Scaling Partnerships to Activate Idle Community Land in South Africa

Bailey Klinger, Iván Ordóñez, and Federico Sturzenegger

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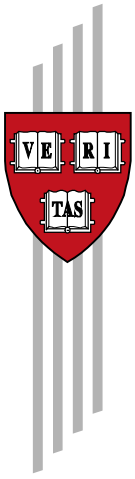

Working Papers

Center for International Development at Harvard University

Scaling Partnerships to Activate Idle Community Land in South Africa *

Bailey Klinger[†], Iván Ordóñez[‡] and Federico Sturzenegger[§]

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Abstract

We discuss three cases of corporate-smallholder partnerships in South Africa's former homelands, which have tried to bridge the problem of low productivity by supplying technology, technical assistance and financing along with established channels for sales and distribution. The cases are indicative of some key difficulties faced by such ventures: building trust, finding a suitable partner, successfully transferring technological to small farms, and reducing risk, particularly climate related. In order for these types partnerships to help close the gap between South Africa's two agricultures, solutions to these problems must be provided at greater scale. We explore mechanisms to achieve that scale, drawing lessons from South Africa's successful franchising sector, as well as newly emerging business models and technologies from abroad.

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[†]Growth Lab, bwklinger@gmail.com

[‡]Universidad del CEMA, iordonez@gmail.com

[§]Harvard Kennedy School, Universidad de San Andrés, fsturzenegger@udesa.edu.ar

1 Introduction

With 93 million hectares of farmland[1] South Africa's agricultural potential is beyond doubt. This potential is confirmed by a modern and world class agricultural sector that exports a wide variety of agricultural products. However, this powerhouse coexists alongside a largely self-subsistence agricultural sector with low productivity.

This paradox of highly productive commercial agricultural co-existing with idle and underutilized land is the result of the agricultural sector's historically-rooted dualism. As summarized by Kirsten and Sihlobo (2021), "South African commercial agriculture has shown dramatic growth over the last three decades. At the same time, the sector continues to be characterized by an extreme dualism between predominantly white commercial farmers and mainly black smallholder farmers, and many failed efforts to grow the sector in an inclusive and transformed manner. As a result, the country still has 'two agricultures'."

The historical sources of this dualism in South Africa's history are equally well studied in the literature. "Colonial rule, the segregationist era, and later apartheid provided the foundation for economic dualism in agriculture that excluded most Black South Africans from access to land ownership, to agricultural support services, and to economic opportunities in South Africa's rural areas" (Kirsten and Sihlobo 2021). As such, much agricultural policy since independence in 1994 has been focused on addressing these inequities and the resulting distortions.

In the attempts to address this issue major focus has been given to land reform, with 17% of formerly white-owned land having been redistributed to the state and

[1] See Kirsten and Sihlobo 2021

black-owned farmers (Kirsten and Sihlobo 2021). At the same time, government spending on providing extension services, training, and subsidized inputs to small-scale farmers has grown significantly (by 73% between 1997 and 2010) and reached a significant level (R/2500 per agricultural household in 2010) (Aliber and Hall 2012). Yet these government services fail to reach more than 2-3% of agriculturally active households. Despite all of the policy focus, land redistribution, and investment in government extension, dualism in agriculture has only increased since independence, as broader liberalization of the agricultural sector has lead to growth and consolidation of commercial farms (Bernstein 2013, Aliber and Hall 2012, Beinart and Delius 2018).

While the historical sources of dualism are clear, there are differing views in the literature in terms of what should be done today to address it. There is an active debate regarding further land redistribution in the commercial sector (Cousins 2018), but a significant proportion of idle and underutilized land in the country is also held by government and smallholders. "The abandonment of arable fields in the former homelands of South Africa has been quite widely registered in recent academic literature... the same seems to apply to land newly acquired through restitution and land redistribution programs" (Hey and Beinart 2017). According to Beinart and Delius (2018), former homelands and recently redistributed agricultural lands represent approximately 25% of agricultural land in the country, but within the former homelands, 80% of former fields are no longer used.

Another strand of the literature focuses on the underlying property rights regimes in areas of idle and underutilized land as cementing this dualism. Traditional and

communal land ownership bind land use rights to those who may be unable or unwilling to farm it due to a prevailing need for high effort for limited returns, and prevent its reallocation to more productive users (Delius and Schirmer 2021). This view fits in the broader literature highlighting that the majority of cross-country productivity differences in agriculture are due to the misallocation of resources, chief among them, land (Restuccia 2020). That literature shows that when restrictive land institutions are reformed to allow for greater reallocation, the productivity gains are significant (for example, a reform allowing land rentals in Ethiopia increasing productivity by 43%, in Chen Restuccia, Chen, Santaeulalia-Llopis, et al. 2020). It is important to note that this reallocation does not necessarily mean from black smallholders to large, predominantly white-owned commercial farms. Restuccia (2020) notes that across emerging markets there is as much dispersion in farm productivity within a farm-size class as across the entire distribution of farms, and most of the drop in labor productivity in agriculture in poor countries is driven by the misallocation of factors across heterogenous farmers rather than reallocation across farm-size categories. Kirsten and Sihlobo (2021) note that farm size, productivity and race do not map as neatly to one another as appears in the discourse: "Not all white commercial farm operations are 'large scale' and not all Black farmers are 'small scale', 'subsistence', or 'emerging'". Nevertheless, restrictive property rights institutions that prevent the productive allocation of land use carry significant economic costs, and therefore property rights reform is a long-studied and debated issue in South Africa.

We should not move forward without mentioning that while obvious that property rights affect who is the beneficiary of a certain property, there is a long tradition in

economics that suggests that property rights are less relevant for determining what is produced on that property. If there are gains from trade the relevant players should find a way to execute those gains, with property rights defining only who takes what share. Under this light, the debate on land reform is a debate on redistribution, not production, and little should be expected in terms of production from that agenda. However, if property rights are blurry, making it unclear who is entitled to what, the same theory confirms that this may have negative consequences on the ability to find those welfare enhancing activities. We come back to this issue below as property rights in the homelands such indeterminacy is present. But notice that the cost would not be cementing on the land those who cannot use it, but because the owners do not have the ability to engage someone that can.

Cousins (2018) and Aliber and Hall (2012) highlight the significant gaps between smallholder and commercial production technologies, and diagnose a bias in public support towards a small number of larger and more commercially-oriented black farms, largely beneficiaries of land redistribution. This represents a broader "conformity to an idealized model of 'commercial agriculture'" in the face of nearly insurmountable gaps between smallholders' capabilities and the demands of supermarkets and formal value chains (Cousins 2018). This literature diagnoses the lower productivity as arising from support that is insufficiently adapted for the larger number of the smallest farming households, the vast majority of whom are not commercializing their output. This view suggests a reorientation of policies towards broader "accumulation from below" through more appropriate broad-based support to smallholders and expecting only limited commercialization in local informal markets rather than

integration into formalized commercial value chains (Aliber and Hall 2012).

Property rights reform, more or different public spending on technology transfer, training, and infrastructure, and other aspects of the government's 'master plans' could surely help close the gap between the two agricultures. But, given the size of this problem, the urgency in greater economic inclusion in South Africa, the long timelines and political contentiousness of reforms, and questionable ability of the public sector to successfully implement their master plans, it is useful to ask what can be done by civil society and the private sector in the meantime? In particular, what beyond traditional outgrower programs (for example in sugar) and supplier development programs (for example by the large grocery chains), which have been operating in South Africa for decades with already well-studied successes and limitations? That question is the focus of this paper.

Following Beinart (2022) and Beinart and Delius (2018), we explore an emerging set of partnerships that seek to bridge the gap within current property rights institutions. In these partnerships, "organised corporate agencies, private companies or groups of commercial farmers — sometimes funded partly by the state — provide start-up capital, inputs, knowledge, extension and links to formal marketing chains which otherwise are very difficult for smallholders to command" (Beinart and Delius 2018). These partnerships, to varying degrees of success, seek to activate underutilized land and connect South Africa's two agricultures, using a variety of legal structures and modes of technology transfer and aggregation, from more traditional outgrower models as seen in the sugar industry to newer, more innovative partnerships. Their challenges show where further effort and innovation are needed, and

where new ideas can make a positive contribution.

The paper proceeds as follows. In Section 2, we discuss three case studies that have tried to bridge the problem of low productivity within current property rights regimes, bringing technology, technical assistance and financing while overcoming challenges of trust and providing some sort of risk (primarily climate) amelioration. These cases will provide the basis for the ideas that we propose to scale up such efforts in Section 3, including methods for building trust among smallholders and communities as well as between local farmers and corporate partners, lessons for scaling up the matching process for such partnerships drawn from the franchising sector, and new tools for technological transfer and international experiences in the use of parametric insurance to ameliorate climate risks. The final section concludes.

2 Three Partnership Case Studies

This section presents three cases of companies that have expanded commercial agriculture operations into areas of communal land. These cases were identified through discussions with South African industry experts, and selected not because they are necessarily the most successful, but because they illustrate a rich variety of partnership structures, with both successes and challenges.

2.1 Wiphold

Wiphold Women's Investment Portfolio Holdings (WIPHOLD) is an investment and operating group owned by black women, with a focus on the economic empowerment

of black women. It was established in 1994 with seed capital of R500,000 (USD 143,000). Figure (1) summarizes ownership and governing structures. Shareholders and management are predominantly black women. According to Debra Marsden, Head of Business Transformation and Public Affairs, Centane and Mbashe are among the poorest rural areas in South Africa. While Wiphold has been working in these areas since 2006 in financial inclusion programs, it was in 2012 when it attempted to operate barren communal land in the Eastern Cape which has a significant share of area as idle land under communal administration, but with the potential for agricultural development. The land was managed following customary law by traditional leaders and operated individually by small scale farmers managing plots smaller than 1.5 hectares. Marsden summarizes the objective as a strategy to increase the local community's income by consolidating land in order to mechanize it and significantly improve yields of crops that can be sold in the market, with a focus on yellow maize and soybean.

