

One Acre Fund Due Diligence Trip Report – Minna, Nigeria (Niger State)

Dates: 12/5 to 12/7/22

Trip Schedule / Agenda:

Day	Activity	Content	Timing
Day 1 12.5	<i>Travel to Minna</i>	<ul style="list-style-type: none"> Pick up from Abuja by 7 am and commute to Minna HQ 	7:00am - 10:00am
	Tour of Minna HQ	<ul style="list-style-type: none"> Introduction to the Minna HQ staff; orientating team on the day's itinerary Breakfast provided during meeting 	10:00am - 10:30am
	Country Overview and Meeting with Leadership Team (Adetola Adegbite, Nigeria Country Lead; Olusola Adeyemo, Deputy Country Director)	<ul style="list-style-type: none"> Introduction of the Nigeria leadership team Core program history and current scale in 2022 Farmer selection criteria Farmer impact (crop yields, income, effect this has on farmers) Market access: where do farmers sell crops? Local vs export? Cooperative selling vs individual selling? What are the pricing levels? Geographic exposure within Nigeria Financial sustainability Re-enrollment rates Repayment rates Core crops Fertilizer access / costs Ecological zones Future expectations Challenges & risks, and how 1AF is dealing with them (including supply chain issues, security issues, sanctions risk, currency risks) 	10:30am - 12:00pm
	Nigeria Agroforestry Program Overview (Olusola Adeyemo, Deputy Country Director; Zainab Haruna, Nigeria Impact Ventures Associate)	<ul style="list-style-type: none"> The NG tree program - from a small trial in 2020 to 56k farmers in 2022 The NG tree model, including a comparison with other markets Scale ambitions over the next 5 years, key opportunities, challenges and risk management Species diversification and promising agroforestry innovations The regulatory environment and partnership with government 	12:00pm - 1:00pm
	Lunch		1:00pm - 2:00pm
	Session on Tree Monitoring & Evaluation (Wale Ogunleye, Nigeria MEL Data Analytics Lead)	<ul style="list-style-type: none"> Tree impact calculation Results from tree M&E surveys for 2021 & 2022 <ul style="list-style-type: none"> Adoption and survival Emerging trends 	2:00pm - 3:00pm
	Session on Field Operations (FOPS) (Emmanuel Bamgboye, Field Operations Lead)	<ul style="list-style-type: none"> Talk through the Field Operations (FOPS) programs running in different regions Discuss how the core program supports the tree program 	3:00pm - 3:45pm

	Session on Rural Retail Program (Adewale Alafia, Nigeria Rural Retail Lead)	<ul style="list-style-type: none"> Talk through Rural Retail (RRT) program so far and expansion plans for 2023 Discuss how the tree and RRT programs synergize 	3:45pm - 4:30pm
	Work from the office	<ul style="list-style-type: none"> Review of activities so far Catch-up on emails etc. 	4:30pm-6:00pm
	Dinner with NG Leadership (Adetola Adegbite, Nigeria Country Lead; Olusola Adeyemo, Deputy Country Director)	<ul style="list-style-type: none"> Discuss FP team's impressions of the visit so far <i>At pizzeria</i>	6:00pm - 7:00pm
Day 2 12.6	Hotel Pickup	<ul style="list-style-type: none"> FP team picked up after breakfast in hotel, and transported to Minna HQ 	8:00am - 8:30am
	Field Visits to Nursery and Farm Locations (Olusola Adeyemo, Deputy Country Director; Jennifer Ahonle, Impact Ventures Field Manager)	<ul style="list-style-type: none"> Visit a nursery established in 2021 (Pyata), and a newer nursery established in 2022 (Jangaru) Meet with nursery managers and community volunteers (tree group leaders, nursery support staff) and field assistants. Visit farmers who have planted OAF trees (including those who have been with the program 2 years running, those who just joined this year, representing a variety of species planted) 	8:30am - 10:30am
	Field Visits to Farm and Rural Retail Locations (Olusola Adeyemo, Deputy Country Director; Emmanuel Bamgboye, Field Operations Lead; Adewale Alafia, Nigeria Rural Retail Lead)	<ul style="list-style-type: none"> Visit to FOPs farm sites in Minna and meet with farmers who have planted Maize (and trees) Visit to one of the RRT shops, talk through plans of leveraging the use of the shops for the trees program <i>Includes travel time to and from the office</i> 	10:30am - 1:00pm
	Lunch		1:00pm - 2:00pm
	Session on Government Relations (Barnabus Usman, Government Relations Lead)	<ul style="list-style-type: none"> Discuss OAF's collaboration with the government in Nigeria, including: <ul style="list-style-type: none"> Development of an MOU with the Forestry Research Institute of Nigeria (FRIN) to supply seed for agroforestry scale-up OAF's partnership with the State Government to plant extra seedlings in forest reserve areas as demonstration plots OAF's partnership to provide 15k trees to schools, LGAs, and other public institutions last season OAF's systems change with in Nigeria, and plans for expansion beyond the core program via government partnerships 	2:00pm - 3:00pm
	Work from the office	<ul style="list-style-type: none"> Review of activities so far Catch-up on emails etc. 	3:00 pm - onward

