Galvanizing smallholder farmers to access new markets through high quality vegetable seeds

A case study of Africasia Seed Company Ltd in Tanzania

Who we are

The AECF (formerly the "Africa Enterprise Challenge Fund") is a leading African-owned and led development organisation that supports innovative enterprises in the agribusiness and renewable energy sectors with the aim of reducing rural poverty, promoting resilient communities and creating jobs.

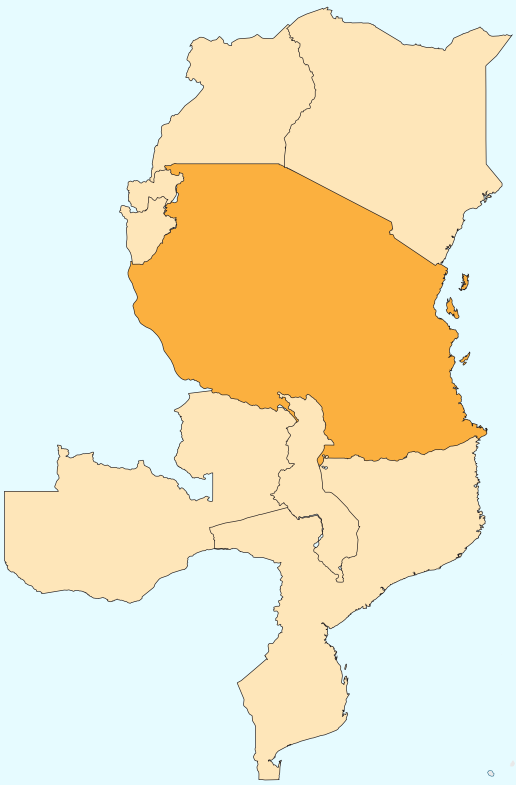
AECF has raised over US$ 400 million to provide catalytic funding and technical advisory support to enterprises that struggle to meet traditional risk-return standards for commercial investors. In just over a decade, we have supported over 375 businesses in 26 countries in Sub-Saharan Africa, impacted more than 30 million lives, created over 27,000 direct jobs, and leveraged US $771 million in matching funds.

We surface and commercialize new ideas, business models and technologies designed to increase agricultural productivity, improve farmer incomes, expand clean energy access, reduce greenhouse gas emissions and improve resilience to the effects of climate change while also addressing the crosscutting themes of women, youth, and fragility. AECF is committed to working in frontier markets, fragile contexts, and high-risk economies where few mainstream financing institutions dare to go.

In 2021, the AECF launched a refreshed strategy with the objective to build resilience and sustainable incomes for rural and marginalized communities in Africa.

The Tanzania Agribusiness Window (TZAW)

The Tanzania Agribusiness Window (TZAW) is a US$ 38M ten-year programme funded by the Foreign Commission Development Office (FCDO) and the Swedish International Development Cooperation Agency (Sida).



The programme seeks to address challenges of the availability, acceptability, affordability, and accessibility of agricultural produce and products by making food supply chain dynamics more efficient and effective to serve the poor; increasing the availability of agricultural inputs such as improved seeds, agrochemicals, fertilizers, veterinary services, transportation, and information; and enabling access to processing infrastructure in both rural and remote areas. The programme also seeks to increase the production and productivity of smallholder farmers thus increasing the availability of food, stabilizing prices, and ensuring a healthier population.

AECF has invested in more than 50 agricultural-oriented companies in a wide range of value chains ranging from seed companies, horticulture, fruit and vegetables, potatoes, fertilizer, and cashew nuts. The program has impacted tens of thousands of rural people, introduced innovative technologies, and changed how markets work for the poor.

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High quality seeds to launch smallholder horticulture production

Background of the innovation

Africasia Seed Company Limited (ASCL) was established in 2012 in Arusha, Tanzania. It focuses on breeding, multiplication and commercial sale of high-quality hybrid and Open Pollinated Varieties (OPV) of vegetable seeds, sourcing the parent lines from smaller seed companies and private breeders across the globe, to sell to commercially oriented smallholder farmers.

