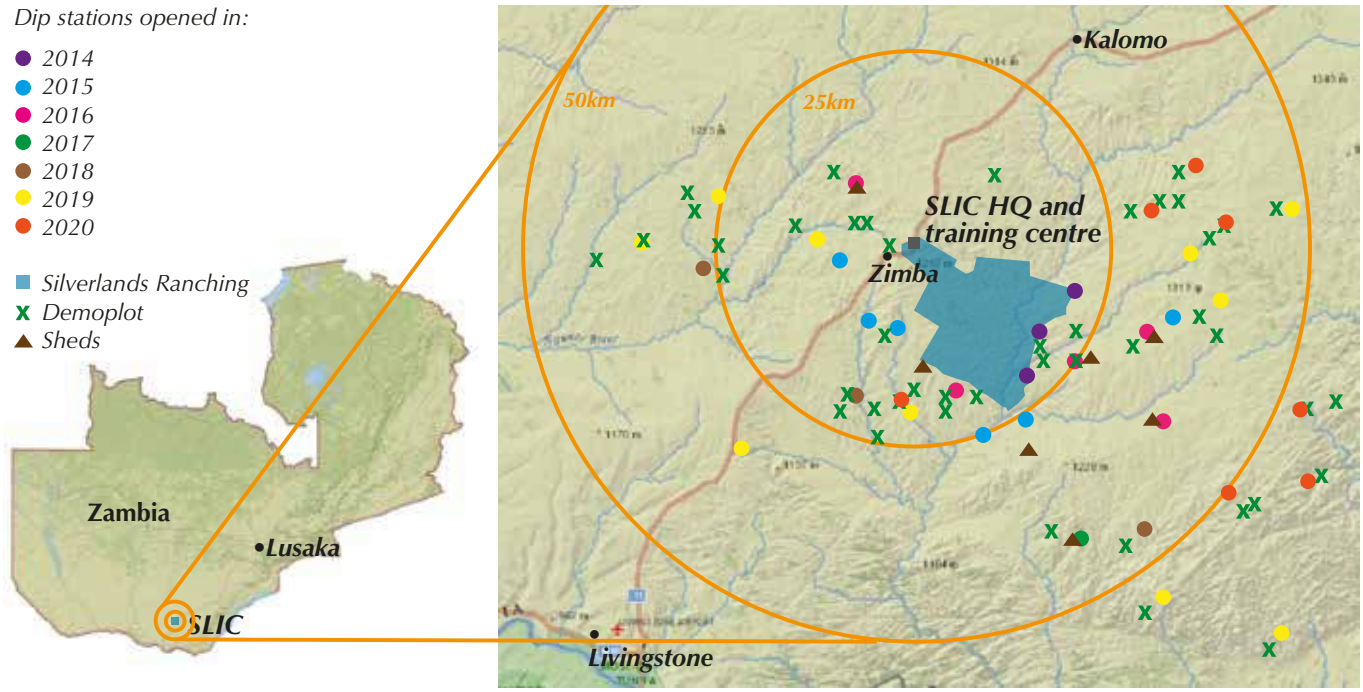
Some headline achievements for SLIC:

- The number of communities accessing a dipping facility increased from 28 to 35 in 2020, despite COVID-19, and from a standing start in 2014;
- Over 35,000 head of community cattle access dipping stations monthly, up from zero in 2013;
- Community cattle mortality rates have typically dropped from around 10% per annum to 2.3%; and
- 12,100 farmers have benefitted economically with their incomes up $2.7m because of this project.

These results, together with the development on the farm of a new export industry for Zambia, pecans, as discussed in chapter 6, has meant that Silverlands Ranching has received very positive press coverage in 2020, particularly because of the pandemic and the difficult economic environment in Zambia.

Smallholder cattle farmers bring their cattle to the Bunsanga spray race. If communities have no plunge dip that can be refurbished, then a spray race is constructed.

This map shows the farm in the centre and the location of communities that form part of the project around the farm.



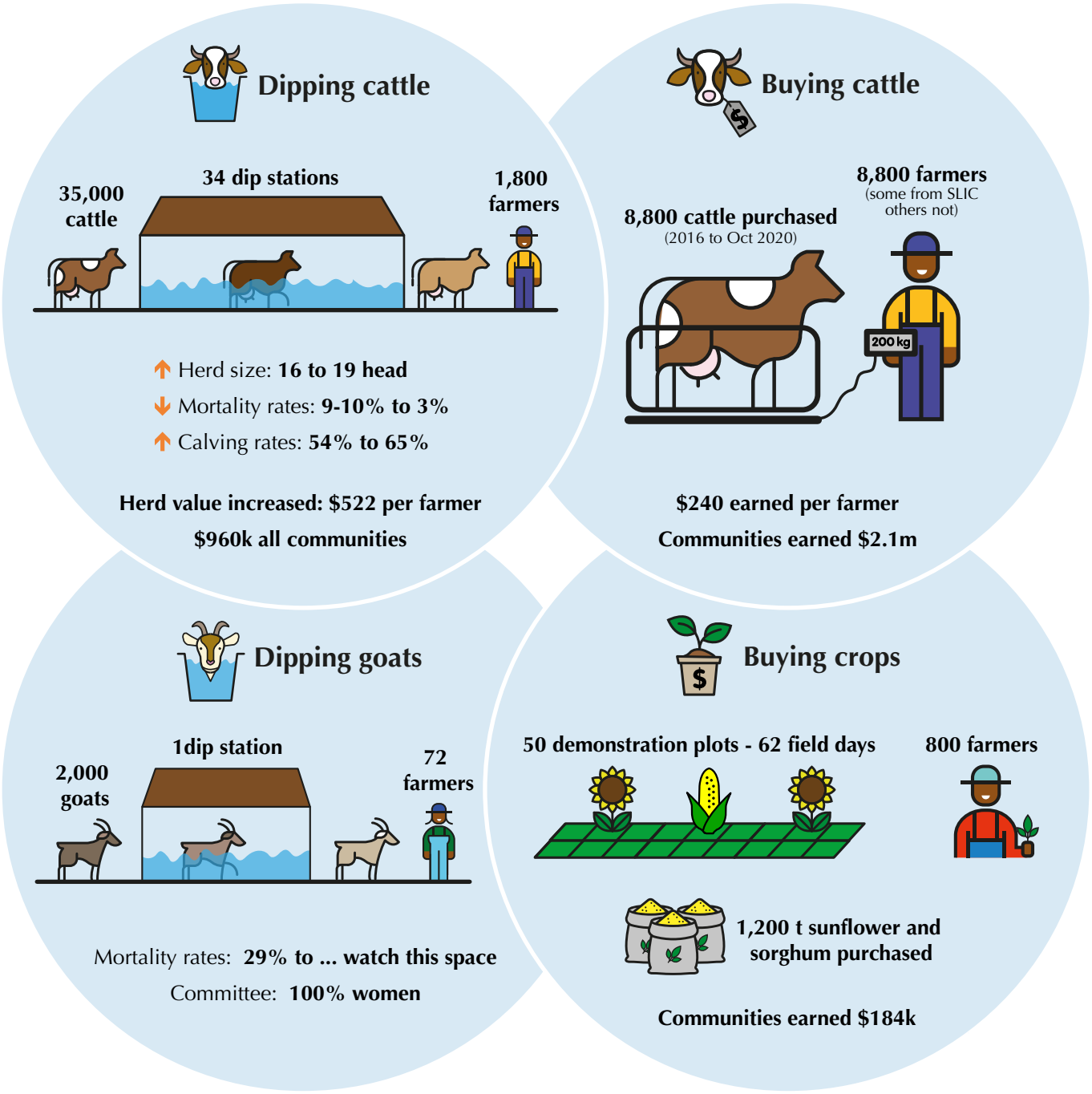
We anticipate greater impact should the business develop into the value chain. Exporting beef will increase the price per head of cattle achieved by an estimated $345 per head, directly improving smallholder cattle farmer incomes.

Impact group	Community participants impacted (#)	Increase in household income annually ($ p.a.)	Value added to community annually ($m p.a.)
Farmers dipping cattle	1,833	522	1.0
Farmers selling cattle to SRL	2,146	35	0.1
Farmers selling grains to/via SRL	798	59	0.1
Farmers growing SRL hybrid seed	8,271	198	1.6
Overall total/weighted average	**12,131***	**224**	**2.7***

**Accounts for farmers who both dip cattle and sell cattle to SRL.*

Mantanyani dip station

Silverlands Ranching has created positive impacts on smallholder farmers via four initiatives:



5.2 The business in summary

Silverlands Ranching and the SLIC programme demonstrate the hub out-grower model in action, benefitting both the communities and the business. The programme has a significant impact, yet its running costs are relatively low, and its low-tech nature is well suited to rural Zambia. Integrating SLIC into the business model is resulting in significant improvements in smallholder farmer incomes that will continue in the long-term.

The programme continues to grow, focusing on:

SLIC benefits both smallholder farmers and Silverlands Ranching

Partner	Benefit	Growth focus
Smallholder farmers	• Silverlands 'hub' provides a **market** for cattle and grains • **Technical training** that improves cattle health and crop productivity and increases smallholder incomes • Access to cattle and goat **dipping facilities** • Facilitating access to **inputs and financial services**	• Increasing **access to a formal market** by expanding the feedlot with opportunity to develop an abattoir and processing facility. • Training in cattle management and handling continues weekly. • Training in conservation agriculture is being both expanded and improved with more demonstration plots and new training materials distributed. • **Expanding the number of dipping stations** - seven new dip stations in the past year, taking the total to 35 dip stations. • Silverlands continue to form **partnerships** to improve smallholder farmer livelihoods.
Silverlands Ranching	• **Increased scale** enabling the feedlot, which requires scale	• **Ongoing expansion** of the feedlot, with the potential to develop an abattoir and processing operation, all of which requires scale.

Developing the Silverlands Ranching Hub

The positive impact on the communities around the ranch continues to expand. Silverlands Ranching operates in the prime cattle-rearing region of South Western Zambia, where over 5,000 cattle are hosted on a 21,000 ha ranch. The original thesis when the ranch was acquired in 2014 was:

- To intensify the farm with cropping and irrigated pastures;
- To integrate up the value chain by adding feedlots and processing; and
- To work with surrounding smallholder farmers through an out-grower programme.

Construction of a large 13 million m3 dam in 2014 allowed the planting of ~500 ha of irrigated pastures and crops to help feed the cattle and intensify farm usage. To develop the value-chain, a feedlot was built in 2016. This has successfully proven the model and helped provide a market for smallholder cattle farmers. There is potential to develop an abattoir and processing plant to complete the beef value chain.

Silverlands Ranching's 'hub' includes a new 13 million m3 dam, cropping, pecan plantation, housing, offices, stores, workshop, silage clamps and feedlot.

5.3 Silverlands ~~Livestock~~ Livelihoods Improvement Community (SLIC) Programme

History and establishment

Smallholder farmers in South Western Zambia rely on cattle for their livelihood. Crop production is inconsistent in this semi-arid region, and farmers depend on cattle as their 'bank', sold for cash when required. Without cattle these farmers would not have a means to support themselves.

In 2014, Silverlands consulted extensively with communities surrounding the ranch, establishing community 'Livestock Committees'. Consultation identified three main issues faced by the communities:

1 High cattle mortality rates due to disease (particularly tick-borne diseases);

2 A lack of operational dipping stations and no veterinary support; and

3 A limited market for cattle and high vulnerability to unfair traders (~40% of cattle transactions were between community members as there was no reliable market).

Smallholder farmers' need for a reliable market confirmed our thesis to develop a beef value chain. This also supported the business case because it meant the whole business could grow larger than if the value chain relied on off-take from Silverlands Ranching alone.

Prior to Silverlands' arrival, cattle disease was rife in the region. Diseases resulted in high livestock mortality and low calving rates. Farmers travelled long distances to markets or were subject to unfair traders.

In 2014, Silverlands established an extension service, hiring the first three 'Livestock Technicians' with veterinary training. These individuals helped the communities refurbish several non-operational cattle dipping stations in community areas. Prior to this, the communities had not been 'dipping' their cattle for 17 years. The project was named the Silverlands Livestock Improvement Community (SLIC) programme.

Smallholder cattle farmers bring their cattle for weekly dipping at the Bunsanga dip station refurbished by Silverlands and the Bunsanga community.

The evolution from 'Livestock' to 'Livelihoods'

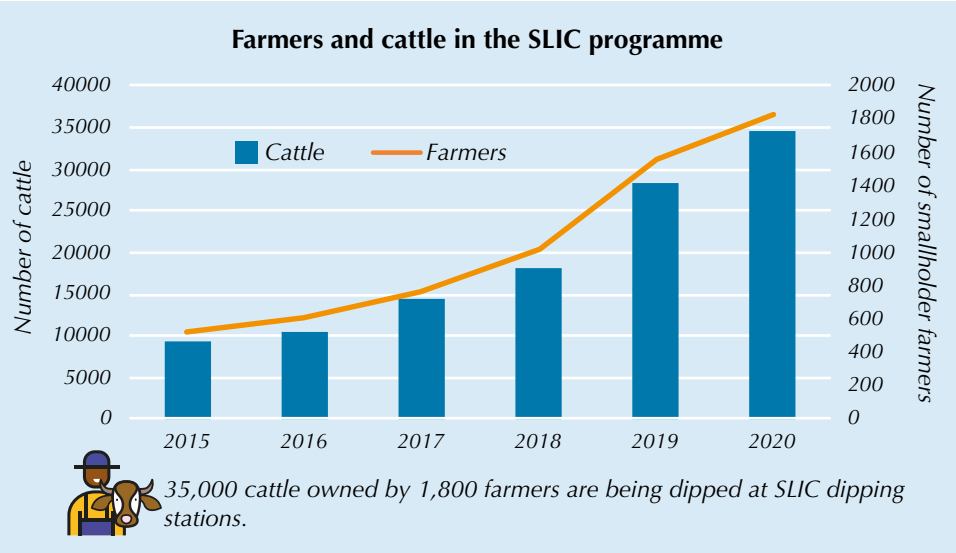
Since beginning with a focus on smallholder livestock, the SLIC programme has developed into so much more. The smallholder cropping aspect of the programme has grown organically up to 50 lead farmers and demonstration plots this year. Access to banking services has been a new arena for the previously unbanked smallholder farmers.

It makes perfect sense for the name to evolve along with the programme, and to be changing in 2021 to the Silverlands Livelihoods Improvement Community (SLIC) Programme, because in fact, **improving livelihoods is what SLIC has always been about**.

SLIC footprint and operations

Silverlands has established dip stations, crop demonstration plots and sheds for distribution of inputs and storage of grains throughout communities surrounding Silverlands Ranching. The SLIC programme has increased the number of dipping stations from zero to 35 in six years.

Due to the success of the dip stations, with community ownership and immediate positive effects noticeable in the herds, new communities continue to invite Silverlands Ranching/SLIC to refurbish old dip stations or set up new spray races. Today, 35 dip stations are up and running, allowing ~1,800 farmers to bring over 35,000 cattle to the dips to get rid of ticks and accompanying diseases. There are sometimes well over 60,000 cattle 'dippings' a month, up from zero in 2014, an impressive logistical feat.



SLIC team

SLIC's Livestock Technicians are trained in agrochemical handling and are present at every dipping day to manage the acaricide (pesticide that targets ticks), water and pH levels in the dip tanks. With veterinary backgrounds, the Livestock Technicians provide training in cattle management and assist with vaccinations, dehorning and other support where necessary. Expert veterinary advice is provided by Dr Moosa who is the vet that oversees the Silverlands' herds.

The SLIC team consists of a Manager, Administrator, Financial Controller, Head Livestock Technician and nine other Livestock Technicians (including one lady). A learner centre has been constructed for hosting workshops and training sessions. Satellite housing facilities are also now established so Livestock Technicians can stay closer to the dip stations during the week, reducing travel times.

SLIC Administrator, Chipuya Simooya, at the learner centre

"I grew up in a similar type of community elsewhere with the same way of doing things. I like the SLIC intervention as I can explain to these communities some of the mistakes that are just part of culture or norms despite being a constraint to development.

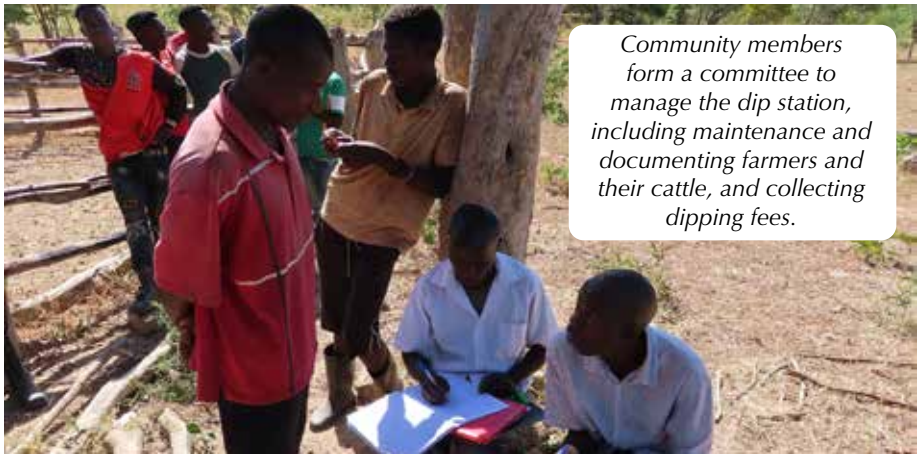
I see a great interest and passion by these smallholder farmers wanting to improve themselves after knowing what is required to do.

I take serious pride to be the one given the task to see the community I call parents, brothers and sisters live decent lives."

Himus Choongo, SLIC Manager

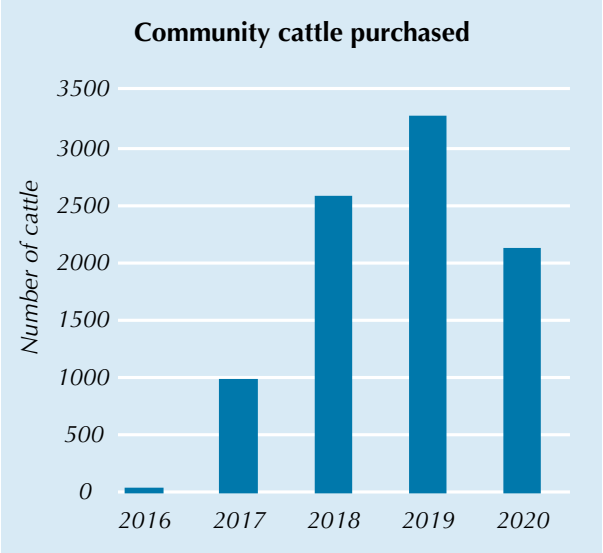
SLIC's success - Communities control their new dip stations

Part of the success of SLIC is the community ownership. Silverlands is invited by communities to provide technical support and advice. A community committee runs each dip station: tracking attendance, collecting fees, providing water and maintaining infrastructure. Dipping fees (ZMK 1.50 or $0.07/head) fund the daily expenses of the programme so the dip stations are self-financing with all fee collection managed by the community itself.


Community members form a committee to manage the dip station, including maintenance and documenting farmers and their cattle, and collecting dipping fees.

SLIC's success – Integrating smallholder cattle into Silverlands' hub and business model

Another success of SLIC is that the programme is fully integrated into Silverlands' business model and both the Silverlands hub and smallholder farmers benefit. Community cattle are needed to fully stock the feedlot. From purchasing just 53 cattle in 2016, the business has purchased over 2,000 head of community cattle for the last 3 years. This market provides valuable income for smallholder farmers and the communities in the area. Since 2016, over $2m of funding has flowed into communities from cattle purchases.




Silverlands' transparent approach to community cattle purchasing is highly appreciated by smallholder farmers.

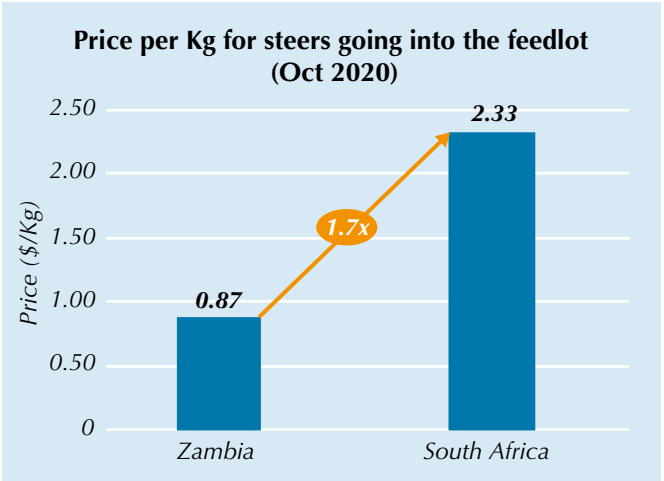
Despite the Zambian Kwacha devaluing by some 50% in 2020, Silverlands' price offered to smallholder farmers has strengthened in US dollar terms from $0.71 to $0.87 per kilogram.

Steer price per Kg paid by Silverlands to smallholder cattle farmers

Month 2020	ZMW/Kg	USD/Kg	ZMW:USD
January	10	0.71	14.1
June	15	0.82	18.3
November	18	0.87	20.6

Export potential

The price of beef in Zambia is currently low compared to other countries regionally. Developing the value chain, with an abattoir and processing, opens the opportunity to export beef out of Zambia and improve the sales price for smallholder farmers. This would result in an enormous uplift for smallholder farmers. The current price for steers going into a feedlot is $2.33/Kg in South Africa, 1.7x the $0.87/Kg in Zambia. At these prices, a 250Kg head of cattle is $218 in Zambia and $583 in South Africa, an enormous difference. Although this may raise the price of beef in Zambia (sold mostly to middle- and high-income families), the positive impact on the lives and livelihoods of smallholder cattle farmers would be immense. We estimate that this uplift would raise the value of the smallholder cattle herd in Zambia (3.5m cattle) by $1.2 billon.



Drought and COVID-19 effects on cattle sales

In 2020 there was a reduction in cattle sales by community members, partly attributed to the COVID-19 related school closures, which lessened their school fee expenses. Due to the drought, families sold cattle to purchase food. However, after harvest, cattle sales to Silverlands reduced as sales of summer crops were covering household expenses.

Despite the financially constrained drought period, farmers made sure to keep some money for dipping their herd. In some cases, this was funded by the sale of cattle, sold to cover household expenses. Farmers have truly acknowledged the value of regularly dipping their livestock.

Community cattle are held in feed pens prior to transfer to the feedlot, to assess their health and give them time to adjust to a fodder-based diet.

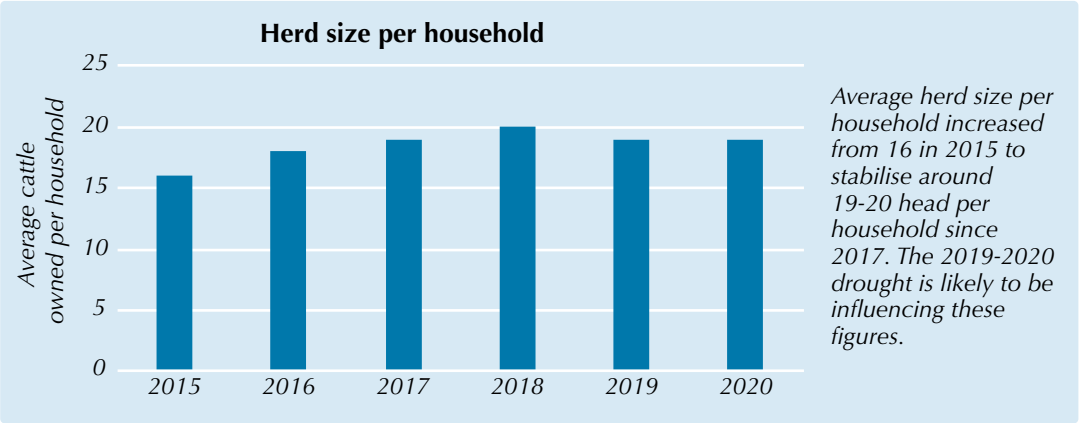
Collaborating with Musika and AgDevCo

Silverlands partnered with the NGO Musika at the start of the project. Musika provided donor support, advice on implementation, and assisted with community surveys. Silverlands Ranching ran the day-to-day out-grower programme. To further expand on the achievements of the project, AgDevCo provided $320k in donor funding through their Smallholder Development Unit for use over three years (2018 to 2021).

Smallholder farmer benefits – Increased herd size

The programme has resulted in remarkable improvements in community herds. Average herd size per farmer has increased from 16 to 19. Assuming a value of $250 for each head, the total herd value for each farmer has increased by ~$750, a substantial uplift in an area where average incomes are only about $700 per annum. With increases in herd size from improved mortality and calving rates, we estimate that each family has access to a potential additional income of ~$522 per year ($957,000 per annum across the 1,800 farmers in the programme).

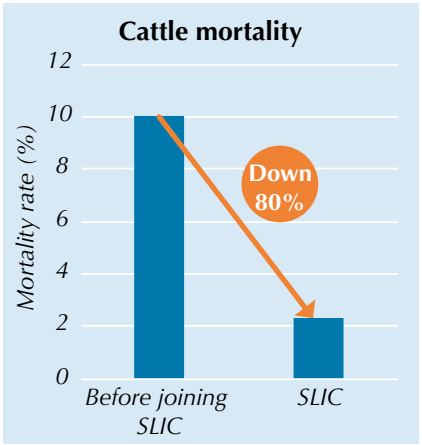
It is notable that herd sizes increased and have then flattened off. This is partly because smallholder farmers are increasing their sales each year (and therefore incomes) rather than continuously building their herds which might otherwise be negative from climate and environmental perspectives.

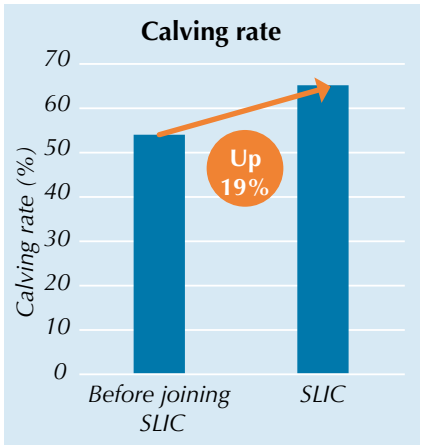


Average herd size per household increased from 16 in 2015 to stabilise around 19-20 head per household since 2017. The 2019-2020 drought is likely to be influencing these figures.