In order to improve yields, Wiphold put in place Centane And Mbashe Agricultural Initiative (CMAI) through the Centane Agricultural Development Company which consolidates farmer's land in a way that enables them to use machinery and implement best practices (hybrid/GMO seeds, agrochemical crop protection with pesticides and crop nutrition with synthetic fertilizers). In grain exporting countries, the average commercial agricultural farm exceeds 180 hectares, while significant economies of scale are achieved above 400 hectares. So scale was a prerequisite for technology.

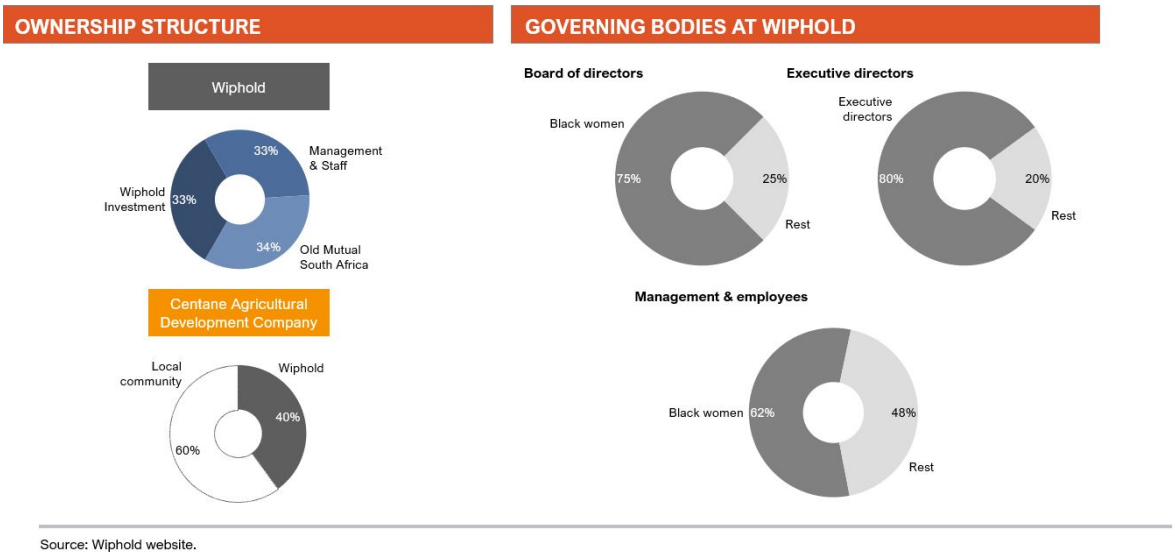


Figure 1: Ownership Structure: Wiphold

Community Participation Engagement Wiphold owns most of the machinery used to operate the plots, as outsourcing agricultural services by hiring contractors is not possible because the area lacks a significant amount of extensive commercial farmers. The local population does not work on the direct tasks of preparing the terrain, sowing, pulverizing and harvesting that involve the use of heavy machinery, though there is a program by Wiphold to recruit local young workers to operate tractors with an end goal of nominating individuals to be trained and mentored by Wiphold as farm managers. By 2020, Wiphold had trained over 2,000 community members.

Aside from granting land for consolidation, community members contribute to the partnership by working on non-core tasks, most importantly erecting and maintaining fencing (provided by Wiphold) and guarding fields against livestock intru-

sion (particularly goats) and theft. There are some activities directly involved with agriculture as support tasks like monitoring crops for diseases and pests, which are usually tasks that in farming operations around the globe are assigned to agricultural engineer students and junior personnel.

Three meetings are held per year (pre-planting, pre-harvesting and end of season) with all landowners present in order to reinforce community participation and understand farm performance. At each of the meetings, a full report is distributed, outlining information on matters such as seeds, chemical and fertilizer programs, harvesting schedules, yield, and financial results (consolidated per block/village).

Ownership and payment structure To successfully work with local communities, Wiphold devised a compensation framework where participating landowners and project members benefit financially in two ways.

First, a fixed land-use fee, by which 400 kilograms of yellow maize per season and hectare are distributed per landowner (approximately USD 130). Average yields were initially forecasted at between 8,000 to 10,000 kilograms per hectare (the average yields in South Africa, Argentina and Brazil), but only a few plots reached 7,000 kg/ha, with yields typically between 2,500 to 5,000 kg/ha depending on the season, placing the fixed income in a range of 8% to 16% of this yield.

The second component is a variable cash distribution directly into each community member's bank account. Cash distributions are made according to a formula that takes into account the size of each farming block relative to total size. This formula imposes penalties for poor performance in each farmer's individual plot, and awards bonuses for good performance. To keep the incentives aligned, damage from

theft of intrusion by cattle are charged to the individual farmer.

To implement these cash distributions Wiphold opens the ownership structure of the Centane Agricultural Development Company giving 60% of the shares to the local community and retaining only 40%. Notice that this diversifies risk *across* communities participating in the project. The fact that farmers receive a share of the profits of a larger geographical pie reduces climate- and crop-related contingencies.

In short, in addition to the productivity gains, the farmers reduce risks significantly. First, because they receive a guaranteed fixed payment (which is honored by the organizing company even if nothing is produced that year), and second, because they receive a dividend that is less volatile as it comes from a larger production area.

Results As shown in figure (2) Wiphold initially started consolidating land in three communities with a total of 69 hectares. In an initial stage the work required organizing 111 farms with an average size of a little more than half an hectare to consolidate the area in order for Wiphold to operate it.

Security and property rights over communal land presented an enforcement challenge, therefore Wiphold suggested to the local community a sowing plan that was focused on grains which have more value sold in the market to be mainly used as animal feed, rather than horticulture. Food staples such as everyday vegetables have a higher volume and value per hectare but pose a significant incentive for theft since these can be easily harvested manually and consumed with little to no preparation.

The model proved successful and the consolidated area began to grow, particularly during the 2014-2016 seasons. According to Wiphold, the cultural shift was driven by cash distributions, which were on average 81% of the payment to landown-

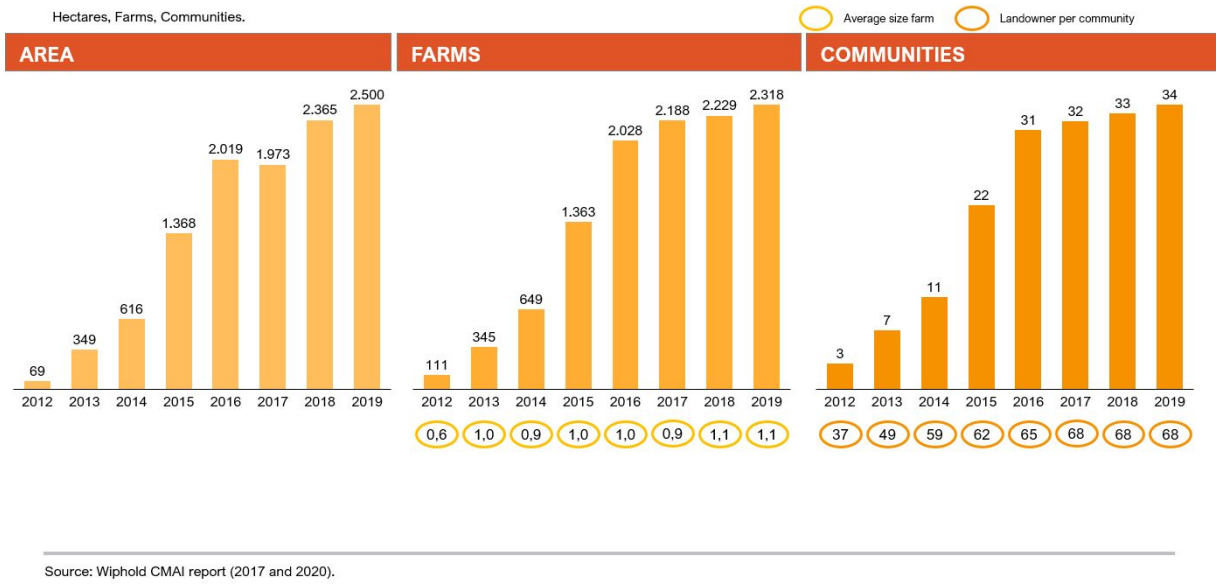


Figure 2: CMAI Growth

ers.

According to Wiphold reports "Years of deep poverty and subsistence existence, as well as failed promises from government and other private-sector initiatives, means that levels of trust are low, which can translate into high crop theft. For this reason, the initiative's financial model is designed in a way that ensures that some funds are set aside each year for dividend distribution while the farming operation builds towards profitability. As shown in figure (3), Wiphold honored the fixed rent amount every year. In some years this payment was an additional contribution by Wiphold as farm profitability did not earn these returns.

Wiphold continues to work to overcome several challenges. Beyond the traditional farming challenges of drought, soil conditions, cattle intrusion, and farming techniques, the partnership faces some more unique difficulties. First, because com-

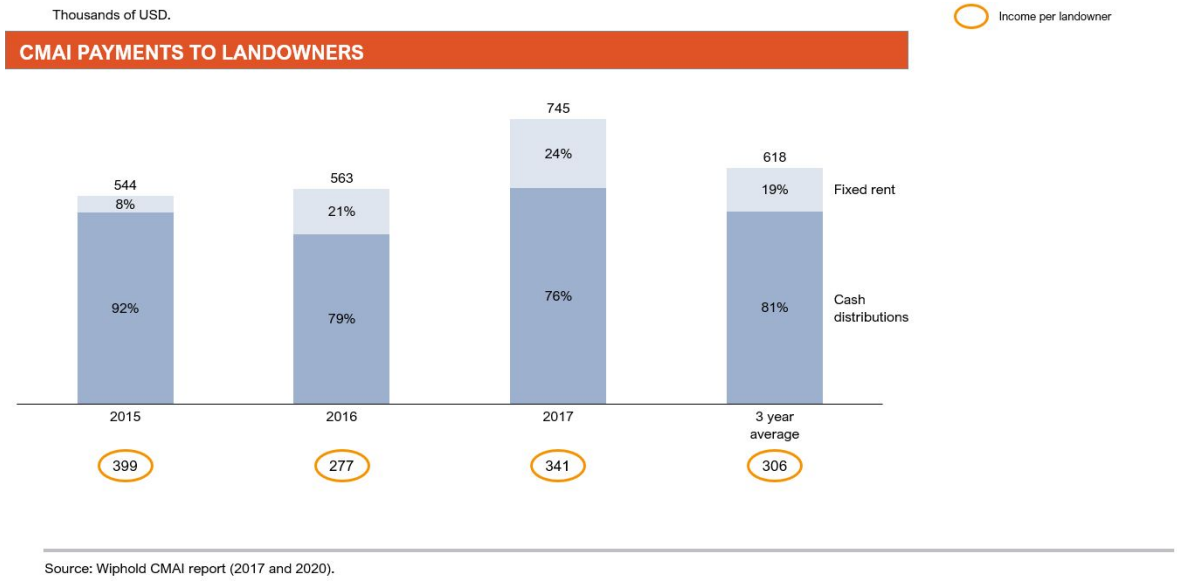


Figure 3: CMAI Payouts to local landowners

munal land cannot be collateralized for financing, it is challenging to finance the high set-up costs (most importantly irrigation). In addition, a lack of familiarity means landowners need to see results every year in order to build trust, and there is significant pressure to see immediate results and cash. Finally, these areas of operation suffer from inadequate transportation infrastructure and thin input markets.

