

To Make a Continent Bloom

Driving African Agribusiness with Israeli Ingenuity

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The Brenthurst Foundation

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Introduction

Meeting with farmers across East Africa reveals a geography ripe for agricultural innovation yet devoid of even the most basic tools and techniques. The village of Hazengo-Handali is located some 50 kilometres from Dodoma in central Tanzania. It is a dry region relative to other parts of the country, yet it is where many inhabitants rely on small-scale farming to eke out a living. A reliance on rainfall combined with limited means of storing water means that farmers struggle to cultivate their crops outside of the rainy season which spans November to April. As such, they resort to digging boreholes in nearby dry riverbeds under the midday summer heat with the aim of harvesting water using buckets and jerrycans. In Kenya's Embu region, which is located 130 kilometres north-east of Nairobi, farmers suffer a myriad of challenges, among them the rugged terrain – a reality due to their location at the foot of Mount Kenya. Limited technical knowledge among farmers sees them overcrowding their plots with a variety of crops, poor access to reliable sources of water means turning to flooding as a means of irrigation, and insufficient storage facilities results in harvests being stored and transported in bags, risking damage and theft. And in Ethiopia farmers must contend with similar inefficiencies surrounding inputs and access. Yet they must also endure exploitative middlemen and brokers, without whom farmers can see gross profits soar 225% higher. All these challenges and constraints risk compounding over the immediate future.

Africa's demographic changes and pressures are immense.¹ Over the next generation the continent is projected to double its population to 2.5 billion. This two-fold increase threatens food security on the continent, a reality which already sees one in five Africans go to bed hungry. Jobs, already at a premium, will depend on Africa creating more opportunities, by training its people with more than just rudimentary skills, providing necessary infrastructure, and creating an attractive value proposition to investors. This is especially true within agriculture, a sector which underpins the livelihoods of millions of Africans yet remains severely untapped and underdeveloped.

Home to 60% of the world's uncultivated arable land and over 30 million smallholder farmers who are not engaged in any commercial activity, the vast majority of whom survive on less than \$2 a day, Africa urgently needs to catalyse growth within its agricultural sector and transform it from one which is rooted in subsistence farming to one that is geared towards sustainable agribusiness. Part of this transformation will require African governments to partner with stakeholders who have the requisite skills and experience in developing successful agribusiness economies. One such partner is Israel who, on previous occasions, has played an integral role in the transfer of skills and knowledge to Africa.

Since diplomatic relations were first established with Ghana in 1957, Israel has sought to solidify its friendships on the continent through the provision of technical expertise and training. In these early years' teachers, engineers and doctors were sent to Africa in their droves with one objective: to share and apply their knowledge. Equally, many Africans visited Israel to educate themselves on how such a small and young nation could achieve so much despite its setbacks and challenges. Yet these golden years were

short-lived as war, politics and ideology saw the relationships which Israel previously shared with many African countries deteriorate, relegating Israeli diplomacy to the fringes.

Contemporary relations have improved but challenges remain. Israeli engagement on the continent is limited by funding and knowledge constraints, exemplified by the miniscule budget at the disposal of MASHAV – the main international development arm of the Ministry of Foreign Affairs – and the small presence in Africa shown by the Israeli Ministry of Economy and Industry, which is responsible for managing and directing trade policy between Israel and partner countries. Israeli businesses also struggle to penetrate African markets due to their fragmented nature, a reality which makes doing business costly and cumbersome. Indeed, trade between Israel and Africa amounts to less than \$1 billion per annum, with imports and exports from the continent accounting for less than 1% of Israel's total trade portfolio. There is also the diplomatic tension between some African governments and Israel due to the latter's relationship with Palestine.

A silver lining has been the wave of Israeli and Jewish NGOs, philanthropies and individual donors who have spearheaded numerous initiatives on the continent. A particular focus for many has been to extend agricultural technologies and know-how from Israel to Africa – a process which draws parallels with the 'golden era' that came to define Israel's presence on the continent during the 1960s. One such organisation is CultivAid whose Agricultural Innovation and Technology Centre (AITEC) model combines commercial farming with local ownership, Israeli training and technology, and smallholder extension services. While only present in Tanzania, Kenya and Ethiopia, these centres have proven to be a successful means by which thousands of local smallholders can engage within an ecosystem which exposes them to commercial operations and provides them access to tools, inputs, and training. In many respects the question of 'what' has been answered – Israeli organisations and donors know what needs to be done to promote equitable and sustainable agricultural development. After all, this is a journey which they themselves embarked on towards the end of the 19th century when agriculture became a priority for Jewish immigrants in the Land of Israel.

The question therefore shifts to 'how' this can be achieved at scale. As Africa undergoes its demographic shift and greater pressure is placed on already underdeveloped agricultural systems due to climate change, it is imperative that new systems are incorporated on the continent and quickly. What CultivAid currently provides is a step in the right direction, but it is just one organisation, and their model is only operational in three countries at the time of writing. If Israel is going to become a suitable development partner for African governments in the field of agriculture, then there will need to be a comprehensive framework for engagement. This will begin with a detailed Israel-Africa strategy which unifies Israeli organisations while also leveraging the global Jewish donor community. Prioritising capacity-building over aid will be important to Israel's success. African governments will also need to act as constructive partners by cutting red tape and ensuring that development initiatives do not get hamstrung with bureaucracy. African governments can also use the AITEC model as a platform to introduce

wider agricultural reforms by working with partners in the formulation of policy, for example.

Many look towards Israel for its sophisticated technologies and systems, believing that the solutions to Africa's developmental challenges lie in cutting-edge technologies and equipment. This belief is understandable because of the tremendous success Israel has witnessed domestically, in part thanks to technological innovations. But if Israel's agricultural revolution is to be understood as a marathon being run, many people look only at the final kilometre which is Israel's sophisticated system today. What they fail to look at are the many kilometres already run which have resulted in Israel's current position. Here is where the basics matter: access to inputs, training and education, and market linkages. To this end the role of Israeli innovation and expertise in Africa is not about artificial intelligence or machine learning. At least not yet. Africa's agribusiness transformation will be a gradual process and the key to its development will be a multi-stakeholder partnership which prioritises best practices which in turn lead to higher yields – this is where Israel can play a vital role. Failing all of this, agriculture in Africa will remain rooted in subsistence farming, reliant on haphazard government intervention and piecemeal initiatives from private sector actors and donors.

The Ebb and Flow of Israeli-African Relations

A discussion around Israel's relationship with Africa (and similarly, Africa's relationship with Israel) is no easy undertaking. With 54 countries on the continent, many of which were established during the decolonisation wave witnessed throughout the latter stages of the 20th century, there can be no fixed or definitive relationship. Rather, the relationship between Israel and Africa can best be described as one which has ebbed and flowed.

Formal diplomatic relations between Israel and the African continent can be traced to November 1957, nine years after the Israeli Declaration of Independence, when the country's first African embassy was opened in Accra, Ghana, overseen by the Vienna-born ambassador, Ehud Avriel. Israel's relationship with the newly independent Ghana would quickly blossom and become 'extraordinarily close'.²

Israel's diplomatic endeavours in the West African nation were part of a larger charm offensive across the African continent aimed at generating Israeli support on the international stage – especially within the United Nations – and steering would-be targets away from those nations looking to promulgate an anti-Israeli narrative. As a small Jewish nation in the Middle East, Israel was surrounded by neighbours who viewed it as illegitimate. Egypt, Iraq, Jordan, Syria, Saudi Arabia, and Lebanon were all members of the Arab League, an alliance of Arab states which had previously invaded Israel shortly after it declared its independence in 1948, resulting in over 6 000 Israeli deaths. It is fitting that Israel's former Defence Minister, Moshe Dayan, would later insist that 'Small nations do not have a foreign policy. They have a defense policy.'³ Garnering diplomatic support was therefore an integral part of Israel's foreign policy during its formative years.

The Golden Era

By 1955, Israel's efforts to forge closer ties with Asia had proven largely unsuccessful after it was excluded from the 1955 Bandung Conference, an event in Indonesia which saw African and Asian countries discuss peace and the role of the Third World in the Cold War, economic development, and decolonisation. Israel's rejection from the Bandung Conference saw it pivot its attention towards Africa, a region which was undergoing a similar existential journey characterised by liberation and a search for relevance on the global stage. As a state that had quickly emerged from the ashes of the Second World War and made rapid progress despite minimal resources, Israel had resonance with the decolonisation trend and African ambitions. As a country not much older than many of the newly independent African nations, Israel positioned itself as a model to emulate.

Beginning with Ghana in 1956, Israel executed a large-scale diplomatic campaign across Africa to secure the diplomatic support and friendship of newly independent nations and those teetering towards independence. Central to achieving this would be technical and military training on behalf of the Israelis. In Ghana, water infrastructure development was spearheaded by Israel's water planning authority, Tahal, while the Ghana National Construction Company was also established, in part, by the Israeli construction firm Solel Boneh. Military training was provided to the Ghanaian army and both the Ghanaian Nautical College, and the Flying Training School were established with the help of Israeli military officers. In 1959 Israel had extended its reach to East Africa where it established trade ties with Ethiopia, Kenya, Tanganyika (Tanzania after gaining independence in 1960 and incorporating Zanzibar) and Uganda. Ethiopia was a particular interest for Israel given its proximity to Egypt. More than 30 Israeli experts had established themselves in Ethiopia by 1963, ranging from doctors to policemen to military officials, the latter of whom were training the Imperial Ethiopian Army, security services and Eritrean Emergency Police.