Day 3 12.7	Hotel Pickup	<ul style="list-style-type: none"> FP team picked up after breakfast in hotel, and transported to Minna HQ 	8:30am - 9:00am
	Session on R&D / Innovations (Adefunke Adewole, Impact Lead)	<ul style="list-style-type: none"> Receive an overview from our Impact Lead on the R&D and Innovations work across the Nigeria program Discussion of agronomic approaches, including: crop diversity intercropping, seed sourcing, seed quality, environmental conditions (pests, soil conditions, etc) 	9:00am - 10:00am
	Site Visit - Joint Tree Planting Venture with the Min of Forestry (Olusola Adeyemo DCD, Aliyu Saliyu & Sadiq Isah-Isako IV Field Managers)	<ul style="list-style-type: none"> Make a site visit to the recent tree planting collaborative effort between OAF and the Niger State Min of Forestry (with ~800 African Mahogany Seedling planted). <i>Includes travel time to and from Kaliko (the site of the Government Forest reserve)</i> 	10:00am - 12:30pm
	Lunch		12:30pm - 1:30pm
	Recap and Feedback Session Shubhra Kumar, New Country Expansion Director	<ul style="list-style-type: none"> Feedback from FP - questions, suggestions, comments on the core program, trees program and other complementary programs, etc. Recap on growth plans for the core program and trees program - 2023 and ahead Global perspective on Nigeria's place in OAF's "New Country Expansion" work 	1:30pm - 3:30pm
	<i>Return to Hotel in Abuja</i>		3:30pm - 6:30pm
	<i>Dinner with NG Leadership Team in the evening</i>		6:30pm - 8:30pm

Key People Present:

- One Acre Fund
 - Senior Leadership
 - **Shubra** - 8yrs with 1AF, started in Kenya, now leading new country expansion. Lives in Bombay, spends time in each of the new countries on regular field visits. Recently handed over India to a local partner (1AF was considering an India program). Now starting in DRC with focus on preventing deforestation (pilot).
 - **Nigeria Leadership**
 - **Tola** – Country Lead, 3 yrs when there were 180 farmers in Nigeria, now 25k farmers
 - **Shola** - Deputy country director – agroforestry lead
 - **Wale** – M&E, Joined in Feb 2022

- **Adiwalde** – 9 months, leads retail team, sells top ups to farmers in core program that need more inputs, making sure farmers can get what agro inputs they need. Two rural retail shops (called “Konas”, aka “dukas”) currently, but expanding rapidly.



- **Emmanuel** – Leads core program / credit program. 3 years. Joined when there were 512 farmers had repayments problems.

Repayment rates now are on track. Core program is high touch program and can't fix everything.

- **Adefunke** (“Ade”) – Impact Lead - joined 2019 in early days of pilot program. Works in innovations. Profiles farmers, figures out how we meet their needs. Looking for products and innovations that bring impact to farmers lives.
- **Barnabus** – 6 months with 1AF Leads government relations and policy for 1AF in Nigeria. Ensures regulatory compliance and anticipates policy changes and recommends how 1AF can respond to those policy changes. Explores potential for partnerships that advance goals of 1AF in terms of expansion. Also covers the safety and security issues.
- **Ibukin** – people and admin lead, 2.5 months. Role is to hire people that have value and share 1AF values. Planning to hire 183 people in 2023.
- **Zena** – Impact ventures associate, 2 days since joining 1AF

- FP
 - Jason
 - Elliott

Overview: 1AF’s work in Nigeria can be split into two components: core program (enhancing farmer productivity relating to cereal crop production, mostly maize) and Impact Ventures. Impact Ventures encompasses everything that is outside the core program and is based on what is needed most by farmers. This has led to a significant expansion in ways 1AF serves farmers. Impact Ventures includes the tree planting program and the retail program (eg. rural retail shops, launched in mid 2022). There is overlap between programs (e.g. the rural retail shops service farmers in the core program and in the trees program) Because 1AF operations in Nigeria launched just four years ago, 1AF is still figuring out what all the components in Nigeria should be and how they fit together. Today, 1AF is running many different programs concurrently and will trim down over time based on what works. There are 30+ states in Nigeria, and it is the biggest potential addressable market of all countries where 1AF currently operates. The goal to achieve financial sustainability for the core program within four years. Today 1AF is sustainable for all field operations but that does not include any load for overhead.

Nigeria Core Program

- Core program history and current scale in 2022.
 - 1AF launched in Niger state in 2018, one of 30+ states in Nigeria.
 - Addressable market vs. population
 - Difficult to get accurate data. Total number of farmers in Nigeria are approximately 55-65m. Security issues take out the NE state indefinitely as well as parts of other regions. Probably 40-50m small holder farmers that can potentially be reached by 1AF. This includes farmers that could participate in either the core program or the trees program.
 - Trees = anyone with farmland is eligible for free distribution

- Core = 1AF filters by poverty levels and focuses on lowest 2 quintiles = 50% of all farmers, meaning ~20-25 million farmers
- Family size
 - 10-14 people in northern states (including Niger State), which is larger than the other parts of the country. Nigeria on average is 4-5 people. 70% of all people in Nigeria are small holder farmers. Land plots roughly align with family size, meaning smaller plots in south

The Journey So Far

	2018	2019	2020	2021	2022
Total # of farmers	180	501	1,834	8,863	25,000 (24,000 for main + 1000 for trial)
Total # of sites	3	9	12	18	45
Clients per FO	48	55	153	492	530
Avg. Tx size	\$156	\$186	\$191	\$226	\$193
Final repayment	96.3%	89.72%	97.9%	96.2%	97%+ (p)
\$ Impact		\$179	\$249	\$298	\$298+ (p)

