BILL & MELINDA GATES foundation

Progress Narrative

Use this form to provide updates to your foundation program officer regarding progress made toward achieving your project's stated outputs and outcomes.

The Progress Narrative must be submitted in Word, as PDFs will not be accepted.

General Information

Investment Title	Building an Economically Sustainable, Integrated Seed System for Cassava in Nigeria		
Grantee/Vendor	International Potato Center		
Primary Contact	Graham Thiele	**Investment Start Date**	November 5, 2015
Feedback Contact[1]	Graham Thiele	**Investment End Date**	December 31, 2019
Feedback Email[1]	g.thiele@cgiar.org	**Reporting Period Start Date**	January 1, 2017
Program Officer	Lawrence Kent	**Reporting Period End Date**	December 31, 2017
Program Coordinator	Jeanne Bridgman	**Reporting Due Date**	January 31, 2018
Investment Total	$11,611,993.00	**Opportunity/Contract ID**	OPP1130642
Scheduled Payment Amount (If applicable)	$3,400,564		

[1] Feedback Contact/Email: The full name and email of the contact whom foundation staff queries for various surveys.

Submission Information

By submitting this report, I declare that I am authorized to certify, on behalf of the grantee or vendor identified on page 1, that I have examined the following statements and related attachments, and that to the best of my knowledge, they are true, correct and complete. I hereby also confirm that the grantee or vendor identified on page 1 has complied with all of the terms and conditions of the Grant Agreement or Contract for Services, as applicable, including but not limited to the clauses contained therein regarding Use of Funds, Anti-Terrorism, Subgrants and Subcontracts, and Regulated Activities.

Date Submitted	March 2, 2018	**Submitted by Contact Name**	Maria Teresa Bellido
		Submitted by Contact Title	Grants and Contracts Manager
		Submitted by Contact Email	m.bellido@cgiar.org
		Submitted by Contact Phone	+511 349 6017 (3013)

Progress and Results

1. Progress Details

Provide information regarding the current period's progress toward achieving the investment outputs and outcomes as well as the work planned or anticipated for the next period. In addition, submit the Results Tracker with actual results as requested.

1. BACKGROUND

The Building an Economically Sustainable, Integrated Seed System for Cassava in Nigeria (BASICS) project is happening in the right place at the right time. The project mission to develop a sustainable cassava seed value chain, characterized by the commercialization of production and dissemination of cassava-planting material, fits in thoroughly with several African initiatives. Examples include the African Union New Partnership for Africa's Development Agency's Pan African Cassava Initiative; the Presidential Initiative on Cassava in Nigeria and Ghana; a recent 12,500-ha "Cassava City" initiative of Kogi State, Nigeria, to develop the entire cassava value chain in one integrated place (https://www.vanguardngr.com/2018/01/kogi-acquires-12500-hectares-land-cassava-city/); and the African Development Bank-funded multicountry, multipartner mega project Technologies for African Transformation, which has cassava value chain transformation as a key component.

In partnership with national partners—the National Root Crops Research Institute (NRCRI) and the National Agricultural Seeds Council (NASC)—and international partners—the International Institute of Tropical Agriculture (IITA), Catholic

Relief Services (CRS), Context Global Development, and Fera Science Ltd)—BASICS is aiming to transform the cassava seed value chain following a market-based approach. A number of developments, or stages, are expected to make quality regulation cost-effective, business-enabling, and demand responsive (Fig. 1). These include the expectation of higher seed quality and tighter regulatory protocols at the early-generation seed (EGS), which consists of breeder and foundation seed together, and the tapering toward the commercial end of the seed value chain. The flow of information on improved varieties and seed supplies (i.e., from left to right in Fig. 1) is expected to generate demand and willingness-to-pay for the improved seeds by farmers. This demand flows up the value chain and the feedback on end-user preferences will feed back to the researchers. This will also guide breeders, thus making the varietal pipeline more market responsive. Two models of sustainable seed supply system are being commercially piloted in the project: a *village seed entrepreneur* (VSE) model and a *processor-led model* (PLM). We currently have 124 VSEs under CRS management and 50 VSEs under NRCRI management, with about 30% female ownership. The PLM has established demand creation trials (DCTs) at three new processors—Crest Agro, Psaltry, and Eagleson—in order to select one or two of them in 2018 to join Flour Mills of Nigeria (FMN) in the PLM pilot. This institutionalized and market-based system is expected to make access to cassava planting material better, faster, and greater. As a result, increased productivity, when linked to appropriate value addition chains and markets, will lead to outcomes that would contribute to Sustainable Development Goals (SDGs) 1—No Poverty; SDG 2—Zero Hunger; SDG5—Gender Equality; and SDG8—Decent Work and Economic Growth.

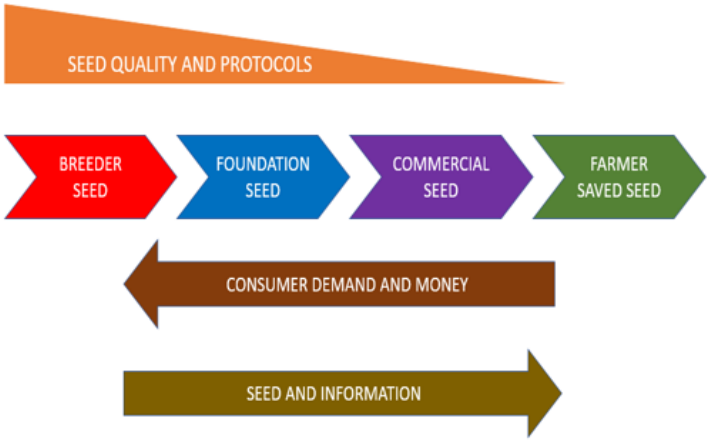

Figure 1. BASICS schema.

Almost 5m ha get planted with cassava in Nigeria every year. At an average of 60 bundles of planting material used for every hectare planted, this means that almost 300m bundles of cassava stems are sourced for planting every year, without considering ratooned fields. Possible seed sources are farmers' own fields, markets, or free supply as part of government or developmental agency-led campaigns. A cassava seed market can be either "informal" (i.e., seeds are transacted for free, lent, bartered, or sold outside of any official regulation and certification) or "formal," whereby there is a deliberate system in which seed producers, technically trained and registered/monitored by the government, sell seeds of officially released and registered varieties under a quality certification regime. In Nigeria, the formal cassava seed system is in its infancy, with much of this development happening through recent Bill and Melinda Gates Foundation (BMGF) projects, including BASICS. In the context of this project and the report, *seed system* refers to the formal cassava seed system.

BASICS is structured around five project components led by specific implementing partners (Fig. 2). Their respective progress narratives are appended as Annexes A—E and their sub-annexes as A1, A2, B1, B2, and so on. The interventions under the five components are designed to lay the foundations for building blocks that together will enable a sustainable and integrated seed system. This report's project-level narrative covers the progress in setting up these building blocks; the Results Tracker (submitted separately) captures project progress against individual work plan items and outputs planned.

A. Breeder seed component—led by IITA, NRCRI
B. Village seed entrepreneur model—led by CRS, NRCRI
C. Processor-led model—led by Context Global Network
D. Quality seed component—led by Fera, NASC
E. Project management unit—led by RTB

Figure 2. Five components of the BASICS project.

The project components contribute to the two-way flows (shown in Fig. 1) along the seed value chain, both improving the supply of seed and creating demand for certified seed of improved varieties. Consequently, by tackling the seed value chain from both directions, a sustainable system begins to emerge. The *breeder seed component* both ensures the availability of improved seed and varieties and creates demand for them via DCTs. The *VSE component* contributes to the supply of seed—from foundation seed to commercial seed—by identifying and training commercial seed growers (VSEs). Through promotion campaigns the VSE component creates demand for certified seed of improved and market-demanded varieties. The *PLM component* also ensures a supply of certified seed of processor-preferred varieties along the whole value chain. It enhances demand by bringing processors on board and training them to manage a seed system, create an outgrower scheme, and establish DCTs. The *quality seed component (QSC)* contributes to a certified seed system along the seed value chain by developing and implementing protocols for quality control of the seed certification classes, and by developing capacity of the NASC seed inspection system. It also provides for a digital system to monitor the flow of seed and its certification along the seed value chain, thus contributing to both the supply and demand of the different seed types. The *project management unit (PMU) component* helps to enhance seed supply by providing guidance on the seed flows in order to allow supply planning. Moreover, it promotes demand by (1) making the case for a formal, sustainable, certified seed system; (2) conducting studies on farmer purchasing behavior; (3) exploring options for establishing foundation seed producers; and (4) interacting with relevant stakeholders of cassava seed and root value chains.

2. PROJECT PROGRESS

Officially launched in April 2016, BASICS chose “acceleration” as the theme of its first Annual Review and Planning Meeting (ARPM), held in March 2017. The project has made good progress over the current reporting period, clocking many Nigeria-firsts along the way (Fig. 3). “Consolidation” has been chosen as the theme for the upcoming ARPM 2018, scheduled to be held on 14–16 March 2018, to strengthen all the project interventions, thereby ensuring durability and legacy of its assets as BASICS looks to lessen and eventually withdraw from direct support.