The demand for high-quality vegetables in Tanzania has steadily increased over the past decade as incomes and urbanization have increased. To meet this demand, the smallholder farmers who produce most of the domestically consumed vegetables in the country need high-quality-quality seeds. These superior genetics are high yielding, resistant to pest and disease, have better taste and greater nutrition, and have a longer shelf life but need to be available at a price low income farmers can afford. By providing high-quality seeds of superior, proprietary genetics at an affordable price, Africasia can enable farmers to increase both yields and profits.

While hybrid seeds are expensive and imported, with costs of production almost twice that of OPVs, they have higher yields. OPVs on the other hand, are planted by Africasia outgrowers and the seeds produced are purchased by the company for sorting, grading, treatment, packaging, and onward sales.

Innovations in the fresh fruits and vegetable value chain are mostly driven by seed companies, which develop new varieties and provide extension services and demonstrations on good agricultural practices (GAP) to increase yields. More than half of the 60 registered seed companies in Tanzania deal in vegetable seeds. The market for these seeds is estimated at US$ 25 million, with an anticipated 260% growth to US$ 65 million by 2024.

Africasia produces 13 seed crops with a range of individual varieties, focusing on African traditional vegetables as well as tomatoes and watermelon as higher value crops that generate significant incomes for farmers. The demand for African traditional vegetables in Tanzania is low due to low consumer awareness of their nutritive value, poor quality seeds, and a lack of appropriate market information and support systems. This has seen a reduction in their proportion of the value of food in diets from 20% to 11%. However, horticulture in Tanzania is the fastest growing sub-sector in agriculture, expanding by double digits (9-12%). While approximately 90% of horticulture products are consumed locally, the value of Tanzania's horticultural exports has increased by 28%, between 2015 and 2019 from US$ 545 million to about US$ 700 million.

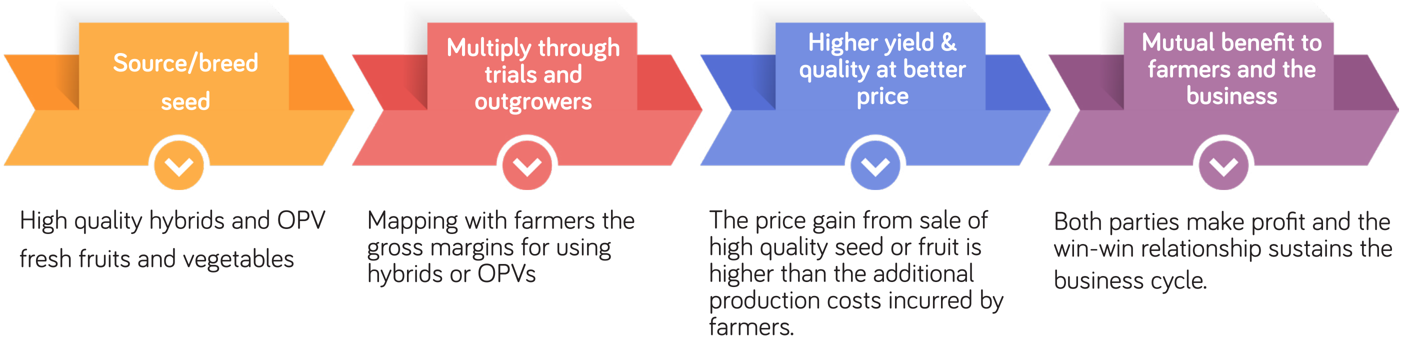


Figure 1. Simplified Africasia business case

Investing in new varieties to improve incomes and nutrition for smallholders

The AECF investment

The AECF investment in Africasia supported expanding the number of seed varieties available to farmers, either by sourcing hybrid parent lines or multiplication of OPV vegetables; expanding the trial sites for OPVs multiplication to fast-track release of the different seed varieties; and improving commercialization of the fresh fruits and vegetables seed varieties through the establishment of demonstration plots, farmer field days, farmer training and meetings as mechanisms to facilitate market uptake.

By 2015, Africasia had a limited range of crop seed varieties[1] with three hybrids and nine OPVs. Its commercial share of acreage under hybrids and OPVs was estimated at 6,000 acres, with the goal to expand the share five-fold to 36,000 acres.