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- Currently serving around 24,000 farmers in Niger state. Goal is to get to 1 million farmers served in Nigeria by 2030 (combined core program + retail + agroforestry)
 - 1AF operated in 18 “sites” in 2021, and is operating in 45 “sites” in 2022
 - Site is a geographical location that is usually the equivalent to a “ward” as defined by the government. There are multiple wards per region, and multiple regions per Nigerian state. Site size varies may have 80k to 150k farmers in total. Sometimes 1AF will split a ward into 2 or 3 1AF sites. There is one Field Officer per site. So as sites grow due to new enrollment, they get split.
 - Currently serving 2 districts in Niger State
 - Minna (18k farmers)
 - Mokowa (6300 farmers)
 - Farmers in Nigeria own on average 5 hectares (approx 12 acres). Property is not usually contiguous, meaning a single farmer can own several tracts. Fertility of the land can vary significantly between plots.
- Core Program (farmer productivity) Operations (Lead: Emmanuel) – Focus Areas / Key Performance Indicators
 - Farmer Enrollment Process
 - Village Selection -Desk Study to understand all villages inside target geography. Group them into clusters
 - Farmers Prospecting - Interest meeting; Mobilization (one on one and mass mobilization); referrals; prospect selection
 - Enrollment and Signing
 - Farmers are arranged into groups. Groups are arranged into Clusters. Clusters into sites. Sites into Pods. Pods into Districts.
 - Field officers train at the group level. Repayments are cross collateralized at the group level.
 - Farmers agree to contracts with 1AF
 - Qualification
 - Farmers receive inputs on credit
 - Compliance

- 1AF requires farmers to comply with best farming practices as taught by 1AF. Failure to comply means they will not be invited back the next year. It's not just about repayment.
 - Spacing of crops in rows, etc.
 - Use and application of fertilizer in doses (rather than spraying over the field)
 - One hybrid seed per hole (rather than 3-4 that they have done traditionally)
 - Management of pests (worm) via spraying, etc.
 - Training is done at the group level by the FO, then reenforced by training videos to remind farmers what they learned.
 - Repayments
 - De-risking repayments – significant issues 1AF is dealing with (see Emmanuel slide)
 - Fraud
 - Yield / Sales related issues
 - Management of flood and drought risk
 - Poor yield
 - Market price fluctuations
 - Leadership
 - Rural Retail shops– “Konas” (aka “Dukas”) – (Lead: Adewale)

- Purpose is to expand 1AF reach beyond core program farmers for increased impact. Enrolling core farmers is expensive and resource intensive, limiting the number of farmers that can be practically reached. Konas offer a way to increase 1AF's reach beyond core farmers by providing access to products in a more traditional retail format. Konas are used to support 1AF's core program farmers as well as farmers participating in the trees program.



- Focus is on providing selection of needed products (inputs, tools, etc.) at good prices at scale to many farmers, making inputs accessible to farmers, helping them to improve their productivity.
- Also important to help 1AF core farmers that need top ups or additional inputs beyond what was supplied through the core program.
- Goal is to have a Kona shop wherever the core program is operating
- Currently there are two Konas setup and operational in Niger state. Expectation is that 10 will be operating by end of 2023 (i.e. +8 in 2023).
- Konas are retail outlets owned by 1AF on land that is rented from a local owner. Depending on local conditions, Konas can take the form of a 1AF container (i.e. shipping container converted to a small retail shop) or can be traditional retail structures that are rented by 1AF (common in more densely populated areas).
- Supports core program field operations
 - Farmer enrollment can be done at the Kona, then the farmer returns to to pick up the 1AF ID following completion of enrollment
 - Collection point for farmer repayments
 - Market access collection point (i.e. drop-off location for selling the harvested crops)
 - Pickup point for non-agro products / incentive products (e.g. solar lights, seed spreaders, cookstoves, etc.)
- Supports trees program
 - Farmer enrollment can be done at the Kona

- Nurseries setup close to Kona so that it farmers can easily pickup seedlings
 - Cost to setup a Kona is approx \$35k USD
 - Limitation on 1AF's rollout capability is that it's difficult to find shops and/or space to put a container (in case of developed areas). Space in the right locations is the limitation.
- Farmer selection criteria
 - In 2019, many farmers had just 1-2 years experience and had poor yields. Now 1AF has refined its selection criteria and is looking for more experienced farmers that are better positioned to benefit from the program and more likely to repay their loans.

- Farmer profile

- Farmer sizes are large -average 5 acres and is planting 4-6 crops. Often farmers are hiring labor to help with farming the land due to the land size. Generally, labor is imported from neighboring states outside of Niger state.



- All farms are owned by men (99%+) in Niger state and elsewhere in northern Nigeria (culturally this is normal). By contrast, 98% in Rwanda are owned by women. Many men have multiple wives to increase the labor available. A commonly held belief in Nigeria is that men have more physical strength than women. Farm labor is divided

according to physical demands. Men do the land preparation, construction, moving heavy items to market, etc. and other tasks requiring more strength. Women generally work in the fields to support crop maintenance and doing harvests because it requires less physical strength. Polygamous families are normal in Nigeria. Adding wives helps to increase the family size, which increases the labor available to work on the farm. This is why family size in Niger state is bigger than in other states in Nigeria and in other 1AF countries. (11-15 people in Niger state vs. ~5 in other countries).