Breeder seed component

1. A potentially game-changing rapid multiplication technology, called semi-autotrophic hydroponics (SAH), was field tested and improved. This pioneering technology has the potential to address one of the most important causes of a weak seed system in cassava: its low and slow multiplication ratio. Three SAH labs have been established representing three different contexts—IITA, Ibadan (international research center); NRCRI–Umudike (national research center); and FMN, Ilorin (a private company). A comparative performance evaluation over the next 2–3 years will give us the best way forward in rapid multiplication.
2. For the first time, tissue culture-derived, virus-free plantlets have been multiplied through SAH for breeder seed production. A combined total of more than 350,000 such plantlets came out of the three SAH labs in 2017 and entered the Nigerian seed chain.
3. A CGIAR-first private entity, called IITA GoSeed LLC, has been established by IITA to produce and make available the EGS of select crops. Starting with cassava, it will include other food security crops, in which the uncertain business case has discouraged private firms from getting involved in these crops. This will be a key building block for a sustainable seed system in Nigeria.

VSE model

1. First private sector cassava foundation seed producer (Renascent Agro-inputs Ltd.) has planted certified breeder seed with a plan to produce certified foundation seed on demand from VSEs.
2. A total of 40 ha were planted by 28 VSEs in 2016 and 5,429 bundles of certified commercial seed were harvested and sold. In 2017 planting season, 139 VSEs have together planted more than 142 ha with five selected varieties, representing over 125 certification units for NASC to certify in 2018.

PLM

1. A total of 26 ha of commercial production has been planted at Shao Farms.
2. SeedSim and ProCost tools for the Seed Unit production planning and operations budgeting has been developed.

Quality seed component

1. First-ever lot of NASC-certified breeder seeds of cassava came out of IITA—more than 1,800 bundles.
2. An innovative information and communication technology was implemented to facilitate NASC's movement toward e-certification regime, facilitate capturing of dynamic market data on seed flows, and facilitate market linkages. This technology, the Cassava Seed Tracker (CST), was developed and will be implemented widely in 2018.

PMU

1. A seed flow template was developed to allow for monitoring and planning of seed needs within the project.
2. A study to evaluate foundation seed producers was completed.

Figure 3. Key project achievements in 2017.

There are supply constraints at each class of seeds—namely breeder seed, foundation seed, and commercial seed. There are definite gaps in the EGS supply chain, and the project has taken some pioneering steps in strengthening the EGS system mentioned in the sections below. But it is important to note that the demand for EGS derives from the demand for commercial seed. Hence, there is a need to develop the supply network of these seeds in tandem with demand-side development of foundation and commercial seed alike. This narrative is therefore structured around both the supply and the demand side of the seed value chain.

3. PROJECT WORK TO DEVELOP SUPPLY SIDE

Improving supply has a technology innovation dimension and an institutional capacity-building dimension. A sustainable cassava seed system will need appropriate technology as well as adequate institutional support to enable the various stakeholders in the value chain to perform their respective roles in the most effective and efficient manner.

3.1 Breeder Seed Component

Technology innovation involved the setting up and implementation of the SAH rapid multiplication technique. By the end of Y2 of the project, IITA, NRCRI, and Shao Farms have established a SAH lab each in Ibadan, Umudike, and Ilorin, respectively (Fig. 4). As the second processor in PLM comes on board in 2018, another SAH lab is expected to come up this year; all these labs collectively add the capacity of the Nigerian cassava sector to introduce more virus-free planting material. In 2017, more than 375,000 virus-free plantlets were produced by SAH at these three locations (Annex A, Tables 1 and 2; Annex C, p. 1). This increased capacity to bring in virus-free planting material of different varieties has the potential to slowly flush out the diseased and less-suited planting material, at least at the EGS stages. So far, field

plantings of 4.5 ha in Ibadan and 2 ha at Ikenne have been established with SAH plantlets. In addition, 0.25 ha of SAH plants were established at CRS and 0.23 ha at Eagleson (processor) under the supervision and backstopping of the IITA breeder seed component team.

Figure 4. SAH lab facilities and trained staff at Ibadan, Umudike, and Ilorin.

In addition to virus-free planting material of released varieties, a robust pipeline of new varieties is essential to meet the evolving demands of the market. The SAH labs allow for such a pipeline of new varieties to be brought into the system (Annex A, pp. 1 and 2, 5) through the rapid multiplication of seed of new demanded varieties, thus also enhancing the capacity of processors to plan their supply of different cassava varieties. At IITA, 12 advanced, pre-release genotypes were introduced into tissue culture (TC) in 2017, as well as 4 pre-released materials developed from the NexGen cassava project. These have potentially higher dry matter (DM) (about 40%) content and yield (about 40 t/ha) than the currently released varieties. Virus-free TC stocks of these genotypes will be transferred for rapid multiplication by SAH. Likewise, NRCRI has selected five genotypes to be introduced into TC, targeting an SAH production of 3,000 plantlets per genotype. In addition to these genotypes, four pro-vitamin A varieties have been selected to be introduced into TC and target an SAH production of 10,000 plantlets per genotype (Annex A, Section 3.4.1, p. 5).
For the first time ever, variety-specific quantitative seed orders were placed with the IITA and NRCRI EGS teams by the VSE teams at both CRS and NRCRI for their respective certified foundation seed requirements for 2018 planting and 2019 planting. Similarly, the foundation seed producers at CRS, NRCRI, and Context placed orders for breeder seed with IITA and NRCRI. Thus, from conventional breeder-seed fields established in 2016, harvested seed was provided in 2017 to foundation seed producers: CRS (70 bundles, five varieties) and the first recognized private sector foundation seed producer, Renascent Agro-inputs Ltd (500 bundles, eight varieties; see Annex A, Table 5, Section 3.2.1). In addition, 240 bundles were provided for the NRCRI breeder seed component. Another 1,086 bundles were used to establish breeder-seed fields in two regions—Southwest (SW) and Northcentral (NC)—in order to supply the establishment of foundation-seed fields in 2018. This would meet the foundation seed request according to the seed flow map (a demand of 6,575 bundles of breeder seed is projected for 2018; Annex E5). Therefore, at Mokwa (NC), 1.4 ha of five varieties were established, whereas at Ago owu and Ikenne (both SW), 8 ha of eight varieties were established. These fields have been visited by NASC (the pre-planting visit). Yet IITA could only fulfill a part of the breeder seed requirement of Renascent Agro-inputs Ltd, which needed 1,125 bundles as opposed to the 500 provided. This weakness in interdependency and integration will be further addressed by the BASICS PMU in order to make it a regular habit for market-based transactions between various players in the value chain. The seed flow map tool developed by PMU captures the commercial seed production plans of all VSEs and processors, and provides an estimate for upstream foundation seed needs and in turn breeder seed needs (Annex E5). As there is at least a 10-month lead time needed for each of these seed classes, PMU has started a process for advance seed orders which specifies the varieties and quantities needed and the price agreed, to be placed by the next level of seed user with the respective seed supplier.

Important milestones were recorded in the establishment of the NRCRI foundation seed multiplication fields to meet the demand for 2017 planting season of the VSEs. These fields are being grown under the NASC seed certification regime. A total of 35 VSEs (22 males, 13 females) were provided with foundation seed totaling 1,750 bundles (Annex A, Table 7). Moreover, 12.7 ha of foundation seed production fields were established in three locations in 2017 in order to supply the expected demand of six different varieties in 2018 by VSEs—an estimated 4,550 bundles (Annex A, Table 8).

In addition, institutional capacity was developed as IITA staff were trained in SAH technologies. They then trained 10 key staff at Shao Farm and NRCRI for scaling up (Annex A, Table 4).

Another key development during the period was the setting up of an independent seed production entity at IITA, called IITA GoSeed LLC. A first draft of a business plan was prepared in 2017, with an investment plan scheduled for the first quarter of 2018.

3.2 VSE Component

In the VSE supply model, community-based progressive and entrepreneurial cassava farmers are trained and enabled to run viable seed businesses. In this period, more than 139 cassava seed producers were trained and are currently involved in multiplying improved seeds to enhance the overall seed supply in Nigeria. A total of 215 people (57 females, 158 males) were trained for the VSE implementation in 2017 (Annex E6). CRS recruited 28 VSEs, which collectively planted 41 fields covering 40 ha in the 2016 season; these production plots were partly harvested in 2017. Out of these 41 fields, 88% (36 fields) passed the NASC certification and 12% (5 fields) were rejected. All the certified commercial seed harvested from these VSEs in 2017 (a total of 5,429 bundles) were sold to VSEs (75%) and farmers (25%). The number of bundles was TMS0505 (723 bundles); TME419 (2,229); TMS1368 (1,147); TMS0581 (750); and TMS30572 (580). These VSE stems and an additional 990 bundles procured from NRCRI were planted on more than 107 ha for another round of seed multiplication. The seeds harvested from these farms will be sold to the farmers in the second half of 2018. Therefore, the number of VSEs identified, selected, and trained by CRS has increased from 28 in 2016 to 124 (34 females, 90 males) in 2017.

NRCRI has selected and trained 35 VSEs who planted 35 ha in 2017. To ensure that the seeds produced comply with the established seed standards, NASC certification inspectors inspected more than 126 fields in 2017 and certified 10,091 bundles of breeder and commercial seed. In 2018, NASC will have more than 150 certification units (a certification unit is a single, unique block of seed production plot that is separated from other fields by specified isolation distances) to monitor and present to NASC for certification by a seed producer.

As mentioned in section 3.1, a private foundation seed producer, Renascent Agro-inputs Ltd, has been brought into the project and has been linked with the VSE producers to provide them with certified foundation seed in 2018.