2.2 Amadlelo

Amadlelo Agri was founded in 2004, and is organized as a private equity fund that invests in different agribusiness units as independent companies in the region of Eastern Cape and KwaZulu-Natal with a strong focus on dairy farming and offering a centralized management service center that reduces overhead costs. The company is a profit sharing scheme similar to that of Wiphold, but with some important

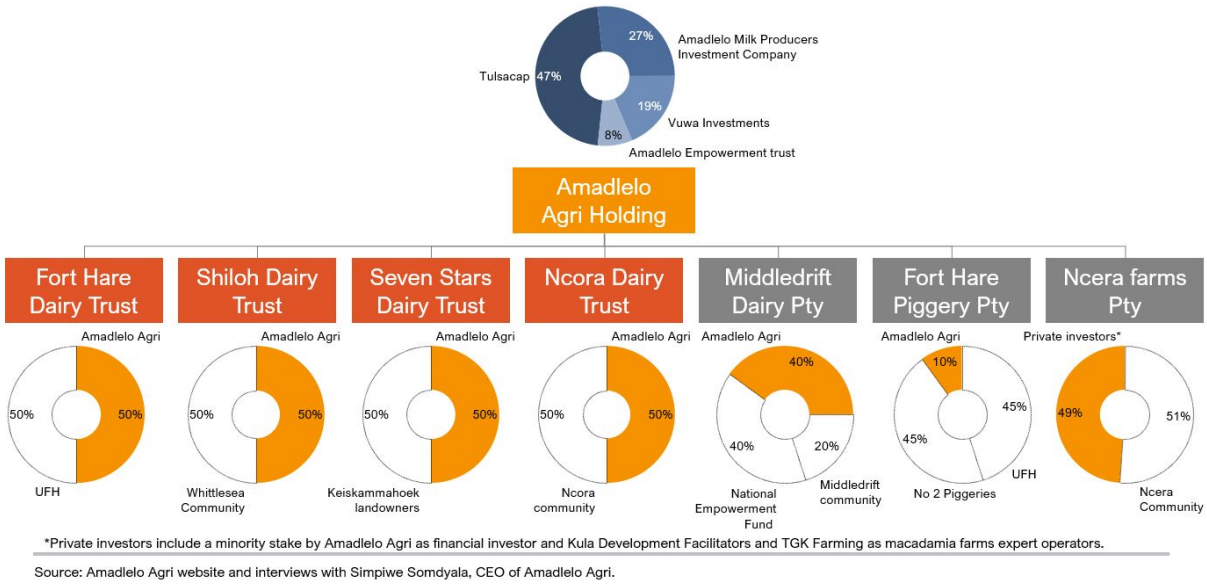


Figure 4: Amadlelo's Capital Structure

differences. Because of the nature of production there is not risk distribution across communities, and local communities have a much more active role in production. In the words of Amadlelo Agri's CEO Simpiwe Somdyala: "our value generation strategy is linked to our capacity to unlock the productive potential of dormant communal land, not to a particular skill-set in a certain industry".

In order to tackle the land tenure challenge, Tulsacap (largest shareholder and founding entity) has opened the ownership structure at the holding and company levels to the local community via partnerships, generating a business that is 72% majority black-owned comprising four groups of shareholders at holding level: Tulsacap (46.4%) which is a group of black professionals and business people that have pooled investment resources in Amadlelo Agri; Amadlelo Milk Producers Investment Company (AMPIC) (26.8%) which includes about 50 commercial farmers from

KwaZulu-Natal and the Eastern Cape; Vuwa Investments (18.8%) which is a 100% black-owned investment company; and Amadlelo Empowerment Trust (8%) which represents 500 black workers of AMPIC membership. The structure is shown in Figure (4).

Community Participation Engagement The community gains access to a proven business model and knowledge to operate the farms. The relationship works like a franchise where the local community follows production standards, which improve productivity and marketability. Other benefits include the ability to aggregate and exploit economies of scale for the benefit of all partners, as bookkeeping and accounting support are done through the centralized business center. Engagement with local communities includes training and skills transfer of local human resources through deployment of experienced managers, mentorship and coaching backed by a network of successful commercial farmers, on-the-job training, and skills transfer with a focus on young people and women.

Because building trust is considered the biggest hurdle, every year the management team of Amadlelo presents an investment plan to the Board of Trustees for approval by consensus. The decision is critical since it involves how much of the profits will be distributed as dividends to both Amadlelo Agri and the local community as well as how much will be reinvested in the company. In all companies, except for Fort Hare Dairy Trust (where seats are evenly split), 80% of the seats on the board belong to the local community and 20% belong to Almadlelo Agri, and voting power replicates the ownership structure which in almost every case is even. A large share of seats representing the local community in the Board of Trustees guar-

antees that the community priorities are represented, giving decisions by consensus legitimacy among all stakeholders.

Ownership and payment structure Usually, within the dairy business unit of Amadlelo, fixed land rent is 3% of the cost structure of the dairy farm operations and is paid in annual or monthly installments after a long-term contract is signed with its price updated following an index tied to the milk price. As shown Figure (5) net farm profit is a result of subtracting the operational costs (excluding the land rent) out of the farm revenue which are then split between Amadlelo and the local community (or an additional third party) following the ownership structure of the company. Out of the local community's share of profit, the advanced payment of land rent is deducted. Thus income to the community has a fixed income tied to land ownership, which is a guaranteed minimum on a variable income linked to the company profits.

Despite the decline in revenue mainly due to droughts, Amadlelo dairy farms sustain a profitable track record with net farm income around 17%-34% as a share of overall revenue depending on the year, while investing in CAPEX an average of 7% of overall revenue in the 2015-2021 period with peaks of 16% in year 2018.

Results Figure (6) shows the growht in number of animals handled by the project. The first farm started operations in 2007 and is managed with the University of Fort Hare (UFH). Currently, the combined production capacity of its five farms is of 7,100 cows with 210 employees, a size that places the dairy business unit among the countries top ten players. The average size of dairy farms in South Africa and

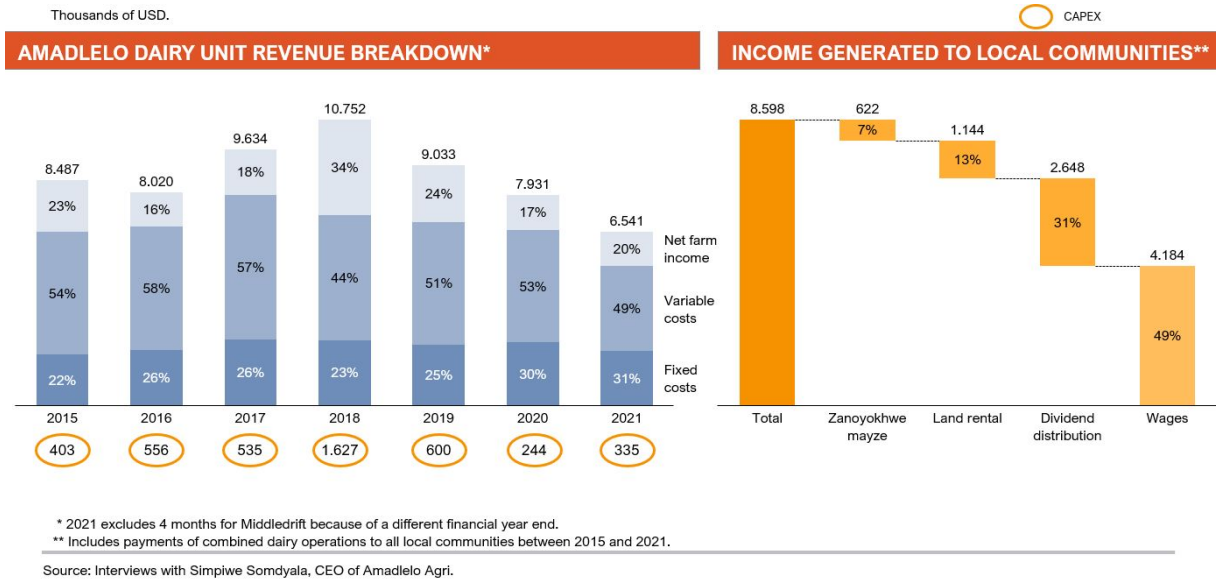


Figure 5: Amadlelo's Income Flow

other top dairy producing countries is significantly smaller than even the smallest farm operated by Amadlelo. On the other hand, productivity by Amadlelo still has room for improvement since its productivity is 23-41% below South Africa national average.

To diversify risk, Amadlelo has launched a piggery in partnership with UFH, and a 160 hectare macadamia farm in East London.

While successful so far, Amadlelo is aware of some constraints that make scaling up more difficult, all of them related to the indeterminacy of property rights in the areas it operates. One is animal intrusion, the other is the fact that as communal land cannot be used as collateral financing for infrastructure developments, such as irrigation, becomes more difficult.