- Labor comes from several sources: Family labor of the farm (11-15 people generally per farm) + community labor (sharing labor among groups of farmers). + farmers for hire from neighboring regions.
- Each Field officer responsible for 530 farmers currently, which is high. Trying to reduce responsibilities of field agents (such as payment collection), so they think there's a possibility Fas can serve more farmers over time.
- Farmers in Niger State have very little formal education, but are very experienced. Sometimes can lead to resistance from farmers to new ideas that change farming practices. Sometimes 1AF funds that farmers are not complying with 1AF practices.
- Average farmer is borrowing \$193 worth of inputs vs \$40 for 1AF org average
- Many farmers are growing and selling yams. Maize is not a cash crop. By participating in 1AF they increase their maize production and eat it, and sell the yams to repay the 1AF loans.

- Farmer training

- Combination of in person education conducted by 1AF field staff, usually at the “group” level in the farmer communities
- Farmer visits to demonstration plots so farmers can observe proper farming practices and see the results in the form of impressive yields
- Video training sessions to remind farmers about best practices (such as pest control, fertilizer use, etc.)



- Impacts to farmers (crop yields, income, what this means to farmers)

- Farmer yields in Nigeria have generally been dropping in recent years for all crops, primarily due to drought conditions / climate change. The issue is especially acute with yams, which is a common cereal crop in Nigeria (although not one that 1AF works with, due to the bulkiness of the seeds). Prices have been going up accordingly.
- Some farmers now selling maize as a cash crop.
- Now giving out rolling planter equipment to help spread the seeds more efficiently. This is being tested for effectiveness. Planters are expensive so 1AF is encouraging farmers to form groups to purchase a shared planter. This is a low cost innovation that is increasing yields based on farmer feedback but has not been tested. For sure it is reducing planting costs because farmers no longer need to hire people to plant the crops.
- Surveys show \$298 of impact to farmer on \$193 loan.
 - Impact surveys are done of 1AF farmers and non 1F farmers so that comparisons can be made.
 - Yields are generally doubling as a result of participation in 1AF program for the hectare that is part of the 1AF program.
 - Unclear what total farmer income is from all sources – data not collectd and is very difficult to collect due to the number of sources of income. Full farm surveys are very difficult to do, so 1AF is benchmarking using World Bank data. Cost is too high to do full farm survey.

- Market access. Pricing.

- Very few farmers are selling their maize. For the few that do 1AF offers a “Buyback program” whereby 1AF finds a commercial buyer for the maize and sells to them for the farmer. Maize can sometimes be stored in the 1AF Kona shops while awaiting pickup by the buyer. This happens at the time of the year after harvest (November to April) while the stores and warehouses are not yet full with fertilizer. This makes use of the otherwise idle storage space in the Konas and the warehouses.



- Maize prices are highest in March, April, and May vs. harvest around September. Goal for 1AF is to transfer March prices in October if 1AF can buy maize in March and hold it to October. Trying to provide

access to institutional buyers via standardization of the product offering (standard 100kg bags that are ready for institutional sale).

- Mobile money is coming via telecoms to run mobile money operations. Still will take time. Would make repayments much more efficient for 1AF and would relieve Field Agents of a huge time-consuming task. Also reduces risk of fraud as it eliminates middlemen. Also difficult to make payments to farmers in the absence of mobile money.
- Network access not available in many places. Most farmers have brick phones, not smart phones.
- Geographic exposure within Nigeria
 - Villages are generally far away from the villages. Farmers tend to have 5 hectares of land, but not necessarily contiguous. Core maize bundles uses just 0.5 or 1 hectare of land.
 - One state – Niger State
 - 2 districts – Minna and Mokwa
 - 45 Sites
 - Expansion plan
 - Second state – trialing in Oyo
- Financial sustainability, expectations for future
 - 70% sustainable today
 - Retail will help accelerate the path to sustainability, which is only in its 4th month. Most projections so far have been done based on core program driving the path towards sustainability. Those projections estimated that we could achieve sustainability by 2026. That number could come down as retail is factored in.
- Crop diversity
 - Core crops / intercropping
 - Many farmers have one single crop, others are planting haphazardly. Core program offers only a 0.5 hectare bundle or a 1 hectare bundle max cap. Any more than this results in too much credit risk per farmer (based on history, defaulters usually have the biggest bundles). Meaning most farmers have a lot of other things going on. No rush to move away from maize, but currently too much concentration on maize.
 - Maize today is core crop, one and only one currently in Minna
 - Rice is a core crop that will be offered next year in Mokwa. Currently only offering maize.
 - Rice is planted three months after maize when rain is heaviest.
 - Crop diversity improves reliability of repayments
 - Need to consider crop compatibility with other crops – lots of research and study is required. Eg. Soy beans help to kill striga that is killing the maize.
 - Economic crops are in high demand by all farmers we spoke to in the field in Minna. Mangos, oranges, yams, tomatoes, etc. Farmers want, and 1AF supplies, “hybrid” variations of these cash crops, meaning they have been artificially improved and cannot be found naturally in the region, nor are they generally available at local seed markets. One Acre Fund can source the seeds, but they are expensive. Farmers request them frequently as part of the 1AF core bundle, but 1AF’s plan is to provide them as add-ons available from the Kona store for purchase by farmers.
 - Intercropping
 - Being Tried this year: soya beans ready to be trialed at scale via 1000 farmers in 2023. Legumes (soy beans) have organisms that feed nitrogen into the soil that is more absorbable to the cereal crop (maize, etc.). The fixing of nitrogen also reduces the ability of striga to grow.
 - Rice is not intercropped because it needs different soil conditions than maize and is a core / cereal crop.
- Ecological zones
 - Three zones in Nigeria means there are three different cereal crops depending on ecological conditions
 - Maize
 - Rice
 - Yams
- Seed sourcing