CRS, in partnership with NASC and NRCRI, organized a training-of-trainers workshop for program managers (3 females, 5 males) of its five partner organizations and the extension agents (7 females, 19 males) of Benue Agricultural and Rural Development Authority, who provide technical support to the VSEs on the project. The subjects dealt with best practices for cassava production, agronomy, business basics, and NASC quality protocols. Participants learned new skills and knowledge required to deliver the step-down training for VSEs (Annex E6). The training was followed by 3-day step-down trainings for the VSEs and was decentralized in four locations (Gboko, Makurdi, Otukpo, and Katsina-Ala). Beyond the training provided, the VSEs have continued to receive mentoring and technical support from the program managers and the authority's extension agents.

Understanding of NASC regulations is important to ensure high compliance by the VSEs. CRS provided adequate training on the standards during the onboarding of VSEs, step-down training, during the periodic monitoring visits, and at the inspection visits of NASC to VSE fields. Post-training assessment shows that an average of over 75% of the VSEs had improved knowledge. As a demonstration of their knowledge and understanding, all VSEs presented their fields for NASC certification; 88% passed. For the ongoing season, all the fields have undergone the first certification visit by NASC.

3.3 PLM Component

About 80–90% of cassava roots produced in Nigeria is processed locally by cottage industry processors; less than 10% reaches commercial-level processors. The respective cassava producers of these two distinct value chains are affected positively or negatively by unique locational, socioeconomic, and market-linked considerations. The sale price of cassava stems is significantly different—prices of stems in Benue are much higher than, say, in Oyo State. The noncommercial processing sector is able to absorb the high root costs, but the processing sector becomes unviable when root prices go above a certain level. This has resulted in many processors running under capacity. Hence, the PLM has great application in Nigeria and, if implemented well, represents a win for the processor and the farmer. In this model, a commercial processor multiplies and makes available the certified seeds of selected varieties of cassava to its contracted outgrower farmer network in a root buy-back arrangement. The arrangement of farmers in a network, assistance with input supplies in the group due to economies of scale, increased productivity owing to technical assistance, and an assured market at a mutually agreed pricing arrangement through pricing cycles all contribute to a mutually beneficial relationship between farmers and processors. This arrangement has worked successfully across Africa and Asia in many other crops (e.g.,

potato, tomato, gherkins, French beans, etc.), and the BASICS PLM aims to bring it into Nigeria's cassava sector. As it is a new arrangement, it will take a few cropping cycles for both parties to build a mutually beneficial long-term relationship.

Under PLM, the work with Shao Farms progressed, in spite of the challenges of transition within that organization. SAH was operationalized at Shao Farms and produced more than 40,000 plantlets in 2017. Furthermore, Context provided wireless tablets and installed a FieldBooks app that allows lab technicians to track and report on the biweekly progress of lab multiplications. In addition, the field nursery established in 2016 was ratooned and yielded 1,560 bundles of four varieties that were used to plant 26 ha of commercial production.

PLM has advanced in identifying an additional processor to bring into the project. Shortening a list of more than 10 processors, Psaltry and Eagleson and Nito Concepts are being considered in the final round to select the second processor, as planned in the project plan (Annexes C and C2). In addition, a pilot SAH nursery was established at Eagleson's commercial farm in Isenyin, which will serve as a good training and sensitization tool for field staff unfamiliar with plantlet-based commercial nursery systems, albeit at a smaller scale (Annex C4). The PLM component has started work on developing an outgrower network while expanding the seed multiplication plans to supply them with planting material.

As for training modules to enable replication of multiplication systems, Context has developed a processor business case for investing in SAH lab and nursery (5-year Proforma financials) and a draft investment case proposal (Annex C; Primary Outcome 4 Section; Annex C8). This includes the following tools: (1) System Capacity Projections (SeedSim elements), catered to each processor's production area and required seed volumes; (2) Budget Breakouts (ProCost elements), cost projections for lab and nursery setup (with localized cost structures adapted to each processor), ongoing production operating expenses through commercial stage, and seed business unit personnel; and (3) Proforma Financials (Business Case), 5-year rollup of revenues (from stems and roots) and costs (both fixed and operating), broken down by production stage to analyze unit economics and, ultimately, forecasting of unit net income (net present value and internal rate of return). Context completed draft investment case proposals and seed unit business plans with both Eagleson and Psaltry in Q4 2017. These documents will be further refined during site visits in Q1 2018.

3.4 Quality Seed Component

An effective quality control and regulatory regime in the cassava seed sector give potential buyers a level of confidence needed to do business with the seed sellers. Fera, as the lead of the QSC, is working to enhance the seed certification capacity at NASC. In terms of infrastructure, NASC enhanced its facility by relocating from a temporary building in Abuja to a large acreage, permanent location at Sheda, 1 hour from Abuja. This allows them to make physical infrastructure investments as needed to support the seed sector development. In terms of institutional capacity development, NASC and the Federal Ministry of Agriculture have developed and advanced an intention to set up a "center of excellence" for seeds to cater to the broader West African region. Plans in BASICS's QSC to develop a cassava mosaic disease (CMD) virus molecular testing lab and capability at NASC to support industry-responsive seed certification services fit in very well with the national priorities. There has also been progress in seed policy, with e-certification through the use of Cassava Seed Tracker (CST) and third-party certification, both of which have the potential to reduce the overall cost of certification while enhancing the efficiencies in the delivery of the service. The third-party certification legislation is in the final stages of approval in the Nigerian Assembly. BASICS is closely following these developments and enabling them through exposure visits, capacity-building workshops for NASC staff, and the ongoing policy and country priority dialogues in partnership with other CGIAR centers and international agencies. In addition, the project has continued to train NASC staff through visits to FERA in the UK. Six NASC staff have been identified by NASC to champion seed health and pathology (3 females) and molecular diagnostics of pests and diseases (2 males, 1 female). These individuals visited Fera for a 2-week training in these respective subjects in October 2017 (Annex D1).

Information flow on seed supply and demand from stakeholders in the seed value chain is instrumental in enhancing seed transactions. The innovative use of digital devices in cassava seed value chain in Nigeria was further progressed through the CST (Fig. 5). The ongoing development and roll-out of CST at NASC will provide the ability to NASC for real-time monitoring and management of the certification process, while also providing ready access to reliable information to all stakeholders of the seed system (Annex D, pp. 4–8). The QSC team has organized periodic training workshops for the VSEs and NASC staff on using the CST to upload the seed production fields. Wider adoption will enhance the value of CST as a tool for the seed value chain players. The CST shows breeder and commercial seed data for 2017–18, with 10 varieties planted in 198 field units comprising 138.5 ha, 7.1 ha for breeder seed and 131.4 ha for commercial seed. Twenty NASC

seed certification officers (SCOs) were trained on using the CST application at Ibadan (SW Nigeria) and at Zaria (NC Nigeria) in 2017. Another 40 SCOs from SW and NC regions were trained on basic and applied aspects of cassava seed certification. Participants were exposed to varietal identification using morphological markers, identification of diseases based on symptoms, identification of insect pests, estimation of pests and disease incidence and severity, and use of data to qualify for decision-making. Participants were exposed to application of CST's application, and a demonstration was organized in the field using handheld devices (Alcatel Pixi 4 tablet); seven units were handed over to the NASC staff. An additional course was given to three IT staff from NASC on CST database management. The three participants selected will act as "trainers" within NASC to further train NASC staff on the application of CST as well as manage the CST database for NASC, including reporting preparations and troubleshooting. Although more than 50 NASC staff have been exposed to CST training, NASC has identified 5 key staff who will champion the implementation.