Just as Israel was eager to extend its influence across the continent, so too were many African nations in gaining from the Middle Eastern nation. For newly independent nations on the continent, there was a strong desire to pursue their developmental goals and Israel was the ideal partner given that it was non-aligned vis-à-vis the West and Soviet Union, it was a vocal critic of South Africa's apartheid regime, it had a wealth of expertise and technology at its disposal and a successful track record of economic growth. 'It seems logical to us that since we are small we can learn more from a small, efficient country than from a big efficient country', one Senegalese official remarked.⁴ An additional boon for Israel was that many of their African counterparts appreciated their nonpatronizing attitude,⁵ something which complimented their lack of bureaucracy, laid-back approach and willingness to work in the fields.⁶ This approach stood in stark contrast with European and American diplomatic representatives.

By the mid-1960s Israel's charm offensive in Africa had made significant inroads. There were a total of 22 embassies scattered across the continent by 1963, a far cry from

the previous decade when there were none to speak of. Between 1958 and 1970, some 2 500 Israeli experts were sent to Africa to provide training and support for local development projects, while 9 000 Africans had similarly travelled to Israel for training.⁷ Upon his return from Israel in 1962, Tom Mboya, a former Kenyan statesman, commented that 'In Israel I have seen youths trained so that they are a source of pride to the nation', adding 'we must plan this way.'⁸ Israel had subsequently spearheaded youth programmes in more than 20 African nations which were intended to promote national consciousness, unity and discipline amongst the youth. By this point several African intellectuals had also begun positing Zionism and the Jewish revival in Israel as a model for Black Nationalism, giving rise to 'Black Zionism'.⁹

The 1960s saw increasing levels of collaboration between Israel and Africa, solidifying the epoch as the 'golden era' of Israeli-African relations.

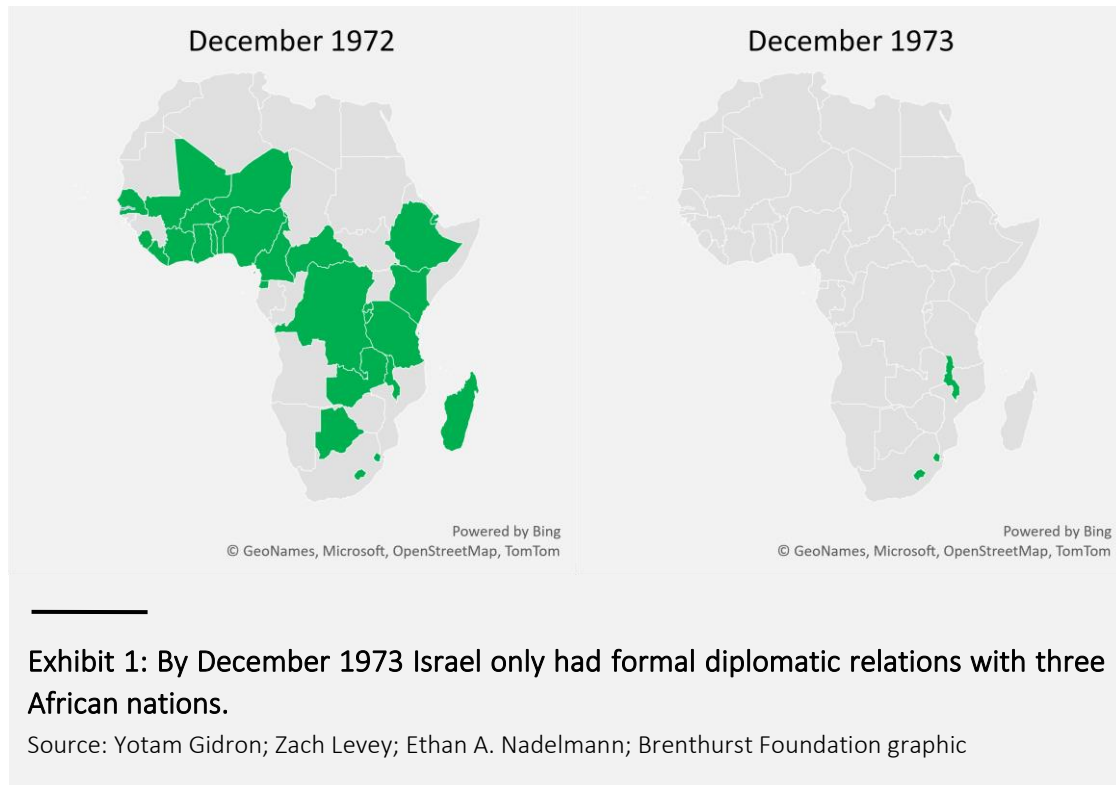
The Turning Point(s)

It was events in 1967, namely the Six Day War, which set in motion the deterioration in relations between Israel and Africa. What began as a pre-emptive airstrike on Egyptian bases and aircraft on June 5, culminated in Israel's expansion into the Jordanian West Bank, the Syrian Golan Heights and Egypt's Sinai Peninsula and Gaza Strip, a series of events which signalled to its many African allies that perhaps Israel's intentions on the continent were not as sincere as they were made to believe. By occupying Egyptian territory in the form of the Sinai, Israel had, in essence, annexed a part of Africa. Guinea was the only African nation to sever ties with Israel in response to these events, bringing the number of Israeli missions in Africa to 32.

Events surrounding 1967 provided Arab nations with ammunition against Israel, as they sought to convince African leaders that Israel was in fact a colonial entity. A catalyst in this war of words came in the form of Muammar al-Gaddafi, who had risen to power in Libya during 1969. Gaddafi was quick to mount a diplomatic offensive against Israel and its endeavours on the African continent.¹⁰ During this period, pro-Arab sentiment was growing in Africa in part because of the decision taken by oil-rich Arab nations to pledge extensive aid packages to the continent. Come the time of the September 1973 conference of the Non-Aligned Movement at Algiers, a resolution was adopted which reaffirmed the legitimacy of the Palestinians struggle against 'colonialism', while also expressing 'concern at Israel's policy of aggression and expansion'. The resolution called for member-countries to boycott Israel economically, diplomatically, militarily, and culturally.

It was the Yom Kippur War in October of 1973, however, which proved to be the death knell for formal diplomatic relations between Israel and Africa. Initially an Egyptian-led offensive into Israel, the conflict was quickly reversed as Israeli forces pushed Egyptian forces back over the Suez Canal towards Cairo. Within four days of the war Dahomey (now Benin) and Rwanda had cut diplomatic ties with Israel. A cascading rupture ensued as nations began severing diplomatic relations with Israel: Upper Volta (11 October), Cameroon (15 October), Equatorial Guinea (16 October), Tanzania (18 October),

Madagascar (20 October), Central African Republic (21 October) and Sierra Leone (22 October). Within a month of the war erupting, 18 African nations had ended diplomatic ties with Israel.¹¹



Diplomacy of a Different Nature

The aftermath of the Yom Kippur War meant that Israel’s diplomatic relations with many African governments had been left derelict as diplomatic missions collapsed. However, this did not bring an end to Israeli-African engagement.

Israeli policy was ambivalent towards those African states which had decided to sever diplomatic ties, and there was a great deal of reluctance on behalf of Israel’s Ministry of Foreign Affairs to resume normal diplomatic relations. Despite this, however, engagement between Israel and Africa continued, albeit in a less formal manner. The government of Kenya, which had cut diplomatic ties on 1 November 1973, maintained contact with Israel through the country’s national intelligence agency, Mossad, pursuing a ‘business as usual’ approach.¹² Indeed, in the months following the diplomatic rupture, Israeli officials met discreetly with the leaders of the Central African Republic, Ethiopia, the Ivory Coast, Kenya, Liberia and Senegal.¹³ The vacuum which had been left by Israel’s Ministry of Foreign Affairs after the Yom Kippur War was therefore quickly filled by a group of shrewd Israelis, many of whom had experience working in Africa due to their careers in either the intelligence or defence sectors.