- Maize is sourced from three or four major suppliers that require orders to be put in around a 3-12 months depending on the seed. All seeds sourced from commercial seed suppliers. Mostly sourced domestically, but some may be imported.
- M&E / Key Performance Indicators, Challenges
 - Repayment rates – (Emmanuel)
 - Farmers prefer to repay in lump sums rather than steady payments, and to do so after they harvest their economic crops. Almost no farmers are selling their maize. They are using the maize for their own food consumption. The excess quantity they produce per 1AF participation allows them to have supplies to last throughout the year. Before 1AF, many farmers faced food insecurity problems because they lacked enough maize to make it through the whole year. We confirmed this with multiple farmers in the field, and with 1AF Field Agents and Field Managers. To repay the 1AF loans, farmers sell their cash crops (mostly yams), which gives them liquidity late in the year. We observed a meeting of Field Agents who reported good progress in this area (Minna). They are currently at 70% repayment and expect to be at 97% by the end of the January. For Mokowa district there are at 50% repayment rate, and also expect to be at 97% by the end of January.
 - 2022 projected to be 97%. Improving over time. Learned that they should target repayments around times when farmers have liquidity (i.e. after yam harvest)
 - 2021 – 96.2%. Lower than usual due to flood or drought.
 - Repayment rates will always be less than 100% due to farmer deaths, which results in loan forgiveness.
 - Farmer to agent ratio
 - Minna: 590 FOs for 17,791 farmers (1:30)
 - Mokwa: 450 FOs for 6300 farmers (1:14)
 - Identification
 - There is no consistent national identification system for farmers, making it difficult to track who has enrolled, who is renewing, etc. Working on a biometrics / fingerprinting system that 1AF can use via tablet. Many forms of ID are available in Nigeria, which makes tracking difficult, therefore no good CRM is in place. 1AF is trying to find a bank to partner with who will do biometrics work in the field so the farmers can get a CDN ID number (ID number issued by Nigeria’s central bank). This would allow 1AF to identify farmers in a consistent way and make sure defaulting farmers don’t re-enroll in subsequent years using different IDs. This has not happened often yet, however there is concern that people will learn they can do this in the absence of a biometrics ID system.
 - Re-enrollment rates
 - For prior re-enrollment periods 1AF has been dealing with small numbers of farmers in the ~500 range. Data is not yet clean regarding re-enrollment. Currently experiencing 60% re-enrollment rate. But because of rapid growth, re-enrollment farmers will be a small fraction of the whole enrollees each year for the foreseeable future. Lack of unique identifier makes it difficult to track re-enrollment rates.
 - Even though 1AF enjoys a 98% repayment rate (meaning 98% of funds advanced are repaid), this ends up banning a large number of farmers due to group liability concept (i.e. as in all 1AF countries, farmers are participate as groups of ~10-20 farmer families living in a given village). Also when there is a default, it is rarely a full 100% default. This means that the number of defaulting farmers is more like 11.2% (i.e. 88.8% of farmers fully repaid their loans). Around 71.3% of farmer groups fully repaid their loans (after some groups rescued individual defaulters in their groups). This in turn means that around 70% of farmers are eligible for re-enrollment based on repayment metrics. Of the farmers eligible for re-enrollment, around 88-90% do re-enroll. When they don’t re-enroll, it is normally because the Field Officer has decided that the group should not re-enroll (because of a weak community lead, etc.). Almost all farmers who can re-enroll do re-enroll. (See re-enrollment survey conducted a couple of years ago). 1AF doesn’t have data on how many of the defaulters were made whole by they group (just not a metric in the system yet).