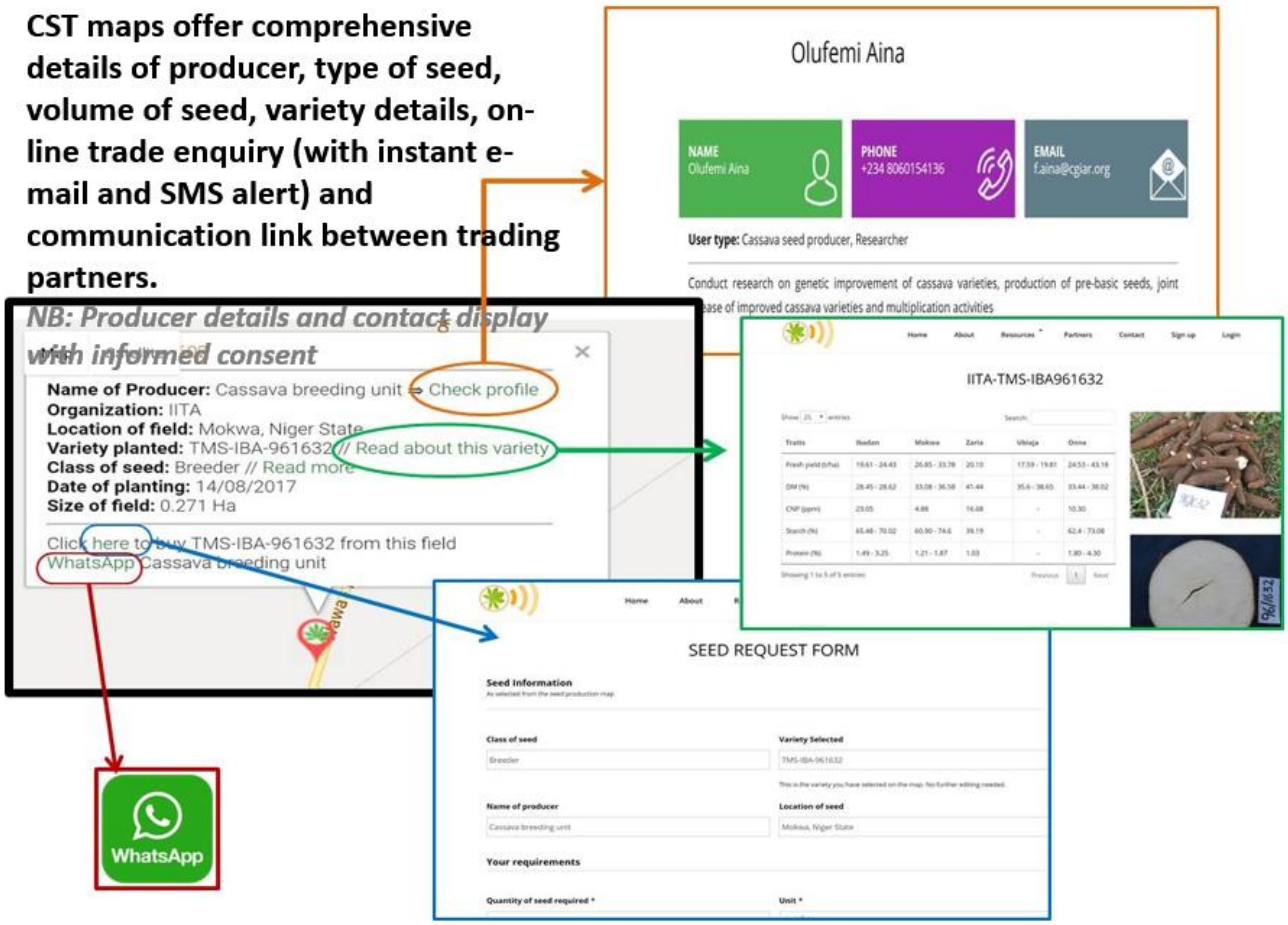

Figure 5. CST features.

Progress was also made with developing fit-for-purpose, certification standards for CMD at all levels of certification (though there is still much discussion on what should be the standard for EGS and commercial seed). During 2017 the significance of gaps in our knowledge of CMD symptoms and virus load became very apparent, specifically as influenced by genetic traits conferring tolerance or susceptibility and how this manifests as impacting yield. It was also noted that the CMD virus-carrying potential of CMD-tolerant varieties, whereby planting material may serve as a carrier for new infection, is also not quantified and may depend on the level of tolerance. The significance of these gaps and how they impact on certification gave greater emphasis to the work entailed in the assessment of VSE and non-VSE pest levels, CMD/CMD virus correlation, and development of a CMD virus diagnostics and trials to estimate the "value added" to farmers in planting certified seed. Below we review the activities that are addressing these issues.

A workshop to discuss SAH and breeders seed certification was held in IITA, Ibadan in March 2017, and provided new insights on the impact of SAH when placed in a cassava seed system. An important conclusion was a proposal to renew breeder seed by SAH after every two generations of field multiplication, observing that the quality of current breeder seed is maintained only by good husbandry and without any renewal from virus-free declared stocks. In support of this intervention, a key delivery of BASICS will be to show the rate of CMD virus infection of SAH material (which is free of the

CMD virus) over cycles of field multiplication and, ultimately, on release to farmers as certified commercial seed. In this consideration, the options for minimizing exposure to CMD virus infection in progressing SAH-derived material through the seed system were discussed. 2017 has already realized some local adaptation in how SAH moves to the field; and with more cumulative experience the relative merits of these methods will be explored and compared. The optimal method of multiplying SAH material, which provides scales of economy and commercial viability, is yet to be established.

The discussion during the breeder seed standard workshop and annual review also served to inform the drafting by Fera of a "discussion paper" on breeder seed certification (Annex D4). This paper is open to review and will be taken forward in 2018 to further the process toward developing a breeder seed standard. The standard is based on a better evidence of CMD virus impact in tolerant and susceptible varieties, prevalence thresholds, and yield benefit. Critically, the paper explores the importance of understanding the correlation between visual CMD (symptomatic) observations with CMD virus levels detected my molecular means.

To address these areas of uncertainty, field data are being obtained to investigate the various parameters. Ms. Nneka Okereke (NRCRI) has led with field assessments of pests and diseases in 20 VSE and 20 neighboring non-VSE fields, focused on visual-CMD (symptomatic) and molecular-detected CMD (virus) levels (Annex D8b). Accordingly, ~4,000 leaf samples of varying visual CMD status have been collected for analysis at Fera. These data will provide the first evidence on the pest "gap" between VSE and non-VSE fields and the correlation between visual-diagnosis for CMD and molecular-detected CMD virus in varieties of different CMD tolerance/virus-carrying capacity. The data on visually assessed pest levels associated with the VSE and neighboring non-VSE fields are given in Appendix D5. It is interesting to observe from this snapshot of field data the higher levels of CMD in fields planted with non-VSE seed (home-saved or local market), and that many farmers are not using improved/or at least recognized varieties. The molecular data are expected in early 2018. Early data support that visual diagnosis of CMD in tolerant varieties provide a poor proxy for CMD virus levels between symptom classes about the tolerance threshold of severity index 3, supporting the application of molecular testing at higher tiers of certification. The data arising from this activity will instruct the newly planted field trials on yield and CMD/healthy seed (Annexes D7 and D8a).

In furthering Y1 work on developing a diagnostic for CMD viruses, Ms. Nneka Okereke of NRCRI undertook her second 3-month (October–December 2017) work placement at Fera. Her study focused on developing an appropriate, easy-to-use, and safe nucleic extraction method for CMD viruses suited for use by NASC, and the risks of CMD virus contamination between leaves by the act of sampling (Annex D3). The work on CMD virus detection is combined with the work on VSE and non-VSE CMD prevalence, and will see some of the most robust evidence on CMD symptom versus virus prevalence and diagnostic comparisons (real-time vs. loop mediated isothermal amplification) to date.

Beyond the technical requirements of certification, the relationship with NASC and the nature of the certification service are also to be considered. BASICS recognizes an important opportunity to be exploited through the proposed revision of the Seed Act of Nigeria, with the recognition for NASC to authorize the certification of certified seed by third-party service providers operating commercially. Currently, only NASC SCOs can undertake certification; however, the volume of seed that a country the size of Nigeria requires to serve with seed makes this an insurmountable challenge, logistically and financially. The QSC, in consultation with NASC, has estimated per certification unit cost to be approximately $100–150. The current costs met by the cassava seed producers is about $10–15, a tenth of the full costs. To provide such a public good at scale is unrealistic; therefore industry must meet these costs. Wider review of other countries supports that industry is increasingly picking up the full cost of seed certification. During the course of BASICS, the concept of third-party certification has been gradually introduced into NASC leadership and other stakeholders (e.g., CRS and NRCRI with their responsibility to the VSEs). Accordingly, NASC and CRS have agreed to participate in the piloting of third-party certification in 2018. A fundamental principle of the pilot will be on estimating the financial costs, cost recovery, and the oversight of the third-party provider by NASC. A leading principle will be to focus NASC staff on those tasks that are best provided directly by NASC and to outsource what may be best delivered by a commercial sector.

3.5 PMU Component

PMU has been playing a stewardship's role and has been mentoring, consulting, and engaging all stakeholders. There is no definitive information about the current market appetite in Nigeria for cassava stems in terms of number of bundles needed as well as where, when, and which varieties. This makes planning the supply side a formidable task. The fact that

the demand for breeder seed depends on that for foundation seed, which in turn depends on the demand for commercial seed and each of these cycles is nearly a year long, makes the seed flow mapping and planning complicated. Regardless, supply-seed strengthening cannot wait for demand-side development; both must go hand-in-hand. BASICS over the last 2 project years has started work on developing all three seed class supply networks—VSEs and processors for commercial seeds, outgrowers and private seed companies for foundation seeds, and IITA and NRCRI for breeder seed—to ensure sustainable and market responsive seed systems.

The VSEs and PLM need a dependable supply of EGS. The known gap of EGS was felt during this project period and two groundbreaking measures were taken to address this gap. An independent seed systems expert, Steve Walsh, was commissioned to help strategize a way forward to develop a private sector network of foundation seed producers to meet the needs of the commercial seed producers (Annex E1). Two private sector players were selected, and quantities of foundation seed to be produced were estimated during the midyear meeting. But, owing to a shortage of certified breeder seed and cash flow issues at the seed producer end, the project was able to get foundation seed production field established by only one of them, Renacent Agro-inputs Ltd. Developing the private sector foundation seed producers' network will progress in the remainder of the project period.

PMU is keenly working with all project partners to collate all useful templates, reports, tools, protocols, and standard operating procedures. These project assets will be part of the project legacy and will help all current and future projects to leverage from BASICS and not reinvent the wheel. We intend to store all these project assets on the project website, which is now live, for a wide audience to access freely as per the global access policy. (Some of the Excel tools developed during the project are appended as annexes to this report.) These tools will continue to evolve with learnings along the way: Annex C8: Processor Business case; Annex C9: BAQSTOPS matrix; Annex A1: SAH Cassava Field Operations standard operating procedures; and Annex E5: Seed Flow Map.