AECF provided a matched grant with additional technical assistance, to enable Africasia to 'revolutionize' its capacity on the range of high-quality hybrid vegetable seeds it can provide to the market, fast track seed trials, increase multiplication capacity in multiple varieties and locations concurrently and expand its processing capacity especially in Arusha. It intended to increase its overall market share for tomato and watermelon from 12% and 11% respectively in 2015 through improved varieties and targeted seed sales to smallholder farmers in Tanzania.

Business model challenges and mitigation

Africasia's business addresses smallholder farmers' demand for high-quality local vegetable seeds. The model was meant to 'pull demand' through innovative solutions including field trials, demonstrations, farmer field days, and training of farmers on good agricultural practices in sub-optimal conditions, with affordable technologies to facilitate uptake.

By patiently demonstrating the benefits of modern technologies, smallholder farmers who adopt use of these high-quality seeds will experience higher yields of superior quality and fetch higher prices for for seed (as outgrowers or crops farmers producing for the market).

The incremental profit from the higher quality seeds planted will outweigh the higher production costs[2] invested.

OPV and imported hybrid seeds are taken through multiplication or field trials and certified, then produced, processed, and put up for sale to farmers country-wide through a network of sales officers working with agro-dealers.

The success of Africasia's business model was predicated on three key pillars of innovation: Uniqueness; agile delivery and niche market.

Uniqueness

- Revolutionize hybrid vegetable use and build demand for new seed varieties
- Target local and selected high-value hybrids to meet local demand and not competing with multi-national companies segments.

Agile delivery

- Increase acreage of promising crop species (tomato and watermelon) and increase Africasia seed market share in those crops.
- Target smallholder farmers with open-field, affordable, climate-smart technologies and bundled services to improve yields and farmer incomes.

Niche market

- Breeding local vegetables and availing world-class hybrid germplasm at affordable prices to commercially oriented smallholder farmers.

Figure 2. Pillars underlying the model's assumption

Progress, challenges, and lessons

Implementation progress

The investment established a processing plant in Arusha, expanded fresh fruits and vegetables seed varieties and strengthened the out-grower and production base for OPVs.

i. A new seed processing plant was established in Arusha, accommodating the head office.

Having operated for a long time with one processing facility in Magugu, the investment in a new processing facility served the seed market needs for Arusha and nationally. The Arusha processing plant offers processing services and machinery for seed sorting, grading, treatments, (re)packaging, and storage of OPV and hybrid seeds for the domestic market.

ii. The number of outgrowers, OPV acreage, and production volumes peaked in 2018, fluctuating thereafter.

Between 2017 and 2018, the number of outgrowers and indeed OPV production almost doubled, although there were marginal changes in acreage under production. New outgrowers were provided with additional training incentives alongside credit services, high-quality seed, fertilizers, and pesticides. This was coordinated through partnerships with local and international organizations to increase the uptake of a variety of seeds introduced in the market through outgrowers, as well as other farmers, in the regions. These initiatives increased the uptake of seeds by outgrowers who cultivated 11,000 Kgs of OPV seed in 307 hectares of land.

The declines in outgrowers and OPV production volumes, between 2019-2020 were attributed to among others the volatile domestic commodity prices including overproduction of vegetables across the producing regions suppressing the market prices, increased cost of production (and more so for hybrid seeds) and lack of markets exacerbated by the Covid-19 pandemic. In 2021, as Covid-19 regulations eased and costs of fertilizers and pesticides stayed high, Africasia increased its buying price which in part led to an increase in OPV production from 9,000 Kg in 2020) to 19,000 Kg in the following year. There was a marginal improvement in the proportion of reported women outgrowers from a low of 20%, to a peak of 35%.

iii The investment in the importation of hybrid parent lines consistently declined due to economic and policy challenges, exacerbated by Covid-19.

There was a consistent decline in the import of hybrid parent lines offset by the procurement of OPV seeds. Africasia imported a variety of hybrid vegetable seeds for local multiplication. The 2018 introduction of a new tomato hybrid TO 135, was considered a potential game-changer as it had several attractive qualities for both producers and consumers. Despite this, the fall in tomato prices dampened the seed market. In response, Africasia introduced seed pack sizes ranging from 1, 5, 10, 25, 50, 100, and 250g to push more sales to lower cost market segments, but also discounted the seed prices to push more seed products into the depressed market.