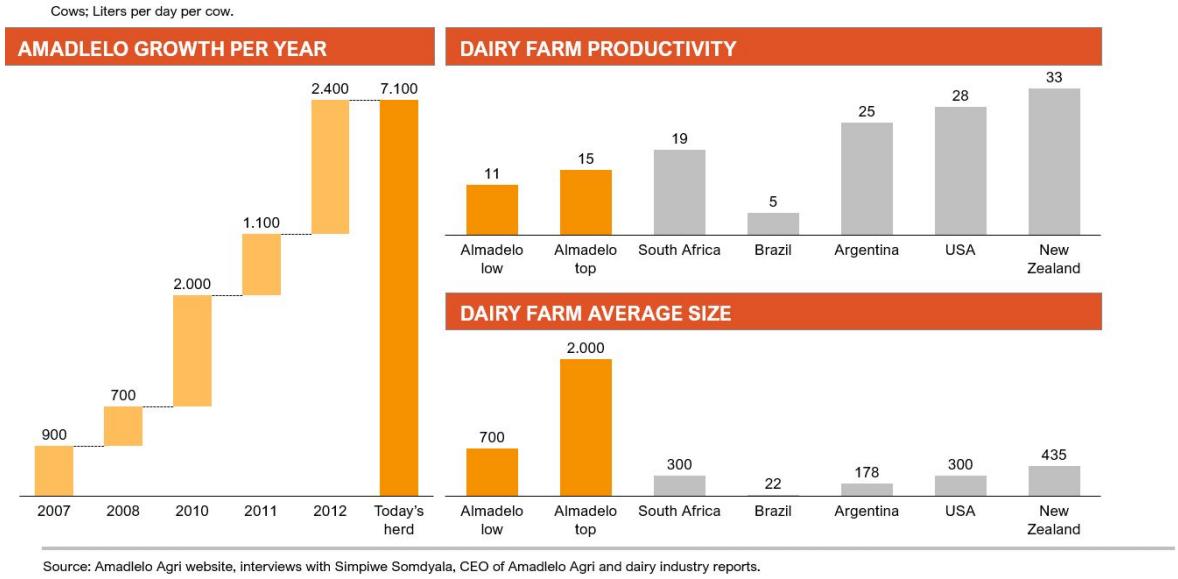


Figure 6: Amadlelo's Growth

2.3 Zamukele

Schoeman is a privately owned agribusiness conglomerate that has operated farms since its foundation as a family run farm in 1930, which started operations with agriculture and cattle ranching. Its latest business unit is a white dry beans origination and processing plant, opened in 2011 to serve the canning industry, which according to Kallie Schoeman, the group CEO, is a market that multiplied by a factor of 4.5 in the last decade, reaching a demand for 45 thousand tons of white dry beans in 2021. Schoeman Group fills 32% of that demand. It is in this business that Schoeman developed Zamukele, a program of knowledge transfer to under-performing communal farmers in Free State, Mpumalanga, Limpopo, and the North-West in 2018.

Community Participation Engagement The Zamukele program is an outgrower scheme in which Schoeman ensures its supply of white beans by supplying technical assistance, inputs, and credit. Participating farmers receive technology and inputs and training on credit, and secured sales of their output. The critical requirements to access the Zamukele network are: having a secured user rights to a plot of no less than five hectares and owning the minimum mechanization set which includes a tractor, plough and tillers, and a sowing machine. The program does not require farmers to consolidate plots. Rather, each farmer can participate with his or her own plot maintaining total control over it. Zamukele operates across nine communities, six of which are located in former homelands. The program focused on communities near Schoeman's commercial operations, which enables the trust building process as they were already familiar with one another.

Through Schoeman's agricultural input distribution company, Agritecnovation, Zamukele supplies credit in forms of inputs to farmers while technical assistance is provided with the support of AgTech app MyFarmWeb, developed by Vodafone. The app works as georeferenced enterprise resource planning (ERP) tool that tracks farmers decisions and performance through satellite monitoring and also helps Zamukele's technical team in crop management recommendations regarding crop nutrition and protection. Zamukele's technical network assisting farmers is also instrumental in generating performance indicators that help the program build a credit track record and reward system that promotes commercial loyalty, which means that after inputs are paid back at harvest time the remaining grain is also commercialized through Zamukele to Schoeman. Finally, Zamukele acts as a liason between Schoeman Group's

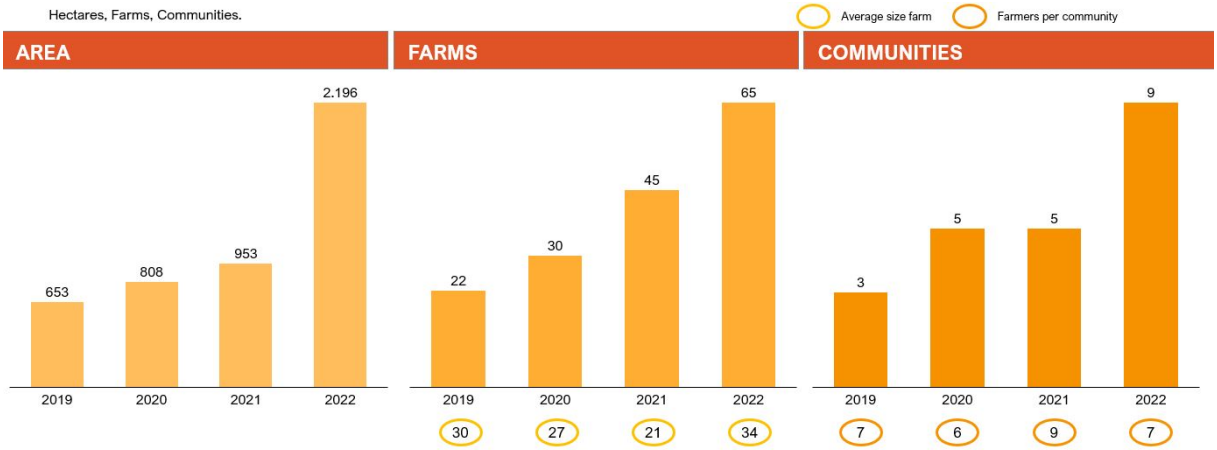
network of farming contractors and local farmers in order to assist them in different tasks.

Ownership and payment structure Unlike the cases of Amadlelo and Wiphold, the partnership model of Zamukele does not include a jointly owned legal entity, and the commercial relationship is more at arms' length. Zamukele provides inputs on credit, which is repaid with output. However the way climate risk is diversified is through credit flexibility with Zamukele. As the relationship is seen as a a long term relationship, and technology allows to monitor effort over the field, Schoeman is willing to delay credit repayment if climate conditions affect crops. In this way the farmer in practice is tapping a financial product with an implicit climate insurance clause which reduces their risks significantly.

Results Figure (7) shows the growth of the project, which almost doubled in size and communities in 2022.

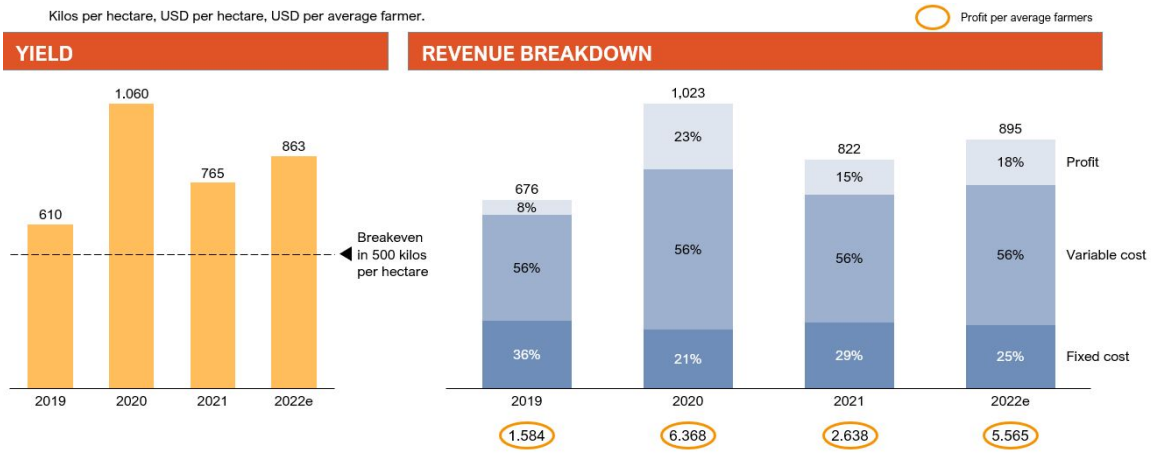
Overhead costs for farmers, according to records, average 500 kilos of white beans per hectare, while variable cost is 56% of revenue as shown in (8). As shown in the following chart, yields have consistently been above break-even generating a average profit margin between 8% and 18% depending the season.

According to Success Mdluli, keeping the default ratio at low levels is critical for the program success. On average, the default ratio is around 11%, but this will triple in 2022 because of adverse climate conditions. Typically debts are rolled over and farmers commit to resume payments after the next harvest, and only a small share of farmers leave. Climate is a critical factor affecting farmers yields, therefore



Source: Interviews with Kallie Schoeman, CEO of Schoeman Group and Success Mdluli, Project Manager of Zamukele.

Figure 7: Zamukele's Growth



Source: Interviews with Kallie Schoeman, CEO of Schoeman Group and Success Mdluli, Project Manager of Zamukele.

Figure 8: Zamukele's Yields and Revenue

the program is evaluating contracting climate insurance in order to minimize its own risk. The program's success is demonstrated by the continued scale-up to more communities, with area under cultivation increasing by nearly four times between 2019 and 2022.

In addition to climate risks, a constraint to the program's growth is land management by traditional authorities. Mdluli notes that sometimes, after a successful harvest, traditional leaders decide to cancel the contract or significantly increase rent charged to the farmer, up to a point where farming the plot is no longer profitable. Customary, rent between traditional leaders and farmers is negotiated annually, which introduces significant volatility in the farmers profit. This churn can be seen by the fact that only eight of the first 22 farmers participating in the program remain.