BASICS is exploring what learnings in other countries in third-party certification can benefit Nigeria and can be implemented here. Fera and PMU are studying the best examples from countries such as South Africa, Tanzania, and India, to make available for adaptation and use in Nigeria.

4. PROJECT WORK TO DEVELOP SEED DEMAND

Farmers, seed producers, processors, regulators, intermediaries, and consumers are the six key stakeholders in the cassava value chain. If these stakeholders do not see anything amiss with the current situation as regards to cassava productivity and net returns for their labor, or if they do not have the desire, capacity, and the needed connections to change things, the chances of a sustainable seed system to get established are low. This would mean no material change in improved seed adoption and crop productivity in cassava. There is a lack of reliable market-demand information. And lead times for seed production are long because of its low and slow multiplication ratio, bulkiness, low transportability and storability, and reusability. These two factors pose multiple challenges in creating a sustained demand for improved cassava seeds. A concerted effort was needed to take Nigerian farmers through the evolutionary steps of "awareness–conviction–conversion" to becoming regular formal seed system customers. BASICS carried out several activities and strategies to develop the demand side in cassava seed system.

4.1 Breeder Seed Component

DCTs were set up to help cassava processors assess the processing value and demand for released and pre-release cassava varieties. This will help to target the need for cassava-planting stems so that seed producers can select and produce cassava varieties that will be most valued by processing factories. Eight promising varieties were planted in DCTs in three replicates at Ikenne, Ago owu, and Shao, in collaboration with the PLM component. The trials were harvested at different times, and farmers and processors participated in the harvest demonstration (Annex C3). The plot sizes in the trials were designed to allow a large quantity of roots to be harvested and evaluated for agronomic performance and for processing characteristics. Therefore, harvested root yields were evaluated by the IITA team; Thai Farms took the roots for processing. Figure 6 shows a summary of results of DCTs harvested from Ilorin, Ikenne, and Ago owu for total root yield and DM content.

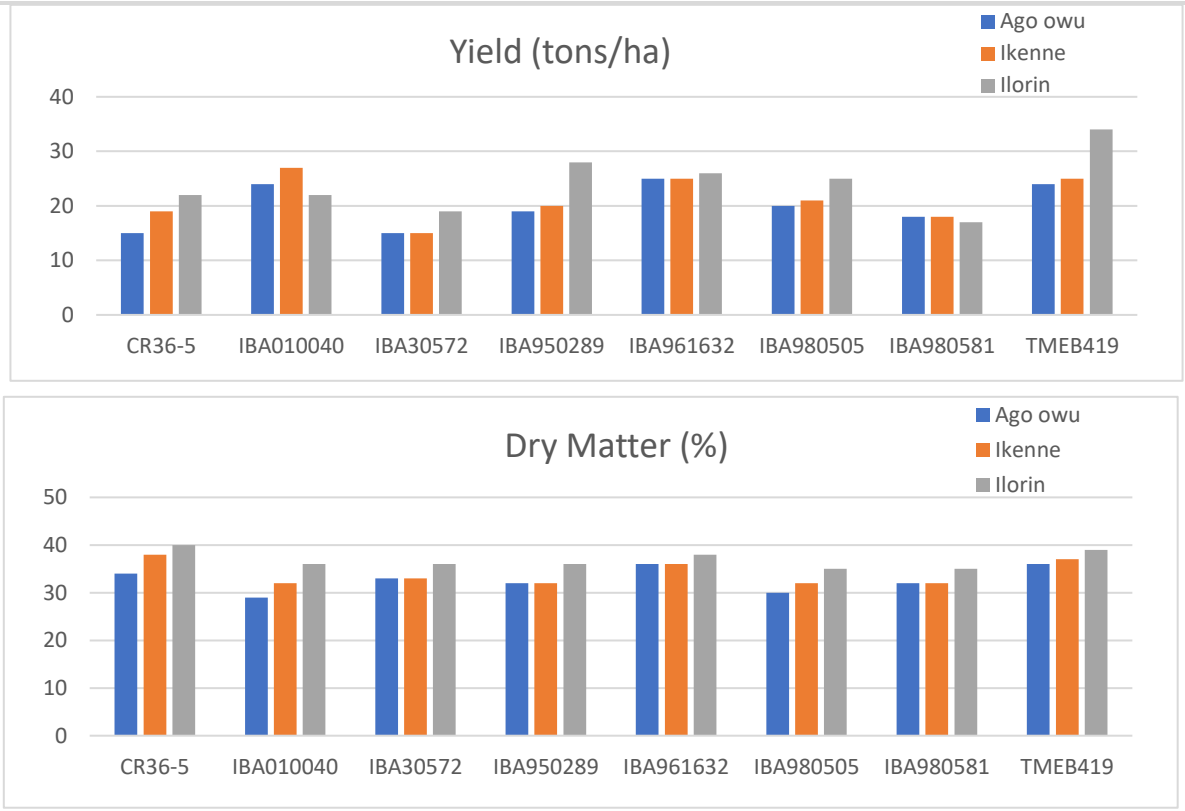

Figure 6. DCT yield (t/ha) and DM content (%) at Ago owu, Ikenne, and Ilorin in 2017.

Figure 6 shows that TMEB419 at Ilorin had the highest yield of 34 t/ha; however, the yield for IBA961632 and IBA980581 seems to be more stable across the three locations, even with the different harvest dates (during rainy season for Ikenne and Ago owu, and after the rainy season in Ilorin). For DM content, CR36-5 ranked the highest with 40% DM content at Ilorin, although yields were lower. Nevertheless, other lower yielding varieties did not reach this level of DM, so this could be of potential interest to processors. This needs further testing in semi-commercial plots since this is a new variety that has not been previously distributed. From the 2017 DCTs, we recommend production be continued and scaled up of IBA961632, TMEB419, IBA070593, IBA070539, and IBA980581 as these listed varieties have top DM/yield index and are stable across environments. CR36-5 was identified as a good candidate for processors. The Ikenne, Ago owu, and Ilorin DCTs were replanted in 2017. Three additional trials were established on new processor farms—namely Psaltry and Eagleson in Oyo State and Crest Agro in Kogi State. Six DCTs for 2017 will be harvested in 2018.

A sustained demand is only possible when the "product" is superior, represents value for money, offers some advantage that is currently not available to the farmers, and its quality is reliably certified. In an effort to identify and demonstrate this, IITA and NRCRI have planted a series of trials comparing farmer-saved seed with VSE seed. In addition, a trial to compare the performance of SAH plantlets, SAH-derived stems, and traditional breeder seed stems was also established. The first trials were established in 2017 and will be harvested later in 2018. The trials will be repeated for a further 2 years to draw dependable conclusions (see Annexes A2, A3, and D5 for the status of these trials and tests). Also, as mentioned in the supply section for breeder seed, in efforts to ensure a steady pipeline of new varieties suited to the changing needs and preferences of the market, 12 advanced pre-release varieties were introduced into TC in 2017 (Annex A, p. 5, Section 3.4.1).

To identify optimum plant density to get maximum net income, Context conducted a population density trial in Ilorin. First results showed 12,500 plants/ha to give the highest root yields. More tests and data analysis are needed to draw dependable conclusions. In addition, the recently conducted farmer seed-buying behavior survey organized by PMU in partnership with Wageningen University, NRCRI, and CRS will give us an indication of what an average cassava farmer is willing to pay for seed. A report on this study is being prepared and is expected to be ready for sharing later in 2018.

4.2 VSE Component

To help enhance seed adoption, awareness creation among all stakeholders is key. The market survey organized by CRS in 2016 (submitted as an annex in last year's annual report) provided valuable insights both into cassava root traits

preferred by men and women and also the baseline knowledge and the main sources of information farmers had about VSEs. Other than addressing the challenge of getting the farmers to buy the improved, certified seeds the first time, the buyers' tendency to recycle their planting material and in fact share or sell it to others is a challenge to be factored in by VSEs. In the low disease pressure situation in Nigeria, trying to create a market for varieties based on disease resistance alone is likely to fail.

On the basis of this market survey and experience of the previous Sustainable Cassava Seed System project, CRS trained VSEs on the cassava market. A knowledge assessment conducted after the training showed that 96% of VSEs have an adequate knowledge of the cassava market in the state after the training, compared with 60% before the training (Annex B, pp. 1 and 2). PMU has been trying to facilitate the transfer of learnings from CRS to NRCRI. As a result, NRCRI plans to train all the VSEs in early 2018 to improve their capacities to produce and market seeds.

CRS established 50 demo plots in 17 local government areas (LGAs) of Benue State. The plots were established in highly visible locations where farmers, processors, and others could be shown the varietal performance of the promoted varieties. Each plot of about 0.015 ha was planted with the following improved cassava varieties: TME 419, TMS 98/0581, TMS 01/1368 and TMS 98/0505 or NR 8082, and TMS 30572, and Akpu Fefa/Wonono as local controls (Fig. 7A). On the basis of the marketing study conducted earlier by the project in 2016, CRS also developed a marketing communication strategy that guided the design of marketing and promotional materials (e.g., branded T-shirts, face caps, posters, flyers, billboards, promotional bags, and radio spots). The radio spots were produced and aired in three languages in three radio stations spread across the state. Thirty-two market day promotions (MDPs) were held across the 14 out of the 17 LGAs where the project is currently operational, in cassava and cassava products markets (Fig. 7B). During the MDPs information about the project, improved varieties and VSEs, including where and how to buy the varieties, were communicated to farmers through word-of-mouth and flyers. The messages emphasized seed quality and NASC certification. Question-and-answer sessions featured in all MDP locations witnessed high turnout of farmers, traders, and other market patrons.