It would become the perfect storm. Israel began bolstering its defence sector capabilities in the aftermath of the Yom Kippur War, while African leaders, anxious about their own security given the economic crises of the 1970s and subsequent austerity measures, were looking for arms, intelligence systems and expertise in a bid to retain power. This supply of Israeli arms combined with the demand from African states meant that Israel's relations with Africa were brokered through former Mossad operatives and military personnel rather than traditional ambassadors, and their engagements more often than not involved training elite Presidential defence units and selling armaments, rather than eating canapés and cutting ribbons. As time progressed, Sasha Polakow-Suransky observes, the Israeli government found that compromising certain values was necessary for survival, and the country's socialist idealism quickly gave way to *realpolitik*.¹⁴ Israel had subsequently forged a new alliance with South Africa, a country which it historically renounced because of its moral and religious objections to the country's apartheid system. The alliance meant that Israel profited from a new arms export market and South Africa saw its military machine strengthened. Israel is even said to have helped South Africa develop its nuclear capabilities.¹⁵

Despite its controversial relationship with South Africa, Israel continued to re-establish ties across the continent. In 1982 it restored diplomatic relations with Zaire as part of an agreement between the two countries which would see Israel provide security assistance, support in lobbying for Zaire's reputation in Washington D.C. and an inward flow of investment by Israeli businessmen. Similar developments occurred in Cameroon, Uganda, and Chad. President Paul Biya of Cameroon requested Israel train his security services as well as reorganise, train and arm his personal guards in 1984. This arrangement was facilitated by Meir Meyouhas, a Mossad agent-turned-businessman who at one point served as an advisor to President Mobutu. Elsewhere in Uganda, the country's Joint Anti-Terrorism Task Force received training from Israeli private actors; in Congo (Brazzaville) Israeli firms trained the Presidential Guard and supplied the government with surveillance equipment;¹⁶ and weapons are reported to have been supplied to Chad between 2005 and 2008 during its Civil War.¹⁷

Today dozens of Israeli companies continue to provide security services and equipment across the continent. Magal Security Systems, which was involved in the construction of the separation wall around the West Bank, provided their services in Gabon during the 2012 African Cup of Nations,¹⁸ while Rafael Advanced Defense Systems have worked in Kenya where they provided protection services for energy infrastructure and oil pipelines.¹⁹

Other firms such as LR Group, Mitrelli and NSO Group have all been criticised for their activities across the continent, either past or present. Indeed, headlines continue to illustrate the close connection many of these Israeli businesses and their directors have with Africa's political elite, and the nefarious activities they engage in. In 2017 the Israeli billionaire, Dan Gertler, was sanctioned by the U.S. Treasury under the Magnitsky Act, designed to freeze the assets of individuals alleged to have committed gross human rights violations or corrupt activities, for his 'opaque' activities in the Democratic Republic of the

Congo (DRC).²⁰ Israel Ziv, a retired Israeli Defence Force (IDF) Major General, was also sanctioned by the U.S. Treasury in 2018 for his alleged involvement in the South Sudan conflict. It is argued that he used his agricultural consultancy as cover for weapons sales into South Sudan valued at \$150 million.²¹ The former Head of Mossad, Yossi Cohen, was deported from the DRC in 2019 following several unsavoury encounters with senior political figures including the former and incumbent presidents, Joseph Kabila and Félix Tshisekedi.²² Finally, the infamous Israeli cybersecurity firm known as NSO Group was revealed to have sold its spyware—Pegasus—to the Ugandan and Rwandan governments.²³

Looking Ahead: More Questions Than Answers

The relationship between Israel and Africa has ebbed and flowed: from the height of the golden era when trade and the exchange of knowledge was flourishing, to the severing of ties following the Yom Kippur War, to the network of businessmen and former security personnel who have come to define Israel's presence in Africa.

There certainly have been efforts to forge closer and more formal relations between the two. It was former Prime Minister Benjamin Netanyahu's trip to Africa in 2016—the first diplomatic trip to the continent by a sitting Israeli Prime Minister in 30 years—which set this in motion. 'Israel is coming back to Africa. Africa is coming back to Israel' exclaimed Netanyahu,²⁴ as he undertook a diplomatic roadshow across Uganda, Kenya, Rwanda, and Ethiopia. Part of this new era of engagement has been a focus on history, reminiscing on older memories of cooperation while also engaging on contemporary issues of counterterrorism, security, and technological innovation. Formal diplomatic relations certainly have improved since the fallout of the late 20th century. Today Israel boasts 36 diplomatic missions across Africa while 25 African nations have diplomatic missions in Israel.²⁵ The most recent of these was in January 2019 when Israel restored relations with Muslim-majority Chad. Another development came in July 2021 when Israel was granted observer status at the African Union (AU), a privilege which had previously been withdrawn in 2002 following pressure from Libya.

Yet engagement between Israel and Africa remains limited. Trade is one such area where there is tremendous opportunity for growth: Israeli exports to Africa in 2019 amounted to \$550 million – 0.94% of their total exports. The largest country in this regard was Nigeria which accounted for \$165 million. Imports from Africa are even smaller, standing at \$274 million – 0.36% of all imports – with Ethiopia the largest partner at \$100 million.²⁶ Key among these exports are intermediate goods such as mineral fuels and oils, while imports are dominated by fruits and seeds.

The current landscape begs the question: what does the future hold for Israeli-African relations? The official narrative coming out of African capitals is mixed at best. Many are critical of Israel for its perceived persecution of Palestinians while others remain silent, preferring to abstain from UN votes and engage in business activities similar to those discussed above. Jerusalem (or indeed, Tel Aviv) would suggest that the solution to

many of Africa's development woes lies with its 'Start-up nation' model. This is especially true in the area of agriculture, where Israel's ability to nurture an advanced and thriving agricultural industry is certainly one to envy.

But if Africa is to undergo its own agricultural revolution with the support of Israel, what exactly is there to be learned and borrowed? Which stakeholders will be involved and what role are they to play? And finally, how is transparent development which does not involve clandestine activity between politicians and business elites ensured?

A Tale of Two Agricultural Trajectories

Both Israel and Africa serve as fascinating case studies in agricultural development. The former is a dry and harsh environment which many would not consider an ideal location for agriculture. From the southern-most tip of the Negev desert to the northern border with Lebanon, only 18% of Israel's 22 000 square kilometre landmass is arable. Yet the small nation has been able to establish itself as a global leader in agricultural innovation, boasting \$3.4 billion worth of outputs for domestic consumption and a further \$1.2 billion worth of exports in 2020.²⁷

Africa by contrast has a largely fertile topography and has seen agriculture maintain a significant social and economic footprint for generations. Roughly 60% of the world's uncultivated arable land is on the African continent. By comparison that is a landmass 650 times larger than Israel.²⁸ It is unsurprising then, that agriculture as an industry accounts for 23% of the continent's GDP – a staggering \$414 billion.²⁹

The reality, however, is that while Africa trumps Israel in the size, scale, and value of its agricultural sector, it remains largely underdeveloped and untapped. Israel by contrast has demonstrated tremendous success in maximising yields from the limited resources at its disposal and developing effective systems to counteract the many challenges it has historically encountered. Look beyond the size and value of Africa's agriculture sector and one will see numerous bottlenecks and inefficiencies across logistics, education, and technology. The implications thereof have forced the continent to import large sums of food – in 2019 the continent spent \$43 billion on food imports³⁰ – while also having to contend with the growing threat of food insecurity. In 2020 an estimated 798 million of the continent's inhabitants faced either moderate or severe food insecurity.³¹

Why, then, has a small nation been capable of making its desert bloom while a continent endowed with fertile lands and resources has struggled to provide for its people?

Israel's Agricultural Revolution

Shimon Peres, the Nobel laureate and former Israeli prime minister, was quoted as saying that 'Agriculture is more revolutionary than industry', adding that it is 'ninety-five percent science and five percent work'.³²

When the Polish-Israeli water engineer Simcha Blass established a joint venture with a kibbutz in 1965, his mission was to revolutionise Israeli agriculture using science. His newfound company, Netafim (translated as 'dripping' from Hebrew), began supplying drip irrigation equipment to Israeli vineyards in 1966 and later expanded to several settlements in the Arava desert along the Israel-Jordan border. The project was a great success. Netafim's irrigation technology enabled farmers to water their crops in a simple yet effective fashion by targeting their roots directly as opposed to watering the ground above using sprinkler systems. The company's solutions had increased crop yields in the Arava by nearly 70% and farmers were suddenly growing tomatoes, peppers, melons and eggplants in the desert.³³ Netafim's technology even helped the Arava become one of Europe's leading suppliers of winter fruits and vegetables. The company has since come a long distance from its humble beginnings experimenting with rudimentary dripping devices on kibbutzim, today boasting over 5 000 employees, annual revenue in excess of \$1 billion and a 30% share of the global drip irrigation market.³⁴ Netafim is one example of Israel's successful agricultural journey. Today the country is renowned for its advanced agriculture sector. The use of technology and innovative systems, whether it be improving the wellbeing of livestock, monitoring nutrition, or increasing the shelf life of produce, has positioned the tiny nation as a hotbed for pioneering agricultural technologies (commonly referred to as AgTech) while also spurring a new generation of start-ups and entrepreneurs seeking to follow in the footsteps of Netafim. To attribute Israel's agricultural success to any single individual, organisation or action would be a disservice to the rich history which has unfolded over generations. Indeed, Israel's agricultural transformation was as much of an existential necessity as it was a government-led agenda.