Out grower variables	Y2017	Y2018	Y2019	Y2020	Y2021
# Of outgrowers (Total)	74	137	95	95	95
# Of acres planted by outgrowers	306	317	285	271	287
OPV seed production in Kgs	8,960	14,250	9,000	9,000	19,000
% outgrowers who are women	20%	18%	35%	35%	35%

Figure 3: Number of out-growers, OPV acreage, and production volumes

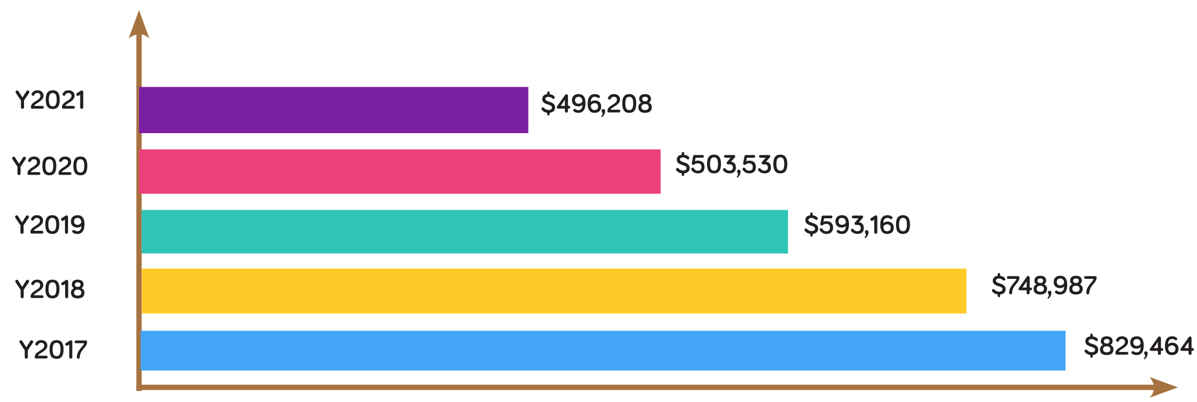


Figure 4: Hybrid seed imports in USD (2017-2021)

iv. Significant expansion in the crop seed varieties made available to farmers and regions of operation

Expansion in seed varieties and regions was enabled through partnerships established for research and trials with local outgrowers and breeders.

The use of demonstration plots, additional bundled services and incentives of loaning outgrowers seed extraction machines for quality control helped to increase production.

This was complemented by expansion of trial sites to Morogoro and Moshi, expansion of seed varieties in the market and recruitment of new sales staff for new regional markets.

Africasia started processing 11 seed varieties (OPV and hybrids) in the Arusha processing plant and extended the number of trial sites for different varieties. By 2021, they had expanded to dealing with 13 crop species with more than 8 different seed varieties in more than 10 regions of Tanzania.