Figure 7A. A demonstration plot in Tse Ukange, Gwer Est LGA.

Figure 7B. MDP in Gwer East LGA by CRS.

About 30,000 farmers were reached directly, and more than 100,000 farmers were reached through mass communication media. A sample survey of farmers around these locations is being planned by CRS in 2018 to measure the level of awareness of farmers about the project, VSEs, and varieties promoted. This will guide the next phase of the CRS activities to promote awareness about the project, promoted varieties, and VSEs.

CRS has facilitated formation of five chapters of VSE association in Benue so that the VSEs, their trainers, potential suppliers, and customers can meet and exchange ideas regularly. The VSEs were also linked to the agro-input dealers in their respective LGAs (Annex B, p. 1). This promotes both supply improvement and demand creation for commercial seed.

4.3 PLM COMPONENT

The PLM component participated in the DCTs (see section 3.1 above). Between 200 and 500 kg of the roots harvested from the Shao Farms (Ilorin) DCTs were milled at Thai Farms processing facility and assayed for starch content and yield as well as gari production (Annex C5). Likewise, 150–300 kg of roots were processed into high-quality cassava flour; starch and fiber content was determined. Combining results from both trials allowed differentiation between the varieties (Annex C5). Continued root tests of the DCT harvests will provide additional results and insights that are important to commercial processors. It is expected that they will also uncover some regional insights as to best performing varieties, and be a good training and sensitization tool for field staff unfamiliar with plantlet-based commercial nursery systems.

Sahel Capital, a partner with the Context Global Development on the processor-led component of BASICS, surveyed 90 experienced cassava farmers across 16 villages in the Moro LGA of Kwara State, near FMN's cassava farm. The survey aimed to understand the varietal preferences of cassava growers, availability of quality cassava stems, and farmers' stem sourcing strategy. In addition, the survey assessed production and marketing priorities of cassava growers and their perceptions of the cassava seed system project (Annex C1). The most experienced farmer, Mr. Alhaji Nda Mohammed, was the team leaded for a local farmers group and can be engaged by the seed system after the BASICS project ends, to advance the PLM. The survey revealed that these farmers had not been exposed to improved varieties for over a decade and have been growing mainly two landraces. Yet they are very much willing to try new varieties that are preferred by the processor (provided they do perform better) and to participate in an outgrower scheme with FMN, provided that growing the stems is profitable.

4.4 QSC

Fera, together with NRCRI, is developing a full field trial plan that builds on the CMD/pest prevalence assessment of 20 VSE and 20 non-VSE neighbor farms (as described in supply section; QSC above). Two main designs (on-station and on-farm trials) were formulated (Annex D7, pp. 6–9). These trials will be repeated each season to determine the change accrued by BASICS through increasing the health of VSE certified seed. The on-station design has had to be modified due to delays in sourcing planting material. Field data are actively being collated by NRCRI. The on-farm trial was not done in 2017 but is scheduled for 2018. Essentially, this trial will record the productivity of VSE material in the hands of non-VSE farmers in comparison with their current material. It could usefully be part of the project's monitoring and evaluation.

Not knowing seed availability, where to procure, variety details, producer contact, seed class, and the like are some of the major gaps in the seed value chain and an impediment to seed trade. As mentioned above in the supply improvement section for the QSC, the CST maps the seed production fields across the value chain. Those in need of seed can get all the details from a CST map, contact a seed producer, and order seed. Since only accredited producers can gain entry to CST, by default the system should eliminate unscrupulous producers. Therefore, the CST can facilitate demand by providing information about the availability of certified seed of improved varieties in the localities of where the VSEs are producing commercial seed. The CST analytics provide a visualization of seed production data by production year, variety, class of seed, and zones (Annex D, section on CST data analytics).

4.5 PMU Component

PMU met with the representatives of the Market Development Project in The Niger Delta (MADE), a 5-year project funded by the Department for International Development. MADE operates in adjacent areas to BASICS's catchment areas in an industry workshop and shared the work of BASICS and especially the VSE component. The discussions culminated in NRCRI signing a memorandum of understanding with MADE to help them develop 60 VSEs following the BASICS model. The first batch of 30 VSEs was trained in 2017, with the remaining 30 VSEs to be trained in 2018; all 60 VSEs are expected to plant commercial seed fields in 2018. This cohort of VSEs, along with BASICS's cohort of VSEs, will enhance the economies of scale and is expected to develop a healthy competition, thus enhancing the sustainability of commercial seed production. MADE has also expressed an interest in learning about third-party seed certification.

In the project's midyear meeting in September 2017 in Lagos, two cassava sector leaders, Prof. Shola Ajayi and Tony Egba, were invited to share their practical insights with all BASICS members. Mr. Egba gave a good example of stem-handling practices that need to be modified so as to safeguard the seed.

IITA and NASC conducted a series of training programs through the year to build the capacities of seed producers, NASC inspectors, SAH lab staff, and farmers. The demo days and NASC inspections were learning experiences for all the players in the system (Annexes C6 and C7). Various activities under the project were aimed at educating stakeholders in the cassava seed system and building their capacities to effect a behavior change toward a sustainable seed system.

With active support from BASICS Project Advisory Committee member Ms. F. Olaniyan, BASICS conducted a panel discussion at the industry trade event Agra Innovate (https://sundiatapost.com/2017/11/13/40-exhibitors-60-speakers-to-participate-in-lagos-agric-expo-director/) to promote certified seeds in improving the crop productivity in cassava. Cassava processers, processing equipment manufacturers, traders, policymakers, researchers, farmers, academics, and others from Nigeria and abroad participated.

In 2018, activities aimed at enhancing the demand creation in the cassava seed value chain–that is, building aspirations for better outcomes for all the players involved as well as building their respective capacities and productive connections—will be expanded further. BASICS will build a robust communication system so the demand at one level is known by the next higher level of seed producer, thus the production schedules and quantities can be planned well. Activities are planned to stimulate demand for commercial seed at farmer level to achieve an estimated production level. This will be used by the VSEs to plan their varieties and quantity planning. And, based on their plans, the foundation seed producers and, in turn, the breeder seed producers can plan their production.

The BASICS PMU believes that the concerted efforts of all the five components and the traction developed over the first 2 years of the project have laid a good base for consolidation of the developments in supply improvement and demand creation along all parts of the seed value chain (see Fig. 1).

2. Project Adjustments

For each outcome or output that is behind schedule or under target, explain what adjustments you are making to get back on track.

Breeder seed component: (Annex A)
Project vehicle purchase at IITA and NRCRI has been delayed. It is a challenge to get cars released from customs, and many IITA cars that were imported have been stuck at the bonded warehouse for many months now. Consequently, the two cars budgeted for IITA and NRCRI will now be procured locally from within Nigeria. The cost is significantly higher than for imported cars, so some budgetary adjustments will need to be done to meet the need.

Activities at NRCRI were affected due to delays in fund disbursements. The delayed activities will go forward in 2018.

VSE component: (Annex B)
Of the 41 VSE fields planted in 2016 and presented for NASC certification, 5 could not pass the certification process because of poor sanitation due to to unforeseen cash flow challenges faced by the VSEs. This was a good lesson for all involved.

A majority (75%) of the stems coming out of the VSE fields planted in 2016 and harvested in 2017 were used as planting material by VSEs in 2017. The stems that will be harvested from these fields in 2018 are expected to be sold to the farmers as certified seeds. The project will be able to better monitor and understand farmer patronage and prices they are willing to pay, which will help to establish sustainable VSEs.

The project will increase farmer outreach through direct contact and audio-visual marketing campaigns in 2018. This effort will help to lay the groundwork for the VSEs to be able to sell their produce to farmers in the second half of 2018.

To ensure sufficient quantity of certified foundation seed of appropriate varieties in the 2018 and 2019 planting seasons, proactive planning has been done by placing orders with IITA and NRCRI. This will be followed up by both parties.

PLM component: (Annex C)
Challenging economic conditions in Nigeria and internal reorganization at FMN continued in 2017. FMN decided to transition the Shao Farm management to Ere Egwa Farms, which necessitated a lengthy contractual deliberation. A new head of agricultural operations at FMN means the delayed activities are expected to accelerate in 2018.

Getting the irrigation facility established at Shao Farm continues to be a challenge. The plantlets coming out of the SAH lab are being grown in a shaded area at the lab site and are expected to be planted on the farm when irrigation system is ready in Q1 2018.

QSC: (Annex D)
The establishment of a diagnostic lab that was planned for 2017 will now happen in 2018. A suitable location within NASC's premises was identified and suitable modifications to the structure were completed. An order with the supplier of the lab equipment has been placed and delivery is expected in Q1 2018. NASC staff have been suitably trained on good lab operational practices through their exposure visit to Fera in the UK. This activity is expected to go well in 2018.

PMU: (Annex E)

Delays in project components' reporting and financial reporting led to delays in signing contracts. This has been identified as an issue to be addressed. PMU has had a series of consultations, and appropriate strategies have been made to address this issue in order to mitigate such delays in the future.