Agriculture has featured prominently within Zionist literature and thinking prior to the State of Israel's formation in 1948. At the core of Zionist ideology is the creation of a Jewish homeland in the historical Land of Israel. For many advocates of Zionism in the late 19th and early 20th centuries it was believed that agriculture provided an indispensable opportunity to realise this dream as it could both 'redeem' the Jewish homeland and 'restore' the Jews as a people.³⁵ The belief was that the Jewish people whose historical and theological identity has been linked to agriculture, had become detached from the land over centuries of migration. Returning to the Land of Israel to farm was therefore the aspiration of many Zionists. Another core tenet of Zionist thinking was that of cooperative ventures – that there were neither owners nor managers but rather the workers would share equally in the profits of their collective enterprises.³⁶ This combination of agricultural reverence and collective thinking supported a wave of collective farming among Jewish immigrant communities, giving rise to the Moshav and Kibbutz settlement models. A crucial aspect of these settlements was that they consolidated resources and developed local agricultural economies based on improved rotation of crops, irrigation, and mechanised cultivation.³⁷

One must also acknowledge the existential role agriculture played beyond Zionist ideology. Life for many Jewish immigrants was challenging: the climate and terrain was unlike anything they had experienced in Europe and was made worse by disease and limited infrastructure. This ‘consciousness of scarcity and adversity’³⁸ cannot be overstated. Agriculture needed to be successful. It was not simply about reconnecting with the land; it was a means of survival. This perseverance bred a population who were both physically and mentally resilient and who were driven to achieve success regardless of the constraints.

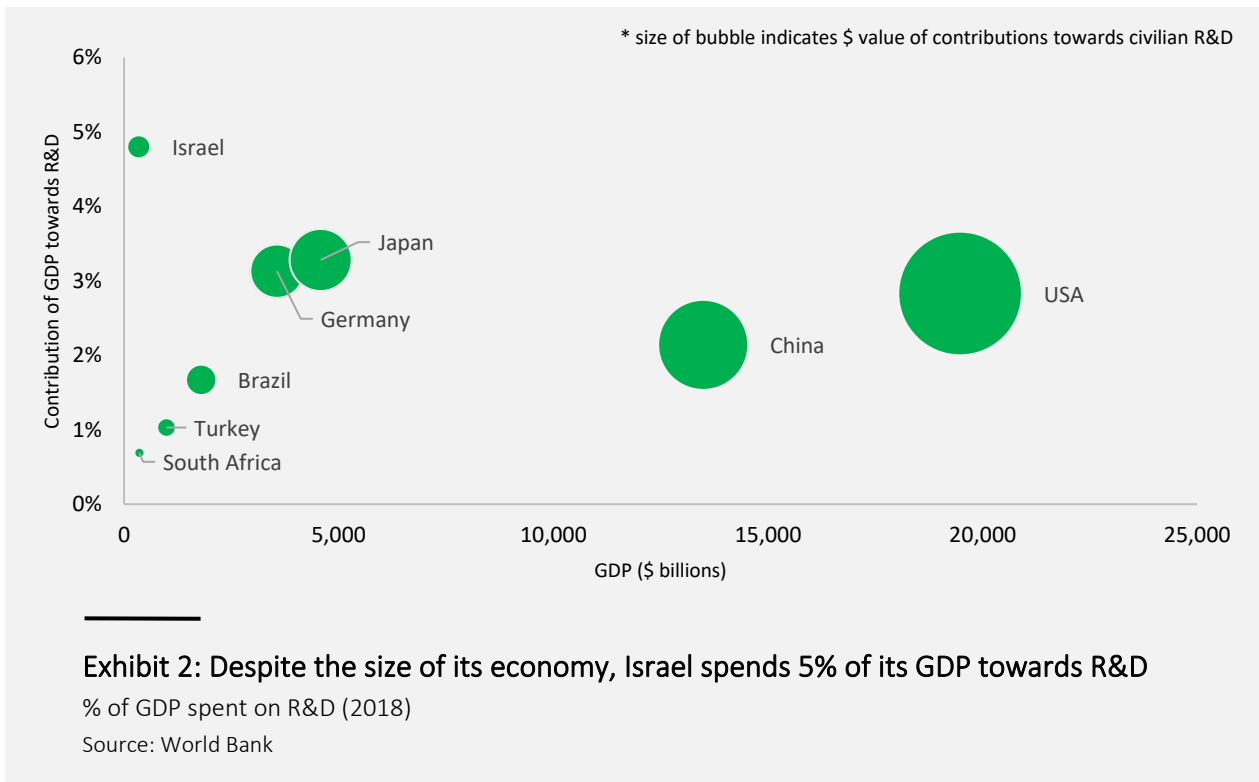
The Israeli government has also played an integral role in the country’s agricultural transformation following its creation in 1948. The decision to expand Israeli agricultural production was driven by the country’s government under the leadership of David Ben-Gurion following the aftermath of the War of Independence in 1949. The government sought to achieve agricultural self-reliance given the food shortages the newly independent nation was facing. During the 1950s Ben-Gurion quickly embarked on his quest for self-reliance, beginning with plans to develop a large-scale water project which would transport water from the Sea of Galilee to the south of the country. Fast-forward to 1964 and the National Water Carrier of Israel became operational and remains the largest water project in Israel, transferring fresh water from the Sea of Galilee in the north down to the country’s southern Negev region. It was a mammoth project. On a per capita basis Israel had spent six times more building the National Water Carrier than the US did when building the Panama Canal.³⁹ As of 2015 the National Water Carrier had the capacity to pump more than 120 billion gallons of water.⁴⁰

A visit to the Jordan Valley Water Association in northern Israel reveals the impact that similar infrastructure can have on agriculture, albeit on a smaller scale. Established as a cooperative by local farmers in 1978, the entity both produces and distributes water to the 12 Kibbutzim (cooperative settlements) located around the Sea of Galilee. It may sound like a simple endeavour involving several switches and buttons, but the reality is that the association is responsible for operating and maintaining 30 pumping stations, a drinking water treatment plant, six operative water reservoirs, one wastewater treatment plant and a desalination plant.⁴¹ The 1950s also saw the government subsidise water for agricultural use, provide disaster relief, and extension services.⁴² There was also close collaboration between the public and private sectors. When Netafim was in its infancy during the 1960s it was Yehuda Zohar – one of the first field service advisors for the Israeli Agriculture Ministry’s extension service – who promoted the company’s technology across the country, playing a key role in its adoption within the Arava region. As one commentator later observed, the Israeli government had created a state-supported framework ‘that both deified and subsidized agriculture.’⁴³

Complimenting the support from government has also been a focus on civilian and military Research & Development (R&D) expenditure. Today, Israel’s civilian R&D is 4.8% of GDP, while Japan’s is 3.3%, Germany 3%, the United States’ 2.8%, and China 2%. To this must be added military R&D. This is difficult to quantify, but the military has historically accounted for as much, in the worst security years, as 40% of the national budget. The

military, the regional threat and limited international friendships have combined to drive innovation in military technology: As the first Israeli Prime Minister David Ben-Gurion was reportedly fond of saying: ‘In the army it is not enough to be up to date; you have to be up tomorrow’.⁴⁴

More important perhaps than money from the military was the culture it engendered, of accountability no matter the rank, agility, questioning and problem-solving rather than uniform rigidity, and a can-do, risk-taking attitude. Major General Aharon Ze’evi-Farkash headed up a variety of units during his 40 years in the armed forces, including the elite Unit 8200 signals intelligence unit and, from 2002 until his retirement from active duty in 2006, the Military Intelligence Directorate (known as ‘Aman’). Farkash says: ‘It is also a bottom-up process since it is dependent on taking young, brilliant soldiers who are highly motivated because they understand what is at stake, and we give them a budget, a target and a short time-frame.’⁴⁵ Money and even technology is however not enough. To be effective it must form part of a system aimed at translating ideas into business ventures. Here is where the agricultural research centres have proven instrumental in advancing a commercial agriculture sector.



A separate initiative by the Israeli government shortly after its establishment was to fund research across the country’s agricultural landscape. Central to the success of this endeavour was the establishment of R&D centres. The Ramat Hanegev Agricultural R&D Centre in the Western Negev is one of nine scattered throughout Israel whose primary purpose is to serve as a bridge between researchers and local farmers. As such these

centres provide farmers with tools, techniques and systems which are intended to improve existing practices while also introducing new ones. A major benefit in this regard is that farmers are shielded from the risks associated with experimentation were they to conduct it themselves.

Today agriculture occupies a small piece of the larger Israeli economy: the sector employs 1% of the country's labour force⁴⁶ and contributes as little as 1.2% towards overall GDP.⁴⁷ Yet in many ways this is not the headline measurement which ought to constitute success. Success in this context ought to be the ingenuity and commitment which created Israel's agricultural ecosystem where there was once none. What began as an ideological vehicle transitioned into a means of self-sufficiency and food security, and later a platform for innovation. Throughout Israel's agricultural journey has been a unique mixture of bottom-up ownership and top-down inputs, creating an ecosystem which championed collaboration and forward-thinking innovation amongst a variety of stakeholders. It is this development story which can bring value to Africa.



Exhibit 3: Lion David (R) showcases the various research initiatives which are being conducted at the Ramat Hanegev Agricultural R&D Centre.

Source: Richard Morrow

Africa, the Sleeping Agricultural Giant

Agriculture is synonymous with Africa. From vineyards in South Africa, to cocoa farms in Côte d'Ivoire, to coffee plantations in Ethiopia, agriculture remains an economic mainstay for the continent. Roughly half of Africa's workforce, some 230 million people, engage in agricultural activity, a sector which accounts for 23% of the continent's GDP.⁴⁸ Yet despite its size and significance, agriculture in Africa today remains underdeveloped and untapped.