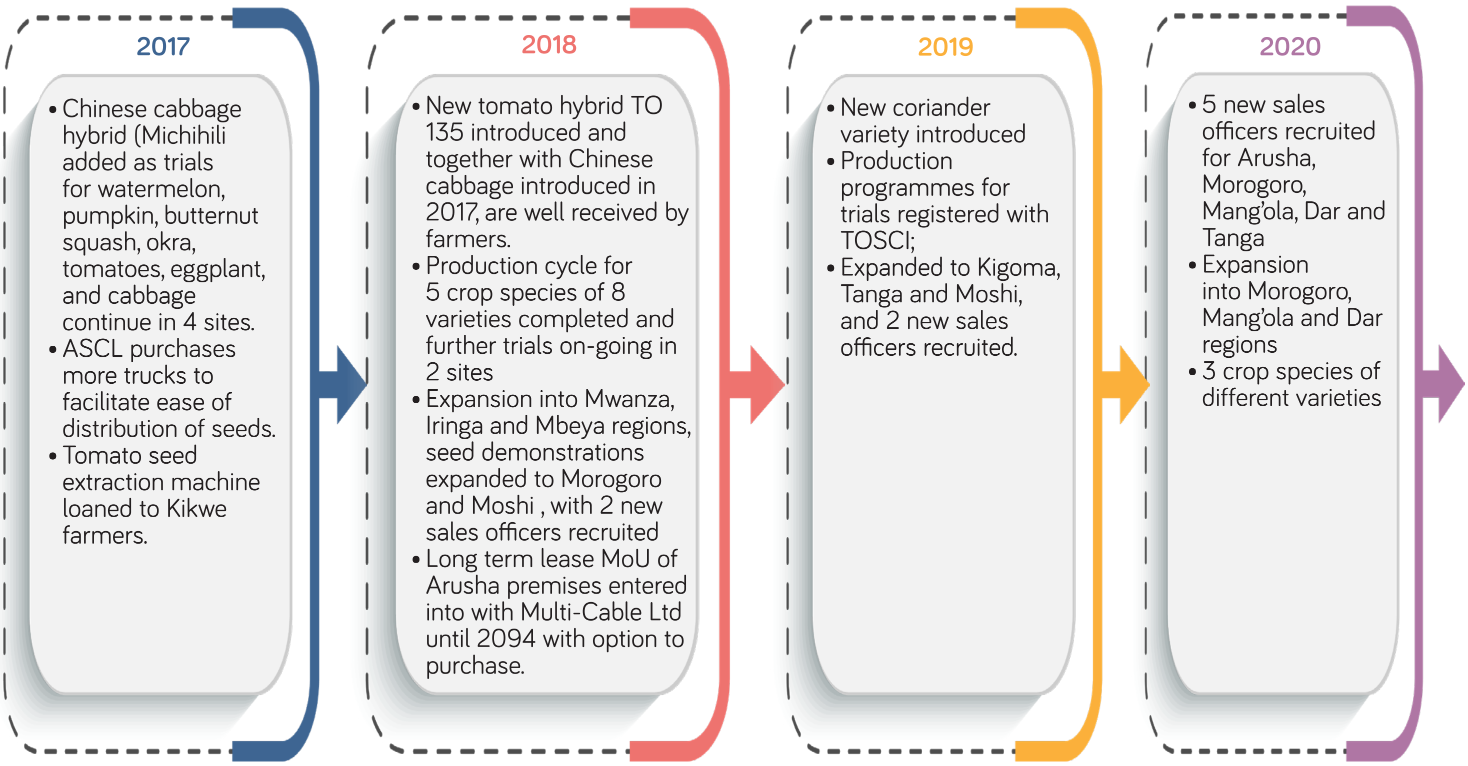


Figure 5: ASCL operations expansion timeline (2017-2020)

v. Africasia's performance surpassed targets averaging profit margin of 3% between 2017 and 2020.

Africasia's performance was profitable over the investment period but with tight profit margins averaging around 3%. The positive performance was driven by an adaptive business strategy, good management of cash flows and debt, targeted varieties and market expansion, high-quality seed varieties, and input credit services that cushioned farmers from capital out-flows.

The business strategy balanced importation of OPV and hybrids with expanded production and multiplication of seeds for the local market, as well as expanding the range of seed pack sizes to target the lower segment of smallholder farmers. This resulted in better management of cash flows by fast-tracking the release of multiple quality seed varieties into the market.

Varieties targeted were high value and with qualities that are demanded by the market, and since distribution was based on the use of agro-dealers, the expansion into new regions was informed by demand and existing orders placed through the trusted partners. Building trust and providing quality services were instrumental in this expansion.

Deepening knowledge and skills training through the demonstration plots and farmer field days, advanced provision of input credit (seeds, fertilizer, pesticides, and seed extractors) to outgrowers, and consistent agronomic and quality monitoring support built additional trust, for an assured market for outgrowers, while the high-quality performance of introduced seeds captured a trusted market across the nation.

	Y2017	Y2018	Y2019	Y2020
EBITDA[3] (US $)	$ 164,565	$ 148,308	$ 149,293	$ 105,824
Profit Margin (%)	2%	4%	2%	2%

Figure 5: ASCL Operations Expansion timeline (2017-2020)

Business challenges and lessons

The key challenges and mitigation strategies

The investment faced a myriad of challenges. Africasia made strategic decisions to reduce overheads, and avoid bad debts by extending repayment grace periods, pursuing alternative procurement options, and aligning operations with the business size and profit potential.