- Quality of seeds
 - Nigerian seeds are good for both core crops and trees program. Not an issue in finding good quality seeds so far. Could be an issue as 1AF expands to other varieties of crops and trees (soy beans, rice, citrus, etc.). For primary seeds, good so far.
- Environmental concerns (e.g. striga, soil conditions, etc.)
 - Striga is present in Niger State. Training farmers on how to manage striga. Only recommending striga resistant crop varieties. Soya beans release exudates (gasses) that slows and kills striga weed. Improving new varieties of soy beans will thus have multiple benefits.
- Fertilizer access / costs / Impacts of supply chain issues, war/sanctions issues?
 - Fertilizer prices rising. This is the other major issue (aside from finding talent). Although fertilizer generally cheap in Nigeria due to abundant petroleum, more fertilizer is now being exported to international markets due to shortage of supply since Russian sanctions. Nigerian government puts requirements on fertilizer exporters to sell certain percentage domestically, however end result is that prices are rising. Creates a working capital problem because cost of fertilizer is in the \$millions already. Can't import fertilizer due to Nigerian laws, and 1AF is not big enough to negotiate good fertilizer rates. Double whammy of inflation @ 23% and Russian sanctions will be a big problem coming up. Bought for 2022 at the end of 2021, so not affected yet, but creates a big problem for next year.
- Domestic security risks, currency risks
 - Inflation running around 23%.
 - Security issues in certain regions, especially in Western Nigeria, however 1AF does not operate in regions where there are security problems. Elections will happen in March of 2023. Expecting political instability to increase around that time, especially because incumbent President is not eligible for re-election.
- System change / expansion beyond core program via govt. partnerships
 - Overview
 - Foreign exchange situation is volatile, inflation is rising, creating a difficult situation
 - 2023 general elections are on the horizon. This is the most important factor potentially affecting the business in coming years. Possibility of post election violence exists.
 - Security is an issue that can impair operations and puts 1AF assets at risk. More of a concern in capital cities, but still a possibility of problems in Minna
 - Major concern surrounds a.) continued ability to operate the Minna office and b.) warehouse safety. Considering insurance, security contracts, etc. Looking at experience in Kenya and replicating best practices. Will have remote work for a month around election period. Mostly will be enrollment activates, so easy to do in the field. Office work will be done from home.
 - Goals / priorities
 - Ensuring regulatory compliance. Inputs delivery, running of trials, etc. all must be done within the regulatory framework in Nigeria, which is constantly changing. Many licenses required. New requirements popping up all the time.
 - Extremal communications. Keeping government informed about how 1AF is advancing government priorities. This opens up new pathways to donors who are working with the government and looking to work in Nigeria. Mostly talking about major aid funds from states like Netherlands and Norway. 1AF has capabilities that can be leveraged by these stakeholders.
 - Partnerships for expansion. Looking for ways to reach new farmers and overcome the challenges inherent to expansion. Some organizations are already providing NGO interventions (normally health) and have laid some of the groundwork that could be useful to 1AF. For example, building a database of registered homes.
 - Coalition building. There are always opportunities to build coalitions for purposes of doing advocacy for farmers. Looking at issues such as climate change and how to influence government policy. Using trees to combat effects of climate change as an example of a policy 1AF would like to advance because it provides a pathway to help farmers.

- Seed supply. Important to find quality seeds at quantity that can be sourced reliably. FRIN (Forestry Research Institute of Nigeria) provides a path to achieve this goal. Regulations restrict import of seeds, so there are few alternatives.

Nigeria Trees Program

- History
 - Started with 480 farmer trial in 2020 planting 4000 trees – seedling that were bought, 1.2 SROI, \$10 impact per adopter.
 - Grew to 21k in 2021, 180k trees planted, \$9 impact per adopter, 1.85 SROI, 30 nurseries
 - Began growing seedlings but 30% germination rate was low, so setup a centralized nursery to understand what was going on.
 - In off season before 2022 did lots of testing to try to determine if they were planting at the right time of the year, tested different water treatments, etc. Also considered optional fruit trees.
 - 2022 40k farmers planting 752k trees, 72 nurseries
 - Germination rate improved from 30% to 81%, some entrepreneurs significantly outperforming others.
 - Centralized nursery was not as important in this year because germination rate was higher. Also centralized nursery was not scalable. Still used for backfilling where excess needs exist.
 - Issue was that time required to invest in planting trees overlaps with the intensive time needed for growing core crops.
 - Demand dropped significantly from 13 seedlings for free distribution (40k) to 3 seedlings per farmer when they trialed a paid distribution (3k farmers).
 - Goal for 2023 is 96k farmers planting 2.4m trees, \$24 per adopter impact, 5.3 SROI, 160 nurseries
 - Centralized nursery being used only for R&D, no longer as a supply source.
 - Adding parkia biglobosa
 - Goal for 204 is 206k farmers planting 5.4m trees
- Species
 - Currently offering Albizia lebbek. Lots of demand but only if free. So they are going for free model because goal is to put as many trees in the ground as possible.
 - Adding parkia biglobosa which is nitrogen fixing species, which will be another free offering. Also can be used for soup making. Farmers asking for this species. Quasi native species (been around for a while). This is being trialed in 2022 in the older sites.
 - Experimenting with other varieties that are paid – value add – oranges, cashews, mahogany (20 year investment). \$1 per orange seedling, for example.
 - Farmers demanding mango
- Seed sourcing –
 - Citrus, mahogany, cashews (economic) seedlings coming from Cano, another state in Nigeria via FRIN (Nigerian govt)
 - Albizia seeds come via FRIN currently (government forestry research institute). Currently diversifying to use a private vendor to de-risk on the supply side. Now have one private seed supplier (40%), plus FRIN (60%). Private supplier also is supplying most of the economic seeds.
- Grafting – used to accelerate the growth of the citrus varieties only. Testing in centralized nursery then will be rolled out to farmers.
- Planting practices

- Mostly perimeter planting, but also significant amounts of next to house planting.

- Herdsmen (nomadic “Fellanes”) have been going around communities cutting down trees to feed them to cattle, which can be a risk for trees planted on farm perimeters. This is why they plant trees near to house, to increase security. Herdsmen represent a significant challenge to farmers, as confrontation can result in violence. Legally there is little the farmers can do as official government policies favor the herdsmen. The existing government is Fellane,



resulting in policies favorable to the Fellane tribe. Elections in 2023 may result in changes to the policies that could shift in favor of increased farmer protections. We observed these herdsmen moving through farmer properties on many occasions on our visit, appearing to disregard the private property rights of the farmers without hesitation or fear.