Reducing mortality rates

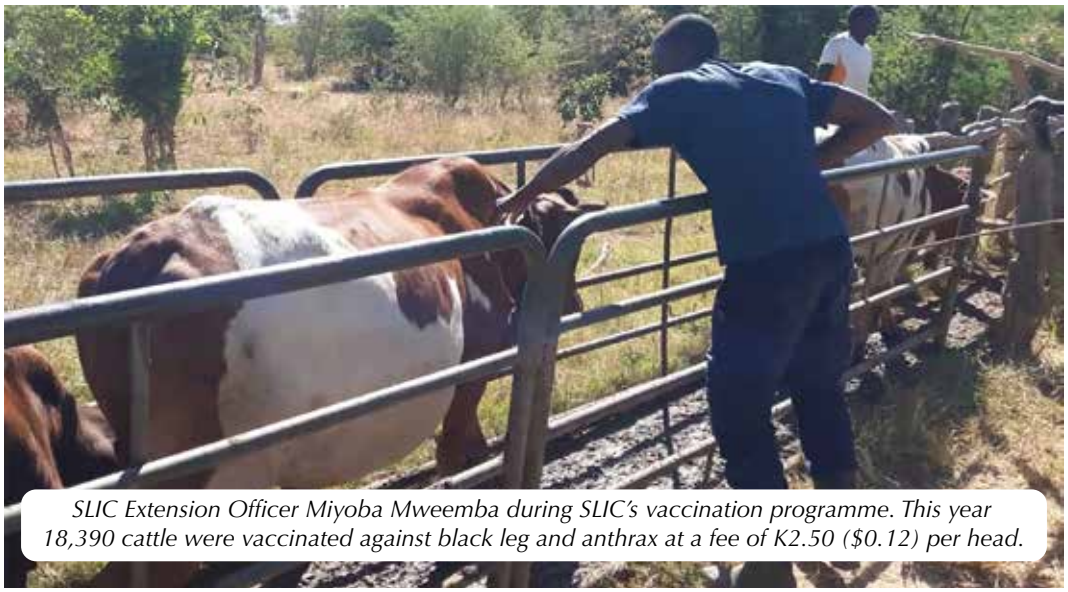
In 2012, before the SLIC programme started, 70% of households reported that their herds had been affected by cattle diseases. Cattle mortality rates in Zambia's Southern Province stood at 9.3% (Rural Agricultural Livelihood Survey, 2012) with similar cattle mortality rates (~10%) shown in a 2019 survey, for new herds before they joined the programme. In contrast, mortality rates amongst cattle within the SLIC programme have reduced to 2.3%, implying a substantial benefit for farmers.





Improved calving rates

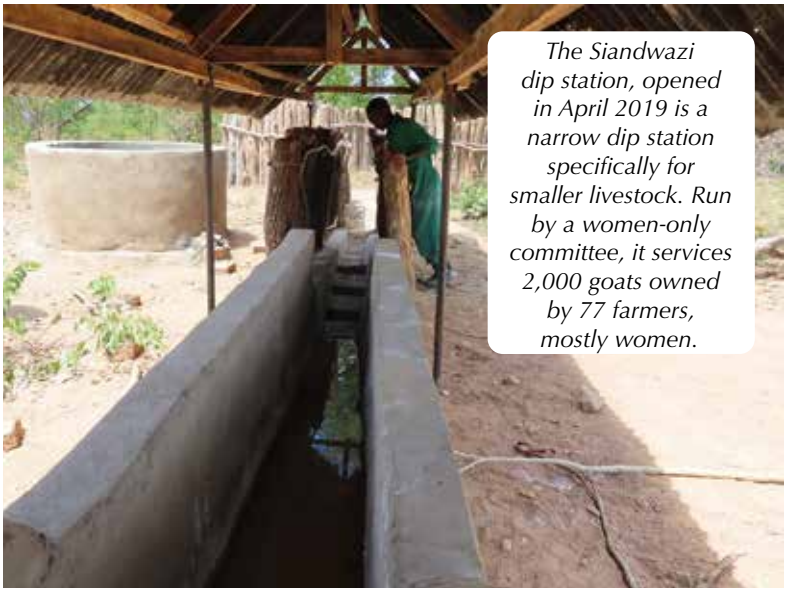
Calving rates in smallholder herds improved from 54% before joining SLIC to an average of 65% between 2016 and 2019. This implies approximately 20% more calves in the community herd. Calving rates have risen because cattle are healthier as a result of the dipping. More calves mean a greater income for farmers.



SLIC Extension Officer Miyoba Mweemba during SLIC's vaccination programme. This year 18,390 cattle were vaccinated against black leg and anthrax at a fee of K2.50 ($0.12) per head.

Working with women – SLIC's Siandwazi goat dipping station

Cattle are traditionally owned and managed by men in the community, with women usually focusing on cropping and goats. In partnership with a women-only committee, SLIC helped build a narrow dip station solely for goats and sheep.



The Siandwazi dip station, opened in April 2019 is a narrow dip station specifically for smaller livestock. Run by a women-only committee, it services 2,000 goats owned by 77 farmers, mostly women.

The station began dipping goats in April 2019. It was reported that mortality rates amongst these goat herds was as high as 29%. Anecdotally, this has been significantly reduced. About 2,000 goats are brought for weekly dipping by 77 farmers (most of whom are women). In addition to improving the health of their herds, these women benefit from the transfer of organisational and management, animal husbandry and financial record-keeping skills.

Silverlands Ranching in the press

Silverlands Ranching has achieved a number of positive articles from its successes, particularly because of the continued expansion of the SLIC project, despite COVID-19 and the difficult economic conditions in Zambia.

The Mast, 4th July 2020

Silverlands reports decreased cattle mortality in Zimba district

by Chambwa Moonga

THREE communities in Zimba district in Southern Province are benefiting from three newly constructed livestock dip facilities, as part of Silverlands Ranching Limited's livestock improvement programme.

According to a statement issued by Silverlands Ranching Limited, the programme started in 2014 and now covers over 50,000 community cattle dippings per month.

The new dip stations are located in Siameja, Shangu and Chidi areas of Zimba district.

"After attracting investment in 2014 from SilverStreet Capital, an impact investor with experience building successful out-grower programmes in Sub-Saharan Africa, Silverlands Ranching began the Silverlands Livestock Improvement Community programme, known locally as "SLIC", to assist small-scale cattle farmers in the area," the statement read.

"After six successful years, cattle mortality in the district has now decreased by 80 per cent and calving rates have increased by 19 per cent, leading to a significant increase in household income."

The statement added that the SLIC programme benefitted more than 2,000 small-holder livestock farmers and 3,000 cropping farmers in Zimba.

Silverlands Ranching Limited (SRL) senior livestock technician Lewis Mutinta said the success of the project could be attributed to their approach.

"We operate by invitation only. Only when we are asked to engage with communities do we come forward and provide extension services for better animal husbandry and improved farming practices," said Mutinta.

The SLIC programme, the statement added, has been run in collaboration with Musika and, from a standing start in 2014, "has refurbished and built dip stations for 31 communities, sustained and managed by committees made up of community members."

It stated that before the SLIC programme started, tick-borne diseases were rife in Zimba district, resulting in high livestock mortality and low calving rates due to the lack of operational dip stations.

Read the full story online at www.themastonline.com

Zambia Daily Mail, 29th July 2020

Silverlands helps lower goat mortality rate

by Nkole Nkole

• Over 77 female farmers now dip about 2,000 animals monthly

Over 70 female small-scale farmers are benefiting from the construction of the first ever goat and sheep dip station by Silverlands Ranching in Zimba district, resulting in the significant reduction in goat mortality rates.

The Siandwazi dip station in Zimba was constructed by Silverlands Livestock Improvement Community programme (SLIC), an initiative run by Silverlands Ranching in collaboration with Musika.

The dip is managed by an all-female committee and is attended by over 77 female goat farmers who dip an estimated 2000 goats monthly.

In an interview, Violet Siatunono, a smallholder goat farmer in Zimba described the benefits of dipping goats, "The goat herd no longer have eye problems, infection outbreaks and coughs," she said. Mrs Siatunono has observed a reduction in mortality in the herds of farmers who regularly dip their goats.

After attracting investment in 2014 from SilverStreet Capital, an impact investor with experience building successful out-grower programmes in Sub-Saharan Africa, Silverlands Ranching began the Silverlands Livestock Improvement Community programme, known locally as "SLIC", to assist small-scale cattle farmers in the area.

SLIC has reduced cattle mortality and increased calving rates for smallholder farmers in the area. This was achieved through the construction and renovation of cattle dip stations that reduce tick borne diseases. SLIC rapidly expanded through popular demand and now dips more than 50,000 community cattle monthly. This is benefitting an estimated 2,000 smallholder cattle farmers.

The programme identified unique challenges for women small-scale farmers, who typically keep goats or sheep.

Female small-scale farmers in the region reported having never dipped or sprayed their goats at all, resulting in high mortality rates and slow production due to the occurrence of multiple diseases.

SLIC found that goat mortality rates were as high as 29 percent, representing a significant challenge and creating a poverty trap.

Mable Kasama, chairlady of the Siandwazi dip facility, asserted its success during a recently held focus group discussion aimed at establishing the challenges faced by the female farmers and how the facility has been beneficial to them.

Most of the attendees highlighted that having a healthy goat herd has really helped farmers generate income for their families because they give birth twice a year and are easier to sell. Another benefit of goats is that they can also be used to pay bride price and because they are smaller in size in comparison to cattle and higher in production, farmers do not have a problem with saving some for consumption.

The programme works with local farmers to improve the local goat breed, encourage proper management and herd health, and teach business skills for improving agri-business activities.

Since the start of the programme, SLIC has recorded an increased interest in small ruminant production in the area and hopes to positively impact more female small-scale farmers.

Zambia Daily Mail, 3rd July 2020

Zimba gets livestock dip facilities

by Nancy Mwape and Kelly Njombo

AS PART of Silverlands Ranching Limited (SRL) improvement programme, three livestock dip facilities have been constructed in Zimba, Southern Province, to assist small-scale cattle farmers.

The programme, which started in 2014 after luring investment from SilverStreet Capital, now over-sees over 50,000 community cattle dipping monthly in Zimba.

SRL senior livestock technician Lewis Mutinta said the project, known as Silverlands Livestock Improvement Community (SLIC), is aimed at assisting small-scale cattle farmers who have seen reduced cattle mortality after six years.

Before the SLIC programme started, tick-borne diseases were rife in the Zimba district resulting in high livestock mortality and low calving rates due to the lack of operational dip stations that help to get rid of livestock ticks monthly.

The SLIC programme benefits more than 2,000 smallholder livestock farmers and 3,000 cropping farmers in Zimba.

Due to the extreme drought in Zambia's Southern Province, smallholder cattle farmers have sold cattle in order to free up funds for other needs.

Silverlands Ranching managing director Steven Sprighton said the company is providing a local market for farmers, who otherwise would have to travel great distances to sell their cattle.

The company is also assisting smallholder farmers in growing sunflower and maize, which is then bought to make feed for cattle.

By providing seed and fertiliser, and training in conservation farming methods, the SLIC programme has helped increase crop yields for surrounding smallholder farmers and encouraged them to grow drought-tolerant crops under a climate smart programme." Mr Sprighton said.

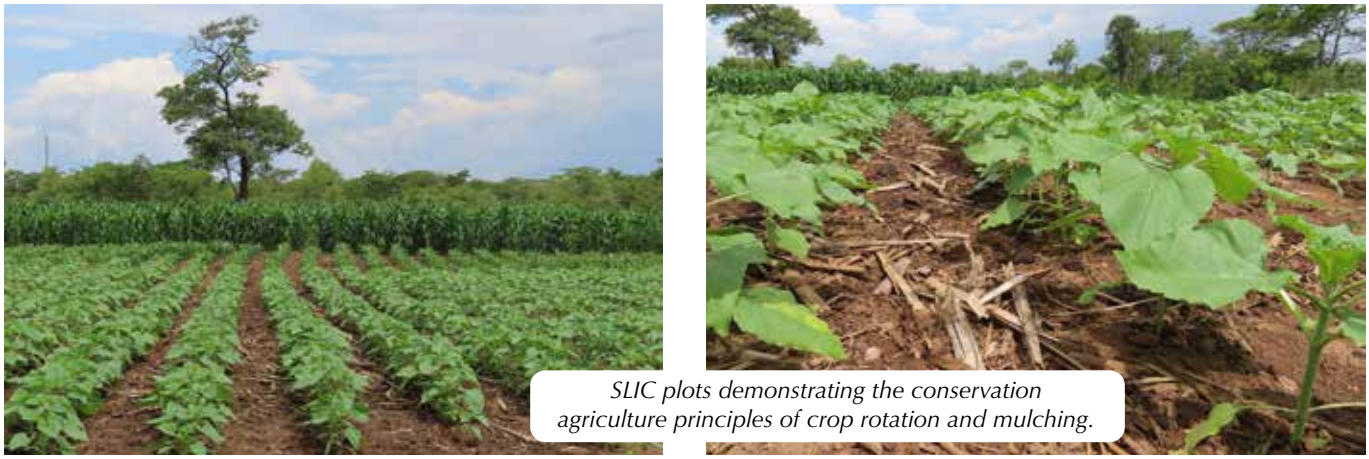
5.4 Supporting smallholder cropping

Silverlands' hub provides a market for smallholder crops that are processed into cattle feed for the feedlot or channelled to other markets. Although livestock is the primary income source in this area, many smallholder farmers also grow ~3-4 ha of crops.

Silverlands Ranching trains smallholder grain farmers in conservation agriculture and drought resistant crops with assistance from NGO Conservation Farming Unit, AgDevCo and an independent consultant. 62 field days including over 1,700 farmers have been hosted at 18 demonstration plots in community areas in the last year. Training focuses on:

- Conservation agriculture methods - These include minimum tillage, proper and timely land preparation, correct spacing, weed management and using manure or compost.
- Drought resistant crops - The main crop grown has historically been white maize (equating to over 70% of income according to a 2017 Silverlands survey). White maize performs poorly in dry climates and SLIC have been introducing farmers to drought-tolerant crops such as sunflower and sorghum. This enables families to spread their risk across crops and benefit from the assorted nutrition they provide. Excess crops can be sold to Silverlands and others.

In preparation for the 2020-2021 season, SLIC has trained 50 lead farmers (up from 15 last year) to manage demonstration plots. The lead farmers then provide training to smaller groups of farmers in their areas on conservation agriculture, improved farming techniques, drought tolerant crops and crop rotation.



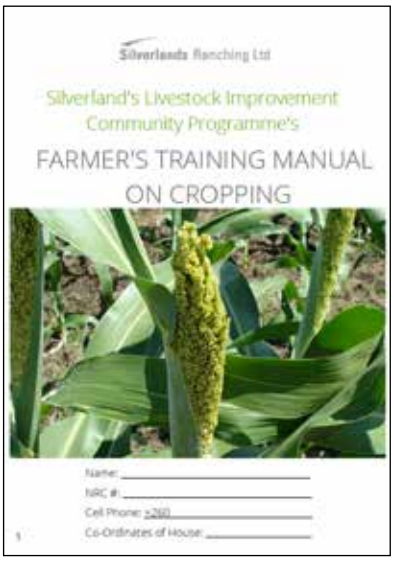
SLIC plots demonstrating the conservation agriculture principles of crop rotation and mulching.

Lead farmers are assessed by SLIC in their management and application of farming methods and support for surrounding farmers. Prizes awarded include the magoye ripper, an ox-drawn implement that cuts a thin line for planting and does not till the soil. This is a useful minimum tillage conservation agriculture tool in areas where cattle are available to help with the hard work.

On the left, Senior Extension Officer, Lewis Mutinta hands over an ox-drawn magoye ripper to Dennis Sianchongwe from Sindowe. On the right, Richard Hamusankwa from Lifalale shows off his new magoye ripper.

Conservation agriculture cropping manual and training-the-trainers

SLIC has finalised a 'Cropping Training Manual' with assistance from an independent consultant, which includes all key conservation agriculture messages. The consultant has also provided ongoing train-the-trainer support so the messages can get efficiently distributed throughout the community. The programme includes well planned training and monitoring schedules.



During a field day in the Mantanyani area, women were shown the difference between the SLIC demonstration plot and a nearby field where the farmer was not following the projects' crop extension messages

SLIC plot demonstrating conservation agriculture.

Field where conservation agriculture is not being practiced.

Silverlands facilitating smallholder production of sorghum

Silverlands Ranching has linked smallholder farmers to a market for sorghum. In 2020, 903 tonnes of sorghum were purchased, with K 2.7 million ($143,000) paid to smallholder farmers. Community incomes were approximately doubled because of better prices received by the farmers. Across 800 farmers, each selling 1.1 tonnes of sorghum, the income improvement per farmer is $80 per annum.

Silverlands distributed sorghum seed to 1,200 farmers (35% women) in October 2019 and provided technical training on sorghum production via field days and lead farmers. This was after Zambian Breweries approached Silverlands Ranching to facilitate smallholder production of sorghum. Silverlands invested in seed cleaning and weighing equipment, and now purchases sorghum from the farmers and delivers it to Zambian Breweries.

Silverlands assumes responsibility for the quality of the product, removing this risk from the smallholder farmers. Without Silverlands these farmers would not have had access to this market, which allows them to diversify their cropping with the production of drought tolerant/climate smart crops.

Using the **blockchain software platform**, BanQu, farmers were registered during seed distribution. Farmers in that remote area are mostly unbanked. To facilitate payments, farmers were registered with Zambia National Commercial Bank (ZANACO) Agripay. This digital financial solution enables cashless payments and is particularly useful in areas far from financial infrastructure and was designed specifically for the smallholder farmer in Zambia. For the first time farmers can easily send, receive and save money.

Benefits of this programme for smallholder farmers:

- Access to a **reliable market** which pays **fair prices** (88% higher than “briefcase” traders).
- Provision of **training** in **improved agricultural practices**.
- By selling grains as they harvest, farmers can **reduce losses from inadequate storage**.
- **Seed was received on credit** and no capital was required. Each farmer received 5-10 Kg of seed which is enough to plant a half to one hectare of land. Cost of seed was deducted prior to payment for their harvest.
- **Access to banking services for the first time**, removing the need to handle cash, and enabling them to save for future household expenses.
- **Diversification of cropping**, with the planting of a drought tolerant/climate smart crop.

One challenge thus far is that briefcase buyers or traders have been offering K1.60/Kg to farmers at their homes, and some farmers have opted to sell at this price, as transportation is a challenge.

Smallholder farmers bring their grains for sale. Silverlands clean, weigh and re-bag the sorghum for delivery to Zambian Breweries.

Funds are transferred into the farmer's ZANACO AgriPay account using the BanQu platform. Following each purchase, the BanQu service sends a text message to farmers with details of the transaction.

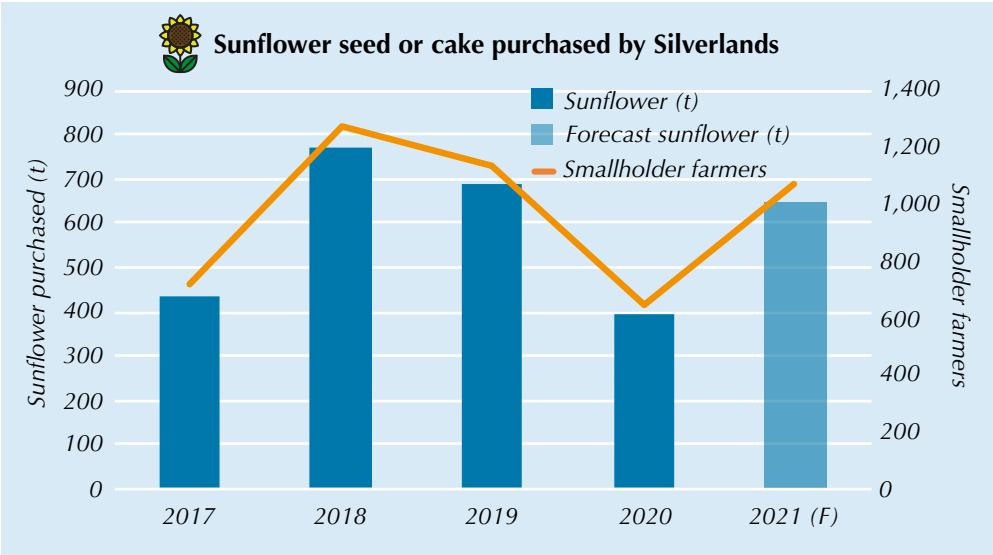
Payment process on BanQu.

Farmer, Abraham Sianzovu

Notification of receipt via cellphone.

Sunflowers – Drought tolerant and good cattle fodder

Sunflower seed may be processed into cooking oil for human consumption and sunflower 'cake' for adding into cattle feed. Also, as sunflowers are well adapted to growing in drier climates, Silverlands has promoted it in demonstration plots and training. This training has paid off, and a 2019 survey showed that the number of farmers growing sunflower roughly doubled from 43% in 2014-2015 to 82% in the 2017-2018 season.



Silverlands Ranching purchased nearly 2,300 t sunflower seed or cake from 2017 to 2020, equating to $256k of cash into the community (400 t equating to $47,000 in 2020). It is estimated this is grown by some 3,800 farmers.

The area has been negatively affected by drought and COVID-19 in 2020. Less sunflower and cattle were available for sale to Silverlands. At the same time, with fewer cattle in the feedlot, demand for sunflower by Silverlands was lower. It is anticipated that sunflower purchases in 2021 will rebound with 650 t purchased from 1,100 farmers during the year.

Aggregation points – Input distribution and grain aggregation

Silverlands Ranching built seven sheds in communities, in partnership with Musika, to help with the distribution of inputs and aggregation of grains. Agro dealers use the sheds to sell fertiliser and seed, and farmers can store their grains in the sheds for sale to Silverlands. For the first time in decades, farmers have distribution points located near to them, reducing the logistical costs and difficulties of buying inputs and selling grains.

5.5 Cattle and the environment

Cattle production may trigger thoughts about methane emissions and clearing rainforests for soya production. In middle- to high-income groups, these negative environmental impacts have driven the movement to reduce meat and dairy consumption.

The Southern Zambian context

The context around Silverlands Ranching in Southern Zambia, deserves some explanation. In this area:

- Smallholder farmers have **limited earning opportunities**. In this dry area smallholder farmers lack water security and crops often fail due to drought. It has thus traditionally been a cattle area and the 1.2 million head of smallholder cattle in the Southern Province make up 33% of the national herd (2017-2018 Livestock Census). Cattle are a critical part of securing livelihoods in this region. Cattle make up 19% of farm income (Rural Agricultural Livelihood Survey (RALS), 2015), unless crops fail in which case cattle make up nearly all of farm income. Education Levels are extremely low in the area and 51% of farmers have only primary school education (SLIC survey, 2019), contributing to the low income-earning potential.
- **Incomes are low**. Household incomes are in the region of $700 to $800 per annum (Internal estimates, RALS, 2015). At $240 per head, cattle are of significant value. Using transport to describe the level of wealth, 1/3 of farmers own ox-drawn scotch carts, 14% own motorbikes and only 4% own a pick-up truck (SLIC survey, 2019).
- **Nutrition is poor**. Although the farmers rear cattle, these are not for consumption, but are bred for income. Household Dietary Diversity Scores (HDDS) are 6 out of 12 in Southern Zambia (RALS, 2015). Anecdotally, some farmers eat chicken “maybe once a month”, and beef “not every year”.
- **Relatively few cattle are involved**. The ~35,000 head of cattle in the SLIC programme are 1% of the Zambian cattle population (and 0.004% of the global cattle population). Zambia’s cattle population (3.7million head) makes up 0.4% of the global cattle population (998 million head).

Greenhouse gas emissions

Of global greenhouse gas (GHG) emissions, livestock and manure constitute 5.8% (Ritchie, 2020 in OurWorldinData). Within the livestock sector, beef production accounts for 41% of GHG emissions, with half of the emissions from enteric fermentation (methane produced by ruminant digestion) (FAO 2013). Reducing enteric fermentation is thus a key part of reducing emissions from cattle.

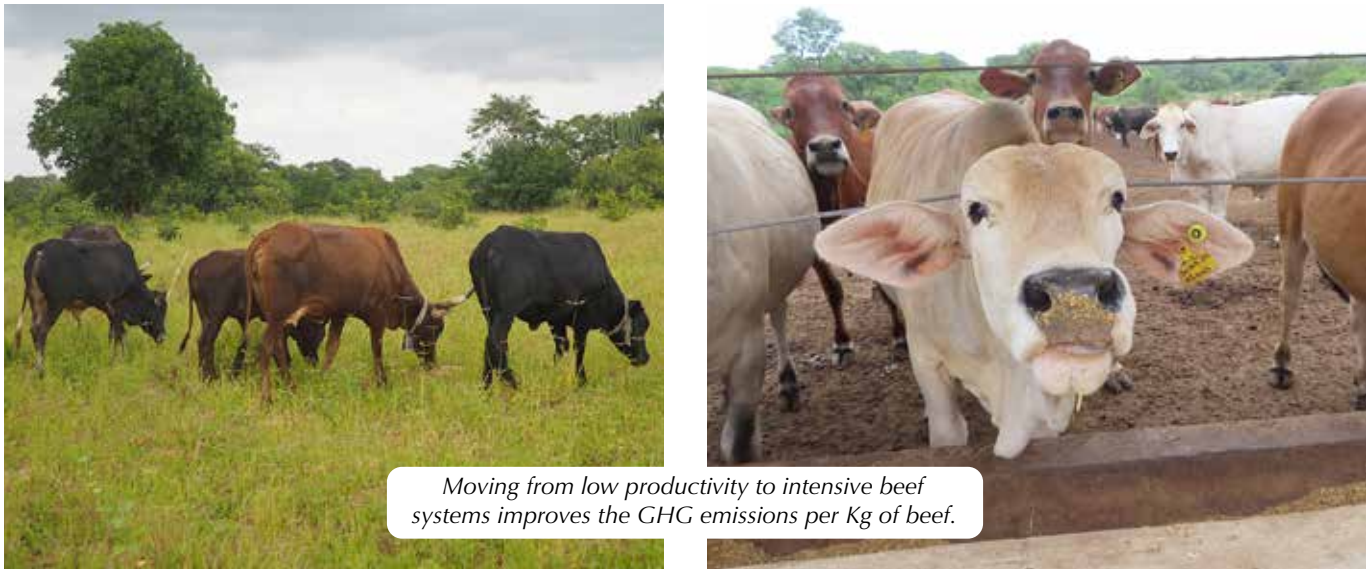
Low productivity systems result in high GHG emissions per kg of beef

Beef produced from cattle on rangeland, with little management and eating unproductive plants, results in the highest GHG emissions (Cardoso et al 2015, Dick et al 2016). The GHG emissions per kg of meat are higher in smallholder cattle than any other method of beef production partly due to the low fertility and high mortality rates (Gerssen-Gondelach et al 2017, FAO 2013, Cardoso et al 2015).