For the customers, 'creation of value' was strengthened through deepening contact and support through demonstration plots, training and farmer field days, constant communication to understand their needs and resolve complaints and improve customer satisfaction, focusing on 'creating demand for seed' not just supplying seeds to the market, and providing special incentives to high-value customers and outgrowers as a retention mechanism.

i. Regulatory challenges:

There were delays in the registration of new seed varieties by Tanzania Official Seed Certification Institute (TOSCI)[4]. This was caused by insufficient technical personnel at TOSCI to provide oversight to seed trials and certification processes and the lengthy and costly process of certification. The other regulatory challenge – the changes in fertilizer (bulk) procurement regulations in 2017 - increased the cost of fertilizers to the farmers while the increased tax burden on the private sector also affected cash flows and capital available for investment.

In response to regulatory challenges, Africasia expanded its partnerships with breeders and local farmers, to facilitate multi-variety trials in multiple sites and invited TOSCI to oversee the processes. While the high costs of fertilizers continued after the regulations, and were compounded by Covid-19, farmers (especially seed outgrowers), were provided with fertilizers (and pesticides) as advance loans under contract which cushioned them from capital outflows.

ii. Fluctuations in commodity prices:

The volatilities in the international commodity markets of 2017-2018 generally had effects on import and logistic costs and prices. The Indian ban (2017) on pigeon peas from Tanzania also affected the production market. At the domestic stage, the weather patterns that determine the production volumes of tomatoes in Tanzania wreaked havoc causing fluctuations in price in the domestic market. This depressed the market uptake for seeds in Tanzania.

Different options were instituted by Africasia to mitigate this challenge. As has been shown before, Africasia had to slow down on importation of hybrid seeds to manage the high costs involved, expand options for seed labeling to cater for lower market segments of smallholder farmers, provide incentives including bundled services, seed extraction machines on credit, discounting prices of seed sold in the market, but also increasing the price paid to seed outgrowers.

iii. Covid-19 impact:

Covid-19 impact was felt from 2020 on three fronts: loss of market share; low prices for farmers and higher importation costs and delays. The loss of market share was caused by a lack of markets for farmers reducing the uptake of improved seeds as they reduced their farm sizes and costs of production.

Due to the closure of both regional and international export markets, there was a glut of agricultural product in the domestic market which reduced prices and farmers' incomes. Covid-19 impact was also felt in an increase in freight and logistic costs for imported seeds, as well as significant delays in freight deliveries which affected production. Increases in input costs were transferred as input credit to outgrower farmers, eating into their farm incomes and increasing costs of production in the market.

iv. Climate change and effects:

Changes in rainfall patterns between 2016 and 2018 affected farmers' productivity and incomes and overall company sales turnover. In 2016 and 2017, the rains came late but also came in greater than normal amounts causing flooding which significantly affected vegetable growers. In 2018, there was a serious drought, and climate variabilities exposed crops to pests and diseases, which affected vegetables production leading to poor harvest.

v. Technical capacity challenges:

Challenges with recruiting (expatriate) agronomists, and locally qualified personnel delayed staffing, however, Africasia navigated this through providing on-job training, mentoring and coaching, and exposure learning visits to the local staff so as to continue providing effective and quality services to customers.

Lessons learnt

The following key lessons learned in the business implementation are critical in moving forward:

- **Effective partnerships:** The importance of building effective partnerships and relations with regulatory authorities, as well as stakeholder groups, have supported navigating the challenges in the regulatory environment, but also strengthening voice in seed market reforms.

- **Input credit and bundled services:** These incentives not only help cushion farmers, but also offers alternative options to farmers that help in promoting and sustaining uptake of new technologies.

- **Versatile operations and marketing strategies:** Learnings through the implementation period indicated the need to review the marketing and operational strategies to manage risks in terms of production, market, procurement and cash-flows. The integration of such changes enabled development of resilient systems and approaches that have weathered significant adversities faced.