A project car for PMU's use was imported but has been stuck in the Lagos port since July 2017, due to some issues with customs policy and disputes. The issue is being actively pursued by the IITA team, and the car is expected to be accessible in Q1 2018.

3. Geographic Areas to Be Served

Provide the most updated list of countries and sub-regions/states that have benefitted or will benefit from this work and associated dollar amounts. If areas to be served include the United States, indicate city and state. Reflect both spent and unspent funds. Add more rows as needed. More information about Geographic Areas to Be Served can be found here.

Location	Foundation Funding (U.S.$)
Nigeria: Districts of Oyo, Ogun, Osun, Kwara, Niger, Abuja, Cross River, Akwa Ibom, Imo, Abia, Benue, and Anambra	2,565,087.03 (in 2017)

4. Geographic Location of Work

Provide the most updated list of countries and sub-regions/states where this work has been or will be performed and associated dollar amounts. If location of work includes the United States, indicate city and state. Reflect both spent and unspent funds. Add more rows as needed. More information about Geographic Location of Work can be found here.

Location	Foundation Funding (U.S.$)
Nigeria	2,145,422.24
Lima	362,248.79

5. Feedback for the Foundation

Provide one to three ways the foundation has successfully enabled your work so far. Provide one to three ways the foundation can improve.

Periodic project update calls with the program officer have been very useful. Through these interactions, apart from many other areas, the work on three key areas in the project has significantly benefited—namely the work on a pioneering initiative to strengthen the EGS system in the form of IITA GoSeed Ltd; stem coordination efforts through development of the seed flow map; and the seed comparison trials to demonstrate the value for money of improved seeds when compared with farmer-saved seeds, so that the farmers see value in buying certified improved seeds, which is fundamental to establishment of viable seed businesses.

6. Global Access and Intellectual Property

If your funding agreement is subject to Intellectual Property Reporting, please click the following link to complete an Intellectual Property (IP) Report.

If not, please acknowledge by typing "N/A": _____

To delegate permissions to another member of your project team or for any questions regarding the Intellectual Property Report, please contact GlobalAccess@gatesfoundation.org.

7. Regulated Activities

Do you represent that all Regulated Activities[1] related to your project are in compliance with all applicable safety, regulatory, ethical and legal requirements? Please mark with an "X":

_____ **N/A (no Regulated Activities in project)**

_____ **Yes**

_____ **No (if no, please explain below)**

N/A

Are any new Regulated Activities[1] planned which were not described in any documents previously submitted to the foundation? Please mark with an "X":

_____ **No**

_____ **Yes (if yes, please explain below)**

1 Regulated Activities include but are not limited to: clinical trials; research involving human subjects; provision of diagnostic, prophylactic, medical or health services; experimental medicine; the use of human tissue, animals, radioactive isotopes, pathogenic organisms, genetically modified organisms, recombinant nucleic acids, Select Agents or Toxins (www.selectagents.gov), Dual Use technology (http://export.gov/regulation/eg_main_018229.asp), or any substance, organism, or material that is toxic or hazardous; as well as the approvals, records, data, specimens, and materials related to any of the forgoing.

8. Subgrants

If your grant agreement (not applicable to contracts) is subject to expenditure responsibility and permits you to make subgrants to organizations that are not U.S. public charities or government agencies/instrumentalities, please complete the Subgrantee Checklist and attach a copy with this progress narrative for each such subgrantee.

Financial Update

The purpose of the Financial Update section is to supplement the information provided in the "Financial Summary & Reporting" sheet in the foundation budget template, which reports actual expenditures and projections for the remaining periods of the grant. This section is a tool to help foundation staff fully understand the financial expenditures across the life of the project. Together, the Financial Update section and budget template ("Financial Summary & Reporting" sheet) should provide a complete quantitative and qualitative explanation of variances to approved budget.

Note: If you are using an older version of the budget template, this information could be in a different location in your template.

1. Summary

Briefly describe how total project spending to date compares against the budget and how your assumptions may have changed as the project progressed.

The project recorded a total expenditure of $2,507,671 in the current project period (Y2 execution rate of 66% of the approved budget as per the table below) compared with the Y1 execution rate of 56%.

Organization	Budget Year 2 (US$)	Actual Expenditure (US$)	Balance (US$)	Burn Rate (%)
IITA	979,979	428,671	551,308	44
CRS	939,746	638,647	301,099	68
FERA	261,662	136,092	125,570	52
CONTEXT	664,085	518,717	145,368	78
PMU-RTB	957,152	785,544	171,608	82
Grant Total	**3,802,624**	**2,507,671**	**1,294,953**	**66**

The total carry-over from Y1 and Y2 is $1,294,953. This amount has been spread across 2018 and 2019 budgets for the time being. During the annual review and planning meeting in March 2018, a team discussion is planned to explore the possibility of a no-cost extension (NCE) request for the project. That is why most carry-over funds have been included in Y4, allowing the project to close in year 2020 when the cassava seed production fields planted in 2019 are expected to be harvested.

Most of the field activities planned in 2017 were carried out, except for spill-over to 2018 of the capital items like the lab set up at NASC and the two car purchases at IITA and NRCRI. The favorable exchange rate situation, stabilizing at around 360 Naira to the dollar for most of the year, allowed for all the Naira-designated costs to be under-budget in dollar terms.

Breeder Seed Component (IITA):
The total project spending to date amounted to $797,475 against the Y2 budget of $1,665,986. The total spending to date is equivalent to 48% of the Y2 budget and 24.9% of the total budget for 4 years. This is largely due to three factors: delays in procuring two project vehicles, challenges in allocating funds to NRCRI on account of delays in reporting and contracting leading to lower sub-grant disbursal, and the positive foreign exchange situation leading to savings in some of the Naira-denominated costs. But, most of the planned field activities are largely on track.

Total Budget Y1 & Y2 ($)	Total Expenses Y1 & Y2 ($)	Balance ($)	
1,665,986.00	797,475.00	868,511.00	**48%**

The burn rate for year 2017 is 44%.

Category	Approved Budget ($)	Expenditures Y2 ($)	Balance ($)	Burn Rate (%)
Personnel	130,681.00	76,157.00	54,524.00	58
Travel	33,085.00	16,682.00	16,403.00	50
Equipment	15,000.00	15,408.00	-408.00	103
Other Direct Costs	176,525.00	82,524.00	94,001.00	47
Sub Awards	549,417.00	206,632.00	342,785.00	38
Subtotal	**904,708.00**	**397,403.00**	**507,305.00**	**44**
Indirect Cost	75,271.00	31,268.00	44,003.00	42
Total	**979,979.00**	**428,671.00**	**551,308.00**	**44**

IITA, NRCRI, NASC:
Budgets are underspent across all line items. The pending car purchase is planned in 2018. The sub-award is underspent due to delays in signing the contracts and obtaining the budget liquidation details for IITA to release the subsequent tranche of payment to NRCRI.

VSE component (CRS):
The total project spending to date amounted to $844,844.76 against the Y2 budget of $1,432,034.00. The total spending to date is equivalent to 59% of the Y2 budget and 30% of the total budget for 4 years. This has no negative effect on project implementation because the variance is largely due to the variation in the exchange rate of N361/$1, compared with N180/$1 used for initial budgeting. There is no significant risk affecting CRS's ability to complete the implementation of the project. The savings have been redistributed to the outstanding project activities in remaining years and may be considered for use in a NCE.

Total Budget Y1 & Y2 ($)	Total Expenses Y1 & Y2 ($)	Balance ($)	
1,432,034.00	844,844.76	587,189.24	**59%**

The burn rate for year 2017 is 68%, which has increased significantly with respect to the previous year in 18%, even when the variation in the exchange rate affected the financial execution.

Category	Approved Budget ($)	Expenditures Y2 ($)	Balance ($)	Burn rate
Personnel	247,370.00	201,683.42	45,686.58	82%
Travel	59,970.00	55,871.24	4,098.76	93%
Consultants	11,900.00	8,780.58	3,119.42	74%
Equipment	0.00	0.00	0.00	0%
Other Direct Costs	143,375.00	125,531.98	17,843.02	88%
Sub Awards	359,766.00	163,468.50	196,297.50	45%
Subtotal	**822,381.00**	**555,335.72**	**267,045.28**	**68%**
Indirect Cost	117,365.00	83,310.53	34,054.47	71%
Total	**939,746.00**	**638,646.25**	**301,099.75**	**68%**

PLM component (Context):
The total project spending in PLM to date is $772,546 against the Y2 budget of $923,617. The total spending to date is equivalent to 84% of the Y2 budget and 43% of the total budget for 4 years. During the year, Context made some changes in the project personnel to meet work requirements. Budget adjustment between personnel and consultants was sought while keeping the overall budget as per the original contract.

Total Budget Y1 & Y2 ($)	Total Expenses Y1 & Y2 ($)	Balance ($)	
923,617.00	772,546.00	151,071.00	**84%**

The burn rate for year 2017 is 78%.