Box: Outgrower Production in the Sugar Sector The sugar cane industry has been operating in an outgrower model similar to Zamukele, but for a longer period and at a larger scale. Currently, the industry is made up of almost 22 thousand sugarcane farmers mainly located in KwaZulu-Natal and Mpumalanga and, according to the South African Sugar Association (SASA), it employs 85 thousand people. The farming sector is heavily atomized with 21 thousand small scale farmers and one thousand large scale operations. Although there are no official statistics on production per group, Illovo sugar estimates that 570 commercial farmers account for 76% of it outsourcing, while 2,258 small scale stand for the remaining 24%.

There are six milling companies operating 14 sugar mills, grinding an average of 18 million tons of raw sugar cane that produces 2.2 million tons of sugar per season.

Three players account for 90% of processing, with Illovo Sugar being the largest one with 30% of the total. Roughly 40% of production is exported, mainly to countries in Africa, Asia and the Middle East. Although production has been declining in the past decade, South Africa remains among the Top 10 exporters, with 1% of global trade accoridng to the FAO.

Matenga (2019) and Chisanga and Vilakazi (2014) show that contract farming with an out grower scheme is a well extended practice in Kenya, South Africa, Tanzania and Zambia. Particularly in South Africa, Matenga explains that "the nucleus estate (farms operated directly by the processing company) takes control of land management and marketing of the crop, while landowners become shareholders. It has become popular in the sugar sector in southern and eastern Africa as a way of expanding land area for estates, as well as accessing water. By involving landholders as shareholders in the scheme, the social objectives of supporting smallholders can be met, and donor funds accessed to support infrastructural development and expansion of sugar production". "With input from both producers and growers, SASA determines a notional price for sugar which serves as a reference price... the sugarcane price (paid to outgrowers) is based largely on Estimated Recoverable Crystals (ERC) (or recoverable value) of cane delivered by a grower for crushing (a measure of cane quality), and shared proceeds from the sale of sugar. In South Africa this ratio is about 63:37 in favor of growers" Chisanga and Vilakazi (2014).

Illovo engages in two critical activities in order to improve farmers' productivity and income: knowledge transfer and securing property rights over land. In order transfer knowledge Illovo: a) hosts a field days around demonstration plots to

showcase production techniques, b) training funded by the sugar industry Grower Development Account, and c) access to development finance through Umthombo Agricultural Finance (a division of SASA). Also Illovo d) provides extension officers help small holders with crop protection and management, confirmation of crop estimates, harvesting and delivery co-ordination and finally e) training for Fairtrade compliance, coordination of application for certification and audits, interpretation of audit findings and development of action plans.

Illovo's support to small-scale growers has the double objective of increasing sourcing security and supporting local communities. Small-scale growers receive a supplementary payment of ZAR 35 (USD 1.91) per ton of cane, plus a VAT rebate of ZAR 45 (USD 2.46) per ton, from SASA, funded from industry proceeds. Together with that, the Noodsberg mill sources a small amount of cane (approximately 2,000 tonnes) from two Fairtrade-accredited smallholder co-operatives. These farmers are paid the Fairtrade premium of ZAR 600 (USD 32.7) per ton of sugar – equating to approximately ZAR 55 (USD 3) per ton of sugarcane. Illovo is instrumental in various tasks: a) aiding the coops to gain Fair Trade accreditation, b) farm management, particularly in the critical task of measuring soil nutrients requirements that translate into fertilization needs and c) and planting and harvesting. Chisanga and Vilakazi (2014) explains that transportation costs are critical for the industry and typically born by growers and amount for 12% of the total cost. Illovo addresses this issue by subsidizing transportation cost for the more distant farmers.

As shown by Sifundza (2019), contract farming enables these types of assistance, financing, and technical transfer for participating smallholders through fixed con-

tracts to secure sourcing for mills. Yet, "Farmers usually default in their contractual agreements through side-selling their produce to competing buyers, and sometimes even default on their loan repayment. Another form of default by farmers is when they deliver poor quality and quantity of produce, deviating from what was agreed upon in the contractual agreement (Kokeyo (2013)). Contractors too default by buying less of the product or by not paying the initial price agreed upon", Sifundza (2019).

For these and other reasons, the number of small holder farmers in the sugar sector in South Africa has fallen from its peak of 50 thousand in the 90s to a low of only 13 thousand in 2010, before recovering slightly. Smallholders suffer high input costs, limited use and availability of recommended technologies, droughts, unstable prices in global markets, poor infrastructure and social challenges Metizo and Tsvakirai (2016). According to Illovo, South Africa's small-scale grower sector has been in decline for the past two decades.

Though sugar remains a success story for the outgrower model overall, it also illustrates its limits. Training and technology transfer is under-invested in because of side-selling and other spillovers, and has lead to experimentation with closer corporate-grower relationships illustrated in the other cases.

2.4 Discussion

Wiphold is a company that attempted to increase scale and bring mechanization in order to produce extensive crops in unutilized land in the Eastern Cape. Amadlelo focused on technological transfer and market development for dairy producers, and

Zamukele on financing and technology transfer for white bean producers.

The optimization of idle or underutilized communal land with the introduction of modern commercial agricultural techniques has obvious benefits: it increases productivity, growing the pie of available resources and increases the marketability of goods, which operates in the same direction. But importantly, newer contractual relationships that go beyond traditional outgrower models, such as Amadlelo and Wiphold, redistribute risks across communities and with shareholders.

One issue that each company had to face in these cases was the role of communal land tenure. The customary communal land tenure system in the local communities is a deterrent for the productive transformation that commercial agriculture usually requires, as it forces communal management of the land resource. The cases show that it is possible, at least in some cases, to achieve an efficient result under existing property rights institutions.

Of course, when property rights are less clear or are managed by a larger group of stakeholders, it requires another input: trust. All cases underscored that developing trust was an essential challenge that needed to be tackled, a process that was complex, long, and costly. The firms used a variety of carefully designed governance frameworks to build trust. These increased the base of support of the local community by opening the ownership structure, providing seats on the board of the legal entity that controls the project, and clearly communicating relevant information to allow the community to follow the performance of the venture. In the case of the out-grower model by Zamukele, trust was built around the origination contract which leaves the farmer with control of production decisions. Different payment structures

also build trust by ensuring a relatively fixed income to the communal landowners for the right to operate the land. But all cases mentioned that strengthening trust is a continuous process.

Trust must be established with local traditional leaders, some of which show long term views while others have a more opportunistic behavior, and with the local communities or the local independent farmers who may have veto power. After establishing initial levels of trust, partnerships must then generate a solid track record of performance, often audited by a third party (or contractual parameters be easily checked). This is important for building trust with third parties outside the community, particularly businesses that support farming activities such as input distributors, grain originators and logistical operators, farming contractors, and financial institutions.

The cases reveal that even after land tenure and trust are accounted for, strategies are needed to create conditions for aggregation and mechanization. In two of the three cases, aggregation of plots to increase farm size were critical for the introduction of commercial agriculture technologies, particularly mechanization. However, all three business cases show that the small size of the plots, often scattered geographically with very poor road connectivity, have negative consequences. This increases the costs of the relationship management and makes the development of equipment leasing and input markets more challenging.

One of the striking features of the cases was the central role played by risk dilution and diversification across participating partners. In some cases payment to farmers was non-contingent payment, shifting the risk of the activities from the land owner

to the land user. In some cases risk was distributed by making payments contingent in production from a larger area.

The Table below shows how the schemes operate across key design dimensions. They differ in their allocation of risk, which is shared in varying ways between the farmer to the aggregator, and sometimes divided across communities. Local involvement in the work of farming itself also differs, with schemes where local labor is not put to use and others where communities represent the largest share of employees.

Summary chart

	AMADLELO AGRI (TOGETHER WE GROW • TOGETHER WE REAP)	WIPHOLD	ZAMUKELE (PART OF THE SCHOEMAN GROUP)
Property framework with the community	Shared property between Private Party and community at holding and company level	Shared property of the operating company	No property sharing as it is an out-grower model
Governance	Board of trustees with a majority for the community while Amadlelo´s management make everyday operational decisions	Wiphold oversees both strategic and operational decisions	Local farmers in full charge of strategic and operational decision only advised by Zamukele
Plot consolidation	Communal land owned by the community consolidates in a single plot	Communal land owned by the community consolidates in a single plot	There is no plot consolidation, each farmer operates its plot by its own
Compensation to local community	Land lease linked to fixed sum and dividend distribution based on the operation performance	Land lease linked to fixed sum and cash distribution following a performance score	Farmer's individual profits on its operation
Trust building	By making decision process transparent and including the community in it as well as payment of fixed rent	By paying a fixed rent to farmers plus using own money to honor that guarantee	Based on knowledge of Schoeman in the area
Risk sharing between private party and local community	Farmers reduce risk by sharing it with private party and by receiving a fixed compensation for land use	Farmers reduce risk by sharing it with private party and by receiving a fixed compensation for land use	Farmers reduce risk by rolling over with private party their debt obligations
Risk sharing between communities	There is risk sharing between subsidiary companies through Amadlelo shares in subsidiaries, but local communities absorb the impact of the performance of their company in their community	Significant, since all communities are part owners of the single company in charge of CMAI, but cash distributions may have a penalty in individual landowners according to performance of each plot	None, since each farmer is responsible for its own operation
Involvement of community in farming activities	Large share of employees work directly in dairy farms in core chores	Communal landowners perform non-core farming chores	Local farmers oversee production decisions and crop management and hire farm contractors on their own, assisted by Zamukele
Knowhow diffusion	Significant as local communities employed in its different operations climb in the company's organizational chart	Even though Wiphold executes a training program for the local community there is little "learning by doing" of farming chores	Significant as farmers adopt not only a new crop, but also a management approach that relies on data
Technological upgrade	Significant as private partner brings in machinery, know-how and management skills	Relevant as through consolidation allows for mechanized extensive agriculture	Significant in terms of commercialization, financing and the use of digital apps
Profitability	Profitable for both, private party and community	Farms are not profitable after 7 years of operation	Profitable for both, private party and community

Figure 9: Summary of Case Studies

It is clear that hurdles to aggregation, risk sharing, and outgrowing networks arise from the communal land tenure system, small size of plots, the lack of confidence in South African society, and the particular nature of production. These partnerships show that these challenges can be overcome without having to wait for wholesale reform of land ownership and leasing laws. Moreover, they suggest that even with wholesale reform, several critical challenges would limit the resulting increase in agricultural land utilization. Our proposals in the following section center on identifying mechanisms to make these partnerships easier to form and scale up across South Africa.