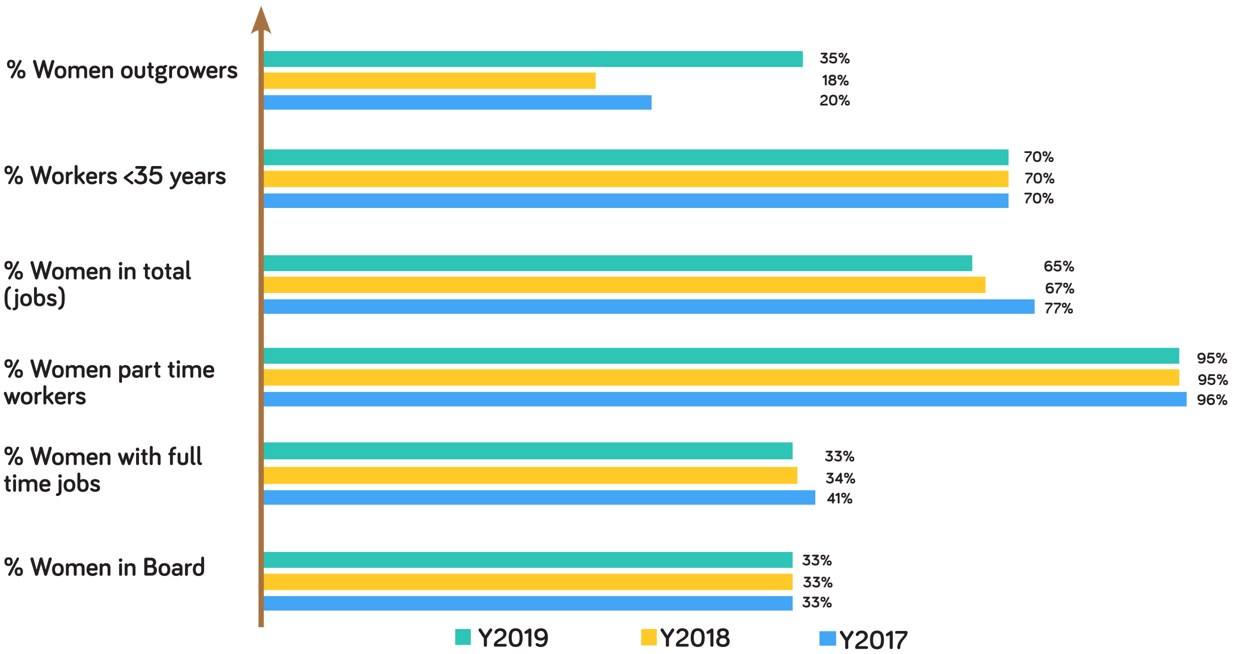
AECF Additionality

Africasia's investment design and implementation were gender-neutral and had no special focus on youth. However, investment assessments by AECF had identified inclusion as critical. AECF thus continually encouraged Africasia to mainstream gender and youth inclusion in its implementation, using indicators which were assessed during the investment.

The inclusion gaps identified low women and youth participation as seed outgrowers, disproportionate full-time employment (FTE) of men compared to women, and significant engagement of women as part-time workers.

Africasia initiated some responses to target greater inclusion of women and youth through invitations to community demonstration plots and field days, as well as greater access to training on new technologies.

Some marginal progress was made on this front, increasing the proportion of women outgrowers from 20% in 2017 to 35% in 2019. However, even with the opportunities that horticulture value chains offer to women, the gender gap has socio-cultural foundations that will require alternative long-term mechanisms to address.



The development impact

Outgrowers producing OPV tomatoes for Africasia earn US$ 3,980 per acre. Farmers indicate that the seed contract under Africasia provides them with an assured market, enabling them to plan their production cycles and increase monitoring of the production process and supply chains.
Fruit production for the market is, however, affected by fluctuations in the market prices, since any bumper harvest across the country depresses the market prices leading to many farmers incurring losses. Outgrowers indicated that they have increased their acreages under OPV Tomato from an average of 2-5.5 acres, because of higher benefits, and still commit to further expansion.

The biggest challenge to expansion is the high cost of inputs. Even though Africasia Seed Company provides advance input credit including seed, fertilizers, pesticides as well as seed extraction machines on loans, the costs are deducted from the farmer's sales delivered to the company. Since costs of labor and production activities are not covered by Africasia, farmers still use their incomes to cater for these and any household needs thus diminishing their production capital for the next season, which makes them dependent on input credit.