Low productivity beef systems result in high GHG emissions per kg of meat

Low productivity production is associated with …	Leading to …
Lower feed quality and digestibility	More enteric fermentation and reduced productivity
Poorer animal husbandry	Higher mortality and therefore emissions that do not result in production
Higher slaughter ages	It takes longer for an animal to mature and more emissions are produced in this time

There is greater potential to reduce emissions intensity in developing countries than already industrialised countries (Gerssen-Gondelach et al 2017).



Moving from low productivity to intensive beef systems improves the GHG emissions per Kg of beef.

Silverlands is helping reduce emissions

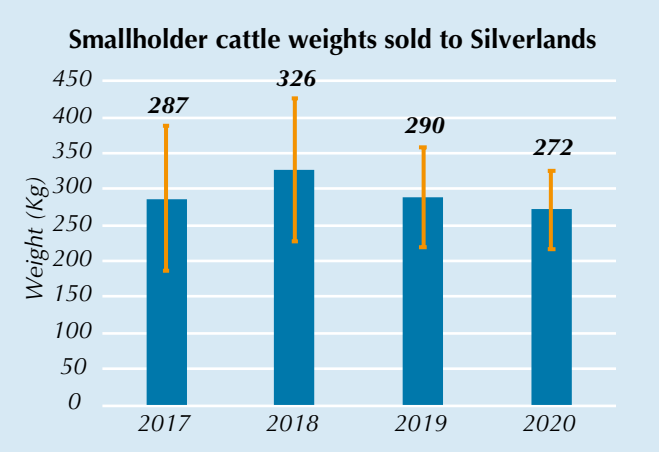
Silverlands is making the production of cattle more efficient from an emissions perspective through the provision of a market for cattle and improved feed in the feedlot. By moving from a pasture-based system (where cattle solely graze on vegetation) to a feedlot or mixed system (where some of the cattle's diet is from high protein improved feed), total emissions are significantly reduced (Gerssen-Gondelach et al 2017, FAO 2013).

Raising cattle on more productive grasses, utilising veterinary techniques and animal husbandry, and finishing in a feedlot, reduces GHG emissions by 50% (whilst accounting for emissions from fertiliser application, land cultivated for improved feed, and manure management) (Cardoso et al 2015).

Emissions would be further reduced by keeping cattle on highly productive grassland or entirely in feedlots (Dick et al 2016), and this strategy has been implemented in most developed countries. However, smallholder farmers have no access to improved pastures, and restricting beef production to feedlots would deny smallholder farmers a livelihood.

The trend in cattle purchase data is that smallholder farmers are selling smaller, typically younger cattle. Silverlands encourages farmers, partly through preferential pricing, to sell young steers which perform well in the feedlot. However, farmers will only do this if fertility rates are good and their herds are productive. We have already shown that increases in calving rates and reductions in mortality can be achieved. All these results point towards a more productive beef system overall.

By introducing SLIC into the surrounding area and purchasing cattle to be finished in a feedlot, Silverlands Ranching is making smallholder beef as efficient and sustainable as possible, while enabling farmers to continue earning a living from cattle.



As demand for meat increases in developing countries, by improving animal health, herd performance, cattle breeds and finishing cattle on highly productive feed, productivity will grow at a faster rate than emissions (Clark 2016) – meaning demand can be met sustainably.

Biodiversity implications of clearing land

The area is a mix of woodlands and grasslands common to the region. On the 21,000 ha Silverlands property, livestock feed is produced on ~730 ha including up to 260 ha of irrigated silage and 470 ha of dryland pastures. In addition, grains are purchased from smallholder farmers, providing them with a valuable income. On the uncultivated areas of Silverlands Ranching, the impact of cattle grazing is comparable to that of herbivores historically, and the ecosystem has therefore remained relatively natural with a diversity of plant and animal species. The property also offers valuable protection to biodiversity from poaching.

Keeping in line with the carrying capacity of the land

We are conscious of ensuring smallholder herds stay within the carrying capacity of the land and do not cause land degradation. Although farmer herd sizes increased from 16 in 2015 to 19 in 2017, they have remained constant at either 19 or 20 for four years now. Farmers are therefore not further increasing their herd sizes but are selling off additional cattle for cash income. This is in line with Silverlands' encouragement to farmers to be more commercial in their thinking and sell off young steers.

To quantify the carrying capacity, we estimate the area that the SLIC programme covers is roughly 200,000 ha of community land. The stocking rate of the 35,000 cattle who visit the dip stations is 6 ha/head (or livestock unit, LU). Alternatively, the stocking rate of the Zimba district is 12 ha/LU, using an estimated 43,500 head over 525,200 ha. Both of these are less dense than the 5 ha/LU stocking rate typically used by commercial farmers in the area, and the carry capacity for similar semi-arid regions in Tanzania, which range from 3 to 7 ha/LU (Pratt and Gwynne 1977, Sangeda and Maleko 2018). Herd sizes will continue to be monitored and carrying capacity assessed.

6 Plantation Crops

6.1 Developmental impact of plantation crops

Plantation crops have a unique set of development impacts:

- **Creating entirely new industries**

  We are growing plantation crops such as date palms, pecans, macadamias, apples, pears and avocados. In many cases these crops are new to the countries or regions. For example, macadamias in northern Mozambique, pecan nuts in Southern Zambia and date palms in Namibia. This introduces an innovative income stream to the country. Spearheading developments can open doors for others with the potential for significant new industries to become embedded in these countries.

  These crops have the potential to be exported, and therefore bring valuable foreign currency into a country. Also, as they generate a high income, they contribute notably to tax income for governments.

- **Healthy eating**

  These plantation crops produce products with diverse health benefits, such as avocados, tree nuts and date palms (e.g. for diabetics). This also means that demand is likely to grow faster than the main staples, as has already taken place for these crops.

- **Potential carbon benefits**

  There are potential carbon storage benefits of planting hundreds of hectares of trees, if planted on previously converted or degraded land. As we have seen with the production of apples, the orchards can last 30 to 40 years and when replaced, the old trees are chipped and added back to the soil, ensuring retention of the bulk of the carbon.

Incorporating communities – the joint venture model

Plantation crops are often expensive to grow per hectare and require capital investment and expertise, which may exclude smallholder farmers from their production. However, communities can still benefit through the joint venture model, described in the next section.

Some trees however grow easily in certain areas in Africa and smallholder farmers can benefit from their production, either for sale or their own consumption. Examples include cocoa, coffee, avocados and cashews, all of which are successfully grown by smallholders. These are primarily grown only in the limited areas where these trees are indigenous, or have been grown for a long time, and in climates where they do not require irrigation.

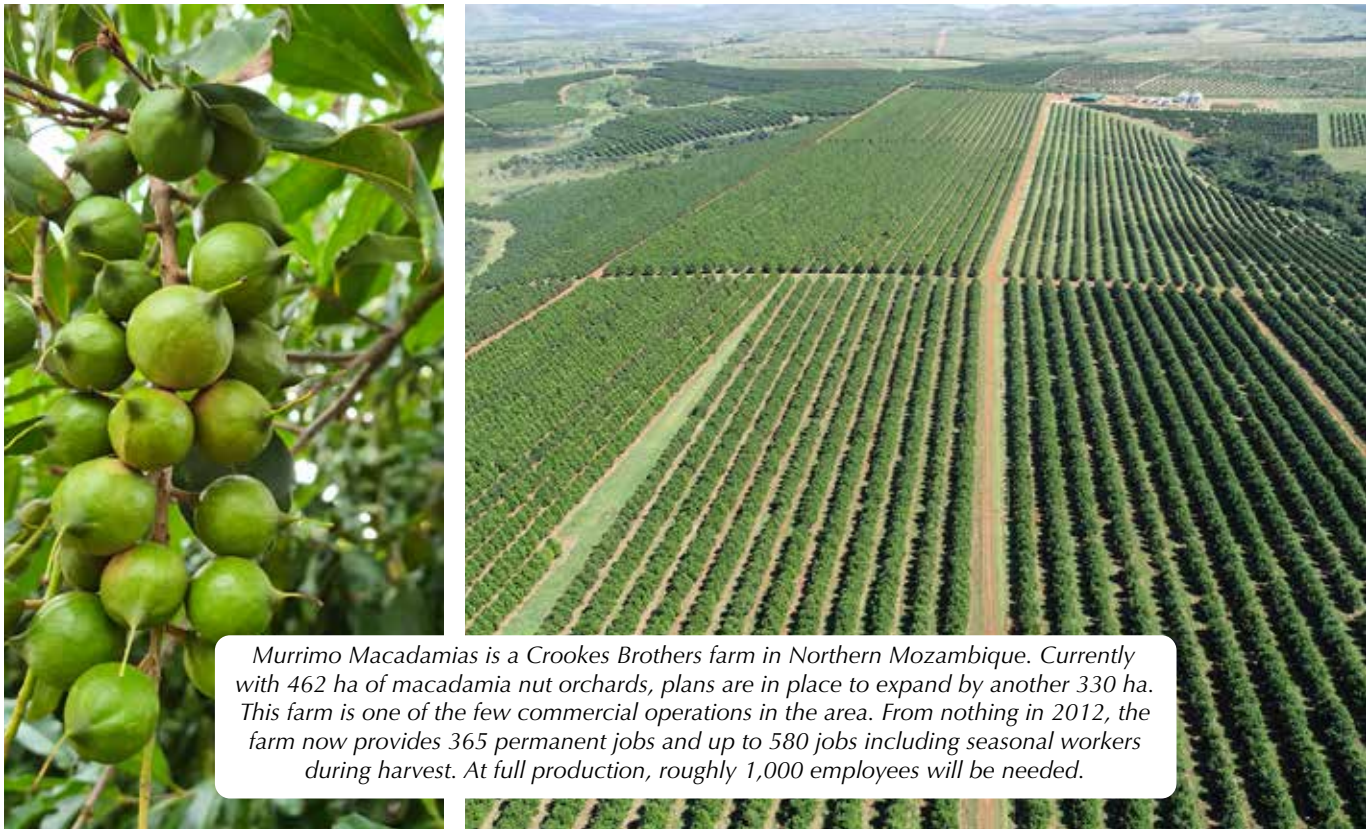
Case study: Dates and table grapes in Namibia

Using our investments in Namibia as an example we show how our investments bring food security, substantial jobs, export earnings and foreign direct investment to countries:

- **Employment**: Namibia is very dry with most land only suitable for game or cattle ranching. Unemployment is extremely high at 21%. Agriculture employs ~41% of the labour force, with table grapes and cotton being the main export crops. Silverlands Vineyards and Achill already employ 2,300 people, and this is expected to grow to roughly 2,900 people as the farms mature.

- **Foreign Direct Investment**: The country has a relatively small economy and foreign direct investment is typically in the range $150-400m across all sectors, although it was actually negative in 2019. The $72m investment into Silverlands Vineyards and Achill to date is material in the context of this economy.
- **Export earnings**: Namibia's imports of goods and services are 47% of GDP and exports are only 37% of GDP. Businesses like Silverlands Vineyards and Achill greatly help to increase exports, bring in foreign currency and close this deficit.
- **Introducing date palms, a new industry**: Our investments are introducing a novel export crop to the country (dates) and are leading development of the industry in Namibia. Whilst smaller plantations have been planted, the two Silverlands Funds are developing substantial date palm farms, a processing and export business and the goal is to be the cornerstone of a significant new industry in Namibia. This new date palm industry will help to provide much needed export revenues, foreign currency and tax income for the government.

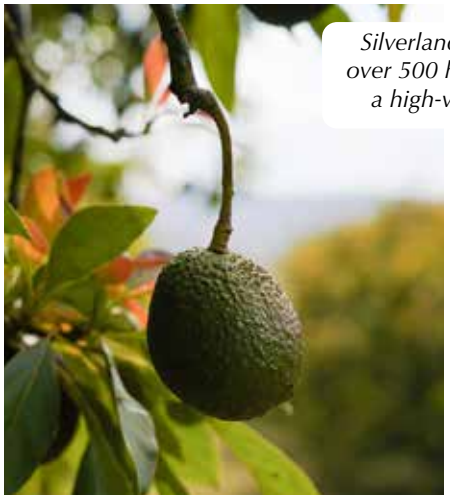
In Namibia, Silverlands Vineyards and Achill Island Investments have nearly 600 ha of table grapes and have begun planting date palms, a novel crop to Namibia.

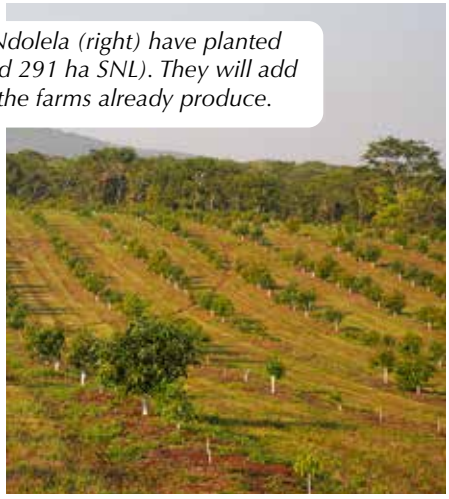


Murrimo Macadamias is a Crookes Brothers farm in Northern Mozambique. Currently with 462 ha of macadamia nut orchards, plans are in place to expand by another 330 ha. This farm is one of the few commercial operations in the area. From nothing in 2012, the farm now provides 365 permanent jobs and up to 580 jobs including seasonal workers during harvest. At full production, roughly 1,000 employees will be needed.

Silverlands Ranching diversified from cattle and cropping by planting 70 ha of pecan orchards in 2019. The additional 60 ha planted in 2020 entailed an impressive 15,000 seedlings. Already these orchards have provided new jobs. For some of these new employees, many of whom are women, it is their first formal employment. This is the first pecan plantation of any material size in Zambia and is pioneering the development of a new, high value export crop for Zambia.

Silverlands Tanzania (left and centre) and Silverlands Ndolela (right) have planted over 500 ha of avocados between them (230 ha STL and 291 ha SNL). They will add a high-value export crop to the locally sold seed that the farms already produce.





Quinta da Bela Vista Limitada (QBV) in Southern Mozambique fully began operations in 2019 and now has 117 ha planted to bananas. QBV began their first harvest in May 2020 with a yield of 64 t/ha, higher than the budget of 57 t/ha, and a total production of 7,524 tonnes of bananas sold into the South African market.

6.2 The community joint venture model

Community joint venture impact summary

Three communities benefit from joint ventures with Crookes Brothers (Silverlands I) in South Africa. The JVs earn a combined $2.3 million annually (3-year 2018 to 2020 average), or $910 per annum on average for each of the 2,500 families (likely about 11,000 people). This is a passive income, likely added to incomes from jobs and elsewhere.

Community participants impacted (# families)	Income per family ($ p.a. 3-year average)	Value added to community annually ($ p.a. 3-year average)
2,532	(Avg) 910	2.3m

**Average is a weighted average (was previously a straight average)*

The community joint venture model

The community joint venture (JV) model can empower communities sustainably for the long-term and ensure a transfer of skills needed to sustain plantation crop farms. In this model, the portfolio company forms a long-term partnership with a community, typically 15-20 years. A joint venture company is formed that leases land from the community and pays a management fee to the Silverlands portfolio company. Profits are split between the community and the portfolio company with the community usually owning 51-55%. The community therefore earns their profit share plus land rent.

Joint ventures have material benefits for both parties

Community benefits	Portfolio company benefits
• Ability to farm **crops that require scale** and are too expensive per hectare to be an option for smallholder farmers • Farms are **run professionally** resulting in a **reliable income** • **Training and skills transfer** via bursaries and working for the JV • Development of a positive sense of ownership through **owning 51-55%** of the company • The community earns their share of the profits plus land rent from leasing their property to the JV.	• **Reduced capital requirement** as the company does not need to buy the farm • Benefits from the **stream of profits** • Receives a **management fee** • Develop partnerships that enable **material positive impacts** for entire communities.

The model has been implemented in South Africa where a land transformation process is in place and where there is a shortage of skills to manage the farms post-transfer. This is a perfect model for ensuring community development. Our JVs are outstanding examples of increased food production and profitability as part of the land restitution drive in South Africa.

Impact

JVs with communities benefit large numbers of families as profits are shared between the community and the management company. Silverlands I's investee Crookes Brothers Limited (CBL) has three JVs in South Africa: two in sugar cane and one in deciduous fruit. The JVs provide incomes to over 2,500 families, approximately 11,000 people. The combined average profit earned by the three JVs over the last three years is over $2m per annum, or $910 per family. In addition to this passive income, family members typically also have income from jobs or from managing their own businesses/farms.

Impact of joint venture projects: Average for 2018-2020

Name of JV	Location in South Africa	Community	Number of families benefitting	Profit ($)	% JV owned by community	Community profits + rental ($)	Income per family ($)***
Mawecro Farming	Komatipoort	Mawewe	558	1.9m	51%	1.9m	3,447
Libcro Farming*	Malelane	Libuyile	1,964	0.2m	55%	0.4m	185
Bellcro	Villiersdorp	Ex-employees	10	0.03m	55%	0.02m**	1,661
Total or average			**2,532**	**2.1m**		**2.3m**	**(Avg) 910**

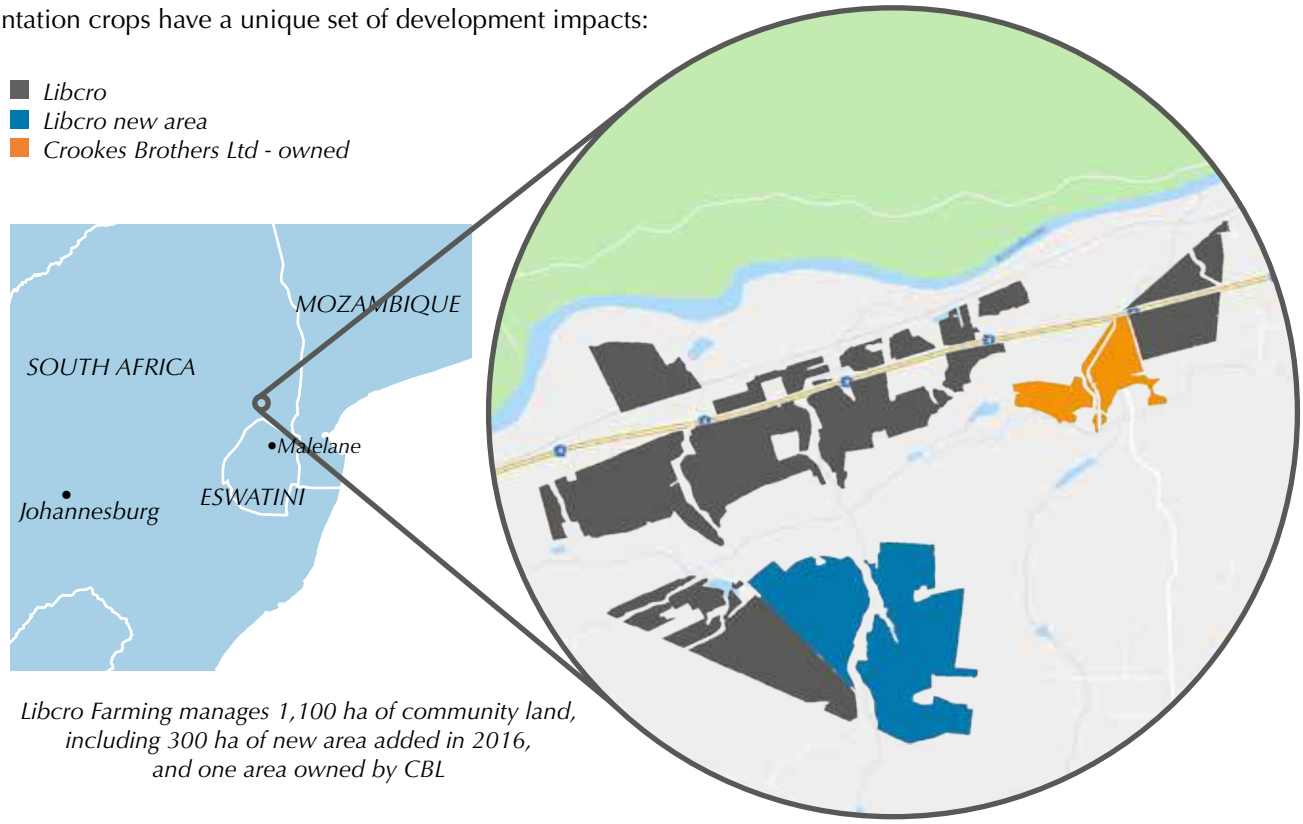
**Libcro Farming was previously called Mthayiza Farming*
***No rental to Bellcro as the government owns the farm*
****Weighted average (previously a straight average was presented)*

"We see the joint venture model playing a vital role in ensuring the longevity of our business."
Crookes Brothers Integrated Report 2020

Libcro Farming is a joint venture between the Libuyile community and Crookes Brothers (hence the name). It manages 1,100 ha of irrigated sugar cane in South Africa.

6.2.1 Libcro (previously Mthayiza) Farming

Plantation crops have a unique set of development impacts:



Libcro Farming manages 1,100 ha of community land, including 300 ha of new area added in 2016, and one area owned by CBL

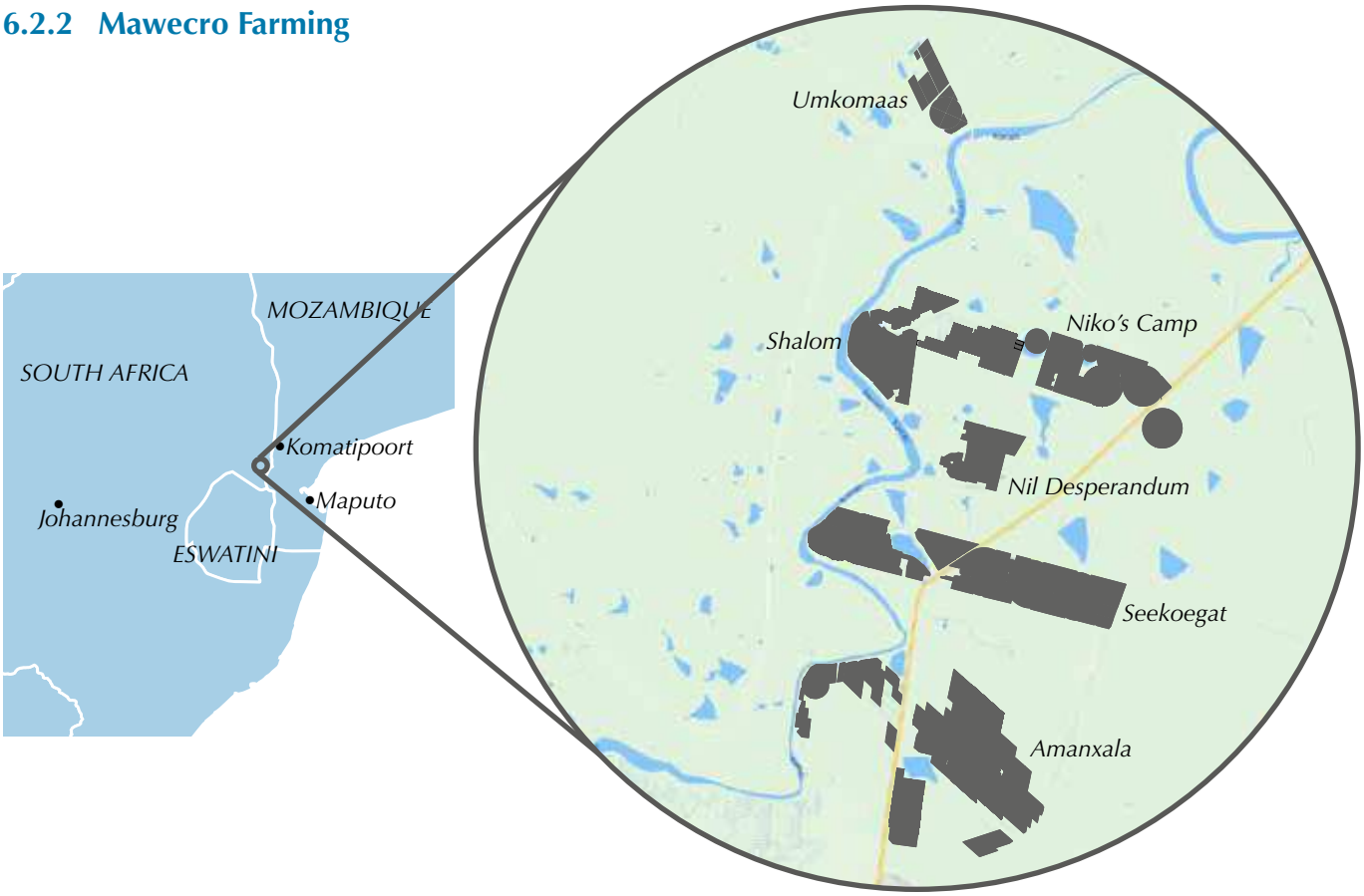
The Libuyile community have maintained a long-term partnership with Crookes Brothers in a joint venture formed in 2008. Crookes Brothers assisted in improving the yields on this 1,100 ha sugar cane operation, from as low as 60 t/ha to a consistent 100 t/ha, and more under drip irrigation.

This partnership has been a great success. Testament to the focus on education with provision of bursaries and ongoing training is that a community member, Tsepo Sangwane is now running the operation, with oversight from Crookes Brothers. Tsepo began as a trainee on the farm in 2010.

This year the JV company rebranded to Libcro Farming from Mthayiza Farming to incorporate the name of the whole community, Libuyile, rather than the family name of the late chief.

Evidence that the community trusts the partnership and appreciates the professionally run operation is the extension of the JV, initially planned for 15 years, by another 15 years, together with the addition of 300 ha of land into the JV in 2016.