- Planting calendar

- January – setup and training
- Feb – Community recruitment
- March – Nursery setup
- April-June – Seedlings raising and farmer mobilization
- July-Aug – Tree distribution
- Sept-December – Post distribution

- Structure of decentralized nursery model

- Entrepreneur sourcing
 - Process starts with community leaders who recommends farmers that have the time and experience to oversee the nursery
 - Then testing is done by 1AF to determine the qualifications and experience to determine which one to select
 - 1AF Field Manager checks for resources (land size, time available, access to water, etc.), then rates the respondents. Selects the top 1 and keeps the other in reserve.
 - Access to assistance in case extra help is needed (because one nursery manager is not enough to maintain a nursery producing ~10k seedlings annually)
- Chain of command (currently, although this will change over time as layers need to be added as the program expands)
 - Deputy Country Director
 - Zena
 - Impact ventures specialist
 - Field Managers (manages pods)
 - Field assistants (seasonal)
 - Nursery managers
- Entrepreneur compensation
 - Start them off with an advance to setup the nursery (capital investment)
 - At mid of season, if germination rate is at least 50%,then farmers get an advance / early payment (will move this to 60-70%)

- Pay them on a per seedling raised at the time of distribution. At the end of the day they are paid for every seedling successfully raised. IF the farmer got the germination advance, then it is deducted from the final payment.
 - Entrepreneurs make more money and also get satisfaction for being such a valuable contributor to the community.
 - 1AF subsidies
 - Certain seedlings provided for free to all farmers. Not restricted to 1AF core program farmers.
 - 2022 13 free Abizia Lebek seedlings for any farmers. No special treatment for 1AF farmers currently.
 - 2023 goal is to provide 20-25 free seedlings (Abizia Lebek)
 - For farmers that want additional seedlings at 100 nira each (vs 15 nira 1AF paid to nursery manager). For comparison, market price is 100 nira.
 - Economic seedlings can be purchased separately
 - Bought from a supplier as seedlings, not grown by 1AF nurseries
 - Cashews bought by 1AF at 300 vs. sold at 350 nira
 - Oranges bought at 400 sold at 500 nira
- Scaling progress in 2022 (vs 18k farmers / 172k trees in 2021) / M&E
 - Goal 660k farmers planting 18.5m trees in 2026
 - Currently in Minna but plan to expand into Oyo, Bida, Mokwa... all reasonably close to Minna.
 - Important to de-risk seed supplies. Plan is to do this via long term partnership with FRIN (govt seed supplier). Also looking for private supplier base. Also looking to expand species to avoid stressing supply chains for single species.
 - In 2022 – one field manager manages 3 field assistants, each of which manages 4 nursery managers, hoping to grow this to 5-6 nursery managers
 - Nursery managers grow on average 10k seedlings, hopefully can grow this to 15k to 20k on average
 - M&E
 - 2021 Survey did not have control farmers
 - 2022 phone survey conducted late in the year, finishing up now. This will be basis for impact calculation. Asked about Abizia seedlings received, seedling planted, seedlings survived. 56k farmers served across 73 nursery sites in 2022 receiving 700k tree seedlings. Randomly selected 30 of 73 nursery sites and 311 1AF farmers proportionate to size of each nursery sites across the selected sites. Control group consisted of approx 300 Non 1AF farmers. Survey will form the basis of the impact calculations.
 - Challenges:
 - Planting trees is not generally common in Nigeria. Agroforestry is relatively new and unfamiliar, mainly because it is a long term investment that consumes current resources. For subsistence farmers, long term investing is not practical. Where tree planting has been done, it usually has been the result of a government program or sponsorship. Because Abizia is not a native species, it can be difficult to find examples of mature Abizia trees that can inform about market price. So instead 1AF used the closest comparable tree, Madobia, which is a natural native tree growing in Niger state.
 - Key Findings:
 - See survey table
 - 2022 - Farmers received 13 seedlings and planted 11.3 of them. Survival number is TBD as they were just planted.
 - Of the ones that weren't planted, approx 1/3 remained in socket, 1/3 were stolen, and 1/3 were given away
 - 201 - Farmers received 9 seedlings, planted 9, 6 (68%) survived after one year since planting
 - Generally low levels of tree planting activity going on. Very few trees being planted outside of seedlings given away by 1AF. Cultural issue.
 - Good prospects for survival based on 2021 data
 - Uses of Abizia. Many potential uses:

- While in the ground
 - Shade for crops
 - Erosion and wind control
 - Boundary demarcation
 - Nitrogen for soil
- As cut timber
 - Sell it
 - Build structures (roofing, walls)
 - Build furniture
 - Build canoes
 - Fencing /boundary demarcation
- Branches
 - Burn it for cooking
 - Yam sticks / climbing beans (after branches are 3 years)
- Participation by core farmers vs. trees only
 - In 2022, 63% of core farmers participated in the tree program. 43% of tree program participants are in the core program. Right now the trees program is piggy backing on the core program, but the trees program will scale much faster than the core program, so as we enter new regions for trees, this will serve as a way to identify new farmers for the core program.
- Coordination with government / Reforestation Partnership
 - Overview
 - Making progress this year. Policy is supportive on 1AF work, especially ministry of environment. Govt wants to decrease deforestation and sees the value of 1AF's work.
 - Presidential Trees Planting Campaign aims to plant 25m trees has been in place since 2016-17. 1AF trying to let govt take credit for some of 1AF trees planted.
 - Trying to partner with other NGOs providing other services to farmers (health services, etc.), perhaps can piggyback on their networks.
 - Reforestation Partnership in Kaliko (1 hour drive from Minnna) – Barnabus
 - 1AF has partnered with Nigerian government for tree planting project. Goal is for this to serve as a proof of concept, then roll out in other parts of Nigeria.
 - Project involves planting of 800 mahogany trees (provided for free by 1AF @ approx \$1 per seedling) on government land. Farmers are allowed to plant crops on a portion of the land for free (i.e. free land lease) in exchange for providing security for the land (against herdsmen) and for watering the mahogany trees.
 - Will take 2 years to prove that the trees are growing and able to survive on their own.
 - Advances goals of government (trying to plant 25m trees) and 1AF (provides farm land for farmers)
- Challenges
 - Currently there is resistance from farmers to participating in the trees program because they're afraid the government will come and take their trees or claim the land that they have planted trees on. All land in Nigeria is owned by the government and is occupied based on license / lease. When people have planted trees historically at scale it is usually through a government program, so people associate tree