The reality across Africa is that an estimated 80% of all farms are smallholdings, while the remaining 20% engage in medium-to-large-scale farming.⁴⁹ It is the smallholder community—those who operate on less than three hectares of land—which must endure some of the toughest challenges. Comprising a large proportion of the world's poor living on less than \$2 a day, the average smallholder is severely constrained in their ability to cultivate large areas of land and purchase machinery, equipment, and inputs such as fertiliser and improved seed varieties. Indeed, today's adoption rate of improved agricultural technologies in Africa stands at 35% while only an estimated 33% of arable land is grown for improved crop varieties on the continent.⁵⁰ The same can be said for mechanisation, where African food producers are said to have 10 times fewer mechanised tools and technological innovations per farm area than farmers in other developing regions.⁵¹

These constraints are further compounded by a litany of challenges surrounding financing opportunities, market access and support from governments. Across Africa the market for agricultural finance is an estimated \$240 billion, yet only 25% is being met which creates a funding gap of \$180 billion.⁵² In East Africa for example, where agriculture accounts for 60% of all formal employment, loans to those operating in the sector represent on average less than 6% of total lending by commercial banks.⁵³ This financing gap has created a community of 'missing middle' farmers who cannot expand their capabilities without the requisite capital resources. Then there are the market and value chain linkage issues. Value chains across much of Africa remain underdeveloped and fraught with frictional costs. The cost of moving a forty-foot container (FEU) from Beira in Mozambique to Lilongwe in Malawi is around \$4,750, including port and handling charges totalling \$2,000 – nearly ten times the cost through Antwerp for example.⁵⁴ Much of this can be attributed to the complicated and often treacherous journey these shipments must make, while there are also the bureaucratic obstacles along the way which can make a border become a barrier.

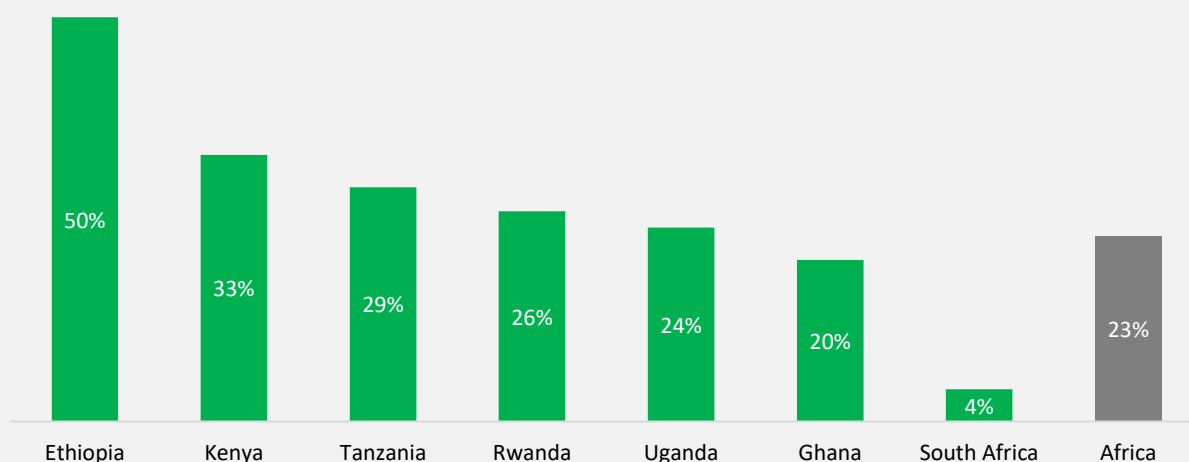


Exhibit 4: Agriculture plays a significant role in many African economies

Agriculture contribution to GDP, 2020, %

Source: Ministry of Food and Agriculture (Ghana); Ministry of Agriculture and Livestock Development (Kenya); Ministry of Agriculture and Animal Resources (Rwanda); ACELI Africa; McKinsey & Company

All of this is not to say that African governments are unaware of these challenges, or that they have not endeavoured to support their respective agricultural sectors through various initiatives and declarations. The 2003 Comprehensive African Agricultural Development Programme (CAADP) saw governments commit to spend a minimum of 10% of GDP on agriculture by 2008. The 2006 Abuja Declaration stipulated that African Union (AU) members would increase the use of fertiliser within their respective countries to an average of 50 kilograms per hectare by 2015. Neither of the two have achieved their objectives. Most African governments allocate less than 5% of their GDP towards agriculture,⁵⁵ meanwhile average fertiliser usage across Africa stands at an average 22.5 kilograms per hectare.⁵⁶ This reality illustrates why millions of African smallholder farmers struggle to produce the volume of high-quality yields necessary to compete in commercial value chains and why the continent remains trapped in a low-growth trajectory. Three countries typify these challenges.



Exhibit 5: A farmer from the village of Hazengo-Handali harvests water from boreholes

Source: Richard Morrow

In Tanzania the agricultural sector employs some 67% of the country's labour force yet the sector only accounts for 29% of GDP.⁵⁷ This is partly because most Tanzanian farmers are smallholders, with some estimates suggesting that they represent 90% of the sector.⁵⁸ The challenges faced by these smallholders are varied and ultimately hinder their ability to participate in a commercially sustainable agribusiness environment. The village of Mazengo-Handali, some 50 kilometres south-east from Dodoma, exemplifies these challenges. Beginning with inputs, farmers in the area are at the mercy of the climate as the region receives roughly 605 millimetres of rainfall annually. Without adequate means of storing this rainfall, the community resorts to sinking boreholes in the nearby riverbed as a means of harvesting water, which is then used for drinking and crop irrigation. The crops themselves are planted without much consideration for spacing or other best practices due to a lack of education amongst the community. Fertiliser is scarce and so those farmers who choose to utilise it resort to using manure from their cattle. A combination of irregular irrigation and inadequate farming techniques and inputs results in low yields of mediocre quality. The absence of packing houses and affordable transport linkages means these farmers cannot sell their produce at larger markets where they would likely fetch a higher price. The farming community in Mazengo-Handali is therefore stuck in a vicious cycle of low- and poor-quality yields, limited market linkages and scant profits.

A similar scenario exists in Kenya. With a \$98 billion economy, Kenya relies on the agriculture sector for 33% of its GDP, 62% of all exports and employment for 80% of the country's rural population.⁵⁹ The country's agricultural sector boasts several strengths relative to other African countries, including one of the region's largest dairy sectors – accounting for 4% of the East African nation's GDP. Yet like its southern neighbour, Tanzania, Kenya's agriculture sector remains largely underdeveloped, exemplified by the 8.6 million smallholder farmers who operate within it, many of whom have access less than three acres of land.⁶⁰ For these farmers there is no shortage of challenges impeding their ability to scale and develop. Among these are limited access to affordable and quality inputs, mechanisation, and new technologies such as improved irrigation systems.⁶¹ These realities can be seen in Embu County, one of Kenya's 47 counties located in its central region. Some 85% of the county's population engage in agricultural activity with as many as 90% being smallholder farmers earning \$413 annually.⁶²

Several farmers construct their own nurseries where they grow seedlings for the purposes of transplanting. The challenge is that these nurseries do not provide adequate protection against the elements, often comprising just sticks and leaves. Those seedlings which do survive are transplanted onto small plots – no larger than three hectares. Here the challenge is overcrowding. Farmers sow a variety of seeds on the same plot as the transplanted seedlings without consideration for spacing or nutrient demand. This is made worse given that farmers typically do not use fertiliser nor pesticides, owing to affordability. Irrigation is another issue. With less than 1% of Kenya's land irrigated,⁶³ many farmers harvest water from nearby rivers using jerrycans or small diesel-powered pumps. Once farmers have harvested their water they irrigate through flooding – the process in which they submerge their crops with water. This practice is inconsistent by nature as farmers irrigate not according to scientific measurements but rather according to intuition and convenience. Crops are therefore provided with either too much or too little water. This combination ultimately affects the size and quality of yields. But the difficulty does not end there. Without adequate storage infrastructure such as pack houses, farmers cannot store their yields in an optimal and safe environment. Instead, they use sacks and bags which cannot ensure adequate temperatures nor protection. The reality in Kenya is that smallholder farmers – like those in Embu County – can experience significant post-harvest losses of up to 25% for key staples.⁶⁴



Exhibit 6: Top left: A seedling nursery constructed by local farmers which is vulnerable to the elements. Top right: A crowded plot suffers from low- and poor-quality yields. Bottom right: Inadequate storage facilities mean that farmers resort to packing and storing using bags. Bottom left: Farmers flood their crops due to unreliable irrigation systems.