6.2.2 Mawecro Farming



The joint venture between the Mawewe community and Crookes Brothers, called Mawecro Farming, manages 1,612 ha of sugar cane, and 323 ha of bananas. Crookes Brothers previously owned the farm which was sold to the government in 2010 and leased back to CBL. This was converted to a 20-year JV with the Mawewe community in 2016. This year saw a rotation of community leadership and a subsequent improvement in relationship and governance. Two sections of community land, Umkomaas and Niko's Camp with 366 ha of sugar cane and 167 ha of bananas, previously leased to Crookes Brothers, have been added into the joint venture for an initial 10 years.

Mawecro's sugar cane continues to perform well with yields around 115 t/ha for two years, benefitting from rotation with bananas which build soil organic matter, and drip irrigation that increases yields from 80-100 t/ha to 120-125 t/ha.

> **"We see our joint ventures as strong symbiotic relationships which will lead the way in building a commercially sustainable industry."**
>
> *Crookes Brothers Integrated Report 2020*

6.2.3 Bellcro Farming

Bellcro Farming is a joint venture between Crookes Brothers and ten former employees who own 55%. The 42-ha deciduous fruit farm in the Western Cape, South Africa was formerly owned by Crookes Brothers and sold to the Department of Rural Development and Land Reform as a land transformation project in 2012. In 2017, the Government released the recapitalisation funds for the operation and Crookes Brothers were approved as the strategic partner for the JV.

Piet Dawids worked for Crookes Brothers for 25 years. He is now one of the beneficiaries of the JV and manages the farm with support from Crookes Brothers.

"Crookes Brothers, our partner, helps us a lot to make the joint venture a success. I feel a great honour, because there's many people on the outside, farm owners that say, "You are very lucky to have that opportunity." In the long term we will hopefully manage Bellcro on our own. Our partner Crookes Brothers helps us a lot to learn how to manage for the future."

Piet Dawids

6.2.4 New partnership: Renishaw Property Development

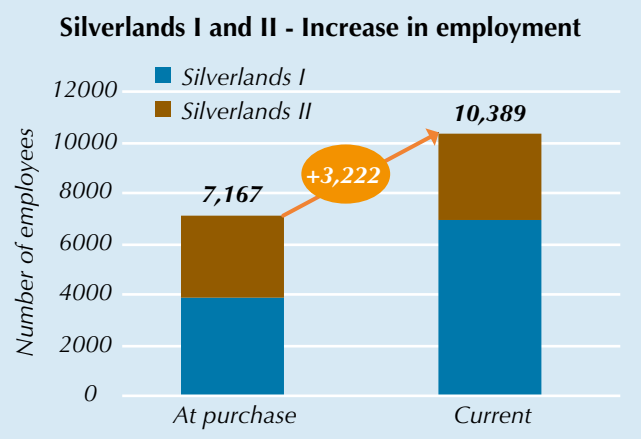
In 2020, Crookes Brothers concluded a memorandum of understanding with the neighbouring Cele community to involve them as partners and shareholders in the Renishaw property development project. Renishaw was a ~1,800 ha dryland sugar cane farm and planning permission was obtained to convert some 280 ha of this to residential and commercial use. This conversion has commenced with a retirement village and CBL is now selling plots of land for other parties to develop a hospital, school, shops and so on. The Cele community are now a partner in this development.

Renishaw property development

7 Development Impact

7.1 Boosting employment

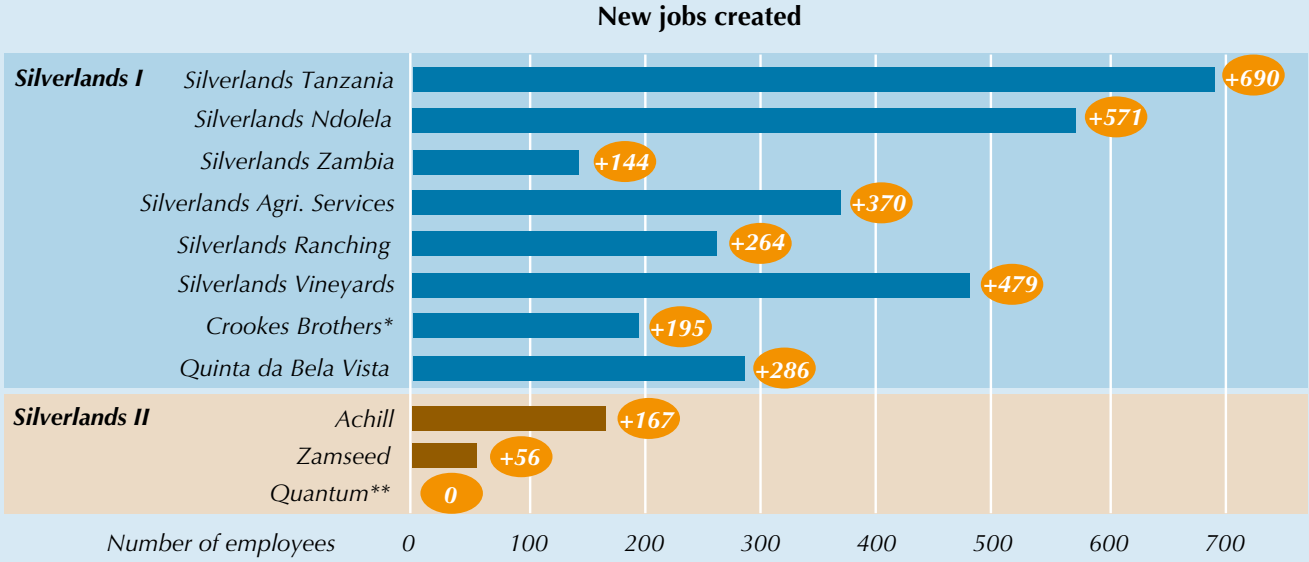
Supporting the creation of jobs is an integral aspect to Silverlands' positive impact. By increasing the number of jobs and upskilling the workforce our investments channel money into the surrounding communities.



Our portfolio companies are key employers in areas which are typically rural with little high-paid work available. Since our investments, we have created over 3,000 jobs.

Silverlands now employs 10,400 people, a 45% increase from the number employed when the businesses were purchased (~7,100).

As the following chart and table illustrate, new jobs have been created at every project, typically 200-600 jobs. Quantum was only purchased in July 2020 so shows no job gains yet.



*CBL numbers adjusted for farm sales and outsourcing seasonal workers.
**New investment, July 2020.

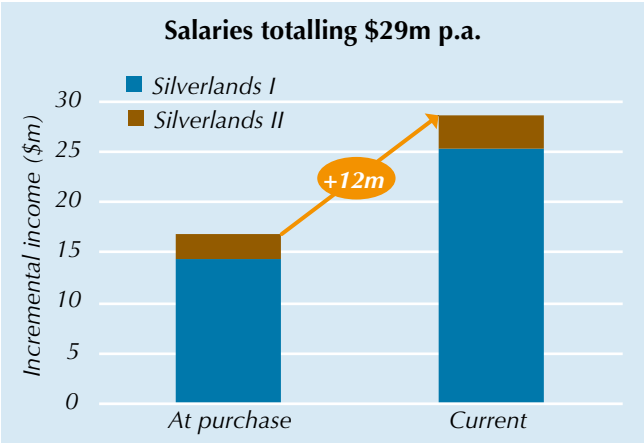
Increase in employment

Portfolio company	Number of employees			
	At purchase	Current	Change	Increase
Silverlands I				
Silverlands Tanzania	248	938	+ 690	3.8 x
Silverlands Ndolela	78	649	+ 571	8.3 x
Silverlands Zambia	53	197	+ 144	3.7 x
Silverlands Agriculture Services	16	386	+ 370	24.1 x
Silverlands Ranching	86	350	+ 264	4.1 x
Silverlands Vineyards	1,104	1,583	+ 479	1.4 x
Crookes Brothers*	2,365	2,560	+ 195	1.1 x
Quinta da Bela Vista	4	290	+ 286	72.5 x
Silverlands I total	**3,954**	**6,953**	**+ 2,999**	**1.8 x**
Silverlands II				
Achill	555	722	+ 167	1.3 x
Zamseed	201	257	+ 56	1.3 x
Quantum	2,457	2,457	0	1.0 x
Silverlands II total	**3,213**	**3,436**	**+ 223**	**1.1 x**
Overall total	**7,167**	**10,389**	**+ 3,222**	**1.4 x**

**CBL numbers adjusted for farm sales and outsourcing seasonal workers.*

7.2 Boosting salaries through expansion

By employing more people, particularly in roles with a higher salary such as technical positions, we put more money into local economies. Salaries have increased 1.7-fold since purchase and 3-fold when CBL is excluded, which was already well established at the time of investment. The payroll is now nearly $25m for Silverlands I and $3m for Silverlands II.



The increases in salary bills in Tanzania, Zambia and Mozambique are partly due to the large (4- to 70-fold) increase in employee numbers. Furthermore, average salaries increase as the incremental jobs are more technical and therefore better paid.

Salary spend up 3-fold

Portfolio company	At purchase annual salaries ($ millions)	Current annual salaries ($ millions)	Increase
Silverlands I			
Silverlands Tanzania	0.1	4.0	33.6 x
Silverlands Ndolela	0.1	1.5	16.9 x
Silverlands Zambia	0.1	0.6	7.7 x
Silverlands Agriculture Services	0.0	0.9	40.9 x
Silverlands Ranching	0.1	0.9	6.7 x
Silverlands Vineyards	1.6	3.1	1.9 x
Crookes Brothers	12.3	14.1	1.1 x
Quinta da Bela Vista	0.0	0.2	75.3 x
Silverlands I total	**14.3**	**25.3**	**1.8 x**
Silverlands II			
Achill	0.7	1.8	2.8 x
Zamseed	2.0	1.5	0.8 x
Silverlands II total	**2.6**	**3.3**	**1.3 x**
Total	**16.9**	**28.6**	**1.7 x**
Total excluding CBL	**4.6**	**14.5**	**3.1 x**

**Excludes Quantum which joined the portfolio after the reporting period.*

Case study – Silverlands Tanzania

Silverlands Tanzania has increased its employment numbers by nearly 4-fold from 248 to 938. This was driven by development of new businesses, such as the processing plant, storage and hatchery. Because these facilities require technical skills, the jobs created were higher paid than those generally available in the area and those being provided at acquisition. This meant that Silverlands Tanzania's salary spend increased by a staggering 34x. This has injected cash into the surrounding communities and has noticeably increased development in these areas, most prominently in housing and retail.

Kepha Kulanga monitoring the feed mill

Stanley Mtewele, Hatchery Manager

7.3 The employment multiplier effect

Employing ~10,400 people has two main multiplier effects. Firstly, indirect and induced jobs created as a function of each permanent job we create. (An IFC jobs study suggests a 3x multiplier for the agricultural sector in Tanzania.) Secondly, every employee's family benefits from their income. We have used a 4.4x multiplier here based on the average family size from UN 2018 data for Zambia, Tanzania, Mozambique, South Africa, Namibia and eSwatini/Swaziland.

We create impact through additional jobs created and household persons benefitting

Portfolio company	Employees			Job creation effect from employment	Household persons impacted	Total persons impacted
	Total permanent & seasonal	Permanent	Seasonal	Direct, indirect, induced jobs (3x permanent jobs)	Employment (4.4x total employment)	
Silverlands I						
Silverlands Tanzania	938	424	514	1,272	4,127	5,399
Silverlands Ndolela	649	179	470	537	2,856	3,393
Silverlands Zambia	197	163	34	489	867	1,356
Silverlands Agri. Services	386	173	213	519	1,698	2,217
Silverlands Ranching	350	229	121	687	1,540	2,227
Silverlands Vineyards	1,583	154	1,429	462	6,965	7,427
Crookes Brothers	2,560	1,048	1,512	3,144	11,264	14,408
Quinta da Bela Vista	290	27	263	81	1,276	1,357
Silverlands I total	6,953	2,397	4,556	7,191	30,593	37,784
Silverlands II						
Achill	722	56	666	168	3,177	3,345
Zamseed	257	133	124	399	1,131	1,530
Quantum	2,457	2,387	70	7,161	10,811	17,972
Silverlands II total	**3,436**	**2,576**	**860**	**7,728**	**15,118**	**22,846**
Overall total	**10,389**	**4,973**	**5,416**	**14,919**	**45,712**	**60,631**

7.4 Gender equality

Improving lives and livelihoods is integral to Silverlands' operations. We focus on women and believe that getting money into the hands of women builds sustainable economies and healthier, better educated families.

Women in agriculture

Women play a key role in the agricultural sector. Sub-Saharan Africa has the highest female agricultural labour-force participation in the world (FAO 2011). Depending upon the study, women are around 50% (FAO 2011) or as much as 60-80% (UNECA, 1972) of the agricultural labour-force.

We have seen that men tend to claim responsibility for those agricultural aspects that are external (e.g. surveys) or financial (e.g. sales), whereas women often perform the day-to-day agricultural tasks, in addition to caring for children and the household.

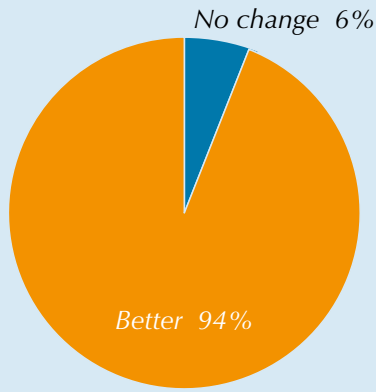
> **Women play significant roles in production and post-harvest processing that are often key determinants of the size and quality of the final commodities produced.**
>
> *The International Finance Corporation*

Benefits of improved cropping inputs for women

Female smallholder farmers typically use fewer improved resources such as seed. This results in a gender yield gap, where women could produce an estimated ~20-30% more if they had the same agricultural resources as men (FAO 2011). The FAO estimate that this could increase total production in developing countries by 2.4-4%.

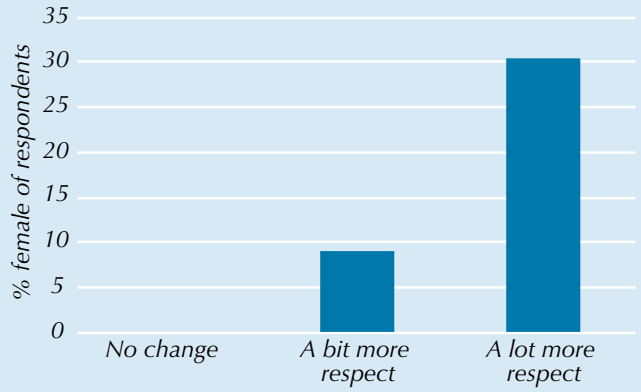
In our survey of smallholder farmers in Zambia, 94% of women stated that hybrid seed made their life better. By increasing access to hybrid seed, female smallholder farmers can close this yield gap and support food security.

94% of women surveyed in Zambia agreed that using hybrid seed made their life better



Benefits of poultry to women: respect and financial decision-making

39% of female smallholder poultry farmers experienced greater respect since keeping poultry



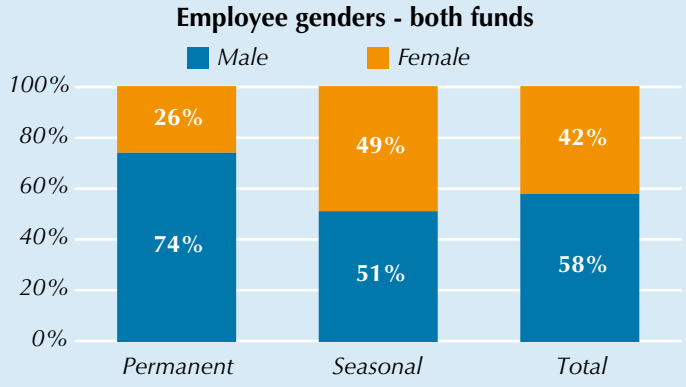
Raising poultry is generally left to women, who commonly keep the profit from the sale of eggs and birds. Silverlands Tanzania is focusing on poultry-rearing by women. It is anticipated that this will benefit the income and nutrition of the whole household and empower women.

In our 2020 survey of smallholder poultry farmers, 39% of female respondents reported they are more respected due to keeping poultry and 34% said they were more involved in decision-making.

Women in our workforce

Gender equality in the workplace is essential to operating responsibly and effectively. Although the commercial agricultural sector is typically male dominated we employ a significant proportion of women. Of our total workforce, 42% are women, although there are more in the seasonal/ temporary labour force (49%) than in the permanent staff (26%). Rebalancing the gender split remains an ongoing focus.

Zamseed participating in International Women's Day, 2020



	Silverlands I	Silverlands II	Both funds
Permanent			
Male	74%	75%	74%
Female	26%	25%	26%
Seasonal			
Male	50%	61%	51%
Female	50%	39%	49%
Total			
Male	57%	63%	58%
Female	43%	37%	42%

Our role models - women in leadership

In commercial agriculture, especially in rural areas, demonstrating change through gender champions is vital to promote women's participation in the workplace. Just one woman in a key role can lead to many more skilled women in management positions and across the business.

Many women have been appointed into key management positions. Hiring women continues to be a focus for each operation, and over time cultures are changing to allow women to seek employment. We are proud to have three female board members across our portfolio:

Phumla Mnganga, CBL

Thembi Xaba, CBL

Caroline Achieng Owino, Silverlands Kenya (affiliate of STL)

"I met a security guard who stopped me for a conversation, he thanked and praised me for having worked my way through school and finally landing myself a role with Silverlands, he told me 'It's inspiring to see you in this management role. You make me think of my grand-daughter and what is possible for her.'"

Amanda Moshi, Global Gap Compliance Officer, Silverlands Tanzania

"Women think about their families, empowering a woman is empowering a society."

Stella Mgavano, Head of Seasonal Workers, Silverlands Tanzania

"Having worked for Zamseed for over 13 years in a challenging, male dominated profession, my hope is that I can inspire more women to defy odds and fulfill their full potentials - just as I am doing."

Nokuthula Thandiwe Ndhlovu, Business Development Manager, Zamseed

Hearing women's voices through women's forums

Creating a safe and equal working environment for women relies on women across the business having a voice. To ensure that women can discuss matters that are important to them and make suggestions to management, 'Women's Forums' have been created in a number of our businesses. These provide a platform for women to raise issues that they may not feel comfortable raising with men around. Topics discussed include: an interest in more technical and machine operator training; upgrading toilets and facilities; and increased support from one another in times of bereavement, marriages or childbirth.

In addition, comprehensive grievance mechanisms ensure that employees working at different levels of the business can reach out to senior management or independent board members to raise concerns.

> **"Having women only forums give a chance for women at all levels of the company to talk about issues that relate to us as a group and support each other."**
>
> *Emelda Mubanga, Chairperson of the Zamseed Women's Forum*

Creche in Namibia – enabling women to work with peace of mind

At Silverlands Vineyards and Achill in Namibia, many mothers were forced to prioritise childcare over employment, or leave their children in a creche with poor conditions. To enable these women to work and be comfortable that their children are properly cared for, Silverlands Vineyards and Achill set up a creche. The creche provides childcare and food for employees' children during work hours. Transportation is also provided for the children to travel with their parents.

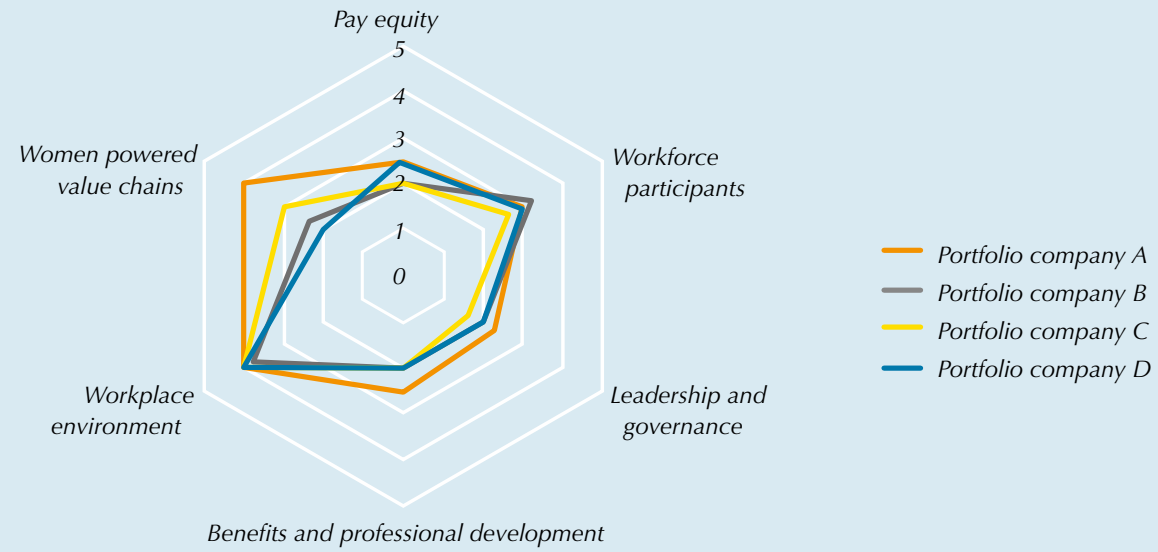
Women can bring their children to the new creche in Namibia and work peacefully knowing they are well cared for.

Identifying focus areas with a gender scorecard

Commercial agriculture is a male dominated sector. Despite women participating in much of the agricultural labour at the household level, they are typically significantly under-represented in commercial settings. We are cognisant of the need to support change in this area and help our portfolio companies become more gender equal. This takes time and will not change overnight.

We were fortunate to be invited by the Danish DFI, the Investment Fund for Developing Countries (IFU), to trial the SEAF Gender Equality Scorecard (GES). The scorecard provides an overall rating on the level of women's economic empowerment and gender equality in each business.

Examples of scores



**Scores have been anonymised as they have not yet been finalised.*

The gender equality scores are split into six areas. Each area is calculated by self-assessment and using the SEAF Gender Equality Rating Matrix. This matrix benchmarks the scores against five stages of gender equality.

A score of five, for example, implies that women are represented in 50% of the roles and professional development programmes are significantly advanced.

1 We need to talk
2 More work to do
3 Getting there
4 Advancing to role model
5 Role mode

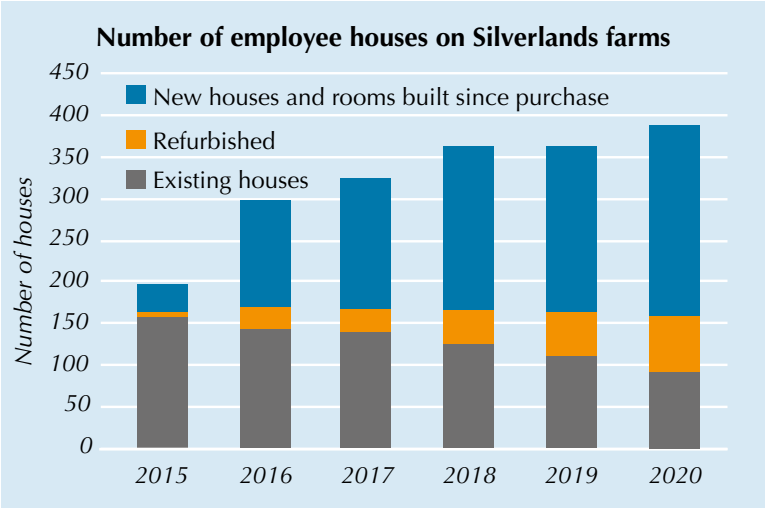
We found that the process of scoring each company inspired discussions on gender strategy and identified areas of under-representation. The scores are helpful to enable management to focus attention on areas that need more work and to build on areas that are already demonstrating equality.

Silverlands Fund I gender equality scorecard: Key takeaways

Area	Comment
Pay equity	Pay equity is calculated using a ratio of non-permanent and permanent pay. Silverlands' scores of 2-3 demonstrate there is more work to do. Pay disparities are in part due to fewer women in higher paid positions. Changing this is a key focus for management.
Workforce participation	Women's participation within the workforce is high overall with scores around 3. This is primarily due to the high score in the seasonal category. Portfolio companies are focused on training and hiring more women as permanent or managerial employees.
Leadership and governance	Increasing women's representation in senior leadership roles is an aim for the businesses. Scores were between 1-3, demonstrating under-representation. While progress has been made with the addition of two female board members recently, more work is needed.
Professional development	Most companies scored well, between 2-3. This is because all companies implement applicable standards relating to women's benefits, such as leave policies; training; a commitment to equal opportunity and unbiased performance evaluation. The next step is to measure women's professional development and set targets.
Workplace environment	All companies scored highly (3-4). This is because safe workplaces are created for women. This year, new whistle blowing mechanisms were introduced for middle managers who may be uncomfortable using general employee whistle blowing mechanisms. Additionally, women's forums have been established at two companies.
Women powered value-chains	For companies that operate out-grower schemes, women's participation in value-chains is very high. For example, SRL measures and reports on women's participation within the value-chain and has introduced programmes that specifically address key challenges faced by women.

7.5 Improving employee housing

Employees' happiness, wellbeing and productivity is better when they live in good housing in a pleasant environment. Generally, the Silverlands farms were not operational at acquisition. Of the limited housing available, most needed upgrading. Housing has thus been a priority focus for farm development. Across seven operations in Tanzania, Zambia and Namibia, 253 houses have been refurbished or built over the last six years (all Silverlands I plus 7 houses at Achill in Silverlands II). This work has taken place alongside the construction of dams, canals, management hubs, irrigation systems and cropping development, which has been no small feat.



An example of an employee house at Silverlands Ranching.

Staff housing, Silverlands Ranching Limited.

7.6 Skills development

Many of our portfolio companies operate in remote areas where there is a shortage of skills, particularly among general workers and junior-middle management. Furthermore, many of our operations utilise new and innovative methods, technologies and products that might not have been used previously in the regions where we operate. To raise the pool of skills within the workforce, our operations provide constant on-the-ground training, with our experienced senior managers feeding knowledge into their teams, supported by a wide variety of formal training.

Theme	Specific topics
Safety	Firefighting, health and safety, first-aid, safe handling of chemicals, emergency response.
Health and wellness and disease control	HIV/AIDS education, malaria spraying, testing and knowledge dissemination.
Operating machinery	Tractor, grader, excavator, motorbike, forklift, knapsack, chainsaw, combine harvesters, pump stations, pivots, etc.
General agriculture	Plant production, irrigators, pruning, pest and disease scouting, sprayers, conservation farming.
Specialist agriculture	Cultivation of novel crops, hybrid seed production, poultry feed production.
Livestock	Biosecurity, cattle handling, poultry production, poultry brooder management.
Finance, IT	Payroll, Excel, tax, capital allowances, internal auditing, basic financial understanding and planning for general workers.
Governance	Anti-bribery and corruption, harassment, whistle-blowing, etc.
Other	GlobalGAP, Hazard Analysis and Critical Control Points (HACCP), teambuilding, etc.