Farmers noted that what sets Africasia Seed Company apart from their competitors are:

i. The Tomato seeds have high germination rates,

ii. Africasia perform soil sampling and uses these in their trials to suit outgrowers' farming conditions,

iii. They have low rejection rates as the quality is higher and quality control systems are closely monitored and transparent,

iv. Payments for seed supplied are not delayed,

v. Agronomic support, advance input-credit, and seed extraction equipment loans,

vi. The contract assures a reliable market,

vii. There is a high degree of trust between outgrowers and Africasia Seed Company.

Smallholders producing for the market

Africasia has not developed systems to track and monitor production data from smallholders using their vegetable seeds. Currently, seeds are sold through supply outlet chains and only sales figures are available. This is a key area that Africasia will need to strengthen in order to monitor how the company seeds perform in the market.

Africasia's influence on market systems

Heightened competition despite huge market demand for fresh fruits and vegetables seed.

Africasia's business model of keeping overheads low while offering high-quality vegetable seed to smallholder farmers thrives on the delivery of quality, affordable, authentic seeds, and bundled services to trusted customers (farmers and agro-dealers). This model is often untenable to global and African MNCs because it requires a targeted, patient, hand-holding approach with smallholder farmers over time to build a trusted niche market, and not based on capturing a mass market. The Africasia's Managing Director puts it more succinctly:

> **To fend off competition, Africasia Seed Company prices are lower, services are provided faster, we offer superior seeds of better quality and a wide range of bundled services. We don't just sell seeds, we sell SEED, TRUST AND SERVICE.**

However, Africasia indicated that Regina seeds, Alpha seeds, Kibo Seeds Company Ltd, East African Seeds, Advanta Seeds, and SeedCo (many of which have also been supported by AECF) were using a similar model and were potentially increasing competition thus cutting into their market share.

Meanwhile, many start-up seed companies have entered into the market despite the challenges in the broader enabling environment[5] for the private sector between 2017-2021.

New businesses have crowded in offering complementary services and products

The investment has opened up the value chains to additional players offering complementary services.

The loan services to outgrowers for seed extraction machines is an opportunity to expand the provision of such services, as outgrowers already rent these services out even to non-Africasia farmers and potential seed processors.

Africasia Seed Company packaging services also open up trade to packaging companies within the value chain, while bundled services including low-cost drip irrigation attract irrigation service providers to engage with farmers and improve water-efficient technologies for production.

The focus on the domestic market for vegetables has also expanded a market for fresh produce vendors (referred to as vegetable kiosks), who target high-end tourism as well as retail chain markets in urban settings.

Conclusions

The investment performance has made modest profit margins despite all the odds of rising input prices, fluctuating commodity prices, disabling policy and regulatory environment, and the impact of Covid-19. It has registered significant expansion and uptake of high-quality OPV and hybrid vegetable seeds in the market. These are demonstrated by the high net benefit accruing to farmers producing OPV tomato seeds, which has exceeded expectations.

These benefits to farmers, especially to the outgrowers, encourage the agri-business mindset which will potentially lead to increased uptake of high-quality vegetable seeds and expansion of farm sizes under production. While the policy and regulatory environment in Tanzania is set to improve with the new government in place, international commodity prices will most likely remain high, affecting access to inputs, however, the business strategy employed by Africasia demonstrates resilience to such disruptions.

Despite the impressive investment gains, Africasia Seed Company will require thoughtful mechanisms to strengthen women and youth inclusion in the vegetable seed value chain and markets, build robust production and market assessments of the performance of its marketed vegetables seeds, against its competitors, and explore means to align with the dominant narrative of sustainable food systems which is gaining prominence nationally and globally.

End Notes

1 The three hybrid seed varieties were Tomato, Watermelon and Papaya, while the OPVs included Tomato, capsicum, African eggplant, Amaranthus, Cucumber, Okra and Pigeon peas

2 ASCL provides fertilizers and agro-chemicals as credit with parent lines/seeds to farmers and recover the costs from seed volumes produced by the outgrowers.

3 The EBITDA includes sales from non-vegetable seeds that ASCL also works in including maize and pigeon peas, as well as seed operations and incomes outside of the AECF investment.

4 Tanzania Official Seed Certification (TOSCI) is a government Institute under the Ministry of Agriculture (MoA). It is responsible for certification and promotion of quality agricultural seeds produced or imported into the country.

5 These tendencies during the previous government included throttling tax regulations, challenges with labor policies, and direct competition between government and public sector in the seed trade.

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