Source: Richard Morrow

Continuing further north lies Ethiopia. Despite its location in the Horn of Africa, agriculture is an integral part of the country's economy: it contributes as much 50% of the national GDP, is responsible for 80% of exports and employs 80% of Ethiopia's labour force. Ethiopia has become a household name for its coffee industry as the East African nation grew an estimated 7.7 million bags of coffee in 2019, with 3.42 million destined for major export markets including Germany, Saudi Arabia, Japan, the US, and Belgium.⁶⁵ Yet like Tanzania and Kenya, Ethiopia's agricultural landscape is fraught with inefficiencies across almost every aspect of the value chain.

Ethiopia's agriculture sector is almost entirely dependent on smallholder communities as they are responsible for more than 95% of agricultural output.⁶⁶ As previously discussed, these communities must endure a myriad of challenges ranging from irrigation

to fertiliser use and limited access to mechanised technologies. Some communities are fortunate to have modern facilities and resources at their disposal, but they too face challenges. One such nursery in Addis Ababa features a 14-year-old net house, which despite its features when compared with rudimentary nurseries seen elsewhere on the continent, is exposed to wind, insects, and weeds. These sub-optimal conditions result in a seedling germination rate of less than 70%.⁶⁷



Exhibit 7: Abebe manages a 14-year-old nursery in Addis Ababa where a combination of rudimentary tools and poor facilities dramatically reduces the germination rate by as much as 30%.

Source: Richard Morrow

But the challenges extend beyond inputs to post-harvest. Farmers must get their produce to market, and this is where they rely on middlemen, also known as brokers, who play an integral role within the smallholder community. The difficulty is that these agents inflate costs and often undercut farmers. One study in Ethiopia found that farmers' gross profits can be 225% higher if they exclude intermediaries such as middlemen and brokers.⁶⁸ This is one reason why fertiliser is expensive in Ethiopia as products must be distributed through such agents if they are to reach farmers. Infrastructure is another issue. In the country's dairy sector for example, collecting fresh milk from smallholders for processing is challenging due to distances and the absence of a functioning cold chain.⁶⁹

For Africa there is a clear and obvious need for catalysing growth within its own agricultural sector. Poor yields are the result of a dearth of expertise, technology, market

linkages and infrastructure, exemplified by the 30 million smallholder farmers who are not engaged in any commercial activity and the additional 16 million who are integrated in loose value chains.⁷⁰ Thus, much of Africa’s smallholders are unable to create a virtuous cycle of farming, profit, investment in education and new technologies, further improved yields, and more profit.

Compounding the continent’s already underdeveloped agriculture sector and undermining future gains, are a slew of threats. Africa’s population is expected to grow by 1 billion between now and 2050, making it the world’s most populous continent at 2.5 billion inhabitants. This boom in population growth will be accompanied by an increased rate of urbanisation which in turn will see rural farming communities shrink and greater pressure placed on meagre smallholdings for food. Extreme and unpredictable weather conditions brought about by climate change will make it difficult to engage in traditional agricultural activities, thereby threatening livelihoods and economies. The spill-over effects of these phenomena will worsen food insecurity as millions of the continent’s inhabitants are either facing moderate or severe food insecurity. Indeed, the 2022 Global Food Security Index which measures food security according to affordability, availability, quality and safety, and sustainability and adaptation, ranks Sub-Saharan Africa as the most food insecure region in the world with a score of 47 and six African countries ranked in the bottom 10.⁷¹ In response, governments will be forced to divert larger allocations of their budgets to food imports and thus the vicious cycle continues.



The reality is that Africa’s current agricultural trajectory is not sustainable. Some estimates suggest that the continent could produce two to three times more cereals and grains⁷² but this is contingent on the right mixture of inputs, policy, infrastructure, expertise, and a determination on the part of all stakeholders. Israel does provide both lessons and

opportunities for partnership which can remedy many of the continent's challenges while also catalysing inclusive growth. The key to achieving this, however, is to assess the challenges, failures, opportunities, and successes of Israeli engagement on the continent and to use this insight as a means of developing a framework for future engagement.

The Limitations and Opportunities for Israel in Africa

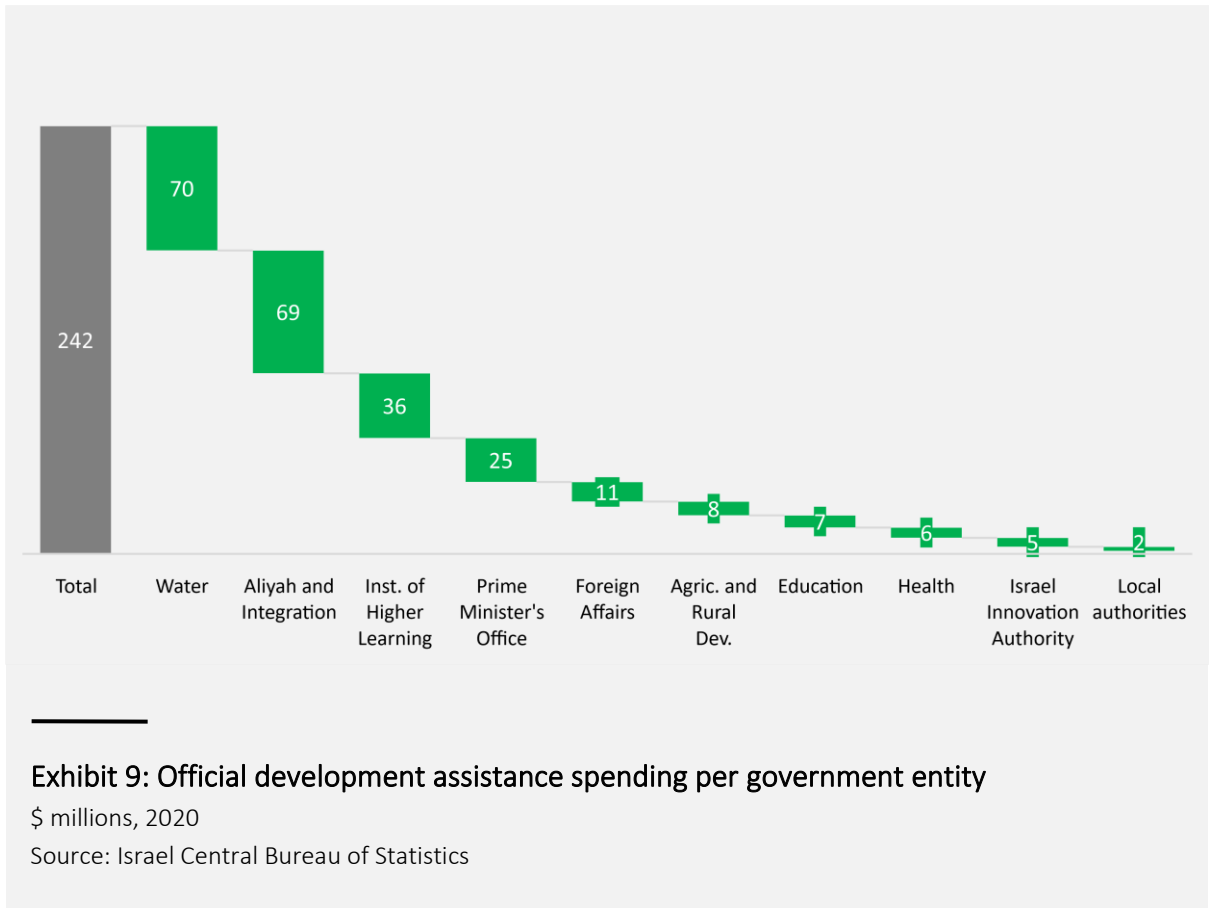
It is easy to view Israel's development success—especially within agriculture—as a plug-and-play model which can be applied to Africa. This mindset is misleading. There are numerous factors across both Israel and Africa which impede greater collaboration between the two and which ultimately limit the role which Israel plays on the continent. There are, however, opportunities where Israeli innovation can gain greater prominence and contribute towards the development of Africa's agribusiness landscape.

Funding and Knowledge Gaps

A major impediment to Israeli engagement in Africa is the lack of funding. This is most pronounced at a diplomatic level. With a budget of \$11 million in 2020, Israel's Ministry of Foreign Affairs must carefully choose where to allocate its funds, meaning that MASHAV – the main international development arm of the Ministry – is likely to have a budget no greater than \$10 million when considering administrative costs. Indeed, the activity of the Ministry of Foreign Affairs through MASHAV was some 5% of all bilateral assistance in 2020.⁷³ With this paltry sum the organisation must execute its development agenda globally, a herculean feat for any organisation faced with such constraints.

Compounding the scarce funding opportunities is a limited knowledge and professional network across the continent. Unlike in European or North American markets, Israeli firms do not enjoy a large network in Africa which they can leverage for professional opportunities. This is in part due to the small Israeli and Jewish communities which reside on the continent, but it also the result of strategic and political oversight. The Israeli Ministry of Economy and Industry, which is responsible for managing and directing trade policy between Israel and partner countries, boasts only three trade missions in Africa

Ghana, Kenya and South Africa. By comparison there are four in the USA, three in India and two in Germany.