3 Overcoming Partnership Challenges at Scale

So far we have shown one of the new ways that idle land in the former homelands could be more productively used is through partnerships between communities and corporates, but these partnerships are currently very small compared to the size of the challenge, and are costly to develop. Without an established market for matching communities and corporates, finding opportunities is enormously difficult. Once partnerships are formed, several common hurdles must be overcome, including building trust and sharing risks. However, partnerships that have formed and overcome these hurdles have been able to increase productivity on previously underutilized agricultural land under communal administration, with benefits shared between the communities and firms.

The question is therefore how can these types of partnerships, and the benefits

they provide, be scaled up in South Africa in order to spread higher productivity agriculture more broadly and profitably? Below, we focus on three key areas to enable such scale-up.

The first area — building trust at scale - follows from the most ubiquitous problem that the the partnerships discussed in the cases above needed to overcome. The more that communities and corporates could leverage common tools for building trust, the more such partnerships we would expect to see emerge. The second area discusses the lack of a market where communities and corporates can find potential partners, and identifies features that are present in South Africa's mature franchising sector that could also enable a thicker market for community-corporate matching in agriculture. The third area is all about a particular type of risk — weather damage — that each partnership faces and the risk reduction response tool that exists in many other countries in parametric weather insurance.

1. Mechanisms to build trust at scale
2. Creating a market between communities and firms
3. Transferring technology to smaller farms
4. Reducing risk through parametric climate insurance

3.1 Mechanisms to build trust at scale

Trust is "the willingness of a party to be vulnerable to the actions of another party, based on the expectation that the other will perform a particular action important to

the trustor, irrespective of the ability to monitor or control that other party" (Mayer, Davis, and Schoorman 1995). In situations when future actions are not observable and enforceable using contracts, two parties will have to rely on trust to some degree to transact.

In the case of smallholder agriculture, there has been research showing the importance of trust in the creation and performance of co-operatives. Co-operatives operate more efficiently when there is a higher level of trust among members because this lowers transaction and monitoring costs while also increasing members' willingness to work through the organization and share information and resources (James Jr and Sykuta 2005, Dakhli and De Clercq 2004). Trust is shown as an important determinant of success among Swedish farming co-operative members (Österberg and Nilsson 2009) and drives greater group cohesion among US farming co-op members (Hansen, Morrow Jr, and Batista 2002). Belay (2020) shows trust among members of dairy cooperatives in Eithopia leads to greater co-op sales by members.

The partnerships discussed above include the aggregation of smallholders as in co-operatives, making trust important. But they also incorporate a corporate entity bringing know-how, (in two of the three cases) aggregation, and sales channels to the smallholder participants. Given this closer level of engagement with an external entity, trust is even more central to these partnerships than the general co-op case. Trusting - making oneself vulnerable - is more difficult when one has less familiarity with the other party, as it is more difficult to predict their future actions. In the cases of these partnerships, where smallholders and their communities engage with corporate entities that are new to them, trust is more difficult to establish and a

greater impediment to transactions.

Given that familiarity enables the prediction of future actions, increasing familiarity is obviously a key component to building trust. In other words, time and experience with the other party is valuable. This builds up information on the capability of the other, on how they react to threats and opportunities, and that in turn builds confidence that they will not exploit vulnerabilities for short-term gain (Österberg and Nilsson 2009). Each of the interviewees in our case studies pointed to an important and time-consuming investment necessary, up-front, for themselves and the community to become familiar though repeated meetings, questions, and discussions.

Over time, communities and downstream entities can build a track record of mutually beneficial cooperation rather than opportunistic behavior. The resulting reputation of both members of the partnership can create a positive signal that reduces the cost of building trust with new partners. Broader familiarity with these types of partnerships would itself reduce the cost of building trust. There is a role for institutions in South Africa with relevant convening power to promote this diffusion process. Cases of these partnerships should be shared in a candid and transparent way that communities can trust. This can begin with documents, events/conferences, and eventually trade shows. To the degree that partners in discussions with new communities can bring members of existing community partners to speak on their behalf would also establish their trustworthiness more rapidly.

The literature does identify some other ways to accelerate the trust building process. One is to use trust that has already been built among reliable third parties

or through pre-existing networks such as family, religious groups, and communities (Österberg and Nilsson 2009). Two parties seeking trust can use these networks either directly or to connect through mutually-trusted intermediaries. One of our cases, Zamukele, relied on relationships already established between the corporate farm and the surrounding community. There is a premium on searching for third parties that are trusted by the communities, who would be able to vet potential downstream partners and vouch for those that are reliable. These could be political institutions, religious groups, NGOs, firms, trade associations, or individual leaders.

However, these mechanisms for building trust are difficult to scale. Franchising is a developed business model that overcomes similar challenges at scale by creating thick market between franshisors and franchisees. In many countries, the national franchise association evaluates franchisors and their adherence to best practices and codes of conduct to vet them on behalf of potential franchisees. Similar experience could be built up in the area of community agricultural development partnerships both by the government or private players.

In addition to trusted third parties, another way to establish trustworthiness is reliable third party information. Some of this information can be taken from the credit records. Trust on individual debtors and institutions is built from credit histories and scores based on their past performance at meeting credit obligations. In recent years there has been a push to make this information more accessible and free, and this could be used both by communities and by downstream corporates for judging the trustworthiness of their potential partners, at least along one critical

dimension.[2]

One critical factor that permanently erodes trust is the precise definition of property rights over the most critical production factor in agribusiness: land. As mentioned in the introduction, well defined property rights ensure that private parties obtain efficient outcomes *regardless* of who owns the land. So the theory has little to say about who owns the land, but has a lot to say about the need to establish an owner. In fact, this insight earned Ronald Coase a Nobel Prize in economics. Undefined property rights preclude the negotiations between interested parties and keep land idle. In this regard having a clearer picture of property rights in communal land would be useful. We identified several issues concerning land demarcation and use in South Africa which rose in different exchanges with players and academics of the local agribusiness ecosystem. The issue of communal land and its blurry demarcation clearly sets apart South Africa from those of other global food powerhouses such as Argentina, Brazil, Paraguay and United States.

There are four critical issues regarding land tenure information: a) the correct demarcation of communal land both on paper and in the territory, b) the identifi-

[2]There is significant experience in sharing information from smaller units in the financial sector. For example there is a growing experience in scoring individuals on the basis of their living habits rather than on their commercial activities or even their past credit history. This technology has focused on studying the regularity in living patterns which has been found to be a good predictor of repayment, based on cellphone information that collects a wealth of information ranging from model type, apps downloaded, mobility, purchases, contact information, and so on. Some models identify, for example, hours of work (by matching the location with declared workplace), or the number of calls to relatives (calling your mom seems to be highly correlated with payment performance). A universal scoring through these mechanisms, though constrained to the cases where they hold a smart-phone, should allow farmers to leap frog completely the trust dimension as the algorithms could point the community across trustworthiness dimensions. On the other hand, farmers could also leap frog their knowledge of the private sector parties if their credit scores were publicly available on the web, an initiative that other countries have implemented and is primarily a responsibility of the Reserve Bank.

cation of land plots and their current tenants/operators, also on paper and in the territory, c) the full organizational chart of communal leaders and their roles required to make decisions over communal land, as well as the decision making process and d) the centralization and availability of the information for the public to access it. Tackling these issues is a necessary step for initiatives such as Wiphold, Amadlelo and Zamukele to gain scale, since it represents a significant reduction of transaction cost both ex ante and ex post.

Finally, the literature suggests that trust is further enhanced with greater competency of management, greater transparency and communication by management, and the use of democratic governance in co-op decision making so that members feel a sense of input and control (Lyon 2003, Belay 2020). This in a sense is about reducing the need for trust. Within cooperatives, when members can monitor and sanction management, there is less need for trust (Lyon 2003). Similarly between parties, when reputations become more observable, and those reputations can be damaged by opportunistic behavior, there is less need to rely on trust (Österberg and Nilsson 2009). In our cases, meetings and particularly board seats in the Almadedlo case are ways of dealing with these issues, as well as transparency in the partnership's financial data.

3.2 Creating a market between communities and firms

For any cases like those discussed in this paper to happen, communities and their potential downstream partners need to first find one another and then develop their partnership approach. In the cases presented, this involved firms going from com-

munity to community and forming bespoke legal arrangements between them, which entails very high transaction costs. This is the unfortunate consequence of the lack of a market between communities and agriculture firms. For this matching process to scale up and make a meaningful contribution to the country's agricultural output, this requires hundreds if not thousands of partnerships forming across the country. Fortunately, there is an analogue process already occurring successfully in South Africa at this scale that we can draw lessons from: the franchising sector.

There are 500,000 employees working in franchised retail and service providers in the country, which is roughly equal to the number of South Africans working in small-scale agriculture (Klinger 2022, Cousins 2018). And there are key parallels between the franchising sector and the partnerships we have examined. Fundamentally they are both cases where a larger entity has figured out a promising production and sales technology and seeks to transfer that know-how to a larger number of smaller partners in order to expand. Franchisors have to identify the right set of franchisees, market their franchise concepts, agree on the parameters of the partnership in a franchise agreement, transfer technology, and continuously train, monitor, improve, and share the subsequent economic benefits. Franchisees have to select among potential franchise concepts, including both demonstrating and evaluating trustworthiness.

Klinger (2022) highlights several features of the mature franchising sector that could enable the process of building partnerships between communities, smallholder farmers, and corporate partners: contract enforcement and standardization; a variety of proposals to allow matching in a marketplace; transfer of know-how at scale. These are discussed here.