planting with government ownership of land. It is an irrational fear that 1AF is trying to combat by educating farmers about government priorities (to de-mystify)

- Tungya system – farmers provide security to the government land where the reforestation project is in exchange for being allowed to use the adjacent crop land. Farmers get to see the benefits of planting trees and take this information back to their communities, driving demand for 1AF programs.
- Benefits to farmers of planting trees
 - Provides shade, prevents desert encroachment. People cutting down trees for firewood and other uses, which is expanding the desert into the farmer areas.
 - Building structures as timber
 - Soil fertilizer
 - Erosion prevention
 - Wind protection
 - Potential source of revenue

1AF Innovations (Lead: Adefunke) – Serves both core program and trees program. Experimenting with ways to improve efficiency and farmer productivity. Investing in innovation in systematic way is how 1AF adapts its main programs (core and trees) to local conditions. Customizing to local ecological, environmental, and economic conditions, consistent with local farmer practices and demands is how 1AF optimizes across its geographies. This is at the heart of 1AF’s “farmers first” ethos.

- Key innovations
 - Fertilizer has been and remains the key innovation 1AF brings to farmers. But the innovations are expanding as 1AF learns more and identifies new ways to introduce innovation
 - Crop diversification
 - rice and soya beans are the focus now for core program (intercropping)
 - economic tree species is focus for trees program
 - Soil health
 - Campaign in place to educate farmer about important of soil health
 - Looking at compost production to increase yields. Often compost is burned or taken off to build yam barns or disposed of. Looking for ways to efficiently create homemade organic fertilizer, reducing the need for farmers to purchase fertilizer (reducing cost)
 - Safe use of chemicals (pesticides, etc.)
 - 1AF believes in doing no harm to the environment, but notices that farmers are already using chemicals in an inappropriate / uneducated way. Vendors of chemicals also providing bad advice to farmers. 1AF looking for ways to intervene. Trains farmers on alternative ways to control and prevent pests in a responsible and “last resort” way. Preferably by preventing the need for chemicals, then to use chemicals in a proper way if necessary.
 - Use of hybrid seeds
 - Looking for seeds that produce more and have increased resistance to conditions and contribute to soil health. Looking for seed options that have striga resistance for maize, introducing soya beans for intercropping (also to improve striga resistance).
- Process
 - Begins with desk research about what is available, balanced with farmer needs identified in the field
 - Then an identified solution (say new variety) is tested in a controlled environment, usually a test farmer plot. This answers questions such as yield potential, side effects, etc.
 - Then the test is repeated on a larger sample of farm plots to see how it works in a slightly less controlled environment
 - Then it is rolled out to larger sample size
 - Then it is rolled out to all farmers via full adoption
 - Looking to achieve
 - From farmer perspective
 - Yield potential

- Low cost of production (relative to what is being produced, which tells 1AF what the impact is to the farmer from the intervention)
- Ease of production – with every product there is a procedure required to implement and adopt. Ensuring the implementation is easy to understand and practice. If it is too time consuming (e.g. microdose fertilizer manually) then it may not be practical to deploy. This may result in a new innovation to overcome the difficulty (e.g. a drum planting device that both plants and fertilizes at the same time)
- From 1AF perspective
 - Ease of operation – looking at procuring the necessary input, how to overcome the logistics bottlenecks, warehousing, last mile delivery, systems to track what is given to farmer and how to track
 - E.g. for yam seeds, the FRIN seeds are very bulky. To plant hectare of land you need 1 metric ton of seeds. No way to scale with this. This info is given to IITA, who is now looking at ways to produce smaller yam seeds and is advancing rapidly and is trialing new microseeds. This project is thus now sidelined despite high potential of yams. Will return to this when IITA has developed a better seed alternative. Until then, farmers recycle from their own seeds. In the mean time, yields from yams is decreasing. This is because when seeds are replanted from parent seeds, the yields decline over time (because pests and viruses live in the replanted seeds). Hybrid seeds are propagated from clean / non recycled seeds. The problem is tolerable up until 4 replanting cycles before significant yield declines start to be noticed.
- Political stability / security – see above
 - Issues in NE of Nigeria with Boko Haram, etc. 1AF does not operate in areas where there is a security risk or political instability.



Women farmers preparing millet that has recently been harvested. They strike the harvested millet to release the seed product.



One of 800 mahogany trees planted in partnership with the government as part of an experimental tree planting partnership



Meeting of field managers discussing repayment status at the 1AF HQ in Minna.



Many children can be found on a typical farmer property. Large family sizes help to ensure a labor supply will be there in the future to continue farming operations.