Business and Frictional Costs

The financial impediments extend beyond funding opportunities to include the commercial landscape in Africa. Groundwork BioAg is an Israeli company which produces mycorrhizal inoculants for commercial agriculture. Their products are designed to increase crop yields while also reducing fertiliser and water inputs, thereby lowering input costs. While the company has a presence in Kenya, Mauritius, South Africa and Ghana, these countries account for less than 10% of the company’s overall revenue.⁷⁴ ‘It is about market size and the cost of doing business’ says co-founder and director, Dan Grotzky.⁷⁵ While Africa is large and accounts for 60% of the world’s uncultivated arable land, it is a fragmented marketplace comprising 54 economies. This fragmentation impacts on supply chains, thereby increasing costs and resulting in a product which the end consumer will typically find difficult to afford. For example, a 50-kilogram bag of fertiliser would have an import cost of \$17.4 into Tanzania, later selling at a retail price of between \$33 and \$38.5 due to the various cost it will accrue throughout the value chain.⁷⁶ Africa as a market for Groundwork BioAg, Grotzky adds, trails behind India, Brazil, USA, and Ukraine. There are also issues surrounding distribution. Simon Schwall is the founder and director of OKO, an

Israeli-based company which creates innovative tools to distribute insurance in remote areas of Africa and to unbanked farmers. To date OKO boasts an estimated 12 000 active policies in Mali while several hundred in Uganda. Despite the nature of OKO's service offering – a digital-first mobile solution – Schwall identifies distribution as a key problem when doing business on the continent. 'OKO's customers are rural farmers and are difficult to reach' explains Schwall. 'To reach them, OKO had to set-up a nation-wide network of agents in charge of educating farmers about the concept of insurance and helping them register. And this needs to be repeated for every new market in Africa, which slows down our growth as time and money need to be invested in this initial customer acquisition.'⁷⁷

Diplomatic Shortcomings

Politics is another such obstacle. The Israeli-Palestinian relationship is a pain point for many African governments, not least because they view Israel's actions as colonial in nature, something Africa knows too well. The optics of therefore engaging openly with Israel would be politically damaging for many of Africa's governments, leading some to take a vocal stand against the Jewish nation. South Africa's Minister of International Relations and Cooperation, Naledi Pandor, has called for Israel to be classified as an 'apartheid state', likening it to the apartheid government in South Africa which governed the country under a racially imposed system for 46 years.⁷⁸ Israel's status as an accredited observer at the AU has also been threatened as both South Africa and Algeria have lobbied for its forced removal.

Philanthropic Community

Filling Israel's diplomatic and commercial hole in Africa are the various Israeli NGOs and Jewish philanthropies which invest their time, energy, and money into development projects across Africa. Driven by the notion of *tikkun olam* ('repair of the world' in Hebrew), these organisations, actors and groups have increasingly gained recognition for their work. Ambassador Gideon Behar revelled in their growth across Africa in recent years. 'It is a development of the last decade' explains Behar. 'When I was an ambassador in Senegal between 2006 and 2011, I hardly saw any [Israeli] civil society actors in my area in West Africa'.⁷⁹

But it is not just Israeli organisations and actors who are making their presence felt in Africa; Jewish donors from outside Israel are doing the same. The American Jewish Joint Distribution Committee (JDC) is one such example. In an effort to leverage Jewish philanthropy and mobilise Israel's agricultural expertise in support of African smallholders, the JDC established Tikkun Olam Ventures in Ethiopia during October 2018. Using philanthropic funds from US-based companies and individuals, Tikkun Olam Ventures was able to provide smallholder farmers in Ethiopia with loans, Israeli technology, training, and access to new markets for crops. John Craig is another individual from the U.S.' Jewish community who is financing development initiatives in Africa. The DOV Centre – named after the renowned Israeli agricultural scientist Professor Dov Pasternak – is in Niger and

looks to train the next generation of farmers and agricultural technicians. John, together with his wife, have invested \$1.5 million into the Centre and aim to deliver a curriculum in 2023 that will provide learners with the requisite knowledge and expertise to catalyse a commercially minded and sustainably led agriculture sector in Niger.

Yet the Israeli philanthropic space remains small and fragmented. As the director of one such organisation made clear while in Jerusalem, egos are an issue. 'Israeli's can certainly work together in teams' he says, citing the emphasis on teamwork many acquire during their military service, but tempers that by adding: 'Israeli's are opinionated and often there is difficulty in joining forces.' This is problematic when considering their role within Israel's Africa development agenda.

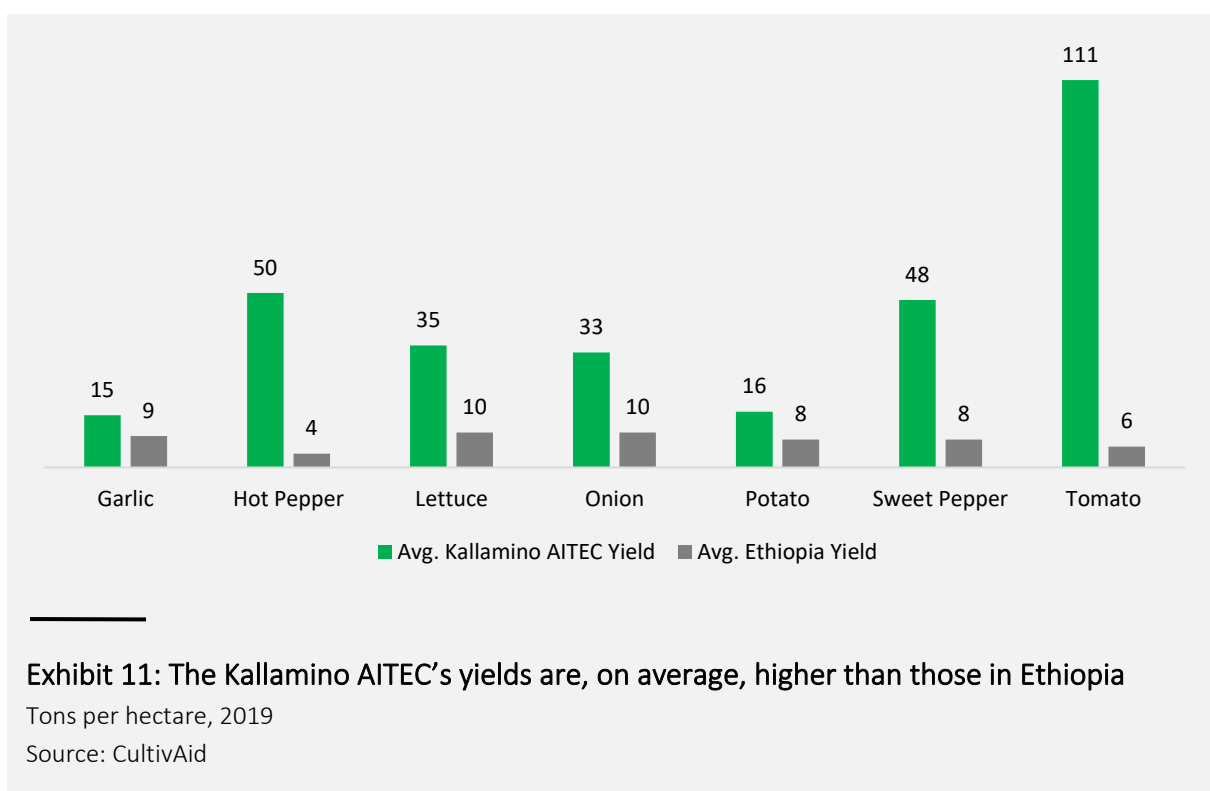
Case Study: Agricultural Innovation and Technology Centres

There is no shortage of challenges impeding Israel's engagement with Africa. The limitations surrounding finance, knowledge, diplomacy, and philanthropy mean that no single model can serve as a bridge between Israeli ingenuity and African agribusiness. When considering a model which can succeed—or at the very least be trialled—one would need to leverage the opportunities which exist while also overcoming the current challenges. This would mean creating a model which is economically viable; one that enables the transfer of knowledge between Israeli and African stakeholders; encourages diplomatic cooperation and which successfully leverages the Israeli and Jewish philanthropic communities. One such model is already making inroads in this regard and is being championed by CultivAid, an Israeli NGO focused on improving agricultural practices to enhance local yields, income, and nutrition. CultivAid has, together with its partners and donors including Water 4 Mercy, a US-based charity which champions equitable and sustainable access to water, spearheaded the establishment of Agricultural Innovation and Technology Centres (AITEC) which are designed to introduce technologies, develop innovative interventions, and provide training, demonstration and research to smallholder communities, entrepreneurs, agronomists, and students within an African context.

Founded in 2016, CultivAid has established four AITECS to date: two in Ethiopia, one in Tanzania and one in Kenya. The fifth is currently being finalised and will be located in Ethiopia. A typical AITEC will comprise of a demonstration site and a commercial farm. The funding required to establish an AITEC will vary based on its size and complexity. A two-and-a-half-hectare site (six-acre) as seen in Tanzania will cost \$165,000 and this will comprise the initial design and capital costs. Additional costs also include staff salaries as well as operational costs which can total \$239,000 per annum. Donors have traditionally provided the requisite funding for these expenses except for operational overheads. This is because of the commercial farm.