Contract enforcement and standardization: Franchising relies intensively on the legal system to govern the relationship between franchisor and franchisee. Franchisees have incentives to lower quality and free-ride, and franchisors have scope be abusive and anti-competitive. There is therefore a large system of case law, experienced lawyers, consultants, and technical experts, which the country has built up through the decades in traditional franchising. Models in the agricultural sector could draw on these capabilities to allow a larger number of entities to productively engage with one another.

This legal system that allows for franchisor-franchisee relationships to form at scale also depends on contract standardization. For franchisors to interface with hundreds of potential franchisees, and for franchisees to evaluate hundreds of potential franchisor concepts, franchise agreements have evolved a somewhat standardized structure with a surprisingly standardized set of parameters to make this matching process more efficient (Blair, Lafontaine, et al. 2005). Where those contracts differ, it is usually along a set of well-understood dimensions, such as the size of the franchise fee, royalty rate, marketing cost, and territory. That is to say, this standardization still allows for customization- its just that the parameters of customization become well-defined and well-known to enable matching at scale.

A solution to South Africa's duality challenge in agriculture will also require a large number of market connections to be made, which will rely on legal contract enforcement and will require the evolution of a set of standardized contracts that are customizatble to the variety of unique situations across the former homelands, but along a better-defined set of parameters and with more and more past cases to use as

guides. There may be some role for regulations to be introduced or modified, meaning the relevant agencies in government should be particularly attentive and responsive to the sector. However, these standards should evolve out of the experiences of communities and corporates in forming partnerships, potentially facilitated by a trade association.

A variety of proposals to allow matching in a marketplace: Contracts are standardized to minimize transaction costs, but within those standardized structures, there are a variety of options in the traditional franchising sector so that matches can be found with the variety of potential franchisees, many of which will be seeking different types of opportunities. A wide variety of franchising concepts are marketed by franchisors to a wide variety of franchisees in a series of publications, conferences, and events. Franchisors can compare their offerings to others in the market, attempt to differentiate themselves, and find new franchisees whose experience and interest are the best match with their needs. This searching and matching process would be much more difficult without this wide variety of proposals circulating in the marketplace.

A franchise approach to smallholder agriculture could similarly evolve to a marketplace of proposals, where different communities and agglomerations of smallholder farmers could select different types of proposals from franchisors based on what they want instead of a more limited set of top-down solutions like trying to form standardized cooperatives and traditional outgrower systems. Some groups of smallholders may want more fixed income with lower risk, others may want more ownership and participation in the up-side. Some communities may want a greater role in management while others are looking to maximize employment or income.

If a wider variety of franchise-like proposals could meet a wider set of smallholder groups in a marketplace of proposals, there will be more productive matching as there is in franchising.

It is not clear what institutions could and should facilitate this process. Though a case could be made for government support of this matching process, public sector resources and capacity are limited. Research institutions, agriculturally focused NGOs or trade groups, economic development agencies for the former homelands, are possibilities, though there are surely others. It would be worthwhile to socialize these cases and this proposal for scale-up to a wide range of institutions to find one who could effectively fill this role of facilitating partnerships.

3.3 Transfer of know-how at scale:

Transferring know-how in the agricultural sector is notoriously difficult, particularly because of the idiosyncratic nature of production when the sector grows and diversifies beyond what basic extension services can support. Moreover, input suppliers have less natural incentive to provide training to smaller farms since the unit costs of providing technology transfer rise as the size of the farms and their input purchases fall. Processors and aggregators attempt to provide training paid for by subsequent output (contract farming), but the high costs of reaching a large number of smaller farmers remain, and are exacerbated by the problem of side-selling and lack of trust. The government seeks to provide training and know-how via agricultural extension services to small farmers, but these also tend to be of poor quality and reach in South Africa.

In order to offer a uniform product and service across traditional franchise networks, it is necessary to specify all aspects of the business technology in franchise manuals, and to train franchisees in this technology. A franchise approach to smallholder partnerships in agriculture would mean the partner provides the training and assistance to a large number of smallholders, building on the training industry that has built up around standardizing process and training in the traditional franchising space. This transfer of know-how under a franchise-type approach would be paid by the franchisee to the franchisor, possibly with external funding, or possibly with an in-kind contribution to the franchise such as the land use-rights. This model should be more demand-focused and efficient than state-funded extension services, and the closer nature of these partnerships should reduce the challenges of side-selling in traditional contract farming and outgrower training programs.

We want to point to the experience of Zamukele which has developed an ag-app that allows for online crop evaluation and recommendations online. In recent years there is ample proliferation of "AgTech" companies that have taken advantage of the digital revolution and offered solutions that have dramatically reduced the cost of producing, processing and analyzing information. This information is produced through the sensorization of agriculture obtained from satellite imagery, cameras in phones and drones, as well as through sensors embedded in agricultural machinery. In turn, this information can be easily shared and centralized. Because of this, the cost of transferring agricultural knowledge from technicians to farmers has dropped dramatically. Consider BoosterAgro, an app that centralizes weather information and makes it available online, or agrochemical vademecums that recognize weeds or

plant diseases through a simple photograph, or an AAPRESID app that allows geographical identification of resistant weeds through a collaborative app where farmers upload information individually raising alerts when certain type of weed is present in their plot and therefore a risk to the surrounding plots. Consider as well apps that enable farmers to better manage irrigation, or that give customized recommendations on density of fertilization like that of Auravant. For plot security consider remote monitoring of cattle with nutrition and health recommendations as the one designed by Cattler; and last, but not least, the wide array of farming ERP software companies designed to build georrereferenced business information that improve management practices.

These developments reduce the fixed costs of technical assistance which is inherent to the rural world: high dispersion of atomized players in a wide geography, a feature that is more problematic in smallholder low productivity farming ecosystems. AgTech companies have improved the accuracy of recommendations by georeferencing information and allowing for customized advise on a plot-by-plot basis helping to build trust between farmers and each tool. In addition, blockchain technology has reduced the cost of auditing every aspect of the business operation by sealing the traceability of the both input and output, also reducing the cost of building trust between parties, typically farmers and agricultural inputs distributors or grain originators. AgTech allows today for better coordination of networks of small operations as well as reducing the management challenges of operating large scale operations opening the door to competitively implementing new cooperative agreements that may help bridge the gap between the two agricultures, notwithstanding the well-

known challenges of technology transfer and implementation in relatively poor rural areas.

3.4 Reducing risk through parametric climate insurance

One of key benefits of partnerships discussed in this paper is reducing risk. The partnerships can dramatically reduce risk faced by individual small-scale farmers and they also work to reduce overall risk of agriculture firms by enabling their diversification. However, one type of risk was raised repeatedly in our interviews across the cases: climate risk. Climate risk is one of the most relevant risks in agriculture (the other two are price and operational risk), as it introduces significant volatility to the output produced. Despite the significant risk mitigation created by these partnerships, climate risks continue to inhibit results in all three cases.

Farmers around the world hedge against climate risk by diversifying the crop portfolio between summer and winter seasons and, when size makes it possible, by developing a geographically diversified portfolio of farms. Also, they utilize insurance markets, where available including climate insurance.

Conventional climate insurance requires to insure a particular piece of property (i.e. a crop) against a particular risk (i.e. drought). In order to price the insurance premium, the insurer not only requires a broad set of information with a relevant track record, it also involves the administrative cost of verifying that the piece of property has been impacted by the particular event. In other words, a surveyor of the insurance company must validate that the crop has reduced its yield because of a drought to a level where the insurance triggers a compensation to the farmer. The

mix between the relative small size of plots and it scattered distribution with the fact that a new crop would be sown in a brand new commercial farms in underutilized areas, producing conventional insurance policies pose a significant challenge for the insurance industry in two senses. First, it is difficult to price the risk involved, and second it is costly to audit damage when a particular event strikes. Both features may result in a product with a cost that discourage farmers.

Since the late 1990s, there has been significant discussion about the potential uses of index-based agriculture insurance (also known as parametric insurance). The basic underlying premise behind a parametric insurance policy is that insurance cost can be significantly reduced when you are not insuring a particular piece of property against an event, but instead you are insuring an amount of capital against an index that replicates the damage that the farmer wants to hedge against. By using index-based insurance both challenges for the industry are partly resolved, since the index chosen targets the information challenge while administrative cost linked to auditing is reduced dramatically. What triggers the payment of the insurance is an index, not a damage to a crop, so auditing is not required.

Since parametric climate insurance has not developed in South Africa, despite its mature financial system, we highlight two cases from other countries to illustrate the role it can play.

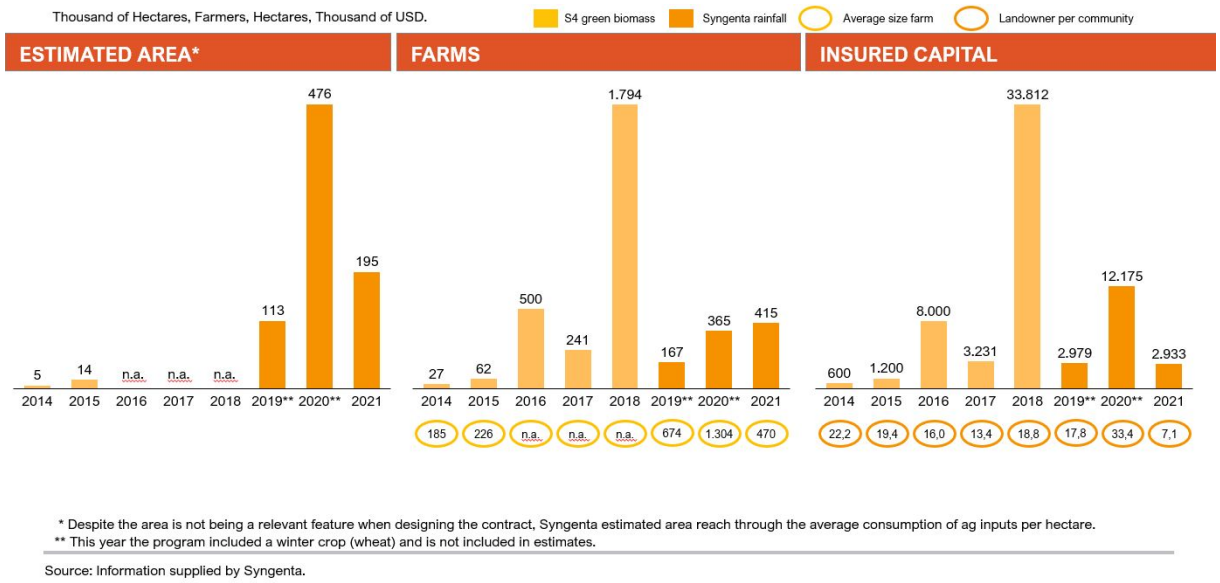
The first example is the Integra Program by Syngenta, which originated in Argentina. When the program was launched as pilot in 2014, it was devised as a tool to strengthen client loyalty and increase input purchasing share. Syngenta offered a climate hedging tool to farmers by subsidizing the entire cost of the insurance pre-

mium covering the full investment in a complete agricultural package (agrochemicals and seeds) purchased from a Syngenta distributor.