Machine operation training: Operating large farming equipment requires outstanding technical skills. In Zambia, a precision minimum tillage drill seeder plants Zamseed's hybrid seed maize crop in Chiawa. The technology enables Zamseed to plant crops without disturbing the soil, conserving moisture and nutrients and reducing runoff.

Feed quality testing facility built: With no feed quality testing facilities in the region, Silverlands Tanzania built its own facility to test every batch of poultry feed produced. The quality of poultry feed is essential to increasing the efficiencies of chickens. Skilled technicians are integral to checking the quality of poultry feed accurately.

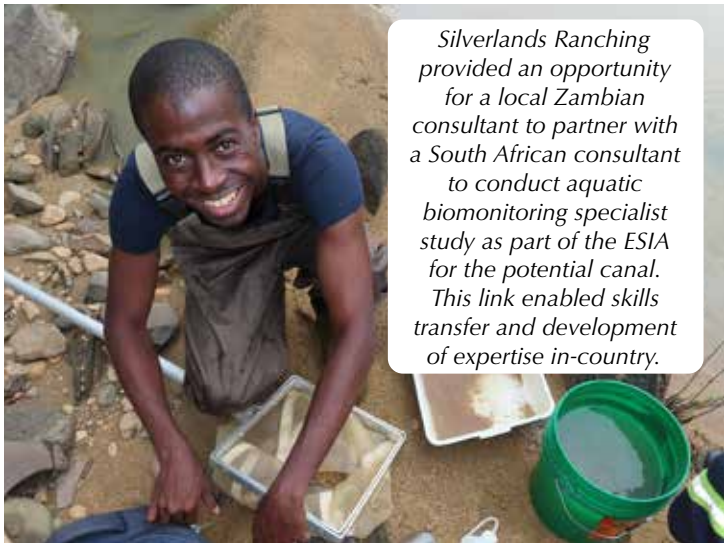
Training in refractometers: Assessing the sugar content of grapes during picking is crucial in making sure they are ready to harvest. Silverlands Vineyards has trained employees to use a refractometer to test the sugar percentages in the grapes, using a small piece of the grape squashed on the hand-held device and holding it to the light.

7.7 Supporting SMEs who support us

Our operations are supported by a wide array of small and medium enterprises. This includes transporters, builders, electricians, caterers, agri-dealers, and various smaller suppliers. By growing and expanding our businesses we have enabled these SME businesses to expand, increasing their workforce with positive knock-on effects on local economies. Our businesses rely on roughly 880 SMEs in Tanzania, Zambia and Namibia.

Annually, over $24 million is paid to these SMEs for services, which filters into our surrounding economies. If each SME has ~10 employees, this implies that some 8,800 jobs are supported by our businesses.

All transport of Silverlands Tanzania's grains and poultry feed is done by SME trucking businesses.



Silverlands Ranching provided an opportunity for a local Zambian consultant to partner with a South African consultant to conduct aquatic biomonitoring specialist study as part of the ESIA for the potential canal. This link enabled skills transfer and development of expertise in-country.

7.8 Community engagement

Our aim is to support and develop the communities in which we operate. In addition to the numerous community engagements described above (i.e. employment, CSI projects and interactions through our JVs and hub out-grower models), we also strive to understand and positively impact the communities immediately surrounding our farms. Community liaison personnel regularly meet with our neighbours. Strong relationships with communities are essential for the success of our operations.

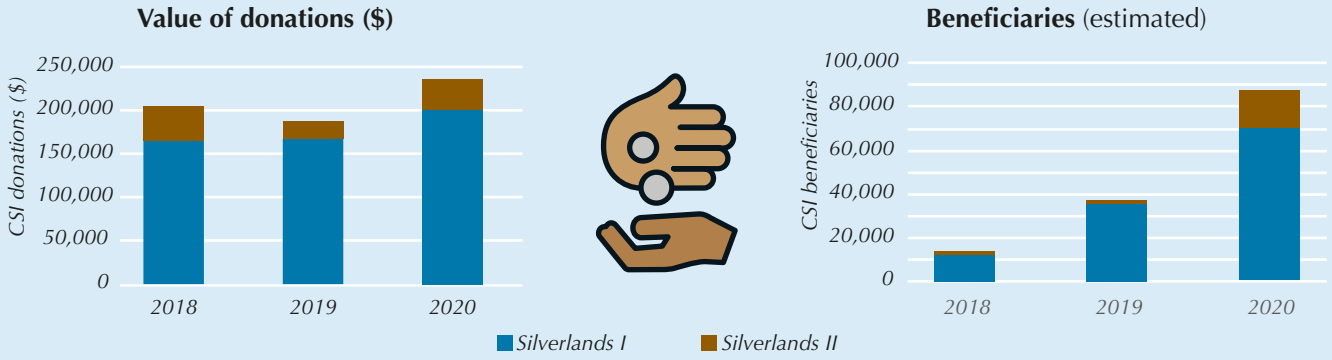
7.9 Corporate Social Investment

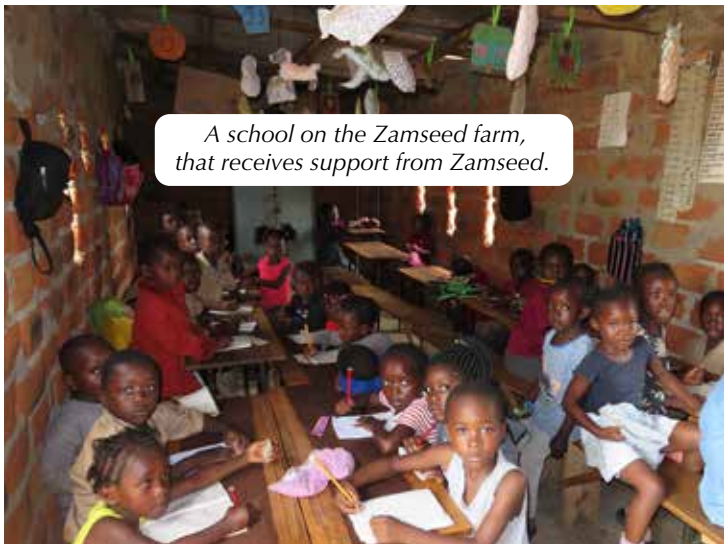
We are conscious that donations can have long lasting positive impacts on people's lives. Every operation contributes in some way each year to those in need. These initiatives are an important mechanism for meaningful interaction with our surrounding communities.

In 2020, $236,000 of CSI donations were made, up from the 2018 and 2019 spends of $200,000 and $185,000 respectively. We estimate that this year's donations benefitted 88,000 people, up from 36,000 last year and 12,000 in 2018.

Our general focus has been on improving access to healthcare, education and water. This year there were numerous donations of COVID-19 preparedness materials. Contributions included the construction of clinics, schoolrooms, teacher houses, boreholes, water dispensers, weirs and roads; donations of COVID-19 preparedness materials, food, training materials, and fuel; and hosting training days and school educational visits. Some sponsorship is also allocated to sports teams and celebrations.

Corporate Social Investment (CSI)





A school on the Zamseed farm, that receives support from Zamseed.

Some donations go to sports teams and sporting events – an important part of life after work.

Silverlands Tanzania donated poultry to a school and received this feedback:

"Last year we received chicken which we provided to a few of our students. They really profiting from the chicken. They are collecting eggs which is helping them to buy daily family needs and even helping with stationary like pencils and exercise books.

On behalf of all of our Community School I would like to pass our big thank you for your support."

Providing clean water to Aussenkehr using AQTaps

Silverlands Vineyards and Achill have worked hard to improve the ease of access to clean water in the Aussenkehr town. This has required long-term engagement with multiple stakeholders. As a trial, four Grundfos AQTaps were installed in April 2020. These were well received by the community who otherwise may be a long-distance from water taps. As a result, a further 10 water points have been installed, rolled-out in November 2020, which means that every resident will have access to clean water within a maximum of 200m of their home. This has been facilitated by a ~$40,000 grant from Danida (the Danish Ministry of Foreign Affairs) via the Danish Investment Fund for Developing Countries (IFU). These AQTap water dispensers are a sustainable solution to the provision of clean water in Aussenkehr.

7.10 Tax contributions

Most of the portfolio companies have executed major developmental programs and are still benefitting from standard tax offsets to profits.

Portfolio company	Income taxes ($)	Total taxes ($) *	Year end
Silverlands I			
Crookes Brothers	389,897	1,308,187	31 Mar 20
Silverlands Ranching	None	352,807	31 Dec 19
Silverlands Zambia	1,386	344,318	31 Dec 19
Silverlands Tanzania	None	2,865,254	31 Dec 19
Silverlands Agriculture Services	281	152,504	31 Dec 19
Silverlands Ndolela	None	667,032	31 Dec 19
Silverlands Vineyards	None	799,497	28 Feb 20
Quinta da Bela Vista	None	None	31 Mar 20
Silverlands II			
Achill	None	776,046	29 Feb 20
Zamseed	2,989	399,866	31 Mar 20

** Taxes and all fees and proceeds paid to local and central government of host country, including customs, duties and royalties, VAT, social security payments and deferred tax over the last reported financial year.*

8 Protecting Our Environment: Strategies and Efficiencies

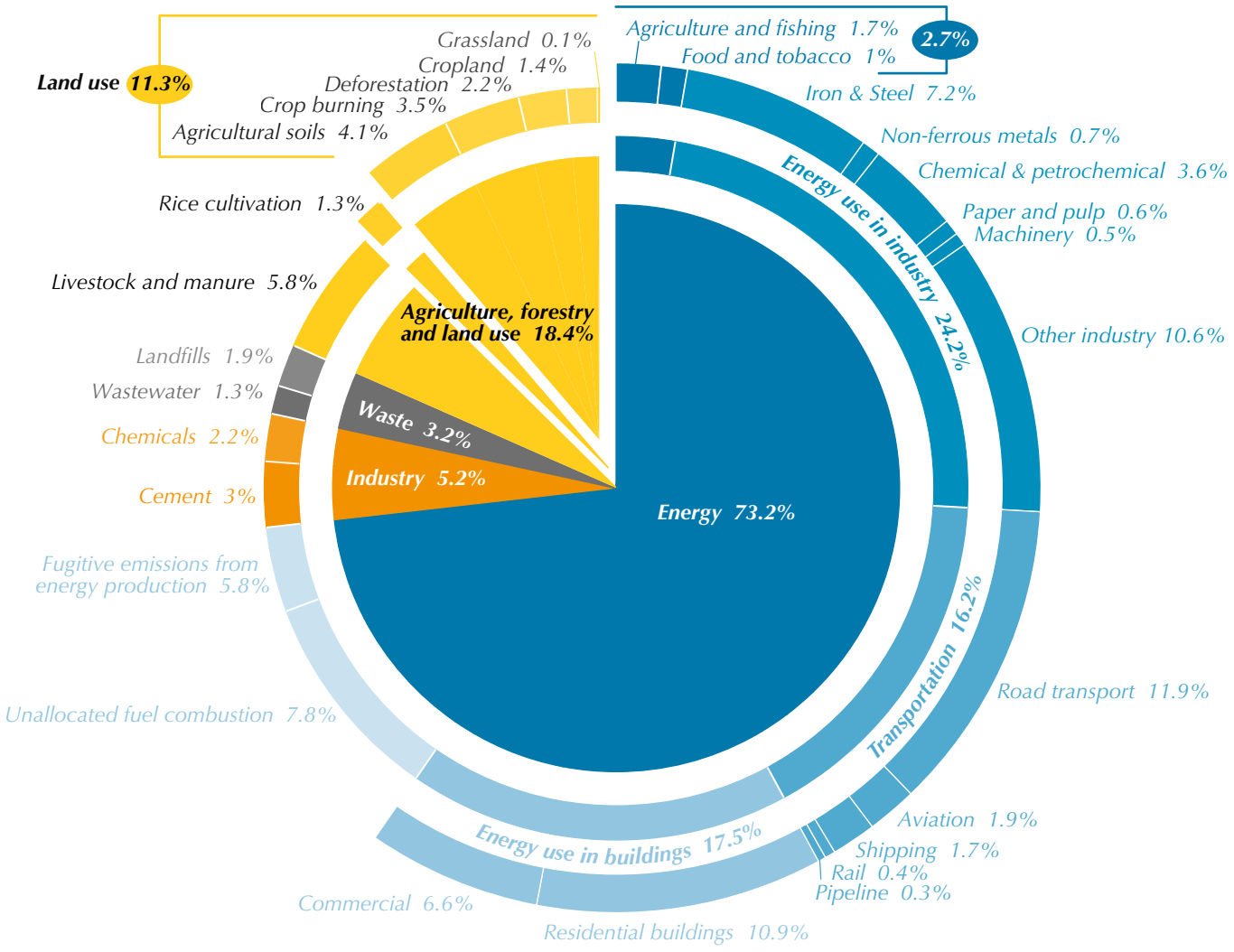
Protecting the environment and utilising the most climate smart farming techniques is critical to the long-term success of our businesses. By adopting more efficient and environmentally friendly methods, we have increased production, lowered costs, and reduced negative impacts on the environment.

Climate impacts are top of mind. The graphic below illustrates that globally, "Deforestation", "Crop burning" and "Agricultural Soils" make up 9.8% of emissions. These are our main target areas from a climate perspective – increasing the use of hybrid seed and conservation farming techniques amongst smallholder farmers addresses a very important part of the emissions issue, ~10% out of ~28% of non-energy related emissions. Practising conservation agriculture and using hybrid seed also benefits productivity, generating increased incomes for both our operations and smallholder farmers.

We support the reduction of greenhouse gas emissions by:

- Raising yields on smallholder farmers, reducing the need to clear land;
- Implementing renewable energy projects at our operations; and
- Using innovative technology to reduce unnecessary input use.

Global greenhouse gas emissions by sector



This is shown for the year 2016 global greenhouse gas emissions were 49.4 billion tonnes CO_2eq
Source: Climate Watch, Hannah Ritchie, the World Resources Institute (2020), OurWorldinData.org

To increase yields and soil nutrients; protect biodiversity; and ensure water efficiency our operations utilise:

- Minimum or zero tillage;
- Automated irrigation technology; and
- Detailed soil analysis.

Operations adhere to appropriate waste management practices including management of hazardous wastes (such as empty chemical containers). Furthermore, each farm protects the biodiversity in its non-cropping areas. Compliance of each business to the environmental aspects in our Responsible Investment Code and the IFC Performance Standards are reviewed externally each year.

8.1 Our strategies for climate resilience

Climate models predict greater volatility in weather with more variable rainfall patterns. Recognising the potential challenges associated with rising temperatures, droughts and floods, we seek to mitigate climate-related risks through the following measures:

1 Using irrigation rather than relying on rainfall alone

2 Storing water from summer floods to use during dry winter periods

3 Selecting investments in climatically optimal locations

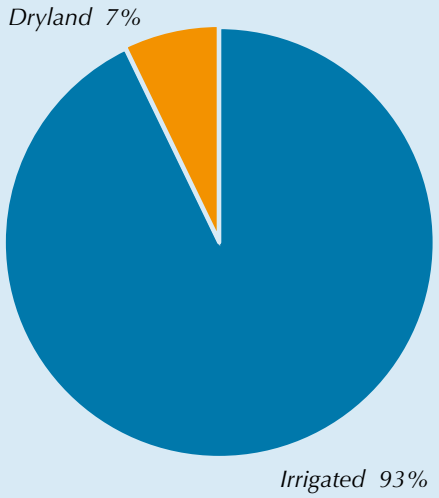
4 Growing crop and livestock varieties best adapted for local conditions.

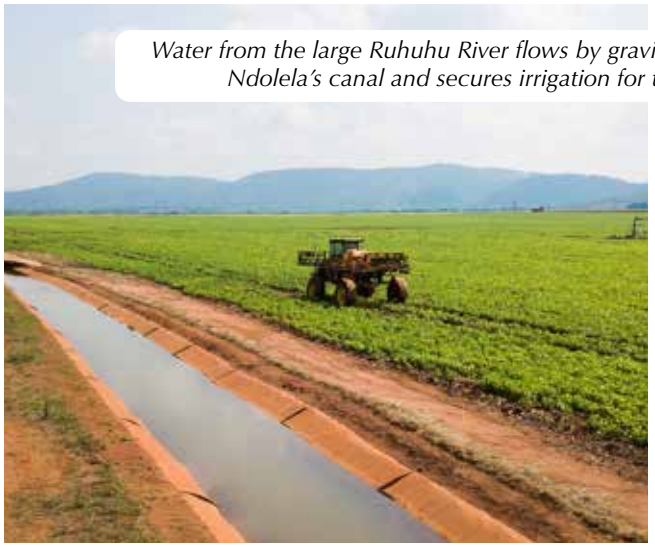
1 Irrigation

We follow an irrigated cropping strategy for over 90% of the hectares cropped. With irrigation, a crop can receive supplemental irrigation to help it through a dry period mid-season. This is particularly important at certain times in the crop's life e.g. during the crucial two-week period when soya beans flower, a lack of rain can reduce the crop yield by around 25%. The ability to add irrigation at this critical point is obviously beneficial. The small area of 'dryland' cropping may be an addition to the core irrigated strategy.

	Irrigated	Dryland	Total hectares
Silverlands I	16,556	872	17,428
Silverlands II	687	460	1,147
Total	**17,243**	**1,332**	**18,575**

Cropping area: irrigated vs dryland (ha)





Water from the large Ruhuhu River flows by gravity in Silverlands Ndolela's canal and secures irrigation for the farm.

2 Water storage

As rainfall is predicted to become more volatile, the ability to catch sudden downpours can provide water security. Where possible, we seek to store water rather than rely on the run of rivers.

Most of our projects already use stored water, with the following exceptions:

- Silverlands Ndolela: The water risk is very low given the large size of the river. There are also no major water users either up or down steam.
- Silverlands Tanzania (Iringa farm): A holding dam is being planned.
- Silverlands Zambia: The team is working with others in the catchment area on the planning of a dam, which would supply all the users in the area.
- Silverlands Vineyards and Achill: Although the farms do not have their own dams, several dams feed the Orange River upstream in its large catchment area. The key risk is one of mismanagement of these dams, which is largely under government control.

3 Climatically optimal locations

To mitigate the risk of climate volatility, we seek operations that are in the optimal locations for each crop. For example, Central Zambia and Southern Tanzania have optimal climates for growing grains and soya; Southern Namibia is ideal for table grapes and dates. Furthermore, we are careful in selecting areas where water security is highest.

Silverlands Ndolela has water security in the form of the large Ruhuhu River with no other major water users.

4 Variety/Breed selection

Some varieties are better adapted to climate variations, particularly drought, as well as to pests and diseases. Our operations select the best varieties for their area. This is done for every crop in the portfolio (e.g. sugar cane, soya, maize, beans, wheat, barley, macadamias, apples, pears and avocados) as well as for livestock.

The Sasso poultry breed (left) is better adapted to the free-range environment of rural Tanzania than traditional 'Western' poultry breeds. Silverlands Tanzania is registering several potato varieties (right) that are suited to the cool high elevation climate in Southern Tanzania and is also blight resistant – crucial for smallholder farmers.

8.2 Increasing productivity

Globally, agriculture is under pressure to produce more on the same area of land, and with less resources. Our region's population is forecast to increase by more than 1 billion people in the next three decades. Much of this will come from urban areas where there are higher household incomes. This will result in changing diet patterns, especially a shift towards increased consumption of foodstuffs such as fruits, nuts, wheat, beans and eggs and meat.

Most countries in Sub-Saharan Africa have food deficits today, so to meet this rise in demand, a huge and sustainable increase in yield productivity is necessary. Most historic production increases have been the result of an expansion in cultivation area, releasing a vast amount of carbon dioxide into the atmosphere. Yields in Africa have remained low compared to other parts of the globe due to under-investment in key inputs (e.g. irrigation, seed, and fertiliser) market access and expertise. To significantly ramp up production sustainably, capital needs to be invested to unlock crop value chains.

By focusing on sustainable land practices, key infrastructure investments (e.g. dams and irrigation), and crop diversification, our portfolio has trebled food production since purchase (excluding sugar cane which distorts the figures because of its large volumes). In the last season, our operations produced nearly 800,000 tonnes in aggregate. Production of fruit has doubled, row crops (mostly grains and soya) are up over five-fold and seed maize which is utilised by smallholder farmers are up nearly four-fold. In Silverlands II food production has already approximately doubled.

Seed beans at Silverlands Ndolela, Tanzania

Silverlands I – production volume summary

Product	Year prior to acquisition	Current year	Multiple of start value	Cropping area (ha)
Livestock				
Cattle	778	5,078	6.5 x	
Day-old chicks		11,065,728		
Processing				
Poultry feed (t)		43,089		
Seed crops				
Seed maize (t)	1,401	5,124	3.7 x	1,075
Seed beans (t)		1,430		640
Seed potatoes (t)		2,740		143
Seed sunflower (t)		60		171
Seed crops total (t)	**1,401**	**9,354**		**2,029**
Row crops				
Barley (t)	460	1,198	2.6 x	178
Commercial maize (t)		7,652		526
Groundnuts (t)		132		41
Soya beans (t)	125	8,406	67.3 x	2,171
Ware potatoes (t)		2,256		132
Wheat (t)	6,614	15,778	2.4 x	2,053
Silage (t)		773		20
Pasture (t)		1,549		
Sun hemp (t)		15		15
Row crops total (t)	**7,199**	**37,760**	**5.2 x**	**5,135**
Plantation crops				
Sugar cane (t)	552,728	680,000	1.2 x	6,402
Fruit				
Avocados (t)				
Grapes (t)	3,198	4,254	1.3 x	340
Dates (t)				6
Deciduous fruit (t)	14,900	31,814	2.1 x	653
Bananas (t)	12,618	27,328	2.2 x	633
Fruit total (t)	**30,716**	**63,396**	**2.1 x**	**1,632**
Tree nuts				
Macadamia nuts (t NIS)		303		463
Pecan nuts (t)				130
Tree nuts Total (t)		**303**		**593**
Total crops (incl sugar cane)	**592,044**	**790,813**	**1.3 x**	**15,791**
Total crops (excl sugar cane)	**39,316**	**110,813**	**2.8 x**	**9,388**

Silverlands I – production volume summary

Product	Year prior to acquisition	Current year	Multiple of start value	Cropping area (ha)
Seed crops				
Commercial seed (t)	2,096	3,852	1.8 x	1,505*
Fruit crops				
Grapes (t)	868	1,637	1.9 x	242
Total crops	**2,964**	**5,489**	**1.9 x**	**1,747**

**Zamseed cropping area includes outsourced and leased land.*

8.3 Reducing carbon emissions

Our operations are aiming to reduce emissions through several important initiatives:

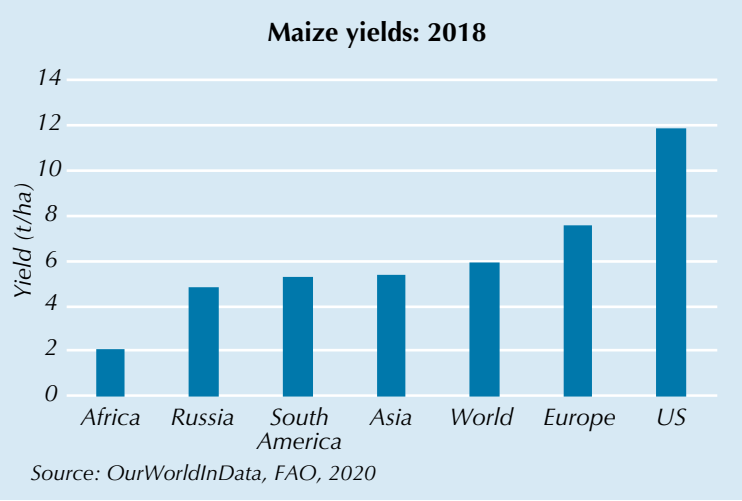
1 Reducing deforestation by improving access to hybrid seed;
2 Increasing local production and reducing imports;
3 Improved farming methods – reducing emissions and increasing carbon stored in soils.

We describe these topics in more detail below.

1 Reducing deforestation by improving access to hybrid seed

The combination of rising populations, low crop yields and sub-optimal practices is leading to deforestion in Africa as smallholder farmers expand production to meet the rising food requirements. Over the past 60 years, a period in which the global population has more than doubled, maize yields in Africa have only increased from 1 t/ha to ~1.5-2 t/ha. In the same period, global average maize yields globally grew from ~2 t/ha to ~6 t/ha and US farmers now achieve average yields of around 12 t/ha.

Commercial farmers in Africa have shown that world class yields in maize, soya, wheat and other crops can be achieved. The chart on the right shows the substantial yield gap between Africa and the rest of the world for maize.

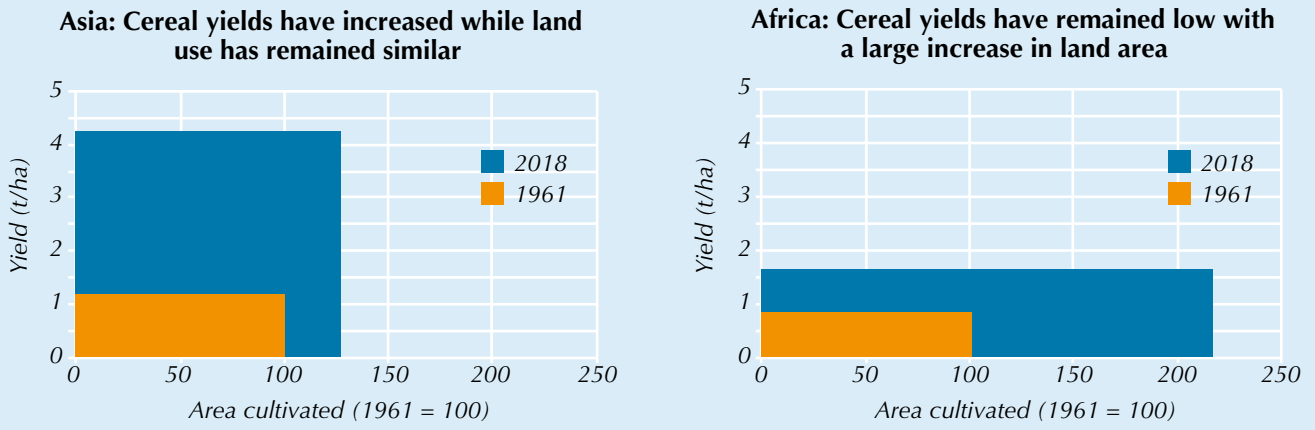


From a climate perspective, this is a substantial issue because food production has been boosted in Africa predominantly through the expansion of the area under cultivation, rather than yield per hectare, meaning the substantial deforestation of (mostly) savanna woodlands.