The commercial arm of the AITEC exists to maximise profits and ensure functionality over the long-term. It can generate profits and achieve this objective because of the technology and expertise which it incorporates. Much of the technology used to operate

an AITEC is from Israel, ranging from drip irrigation through to net houses for seedling nurseries. This is then complimented by the skilled Israeli agronomists who are responsible for operating the commercial farms at each AITEC and ensuring that they function at optimal capacity. Here they also apply a market-led approach by taking into consideration local demand, supply and overall crop viability before sowing any seeds. The Kallamino AITEC in Ethiopia illustrates the success of this combination and approach as tomato and pepper yields saw as high as a twenty-fold increase when compared with the national average (see Exhibit 11). These yields subsequently generated \$44 000 and \$52 000 per hectare respectively.⁸⁰



These AITEC do not only serve a commercial purpose, but also an educational one. At the heart of each AITEC is the mission of providing training to local farmers, students and agronomists, and to demonstrate what can be achieved if improved technologies and techniques are incorporated. As David Zukerman, CultivAid’s Tanzania country manager emphasises: ‘It is important for people here to see what we are doing and what we can achieve’.⁸¹ As such, each AITEC features a training, demonstration and research (TDR) site which is a two-hectare plot equipped with drip irrigation, sprinklers and net houses. Each TDR demonstrates different crops, inputs, techniques and innovations to farmers with the intention of both educating but also encouraging the adoption of said systems and practices. These training and demonstration services are also be provided to farmers in neighbouring communities in the form of extension services.

The final pillar of an AITEC is to promote market linkages and value chain development in the territories they operate. Here the emphasis is on facilitating connections and partnerships between local and international stakeholders. The Dodoma AITEC has signed a memorandum of understanding with the Tanzania Horticultural Association to provide greater extension services, while an export oriented avocado production programme has been introduced at the Kallamino AITEC.



Exhibit 12: The Embu AITEC in Kenya boasts a range of Israeli technologies including Netafim drip irrigation systems.

Source: Richard Morrow

Looking at the AITEC model there certainly are impressive characteristics. The training and extension service is one such example whose impact can be seen in Mazengo-Handali. Less than 500 meters from the boreholes which are sunk in the dry riverbed sits a half-hectare plot featuring a colourful assortment of onions, tomatoes and Chinese cabbage. The plot itself is operated by 24 local farmers, all of whom interact with an extension officer on a weekly basis. The extension officer is trained by CultivAid and works with the local farmers to ensure they are receiving quality education and support in relation to the maintenance

and financial viability of the plot. But perhaps most important is that the success of this plot is being observed and admired by local farmers in the community, many of whom wish to emulate its performance with the help of CultivAid. David Mwaka operates a 40-acre farm in the Dodoma region where he grows tomatoes, maize, passion fruit and bananas, and employs 17 farmhands. David is one of the few farmers in the region who has installed his own pump irrigation system, yet he admits that it is difficult to source skilled labourers to operate the machinery. As such, David expressed interest in having CultivAid staff come to his farm and train his employees in maintaining their irrigation infrastructure.



Exhibit 13: (L) The commercial plot at the Dodoma AITEC in Tanzania. (R) David Zukerman discussing irrigation best practices with David Mwaka.

Source: Richard Morrow

An additional boon for the AITEC model is its governance structure and the fact that CultivAid does not own the AITECs which they establish. Rather, CultivAid partners with local stakeholders who have an established reputation in their respective territories and who can assist with much of the ‘heavy lifting’ regarding access to land and local stakeholders, among others. The act of entering a new geography at the community level and ensuring that they are not only part of the construction phase but also the ownership and day-to-day operations provides tremendous motivation to ensure their success. An

instrumental stakeholder in this context has been Don Bosco, a Catholic non-profit focused on youth education. In Tanzania and Kenya, the AITECs are constructed on land owned by Don Bosco which ensures CultivAid can begin operations immediately. It also encourages greater participation from Don Bosco given that they are invested in the initiative. Through Don Bosco Tech Africa, a division of the organisation's technical and vocational arm, CultivAid can also leverage the educational infrastructure Don Bosco provides across the 34 African countries they operate in.

It is this 80/20 approach of maximising outputs while minimising inputs which makes CultivAid's AITEC model particularly successful. As a small NGO they have learned to be nimble and to identify the levers which enable them to have the biggest impact. To this end CultivAid is not concerned with engaging smallholder farmers at a micro level; 'Smallholders need to be aggregated' insists Dr Tomer Malchi, Director of CultivAid, adding that 'Israelis cannot engage with individual farmers ... a farmer-to-farmer approach is not possible'.⁸² The location of each AITEC is therefore deliberate and is focused on maximising both reach and engagement. By way of illustration, the Kallamino AITEC has trained between 60 and 70 local agronomists during its seven years of operating and has impacted the lives of tens of thousands of farmers both directly and indirectly.⁸³

Of course, the AITEC model can be improved, providing new features and exploiting nascent opportunities. Increasing the revenue sources is one imperative, whether that be achieved by expanding the pool of donors or developing new income-generating models within each AITEC. There is the opportunity to use AITEC as central distribution nodes for Israeli companies, leveraging their extension service capabilities as a means of reaching wider markets. Economies of scale are important and if private sector companies can both access larger markets and trust that their products and services are being distributed efficiently and affordably, then they will likely invest in said market. As Simon Schwall points out: 'We [OKO] could vastly benefit from an existing network of trusted representatives who can bring new services to their communities, or from organisations that aggregate a large number of farmers.' Future developments can also see packing houses and cold storage infrastructure installed at each AITEC, enabling local farmers to use the AITEC as a depot and storage facility for certain produce. Another opportunity lies with the promotion of R&D between local communities and Israeli start-ups and researchers. A central hub can prove valuable in conducting 'last-mile' research and for piloting new Israeli systems. Diplomatic opportunities can also be explored with MASHAV or the Ministry of Foreign Affairs more broadly, particularly vis-à-vis agricultural ministries in Africa. In this context there is a tremendous opportunity for using AITECs as a bridge between the respective stakeholders and encouraging exchange opportunities and training events, among others.

Conclusion: Towards A New Golden Era for Israel and Africa

Two important questions determine Africa's trajectory for the foreseeable future: where will the continent's burgeoning population find jobs and how will they feed themselves?

From what we know now, it is likely that food production and processing will grow in importance and value. The challenge, however, lies in the ability to increase the availability, quality, and value of food. For Africa to create jobs and ensure food security it must focus on its agricultural endowments, but this will require a dramatic shift towards mechanisation, improved education and above all, a commercial mindset.

Any effort to achieve this will require a combination of local ownership with external support. Indeed, for a solution to be sustainable it must be championed by African governments, and more specifically, the local communities within these countries, as externally led enthusiasm alone will be unable to sustain itself. Similarly, governments will require the support of external partners when it comes to financial input, expertise, and technology otherwise their initiatives will fail to gain any traction. Israel has a demonstrated history of working in Africa; in fact it was the ability of Israelis to roll up their sleeves and work in the fields which earned them a favourable reputation amongst their African peers during the 1960s. Fast-forward 60 years and Israel now boasts one of the world's most innovative and technologically advanced agriculture sectors.

For Israel to engage with Africa in a constructive and coherent way it will require a concise strategy for doing so. This will need to be led from the highest echelons of government and leverage the expertise and networks of Israeli organisations and actors who operate in Africa. The strategy will also need to engage the broader Jewish and Israeli philanthropic communities for greater collaborative opportunities. This strategy will ultimately remedy the fragmented development landscape which exists within Israel while addressing its many financial, diplomatic, and philanthropic shortcomings.

Indeed, Israel's competitive advantage in the development sector has always been its expertise and knowledge transfer capabilities. Considering the dearth of skills in many parts of Africa and the financial constraints confronting Israeli development actors, the focus of the latter's engagement must be centred around capacity-building. Here the aim is to not only equip farmers with the tools and knowledge required to operate but more importantly, provide them with the capabilities to sustain this. Here is where the AITEC model is optimal.

There certainly is a role for African governments to play in all of this. For Israeli ingenuity to have an impact in Africa there needs to be a concerted effort from African stakeholders, namely governments, to ensure that conducive environments exist. It is vital that African governments engage with Israeli counterparts on what is required and ensure that they facilitate these requests. This can include the provision of visas for skilled labourers, redressing import tariffs on specific machinery and equipment and providing direct communication channels with senior government officials.

The AITEC model is one avenue for increased Israeli-African engagement, but it need not stop there. A focus for African governments will need to maximise their relationships with their Israeli counterparts and this will entail exploring new and innovative opportunities for closer collaboration. Examples include the formulation of agricultural policy, strategies, and R&D initiatives.

John Craig is vocal about creating ‘tipping points’, the idea of presenting success stories for local people to see and eventually adopt. Dr Tomer Malchi shares this belief: ‘Seeing is believing’ he says when discussing CultivAid’s AITEC model and the impact it has on local communities. If the future of Africa’s agricultural landscape lies with the continent’s smallholder farmers, then it is vital that these success stories are seen, understood, and adopted by them.

Endnotes

¹ For the purposes of this paper, and unless otherwise specified, we define Africa and any reference to the continent as comprising those countries in Sub-Saharan Africa.

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