Category	Approved Budget ($)	Expenditures Y2 ($)	Balance ($)	Burn Rate (%)
Personnel	126,000.00	73,983.34	52,016.66	59
Travel	59,979.00	49,120.51	10,858.49	82
Consultants	361,560.00	308,853.00	52,707.00	85
Equipment	0.00	0.00	0.00	0
Other Direct Costs	29,926.00	19,101.40	10,824.60	64
Sub Awards	0.00	0.00	0.00	0
Subtotal	**577,465.00**	**451,058.25**	**126,406.75**	**78**
Indirect Cost	86,620.00	67,659.04	18,960.96	78
Total	**664,085.00**	**518,717.29**	**145,367.71**	**78**

QSC (Fera):

Total project spending to date reported by FERA amounted to $281,177.26 against the Y2 budget of $469,537.00. This is equivalent to 60% of the Y2 budget and 41% of the total budget for 4 years.

Total Budget Y1 & Y2 ($)	Total Expenses Y1 & Y2 ($)	Balance ($)	
469,537.00	281,177.26	188,359.74	**60%**

Overall, the project is tracking well on the planned activities. The favorable exchange rate situation also is helping the project to be in a position to plan for a NCE in order to complete the crop cycle of cassava planted in 2019 season. This will be discussed and a strategy evolved during the annual review and planning meeting in March 2018.

In relation to the overspent in personnel category, it is because in the first half of Y2, significant senior staff time was invested in working out the intern-partner work plan and budget allocations to ensure smooth operations.

The burn rate for year 2017 is 52%.

Category	Approved Budget ($)	Expenditures Y2 ($)	Balance ($)	Burn Rate (%)
Personnel	72,859.00	92,638.00	-19,779.00	127
Travel	17,083.00	19,044.01	-1,961.01	111
Consultants	0.00	0.00	0.00	0
Equipment	100,000.00	21,489.25	78,510.75	21
Other Direct Costs	71,720.00	2,921.00	68,799.00	4
Sub Awards	0.00	0.00	0.00	0
Subtotal	**261,662.00**	**136,092.26**	**125,569.74**	**52**
Indirect Cost	0.00	0.00	0.00	0
Total	**261,662.00**	**136,092.26**	**125,569.74**	**52**

PMU:

In Y2, the PMU has executed 91% of its budget, a significant increase over the previous year (51%).

Category	Approved Budget ($)	Expenditures Y2 ($)	Balance ($)	Burn Rate (%)
Personnel	327,745.00	297,930.15	29,814.85	91
Travel	25,650.00	48,993.94	-23,343.94	191
Consultants	30,000.00	28,783.98	1,216.02	96
Equipment	35,000.00	0.00	35,000.00	0
Other Direct Costs	127,978.00	120,023.86	7,954.14	94
Subtotal	**546,373.00**	**495,731.93**	**50,641.07**	**91**

All categories have been executed as planned, except for the category of travel. The PMU travel frequency and duration for monitoring of activities, monitoring of partners, and for planning meetings and trainings have significantly increased in Y2. This is reflected in better implementation of project activities—for example, selection of VSEs at NRCRI, the study of private sector foundation seed network, establishment of foundation seed production field at Renascent Agro inputs to serve the CRS VSEs, and facilitating pioneering SAH plantlet transport from IITA to Benue to observe the ability of the tender plantlets to withstand the road journey (which was successful).

Another considerable variation is the purchase of a vehicle budgeted for Y2. The vehicle was bought this year but the documentation is still in the Foreign Affairs Ministry of Abuja. For registration in our accounting system, we require the complete information with the final cost of the vehicle, which we do not have yet. This is the reason why this purchase has not been registered and thus reported.

The overall carry-over of Y2 will be distributed in Y3 and Y4. The budget proposed is shown in the following table:

Category	Y1 Executed ($)	Y2 Executed ($)	Y3 Forecast ($)	Y4 Forecast ($)	Total ($)
Personnel	138,929.00	297,930.00	279,889.00	417,718.00	1,134,466.00
Travel	8,796.00	48,994.00	0,000.00	42,700.00	140,490.00
Consultant	13,475.00	28,784.00	35,000.00	40,000.00	112,259.00
Equipment	0.00		38,000.00	0.00	43,000.00
Other Direct Costs	18,020.00	120,024.00	121,570.00	186,729.00	446,343.00
Sub Awards	973,915.00	1,722,127.00	2,640,522.00	3,162,134.00	8,498,698.00
Subtotal	**1,153,135.00**	**2,217,859.00**	**3,154,981.00**	**3,849,281.00**	**10,375,256.00**
Indirect Cost	136,090.00	289,812.00	353,738.00	457,097.00	1,236,737.00
Total	**1,289,225.00**	**2,507,671.00**	**3,508,719.00**	**4,306,378.00**	**11,611,993.00**

The main considerations for this proposal are:

- Personnel cost: The carry-over is included in Y4 for a possible NCE of the project.
- Travel line has been increased to meet the project needed for more frequent field visits for close monitoring.
- Consultant: The carry-over has been currently moved to Y4.
- Equipment: The cost of the vehicle was $30,000. We moved this amount to Y3 and added $8,000 more to pay for the demurrage cost due to the delay in the Foreign Affairs Ministry of Abuja.
- Sub-awards: The budget for Y3 is the same as was proposed last year. The carry-over is included in Y4 for a possible NCE.

2. Latest Period Variance

Provide explanation for any cost category variances outside the allowable range. Explain causes, consequences for the project, and mitigation plans if relevant. Report whether or not approval for the variance has been obtained from your Program Officer.

Note: "Latest period variance" compares actuals to previous projections for the period. See "Financial Summary & Reporting" sheet in the foundation budget template for calculated variance. If you are using an older version of the budget template, this information could be in a different location in your template. Allowable variance is defined in your grant agreement.

Across the project, none of the line items have been overspent; in fact, most are underspent. The significant variations are:

Breeder Seed Component:
Budgets are underspent across all line items. The pending car purchase is planned in 2018. The sub-award is underspent due to delays in signing the contracts and obtaining the budget liquidation details for IIAT to release the subsequent tranche of payment to NRCRI.

VSE Component:
The significant devaluation of Naira, from 198 to a Dollar to 300–450 in the last 2 years, has now stabilized at 360 for the last several months. This has helped the component to conduct the planned activities at lower dollar cost. The savings have been reflected in the budget and may be used for a possible NCE. There were no overspends.

QSC:
In the Direct Costs category a major expense item worth $100,000 on account of capital equipment for the molecular lab at NASC was delayed and is expected to materialize in Q1 2018. The leaf sample testing was delayed and happened in December 2017, which will be reported in Y3; hence the $38,000 allocated for this activity shows unspent in period 2. The overspend in personnel category is because in the first half of Y2, their staff have been worked significantly more into work planning than was anticipated.

PMU:
As was explained above, there has been more travel by the project team for monitoring of activities, monitoring of partners, and planning meetings and trainings.

3. Total Grant Variance

Provide explanation for any cost category variances outside the allowable range. Explain causes, consequences for the project, and mitigation plans if relevant. Report whether or not approval for the variance has been obtained from your Program Officer.

Note: "Total grant variance" compares actuals plus current projections to the budget. See "Financial Summary & Reporting" sheet in the foundation budget template for calculated variance. If you are using an older version of the budget template, this information could be in a different location in your template. Allowable variance is defined in your grant agreement.

4. Sub-awards (if applicable)

Use the chart to provide the name(s) of the sub-grantee(s) or subcontractor(s), actual disbursement for this reporting period, total disbursement to date from the primary grantee to sub-awardee, total spend to date by the sub-awardee and total contracted amount.

Note: The total of actual disbursements for this reporting period should equal the actual Sub-awards expenses reported on the "Financial Summary & Reporting" sheet in the foundation template for this reporting period. If you are using an older version of the budget template, this information could be in a different location in your template.

Organization Name	Actual Disbursement for this Reporting Period (U.S.$)	Total Disbursed from Primary Awardee to Sub to Date (U.S.$)	Total Sub-Awardee Spent to Date (U.S.$)	Total Contracted Amount (U.S.$)
CONTEXT	526,704.00	786,236.00	772,546.00	1,799,308.00
FERA	120,341.00	286,407.00	281,177.26	690,000.00
CRS	719,840.00	965,984.00	844,844.76	2,808,030.00
IITA	479,987.00	1,028,792.00	797,475.00	3,201,360.00

5. Other Sources of Support (if applicable)

List and describe any sources of *in-kind* project support or resources received in the reporting period.

Note: Names of the other sources of funding and their contributions (U.S.$) should be included in the budget template on the "Financial Summary & Reporting" sheet in the foundation budget template in the Funding Plan table. If you are using an older version of the budget template, this information could be in a different location in your template.

Describe how interest earned and/or currency gains were used to support the project.

Privacy and Non-Confidentiality Notice

The foundation is required by the IRS to publish a list of its grants. We may also provide a general description of our grants and contracts on our web sites, in press releases, and in other marketing materials. Subject to the foundation's Privacy Policy, the foundation may also share information you provide to us (either orally or in writing) with third parties, including external reviewers, key partners and co-funders. This document is subject to the foundation's Terms of Use.

For Foundation Staff to Complete

Analysis (required if contingent payment or PO assessment differs from grantee/vendor assessment)

Progress Analysis

Include analysis of significant project variances and key learnings that may inform portfolio discussions for progress against the strategic goals.

Budget and Financial Analysis

Include analysis of unexpended funds or over expenditures. Refer to the Unexpended Grant Funds Policy for options available when recommending how to handle unexpended grant funds, or reach out to your primary contact in GCM.

Scheduled Payment Amount	$
Carryover Amount	$
Recommended Payment Amount	$

Approver Comments (if applicable)

Name	Title	Date Approved

Comments