The chart following illustrates the very different paths that Asia and Africa have taken since the 1960's. Asia has increased the cultivation area marginally but has increased yields substantially. Conversely, in Sub-Saharan Africa, yields have remained relatively low and the area under cultivation has been increased significantly.

Halting this trend is very important from a climate change perspective.

Maize production in Asia and Sub-Saharan Africa since 1961: Illustrating the increasing area farmed vs yield increases



Source: Our World in Data

Productivity on already cultivated land must increase to prevent more land clearance while meeting the food requirements of the growing population. High yielding hybrid seed is critical to realising this productivity increase and is key to Africa realising a sustainable increase in food production without accelerating climate change and biodiversity loss through land clearance.

To illustrate this point, our literature review of studies including over 10,000 smallholder farmers showed that farmers using hybrid seed-maize achieved average yields of 2.6 t/ha , whereas farmers using farm-saved seed achieved an average yield of 1.6 t/ha. Based on these average yields, 1 tonne of hybrid maize seed will be used to plant 40 ha of maize and on average produces 104 tonnes of maize for food. To achieve the same production with farm-saved seed 63% more land (a total area of 65 ha) would be required. In other words, every tonne of hybrid seed produced, saves 25 ha of land from being cleared.

Using this assumption, the 9,100 tonnes of seed produced in 2020 could mean that 181,000 ha of land is saved from being cleared, the area which would have been necessary to achieve the same increased production from farm-saved seed. We have not yet quantified the carbon impact but it is clear that it is substantial. Additionally this, combined with training on conservation farming techniques, not only improves farmer incomes but has a material climate benefit.

Hybrid seed allows the same production on a smaller area of land

Seed type	Hybrid	Farm-saved	Difference
Yield	2.6 t/ha	1.6 t/ha	Hybrid = better yield
Seed volume	1 t	1 t	Constant
Production	104 t	104 t	Constant
Area needed	40 ha	65 ha	Hybrid = less land needed

2 Increasing local production and reducing imports

Food production at our farms is reducing the need for food imports into those countries, reducing both the carbon emissions from transportation, as well as the cost of food in-country.

Wheat: In Zambia, our wheat already contributes notably to national production levels. Silverlands is projected to produce over 7% of the national production of wheat in 2019, up from less than 0.1% prior to Silverlands' purchase.

Soya beans: Soya beans are not only a high value crop but is also beneficial as a legume that fixes nitrogen levels within soil. When rotated with other crops, soya beans help to improve yields and incomes. In Tanzania there was historically very little soya bean production. By creating a processing plant in our feed mill and assisting nearby smallholder farmers to grow the crop, Silverlands Tanzania has created a new market. This year, Silverlands Tanzania is purchasing soya beans from nearly 7,000 farmers, and more farmers are now selling into the local and regional markets. We expect Tanzania to become fully self-sufficient in soya beans over the next eight to ten years through our initiatives.

Fruit: Apples and pears are sold through Two-a-Day (of which CBL own 19%) into 65 different countries. The volume directed into local African markets has increased, reducing the associated carbon footprint.

Locally produced bananas reduce the need to import from Latin America. Since investing in CBL, banana production has increased 120% from 12,618 t in 2012 to 27,742 t in 2020.

Quinta da Bela Vista in Mozambique began banana production in 2020 and hosted dignitaries in their newly constructed pack shed.

3 Improved farming methods – reducing emissions and increasing carbon stored in soils

The importance of soil health

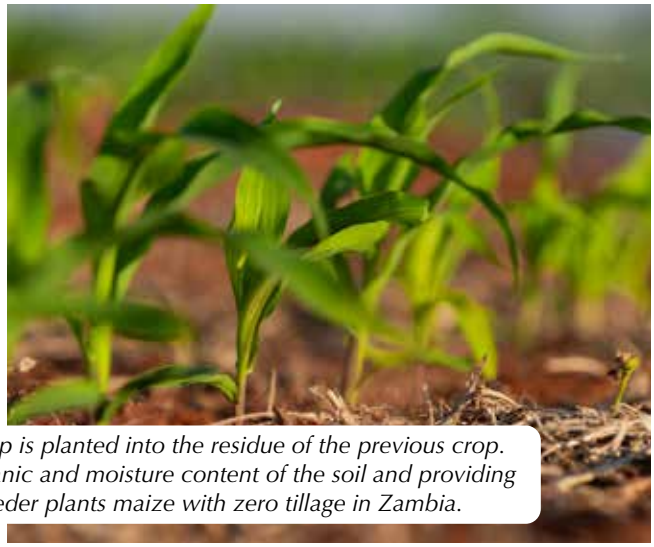
Our farms use innovative climate smart agricultural methods to protect soil health. Soil creates a critical ecosystem that is integral to life. Out-dated farming techniques have led to substantial soil degradation which threatens the soils' ability to produce food, store carbon and retain moisture. The overuse of fertilisers and pesticides and consistent tillage have increased run-off and depleted soil nutrition.

This critical natural resource must be protected, and where possible rehabilitated by using optimal climate smart agricultural techniques. This aim aligns with our goal to produce more on the same area of land and reduce the use of unnecessary inputs. This will support the increase in production without the negative environmental effects of land conversion and save costs through more precise input application. Initiatives to improve our soils include:

"There is going to come a time within the financial audit, when the auditors are going to accurately measure the quality of your soil as a biological asset and that will impact on your fixed asset value on the balance sheet."

Rory Niven, Crookes Brothers, Chief Operations Officer

Minimum tillage: By drastically reducing the disturbance to the soil, minimum tillage leads to increases in soil organic matter with associated carbon benefits. This improves soil structure, moisture levels, and reduces erosion. Our farmers practice minimum tillage and the smallholder grain farmers we work with receive training in the benefits of minimum tillage and other conservation agriculture practices.



When practicing minimum tillage, the next season's crop is planted into the residue of the previous crop. Over time, this residue breaks down, improving the organic and moisture content of the soil and providing a barrier to erosion. On the left, a precision drill seeder plants maize with zero tillage in Zambia.

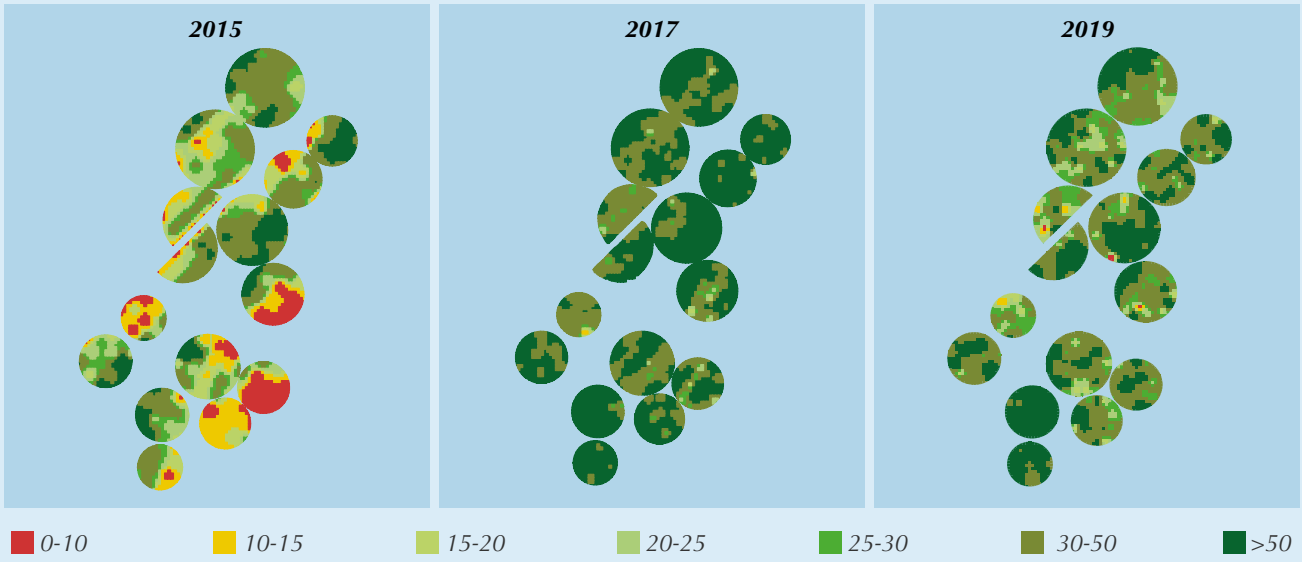
Crop rotation and intercropping: Nitrogen is an important nutrient, and legumes significantly increase nitrogen in the soil, as well as improving soil organic matter and soil structure. Using legumes in rotation with other crops results in marked improvements in yields, and reduction in fertiliser use.

Crops can also be intercropped, for example wheat between the rows of new vines in Namibia (right) stabilises soils and improves soil structure.

Nutrient management: All farms across the group make use of soil and leaf analyses in designing fertiliser programmes. With detailed analysis, and equipment allowing for variable fertiliser application, we can minimise environmental impacts and reduce costs.

The below image of Silverlands Agriculture Services, in Zambia, demonstrates the detailed analysis undertaken on the soil to ensure accurate and precise input use. It shows the phosphate concentrations over four years. Phosphate is an essential nutrient for a crop's growth. The optimal phosphate concentration is 30-50 mg/kg. As the diagram shows, Silverlands' phosphate levels were depleted and rose sharply with soil management. Using precise placement of inputs, the levels have now stabilised and are coming down to optimal levels.

Soil phosphate concentrations



Composting: This improves organic content, moisture levels, soil structure and fertility. An example of composting is when old grape vines that have been chipped are used as compost at Silverlands Vineyards (right).

Poultry manure: In Tanzania, poultry manure is composted and spread on fields as a natural fertiliser.

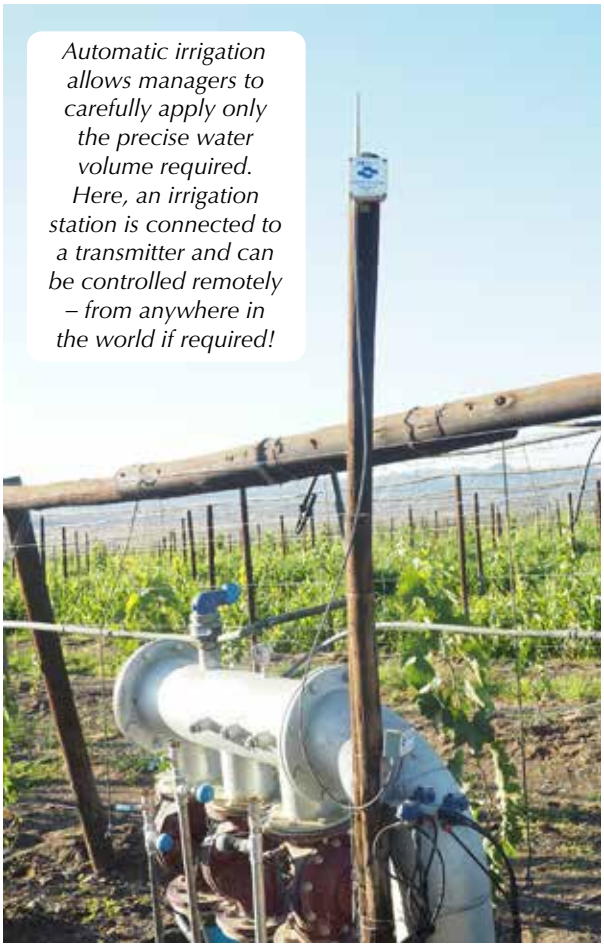
Erosion control: Contouring, carefully designed by engineers and marked out on the ground by surveyors, is implemented and maintained to reduce surface runoff. Additional erosion control methods are implemented where required.

8.4 Efficient water management

Water is the largest input by volume in many types of agriculture and of high concern to our farmers. Minimising water use has direct benefits for the environment, other water users and profitability (using less water reduces electricity costs, directly affecting the bottom line).

Implementing the most efficient technologies, and with diligent on-the-ground management, our managers take extreme care to minimise the volume of water used. Some of our operations have also been integral in establishing water user associations with other commercial farmers, to ensure good water management beyond our boundaries.

Technologies to aid in water management and improve water use efficiency include flow meters, variable speed drive pumps (VSDs), drip and micro-sprinkler irrigation systems, soil moisture probes, weather stations, evaporation pans and automation methods.

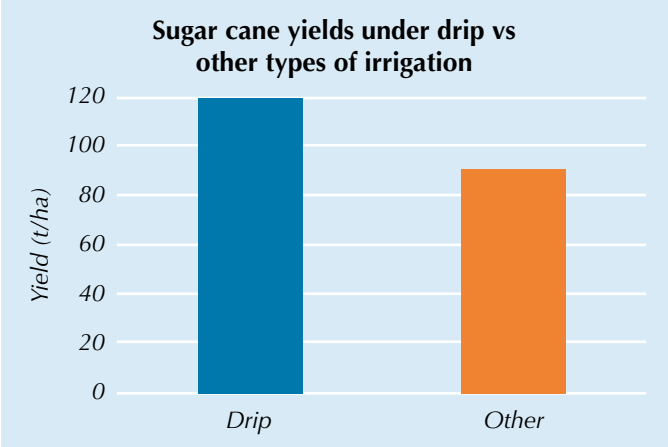


Automatic irrigation allows managers to carefully apply only the precise water volume required. Here, an irrigation station is connected to a transmitter and can be controlled remotely – from anywhere in the world if required!

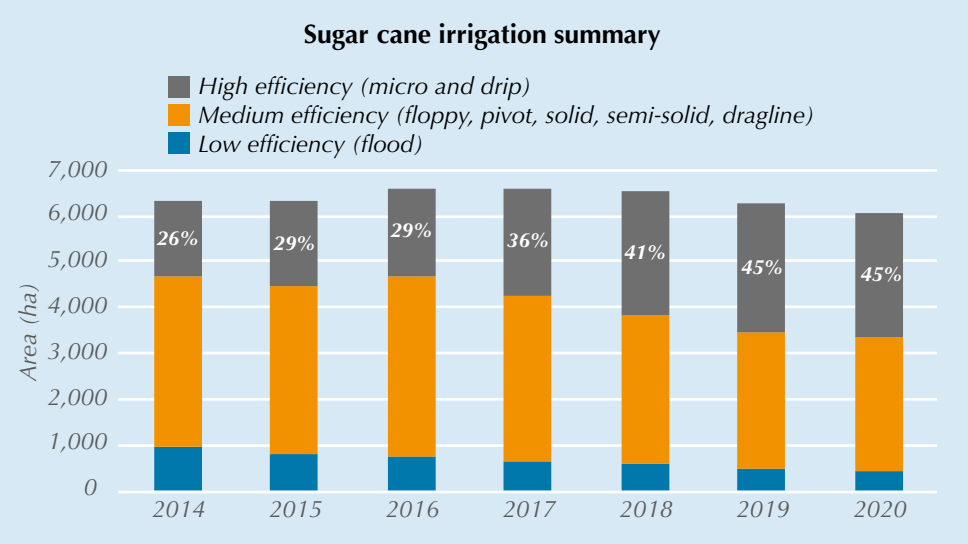
Conversion to drip irrigation

Most of our Silverlands investments were new developments or expansions and therefore efficient irrigation systems were implemented from the start. As an established company, Crookes Brothers is doing well to continuously upgrade to the most efficient irrigation types.

Drip irrigation is best for sugar cane, both for water use and profits as yields increase over 30% while using 25% less water. This is a remarkable saving that maximises water efficiency and reduces electricity costs. Improved performance from areas under drip irrigation is especially noticeable when water supply is restricted. This significant increase in yields, from around 90 to 120 t/ha, brings substantial increases in profitability.



Sugar cane is re-planted roughly every 10 years, and so about 10% of a farm's cropping area may be replanted annually. This is the opportunity to change the irrigation. It cannot be done all at once, rather consistently each year as replanting takes place and budgets allow. CBL continues to convert their areas of cane with 45% now under drip irrigation, up from 26% six years' ago.



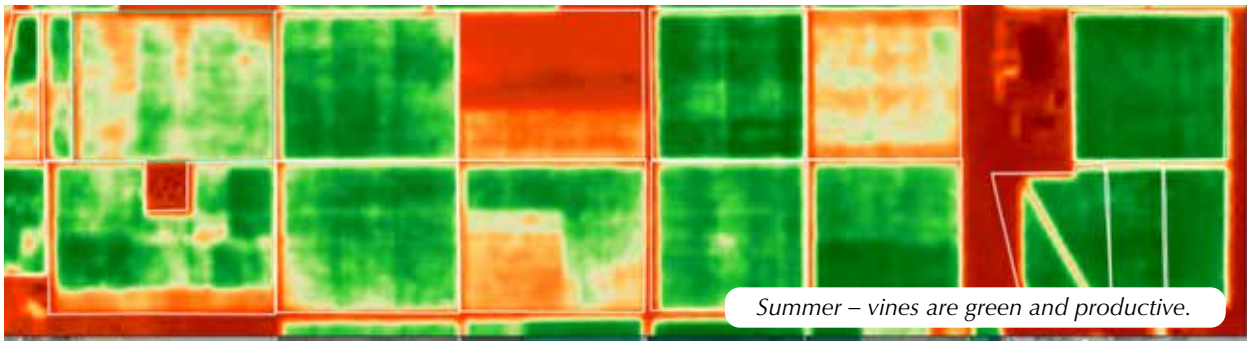
Aquatic biomonitoring: To check we are not negatively affecting dams and rivers, we use insect larvae as a sensitive indication of water quality. After four consecutive years using expertise from the University of Cape Town, this year we used aquatic expert, Dr. Bruce Paxton from the Freshwater Research Centre and Namafe Namafe, from the Zambian Department of Water Resources Development.

8.5 Using satellite technology

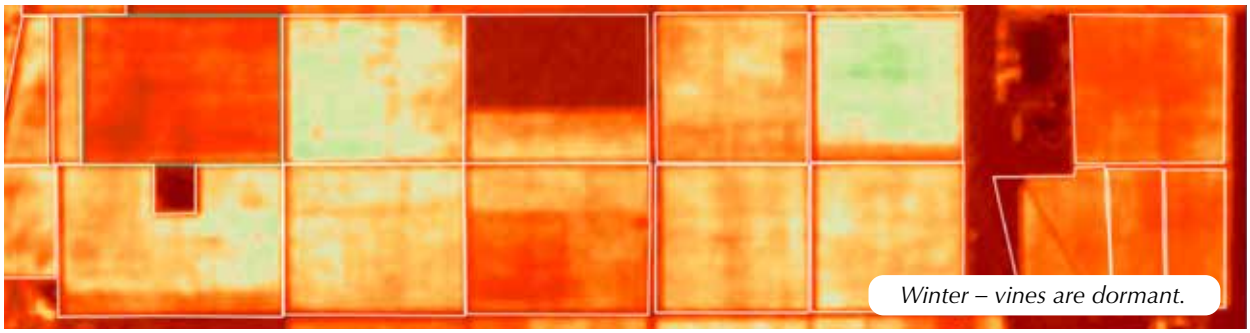
Almost all our farms are now using Normalised Difference Vegetation Index (NDVI) imagery to identify areas of crops in need of attention. The NDVI provides an indication of vegetation health using near-infrared light (which vegetation reflects) and red light (which vegetation absorbs).

Taken by either satellite or drone (or both), with possible weekly updates, the imagery is used to assess plant health, monitor impact by pests and diseases, and plan management of the farm, such as irrigation and fertilisation. With high resolution imagery (up to 3 cm accuracy), farmers can focus their attention on individual trees or vines. This helps management to be more accurate, thereby reducing time and resources spent on each intervention. The result is that the field, orchard or vineyard is more uniform and ultimately maximises production while minimising inputs.

An example of NDVI imagery on a section of Achill in Namibia. Darker green areas show stronger plant growth. Lighter and patchy green areas show newer/younger vines.



Summer – vines are green and productive.

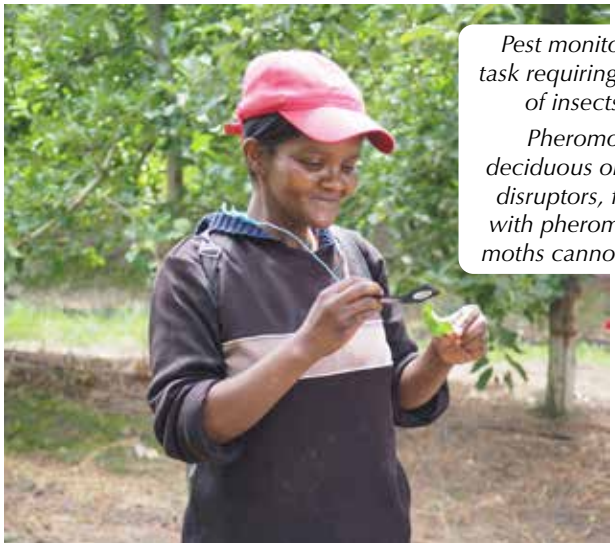


Winter – vines are dormant.

8.6 Integrated pest management

To maximise the efficiency of production, pests need to be managed, using as little pesticide as possible. Multiple other pest control measures are implemented to prevent the use of pesticides, which are costly to the business, the environment and have potential health risks. Initiatives include:

- Maintaining buffer zones of vegetation around the cropping areas provides habitats for natural pest predators.
- Bat houses erected to increase the bat population to control fall army worm.
- Certain pests are physically removed by hand, such as the fungal 'smut' in sugar cane.
- Using physical barriers – such as wrapping sticky tape around the trunks of fruit trees to prevent crawling insects, such as snout beetles, from climbing up and damaging fruit.
- Tying up tags dosed with pheromones in the deciduous fruit tree orchards; these act as mating disruptors, flooding the orchard with pheromone so male codling moths can't locate their females.
- Releasing sterile fruit flies into orchards and vineyards.
- Using early detection systems to help catch infestations early and allow small focused applications of pesticides rather than broad spectrum spraying; for this, employees trained as pest scouts walk through fields assessing pest numbers, and insect traps placed in fields are frequently checked.



Pest monitoring (left) is a daily task requiring precise identification of insects and other pests.

Pheromone tags (right) in deciduous orchards act as mating disruptors, flooding the orchard with pheromone so male codling moths cannot locate their females.

8.7 Waste management

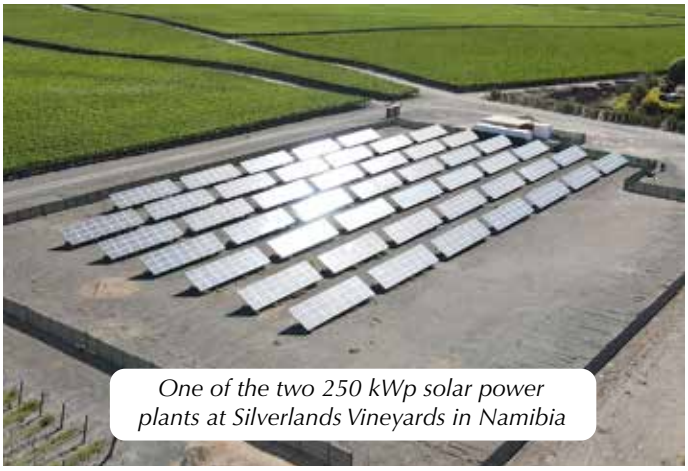
In accordance with the IFC Performance Standards, we dispose of our hazardous waste – such as empty chemical containers and used oil and oil filters – with registered hazardous waste disposal facilities. Identifying such companies outside of South Africa remains a challenge, and where available this service is extremely expensive. To keep the cost in check, some farms are using pelletisers to condense the volume of containers and reduce transport and disposal costs. In Tanzania, agrochemical suppliers have agreed to take their old containers back.

We continue to try to implement recycling initiatives across all our operations; however, service providers are seldom present in remote areas. Only 4% of waste in Africa is recycled, largely a result of inadequate investment into recycling services (UNEP, 2018). We continue to monitor available providers to responsibly recycle waste and welcome suggestions regarding waste disposal and recycling options if other investors have innovative solutions.

8.8 Power management

Efficiencies and infrastructure: Pumping water is typically the greatest energy requirement in farming. To minimise this, the amount of water needed must be minimised (see section on water management above). In addition, energy efficient variable speed drive (VSD) pumps are installed whenever a new pump is required. They are relatively new in farming and reduce the power requirement.

Solar power: Namibia is an excellent location for solar and Silverlands Vineyards has implemented two 250 kWp solar power plants to supplement grid power on the farm, as well as reduce the dependence on fossil-fuel-generated electricity. Achill will also likely implement a solar project for their development. Also, CBL have received environmental approval for implementation of a 1.5MW solar power project at their sugar cane farm in eSwatini.



One of the two 250 kWp solar power plants at Silverlands Vineyards in Namibia

Hydro-electric power: Hydro-electric power is a proven and clean technology and can be the most efficient in certain locations. Silverlands Ndolela upgraded the mini hydropower facility present at acquisition from 80 to 800 kW by extending the canal and installing a new hydroelectric plant. Commissioned in December 2017, the hydro-generated electricity powers the farm's irrigation pumps, pivots, housing and offices. It supplies the power requirements for all except two months of the year when it fulfils around 70% of the farm's needs.

Silverlands Ndolela is privileged to have use of an 80m drop on the large Ruhuhu River – the perfect location for a hydropower plant. A small quantity of the total river volume flows into a pipe that drops steeply down a bank and into the turbine house. Water enters from the left and turns turbines in the large blue casings (left), before being released back into the Ruhuhu River (right).

9 Summarising Our Impact Through the Sustainable Development Goals (SDGs)

The UN's Sustainable Development Goals are aimed at improving the quality of life for all people and our planet. The goals recognise that poverty reduction comes hand in hand with other development priorities, such as the environment and gender equality. Most of our work is in low income countries with steep population growth, a shortage of decent work, and significant food security challenges. Many of our investments focus on providing quality jobs or inputs in rural areas where people are dependent on land, livestock and agriculture for their livelihoods. These people are typically the poorest in these countries.

We feel privileged to have the opportunity to take financing, knowledge and resources into these areas to make a significant difference to the lives of people in rural Africa.