From 2014-2018, Syngenta worked with S4, an AgTech company that had developed a parametric index based on green biomass index, which is a proven forecaster of crop yield, particularly for year round crops such as soybean, yellow maize and wheat. The initial design of the program was to cover the 3% premia covering 100% of the input package sold to the farmer. After two pilot years, the program was adjusted such that if purchases were below a certain threshold, Syngenta would only reimburse 66% of the insurance cost (only 200 basic points would be subsidized). In its fourth campaign (2017) the program was incredibly successful in protecting farmers against the impact of a significant flood in the Santa Fe province, generating payments to clients to a total of USD 5 million, an average of USD 10 thousand per farmer with peaks of USD 15 thousand in particularly damaged counties. This year was critical in reputation building for the Integra program in building its client base, but also adjusted program costs upwards by the insurance company participating in the program significantly increasing the cost for Syngenta. Figure (10) shows the evolution of the program over the years.

Based on this successful initial experience Syngenta decided to expand the program to other critical markets as a loyalty tool (Australia, Brazil, Paraguay, South Africa and USA and is currently active there) and conducted pilots with smallholder farmers in South East Asia.

After several campaigns Syngenta, decided to integrate the business in order to fully own data and incorporate knowledge. Most relevantly, the company decided



* Despite the area is not being a relevant feature when designing the contract, Syngenta estimated area reach through the average consumption of ag inputs per hectare.
** This year the program included a winter crop (wheat) and is not included in estimates.

Source: Information supplied by Syngenta.

Figure 10: Summary of Case Studies

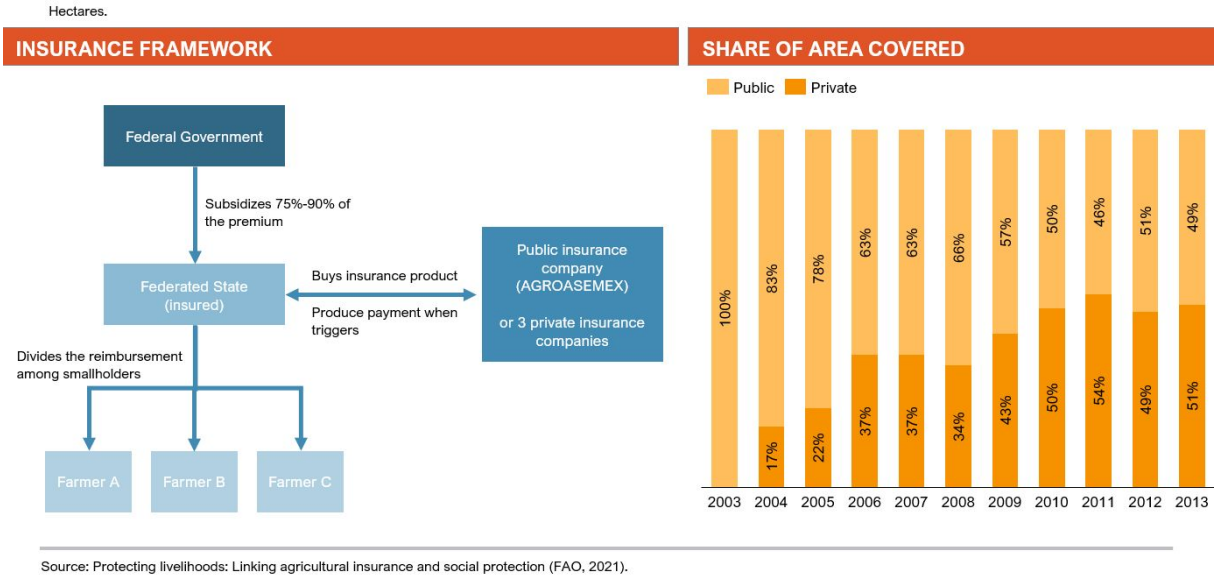
that the green biomass index was unclear to farmers and the geographical delimitation of counties was one of the main reasons for excluding farmers from coverage they expected. Thus the product, originally conceived as a loyalty program to be marketed by Syngenta's distributors, was eroding trust for some customers. Syngenta therefore decided to a) simplify the index using only rainfall during the critical period, a more familiar variable to the farmer and b) changing the area under analysis from unevenly sized counties to grids of 25 square kilometers. Additionally, Syngenta decided to put a 40% cap of the input package insured in order increase the proportion of self-insurance and avoid increasing the premium. Lastly, the subsidy of the insurance premium was reduced during 2019 and 2020, until the 2021 season when it was launched without any subsidy at all. As Figure (10) shows, as subsidies were reduced usage declined, which shows that there are important communication

and marketing challenges associated to weather insurance.

Additionally, S4 has continued to market its index with a strategy focused in input manufacturers and governments. BASF has developed a program very similar to Syngenta and fertilizer manufacturer Yara has insured its own agriculture business unit with S4. Currently, the Brazilian Ministry for Smallholder Farmers is working together with S4 in order to develop a pilot program to support micro farmers (less than 2 hectares) in the south of the country to leverage its microcredit program by complementing it with a parametric insurance mainly linked to rainfall, since measuring green mass index in the area is not a relevant forecaster of crop yield.

Meanwhile, Mexico has implemented a broad insurance since 2003 based on parametric indexes, mainly based on green biomass, to protect the income of smallholder farmers. "The Mexican government initially ran a large-scale MPCI programme in the 1980s, under the "National Crop and Livestock Insurance Company" (ANAGSA), which eventually became too expensive and draining for the public budget" as explained by Niclas Benni (FAO, 2021). The "Component for the attention to natural disasters" (CADENA) is a public-private insurance coverage scheme launched in 2003 by the Mexican Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA).

FAO (2021) explains step by step how each state of Mexico purchases the insurance products from the AGROASEMEX (the public company that manages the program), with which to cover different areas against specific risks. Therefore, the state is the owner of the policy, while the farmer with a surface of less than 20 hectares (or 60 cows) is the ultimate beneficiaries of payouts.



Source: Protecting livelihoods: Linking agricultural insurance and social protection (FAO, 2021).

Figure 11: Parametric Insurance in Mexico

As shown Figure (11), the federal government subsidizes 75–90 percent of the premium on the insurance bundle. Once a disaster strikes, the state government is tasked with distributing the payouts received from the insurance companies to the farmer. According to the FAO report, CADENA's budget has increased from USD 6 million in 2003 to USD 303 million in 2017, covering 12 million hectares (65% of cultivated area) and reaching 3.7 million smallholder farmers. Over time this program has replaced the original budgeted amounts for disaster relief, though it is too early to assess whether there are net savings.

Both examples by programs run by Syngenta and CADENA show that a relevant degree of coordination by an entity larger than farmers is required in order to: (1) generate the level of adoption for an insurance program to gain the scale required to dilute fixed costs; (2) standardize contracts in order to simplify options, (3) generate

a learning curve that shows the potential of the instrument (4) use an international re-insurer. Together with coordination, a certain degree of subsidy to the insurance premium was also critical for the initial adoption of the instrument. In the South African context, it is unclear who could support the initial cost of subsidization, but it may not need to be government if parts of the private sector see the potential for long-term gains that would justify the up-front investment. In Argentina the Central Bank reduced reserve requirements for agricultural loans which included parametric insurance, the idea was to provide a nudge so that the product would become more popular.

4 Conclusion

A significant proportion of South Africa's un- and under-utilized farmland is found in areas with communal land administration, which prevents a classical land reallocation and agglomeration process to unfold. There are many questions as to the efficiency of these land institutions, and to the effectiveness and incentives facing traditional leaders in former homeland areas. However, property rights have to do with the owner of the produce, not so much with the produce itself, if there are gains from trade between the different players, property rights not need to be a limiting constraint (except to the extent that they make those rights undefined). To that point our case studies demonstrate that increases and productivity and output are possible when the right matches are made, even under the current institutional framework via new forms of partnerships between corporates and smallholders.

Clearly, such partnerships alone are not a solution to the country's massive underutilization gap. It would be a positive development if the South African state could dramatically improve rural infrastructure, invest in smallholder training and technology transfer, and improve land institutions nationally. However, we have focused on what actions can be taken now under existing institutions, independent of the public sector, and without waiting for wholesale politically-contentious reforms:

- Identify organizations with convening power and trust among both communities with agricultural potential as well as purchasers, downstream processors, input providers, social enterprises, or other corporate entities that can partner with them to transfer know-how, agglomerate output, and provide sales and distribution channels.

- Increase the quantity, quality and availability of information on communal land tenure.

- Those organizations can begin a process of sharing experiences and building reputations and trust among a broader set of potential partners.

- Those organizations can evolve a standardized set of contracts and a marketplace of proposals.

- Those organizations, along with new AgTech tools mentioned above, can achieve the transfer of know-how at a broader scale.

- Climate risks can be further mitigated through the adoption of parametric weather insurance, which requires an entity with a broad enough reach to play a coordinating role.

These partnerships are not a panacea, but the longer that the same critiques about the status quo and the same proposals and master plans for resolving them

go back-and-forth with little progress to show, the stronger the case for searching for what else, in the meantime, can actually be done to close the gap between South Africa's two agricultures.

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