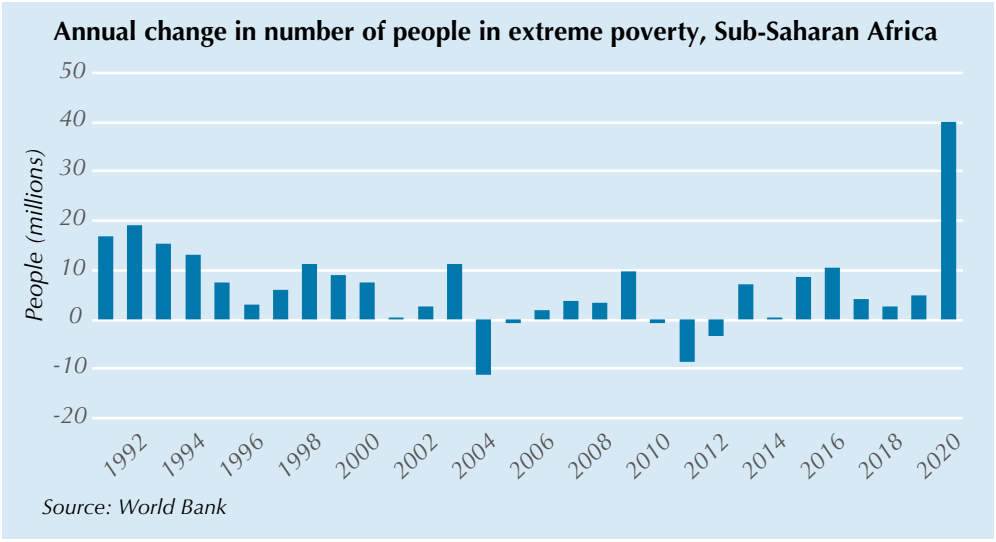
The average GDP per capita in the six countries where we operate is ~$2,950 per annum. We really are operating in poor countries where we can have a large impact.

Country	GDP per capita ($)
Mozambique	492
Namibia	4,958
South Africa	6,001
eSwatini/Swaziland	3,837
Tanzania	1,122
Zambia	1,291
Average	**2,950**

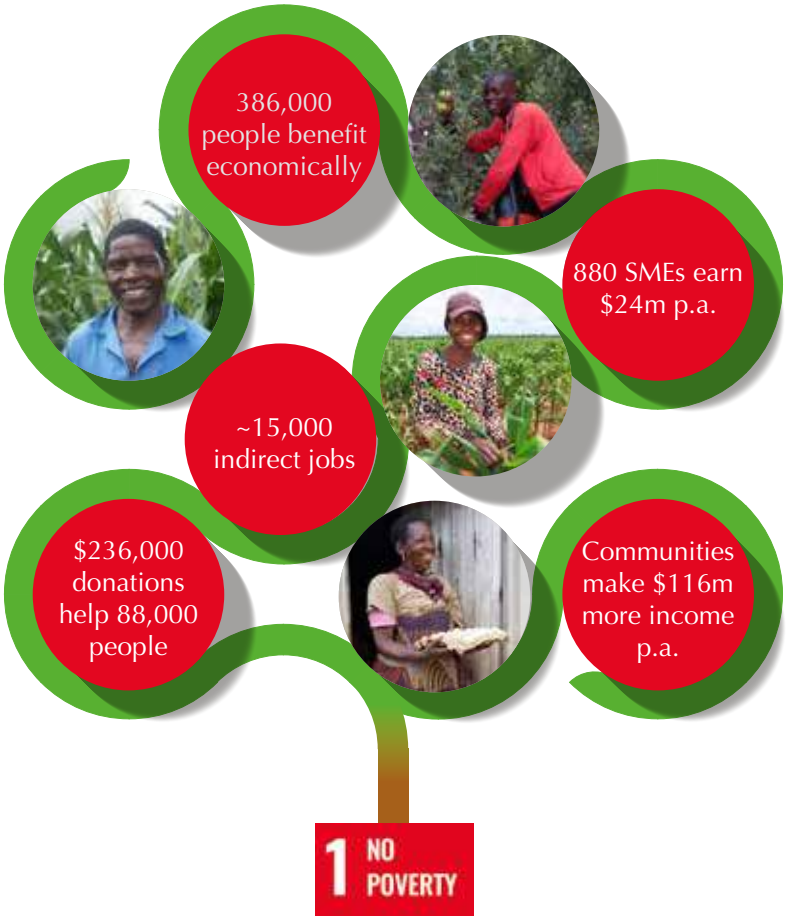
2019 figures, using current (Nov 2020) US$ exchange rates
Source: World Bank, 2019

Meeting the SDGs is integral to a Covid-19 recovery in Africa

The pandemic is not only a health crisis, it has also affected societies and economies around the world. Despite Africa fairing comparatively well in terms of the number of cases when compared to Europe and America, the World Bank expects that COVID-19 may result in the first increase in poverty since 1998 (World Bank, 2020). Estimates made by the World Bank suggest that COVID-19 will push 49 million people into extreme poverty (World Bank, 2020). This comes amidst the World Food Programme (WFP) warning that an additional 130 million people could become acutely food insecure directly due to the effects of COVID-19, with some two-thirds of these in Sub-Saharan Africa.



Source: World Bank



- 386,000 people benefit economically from our investments. On average they profit ~$299 more per annum. In other words, third parties such as employees, smallholder farmers, and communities in joint ventures with our portfolio companies, earn an incremental $116m per annum because of our investments.

- Our businesses transact with over 880 SMEs and pay them more than $24m per annum for their goods and services. We estimate that these SMEs hire over 8,800 people. In total, based on an IFC jobs study multiplier, we support ~15,000 indirect jobs in the industries we rely on.

- CSI donations to communities around our operations total $236,000, this is estimated to benefit ~88,000 people. Our projects focus on improving access to healthcare and education. Because of the COVID-19 pandemic this year, numerous donations of PPE and COVID-19 preparedness materials were donated to local communities.

- Our investments in hybrid seed research and development and seed production aim to increase smallholder farmers' yields and to have a more robust performance under more difficult conditions. Increasing yield through improved seed and training, from ~1.7 to 3.5 t/ha, will help to remove hunger in the countries where we operate.

- In Zambia, the smallholder cattle farmers we work with have seen their herds increase from 16 head to 19-20 head over the last 5 years. This is a result of our extensive dipping and vaccination programme, which has reduced cattle mortality and improved calving rates. Over 35,000 cattle owned by 1,800 farmers benefit from this programme.

- Production on our farms has increased substantially because of our investments. Fruit production alone has doubled since we invested.

- Silverlands' grains farms in Zambia have increased the country's wheat production by 7%.

- Most smallholder farmers are women, and so our impact is particularly empowering for the women in our communities. As an example, we estimate that 100,500 smallholder poultry farmers are earning $412 more per annum from our project in Tanzania, and 70-80% of these are women.
- The majority of grains farmers in Central and Southern Africa are women. This year, over 35,000 t of grains will be purchased from smallholder farmers. Our seed is used by ~216,000 smallholder farmers and higher yields are estimated to increase incomes by ~$220 p.a. per farmer.
- Constituting 42% of our workforce, women are crucial for our operations' success. In areas where there may be little formal work available, women can learn valuable skills and are particularly good at careful and technical work, such as machine operating, laboratory work, managing our feed mill, handling fruit and poultry, and de-tasselling maize.

- Our Silverlands portfolio has 10,400 employees, up 45% from purchase (~7,100). Employee numbers have increased 4-fold in operations in Tanzania, Zambia and Mozambique, associated with our large developments. The focus is on higher quality jobs with higher salaries, which are up 3-fold since purchase (excl. CBL) and are currently at $29m p.a. – this adds valuably to the local rural economies where our businesses are key employers.
- Each operation implements systems to ensure safe work environments for all employees and world-class employment practices are in place. We adhere to international standards including the IFC Performance Standards, UN Global Compact, and UNPRI. Annual ESG audits by independent consultants check compliance. Ongoing training and upskilling are emphasised.

- The key mechanism to help reduce climate impact is through reducing deforestation caused by smallholder farmers using unsustainable farming techniques and low yielding seed. By increasing access to hybrid seed, smallholder farmers can increase their yield on the same area of land. This eliminates the need to clear land and associated carbon emissions. It is estimated that for every tonne of hybrid seed produced, 25 ha of land is saved from being cleared.
- By utilising conservation farming techniques, smallholder farmers can increase their yields, preserve biodiversity in soils, and mitigate against the negative effects of climate change, such as drought.
- Silverlands' farms utilise renewable energy where possible to reduce their carbon footprint. This includes an 800 kW hydro-electric power generator in Tanzania and two 250 kWp solar power plants in Namibia, with additional solar projects planned.
- Beef production by smallholder cattle farmers is typically inefficient. By introducing veterinary support, dip stations, and finishing cattle on highly nutritious feed in a feedlot, Silverlands is reducing the greenhouse gas emissions per kg of beef in this system.

- To protect soils and water resources: water use is minimised by using the most efficient irrigation methods, soil moisture probes, weather stations and mechanisation; runoff is managed with contouring; pesticide use is minimised by following Integrated Pest Management programmes; and fertiliser applications are tailored to the needs of soils and crops rather than broad spectrum application.
- Soils are improved with minimum tillage, cover crops, crop rotation, composting and training smallholders about conservation agriculture. This increases crop productivity and soil carbon on both our farms and many smallholder farms beyond our boundaries.
- On our farms that are fortunate to have large areas of natural woodland and grassland the biodiversity is protected and managed within conservation areas where possible. The removal of alien vegetation is ongoing.
- Adherence to the best environmental practices, as per our Responsible Investment Code and the IFC Performance Standards, are assessed annually during independent ESG audits.

10 Managing ESG Aspects

10.1 The ESG standards we follow

ESG standards
SilverStreet's Responsible Investment Code
International Finance Corporation Performance Standards
UN Principles of Responsible Investment
UN Global Compact

We adhere to our SilverStreet's Responsible Investment Code ("RIC"), which is based on the responsible investment code for the CDC Group PLC, an investor in the Silverlands I Fund. Our RIC references multiple other standards such as the International Finance Corporation ("IFC") Performance Standards along with the IFC Environmental Health and Safety ("EHS") guidelines and sector supplements. These provide excellent guidance in ESG risk management and are used globally.

We also adhere to the principles of the UN Global Compact and the UN Principles of Responsible Investment ("UNPRI"). SilverStreet is a signatory of the UNPRI.

IFC Performance Standards (PS)

Assessment and Management of E&S Risks and Impacts

Labour and Working Conditions

Resource Efficiency and Pollution Prevention

Community Health, Safety and Security

Land Acquisition and Involuntary Resettlement

Biodiversity Conservation and Sustainable Management of Living Natural Resources

Indigenous Peoples

Cultural Heritage

The following table summarises the key components of our RIC:

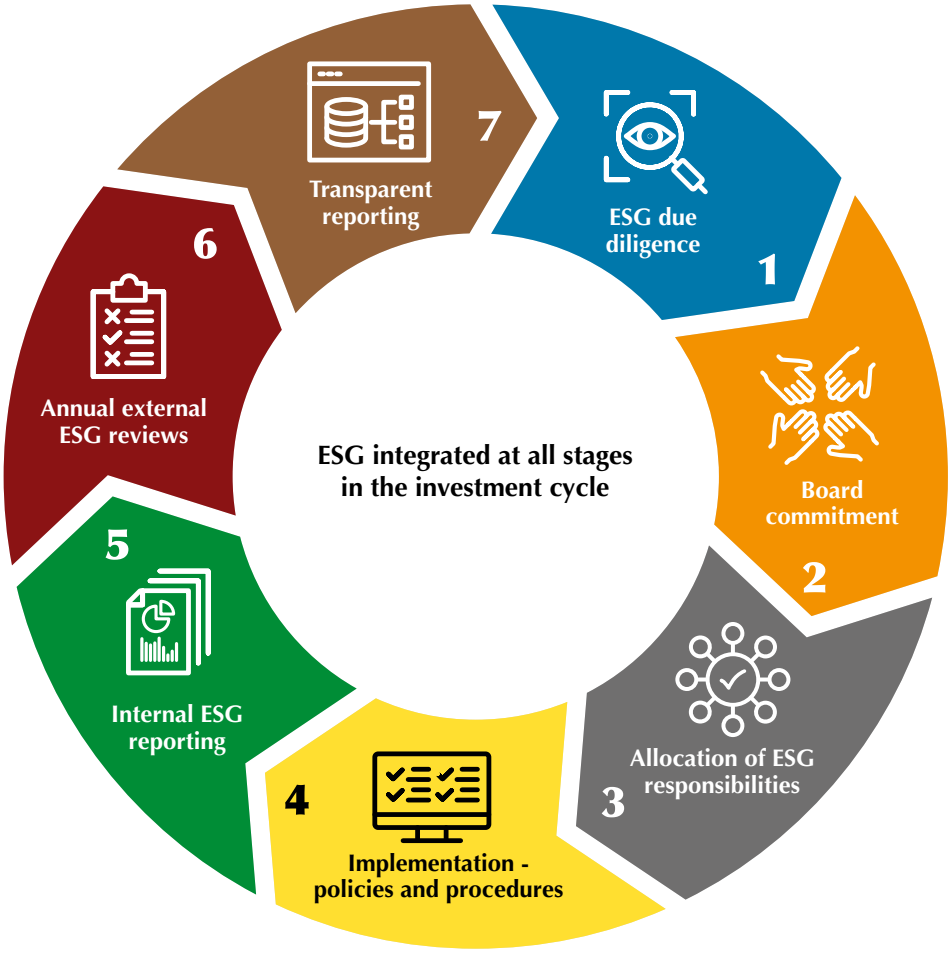
SilverStreet's Responsible Investment Code

RIC Section	Objectives
Environment	• Minimise adverse impacts and enhance positive effects on the environment • Make efficient and sustainable use of natural resources • Support the reduction of greenhouse gas emissions and the development of environmentally friendly technologies
Social	• Treat all employees and contractors fairly and respect their dignity, well-being and diversity • Support the protection of internationally proclaimed human rights and not be complicit with human rights abuses
Other social matters	• Be objective, consistent and fair with all stakeholders • Promote social development impact • Promote local food production • Ensure safe and healthy working conditions for all employees, contractors and others affected by the operations
Governance	• Exhibit honesty, integrity, fairness, diligence and respect in all business dealings • Promote international best practice in relation to corporate governance and work against corruption in all its forms, including extortion and bribery
Animal welfare	• Ensure the fair treatment of animals
Management systems	• Assess the impact of all new investments on ESG matters as an integral part of the investment process • Assign new investments a risk rating on ESG issues to determine the appropriate level of management and monitoring • Divisions to develop action plans of outstanding ESG issues with targets for improvements • Managers to work towards continuous improvements in these areas, with performance monitored • Divisions to adopt and implement policies relating to ESG matters • Report annually on ESG aspects • Monitor and record ESG incidents • Consider the RIC in all investment and divestment activities
Exclusions	• Production or activity involving forced labour or child labour • Production of or trade in any product or activity deemed illegal under applicable local or national laws or regulations, or banned by global conventions and agreement, such as certain hazardous chemicals, pesticides, pharmaceuticals and wastes, ozone depleting substances, endangered or protected wildlife or wildlife products • Production of or trade in arms, i.e., weapons, munitions or nuclear products, primarily designed or primarily designated for military purposes • Gambling, alcoholic beverages, illegal drugs, tobacco or tobacco-related products

The RIC references the IFC Performance Standards as well as other global protocols:

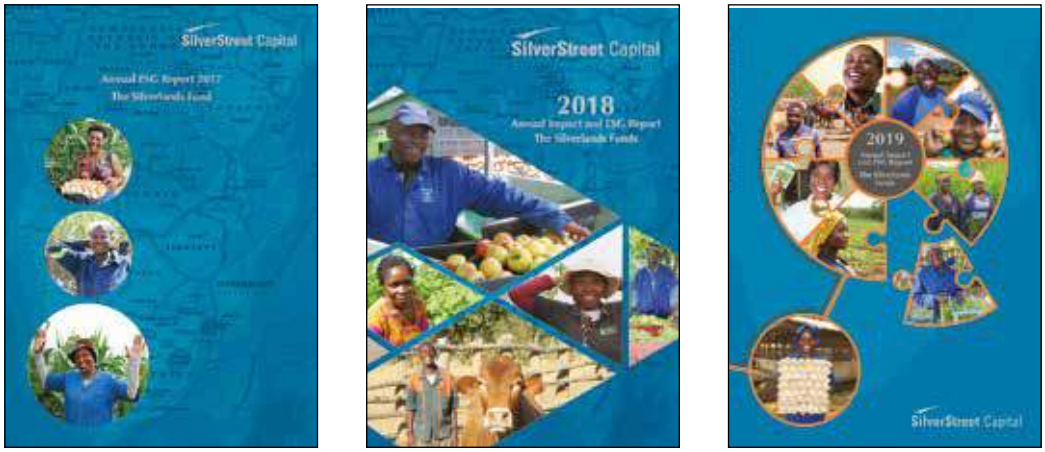
Organisation/topics	Protocols
IFC	• IFC Performance Standards • IFC EHS Guidelines • IFC EHS industry sector guidelines e.g. annual and plantation cropping, livestock production
International Labour Organisation	• Minimum Age Convention from 1973 • Worst Forms of Child Labour Convention from 1999 • The Conventions on Freedom of Association and Collective Bargaining; Forced Labour; and Non-Discrimination
World Health Organisation	• The international Good Manufacturing Practice standards for food and pharmaceutical products
United Nations	• Framework Convention on Climate Change • 2005 UN Anti-Corruption Convention
Management Systems	• The International Organization for Standardization ("ISO") 14000 series, including standards for environmental management systems (ISO 14001) and greenhouse gas emissions (ISO 14064-65) • The international occupational health and safety management system 18001
Organisations for Economic Cooperation and Development	• 2004 Principles of Corporate Governance
Conventions on pollutants and hazardous wastes	• The 2004 Stockholm Convention on Persistent Organic Pollutants • The 1992 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • The 1999 Montreal Protocol on Substances that Deplete the Ozone Layer
Endangered species	• The 1975 Convention on International Trade in Endangered Species or Wild Flora and Fauna

10.2 The Process of ESG implementation in our investment cycle



ESG matters are integrated into all stages of our investment cycle, as follows:

1. An **ESG due diligence** is performed prior to acquisition, resulting in an initial ESG action plan for implementation should the investment go ahead. Significant issues may lead to the termination of a transaction.
2. **Board commitment**: After acquisition, the board of the portfolio company commits to adhere to the RIC.
3. **Assignment of ESG responsibilities**: Responsibility is assigned to individuals within the portfolio company to manage ESG matters. This is often split across multiple roles.
4. Portfolio companies implement a **Social and Environmental Management System ("SEMS")** which includes risk assessments, policies and procedures to manage environmental and social risks (e.g. HR handbook, Transport, Fuel and Agrochemical procedures, etc.)
5. **Monthly internal ESG reporting** is set up and developed over time as needs arise. This ensures ongoing collection and analysis of data relating to ESG matters (e.g. employee numbers, water and electricity use, stakeholder engagement, waste management etc.)
6. **Annual external ESG reviews/audits** are performed by ESG specialists to guide the operation on the next steps of ESG implementation. ESG reviews result in action plans which the portfolio company then implements over the following year.
7. **Transparent reporting**: All ESG reports and additional updates are shared with investors via our online data sharing platform. An Annual ESG Day is held to review the annual ESG 'audits' with any investors wanting to go through the detail. These are typically ESG specialists from our investors. Investor ESG specialists visit our portfolio companies on a regular basis and we adopt a fully transparent ethos.



Our Annual Impact and ESG Reports make up part of our reporting to investors.

10.3 ESG responsibility

The implementation of our ESG performance standards requires a commitment from the boards and management teams of our portfolio companies. It typically requires an allocation of the company's annual budget when ESG action points need resolving and therefore has to form part of the business' day-to-day activities.

Board level responsibility

A member of the board of each portfolio company has been assigned responsibility for ESG issues and ESG is an agenda item at each board meeting. The following individuals are responsible for ESG at a board level:

Portfolio company	ESG board level responsibility
Silverlands I	
Silverlands Tanzania	Elisha Chivero
Silverlands Ndolela	Tim Denton
Silverlands Zambia	Simon Morgan
Silverlands Agriculture Services	Simon Morgan
Silverlands Ranching	Harvey Leared
Silverlands Vineyards	Kevin Liddle
Crookes Brothers	Social and Ethics Committee
Quinta da Bela Vista	Harvey Leared
Silverlands II	
Achill	Kevin Liddle
Zamseed	Simon Morgan
Quantum	Social and Ethics Committee

Day-to-day ESG implementation

Each portfolio company has personnel responsible for ESG. These people oversee ESG matters by managing the Social and Environmental Management Systems (SEMS) that have been implemented. This includes assessing and updating ESG risks, reviewing and implementing procedures, and collating and reporting ESG data to senior management and the General Partner of each Fund. SilverStreet oversees all ESG implementation across all portfolio companies.

The following personnel across the portfolio companies have key ESG management and/or reporting duties:

Julia Wakeling (SSC)
SilverStreet Head of Impact & ESG

Luke Lowsley-Williams (SSC)
SilverStreet Impact & ESG Analyst

Dr Ben Moshi (STL & SNL)
Board, Community Liaison

Janet Sanders (STL & SNL)
ESG Manager Tanzania

Jacqueline Mlowe (SNL)
HR Assistant

Amanda Moshi (STL)
Global Gap Compliance Manager

Sheryl Bradnick (STL)
Poultry Training Manager

Madeus Deule (STL)
HR Assistant and CLO

George Chabaputa (SASL)
HR/ESG Manager Zambia

David Kalunga (SZL)
HR/ESG Assistant

Chris Simpasa (SZL & SASL)
Community Liaison Officer

Francine Matanda (SRL)
HR/ESG Assistant

Ross Trotter (CBL)
Group Services Manager

Bruno Lima (QBV)
Farm Manager

Joel Sambo (QBV)
HR/ESG Assistant Manager

Lara Hough (SVL & Achill)
ESG Manager

Anna-Maria Jossop (SVL)
HR/ESG Assistant

Line De Jager (Achill)
HR/ESG Assistant

Chimankata Kashimbaya (Zamseed) Head of HR

Bill Nicolson (Zamseed)
Farm Manager

> **"I was quite impressed by the practical application. Employees speak the 'ESG' language. It has clearly been embedded in operations and that is really what you are aiming for - that is a harder task than putting the documents together."**
>
> *Annual ESG Review Consultant - Mike Valentine, IBIS Consulting*

Shared responsibilities

Managing all the multiple ESG aspects is more than one person's task. Each farm has an organogram showing how the management of ESG is divided between roles. This exercise helps management understand that ESG is about risk management and is everyone's responsibility.

By way of example, this is an organogram from CBL's Murrimo Macadamias business showing the separation of ESG risk management topics across typical farm roles.

10.4 Social and Environmental Management Systems

The board of each portfolio company has committed to adopt and implement a Social and Environmental Management System (SEMS), also known as an Environmental and Social Management System ("ESMS"). In each SEMS, ESG risks are identified, procedures are implemented to manage the risks and key ESG aspects are reported to management and the boards.

Overview of a Social and Environmental Management System

Portfolio companies in which we have been invested for longer have done well to integrate management of environmental and social aspects into their day-to-day operations. They are now moving from implementation to finessing the management of ESG.

Each Portfolio Company has a suite of 40 or more policies and procedures, guiding the management of ESG matters. In the table below are examples of policies and procedures. Certain policies and procedures (e.g. those relating to livestock) are only relevant for certain operations.

Topic	Policy/procedure	Topic	Policy/procedure
Employees	HR Handbook Induction Grievances Whistleblowing Medical Transport Training Incident reporting HIV policy Recruitment Collective bargaining	**Resources**	Chemicals Integrated pest management Fumigation Gas Hydrocarbons Soil Waste Water (volume) Archaeological finds
Community	Stakeholders External grievances Security (training in human rights)	**Biodiversity**	Conservation Aquatic monitoring Water quality testing
Emergency	Emergency preparedness Dam emergency Evacuation	**Livestock**	Animal welfare Biosecurity Vaccinating
Climate	Climate change plan	**Food safety**	Hygiene Nuts and allergens Product recall
Equipment	Operating Crop drier Silos Working at heights Workshop Tyre repair	**Governance**	Anti-bribery and corruption Legal Purchasing Cyber threats Permits and authorisations

10.5 ESG training

On-the-ground training continues to take place with management and employees with key ESG responsibilities. Topics include: an ESG overview; the IFC Performance Standards; the Fund's RIC; SEMS implementation; monthly reporting; stakeholder engagement; and discussions to ensure an understanding of the Environmental and Social Action Plans.

The COVID-19 related travel restrictions in 2020 have driven a shift to more online-based engagement and training. Group calls with ESG-responsible individuals from multiple companies have been valuable for sharing ideas and experiences. We hope the networking across portfolio companies will continue to be of valuable support to those employees responsible for ESG.

Online ESG training such as the ESG risk assessment and management training provided by the IFC and World Bank, are very useful training tools that continue to be used. CDC Group PLC, an investor in the Silverlands I Fund, also provided valuable in-person training which SilverStreet's Luke Lowsley-Williams and Julia Wakeling attended in London in November 2019.

10.6 ESG monitoring visits in 2019-20

SilverStreet Capital, independent consultants and ESG specialists from our investors typically visit portfolio companies regularly, though such visits have been curtailed in 2020 as a result of the impact of COVID-19. The 2020 ESG reviews were done instead over video calls on the same schedules. However, in the 12-month reporting period, and prior to the implementation of formal lockdowns and travel restrictions, eight of the portfolio businesses were visited by ESG specialists from consultancies, the IFU, the DFC, MIGA and SilverStreet.

ESG visits during the reporting period

Silverlands I			
Date	**Properties**	**Type of visit**	**Participants**
July 2019	CBL Murrimo	Annual ESG Review	SSC, Trusted Partners
	STL, SNL	Annual ESG Review	SSC, Trusted Partners, IFU
	CBL Deciduous	Annual ESG Review	CBL, Trusted Partners
August 2019	CBL Deciduous	ESG training at CBL Agriforum	SSC
November 2019	CBL head office	Social & Ethics Committee meeting	CBL, SSC
December 2019	SVL	ESG monitoring & training	SSC, DFC, MIGA
	CBL Deciduous	ESG monitoring & training	SSC, DFC
January 2020	SRL	ESG monitoring & training	SSC
		Aquatic Biomonitoring: river monitoring, using faunal indicators	Freshwater Research Unit (Cape Town)
February 2020	QBV	ESG monitoring & training	SSC, DFC
	CBL Mpumalanga farms	ESG monitoring & training	SSC
Silverlands II			
December 2019	Achill	ESG monitoring & training	SSC, DFC
February 2020	Zamseed	ESG monitoring & training	SSC

Site visits by ESG professionals naturally include invaluable on-the-ground staff training. Visits in the last year included the DFC and MIGA to Namibia (left) and freshwater specialists to Silverlands Ranching in Zambia (right). We look forward to more visits in future.

10.7 Governance structures

Our goal is to establish high levels of governance through the appropriate board structures and associated board committees at each of our portfolio companies.

Responsible Investment Code: The boards of all our portfolio companies have signed up to our Responsible Investment Code.

Anti-Bribery Policy: The boards of all our portfolio companies have adopted SilverStreet's Anti-Bribery Policy. SilverStreet is committed to ensuring that all officers, employees and third-party representatives of Silverlands are aware of the UK Bribery Act and the US Foreign Corrupt Practices Act, that they do not infringe them and that they exhibit the highest ethical business standards at all times.

Independent directors: We aim to have a minimum of two independent directors as this helps to bring an independent perspective, local networks and expertise in the sector. We aim for one of the independent directors to be of sufficient stature to chair the board meetings.

Board mix: The target board structure, for those companies of which Silverlands owns 100%, usually comprises:

- Two independent board members
- Two executive members (the MD and CFO)
- Two SilverStreet members

In some countries, there are regulatory rules on board membership, which also need to be followed. In Zambia as an example, at least half of the board must be resident in Zambia.

Board committees: We have also put in place board committees to deal with key specific governance issues. The two key committees we target creating are the 'Audit Committee' and the 'Remuneration Committee'. The 'Audit Committee' has the role of overseeing the annual audit process and interacting with the auditors to understand any issues arising and any debates on accounting practices; this allows detailed review and checks.

The 'Remuneration Committee' principally approves the remuneration of the senior management team of the portfolio company, as well as approving the annual bonus scheme and any long-term incentive plans. This committee also reviews and recommends the nomination of any new member to the board, interviewing them and monitoring the balance of skills in the team. On some boards, this role has been separated into a 'Nominations Committee', but it is generally not significant enough to justify a separate committee.

Other committees are added where useful. Examples include a 'Risk Committee' whose members seek to identify the key risks facing the company and to recommend ways that the company can mitigate those risks. Additionally, CBL has a 'Social and Ethics Committee' and Julia Wakeling (our Head of Impact and ESG) attends these meetings.

Reporting: The portfolio companies have a minimum of four board meetings a year. Monthly reports are produced for the SilverStreet Investment Committee. A member of each portfolio company has responsibility for monitoring and reporting back to the SilverStreet Investment Committee on Anti-Bribery and Corruption training.

Strategy: The boards approve budgets and agree strategy. Key strategic matters are escalated to SilverStreet's Investment Committee for its consideration. Examples of such matters include new developments, acquisitions, divestments etc. The Head of Impact and ESG is also a member of the SilverStreet Investment Committee.

Environment, Social and Governance: The portfolio companies conduct an annual ESG review and the results are made available to our investors. They are also presented to the boards of the portfolio companies and action points are discussed. Some of these action points may require sufficient budget to be allocated for the relevant action to be implemented. Action points are monitored between annual reviews, and the ESG team typically visit the portfolio companies to monitor progress and to provide ESG training. COVID-19 related travel restrictions have resulted in more online engagements in 2020. Each portfolio company has a designated ESG contact person.

The following table summarises these governance features. Most of the governance structures are in place. Achill is searching for an independent director. QBV is a joint venture company with CBL and there is already a reasonable balance on the company's board given the company's size. As the business develops the board will be added to.

Portfolio company	Silverlands' stake	Number of independent directors	Independent chairperson	Board committees		Written commitment Responsible Investment Code	Independent auditor
				Audit	Remuneration		
Silverlands I							
Crookes Brothers	44.8%	4	✓	✓	✓	✓	✓
Silverlands Ranching	100%	1	✓	✓	✓	✓	✓
Silverlands Zambia	100%	2	✓	✓	✓	✓	✓
Silverlands Agriculture Services	100%	2	✓	✓	✓	✓	✓
Silverlands Tanzania*	100%	2	✓	✓	✓	✓	✓
Silverlands Ndolela	100%	1	✓	✓	✓	✓	✓
Silverlands Vineyards	100%	1	✓	✓	✓	✓	✓
Quinta da Bela Vista	51%	1	×	×	×	✓	✓
Silverlands II							
Achill	100%	0	✓	✓	✓	✓	✓
Zamseed	83.99%	1	✓	✓	×	✓	✓
Quantum	32%	?	✓	✓	✓	×**	✓

**New STL affiliates are being established in Kenya and Uganda and are in the process of establishing appropriate governance frameworks.*
***Quantum is a recent investment by Silverlands II.*

11 Annual ESG Review

11.1 Overview

The Annual ESG reviews are important in detailing the next step in ESG implementation at each portfolio company. Annual reviews of the portfolio began in 2013. The aim is for the review to be performed by an independent external consultant every second year, however independent consultants have been contracted every year other than 2016, partly to prepare the Silverlands I portfolio companies for exit.

This year the review was divided between two consultancies: IBIS Environmental Social Consulting South Africa and Camp Consult. The rotation from Trusted Partners was for good practice to ensure independence and welcome new ideas from a fresh set of eyes and ears. Detailed ESG reports were completed for each portfolio company.

The reports are detailed "audits" of each portfolio company's ESG performance. Each of the 18 reports are on average 49 pages long. The reports cover 10 portfolio companies: the larger number of reports reflects the facts that some portfolio companies contain more than one business/farm. The reports are carefully reviewed by the management of each portfolio company and the SilverStreet team. All of the reports are made available to our investors via the Sungard system and reviewed in an annual Impact and ESG Day.

Fund	Number of reports	Average pages per report	Total pages
Silverlands I	16	49	**776**
Silverlands II	2	50	**100**
Total	**18**	**49**	**876**

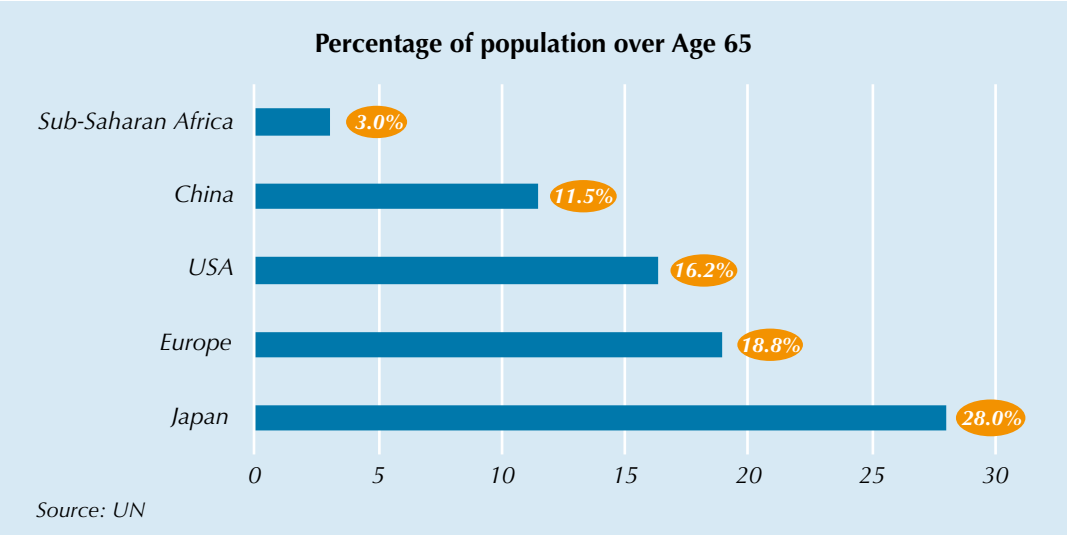
> **Not everyone is as quantitative, comprehensive and transparent at reporting as you are.**
> *ESG Consultant*

11.2 COVID-19 management across the portfolio

To date, Africa seems to have been less affected by COVID-19. Africa has benefitted from:

- A young population
- A relatively warm climate and more outdoor living
- The knowledge and experience gained from those countries where the pandemic struck first.

The following chart illustrates the relatively young populations: only 3% of the Sub-Saharan African population are over 65 compared to 16.2% in the US, 18.8% in Europe and 28% in Japan.



From an operational perspective, border closures and travel restrictions have made the flow of goods more difficult, but there have been no material disruptions to any operations to date. We are fortunate that all our portfolio companies have continued to operate through any lockdowns as they provide essential food and food-related products. The businesses are also in remote areas and have a natural geographical buffer from the cities, which appears to be where most cases are.

From an HR perspective, there have not been any COVID-19 related retrenchment or furloughing. All portfolio companies have implemented measures to protect the health and wellness of employees and reduce infection rates. These measures were implemented early and seem to have had a positive preventative impact:

- Raising awareness and providing training (initiated in February 2020)
- Instituting hand washing, sanitising and social distancing
- Isolating the unwell and protecting the vulnerable
- Ensuring nearby clinics are prepared, for example via donations of materials

An example of COVID-19 prevention measures in place at Silverlands Tanzania – temperature testing and hand washing facility constructed at the entrance gate.

In our portfolio, as at 31 December 2020, we have been informed of less than 50 potential cases of COVID-19, all of whom have recovered, out of about 10,400 employees. These cases have been described as "potential" cases because of a lack of access to testing kits, and/or the possibility of inaccurate testing.

We are in touch with our businesses frequently and continue to monitor and advise on their varied situations.

11.3 Compliance with our Responsible Investment Code

Our Responsible Investment Code is divided into seven sections. Each year in the annual ESG review, portfolio companies are scored against the various topics. Although these reflect only snapshots of the performance of each portfolio company at the time of the annual review, they are a good indicator of overall performance.

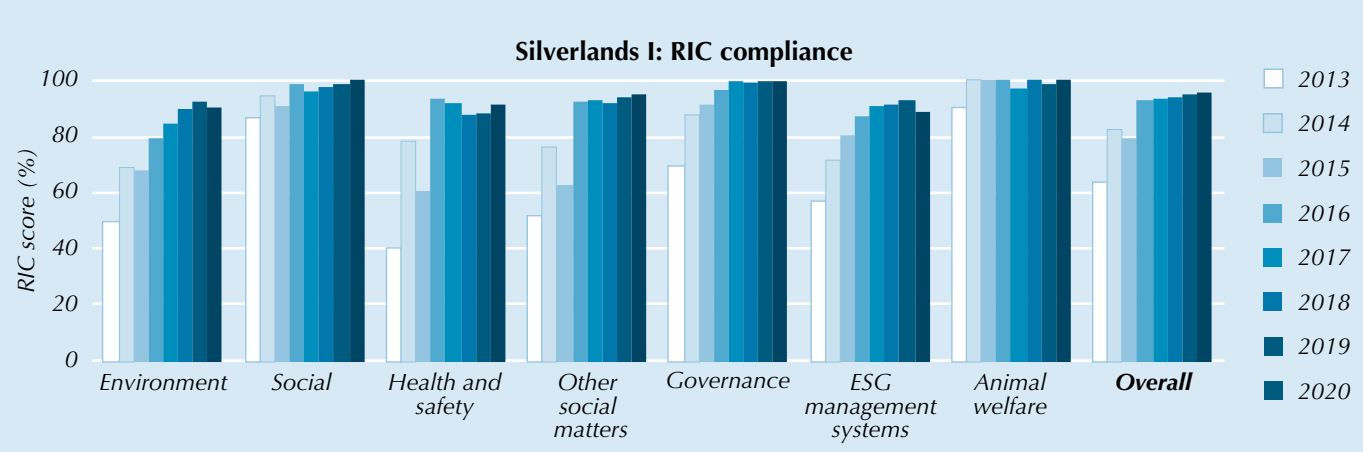
a) Silverlands I

We are proud to report that there continues to be a positive trend in compliance by all portfolio companies. As the businesses have become more established, the focus has shifted from major items to finessing the integration of ESG. As anticipated, scores have remained in the early- to mid-nineties overall and are likely to continue to do so. Scores are shown below and detailed in the individual reports for each portfolio company.

Silverlands I: Responsible Investment Code (RIC) compliance

Section summary	2013 %	2014 %	2015 %	2016 %	2017 %	2018 %	2019 %	2020 %	Change %
Environment	49	69	68	79	84	89	92	90	2 ↓
Social	86	94	90	98	95	97	98	100	2 ↑
Health and safety	40	78	60	93	91	87	88	91	3 ↑
Other social matters	52	76	62	92	93	91	94	95	1 ↑
Governance	69	87	91	96	99	99	99	99	0
ESG management systems	57	71	80	87	91	91	93	89	4 ↓
Animal welfare	90	100	100	100	97	100	98	100	2 ↑
Overall	**63**	**82**	**79**	**92**	**93**	**94**	**94**	**95**	**1 ↑**

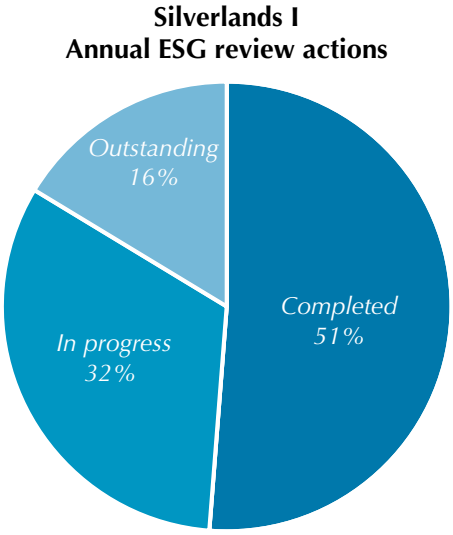
In addition to compliance with the RIC, each portfolio company continues to make progress on action points raised in previous ESG reviews with 84% of actions either completed or in progress.



Silverlands I: Portfolio company progress against previous action plans

Portfolio company	No. of actions	Completed	In progress	Outstanding
Silverlands Tanzania	50	19	22	9
Silverlands Ndolela	25	8	12	5
Silverlands Zambia	25	11	10	4
Silverlands Agri. Services	21	10	7	4
Silverlands Ranching	24	13	10	1
Silverlands Vineyards	15	13	1	1
Quinta da Bela Vista	35	18	5	12
Crookes Brothers	209	115	64	30
Total	**404**	**207 51%**	**131 32%**	**66 16%**

This table excludes actions which are not yet actionable.



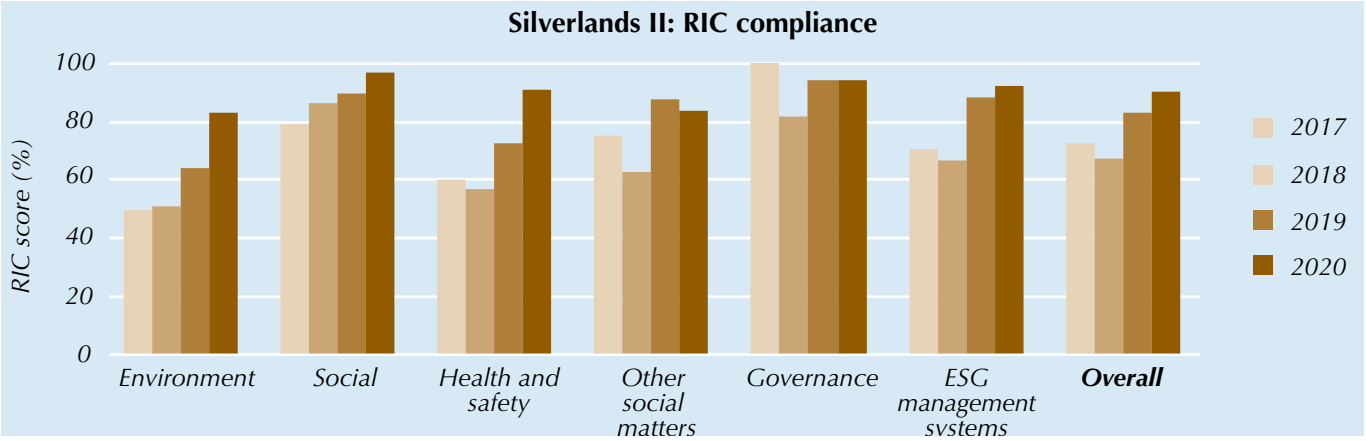
b) Silverlands II

Silverlands II now comprises three companies: Achill Island Investments (Achill), Zambia Seed Company (Zamseed) and Quantum Foods Holdings Limited (Quantum). Please note that the stake in Quantum was acquired in July 2020 after the annual ESG review process had begun and could not be included this year. The following commentary and scores relate only to Achill and Zamseed.

The overall compliance level has improved significantly from 82% to 90%. As implementation continues, we expect scores to rise above 90%. As a reminder, ESG compliance fell in 2018 when the Silverlands II Fund acquired Zamseed and its compliance with our RIC was low at acquisition (44%), improving steadily since then.

Silverlands II: Responsible Investment Code (RIC) compliance

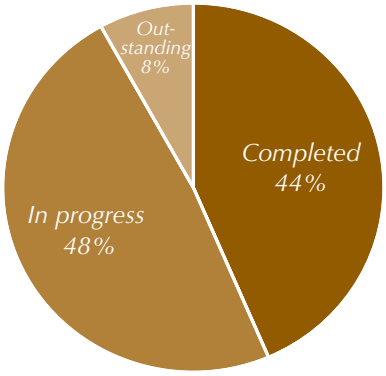
Section summary	2017 %	2018 %	2019 %	2020 %	Change %
Environment	49	51	64	83	19 ↑
Social	79	86	90	97	7 ↑
Health and safety	60	57	72	91	19 ↑
Other social matters	75	63	88	84	4 ↓
Governance	100	82	94	94	0
ESG management systems	71	66	88	92	4 ↑
Overall	**72**	**67**	**82**	**90**	**7 ↑**



Silverlands II: Portfolio company progress against previous action plans

Portfolio Company	No. of actions	Completed	In progress	Outstanding
Achill Island Investments	21	20	0	1
Zambia Seed Company	41	7	30	4
Total	**62**	**27 44%**	**30 48%**	**5 8%**

Silverlands II Annual ESG review actions



11.4 Summary of key actions in progress and outstanding across the group

The latest annual ESG audits have led to the following types of actions that are relatively common across portfolio companies:

Systems

- SEMS implementation: review procedures and ensure access in appropriate languages.
- Risk assessments: update and ensure all risks included. Develop risk-assessment guide.
- ESG team capacity: continue with ESG training for key responsible individuals.
- H&S incident reporting: improve root-cause analysis and implement mitigations.
- Emergency response: review plans and conduct drills.
- ESG farm plans: include ESG performance targets and KPIs.
- Track implementation of actions in EMPs from EIAs.
- Develop procedures for high-risk tasks.
- Legal: develop legal register and conduct periodic legal compliance audits.
- Conduct internal ESG audits of operations.

Environmental

- Fuel, oil and agrochemical storage: ongoing storage and handling improvements.
- Resource use: monitor and benchmark efficiency against production. Develop targets.
- Runoff water: test for presence of agrochemicals.
- Waste management: improve management and reporting of waste volumes.
- Conservation management plans: update plans for management of non-farming areas.
- Establish climate change strategies/plans.

Social

- Training: update training matrices for good planning and budgeting.
- PPE use: ensure appropriate supply, refresher training and checks on PPE use.
- Contractors: monitor contractors' adherence to ESG principles.
- Housing: continue construction/refurbishments, add housing policies to employee contracts.
- Agrochemicals: refresher training on handling and storage, medical checks of handlers.
- Grievance mechanisms: improve accessibility, response and reporting.
- Stakeholder engagement: include number of grievances (if any) in reporting.
- Develop a strategy to identify human rights and health and safety risks within the supply chain.

Appendix

Silverlands Funds I and II are subject to the following annual ESG reporting obligations:

Silverlands I – Reporting Obligations

The Offering Document for the Silverlands Fund provides that the General Partner will produce an annual ESG Report that will cover:

a) *The development and implementation of environmental and social management systems including completed training;*

b) *ESG performance, including compliance with the Investment Code;*

c) *The corrective measures taken and/or still required with regard to the issues listed in the ESG Action Plan; and*

d) *Information on development impact, including any out-grower schemes.*

Additionally, a number of Limited Partners have signed Side Letters with the General Partner in which the General Partner has committed to the following reporting obligation:

"We shall provide an annual report to any Investor who requests such a report on our implementation of the Investment Code and the performance of our investee companies against the Investment Code. The report shall include any issues, targets and a timetable for improvements, and performance over time against such targets and timetable."

Silverlands II – Reporting Obligations

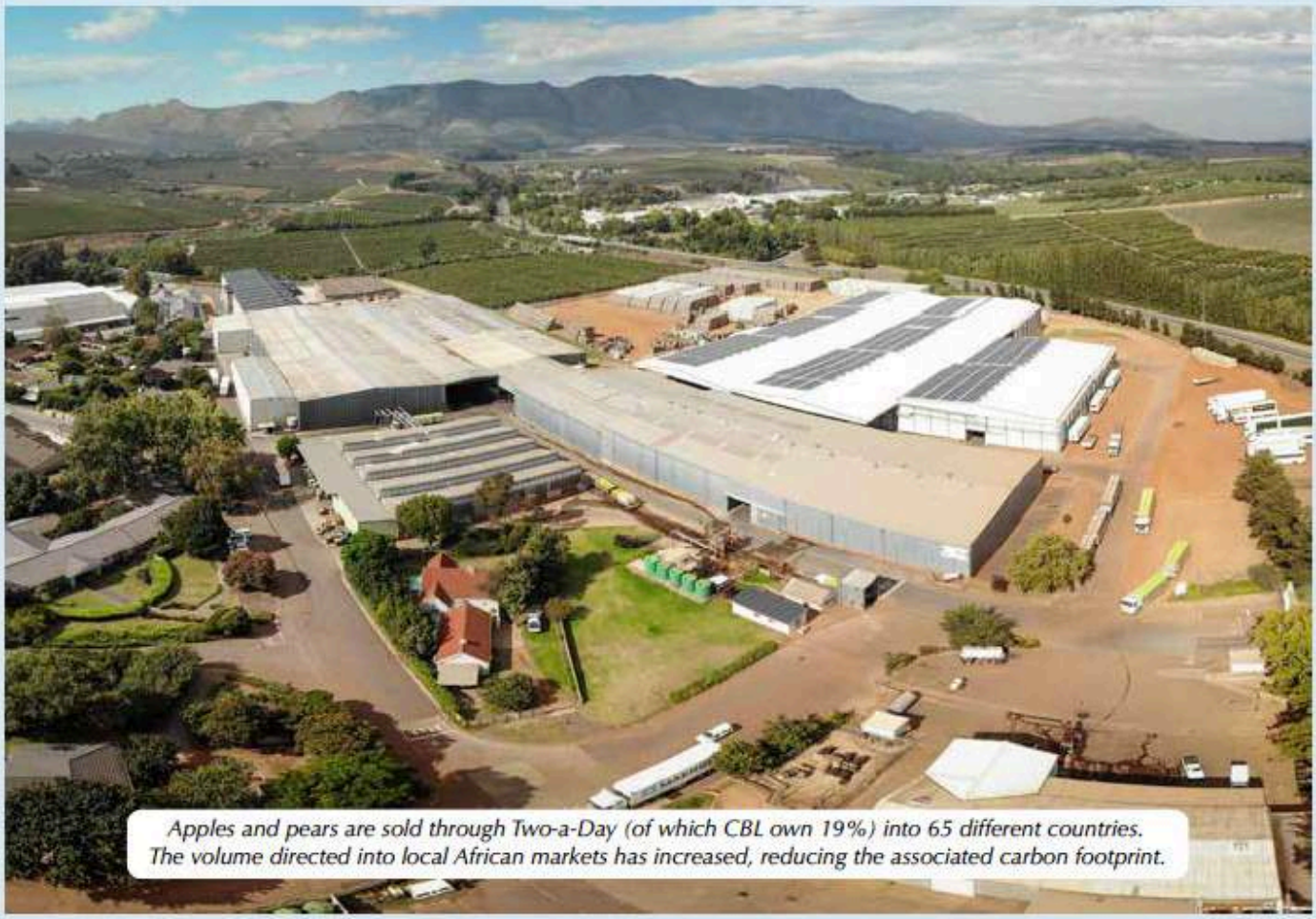
The Silverlands II memorandum commits that:

"SilverStreet seeks to implement its ESG policy and monitor these performance standards across portfolio companies. An annual ESG report is to be produced for investors including updates on social impact initiatives."

Disclaimer

- This report is issued by SilverStreet Capital LLP ("SilverStreet") on a confidential basis to a limited number of sophisticated institutional investors for the sole purpose of providing information about the impact of SilverStreet Private Equity Strategies SICAR – The Silverlands I Fund and Silverlands II SCSp (together, the "Funds"). SilverStreet is authorised and regulated by the UK Financial Conduct Authority.
- SilverStreet has taken all reasonable care to ensure that the facts stated in this report are true and accurate in all material respects and are reasonable estimates of the likely impact of the Funds. Measuring impact of the various projects is by its nature a process which requires assumptions and inference based on the available information. Any estimates or forecasts are, by their nature, uncertain, particularly given the substantial uncertainty created by COVID-19.
- All statements of opinion and/or belief contained in this report, all views expressed and all estimates, projections, forecasts or statements regarding historic, current or future impact and projects related to such impact represent SilverStreet's own assessment and interpretation of the information available to it as at the date of this report. SilverStreet has no obligation to update this document, or any part of it, following its issuance. No warranty or representation is made, or assurance given, that such statements, estimates, views, projections or forecasts are correct or that the objectives of the Funds will be achieved.
- In making any future investment decision, prospective investors must rely solely on their own examination and assessment of the Funds and should conduct their own due diligence and should obtain their own professional advice as to the legal, taxation, financial, impact and other consequences of any investment, including the merits of investing and the risks involved.

Our investments are introducing dates, a novel export crop, to Namibia. Whilst smaller plantations have been planted, the two Silverlands Funds are developing substantial date palm farms. The goal is to be the cornerstone of a significant new industry in Namibia.



Apples and pears are sold through Two-a-Day (of which CBL own 19%) into 65 different countries. The volume directed into local African markets has increased, reducing the associated carbon footprint.